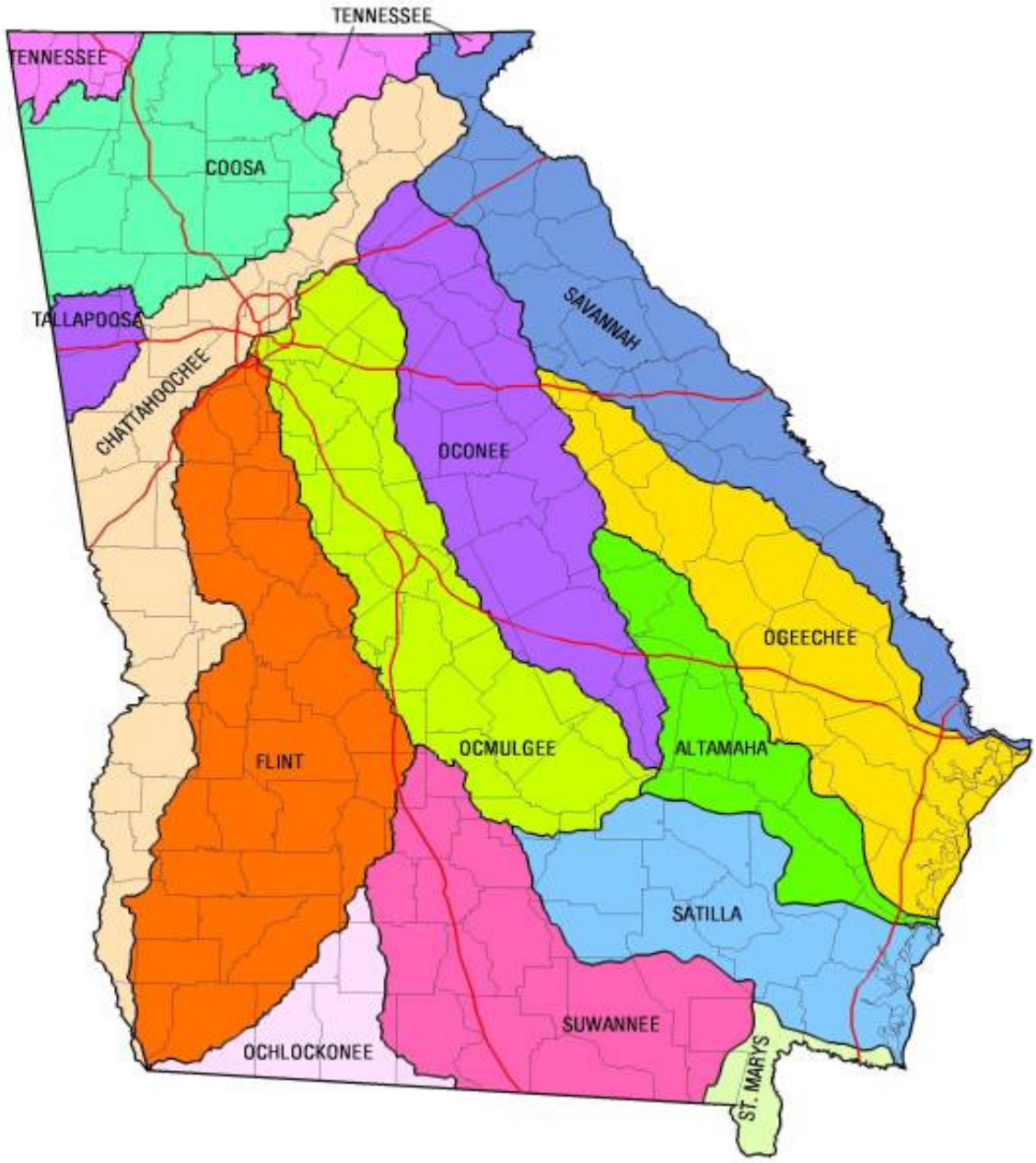
WATER QUALITY IN GEORGIA 2010-2011



Georgia Department of Natural Resources
Environmental Protection Division

Georgia Department of Natural Resources
Environmental Protection Division
205 Butler Street, SE
Floyd Towers East
Atlanta, Georgia 30334

WATER QUALITY IN GEORGIA 2010-2011

Preface

This report was prepared by the Georgia Environmental Protection Division GAEPD, Department of Natural Resources, as required by Section 305(b) of Public Law 92-500 (the Clean Water Act) and as a public information document. It represents a synoptic extraction of the EPD files and, in certain cases, information has been presented in summary form from those files. The reader is therefore advised to use this condensed information with the knowledge that it is a summary document and more detailed information is available in the EPD files.

This report covers a two-year period, January 1, 2010 through December 31, 2011. Comments or questions related to the content of this report are invited and should be addressed to:

Environmental Protection Division
Georgia Department of Natural Resources
Watershed Protection Branch
4220 International Parkway
Suite 101
Atlanta, Georgia 30354

TABLE OF CONTENTS

CHAPTER 4 – WETLAND PROGRAMS

CHAPTER 5 – ESTUARY AND COASTAL PROGRAMS

CHAPTER 6 – PUBLIC HEALTH & AQUATIC LIFE ISSUES

CHAPTER 7 – WATESHED PROTECTION PROGRAMS

CHAPTER 8 – GROUNDWATER AND SURFACE WATER SUPPLIES

CHAPTER 9 – MAJOR ISSUES AND CHALLENGES

LIST OF TABLES

LIST OF FIGURES

APPENDICES

CHAPTER 1
Executive Summary

Purpose

This report, *Water Quality in Georgia, 2010-2011*, was prepared by the Georgia Environmental Protection Division (GAEPD) of the Department of Natural Resources (DNR). The DNR Coastal Resources Division (CRD) and Wildlife Resources Division (WRD), the Georgia Forestry Commission, the Georgia Environmental Finance Authority, and the Georgia Soil and Water Conservation Commission also contributed portions of the report. In addition, water quality data was provided by a number of governmental agencies, environmental groups and universities.

This report is often referred to as the Georgia 305(b) Report as portions of the report are prepared to comply with this section of the Federal Clean Water Act. The report describes water quality conditions of navigable waters across the State. The United States Environmental Protection Agency (USEPA) uses the individual State reports to develop a national water quality inventory report, which is transmitted to the Congress of the United States.

This 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 of water quality problem areas serves as the basis for lists required by Sections 303(d), 314, and 319 of the Clean Water Act. The report also 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.

In addition to complying with the Federal Clean Water Act, the major objective of this report is to provide Georgians a broad summary of information on water quality and the programs being implemented by the GAEPD and its partners to protect water resources across the State.

Watershed Protection In Georgia

The GAEPD is a comprehensive environmental agency responsible for environmental protection, management, regulation, permitting, and enforcement in Georgia. The GAEPD has for many years aggressively sought most available program delegations from the USEPA in order to achieve and maintain a coordinated, integrated approach to environmental management. Today the GAEPD administers programs for planning, water pollution control, water supply and groundwater management, surface water allocation, hazardous waste management, air quality control, solid waste management, strip mining, soil erosion control, geologic survey activities, radiation control, underground storage tanks, and safe dams.

The Watershed Protection Branch of the GAEPD, in cooperation with many local, state, and federal agencies, coordinates programs to address most aspects of drinking water supply and water pollution control including: comprehensive statewide water planning; monitoring; water quality modeling to develop wasteload allocations and total maximum daily loads (TMDLs); TMDL implementation; the continuing planning process; water quality standards; local watershed assessment and watershed protection plans; nonpoint source management; erosion and sedimentation control; stormwater management; Clean Water State Revolving and Georgia Fund Loan programs; the NPDES permit and enforcement program for municipal and industrial point sources; water withdrawal and drinking water permits; water conservation; source water protection; industrial pretreatment; land application of treated wastewater; regulation of concentrated animal feedlot operations (CAFOs); and public outreach including Georgia Project Wet and Adopt-A-Stream programs.

The GAEPD has designated the Georgia Soil and Water Conservation Commission as the lead agency for dealing with water quality problems caused by agriculture. The Georgia

Forestry Commission has been designated by the GAEPD as the lead agency to deal with water quality problems due to commercial forestry operations.

Watershed Protection Programs

Background. 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. This rich water heritage is often taken for granted. However, unusual events such as the flood in the summer of 1994 and drought conditions experienced throughout Georgia in 1986, 1988, 1999-2002, and 2007-2008 serve as reminders that water resources cannot be taken for granted and sound regulatory programs are necessary to protect these resources.

In 2010-2011, the GAEPD placed emphasis on comprehensive statewide water management planning, monitoring and assessment, water quality modeling and TMDLs, TMDL implementation, State revolving and Georgia Fund loan programs, NPDES permitting and enforcement, nonpoint source pollution abatement, stormwater management, erosion and sediment control and public participation projects.

Comprehensive State-wide Water Management Planning. In 2004 the Georgia General Assembly passed new water planning legislation to take the place of river basin planning. The 2004 Comprehensive State-wide Water Management Planning Act calls for the preparation of a comprehensive statewide water plan and provides fundamental goals and guiding principles for the development of the plan. The Statewide Water Plan was completed in 2008 and the Regional Water Councils completed plans in 2011. This work is discussed in Chapter 2.

Watershed Projects. The GAEPD is working with USEPA and South Carolina on several Savannah River projects; with the USEPA and the Alabama Department of Environmental Management (ADEM) on water quality issues in the Coosa River and Lake Weiss; and with the Florida Department of Environmental Protection and the Suwannee River Water Management District to coordinate water protection efforts in the Suwannee River Basin. Georgia is also working with Alabama and Florida, in cooperation with the Corps of Engineers, to develop agreements regarding the use of waters in the ACF and ACT River systems. This work is discussed in Chapter 7.

Monitoring and Assessment. Georgia's waters are currently designated as one of the following water use classifications: drinking water, recreation, fishing, coastal fishing, wild river, or scenic river. Specific water quality standards are assigned to support each water use classification. The quality of Georgia's waters is judged by the extent to which the waters support the uses (comply with standards set for the water use classification or designations) for which they have been designated. Water quality standards, monitoring programs, and information on assessments of Georgia's waters are discussed in Chapter 3. GAEPD's wetland monitoring program is discussed in Chapter 4 and estuary and coastal programs are discussed in Chapter 5.

Water Quality Modeling/Wasteload Allocation/TMDL Development. 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.

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. TMDL implementation is discussed in Chapter 7.

Clean Water Revolving and Georgia Fund Loan Programs. In 2010-2011 more than 334 million dollars were obligated to communities for a variety of wastewater infrastructure and pollution prevention projects through the Georgia Environmental Finance Authority (GEFA) in the form of low-interest, SRF and Georgia Fund loans. The loan programs are discussed in Chapter 7.

Metro District Planning. The Metropolitan North Georgia Water Planning District (District) was created on April 5, 2001 as a planning entity dedicated to developing comprehensive regional and watershed-specific plans to be implemented by local governments in the District. The enabling legislation required the District to develop plans for watershed management, wastewater treatment, and water supply and conservation in its 15-county area that includes Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Fulton, Forsyth, Gwinnett, Hall, Henry, Paulding, and Rockdale Counties and all the municipalities within the District. These plans are designed to protect water quality and public water supplies, protect recreational values of the waters, and to minimize potential adverse impacts of development on waters in and downstream of the region. These plans were updated in May, 2009.

Limited water resources combined with the region's growth places the District in a unique position relative to other areas in Georgia. With a finite water resource and a population of nearly 4 million and growing, the need to carefully and cooperatively manage and protect Metropolitan Atlanta's rivers and streams is a priority.

The EPD is charged with the enforcement of the District plans. State law prohibits the Director from approving any application by a local government in the District to issue, modify, or renew a permit, if such permit would allow an increase in the permitted water withdrawal, public water system capacity, or waste-water treatment system capacity of such local government, or any NPDES Phase I or Phase II General Stormwater permit; unless such local government is in compliance with the applicable provisions of the plan, or the Director certifies that such local government is making good faith efforts to come into compliance. This work is discussed in Chapter 7.

NPDES Permitting and Enforcement. Significant resources were allocated to wastewater discharge permit reissuance activities in 2010-2011. NPDES permits were modified or reissued to 164 municipal/private dischargers and to 115 industrial dischargers.

Compliance and enforcement activities continued to receive significant attention in 2010-2011. By the end of 2011, of 164 major municipal discharges, 159 facilities were in general compliance with limitations. The remaining facilities are under compliance schedules to resolve the noncompliance or implementing infiltration/ inflow strategies. Enforcement action has been taken by the GAEPD to insure problems are alleviated. Of 39 major industrial discharges, all facilities were achieving permit compliance at the end of 2011.

The GAEPD utilizes all reasonable means to attain compliance, including technical assistance, noncompliance notification letters, conferences, consent orders, and civil penalities. Emphasis is placed on achieving compliance through cooperative action. However, compliance cannot always be achieved in a cooperative manner. The Director of the GAEPD has the authority to negotiate consent orders or issue administrative orders. In 2010-2011, 357 Orders were issued and a total of $2,192,634 in negotiated settlements was collected. This includes enforcement actions for all aspects of the water protection program including violations of the Georgia Water Quality Control Act, the Federal Clean Water Act and NPDES permits, with the exclusion of stormwater violations. In 2010-2011 a total of 168 stormwater Orders were issued and a total of

$954,616 in negotiated settlements was collected. Permitting, compliance and enforcement work is discussed in Chapter 7.

Concentrated Animal Feeding Operations. Georgia adopted rules for swine feeding operations in 1999. Rules were adopted for animal (non-swine) feeding operations in 2001. During 2002 and 2003, rules were developed and implemented for large chicken feeding operations. Revisions of those rules, designed to reflect changes in the federal regulations and recent court decisions, are planned for 2012. Work was continued in 2010-2011 to implement this program. This process is discussed in Chapter 7.

Zero Tolerance. In response to a resolution adopted in 1998 by Georgia Department of Natural Resources that directed EPD to provide the "best quality of effort possible enforcing Georgia's environmental laws", a "zero tolerance" strategy was adopted for certain high growth areas of the state requiring enforcement action on any and all noncompliance issues. Significant work was conducted in 2010-2011 to implement this strategy. This process is discussed in Chapter 7.

Nonpoint Source Management Program. Nonpoint source management programs have allowed the GAEPD to place increasing emphasis on the prevention, control and abatement of nonpoint sources of pollution. The GAEPD is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and ground water and has been designated as the lead agency for implementing the State's Nonpoint Source Management Program. This 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, non-governmental organizations and individual citizens.

Georgia's nonpoint source goals and implementation strategies are delineated in the State's Nonpoint Source Management Program. The Program is an inventory of the full breadth of current nonpoint source management activities (regulatory and non-regulatory) in Georgia.

The State's Nonpoint Source Management Program focuses on the comprehensive categories of nonpoint sources of pollution identified by the USEPA: Agriculture, Silviculture, Construction, Urban Runoff, Hydrologic/Habitat Modification, Land Disposal, Resource Extraction and Other Nonpoint Sources.

Under Section 319(h) of the Federal Clean Water Act, the USEPA awards a Nonpoint Source Implementation Grant to the GAEPD to fund eligible projects, which support the implementation of the State's Nonpoint Source Management Program. Section 319(h) Grant funds for the prevention, control and/or abatement of nonpoint sources of pollution of are made available annually to public agencies in Georgia. In FY10 – FY11, Georgia's Section 319(h) grant project funded 50 new projects for over $9 million. The nonpoint source programs are described in Chapter 7.

Stormwater Management. The GAEPD developed its Storm Water Permitting Strategy in February 1991, and revised it in February 1997. Georgia's Phase II Storm Water Permitting Strategy was approved by USEPA in May 2000, and Phase II designation criteria was developed by GAEPD in July 2002. In 1994-1995 a total of 58 NPDES permits were issued to large and medium municipal separate storm sewer systems (MS4s). The 45 NPDES permits covering the Atlanta metro area were reissued in 1999, 2004, and 2009. The 13 NPDES permits for medium MS4s were reissued in 2000, 2005, and 2010. In December 2007, GAEPD reissued the NPDES General Permit for Phase II MS4s, and this permit currently regulates 87 cities and counties. In 2009, a General NPDES Permit was issued to seven Department of Defense (DOD) facilities. Two of the bases closed in 2011, reducing the number of permitted DOD facilities to five. In 2011, GAEPD issued a Phase II MS4 General Stormwater Permit to the Georgia Department of Transportation, which is applicable to post-construction runoff in jurisdictions with MS4 permits.

In 1993, a general NPDES permit for storm water associated with industrial activity was issued. This permit was most recently reissued in 2006, with approximately 2900 facilities

retaining coverage. In addition, 600 industrial activity facilities have submitted an Industrial No Exposure Exclusion Certification Form.

Erosion and Sediment Control. The Georgia Erosion and Sedimentation Act was signed into law in 1975, and has been amended several times. The legislative intent of the Act was to establish a comprehensive and statewide soil, erosion and sedimentation control program to protect and conserve air, land and water resources through the adoption and implementation of local ordinances and programs which regulate certain land disturbing activities generally associated with urban development. EPD implements the program where there is no local ordinance.

The Act requires an erosion and sedimentation control plan and a land disturbing activity permit for sites 1 acre and greater. Erosion, Sedimentation & Pollution Control Plans must be reviewed and approved by the Soil and Water Conservation District or by the local issuing authority before the land disturbing activity permit can be issued. Buffers of 25 feet for warm water streams and 50 feet for trout streams are required by the Act for the protection of water quality. The Act provides for a variance from these buffers under certain circumstances. Variances can only be issued by EPD. Procedures and criteria for obtaining a stream buffer variance are outlined in DNR's Erosion and Sedimentation Control Rules and Regulations and become part of the Land Disturbing Activity Permit. The Act provides for monetary penalties of up to $2,500 per day, enforced by EPD or by the local issuing authority.

After several years of legal challenges, the NPDES General Permit for storm water from construction activities was successfully issued on June 12, 2000 and became effective on August 1, 2000. The permit was reissued on August 13, 2003 as three distinct permits; Stand alone, Infrastructure and Common Development, and required coverage for projects disturbing one acre or more. The permits were most recently reissued by GAEPD on August 1, 2008. The 2008 permits added additional requirements for projects that discharge to impaired stream segments and for projects that disturb 50 acres of more at one time. The three general permits expire on July 31, 2013.

The Act was amended by House Bill 285 in 2003 to create an integrated permitting program for erosion and sedimentation control for land disturbing activities of one acre or greater, thereby standardizing the requirements for local Land Disturbing Activity Permits and the NPDES Construction Storm Water Permits. HB 285 also established a new, mandatory training and certification program for all individuals involved with erosion and sediment control. This program, continues to be administered by the Georgia Soil and Water Conservation Commission. Since 2005, 68,660 individuals have been certified and 25,505 have been recertified. The third major component of HB 285 was to authorize the first NPDES permit fee program in Georgia. The bill authorized a fee of up to $80 per disturbed acre, with half of that amount to go to the local issuing authority. The Act was amended by Senate Bill 460 in 2004 to add three new criteria under which the EPD director can consider stream buffer variances. The Georgia Board of Natural Resources adopted amendments to the Erosion and Sedimentation Control Rules to implement the new criteria effective January 10, 2005. The Act was again amended in 2007 to give subcontrators an additional year to become certified under the mandatory training and certification program. The E&S Rules were amended in 2011 to add a new stream buffer variance criteria for projects that pipe or reroute waterways that are not jurisdictional waters of the U.S., and for new infrastructure projects that impact only the buffer and not the stream. Storm water management and erosion and sediment control are discussed in Chapter 7.

Major Issues and Challenges

Water Planning. Georgia is one of the fastest growing states in the nation. Between 2000 and 2010, Georgia gained 1.5 million new residents, ranking 4th nationally. The increasing population places considerable demands on Georgia's ground and surface water resources in terms of water supply, water quality, and assimilative capacity.

In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act", O.C.G.A. § 12-5-522, which called for the development of a statewide water management plan. Work was completed on the Statewide Water Plan and the plan was approved by the General Assembly and Governor Perdue in February 2008. In the three years since the adoption of the State Water Plan, more than 30.000 volunteer hours have been contributed and the State has invested $30 million in technical work and activities to support regional water planning. The Councils submitted initial recommended plans to the GAEPD in May 2011. The plans were publicly noticed and comments received were thoroughly reviewed. Appropriate revisions were made to the initial plans and final recommended regional water plans were submitted to the GAEPD in September 2011. On November 15, 2011, by action of Director Barnes, the GAEPD officially adopted all ten Regional Water Plans.

The regional water plans are not themselves an end. The plans present solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities. The plans are based on consistent, statewide forecasts of needs and reflect the best available information on the capacities of Georgia's waters. The tools used to assess the capacities have been tested and refined, and will be further refined as the information for planning and management is improved. The process and results of regional planning, taken together, provide solid footing for plan implementation and the five-year review and revision required by the State Water Plan. It is now time to put the regional water plans into action, building on the progress made through collaboration within and among the Water Planning Councils and the Metro Water District. Water users, water providers, local governments, state agencies, and elected leaders all have an important role in actions to ensure that Georgia's waters are sustainably managed to support the state's economy, protect public health and natural systems, and enhance the quality of life for all citizens.

Nonpoint Source Pollution. The pollution impact on Georgia streams has radically shifted over the last several decades. Streams are no longer dominated by untreated or partially treated sewage discharges which resulted in little or no oxygen and little or no aquatic life. The sewage is now treated, oxygen levels have returned and fish have followed. However, another source of pollution is now affecting Georgia streams. That source is referred to as nonpoint and consists of mud, litter, bacteria, pesticides, fertilizers, metals, oils, detergents and a variety of other pollutants being washed into rivers and lakes by stormwater. Even stormwater runoff itself, if rate and volume is unmitigated, can be extremely detrimental to aquatic habitat and hydrologic systems. Nonpoint source pollution, although somewhat less dramatic than raw sewage, must be reduced and controlled to fully protect Georgia's streams. Structural and nonstructural techniques such as green infrastructure, pollution prevention and best management practices must be significantly expanded to minimize nonpoint source pollution. These include both watershed protection through planning, zoning, buffer zones, and appropriate building densities as well as increased use of stormwater structural practices, low impact development, street cleaning and perhaps eventual limitations on pesticide and fertilizer usage.

Toxic Substances. Another issue of importance, the reduction of toxic substances in rivers, lakes, sediment and fish tissue. This is extremely important in protecting both human health and aquatic life. The sources are widespread. The most effective method to reduce releases of toxic substances into rivers is pollution prevention, which consists primarily of eliminating or reducing the use of toxic materials or at least reducing the exposure of toxic materials to drinking water, wastewater and stormwater. It is very expensive and difficult to reduce low concentrations of toxic substances in wastewaters by treatment technologies. It is virtually impossible to treat large quantities of stormwater and reduce toxic substances. Therefore, toxic substances must be controlled at the source.

Nutrients. Nutrients serve a very important role in our environment. They provide the essential building blocks necessary for growth and development of healthy aquatic ecosystems. However, if not properly managed, nutrients in excessive amounts can have detrimental effects on human health and

the environment, creating such water quality problems as excessive growth of macrophytes and phytoplankton, harmful algal blooms, dissolved oxygen depletion, and an imbalance of flora and fauna. In Georgia, site specific nutrient criteria have been adopted for several major lakes and their tributaries. Some of these lakes are currently listed for chlorophyll *a*, which is the primary biological indicator in lakes for nutrient overenrichment. TMDLs, based on watershed modeling, have been completed or are in development to address the nutrient issues for these lakes. Currently, the GAEPD is in the process of collecting the necessary data and information for use in developing nutrient standards for rivers, streams and other waterbodies in Georgia. Determining the relationship of nutrient levels and biological response is necessary in order to develop appropriate nutrient criteria.

Public Involvement. It is clear that local governments and industries, even with well-funded efforts, cannot fully address the challenges of toxic substances and nonpoint source pollution control. Citizens must individually and collectively be part of the solution to these challenges. The main focus is to achieve full public acceptance of the fact that what we do on the land has a direct impact on water quality. Adding more pavement and other impervious surfaces, littering, driving cars which drip oils and antifreeze, applying fertilizers and other activities and behaviors all contribute to toxic and nonpoint source pollution. If streams and lakes are to be pollutant free, then some of the everyday human practices must be modified. The GAEPD will be emphasizing public involvement; not only in decision-making but also in direct programs of stream improvement. The first steps are education and adopt-a-stream programs.

CHAPTER 2

Comprehensive State-wide Water Management Planning

Legislation

Georgia's future relies on the protection and sustainable management of the state's water resources. In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act", O.C.G.A. § 12-5-522, which called for the development of a statewide water management plan. The legislation assigned the responsibility for developing the draft plan to the Georgia Environmental Protection (GAEPD) and established a planning oversight committee, the Georgia Water Council, composed of legislators, legislative appointees, and state agency heads with water related responsibilities. The legislation called for the GAEPD to submit an initial draft plan to the Water Council for review no later than July 1, 2007 and for the Water Council to provide input and modify the draft plan as necessary and approve and recommend a final draft plan no later than the first day of the regular session of the 2008 General Assembly.

State Water Plan Development

The process used to develop the draft statewide water plan provided for meaningful stakeholder participation. A Statewide Advisory Committee (SAC) was convened to provide statewide perspectives on water policy options. Technical Advisory Committees (TACs) provided early input, when needed by answering specific technical questions needed to inform water policy options. Seven Basin Advisory Committees (BACs) were appointed to provide a regional perspective on proposed policy options and management practices.

The initial draft of the statewide water plan, "Georgia's Water Resources: A Blueprint for The Future" was submitted to the Water Council by the EPD on June 28, 2007. The Water Council approved the release of the initial draft and established a portal for public input at its website. The Council discussed and approved a number of revisions to the initial draft plan and a second draft of the plan was prepared and noticed for public input on September 13, 2007.

The Water Council hosted thirteen public meetings across Georgia in November 2007 and received significant public comment on the draft plan. The input was thoroughly reviewed and each change approved by the Council was made in the draft plan. A third draft of the plan was completed and noticed for public comment on December 5, 2007. The Water Council hosted six public meetings to discuss the revised water plan. Public input was reviewed and changes approved by the Water Council were made and a final draft of the plan was approved by the Water Council. This proposed plan, "Georgia Comprehensive State-wide Water Management Plan", was transmitted to the Georgia General Assembly for consideration on January 14, the first day of the 2008 regular session.

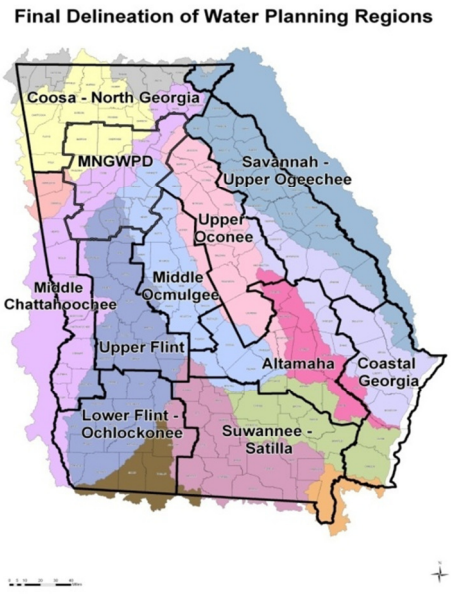
The Georgia General Assembly debated the provisions of the draft water plan and both chambers approved the plan. Governor Perdue signed HR1022, the Statewide Water Plan, on February 6, 2008. A copy of the plan is available at www.georgiawaterplanning.org.

State Water Plan Implementation

Introduction. The State Water Plan ushered in a new era of comprehensive regional water planning for Georgia. Isolated regional water planning efforts aimed at addressing localized water challenges had been attempted in several regions in Georgia since the early 1970s, but not until

the 2004 directive from the Governor and Legislature had Georgia embarked upon statewide comprehensive regional water planning. The State Plan included several innovative concepts. One concept was the idea of appointing regional water planning councils whose responsibility would be to develop regional water plans. A second concept was the development of regional forecasts of water supply and assimilative capacity demands based on forecasts of population and employment for a region. A third concept was the development of water resource assessments to provide information to each Council on available water supply and assimilative capacity.

Regional Water Planning Councils. The regional water planning councils (Councils) represent regions in Georgia as designated in the State Water Plan and adjusted by approved petition. Each Council consists of individuals appointed by the Governor, Lt. Governor, and Speaker of the House. The Metropolitan North Georgia Regional Water Planning District, a separate water planning entity created by the legislature in 2001 will participate in the planning process consistent with the State Water Plan and its enabling legislation. A map of the water planning regions is shown below.



The role of the Councils is to prepare recommended Water Development and Conservation Plans (Regional Water Plans). These long-term regional water resource management plans will include resource assessments, estimates of current and future water needs, and those management practices necessary to meet the region's needs within the capabilities of the resources. More detailed information on each individual regional water planning council can be found at www.georgiawaterplanning.org.

Forecasts of Water and Wastewater Demands. In order for the Councils to produce regional water plans, forecasts of regional water and wastewater needs were required. Long-range population and employment projections were necessary inputs in order to forecast demand for regional municipal and industrial water and wastewater. Population and employment projections were provided to the regional water councils by the Governor's Office of Planning and Budget (OPB). Local governments and Councils were provided an opportunity to comment on the forecasts and the methodologies, assumptions, and data sources used to produce the projections. This input was considered prior to the use of the projections in the planning process. The information was then used in the preparation of water and wastewater demand forecasts for the following water use sectors: Municipal, Industrial, Agricultural, and Energy. The Councils received draft forecasts developed in10 year increments through 2050 for consideration and use in management practice selection. More detailed information on the population and employment projections and on the water and wastewater demand forecasts can be found at www.georgiawaterplanning.org.

Water Resource Assessments. Water resource assessments are also one of the foundational building blocks for regional water planning. The assessments included the compilation and analysis of data and modeling to evaluate the capacity of water resources to meet current and future demands for water supply and wastewater discharge without unreasonable impacts.

The Georgia Environmental Protection Division, with the assistance of other state agencies, the University System of Georgia and other research institutions, the U.S. Geological Survey and contractors conducted water resource assessments to determine Surface Water Availability, Groundwater Availability, and Surface Water Quality (Assimilative Capacity).

In January and February 2010, assessments using current conditions for water use and wastewater discharge were provided to the regional water planning councils as a starting point for the development of recommended Regional Water Plans. More detailed information on the water resource assessments can be found at www.georgiawaterplanning.org.

Regional Water Planning Highlights 2009-2011

The following paragraphs are excerpted from the December 2011 report, "Georgia's Water Future in Focus: Highlights of Regional Water Planning 2009-2011" compiled by the GAEPD; full text available at www.georgiawaterplanning.org.

Introduction. In the three years since the adoption of the State Water Plan, more than 30.000 volunteer hours have been contributed and the State has invested $30 million in technical work and activities to support regional water planning. The Councils and the District have developed regional water plans that together provide a roadmap for sustainable use of Georgia's water resources. The Councils submitted initial recommended plans to the EPD in May 2011. The plans were publicly noticed and comments received were thoroughly reviewed. Appropriate revisions were made to the initial plans and final recommended regional water plans were submitted to the GAEPD in September 2011. On November 15, 2011, by action of Director Barnes, the GAEPD officially adopted all ten Regional Water Plans.

Local governments, utilities, industries, and other water users in each region will implement the plans, and plan contents will help guide state agency decisions on water permits and loans for water-related projects. The following paragraphs provide highlights from the eleven regional water plans. The full plans contain more in-depth information and can be reviewed at www.georgiawaterplanning.org.

Improving Information and Understanding Issues. Homes, schools, businesses, and farms all require water, and the wastewater generated by some water uses has to be safely discharged. Understanding the demands on our water resources is a critical first step in managing Georgia's waters for the future. Forecasts of water and wastewater demand were prepared to support regional water planning, providing this information on a consistent. Statewide basis for the first time. Understanding the capacities of water resources to meet the demands placed on them is also critical to managing water for the future. Over the past three years, the GAEPD led the development of groundwater sustainability models for the most-heavily used aquifers in the state, surface water availability models for the State's major river basins, and water quality models for many streams and most of the large lakes in the state.

Building on prior investments in monitoring and assessment of Georgia's waters, this technical work filled critical information gaps. Results were tested against the knowledge of the Council members who live and work in each region, providing feedback used to refine the tools. The Councils and other participants also identified additional improvements to enhance the models for future use.

Results of these assessments show that, in most regions, additional groundwater is available to meet current and future groundwater needs. Two areas do face limitations on the availability of groundwater, the first is Southwest Georgia, where demand for groundwater exceeds the amount that can be sustainably withdrawn from the region's principal aquifer. The second area lies along the coast, where

groundwater availability is limited by movement of saltwater into the principal aquifer. In these areas, additional demand for water will have to be met from surface water or from other aquifers.

For surface waters, results indicate that much of the state has sufficient water to meet future demands. In river basins with large reservoirs, existing surface water storage would help meet future needs if agreements allowing that use can be made with reservoir owners (U.S. Army Corps of Engineers and power companies).

In some other river basins, however, there may not be enough water during dry periods to meet demands for water and have stream flows above minimum thresholds. These results provide a warning that water consumption may impact uses that rely on water within the banks of streams, rivers, and lakes, such as boating and recreation. Actions to increase water conservation and water supply will be particularly important in these areas.

Most of the surface waters studied will be able to handle additional discharges of treated wastewater. Some discharges, however, may have to provide higher levels of wastewater treatment in order to protect water quality.

In all water planning regions, assessments identified water bodies that currently have poor water quality, often due to the pollutants carried by stormwater. Results also identify areas where pollutants carried in stormwater runoff may cause water quality problems in the future. Actions are needed to protect or restore water quality in these streams, rivers, lakes, and estuaries.

Meeting Georgia's Water Resource Challenges. The regional water plans highlight issues specific to individual regions. Examples include operation of federal reservoirs, protection of recreational uses on lakes, wastewater discharges in waters shared with neighboring states, and water quality issues associated with low levels of dissolved oxygen. Where applicable, the plans recognize the complementary activities that are underway to address these issues.

The regional water plans identify a range of actions or management practices to help meet the state's water challenges. In regions facing challenges with availability of surface water and groundwater, the plans recommend actions such as increasing water conservation and efficiency of use, master planning for local water systems, expanding or optimizing use of existing reservoirs, construction of new reservoirs where need and feasible, and shifting to alternate sources of water.

To address water quality challenges, some or all of the plans call for higher levels of wastewater treatment, master planning for local wastewater systems, improved floodplain management, and stream buffer protection, among other actions. The plans also identify strategies to address water quality problems that result from stormwater carrying pollutants into water bodies, including a funded nonpoint source management project in each region.

Implementing these plans is critical to meeting Georgia's water resource challenges. Local governments and others who develop water infrastructure and apply for permits, grants, and loans have a central role in plan implementation. State government also has an important role in supporting implementation, and, as emphasized in the plans, the success of implementation will rest, in large part, upon funding at state and local levels.

Continuing to improve data and information will also be important in meeting our water resource challenges. Over the past few years, the State made substantial investments in modeling tools and monitoring networks. However, information gaps and uncertainties still affected the Councils' ability to plan. The regional water plans all include specific actions necessary to improve the tools and information used in water planning and management.

An on-going regional voice in water planning will be another key to meeting Georgia's

water resource challenges. Given the progress and needs identified to date, all plans recommend State actions to support on-going activity by the Water Planning Councils.

Finally, the regional water plans recognize the activities underway to promote water conservation, improve operations of federal reservoirs, address water quality in waters shared with other states, resolve interstate disputes over water supply, and meet a number of other region-specific challenges. The strategies in the plans reflect these complimentary activities and will be implemented in concert with them.

In summary, the regional water plans are not themselves an end. The plans represent solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities. They are based on consistent, statewide forecasts of needs and reflect the best available information on the capacities of Georgia's waters. The tools used to assess the capacities have been tested and refined, and will be further refined as the information for planning and management continues to improve. The process and results of regional planning, taken together, provide solid footing for plan implementation and the five-year review and revision required by the State Water Plan.

The investment in these assets will continue to pay off over time, advancing management of Georgia's water to support the state's economy, protect public health and natural systems, and enhance the quality of life for all citizens.

.

CHAPTER 3

Water Quality Monitoring And Assessment

Background

Water Resources Atlas 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. This information is summarized in Table 3-1.

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.

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. Table 3-2 provides a summary of water use classifications and criteria for each use. 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).

TABLE 3-1. WATER RESOURCES ATLAS

State Population (2006 Estimate)	9,383,941
State Surface Area	57,906 sq.mi.
Number of Major River Basins	14
Number of Perennial River Miles	44,056 miles
Number of Intermittent River Miles	23,906 miles
Number of Ditches and Canals	603 miles
Total River Miles	70,150 miles
Number of Lakes Over 500 Acres	48
Acres of Lakes Over 500 Acres	265,365 acres
Number of Lakes Under 500 Acres	11,765
Acres of Lakes Under 500 Acres	160,017 acres
Total Number of Lakes & Reservoirs, Ponds	11,813
Total Acreage of Lakes, Reservoirs, Ponds	425,382 acres
Square Miles of Estuaries	854 sq.mi.
Miles of Coastline	100
Acres of Freshwater Wetlands	4,500,000 acres
Acres of Tidal Wetlands	384,000 acres

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

TABLE 3-2. WATER USE CLASSIFICATIONS AND INSTREAM WATER QUALITY STANDARDS FOR EACH USE

	Bacteria (fecal coliform)		Dissolved Oxygen (other than trout streams)[1]		pH	Temperature (other than trout streams)[1]	
Use Classification	**30-Day Geometric Mean[2] (no./100 mL)**	**Maximum (no./100mL)**	**Daily Average (mg/L)**	**Minimum (mg/L)**	**Std. Units**	**Maximum Rise (°F)**	**Maximum (°F)**
Drinking Water requiring treatment	1,000 (Nov-April) 200 (May-Oct)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Recreation	200 (Freshwater) 100 (Coastal)	--	5.0	4.0	6.0-8.5	5	90
Coastal Fishing[3]							
Fishing	1,000 (Nov-April) 200 (May-Oct)	4,000 (Nov-April)	5.0	4.0	6.0-8.5	5	90
Wild River		No alteration of natural water quality					
Scenic River		No alteration of natural water quality					

[1]Standards for Trout Streams for dissolved oxygen are a daily average of 6.0 mg/L and a minimum of 5.0 mg/L. No temperature alteration is allowed in Primary Trout Streams and a temperature change of 2°F is allowed in Secondary Trout Streams.
[2]Geometric means should be "based on at least four samples collected from a given sampling site over a 30-day period at Intervals not less than 24 hours." The geometric mean of a series of N terms is the Nth root of their product. Example: the geometric mean of 2 and 18 is the square root of 36.
[3]Standards are same as fishing with the exception of dissolved oxygen, which is site specific.

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

Goals 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.

Long-Term Ambient and Lake Tributary Monitoring

Long term monitoring of streams at strategic locations throughout Georgia, trend or ambient monitoring, was initiated by the GAEPD during the late 1960s. This work is conducted by EPD associates and through cooperative agreements with federal, state, and local agencies that collect samples from groups of stations at specific, fixed locations throughout the year.

The cooperating agencies conduct certain tests in the field and ship stream samples to the GAEPD or UGA laboratories for additional laboratory analyses. Although there have been a number of changes over the years, much of the trend monitoring is still accomplished through similar cooperative agreements.

Today the GAEPD contracts with the United States Geological Survey (USGS) for the statewide trend sampling work, and with the Columbus Water Works for sample collection on the Chattahoochee River below Columbus.

TABLE 3-3. GEORGIA INSTREAM WATER QUALITY STANDARDS FOR ALL WATERS: TOXIC SUBSTANCES

(Excerpt from Georgia's Rules and Regulations for Water Quality Control Chapter 391-3-6-.03 - Water Use Classifications and Water Quality Standards)

(i) Instream concentrations of the following chemical constituents which are considered to be other toxic pollutants of concern in the State of Georgia shall not exceed the criteria indicated below under 7-day, 10-year minimum flow (7Q10) or higher stream flow conditions except within established mixing zones:

1. 2,4-Dichlorophenoxyacetic acid (2,4-D)	70 µg/L
2. Methoxychlor	0.03 µg/L*
3. 2,4,5-Trichlorophenoxy propionic acid (TP Silvex)	50 µg/L

(ii) Instream concentrations of the following chemical constituents listed by the U.S. Environmental Protection Agency as toxic priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended) shall not exceed the acute criteria indicated below under 1-day, 10-year minimum flow (1Q10) or higher stream flow conditions and shall not exceed the chronic criteria indicated below under 7-day, 10-year minimum flow (7Q10) or higher stream flow conditions except within established mixing zones or in accordance with site specific effluent limitations developed in accordance with procedures presented in 391-3-6-.06. Unless otherwise specified, the criteria below are listed in their total recoverable form. Because most of the numeric criteria for the metals below are listed as the dissolved form, total recoverable concentrations of metals that are measured instream will need to be translated to the dissolved form in order to compare the instream data with the numeric criteria. This translation will be performed using guidance found in "Guidance Document of Dynamic Modeling and Translators August 1993" found in Appendix J of EPA's Water Quality Standards Handbook: Second Edition, EPA-823-B-94-005a or by using other appropriate guidance from EPA.

		Acute	Chronic
1.	Arsenic		
	(a) Freshwater	340 µg/L [1]	150 µg/L [1]
	(b) Coastal and Marine Estuarine Waters	69 µg/L [1]	36 µg/L [1]
2.	Cadmium		
	(a) Freshwater	1.0 µg/L [1, 3]	0.15 µg/L [1, 3]
	(b) Coastal and Marine Estuarine Waters	40 µg/L [1]	8.8 µg/L [1]
3.	Chromium III		
	(a) Freshwater	320 µg/L [1,3]	42 µg/L [1,3]
	(b) Coastal and Marine Estuarine Waters	--	--
4.	Chromium VI		
	(a) Freshwater	16 µg/L [1]	11 µg/L [1]
	(b) Coastal and Marine Estuarine Waters	1,100 µg/L [1]	50 µg/L [1]
5.	Copper		
	(a) Freshwater	7.0 µg/L [1,2*,3]	5.0 µg/L [1,2*,3]
	(b) Coastal and Marine Estuarine Waters	4.8 µg/L [1,2]	3.1 µg/L [1,2]
6.	Lead		
	(a) Freshwater	30 µg/L [1,3]	1.2 µg/L [1,2*,3]
	(b) Coastal and Marine Estuarine Waters	210 µg/L [1]	8.1 µg/L [1]
7.	Mercury		
	(a) Freshwater	1.4 µg/L	0.012 µg/L [2]
	(b) Coastal and Marine Estuarine Waters	1.8 µg/L	0.025 µg/L [2]
8.	Nickel		
	(a) Freshwater	260 µg/L [1,3]	29 µg/L [1,3]
	(b) Coastal and Marine Estuarine Waters	74 µg/L [1]	8.2 µg/L [1]
9.	Selenium		
	(a) Freshwater	--	5.0 µg/L
	(b) Coastal and Marine Estuarine Waters	290 µg/L [1]	71 µg/L [1]
10.	Silver	-- [4]	-- [4]
11.	Zinc		
	(a) Freshwater	65 µg/L [1,3]	65 µg/L [1,3]
	(b) Coastal and Marine Estuarine Waters	90 µg/L [1]	81 µg/L [1]
12.	Lindane [Hexachlorocyclohexane (g-BHC-Gamma)]		
	(a) Freshwater	0.95 µg/L	
	(b) Coastal and Marine Estuarine Waters	0.16 µg/L	

[1] The in-stream criterion is expressed in terms of the dissolved fraction in the water column. Conversion factors used to calculate dissolved criteria are found in the EPA document – National Recommended Water Quality Criteria – EPA 2006.

[2] The in-stream criterion is lower than the EPD laboratory detection limits (A "*" indicates that the criterion may be higher than or lower than EPD laboratory detection limits depending upon the hardness of the water).
[3] The aquatic life criteria for these metals are expressed as a function of total hardness (mg/L) in a water body. Values in the table above assume a hardness of 50 mg/L CaCO3. For other hardness values, the following equations from the EPA document – National Recommended Water Quality Criteria – EPA 2006 should be used. The minimum hardness allowed for use in these equations shall not be less than 25 mg/L, as calcium carbonate and the maximum shall not be greater than 400 mg/L as calcium carbonate.

Cadmium
acute criteria = $(e^{(1.0166[\ln(\text{hardness})] - 3.924)})(1.136672 - [(\ln \text{hardness})(0.041838)]$ µg/L
chronic criteria = $(e^{(0.7409[\ln(\text{hardness})] - 4.719)})(1.101672 - [(\ln \text{hardness})(0.041838)]$ µg/L

Chromium III
acute criteria = $(e^{(0.8190[\ln(\text{hardness})] + 3.7256)}(0.316)$ µg/L
chronic criteria = $(e^{(0.8190[\ln(\text{hardness})] + 0.6848)})(0.860)$ µg/L

Copper
acute criteria = $(e^{(0.9422[\ln(\text{hardness})] - 1.700)})(0.96)$ µg/L
chronic criteria = $(e^{(0.8545[\ln(\text{hardness})] - 1.702)})(0.96)$ µg/L

Lead
acute criteria = $(e^{(1.273[\ln(\text{hardness}) - 1.460)})(1.46203 - [(\ln \text{hardness})(0.145712)])$ µg/L
chronic criteria = $(e^{(1.273[\ln(\text{hardness}) - 4.705)})(1.46203 - [(\ln \text{hardness})(0.145712)])$ µg/L

Nickel
acute criteria = $(e^{(0.8460[\ln(\text{hardness})] + 2.255)})(.998)$ µg/L
chronic criteria = $(e^{(0.8460[\ln(\text{hardness})] + 0.0584)})(.997)$ µg/L

Zinc
acute criteria = $(e^{(0.8473[\ln(\text{hardness})] + 0.884)})(0.978)$ µg/L
chronic criteria = $(e^{(0.8473[\ln(\text{hardness})] + 0.884)})(0.986)$ µg/L

[4] This pollutant is addressed in 391-3-6-.06.

(iii) Instream concentrations of the following chemical constituents listed by the U.S. Environmental Protection Agency as toxic priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended) shall not exceed criteria indicated below under 7-day, 10-year minimum flow (7Q10) or higher stream flow conditions except within established mixing zones or in accordance with site specific effluent limitations developed in accordance with procedures presented in 391-3-6-.06.

1.	Chlordane	
	(a) Freshwater	0.0043 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.004 µg/L*
2.	Cyanide	
	(a) Freshwater	5.2 µg/L*
	(b) Coastal and Marine Estuarine Waters	1.0 µg/L*
3.	Dieldrin	
	(a) Freshwater	0.056 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0019 µg/L*
4.	4,4'-DDT	0.001 µg/L*
5.	a-Endosulfan	
	(a) Freshwater	0.056 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0087 µg/L*
6.	b-Endosulfan	
	(a) Freshwater	0.056 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0087 µg/L*
7.	Endrin	
	(a) Freshwater	0.036 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0023 µg/L*
8.	Heptachlor	
	(a) Freshwater	0.0038 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0036 µg/L*
9.	Heptachlor Epoxide	
	(a) Freshwater	0.0038 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0036 µg/L*
10	Pentachlorophenol	

	(a) Freshwater	15 µg/L*[1]
	(b) Coastal and Marine Estuarine Waters	7.9 µg/L*
11.	PCBs	
	(a) Freshwater	0.014 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.03 µg/L*
12.	Phenol	300 µg/L
13.	Toxaphene	0.0002 µg/L*

[1]The instream freshwater criterion for pentachlorophenol is a function of pH, determined by the formula ($e^{(1.005(pH)-5.134)}$). At a pH equal to 7.8 standard units the criterion is 15 µg/L.
*The in-stream criterion is lower than the EPD laboratory detection limits.

(iv) Instream concentrations of the following chemical constituents listed by the U. S. Environmental Protection Agency as toxic priority pollutants pursuant to Section 307(a)(1) of the Federal Clean Water Act (as amended) shall not exceed criteria indicated below under annual average or higher stream flow conditions:

1.	Acenaphthene	990 µg/L
2.	Acenaphthylene	**
3.	Acrolein	9.3 µg/L
4.	Acrylonitrile	0.25 µg/L
5.	Aldrin	0.000050 µg/L
6.	Anthracene	40000 µg/L
7.	Antimony	640 µg/L
8.	Arsenic (Total)	
	(a) Drinking Water Supplies	10 µg/L
	(b) All Other Classifications	50 µg/L
9.	Benzidine	0.0002 µg/L
10.	Benzo(a)Anthracene	0.018 µg/L
11.	Benzo(a)Pyrene	0.018 µg/L
12.	3,4-Benzofluoranthene	0.018 µg/L
13.	Benzene	51 µg/L
14.	Benzo(ghi)Perylene	**
15.	Benzo(k)Fluoranthene	0.018 µg/L
16.	Beryllium	**
17.	a-BHC-Alpha	0.0049 µg/L
18.	b-BHC-Beta	0.017 µg/L
19.	Bis(2-Chloroethyl)Ether	0.53 µg/L
20.	Bis(2-Chloroisopropyl)Ether	65000 µg/L
21.	Bis(2-Ethylhexyl)Phthalate	2.2 µg/L
22.	Bromoform (Tribromomethane)	140 µg/L
23.	Butylbenzyl Phthalate	1900 µg/L
24.	Carbon Tetrachloride	1.6 µg/L
25.	Chlorobenzene	1600 µg/L
26.	Chlorodibromomethane	13 µg/L
27.	2-Chloroethylvinyl Ether	**
28.	Chlordane	0.00081 µg/L
29.	Chloroform (Trichloromethane)	470 µg/L
30.	2-Chloronaphthalene	1600 µg/L
31.	2-Chlorophenol	150 µg/L
32.	Chrysene	0.018 µg/L
33.	Dibenzo(a,h)Anthracene	0.018 µg/L
34.	Dichlorobromomethane	17 µg/L
35.	1,2-Dichloroethane	37 µg/L
36.	1,1-Dichloroethylene	7100 µg/L
37	1,2 – Dichloropropane	15 µg/L
38.	1,3-Dichloropropylene	21 µg/L
39.	2,4-Dichlorophenol	290 µg/L
40.	1,2-Dichlorobenzene	1300 µg/L
41.	1,3-Dichlorobenzene	960 µg/L
42.	1,4-Dichlorobenzene	190 µg/L
43.	3,3'-Dichlorobenzidine	0.028 µg/L
44.	4,4'-DDT	0.00022 µg/L
45.	4,4'-DDD	0.00031 µg/L
46.	4,4'-DDE	0.00022 µg/L
47.	Dieldrin	0.000054 µg/L

48.	Diethyl Phthalate	44000 µg/L
49.	Dimethyl Phthalate	1100000 µg/L
50.	2,4-Dimethylphenol	850 µg/L
51.	2,4-Dinitrophenol	5300 µg/L
52.	Di-n-Butyl Phthalate	4500 µg/L
53.	2,4-Dinitrotoluene	3.4 µg/L
54.	1,2-Diphenylhydrazine	0.20 µg/L
55.	Endrin	0.060 µg/L
56.	Endrin Aldehyde	0.30 µg/L
57.	alpha – Endosulfan	89 µg/L
58.	beta – Endosulfan	89 µg/L
59.	Endosulfan Sulfate	89 µg/L
60.	Ethylbenzene	2100 µg/L
61.	Fluoranthene	140 µg/L
62.	Fluorene	5300 µg/L
63.	Heptachlor	0.000079 µg/L
64.	Heptachlor Epoxide	0.000039 µg/L
65.	Hexachlorobenzene	0.00029 µg/L
66.	Hexachlorobutadiene	18 µg/L
67.	Hexachlorocyclopentadiene	1100 µg/L
68.	Hexachloroethane	3.3 µg/L
69.	Indeno(1,2,3-cd)Pyrene	0.018 µg/L
70.	Isophorone	960 µg/L
71.	Lindane [Hexachlorocyclohexane (g-BHC-Gamma)]	1.8 µg/L
72.	Methyl Bromide (Bromomethane)	1500 µg/L
73.	Methyl Chloride (Chloromethane)	**
74.	Methylene Chloride	590 µg/L
75.	2-Methyl-4,6-Dinitrophenol	280 µg/L
76.	3-Methyl-4-Chlorophenol	**
77.	Nitrobenzene	690 µg/L
78.	N-Nitrosodimethylamine	3.0 µg/L
79.	N-Nitrosodi-n-Propylamine	0.51 µg/L
80.	N-Nitrosodiphenylamine	6.0 µg/L
81.	PCBs	0.000064 µg/L
82.	Pentachlorophenol	3.0 µg/L
83.	Phenanthrene	**
84.	Phenol	857000 µg/L
85.	Pyrene	4000 µg/L
86.	1,1,2,2-Tetrachloroethane	4.0 µg/L
87.	Tetrachloroethylene	3.3 µg/L
88.	Thallium	0.47 µg/L
89.	Toluene	5980 µg/L
90.	Toxaphene	0.00028 µg/L
91.	1,2-Trans-Dichloroethylene	10000 µg/L
92.	1,1,2-Trichloroethane	16 µg/L
93.	Trichloroethylene	30 µg/L
94.	2,4,6-Trichlorophenol	2.4 µg/L
95.	1,2,4-Trichlorobenzene	70 µg/L
96.	Vinyl Chloride	2.4 µg/L

**These pollutants are addressed in 391-3-6-.06.

(v) Site specific criteria for the following chemical constituents will be developed on an as-needed basis through toxic pollutant monitoring efforts at new or existing discharges that are suspected to be a source of the pollutant at levels sufficient to interfere with designated uses:

1. Asbestos

(vi) instream concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) must not exceed 0.0000012 µg/L under long-term average stream flow conditions.

(vii) Mercury: For the protection of human health, total mercury concentrations bioaccumulating in a waterbody, in a representative population of fish, shellfish and/or other seafood representing different trophic levels, shall not exceed a total mercury concentration in edible tissues of 0.3 mg/kg wet weight. This standard is in accord with the USEPA *Water Quality Criterion for the Protection of Human Health: Methylmercury*, (January 2001, EPA-823-R-01-001), and because nearly 100% of the mercury in fish tissue is methylmercury, adoption of the

standard as total mercury is an additional conservative measure. The representative fish tissue total mercury concentration for a waterbody is determined by calculating a Trophic-Weighted Residue Value, as described by the Georgia EPD Protocol (October 19, 2001).

(f) Applicable State and Federal requirements and regulations for the discharge of radioactive substances shall be met at all times.

TABLE 3-4. WATER QUALITY STANDARDS FOR MAJOR LAKES

(17) **Specific Criteria for Lakes and Major Lake Tributaries**. In addition to the general criteria, the following lake specific criteria are deemed necessary and shall be required for the specific water usage as shown:

(a) West Point Lake: Those waters impounded by West Point Dam and downstream of U.S. 27 at Franklin.

(i) Chlorophyll a: For the months of April through October, the average of monthly photic zone composite samples shall not exceed 27 µg/L at the LaGrange Water Intake more than once in a five-year period.

(ii) pH: Within the range of 6.0 - 9.5.

(iii) Total Nitrogen: Not to exceed 4.0 mg/L as Nitrogen in the photic zone.

(iv) Phosphorus: Total lake loading shall not exceed 2.4 pounds per acre-foot of lake volume per year.

(v) Fecal Coliform Bacteria:

1. U.S. 27 at Franklin to New River: Fecal coliform bacteria shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(c).
2. New River to West Point Dam: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b).

(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3-6-.03(5)(f).

(vii) Temperature: Not to exceed 90°F. At no time is the temperature of the receiving waters to be increased more than 5°F above intake temperature.

(viii) Major Lake Tributaries: For the following tributaries, the annual total phosphorus loading to West Point Lake shall not exceed the following:

1. Yellow Jacket Creek at Hammet Road:	11,000 pounds.
2. New River at Hwy 100:	14,000 pounds.
3. Chattahoochee River at U.S. 27:	1,400,000 pounds.

(b) Lake Walter F. George: Those waters impounded by Walter F. George Dam and upstream to Georgia Highway 39 near Omaha.

(i) Chlorophyll a: For the months of April through October, the average of monthly photic zone composite samples shall not exceed 18 µg/L at mid-river at U.S. Highway 82 or 15 µg/L at mid-river in the dam forebay more than once in a five-year period.

(ii) pH: Within the range of 6.0-9.5 standard units.

(iii) Total Nitrogen: Not to exceed 3.0 mg/L as nitrogen in the photic zone.

(iv) Phosphorous: Total lake loading shall not exceed 2.4 pounds per acre-foot of lake volume per year.

(v) Fecal Coliform:

1. Georgia Highway 39 to Cowikee Creek: Fecal coliform bacteria shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(c)(iii).
2. Cowikee Creek to Walter F. George Dam: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(I).

(vi) Dissolved Oxygen: A daily average of no less than 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3-6-.03(5)(f).

(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).

(viii) Major Lake Tributary: The annual total phosphorous loading to Lake Walter F. George, monitored at the Chattahoochee River at Georgia Highway 39, shall not exceed 2,000,000 pounds.

(c) Lake Jackson: Those waters impounded by Lloyd Shoals Dam and upstream to Georgia Highway 36 on the South and Yellow Rivers, upstream to Newton Factory Bridge Road on the Alcovy River and upstream to Georgia Highway 36 on Tussahaw Creek.

(i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed 20 µg/L at a location approximately 2 miles downstream of the confluence of the South and Yellow Rivers at the junction of Butts, Newton and Jasper Counties more than once in a five-year period.

(ii) pH: Within the range of 6.0-9.5 standard units.

(iii) Total Nitrogen: Not to exceed 4.0 mg/L as nitrogen in the photic zone.

(iv) Phosphorous: Total lake loading shall not exceed 5.5 pounds per acre-foot of lake volume per year.

(v) Fecal Coliform: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(I).

(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3-6-.03(5)(f).

(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).

(viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading to Lake Jackson shall not exceed the following:

1. South River at Island Shoals:	179,000 pounds
2. Yellow River at Georgia Highway 212:	116,000 pounds
3. Alcovy River at Newton Factory Bridge Road:	55,000 pounds
4. Tussahaw Creek at Fincherville Road:	7,000 pounds

(d) Lake Allatoona: Those waters impounded by Allatoona Dam and upstream to State Highway 5 on the Etowah River, State Highway 5 on Little River, the Lake Acworth dam, and the confluence of Little Allatoona Creek and Allatoona Creek. Other impounded tributaries to an elevation of 840 feet mean sea level corresponding to the normal pool elevation of Lake Allatoona.

(i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. Upstream from the Dam	10 µg/L
2. Allatoona creek upstream from I-75	10 µg/L
3. Mid-Lake downstream from Kellogg Creek	10 µg/L
4. Little River upstream from Highway 205	15 µg/L
5. Etowah River upstream from Sweetwater Creek	12 µg/L

(ii) pH: within the range of 6.0-9.5 standard units

(iii) Total Nitrogen: Not to exceed 4 mg/L as nitrogen in the photic zone.

(iv) Phosphorous: Total lake loading shall not exceed 1.3 pounds per acre-foot of lake volume per year.

(v) Fecal Coliform:

1. Etowah River, State Highway 5 to State Highway 20: Fecal coliform bacteria shall not exceed the Fishing Criterion as presented in 391-3-6-.03(6)(c)(iii).
2. Etowah River, State Highway 20 to Allatoona Dam; Fecal coliform bacteria shall not exceed the Recreation criteria as presented in 391-3-6-.03(6)(b)(i).

(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3-6-.03(5)(g).

(vii)Temperature:

1. Etowah River, State Highway 5 to State Highway 20: Water temperature shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(b)(iv).
2. Etowah River State Highway 20 to Allatoona Dam: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).

(viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading to Lake Allatoona shall not exceed the following:

1. Etowah River at State Highway 5 spur and 140, at the USGS gage	340,000 lbs/yr
2. Little River at State Highway 5 (Highway 754)	42,000 lbs/yr
3. Noonday Creek at North Rope Mill Road	38,000 lbs/yr
4. Shoal Creek at State Highway 108 (Fincher Road)	9,200 lbs/yr

(e) Lake Sidney Lanier: Those waters impounded by Buford Dam and upstream to Belton Bridge Road on the Chattahoochee River, 0.6 miles downstream from State Road 400 on the Chestatee River, as well as other impounded tributaries to an elevation of 1070 feet mean sea level corresponding to the normal pool elevation of Lake Sidney Lanier.

(i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. Upstream from the Buford Dam forebay	5 µg/L
2. Upstream from the Flowery Branch confluence	5 µg/L
3. At Browns Bridge Road (State Road 369)	5 µg/L
4. At Bolling Bridge (State Road 53) on Chestatee River	10 µg/L
5. At Lanier Bridge (State Road 53) on Chattahoochee River	10 µg/L

(ii) pH: Within the range of 6.0-9.5 standard units.

(iii) Total Nitrogen: Not to exceed 4 mg/L as nitrogen in the photic zone.

(iv) Phosphorous: Total lake loading shall not exceed 0.25 pounds per acre-foot of lake volume per year.

(v) Fecal Coliform: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(l).

(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3--6-.03(5)(g).

(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).

(viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading to Lake Sidney Lanier shall not exceed the following:

1. Chattahoochee River at Belton Bridge Road	178,000 pounds
2. Chestatee River at Georgia Highway 400	118,000 pounds
3. Flat Creek at McEver Road	14,400 pounds

(f) Carters Lake: Those waters impounded by Carters Dam and upstream on the Coosawattee River as well as other impounded tributaries to an elevation of 1072 feet mean sea level corresponding to the normal pool elevation of Carters Lake.

(i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. Carters Lake upstream from Woodring Branch 5 µg/L
2. Carters Lake at Coosawattee River embayment mouth 10 µg/L

(ii) pH: within the range of 6.0 – 9.5 standard units.
(iii) Total Nitrogen: Not to exceed 4.0 mg/L as nitrogen in the photic zone.
(iv)Phosphorous: Total lake loading shall not exceed 172,500 pounds or 0.46 pounds per acre-foot of lake volume per year.
(v) Fecal Coliform: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).
(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3-6-.03(5)(g).
(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).
(viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading at the compliance monitoring location shall not exceed the following:

1. Coosawattee River at Old Highway 5 151,500 pounds
2. Mountaintown Creek at U.S. Highway 76 8,000 pounds

In 2010, GAEPD added 41 flow gages to its monitoring network as part of the State Water Plan. Table 3-5 provides a list of the USGS stream gages funded by GAEPD. GAEPD also funds three continuous water quality monitors operated by the USGS on the Coosa River at the GA/AL Stateline, Chattahoochee River at HWY 92, and the Savannah Harbor at the Corps Dock. In addition, GAEPD continues to operate the continuous water quality monitor at Capps Ferry south of Metro Atlanta, which records dissolved oxygen, pH, temperature and specific conductance data every 15 minutes. The data are collected in real-time and updated daily on the GAEPD's website.

In addition to work done through cooperative agreements, GAEPD associates collect monthly samples from a number of locations across the state

Figure 1 shows the monitoring network stations for the sample collection period 2010-2011. A list of the State-wide trend monitoring network stations, which consists of the "core" stations that are sampled every year, is presented in Table 3-6. Tables 3-7 and 3-8 provide a list of stations and parameters for the 2010 and 2011 rotating basin networks.

TABLE 3-5. USGS STREAM GAGES FUNDED BY USGS

USGS Number	Station Name and Location
Savannah River Basin	
02177000	Chattooga River near Clayton, GA
02191300	Broad River above Carlton, GA
02192000	Broad River near Bell, GA
02193340	Kettle Creek near Washington, GA
02193500	Little River near Washington, GA
02197598	Brushy Creek at Campground Road near Wrens, GA
021964832	Savannah River above Augusta Canal, near Bonair, GA
02197830	Brier Creek near Waynesboro, GA
02198375	Savannah River near Estill, GA
02198840	Savannah River at Port Wentworth, GA
02198950	Middle River at GA 25, at Port Wentworth, GA
21989792	Little Back River at GA 25, at Port Wentworth, GA
02198980	Savannah River at Fort Pulaski
02197000	Savannah River at Augusta, GA
Ogeechee River Basin	
02201000	Williamson Swamp Creek at Davisboro, GA
02202190	Ogeechee River At GA 24, near Oliver, GA
02203518	Canoochee River at Bridge 38, at Fort Stewart
02202680	Ogeechee River at GA 204, near Ellabell, GA
02203536	Ogeechee River at US 17, near Richmond Hill, GA
02200120	Ogeechee River GA 88, near Grange GA
Altamaha River Basin	
02215000	Ocmulgee River at US 341, near Hawkinsville, GA
02215100	Tucsawhatchee Creek near Hawkinsville, GA
02215500	Ocmulgee River at Lumber City, GA
02216180	Turnpike Creek near McRae, GA
02214075	Echecommee Creek at Houston Road, near Byron, GA
02214590	Big Indian Creek at US 341, near Clinchfield, GA
02215900	Little Ocmulgee River at GA 149, at Scotland, GA
02208000	Yellow River at Rocky Plains Road, near Rocky Plains, GA
02209000	Alcovy River below Covington, GA
02212735	Ocmulgee River at GA 18, at Dames Ferry, GA
02211800	Towaliga River at GA 83, near Juliette, GA
02204520	South River at GA 81, at Snapping Shoal, GA
02223360	Big Sandy Creek at US 441, near Irwinton, GA
02223190	Commissioner Creek at US 441, at McIntyre, GA
02223110	Buffalo Creek at GA 272, near Oconee, GA
02225270	Ohoopee River at GA 297, near Swainsboro, GA
Suwannee River Basin	
02314495	Suwannee River above Fargo, GA+
02314500	Suwannee River at US 441, at Fargo, GA
02318000	Little River near Adel, GA*
02318700	Okapilco Creek at GA 33, near Quitman, GA
02315920	Alapaha River at GA 125/32, near Irwinville, GA
Satilla River Basin	
02226362	Satilla River at GA 158, near Waycross, GA
02227270	Alabaha River at GA 203, nea Blackshear, GA
02228070	Satilla River at US 17, at Woodbine, GA
St Mary's River Basin	
02231254	St. Mary's River at I-95, near Kingsland, GA
Ochlockonee River Basin	
02327500	Ochlockonee River near Thomasville, GA
02327355	Ochlockonee River at GA 188 near Coolidge, GA

Chattahoochee River Basin	
02336300	Peachtree Creek at Atlanta, GA
02337500	Snake Creek near Whitesburg, GA
02338660	New River near Corinth, GA
02343940	Sawhatchee Creek at Cedar Springs, GA
02342850	Hanahatchee Creek at Union Road, near Union GA
02343225	Pataula Creek ar US 82, near Georgetown, GA
23432415	Chattahoochee River 0.36 miles Downstream of WFG Dam, near Gaines, GA
02343805	Chattahoochee River at Mile 46, near Columbia, AL
02338840	Yellow Jacket Creek at Hammett Road, below Hogansville, GA
02342881	Chattahoochee River at Spur 39, near Omaha, GA
02331000	Chattahoochee River near Leaf, GA
Flint River Basin	
02344700	Line Creek near Senoia, GA
02349900	Turkey Creek at Byromville,GA
02351500	Muckalee Creek near Americus, GA
02353265	Ichawaynochaway Creek at GA 37, near Morgan, GA
02353400	Pachitla Creek near Edison, GA
02353500	Ichawaynochaway Creek at Milford, GA
02355350	Ichawaynochaway Creek below Newton, GA
02355665	Flint River at Riverview Plantation, near Hopeful, GA
02357000	Spring Creek near Iron City, GA*
02350600	Kinchafoonee Creek at Preston. GA
02354410	Chickasawhatchee Creek near Leary, GA
02354475	Spring Creek near Leary, GA
02354800	Chickasawhatchee Creek at Elmodel, GA
02354800	Ichawaynochaway Creek near Elmodel, GA
Coosa River Basin	
02381090	Mountaintown Creek At Ga 76, Near Ellijay, Ga
02381600	Fausett Creek near Talking Rock, GA
02384540	Mill Creek near Crandall, GA
02385800	Holly Creek near Chatsworth, GA
02398000	Chattooga River at Summerville, GA
02395000	Etowah River near Kingston, GA
Tennessee River Basin	
03568933	Lookout Creek near New England, GA
03550500	Nottely River near Blairsville, GA
03567340	West Chickamauga Creek at GA 146, near Lakeview, GA
Tallapoosa River Basin	
02413000	Little Tallapoosa at GA 27, at Carrolton, GA

FIGURE 1
GEORGIA TREND AND LAKE TRIBUTARY MONITORING NETWORK (USGS & CWW)
STATION LOCATIONS 2010-2011

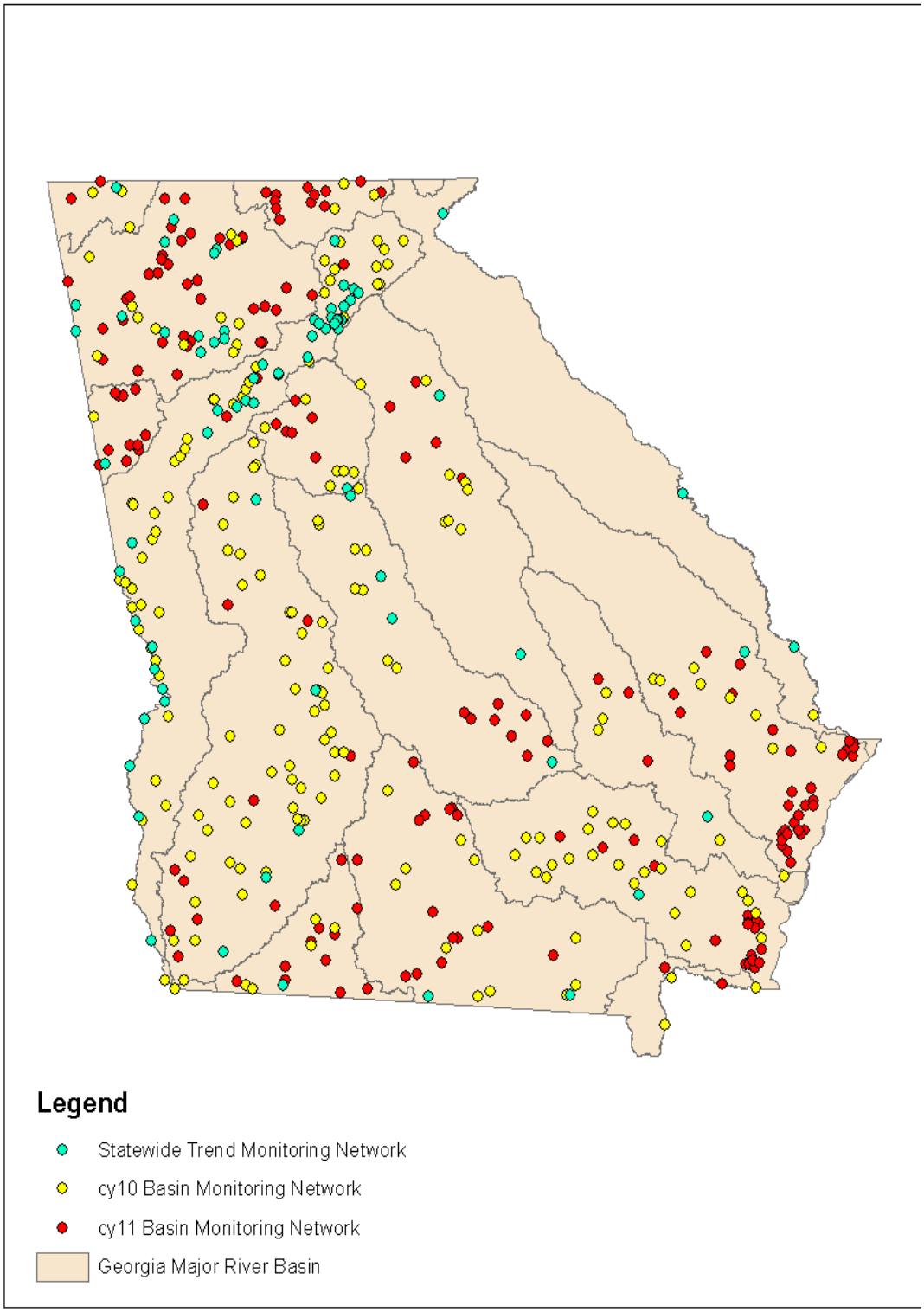


TABLE 3-6. STATEWIDE TREND MONITORING NETWORK (CORE): RIVERS/STREAMS; LAKE/RESERVOIR STANDARD TRIBUTARY STATIONS

Rivers and streams stations are sampled monthly for field and chemical parameters every year. Four fecal coliform bacterial samples are collected each calendar quarter to calculate four geometric means. Lakes and reservoir stations are sampled monthly during the "growing season" from April through October.

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0102060101	Chattooga River at US Hwy. 76 near Clayton, GA	Savannah	USGS	Trend Monitoring	34.8140	-83.3064	X	X			X	
0106050209	Savannah River at 0.5 mile downstream from Spirit Creek	Savannah	USGS	Trend Monitoring	33.3306	-81.9153	X	X			X	
0109020701	Savannah River at Seaboard Coast Line Railway, north of Clyo, GA	Savannah	USGS	Trend Monitoring	32.5250	-81.2640	X	X			X	
0109060602	Savannah River at US Hwy. 17 (Houlihan Bridge)	Savannah	USGS	Trend Monitoring	32.1658	-81.1539	X	X			X	
0202030701	Ogeechee River at Georgia Hwy. 24 near Oliver, GA	Ogeechee	USGS	Trend Monitoring	32.4948	-81.5558	X	X			X	
0301060102	Oconee River at Barnett Shoals Road near Athens, GA	Oconee	USGS	Trend Monitoring	33.8562	-83.3265	X	X			X	
0302090102	Oconee River at Interstate Hwy. 16 near Dublin, GA	Oconee	USGS	Trend Monitoring	32.4804	-82.8582	X	X			X	
0403030501	South River at Island Shoals Road near Snapping Shoals, Ga.	Upper Ocmulgee	USGS	Lake Trib Monitoring	33.4527	-83.9271	X	X			X	
0403060301	Yellow River at Georgia Hwy. 212 near Stewart, Ga.	Upper Ocmulgee	USGS	Lake Trib Monitoring	33.4543	-83.8813	X	X			X	
0403080201	Alcovy River at Newton Factory Bridge Road near Stewart, Ga.	Upper Ocmulgee	USGS	Lake Trib Monitoring	33.4494	-83.8283	X	X			X	
0403090301	Tussahaw Creek at Fincherville Road near Jackson, Ga.	Upper Ocmulgee	USGS	Lake Trib Monitoring	33.3789	-83.9634	X	X			X	
0503160201	Ocmulgee River at New Macon Water Intake	Ocmulgee	USGS	Trend Monitoring	32.8992	-83.6641	X	X			X	
0504030101	Ocmulgee River at Hawkinsville, GA	Ocmulgee	USGS	Trend Monitoring	32.2818	-83.4628	X	X			X	
0504080601	Ocmulgee River at US Hwy. 341 at Lumber City, GA	Ocmulgee	USGS	Trend Monitoring	31.9199	-82.6743	X	X			X	
0606040104	Altamaha River 6.0 miles downstream from Doctortown, GA	Altamaha	USGS	Trend Monitoring	31.6233	-81.7653	X	X			X	
0701070405	Satilla River at Georgia Hwy.15 and Hwy.121	Satilla	USGS	Trend Monitoring	31.2167	-82.1625	X	X			X	
0901010508	Suwannee River at US Hwy. 441 near Fargo, GA	St. Marys	USGS	Trend Monitoring	30.6806	-82.5606	X	X			X	
0903080302	Withlacoochee River at Clyattsville-Nankin Road near Clyattsville, GA	Suwannee	USGS	Trend Monitoring	30.6747	-83.3947	X	X			X	
1003010102	Ochlockonee River at Hadley Ferry Road near Calvary, Ga.	Ochlockonee	USGS	Trend Monitoring	30.7317	-84.2355	X	X			X	
1105010601	Flint River at SR 92 near Griffin, GA	Flint	USGS	Trend Monitoring	33.3089	-84.3931	X	X			X	
1106010701	Flint River at SR 26 near Montezuma	Flint	USGS	Trend Monitoring	32.2929	-84.0440	X	X			X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1108010102	Flint River at SR 234 near Albany, GA	Flint	USGS	Trend Monitoring	31.5524	-84.1463	X	X			X	
1108040101	Flint River at SR 37 at Newton, GA	Flint	USGS	Trend Monitoring	31.3094	-84.3350	X	X			X	
1108070302	Flint River at US Hwy. 27-B near Bainbridge, GA	Flint	USGS	Trend Monitoring	30.9109	-84.5805	X	X			X	
1201030401	Chattahoochee River at Belton Bridge Road near Lula, Ga.	Chattahoochee	USGS	Lake Trib Monitoring	34.4451	-83.6842	X	X			X	
1201050101	Dicks Creek at Forest Service Road 144-1 near Neels Gap, GA	Chattahoochee	USGS	Trend Monitoring	34.6797	-83.9372	X	X			X	
1201060401	Chestatee River at SR 400 near Dahlonega, Ga.	Chattahoochee	USGS	Lake Trib Monitoring	34.4667	-83.9689	X	X			X	
1201080302	Flat Creek at McEver Road near Gainesville, Ga.	Chattahoochee	USGS	Lake Trib Monitoring	34.2658	-83.8850	X	X			X	
1202070301	Yellow Jacket Creek at Hammet Road near Hogansville, GA	Chattahoochee	USGS	Lake Trib Monitoring	33.1392	-84.9753	X	X			X	
1202050501	New River at SR 100 near Corinth, Ga.	Chattahoochee	USGS	Trend Monitoring	33.2353	-84.9878	X	X			X	
1202060101	Chattahoochee River at US Hwy. 27 near Franklin, Ga.	Chattahoochee	USGS	Lake Trib Monitoring	33.2792	-85.1000	X	X			X	
1202110104	Lake Harding - Dam Forebay (aka Chatt. River US Bartletts Ferry Dam)	Chattahoochee	CWW	Trend Monitoring	32.6633	-85.09028	X	X				
1202130502	Lake Oliver - Chattahochee River at Columbus Water Intake near Columbus, GA	Chattahoochee	CWW	Trend Monitoring	32.5214	-84.9983	X	X				
1203010104	Chattahoochee River downstream from Columbus Water Treatment Facility	Chattahoochee	CWW	Trend Monitoring	32.4089	-84.9803	X	X				
1203060101	Chattahoochee River downstream Oswichee Creek	Chattahoochee	CWW	Trend Monitoring	32.3000	-84.9369	X	X				
1203060601	Chattahoochee River at Hichitee Creek (River Mile 127.6)	Chattahoochee	CWW	Trend Monitoring	32.2308	-84.9232	X	X				
1203060602	Chattahoochee River at Spur 39 near Omaha, GA (Seaboard Railroad)	Chattahoochee	USGS	Lake Trib Monitoring	32.1436	-85.0453	X	X			X	
1204080101	Chattahoochee River at SR 91 near Steam Mill, GA	Chattahoochee	USGS	Trend Monitoring	30.9775	-85.0053	X	X			X	
1308020601	Tallapoosa River at Georgia Hwy. 8 near Tallapoosa, Ga.	Tallapoosa	USGS	Trend Monitoring	33.7408	-85.3364	X	X			X	
1308090601	Little Tallapoosa River at Georgia Hwy. 100 near Bowden, GA	Tallapoosa	USGS	Trend Monitoring	33.4928	-85.2792	X	X			X	
1401020703	Conasauga River at US Hwy. 76 near Dalton, GA	Coosa	USGS	Trend Monitoring	34.7830	-84.8730	X	X			X	
1401050106	Conasauga River at Tilton Bridge near Tilton, GA	Coosa	USGS	Trend Monitoring	34.6667	-84.9283	X	X			X	
1402030502	Mountaintown Creek at SR 282 (US Hwy. 76) near Ellijay, Ga.	Coosa	USGS	Trend Monitoring	34.7034	-84.5398	X	X			X	
1402040103	Coosawattee River at Georgia Hwy. 5 near Ellijay, Ga.	Coosa	USGS	Trend Monitoring	34.6717	-84.5002	X	X			X	
1403060401	Oostanaula River at Rome Water Intake near Rome, GA	Coosa	USGS	Trend Monitoring	34.2703	-85.1733	X	X			X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1404060301	Etowah River at SR 5 spur near Canton, Ga.	Coosa	USGS	Lake Trib Monitoring	34.2397	-84.4944	X	X			X	
1404070401	Shoal Creek at SR 108 (Fincher Road) near Waleska, Ga.	Coosa	USGS	Lake Trib Monitoring	34.2608	-84.5956	X	X			X	
1404080802	Noonday Creek at Georgia Hwy. 92 near Woodstock, Ga.	Coosa	USGS	Lake Trib Monitoring	34.0861	-84.5306	X	X			X	
1404080904	Little River at Georgia Hwy. 5 near Woodstock, Ga.	Coosa	USGS	Lake Trib Monitoring	34.1222	-84.5043	X	X			X	
1404150101	Etowah River at Hardin Bridge (FAS 829) near Euharlee, GA	Coosa	USGS	Trend Monitoring	34.18886	-84.9251	X	X			X	
1405010601	Coosa River - GA/Alabama State Line Monitor near Cave Springs	Coosa	USGS	Trend Monitoring	34.1983	-85.4439	X	X			X	
1405050401	Chattooga River at Holland-Chattoogaville Road (FAS1363) near Lyerly, Ga.	Coosa	USGS	Trend Monitoring	34.3356	-85.4453	X	X			X	
1501080101	West Chickamauga Creek - Georgia Highway 146 near Ringgold, Ga.	Coosa	USGS	Trend Monitoring	34.9572	-85.2056	X	X			X	

[1] **Standard field parameters include:** gage height, air temperature, water temperature, dissolved oxygen, pH, conductivity, turbidity.

Standard chemical parameters include: BOD5, alkalinity, hardness, ammonia, nitrite+nitrate nitrogen, phosphorus, TOC and fecal coliform bacteria.

Standard lakes field, chemical and biological parameters include: depth profiles for dissolved oxygen, temperature, pH, and specific conductance, secchi disk transparency, and chemical analyses for chlorophyll *a*, total phosphorus, nitrogen compounds, and turbidity.

TABLE 3-7. GEORGIA BASIN MONITORING NETWORK 2010

Rivers and stream stations are sampled monthly for field and chemical parameters for one calendar year every five years. Four fecal coliform bacterial samples are collected each calendar quarter during the focused monitoring year. Basin lakes and reservoirs are sampled monthly during the growing season during the calendar year.

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0606010401	Oconee Creek at Vidalia Road (CR 78) near Vidalia, Ga.	Altamaha	Brunswick WP	Stream Probablistic	32.0814	-82.4036	X					
0606050101	Alex Creek at River Road near Mount Pleasant, Ga.	Altamaha	Brunswick WP	Stream Probablistic	31.5053	-81.6906	X	X				
0606050204	Altamaha River Estuary - channel marker 201 off Wolf Island	Altamaha	Brunswick WP	Estuary Monitoring	31.3192	-81.3250	X				X	
0607040501	Tiger Creek at Old Normantown Road near Normantown, Ga.	Altamaha	Brunswick WP	Stream Probablistic	32.2806	-82.3589	X					
0607050302	Rocky Creek at SR 4 near Lyons, Ga.	Altamaha	Brunswick WP	Stream Probablistic	32.1269	-82.3600	X					
1202050202	Mountain Creek at Smokey Road near Newnan, Ga.	Chattahoochee	Atlanta WP	Stream target	33.3198	-84.9051	X				X	
1202091204	Long Cane Creek at Old West Point Road near West Point, Ga.	Chattahoochee	Atlanta WP	Stream target	32.8658	-85.1593	X				X	
1202100702	Flat Shoals Creek at SR 103 near West Point, Ga.	Chattahoochee	Atlanta WP	Stream target	32.8368	-85.1158	X				X	
1203030801	Upatoi Creek at Fort Benning Road (Fort Benning) near Columbus, Ga.	Chattahoochee	Atlanta WP	Stream target	32.3746	-84.9567	X	X	X	X	X	
1201010206	Chattahoochee River at Bottom Road near Helen, Ga.	Chattahoochee	Cartersville WP	Stream target	34.6782	-83.6856	X				X	
1201010501	Chattahoochee River at Georgia Hwy. 255	Chattahoochee	Cartersville WP	Stream target	34.6275	-83.6422	X	X	X	X	X	
1201020601	Soquee River at SR 105 near Demorest, Ga.	Chattahoochee	Cartersville WP	Stream target	34.5731	-83.5908	X	X			X	
1201030102	Chattahoochee River at Duncan Bridge Road (Hwy. 384) near Cornelia, Ga.	Chattahoochee	Cartersville WP	Stream target	34.5408	-83.6206	X				X	
1201030201	Mossy Creek at SR 254 near Cleveland, Ga.	Chattahoochee	Cartersville WP	Stream target	34.5353	-83.6994	X	X			X	
1201030303	Mud Creek at Pea Ridge Road near Lula, Ga.	Chattahoochee	Cartersville WP	Stream target	34.4462	-83.6743	X				X	
1201040404	Lake Sidney Lanier - Little River Embayment, Betw M1WC & 3LR	Chattahoochee	Atlanta WP	Lake Monitoring	34.355	-83.8427	X					
1201050201	Chestatee River at US Hwy. 19	Chattahoochee	Cartersville WP	Stream target	34.6625	-83.9011	X				X	
1201050503	Tesnatee Creek at Gene Nix Road near Cleveland, Ga.	Chattahoochee	Cartersville WP	Stream target	34.5685	-83.8358	X	X			X	
1201060103	Chestatee River at Georgia Hwy. 52 near Dahlonega, Ga.	Chattahoochee	Cartersville WP	Stream target	34.5281	-83.9397	X	X			X	
1201060202	Yahoola Creek at Georgia Hwy. 52	Chattahoochee	Cartersville WP	Stream target	34.5426	-83.9707	X	X			X	
1201070201	Toto Creek at Moss Estates Road	Chattahoochee	Cartersville WP	Stream Probablistic	34.3994	-83.9978	X					
1201070501	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.31235	-83.9501	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1201080103	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.32195	-83.88017	X					
1201080203	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Chattahoochee	Atlanta WP	Lake Monitoring	34.261666	-83.95066	X					
1201080304	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2587	-83.9198	X					
1201080307	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2504	-83.9244	X					
1201080401	Lake Sidney Lanier - Mud Crk Embayment, Betw Marina & Ramp	Chattahoochee	Atlanta WP	Lake Monitoring	34.2333	-83.9373	X					
1201080403	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Chattahoochee	Atlanta WP	Lake Monitoring	34.200278	-83.98287	X					
1201080603	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E M9SM	Chattahoochee	Atlanta WP	Lake Monitoring	34.2335	-84.0287	X					
1201080902	Lake Sidney Lanier upstream of Buford Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	34.162778	-84.06711	X					
1201090401	Suwanee Creek at US Hwy. 23 near Suwanee, Ga.	Chattahoochee	Atlanta WP	Stream target	34.0326	-84.0895	X				X	
1201090707	Crooked Creek at Spalding Drive near Norcross, Ga.	Chattahoochee	Atlanta WP	Stream Probablistic	33.9650	-84.2647	X					
1201110102	Willeo Creek at SR 120 near Roswell, Ga.	Chattahoochee	Cartersville WP	Stream target	33.9922	-84.3867	X	X	X	X	X	
1201110304	Sope Creek at Columns Drive near Marietta, Ga.	Chattahoochee	Cartersville WP	Stream target	33.9264	-84.4303	X	X	X		X	
1201110401	Rottenwood Creek at Interstate North Parkway near Smyrna, Ga.	Chattahoochee	Cartersville WP	Stream target	33.8824	-84.4511	X	X	X		X	X
1201110608	Orchard Knob Creek at Woodland Brook Drive	Chattahoochee	Cartersville WP	Stream Probablistic	33.8458	-84.4703	X					
1202010202	Nickajack Creek at Bankhead Hwy. 78 near Mableton, Ga.	Chattahoochee	Cartersville WP	Stream target	33.8033	-84.5214	X	X			X	X
1202020601	Noses Creek at Clay Road near Austell, Ga.	Chattahoochee	Cartersville WP	Stream target	33.8387	-84.6442	X		X		X	
1202020701	Olley Creek at Clay Road near Austell, Ga.	Chattahoochee	Cartersville WP	Stream target	33.8360	-84.6310	X		X		X	
1202030903	Dog River at Ga. Hwy. 166	Chattahoochee	Cartersville WP	Stream target	33.6218	-84.7931	X	X	X	X	X	
1202031001	Wolf Creek at Wilson Road	Chattahoochee	Cartersville WP	Stream target	33.5394	-84.8336	X	X			X	
1202031102	Snake Creek at Black Dirt Road	Chattahoochee	Cartersville WP	Stream target	33.5008	-84.8633	X	X			X	
1202031202	Chattahoochee River at Capps Ferry Road near Rico, Ga.	Chattahoochee	Atlanta WP	Stream target	33.5778	-84.8086	X	X			X	
1202060501	Hillabahatchee Creek at SR 34 near Franklin, Ga.	Chattahoochee	Atlanta WP	Stream Trend	33.2806	-85.1194	X	X	X	X	X	X
1202070501	Beech Creek at Hammett Road near LaGrange, Ga.	Chattahoochee	Atlanta WP	Stream target	33.0924	-84.9835	X	X			X	
1202060802	West Point Lake at LaGrange Water Intake near LaGrange, GA (aka Chatt. River at Lagrange Intake)	Chattahoochee	Atlanta WP	Lake Monitoring	33.0783	-85.11083	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1202080208	West Point Lake - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.9208	-85.1834	X					
1202091102	Blue John Creek at Orchard Hill Road at Lagrange, Ga.	Chattahoochee	Atlanta WP	Stream target	32.9997	-85.0514	X				X	
1202091302	Chattahoochee River at Hwy. 29 at West Point, Ga.	Chattahoochee	Atlanta WP	Stream Probablistic	32.8777	-85.1806	X				X	
1202110102	Lake Harding - midlake	Chattahoochee	Atlanta WP	Lake Monitoring	32.7379	-85.1125	X				X	
1202110104	Lake Harding - dam forebay (Chattahoochee River US Bartletts Ferry Dam)	Chattahoochee	Atlanta WP	Lake Monitoring	32.6633	-85.0903	X				X	
1202110401	Mountain Oak Creek at SR 103 near Hamilton, Ga.	Chattahoochee	Atlanta WP	Stream target	32.7411	-85.0689	X	X			X	
1202120801	Mulberry Creek at Hamilton-Mulberry Grove Road near Mulberry Grove, Ga.	Chattahoochee	Atlanta WP	Stream target	32.7031	-84.9581	X	X			X	
1202130501	Goat Rock Lake - dam forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.6112	-85.0794	X				X	
1202130503	Lake Oliver - dam forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.5160	-85.0009	X				X	
1203010401	Weracoba Creek 0.3 miles downstream from Cusseta Road	Chattahoochee	Atlanta WP	Stream target	32.4567	-84.9750	X	X	X	X	X	
1203070501	Hannahatchee Creek at Toby Road near Union, Ga.	Chattahoochee	Tifton WP	Stream target	32.1528	-84.9058	X	X			X	X
1203130102	Lake Walter F. George - US Hwy. 82	Chattahoochee	Tifton WP	Lake Monitoring	31.8919	-85.1208	X				X	X
1203150801	Pataula Creek at SR 50 near Georgetown, Ga.	Chattahoochee	Tifton WP	Stream target	31.8183	-84.9739	X	X	X	X	X	X
1203160102	Lake Walter F. George - dam forebay	Chattahoochee	Tifton WP	Lake Monitoring	31.6292	-85.0725	X				X	X
1204010101	Chattahoochee River at SR 37 near Fort Gaines, Ga.	Chattahoochee	Tifton WP	Stream target	31.6042	-85.0553	X	X			X	X
1204010301	Hog Creek at CR 15 near Cuthbert, Ga.	Chattahoochee	Tifton WP	Stream target	31.6801	-84.9104	X	X			X	X
1204070101	Lake Andrews - dam forebay	Chattahoochee	Tifton WP	Lake Monitoring	31.2632	-85.1130	X				X	X
1204080104	Lake Seminole - Chattahoochee arm	Chattahoochee	Tifton WP	Lake Monitoring	30.7662	-84.9201	X				X	X
1204080106	Lake Seminole - dam forebay	Chattahoochee	Tifton WP	Lake Monitoring	30.7115	-84.8647	X				X	X
1402040401	Carters Lake (CR1) - Upper Lake, Coosawattee Arm	Coosa	Cartersville WP	Lake Monitoring	34.62087	-84.6212	X					
1402040402	Carters Lake - Midlake (upstream from Woodring Branch)	Coosa	Cartersville WP	Lake Monitoring	34.6076	-84.638	X					
1403060301	Dozier Creek at Bells Ferry Road near Rome, Ga.	Coosa	Cartersville WP	Stream Probablistic	34.3208	-85.1103	X	X				
1404080902	Lake Allatoona at Little River upstream from Highway 205	Coosa	Cartersville WP	Lake Monitoring	34.158611	-84.57722	X					
1404090401	Lake Allatoona Upstream from Dam	Coosa	Cartersville WP	Lake Monitoring	34.160833	-84.72585	X					
1404090404	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Coosa	Cartersville WP	Lake Monitoring	34.085833	-84.71139	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1404100104	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Coosa	Cartersville WP	Lake Monitoring	34.19	-84.57778	X					
1404100409	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Coosa	Cartersville WP	Lake Monitoring	34.138611	-84.63917	X					
1404130105	Etowah River at Douthit Ferry Road near Cartersville, Ga.	Coosa	Cartersville WP	Stream Probablistic	34.1203	-84.8197	X	X				
1404150601	Etowah River at US Hwy. 411 near Kingston, Ga.	Coosa	Cartersville WP	Stream Probablistic	34.2088	-84.9785	X	X	X	X		
1404160402	Dykes Creek at Dykes Creek crossing near Rome, Ga.	Coosa	Cartersville WP	Stream Trend	34.2636	-85.0855	X	X	X	X	X	X
1405020302	Cedar Creek at Cave Spring Road near Cedartown, Ga.	Coosa	Cartersville WP	Stream Probablistic	34.0606	-85.3138	X					
1405040301	Spring Creek at SR 337 near Trion, Ga.	Coosa	Cartersville WP	Stream Probablistic	34.5844	-85.3653	X					
1105010202	Camp Creek at SR 54 near Jonesboro, Ga.	Flint	Atlanta WP	Stream target	33.4858	-84.3976	X	X	X		X	
1105070502	Flint River at Sprewell Bluff State Park	Flint	Atlanta WP	Stream Trend	32.8560	-84.4768	X	X	X	X	X	X
1105120301	Auchumpkee Creek at Old Minor Road near Roberta, Ga.	Flint	Atlanta WP	Stream target	32.7084	-84.1983	X		X	X	X	
1105130501	Beaver Creek at Zenith Mill Road near Roberta, Ga.	Flint	Atlanta WP	Stream target	32.6505	-84.0064	X	X			X	X
1105150703	Whitewater Creek at SR 127 near Rupert, Ga.	Flint	Atlanta WP	Stream target	32.4517	-84.2243	X				X	
1106010703	Spring Creek at SR 90 near Montezuma, Ga.	Flint	Tifton WP	Stream target	32.2848	-84.0076	X				X	X
1105010109	Flint River at Georgia Hwy. 85	Flint	Atlanta WP	Stream target	33.6053	-84.4044	X				X	
1105010301	Morning Creek at SR 54 near Fayetteville, Ga.	Flint	Atlanta WP	Stream target	33.4786	-84.4095	X	X	X	X	X	
1105020302	Line Creek at Georgia Hwy. 85 near Senoia, Ga.	Flint	Atlanta WP	Stream target	33.3194	-84.5236	X	X	X		X	
1105030601	White Oak Creek at SR 85 near Alvaton, Ga.	Flint	Atlanta WP	Stream target	33.1789	-84.5811	X				X	
1105050501	Red Oak Creek at Harman Hall Road near Imlac, Ga.	Flint	Atlanta WP	Stream target	33.0383	-84.5522	X	X			X	X
1105060301	Elkins Creek at SR 109 near Molena, Ga.	Flint	Atlanta WP	Stream target	33.0125	-84.4831	X	X			X	
1105090701	Potato Creek at SR 74 near Thomaston, Ga.	Flint	Atlanta WP	Stream target	32.9042	-84.3625	X	X			X	
1105120601	Ulcohatchee Creek at Charlie Reeves Road near Roberta, Ga.	Flint	Atlanta WP	Stream target	32.7089	-84.1878	X	X			X	
1105140502	Patsiliga Creek at SR 128 near Reynolds, Ga.	Flint	Atlanta WP	Stream target	32.5722	-84.0908	X	X	X		X	
1105150702	Whitewater Creek at SR 128 near Oglethorpe, Ga.	Flint	Tifton WP	Stream target	32.3489	-84.0642	X	X			X	X
1106010102	Beaver Creek at SR 49 near Montezuma, Ga.	Flint	Tifton WP	Stream target	32.2970	-84.0317	X				X	X
1106010201	Beaver Creek at Winchester Road near Marshallville, Ga	Flint	Tifton WP	Stream Probablistic	32.4100	-83.9794	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1106010601	Sweetwater Creek 1 mile upstream from confluence with Flint River	Flint	Tifton WP	Stream target	32.1833	-84.0556	X	X			X	X
1106020901	Buck Creek at SR 240 near Ideal, Ga.	Flint	Tifton WP	Stream target	32.3092	-84.1619	X	X			X	X
1106030401	Hogcrawl Creek at River Road near Montezuma, Ga.	Flint	Tifton WP	Stream Probablistic	32.2172	-83.9917	X					
1106040701	Lime Creek at Spring Hill Church Road near Cobb, Ga.	Flint	Tifton WP	Stream Trend	32.0350	-83.9925	X	X	X	X	X	X
1106050702	Turkey Creek at SR 230 at Drayton, Ga.	Flint	Tifton WP	Stream target	32.0769	-83.9569	X	X			X	X
1106060110	Lake Blackshear - midlake	Flint	Tifton WP	Lake Monitoring	31.9665	-83.9342	X				X	X
1106060503	Gum Creek at US Hwy. 280 at Coney, Ga.	Flint	Tifton WP	Stream target	31.9611	-83.8839	X				X	X
1106061001	Lake Blackshear - dam forebay	Flint	Tifton WP	Lake Monitoring	31.8479	-83.9394	X				X	X
1106070701	Flint River at SR 32 near Albany, Ga.	Flint	Tifton WP	Stream target	31.7253	-84.0182	X	X	X	X	X	X
1106090501	Lake Worth- Flint River arm, midlake	Flint	Tifton WP	Lake Monitoring	31.6085	-84.1190	X				X	X
1106090502	Lake Worth - dam forebay	Flint	Tifton WP	Lake Monitoring	31.6033	-84.1365	X				X	X
1107020401	Kinchafoonee Creek at SR 41 near Preston, Ga.	Flint	Tifton WP	Stream target	32.0536	-84.5481	X				X	X
1107050301	Kinchafoonee Creek at SR 118 near Smithville, Ga.	Flint	Tifton WP	Stream target	31.8680	-84.3082	X				X	X
1107060501	Kinchafoonee Creek at Century Road near Leesburg, Ga.	Flint	Tifton WP	Stream target	31.6766	-84.1796	X		X		X	X
1107070401	Muckalee Creek at SR 30 near Americus, Ga.	Flint	Tifton WP	Stream target	32.0831	-84.2581	X				X	X
1107080501	Muckalee Creek at SR 118 near Smithville, Ga.	Flint	Tifton WP	Stream Probablistic	31.8923	-84.1977	X				X	X
1107090301	Muckaloochee Creek at Smithville Road near Starksville, Ga.	Flint	Tifton WP	Stream target	31.8202	-84.1801	X	X			X	X
1107100101	Muckalee Creek at SR 195 near Leesburg, Ga.	Flint	Tifton WP	Stream target	31.7761	-84.1394	X				X	X
1107100301	Lake Chehaw - above Hwy. 91 bridge / diversion dam	Flint	Tifton WP	Lake Monitoring	31.6109	-84.1500	X				X	X
1108030401	Cooleewahee Creek at SR 91 at Newton, Ga.	Flint	Tifton WP	Stream target	31.3300	-84.3306	X	X	X	X	X	X
1108080405	Lake Seminole - Flint River arm at Spring Creek	Flint	Tifton WP	Lake Monitoring	30.7627	-84.8171	X				X	X
1109020201	Little Ichawaynochaway Creek at CR 3 near Shellman, Ga.	Flint	Tifton WP	Stream Trend	31.8035	-84.6400	X	X	X	X	X	X
1109030101	Ichawaynochaway Creek at Herod Dover Road/CR 167	Flint	Tifton WP	Stream target	31.7021	-84.5457	X		X		X	X
1109040401	Carters Creek at CR 22 near Cuthbert, Ga.	Flint	Tifton WP	Stream target	31.6358	-84.7201	X				X	X
1109050401	Pachitla Creek at SR 37 near Edison, Ga.	Flint	Tifton WP	Stream target	31.5547	-84.6786	X	X			X	X

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1109060301	Ichawaynochaway Creek at SR 216 near Milford, Ga.	Flint	Tifton WP	Stream target	31.3828	-84.5478	X				X	X
1109070501	Chickasawhatchee Creek at SR 234 near Albany, Ga.	Flint	Tifton WP	Stream target	31.5936	-84.4533	X	X			X	X
1109090201	Chickasawhatchee Creek at SR 37 near Elmodel, Ga.	Flint	Tifton WP	Stream target	31.3525	-84.4861	X				X	X
1109100101	Ichawaynochaway Creek at SR 91 near Newton, Ga.	Flint	Tifton WP	Stream target	31.2133	-84.4733	X	X	X	X	X	X
1110010201	Spring Creek at SR 62 near Blakely, Ga.	Flint	Tifton WP	Stream target	31.4145	-84.7751	X				X	X
1110050101	Spring Creek at SR 91 near Colquitt, Ga.	Flint	Tifton WP	Stream target	31.1706	-84.7428	X	X			X	X
1110070101	Spring Creek at US Hwy. 84	Flint	Tifton WP	Stream target	30.9753	-84.7456	X	X	X	X	X	X
1110080202	Fishpond Drain at SR 285 near Donalsonville, Ga.	Flint	Tifton WP	Stream target	30.9789	-84.8714	X	X			X	X
0403010208	South River at US Hwy. 23	Upper Ocmulgee	Atlanta WP	Stream Probablistic	33.6803	-84.3461	X					
0403040605	Pounds Creek at Pucketts Drive near Lilburn, Ga.	Upper Ocmulgee	Atlanta WP	Stream Probablistic	33.8372	-84.1089	X					
0403090302	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Ocmulgee	Atlanta WP	Lake Monitoring	33.368229	-83.86334	X					
0403090306	Lake Jackson - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.322	-83.8409	X					
0503100202	Herds Creek at SR 212 near near Jackson, Ga.	Lower Ocmulgee	Atlanta WP	Stream Probablistic	33.3600	-83.7900	X					
0503110606	High Falls Lake - midlake	Lower Ocmulgee	Atlanta WP	Lake Monitoring	33.1973	-84.0310	X					
0503110608	High Falls Lake - dam forebay	Lower Ocmulgee	Atlanta WP	Lake Monitoring	33.1799	-84.0209	X					
0503130703	Lake Juliette - midlake	Lower Ocmulgee	Atlanta WP	Lake Monitoring	33.0464	-83.8106	X					
0503130704	Lake Juliette - dam forebay	Lower Ocmulgee	Atlanta WP	Lake Monitoring	33.0338	-83.7572	X					
0503140503	Lake Tobesofkee - midlake	Lower Ocmulgee	Atlanta WP	Lake Monitoring	32.8346	-83.8161	X					
0503140505	Lake Tobesofkee - dam forebay	Lower Ocmulgee	Atlanta WP	Lake Monitoring	32.8215	-83.7706	X					
0504020601	Mossy Creek at SR 247 near Perry, Ga.	Lower Ocmulgee	Tifton WP	Stream target	32.4513	-83.6236	X				X	X
0504020701	Big Indian Creek at US 129 near Kathleen, Ga.	Lower Ocmulgee	Tifton WP	Stream Probablistic	32.4144	-83.5714	X					
1002030101	Ochlockonee River at CR 306 (Bee Line Road) near Coolidge, Ga.	Ochlockonee	Tifton WP	Stream Probablistic	31.0333	-83.9353	X					
1002040501	Big Creek at SR 111 near Meigs, Ga.	Ochlockonee	Tifton WP	Stream Probablistic	31.0997	-84.0242	X					
1002050301	East Branch Barnetts Creek at CR 159 near Ochlockonee, Ga.	Ochlockonee	Tifton WP	Stream Probablistic	30.9469	-84.0717	X					
1003020201	Attapulgus Creek at US Hwy. 27 near Attapulgus, Ga.	Ochlockonee	Tifton WP	Stream Probablistic	30.7328	-84.4536	X		X			

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1003020501	Swamp Creek at US Hwy. 27 near Attapulgus, Ga.	Ochlockonee	Tifton WP	Stream Probablistic	30.7194	-84.4114	X					
0301030704	Brooklyn Branch at West Lake Drive near Athens, Ga.	Oconee	Atlanta WP	Stream Probablistic	33.9373	-83.4030	X					
0301080201	Apalachee River at State Route 81 near Bethlehem, Ga.	Oconee	Atlanta WP	Stream Trend	33.9158	-83.7814	X	X	X	X	X	X
0301100102	Lake Oconee - Oconee River arm at Hwy. 44,	Oconee	Atlanta WP	Lake Monitoring	33.4314	-83.2657	X				X	
0301100602	Lake Oconee - 300 meters upstream Wallace Dam, dam forebay	Oconee	Atlanta WP	Lake Monitoring	33.3517	-83.1608	X				X	
0301110502	Lake Oconee - Richland Creek arm	Oconee	Atlanta WP	Lake Monitoring	33.3947	-83.1767	X				X	
0301170701	Lake Sinclair - Little River and Murder Creek arm at US Hwy. 441	Oconee	Atlanta WP	Lake Monitoring	33.1890	-83.2953	X				X	
0301170702	Lake Sinclair - 300 meters upstream of dam (dam forebay)	Oconee	Atlanta WP	Lake Monitoring	33.1428	-83.2026	X				X	
0301180104	Lake Sinclair - Oconee River arm (midlake)	Oconee	Atlanta WP	Lake Monitoring	33.1968	-83.2742	X				X	
0202050301	Lower Black Creek at CR 582 (Arcola Road)	Ogeechee	Brunswick WP	Stream Probablistic	32.2600	-81.6372	X					
0202050801	Black Creek at SR 30 near Blichton, Ga.	Ogeechee	Brunswick WP	Stream target	32.1670	-81.4869	X	X	X		X	
0203010701	Canoochee River at SR 121 near Metter, Ga.	Ogeechee	Brunswick WP	Stream target	32.3559	-82.0899	X	X	X	X	X	
0203020501	Fifteenmile Creek at Excelsior Road near Metter, Ga.	Ogeechee	Brunswick WP	Stream target	32.3473	-82.0434	X	X			X	
0203040501	Wateringhole Branch at Country Club Road	Ogeechee	Brunswick WP	Stream Probablistic	32.4149	-81.8482	X	X				
0203040701	Little Lotts Creek at SR 46 near Stateboro, Ga.	Ogeechee	Brunswick WP	Stream Trend	32.3260	-81.8024	X	X	X	X	X	X
0203060601	Canoochee River at Georgia Hwy. 67	Ogeechee	Brunswick WP	Stream target	31.9831	-81.3853	X	X	X	X	X	
0204010104	Casey Canal South at Montgomery Cross Road at Savannah, Ga.	Ogeechee	Brunswick WP	Stream target	31.9924	-81.1019	X				X	
0701020301	Satilla River at SR 135 near Douglas, Ga.	Satilla	Brunswick WP	Stream target	31.4253	-82.8889	X	X			X	
0701030101	Satilla River at SR 64 near Pearson, Ga.	Satilla	Brunswick WP	Stream Probablistic	31.3364	-82.7686	X					
0701030102	Satilla River at CR 247 Minchew Road	Satilla	Brunswick WP	Stream target	31.3079	-82.7011	X				X	
0701050101	Seventeen Mile River at State Route 221 near Douglas, Ga.	Satilla	Brunswick WP	Stream target	31.5196	-82.8239	X				X	
0701050201	Otter Creek at CR 166	Satilla	Brunswick WP	Stream target	31.5314	-82.7452	X				X	
0701060102	Seventeen Mile River at Georgia Hwy. 64 near Pearson, Ga.	Satilla	Brunswick WP	Stream target	31.3733	-82.6788	X				X	
0701060401	Hog Creek at CR 467 (Telmore-Dixie Union Road) at Bickley, Ga.	Satilla	Brunswick WP	Stream target	31.4047	-82.5731	X				X	
0701090401	Little Hurricane Creek at Hwy. 1 near Waycross, Ga.	Satilla	Brunswick WP	Stream target	31.4235	-82.4328	X	X			X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0701100101	Hurricane Creek at US Hwy. 1 Near Alma, Ga.	Satilla	Brunswick WP	Stream target	31.5667	-82.4639	X	X			X	
0701100301	Alabaha River at SR 203	Satilla	Brunswick WP	Stream target	31.3755	-82.2887	X					
0701100402	Alabaha River at CR 160 near Blackshear, Ga.	Satilla	Brunswick WP	Stream target	31.2744	-82.1906	X	X			X	
0701110202	Satilla River at US Hwy. 82 near Atkinson, Ga.	Satilla	Brunswick WP	Stream target	31.2211	-81.8675	X	X	X		X	
0701110401	Buffalo Creek at CR 81 near Hickox, Ga.	Satilla	Brunswick WP	Stream target	31.1194	-81.9519	X				X	
0701110501	Satilla River at SR 252 near Burntfort, Ga.	Satilla	Brunswick WP	Stream target	30.9456	-81.8994	X				X	
0701120304	St. Andrews Sound - Satilla River	Satilla	Brunswick WP	Estuary Monitoring	30.9832	-81.4532	X				X	
0702010301	Big Satilla Creek at US Hwy. 1 near Baxley, Ga.	Satilla	Brunswick WP	Stream Probablistic	31.6583	-82.4322	X					
0702010401	Big Satilla Creek at SR 203 near Baxley, Ga.	Satilla	Brunswick WP	Stream target	31.5908	-82.3117	X				X	
0702020202	Sweetwater Creek at Holland Cemetary Road near Baxley, Ga.	Satilla	Brunswick WP	Stream target	31.5810	-82.2442	X	X			X	
0702040402	Little Satilla Creek at CR 390 (Nine Run Road) near Screven, Ga.	Satilla	Brunswick WP	Stream target	31.4903	-82.0325	X	X			X	
0702050102	Little Satilla River at SR 32 near Hortense, Ga.	Satilla	Brunswick WP	Stream target	31.3512	-82.0336	X				X	
0702050201	Otter Creek at CR 166 near Douglas, Ga.	Satilla	Brunswick WP	Stream target	31.5314	-82.7452	X	X			X	
0702050201	Otter Creek at Otter Creek Road near Blackshear, Ga.	Satilla	Brunswick WP	Stream Trend	31.3402	-82.1405	X	X	X	X	X	X
0703020101	Turtle River off Hermitage Island	Satilla	Brunswick WP	Estuary Monitoring	31.2203	-81.5642	X	X			X	
0703020106	Turtle River at Georgia Hwy. 303	Satilla	Brunswick WP	Stream target	31.1869	-81.5314	X	X			X	
0703020110	Brunswick River at US Hwy. 17	Satilla	Brunswick WP	Stream target	31.1164	-81.4858	X	X	X	X	X	
0703040208	Cumberland Sound - St. Marys River near St. Marys, Ga.	Satilla	Brunswick WP	Estuary Monitoring	30.7281	-81.4898	X				X	
0804020202	Saint Marys River at SR 94 at Saint George, Ga.	St. Marys	Brunswick WP	Stream target	30.5244	-82.0186	X		X		X	
0804040103	Saint Marys River at US Hwy. 301 near Folkston, Ga.	St. Marys	Brunswick WP	Stream target	30.7764	-81.9789	X		X		X	
0901010505	Cane Creek at Spooner Road near Homerville, Ga.	Suwannee	Brunswick WP	Stream target	30.9807	-82.5343	X				X	
0901020202	Jones Creek at Williamsburgh Road near Fargo, Ga.	Suwannee	Brunswick WP	Stream target	30.7318	-82.5381	X		X		X	
0901030502	Suwannoochee Creek at US 441near Fargo, Ga.	Suwannee	Brunswick WP	Stream target	30.6831	-82.5831	X		X		X	
0902020401	West Fork Deep Creek at SR 159 near Amboy, Ga.	Suwannee	Tifton WP	Stream Probablistic	31.7666	-83.6239	X					
0902050402	Willacoochee River at US Hwy. 82 near Willacoochee, Ga.	Suwannee	Brunswick WP	Stream Probablistic	31.3600	-83.1044	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0902060302	Little Brushy Creek at CR 63 (Harrell Road) near Ocilla, Ga.	Suwannee	Tifton WP	Stream Probablistic	31.5075	-83.2089	X					
0902090501	Alapaha River at Georgia Hwy. 94 near Statenville, Ga.	Suwannee	Brunswick WP	Stream target	30.7039	-83.0333	X				X	
0902100101	Banks Lake - near Lakeland, Ga. (175 yards southwest of the spillway)	Suwannee	Brunswick WP	Lake Monitoring	31.0267	-83.1056	X					
0902110303	Alapahoochee River at Antioch Road near Statenville, Ga.	Suwannee	Brunswick WP	Stream target	30.6731	-83.1042	X				X	
0903040402	Withlacoochee River at FAS 1214 north of Valdosta, Ga.	Suwannee	Tifton WP	Stream Probablistic	30.9325	-83.2894	X					
0904010601	Little River at CR 424 (Omega-Eldorado Road) near Omega, Ga.	Suwannee	Tifton WP	Stream Probablistic	31.3508	-83.5217	X		X	X		
0904020501	TyTy Creek at Livingston Bridge Road near Omega, Ga.	Suwannee	Tifton WP	Stream Probablistic	31.2686	-83.5853	X					
1501080501	Peavine Creek at SR 2 near Fort Oglethorpe, Ga.	Tennessee	Cartersville WP	Stream Probablistic	34.9307	-85.1785	X	X				
1501090101	East Chicamauga Creek at Lower Gordon Springs Road near Dalton, Ga.	Tennessee	Cartersville WP	Stream Trend	34.7469	-85.1236	X	X	X	X	X	X
1501110101	Chattanooga Creek at SR 341 near Chattanooga, Tennessee	Tennessee	Cartersville WP	Stream Probablistic	34.9228	-85.3457	X					
1502010202	Mill Creek at Mill Creek Road near Presley, Ga.	Tennessee	Cartersville WP	Stream target	34.8641	-83.6883	X	X			X	
1502010205	Hiawassee River at Streak Hill Road (CR 87) near Presley, Ga.	Tennessee	Cartersville WP	Stream target	34.9119	-83.7089	X	X			X	
1502010501	Lake Chatuge - State Line (LMP 12)	Tennessee	Cartersville WP	Lake Monitoring	34.9833	-83.7886	X					
1502040201	Brasstown Creek at SR 66 near Young Harris, Ga.	Tennessee	Cartersville WP	Stream Probablistic	34.9730	-83.8819	X	X				
1502080301	Nottely River at Morgan Bridge near Blairsville, Ga.	Tennessee	Cartersville WP	Stream target	34.8418	-83.9358	X	X			X	
1502080601	Lake Nottely - Reece Creek (LMP15A)	Tennessee	Cartersville WP	Lake Monitoring	34.9115	-84.0506	X					
1502080602	Lake Nottely - Dam Forebay (upstream From Nottley Dam)	Tennessee	Cartersville WP	Lake Monitoring	34.9578	-84.0922	X					
1503010701	Lake Blue Ridge - 300 meters upstream of dam (LMP18)	Tennessee	Cartersville WP	Lake Monitoring	34.8817	-84.2800	X					
1503010702	Lake Blue Ridge - 4 miles upstream of dam (LMP18A)	Tennessee	Cartersville WP	Lake Monitoring	34.8402	-84.2731	X					

[1] **Sampling Organization**: Atlanta WP = GAEPD Atlanta office; Brunswick WP = GAEPD Brunswick Regional office; Cartersville WP = GAEPD Cartersville, Office; Tifton WP = GAEPD Tifton Office; Columbus WW = Columbus Water Works; USGS = U.S. Geological Survey.
[2]**Standard field parameters include:** gage height / tape down or discharge measurement, air temperature, water temperature, dissolved oxygen, pH, specific conductivtance.
[2]**Standard chemical parameters include:** turbidity, specific conductance, 5-day BOD, pH, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, Kjeldahl nitrogen, total phosphorus, total organic carbon, and fecal coliform.
[2]**Basin lakes field and chemical parameters include:** water depth, secchi disk transparency, photic zone depth, air temperature, depth profiles for dissolved oxygen, temperature, pH, and specific conductance, and chemical analyses for turbidity, specific conductance, 5-day BOD, pH, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, Kjeldahl nitrogen, total phosphorus, total organic carbon, and chlorophyll a.
[3]**Biomonitoring:** conducted for invertebrates and periphyton using Georgia EPD protocols.

TABLE 3-8. GEORGIA BASIN MONITORING NETWORK 2011

Rivers and streams stations are sampled monthly for field and chemical parameters for one calendar year every five years. Four fecal coliform bacterial samples are collected each calendar quarter during the focused monitoring year. Basin lakes and reservoirs are sampled monthly during the growing season for the calendar year.

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0606050204	Altamaha River - channel marker #201 off Wolf Island	Altamaha	Brunswick WP	Estuary Monitoring	31.319166	-81.325	X					
0607030402	Ohoopee River at SR 152 near Lyons, GA	Altamaha	Brunswick WP	Stream Targeted	32.284527	-82.2293	X					
0607040203	Pendleton Creek at SR 297 near Oak Park, Ga	Altamaha	Brunswick WP	Stream Targeted	32.353792	-82.4092	X					
0607050301	Rocky Creek at Lyons Center Road near Lyons, GA	Altamaha	Brunswick WP	Stream Targeted	32.14765	-82.37558	X	X				
0607050601	Ohoopee River at State Road 178 near Glennville, GA	Altamaha	Brunswick WP	Stream Targeted	31.920278	-82.11278	X	X		X		
1202070501	Beech Creek at Hammett Road near LaGrange, Ga	Chattahoochee	Atlanta WP	Stream Targeted	33.09541	-84.99416	X					
1201040404	Lake Sidney Lanier - Little River Embayment, Betw M1WC & 3LR	Chattahoochee	Atlanta WP	Lake Monitoring	34.355	-83.8427	X					
1201060101	Chestatee River at Copper Mines Road near Dahlonega, Ga	Chattahoochee	Cartersville WP	Stream Probablistic	34.543772	-83.88715	X		X			
1201070501	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.31235	-83.9501	X					
1201080103	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.32195	-83.88017	X					
1201080203	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Chattahoochee	Atlanta WP	Lake Monitoring	34.261666	-83.95066	X					
1201080304	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2587	-83.9198	X					
1201080307	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2504	-83.9244	X					
1201080401	Lake Sidney Lanier - Mud Crk Embayment, Betw Marina & Ramp	Chattahoochee	Atlanta WP	Lake Monitoring	34.2333	-83.9373	X					
1201080403	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Chattahoochee	Atlanta WP	Lake Monitoring	34.200278	-83.98287	X					
1201080603	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E M9SM	Chattahoochee	Atlanta WP	Lake Monitoring	34.2335	-84.0287	X					
1201080902	Lake Sidney Lanier upstream of Buford Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	34.162778	-84.06711	X					
1201090205	Chattahoochee River at McGinnis Ferry Road	Chattahoochee	Atlanta WP	Stream AWW	34.050556	-84.0977	X	X		X		
1201090705	Chattahoochee River - DeKalb County Water Intake	Chattahoochee	Atlanta WP	Stream AWW	33.9731	-84.2631	X	X				
1201090707	Crooked Creek at Spalding Drive near Norcross, GA	Chattahoochee	Atlanta WP	Stream Targeted	33.965	-84.26472	X					
1201110101	Big Creek at Roswell Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	Stream AWW	34.017851	-84.35249	X	X				

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1201110107	March Creek At Brandon Mill Road	Chattahoochee	Atlanta WP	Stream Probablistic	33.9475	-84.38722	X					
1201110109	Chattahoochee River at Cobb County Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	Stream AWW	33.9443	-84.405	X	X				
1201110609	Chattahoochee River - Atlanta Water Intake	Chattahoochee	Atlanta WP	Stream AWW	33.8278	-84.455	X	X				
1201120403	Peachtree Creek at Northside Drive near Atlanta, GA	Chattahoochee	Atlanta WP	Stream AWW	33.8194	-84.40778	X	X		X	X	
1202010104	Chattahoochee River at Bankhead Highway	Chattahoochee	Atlanta WP	Stream AWW	33.795278	-84.50778	X	X		X	X	
1202010301	Utoy Creek At Great Southwest Parkway	Chattahoochee	Atlanta WP	Stream Targeted	33.743506	-84.56832	X	X	X	X	X	
1202020802	Sweetwater Creek at Interstate Highway 20	Chattahoochee	Atlanta WP	Stream AWW	33.7728	-84.61472	X	X				
1202030102	Chattahoochee River - Georgia Highway 92	Chattahoochee	Atlanta WP	Stream AWW	33.6567	-84.67361	X	X				
1202031202	Chattahoochee River at Capps Ferry Road near Rico, GA	Chattahoochee	Atlanta WP	Stream AWW	33.5778	-84.80861	X	X				
1202060501	Hillabahatchee Creek at State Road 34 near Franklin, GA	Chattahoochee	Atlanta WP	Stream Trend	33.280556	-85.11944	X	X	X	X	X	
1202060802	West Point Lake at LaGrange Water Intake near LaGrange, GA (aka Chatt. River at Lagrange Intake)	Chattahoochee	Atlanta WP	Lake Monitoring	33.0783	-85.11083	X					
1202080208	West Point Lake - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.9208	-85.1834	X					
1202091102	Blue John Creek - Orchard Hill Road At Lagrange	Chattahoochee	Atlanta WP	Stream Targeted	32.999722	-85.05139	X	X				
1202091302	Chattahoochee River at Hwy 29 at West Point, GA	Chattahoochee	Atlanta WP	Stream Targeted	32.8777	-85.18063	X					
1202110102	Lake Harding - Midlake, Main Body	Chattahoochee	Atlanta WP	Lake Monitoring	32.7379	-85.1125	X					
1202110104	Lake Harding - Dam Forebay (aka Chatt. River US Bartletts Ferry Dam)	Chattahoochee	Atlanta WP	Lake Monitoring	32.6633	-85.09028	X					
1202130501	Goat Rock Lake - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.6112	-85.0794	X					
1202130503	Lake Oliver - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.516	-85.0009	X					
1203010401	Weracoba Creek - 0.3 Mile Downstream From Cusseta Road	Chattahoochee	Atlanta WP	Stream Targeted	32.456667	-84.975	X			X		
1203030801	Upatoi Crk at Ft. Benning Rd (Fort Benning) nr Columbus, GA	Chattahoochee	Atlanta WP	Stream Targeted	32.374595	-84.95666	X					
1203130102	Lake Walter F. George at U.S. Highway 82 (aka Chatt. River at Hwy 82)	Chattahoochee	Tifton WP	Lake Monitoring	31.891944	-85.12083	X					
1203160102	Lake Walter F. George at Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	31.629167	-85.0725	X					
1204010101	Chattahoochee River at State Road 37 near Fort Gaines, GA	Chattahoochee	Tifton WP	Stream Targeted	31.604167	-85.05528	X					
1204070101	Lake Andrews - Dam Forbay	Chattahoochee	Tifton WP	Lake Monitoring	31.2632	-85.113	X					
1204080104	Lake Seminole - Chattahoochee Arm, Lower	Chattahoochee	Tifton WP	Lake Monitoring	30.7662	-84.9201	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1204080106	Lake Seminole - Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	30.7115	-84.8647	X					
1401020501	Suman Creek at State Road 225 near Sumac, GA	Coosa	Cartersville WP	Stream Targeted	34.894381	-84.80204	X	X	X	X		
1401030401	Coahulla Creek at SR2	Coosa	Cartersville WP	Stream Targeted	34.896167	-84.92072	X		X			
1401030703	Coahulla Creek at Keiths Mill Rd (FAS 2354) East Of Dalton	Coosa	Cartersville WP	Stream Targeted	34.743333	-84.88056	X		X			
1401040601	Holly Creek - 3.3 Mile South Of Chatsworth (Smryna-Ranhurst Rd.)	Coosa	Cartersville WP	Stream Targeted	34.716667	-84.77	X		X			
1401040603	Holly Creek at Georgia Highway 225 near Chatsworth, GA	Coosa	Cartersville WP	Stream Targeted	34.6719	-84.8247	X		X			
1401050109	Conasauga River at State Road 136 near Resaca, GA	Coosa	Cartersville WP	Stream Targeted	34.593333	-84.93389	X	X	X	X	X	
1402010601	Cartecay River at State Road 2 Connector near Ellijay, GA	Coosa	Cartersville WP	Stream Targeted	34.6858	-84.47437	X	X	X			
1402020502	Ellijay River at SR 52 (River Street) near Ellijay, GA	Coosa	Cartersville WP	Stream Targeted	34.692037	-84.47845	X		X			
1402040201	Coosawattee River at Bridge in Coosawattee Resort	Coosa	Cartersville WP	Stream Targeted	34.655537	-84.54224	X	X	X			
1402040301	Tails Creek at SR282 / US Hwy 76 near Ellijay, GA	Coosa	Cartersville WP	Stream Targeted	34.686184	-84.60025	X		X			
1402040401	Carters Lake (CR1) - Upper Lake, Coosawattee Arm	Coosa	Cartersville WP	Lake Monitoring	34.62087	-84.6212	X					
1402040402	Carters Lake - Midlake (upstream from Woodring Branch)	Coosa	Cartersville WP	Lake Monitoring	34.6076	-84.638	X					
1402060401	Salacoa Creek at Mauldlin Road near Farimount, GA	Coosa	Cartersville WP	Stream Targeted	34.468575	-84.73316	X		X			
1402070101	Pine Log Creek at U.S. 411/SR 61 near Rydal, GA	Coosa	Cartersville WP	Stream Targeted	34.369698	-84.71157	X		X			
1402070601	Pine Log Creek at Georgia Highway 53 near Sonoraville, GA	Coosa	Cartersville WP	Stream Targeted	34.4481	-84.7933	X		X			
1402080702	Coosawattee River at State Road 225 near Calhoun, GA	Coosa	Cartersville WP	Stream Targeted	34.541111	-84.90083	X	X	X	X		
1403010101	Oostanaula River at U.S. Highway 41 near Resaca, GA	Coosa	Cartersville WP	Stream Targeted	34.57715	-84.94212	X	X	X	X	X	
1403010401	Oostanaula River at Georgia Highway 156 near Calhoun, GA	Coosa	Cartersville WP	Stream Targeted	34.4919	-85.0136	X		X			
1403020301	Oothkalooga Creek at State Road 156 near Calhoun, GA	Coosa	Cartersville WP	Stream Targeted	34.505482	-84.96856	X		X	X		
1403050701	Armuchee Creek at Old Dalton Road near Rome, GA	Coosa	Cartersville WP	Stream Targeted	34.3608	-85.1403	X		X			
1403060101	Oostanaula River at SR140 near Armuchee, GA	Coosa	Cartersville WP	Stream Targeted	34.379444	-85.12444	X	X	X			
1404010701	Etowah River at Hwy 53 near Dawsonville	Coosa	Cartersville WP	Stream Targeted	34.381867	-84.06342	X		X			
1404020401	Amicalola Creek at State Road 53 near Dawsonville, GA	Coosa	Cartersville WP	Stream Targeted	34.426141	-84.21263	X		X			
1404030601	Etowah River at Yellow Creek Road near Ball Ground, GA	Coosa	Cartersville WP	Stream Targeted	34.301123	-84.27378	X		X	X		

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1404040401	Long Swamp Creek at Conns Creek Road near Ball Ground, GA	Coosa	Cartersville WP	Stream Targeted	34.3267	-84.34484	X		X	X		
1404050601	Sharp Mountain Creek at State Road 5 near Ball Ground, GA	Coosa	Cartersville WP	Stream Targeted	34.31083	-84.4038	X		X			
1404080101	Little River at Batesville Road near Arnold Mill	Coosa	Atlanta WP	Stream Targeted	34.136925	-84.36112	X		X	X		
1404080201	Chicken Creek at Batesville Road near Arnold Mill	Coosa	Atlanta WP	Stream Targeted	34.130573	-84.35324	X		X	X		
1404080902	Lake Allatoona at Little River upstream from Highway 205	Coosa	Cartersville WP	Lake Monitoring	34.158611	-84.57722	X					
1404090401	Lake Allatoona Upstream from Dam	Coosa	Cartersville WP	Lake Monitoring	34.160833	-84.72585	X					
1404090404	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Coosa	Cartersville WP	Lake Monitoring	34.085833	-84.71139	X					
1404100104	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Coosa	Cartersville WP	Lake Monitoring	34.19	-84.57778	X					
1404100409	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Coosa	Cartersville WP	Lake Monitoring	34.138611	-84.63917	X					
1404110301	Pumpkinvine Creek at SR61	Coosa	Atlanta WP	Stream Targeted	33.962667	-84.85422	X	X	X			
1404110501	Pumpkinvine Creek at County Road 636 near Emerson, GA	Coosa	Cartersville WP	Stream Targeted	34.1147	-84.79	X	X	X	X		
1404130103	Etowah River at SR293 at Cartersville, GA	Coosa	Cartersville WP	Stream Targeted	34.146389	-84.77139	X	X	X	X	X	
1404130302	Pettit Creek at CR450 near Cartersville, GA	Coosa	Cartersville WP	Stream Probablistic	34.165278	-84.81639	X		X			
1404140101	Euharlee Creek at Government Farm Road	Coosa	Cartersville WP	Stream Targeted	33.985111	-85.08253	X		X	X		
1404140702	Euharlee Creek at Covered Bridge Road	Coosa	Cartersville WP	Stream Targeted	34.108083	-84.95036	X		X	X		
1404160402	Dykes Crk at Dykes Crk Xing nr Rome, GA	Coosa	Cartersville WP	Stream Targeted	34.263568	-85.08553	X	X	X	X	X	
1404160702	Etowah River at Turner Mccall Boulevard (Hwy 27) near Rome, GA	Coosa	Cartersville WP	Stream Targeted	34.254156	-85.16403	X	X	X	X	X	
1405010106	Coosa River at Blacks Bluff Road near Rome, GA	Coosa	Cartersville WP	Stream Targeted	34.206	-85.28036	X	X	X	X	X	
1405020304	Cedar Creek - Seab Green Road, Nw Of Cedartown	Coosa	Cartersville WP	Stream Targeted	34.049167	-85.28389	X		X			
1405060102	Alpine Creek at Oak Hill Alpine Road near Menlo, GA	Coosa	Cartersville WP	Stream Targeted	34.453	-85.489	X		X			
1105010109	Flint River - Georgia Highway 85	Flint	Atlanta WP	Stream Targeted	33.605278	-84.40444	X	X	X			
1105030301	White Oak Creek at State Road 54 near Sharpsburg, GA	Flint	Atlanta WP	Stream Targeted	33.277541	-84.70199	X					
1105030601	White Oak Creek at State Road 85 near Alvaton, GA	Flint	Atlanta WP	Stream Targeted	33.178889	-84.58111	X	X				
1105070502	Flint River at Sprewell Bluff State Park near	Flint	Atlanta WP	Stream Trend	32.855988	-84.47681	X	X	X	X	X	
1105080301	Lazer Creek at State Road 41 near Talbotton, GA	Flint	Atlanta WP	Stream Probablistic	32.7425	-84.55556	X			X		

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1105130201	Flint River At Georgia Highway 128 Near Roberta	Flint	Atlanta WP	Stream Targeted	32.668889	-84.09889	X					
1106010703	Spring Crk at SR 90 nr Montezuma, GA	Flint	Tifton WP	Stream Targeted	32.284784	-84.00756	X	X		X		
1106040701	Lime Creek at Spring Hill Church Road near Cobb, GA	Flint	Tifton WP	Stream Targeted	32.035	-83.9925	X	X	X	X	X	
1106060110	Lake Blackshear - Midlake	Flint	Tifton WP	Lake Monitoring	31.9665	-83.9342	X					
1106060503	Gum Creek at U.S. Highway 280 at Coney, GA	Flint	Tifton WP	Stream Targeted	31.961111	-83.88389	X	X				
1106061001	Lake Blackshear - Dam Forebay	Flint	Tifton WP	Lake Monitoring	31.8479	-83.9394	X					
1106061109	Gully Creek at Slade Road near Cordele, GA	Flint	Tifton WP	Stream Targeted	31.948702	-83.844856	X					
1106070701	Flint River at SR 32 nr Albany, GA	Flint	Tifton WP	Stream Targeted	31.725254	-84.01824	X			X		
1106090501	Flint River Reservoir - Midlake, Flint River Arm	Flint	Tifton WP	Lake Monitoring	31.6085	-84.119	X					
1106090502	Flint River Reservoir (Lake Worth) - Dam Forebay	Flint	Tifton WP	Lake Monitoring	31.6033	-84.1365	X					
1107050301	Kinchafoonee Creek at State Road 118 near Smithville, GA	Flint	Tifton WP	Stream Probablistic	31.868049	-84.30823	X					
1107100301	Lake Worth (original) - Above Hwy 91 Bridge / Diversion Dam (aka Lake Chehaw)	Flint	Tifton WP	Lake Monitoring	31.6109	-84.15	X					
1108050501	Big Slough at State Road 65 near Camilla, GA	Flint	Tifton WP	Stream Targeted	31.150556	-84.28861	X	X				
1108080405	Lake Seminole - Flint River Arm @ Spring Creek	Flint	Tifton WP	Lake Monitoring	30.7627	-84.8171	X					
1109020201	Little Ichawaynochaway Crk at CR 3 nr Shellman, GA	Flint	Tifton WP	Stram Targeted	31.803532	-84.64001	X	X	X	X	X	
1109070202	Brantley Creek at CR 133 near Herod, GA	Flint	Tifton WP	Stream Targeted	31.71835	-84.40112	X	X		X	X	
1110020101	Dry Creek at Five Bridge Rd. near Blakely, Ga	Flint	Tifton WP	Stream Targeted	31.345711	-84.86408	X					
1110020501	Dry Creek at County Road 279 near Hentown, GA	Flint	Tifton WP	Stream Targeted	31.28596	-84.81907	X					
1110040501	Aycocks Creek at Holmes Road near Boykin, GA	Flint	Tifton WP	Stream Targeted	31.086407	-84.73617	X	X		X		
1110050101	Spring Creek at State Road 91 near Colquitt, GA	Flint	Tifton WP	Stream Targeted	31.170556	-84.74278	X					
1110080202	Fishpond Drain at State Road 285 near Donalsonville, GA	Flint	Tifton WP	Stream Targeted	30.978889	-84.87139	X					
1110080301	Fishpond Drain at CR 219 (Joel Pool Rd.) near Reynoldsville, GA	Flint	Tifton WP	Stream Targeted	30.88583	-84.84643	X			X		
1001010101	Wards Creek at County Road 20 (Twelve Mile Post Rd.) near Metcalf, GA	Ochlockonee	Tifton WP	Stream Targeted	30.690278	-83.90361	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1002010102	Ochlockonee River at CR 411 (Bridgeboro Anderson Rd) near Bridgeboro, GA	Ochlockonee	Tifton WP	Stream Targeted	31.394167	-83.89444	X	X				
1002010401	Ochlockonee River - FAS 1205 near Moultrie, GA	Ochlockonee	Tifton WP	Stream Targeted	31.142333	-83.80361	X	X		X		
1002030102	Ochlockonee River at SR 188 near Coolidge, GA	Ochlockonee	Tifton WP	Stream Targeted	31.002222	-83.93917	X					
1002040503	Oaky Woods Creek at Stage Rd. near Meigs, GA	Ochlockonee	Tifton WP	Stream Targeted	31.034832	-84.02429	X					
1002050302	Horse Creekat SR 188 near Ochlocknee, GA	Ochlockonee	Tifton WP	Stream Targeted	30.965309	-84.07854	X			X		
1002060201	Oquina Creek at County Road 138 (Old Cassidy Rd.) near Thomasville, GA	Ochlockonee	Tifton WP	Stream Targeted	30.884714	-83.98171	X			X		
1002080301	Parkers Mill Creek at County Road 324 near Cairo, GA	Ochlockonee	Tifton WP	Stream Targeted	30.838056	-84.22611	X	X				
1002080401	Tired Creek at County Road 151 near Reno, GA	Ochlockonee	Tifton WP	Stream Probablistic	30.763611	-84.22944	X					
1003010401	Aucilla River at Twelve Mile Post Rd. near Boston, GA	Ochlockonee	Tifton WP	Stream Targeted	30.712452	-83.7444	X	X	X			
1003020201	Attapulgus Creek at U.S. Hwy 27 near Attapulgus, GA	Ochlockonee	Tifton WP	Stream Targeted	30.732778	-84.45361	X		X	X		
1003020302	Little Attapulgus Creek at Faceville-Attapulgus Rd. near Attapulgus, GA	Ochlockonee	Tifton WP	Stream Targeted	30.750046	-84.50133	X		X	X		
0403010201	Doless Creek at Flat Shoals Road near Decatur, GA	Ocmulgee	Atlanta WP	Stream Targeted	33.705898	-84.27743	X	X		X	X	
0403010403	Snapfinger Creek - Dogwood Farms Road	Ocmulgee	Atlanta WP	Stream Probablistic	33.665556	-84.21139	X			X		
0403010501	South River - Georgia Highway 155 near Lithonia, GA	Ocmulgee	Atlanta WP	Stream Targeted	33.653889	-84.18667	X	X		X	X	
0403010703	South River at State Road 20 near Kelleytown, GA	Ocmulgee	Atlanta WP	Stream Probablistic	33.525	-84.04472	X	X				
0403040702	Stone Mountain Creek at Silver Hill Road near Stone Mountain, GA	Ocmulgee	Atlanta WP	Stream Probablistic	33.826111	-84.16528	X	X		X	X	
0403050104	Yellow River at Pleasant Hill Road near Lithonia ,GA	Ocmulgee	Atlanta WP	Stream Targeted	33.733822	-84.06161	X			X		
0403090302	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Ocmulgee	Atlanta WP	Lake Monitoring	33.368229	-83.86334	X					
0403090306	Lake Jackson - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.322	-83.8409	X					
0503110606	High Falls Lake - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	33.1973	-84.031	X					
0503110608	High Falls Lake - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.1799	-84.0209	X					
0503130703	Lake Juliette - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	33.0464	-83.8106	X					
0503130704	Lake Juliette - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.0338	-83.7572	X					
0503140503	Lake Tobesofkee - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	32.8346	-83.8161	X					
0503140505	Lake Tobesofkee - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	32.8215	-83.7706	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0505020201	Gum Swamp Creek at Jaybird Springs Road near Eastman, GA	Ocmulgee	Tifton WP	Stream Targeted	32.134666	-83.00356	X					
0505030201	Alligator Creek at State Road 46 near McRae, GA	Ocmulgee	Tifton WP	Stream Targeted	32.228611	-82.98472	X					
0505030501	Alligator Creek at CR 175 near Alamo, GA	Ocmulgee	Tifton WP	Stream Targeted	32.161703	-82.82199	X					
0505030601	Alligator Creek at State Road 134 near Alamo, GA	Ocmulgee	Tifton WP	Stream Targeted	32.026389	-82.69556	X			X		
0505040102	Sugar Creek at Harry Hargrove Rd. near Eastman, GA	Ocmulgee	Tifton WP	Stream Targeted	32.146168	-83.14985	X					
0505040103	Sugar Creek at SR 117 near Eastman, GA	Ocmulgee	Tifton WP	Stream Targeted	32.172089	-83.18189	X					
0505040301	Turnpike Creek at Cedar Park Dowdyville Road near Lumber City, GA	Ocmulgee	Tifton WP	Stream Probablistic	31.948889	-82.81028	X			X		
0505040402	Sugar Creek - U.S. Hwy 280 / SR 30 near	Ocmulgee	Tifton WP	Stream Probablistic	32.053538	-82.9076	X					
0301030601	Kingswood Branch at Jennings Mill Road near Athens, GA	Oconee	Atlanta WP	Stream Targeted	33.92665	-83.46092	X	X		X		
0301090302	Jacks Creek at Bearden Road near Monroe, GA	Oconee	Atlanta WP	Stream Probablistic	33.79966	-83.61913	X	X				
0301090701	Apalachee River - U.S. Highway 278	Oconee	Atlanta WP	Stream Probablistic	33.608611	-83.34944	X					
0301100102	Lake Oconee At Highway 44, Oconee River Arm	Oconee	Atlanta WP	Lake Monitoring	33.431394	-83.26573	X					
0301100602	Lake Oconee 300 Meters Upstream Wallace Dam (Dam Forebay)	Oconee	Atlanta WP	Lake Monitoring	33.351667	-83.16083	X					
0301110501	Lake Oconee - Richland Creek Embayment	Oconee	Atlanta WP	Lake Monitoring	33.414444	-83.19028	X					
0301140601	Big Indian Creek at Georgia Highway 83 near Madison, GA	Oconee	Atlanta WP	Stream Targeted	33.525556	-83.52444	X	X				
0301170701	Lake Sinclair - Little River & Murder Creek Arm, U/S U.S. Hwy 441	Oconee	Atlanta WP	Lake Monitoring	33.189	-83.2953	X					
0301170702	Lake Sinclair - 300 Meters Upstream Dam (Dam Forebay)	Oconee	Atlanta WP	Lake Monitoring	33.142817	-83.20262	X					
0301180104	Lake Sinclair - Midlake, Oconee River Arm	Oconee	Atlanta WP	Lake Monitoring	33.1968	-83.2742	X					
0202040201	Mill Creek at Lakeview Rd.	Ogeechee	Brunswick WP	Stream Targeted	32.49264	-81.77819	X					
0202040301	Mill Creek at Bulloch County Road 386 Old River Road near Brooklet, GA	Ogeechee	Brunswick WP	Stream Targeted	32.438364	-81.57856	X					
0202050402	Upper Black Creek at CR 582 (Arcola Rd.)	Ogeechee	Brunswick WP	Stream Targeted	32.27574	-81.62826	X					
0202050801	Black Creek at State Road 30 near Blichton, GA	Ogeechee	Brunswick WP	Stream Targeted	32.167043	-81.48685	X		X	X		
0202060501	Ogeechee River at Morgans Bridge Rd. near Bloomingdale, GA	Ogeechee	Brunswick WP	Stream Targeted	32.080379	-81.38513	X	X		X		
0202060601	Ogeechee River at U.S. Hwy 17	Ogeechee	Brunswick WP	Stream Targeted	31.97824	-81.28871	X		X	X		
0203010701	Canoochee River at SR 121 near Metter, GA	Ogeechee	Brunswick WP	Stream Targeted	32.355911	-82.08991	X		X			

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0203020501	Fifteenmile Creek at Candler County Road 28 near Metter, GA	Ogeechee	Brunswick WP	Stream Targeted	32.347341	-82.04344	X			X		
0203030401	Tenmile Creek at Road S2242 (Adabelle Road) near Excelsior, GA	Ogeechee	Brunswick WP	Stream Targeted	32.279651	-81.96155	X					
0203030701	Cedar Creek at State Road 129 at Claxton, GA	Ogeechee	Brunswick WP	Stream Targeted	32.174253	-81.92234	X					
0203040701	Little Lotts Creek at SR46 near Stateboro, GA	Ogeechee	Brunswick WP	Stream Targeted	32.32603	-81.8024	X	X	X	X	X	
0203050601	Taylors Creek at SR119/144 near Hinesville, GA	Ogeechee	Brunswick WP	Stream Targeted	31.893544	-81.63236	X	X				
0203050702	Canoochee Creek at SR 129 near Hinesville, GA	Ogeechee	Brunswick WP	Stream Targeted	31.948929	-81.63297	X					
0203060601	Canoochee River - Georgia Highway 67	Ogeechee	Brunswick WP	Stream Targeted	31.983056	-81.38528	X		X	X		
0204020104	St. Catherines Sound at Medway River Near Midway, GA	Ogeechee	Brunswick WP	Estuary Monitoring	31.715469	-81.1568	X					
0204040103	Sapelo Sound at South Newport River near Barbour Island, GA	Ogeechee	Brunswick WP	Estuary Monitoring	31.554108	-81.20036	X					
0804020202	Saint Marys River at State Road 94 at Saint George, GA	Saint Marys	Brunswick WP	Stream Targeted	30.524444	-82.01861	X			X		
0804030402	Clay Branch at Main Street near Folkston, GA	Saint Marys	Brunswick WP	Stream Targeted	30.828062 22	-82.01917	X					
0804040103	Saint Marys River - U.S. Highway 301 near Folkston, GA	Saint Marys	Brunswick WP	Stream Targeted	30.776389	-81.97889	X	X		X		
0804040202	Saint Marys River at U.S. Highway 17 near Gross, Florida	Saint Marys	Brunswick WP	Stream Targeted	30.741389	-81.68806	X	X				
0701020301	Satilla River at SR 135 near	Satilla	Brunswick WP	Stream Targeted	31.42529	-82.88891	X	X				
0701060201	Hog Creek at SR 32 near Nichols, GA	Satilla	Brunswick WP	Stream Targeted	31.520977	-82.62534	X	X				
0701090401	Little Hurricane Creek at Hwy 1 near Waycross, GA	Satilla	Brunswick WP	Stream Targeted	31.423477	-82.43284	X					
0701100202	Hurricane Creek at County Road 331 near Alma, GA	Satilla	Brunswick WP	Stream Targeted	31.46	-82.37667	X	X		X		
0701100301	Alabaha River - SR 203	Satilla	Brunswick WP	Stream Targeted	31.37547	-82.28867	X	X	X	X		
0701100402	Alabaha River at County Road 160 near Blackshear , GA	Satilla	Brunswick WP	Stream Targeted	31.274444	-82.19056	X		X	X		
0701110501	Satilla River at State Road 252 near Burntfort, GA	Satilla	Brunswick WP	Stream Targeted	30.945556	-81.89944	X		X	X		
0701120101	Satilla River at U.S. Highway 17 at Woodbine, GA	Satilla	Brunswick WP	Stream Targeted	30.974444	-81.72583	X					
0701120304	St. Andrews Sound at Satilla Riv near	Satilla	Brunswick WP	Estuary Monitoring	30.983162	-81.45324	X					
0702010301	Big Satilla Creek @ US Hwy 1 near Baxley, GA.	Satilla	Brunswick WP	Stream Targeted	31.658316	-82.43222	X					
0702020202	Sweetwater Crk at Holland Cemetary Rd nr Baxley, GA	Satilla	Brunswick WP	Stream Probablistic	31.580973	-82.24418	X	X	X			
0702030101	Big Satilla Creek @ SR 121 near Blackshear, GA.	Satilla	Brunswick WP	Stream Targeted	31.506483	-82.1997	X					

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
0702050202	Sixty-foot Branch @ SR 32 near Petterson	Satilla	Brunswick WP	Stream Targeted	31.361	-82.0717	X	X	X	X	X	
0703020101	Turtle River off Hermitage Island	Satilla	Brunswick WP	Estuary Monitoring	31.220278	-81.56417	X	X				
0703020106	Turtle River - Georgia Highway 303	Satilla	Brunswick WP	Estuary Monitoring	31.186944	-81.53139	X	X				
0703020110	Brunswick River - U.S. Highway 17	Satilla	Brunswick WP	Estuary Monitoring	31.1164	-81.4858	X	X		X	X	
0703040208	Cumberland Sound at St. Marys Riv nr St Marys, GA	Satilla	Brunswick WP	Estuary Monitoring	30.728073	-81.48979	X					
0901020201	Tatum Creek at U.S. Highway 441 near Homerville, GA	Suwannee	Brunswick WP	Stream Targeted	30.896389	-82.66583	X	X		X		
0902010301	Mill Creek at State Road 112 near Rochelle, GA	Suwannee	Tifton WP	Stream Targeted	31.911667	-83.47583	X	X				
0902030101	Alapaha River at State Road 32 near Irwinville, GA	Suwannee	Tifton WP	Stream Targeted	31.631111	-83.41806	X					
0902030301	Sand Creek at State Road 125 near Irwinville, GA	Suwannee	Tifton WP	Stream Targeted	31.609444	-83.44472	X	X				
0902050101	Willacoochee River at Perry House Rd. near Fitzgerald, GA	Suwannee	Tifton WP	Stream Targeted	31.660538	-83.26225	X					
0902050201	Turkey Creek at Ed Ward Rd. near Fitzgerald, GA	Suwannee	Tifton WP	Stream Targeted	31.679335	-83.25069	X	X				
0902050303	Willacoochee River at Frank Church Rd. near Ocilla, GA	Suwannee	Tifton WP	Stream Targeted	31.635132	-83.22877	X					
0902070401	Alapaha River at SR 129 near Lakeland, GA	Suwannee	Brunswick WP	Stream Targeted	31.046226	-83.04341	X		X	X		
0902090501	Alapaha River - Georgia Highway 94 nr Statenville	Suwannee	Brunswick WP	Stream Targeted	30.703889	-83.03333	X					
0902100101	Banks Lake - Near Lakeland, GA	Suwannee	Brunswick WP	Lake Monitoring	31.026667	-83.10556	X					
0902110303	Alapahoochee Riv at Antioch Rd/J'frank Culpepper Rd nr Statenville, GA	Suwannee	Brunswick WP	Stream Targeted	30.673141	-83.10424	X		X	X		
0903030201	Cat Creek at C R 777 (Cat Creek Rd) near Barretts, GA	Suwannee	Tifton WP	Stream Targeted	30.989722	-83.245	X					
0903030202	Beatty Branch at Beatty Road near Barretts, GA	Suwannee	Tifton WP	Stream Targeted	30.98622	-83.22038	X					
0903040203	Bear Creek at Community Church Rd. near Adel, GA	Suwannee	Tifton WP	Stream Targeted	31.121521	-83.36225	X	X		X		
0903040404	Sugar Creek - Gronto Road, Northwest Valdosta	Suwannee	Tifton WP	Stream Probablistic	30.859444	-83.31722	X					
0903060301	Okapilco Creek - U.S. Highway 84 near Quitman, GA	Suwannee	Tifton WP	Stream Targeted	30.786111	-83.52583	X					
0903080101	Withlacoochee River - U.S. Highway 84	Suwannee	Tifton WP	Stream Targeted	30.793056	-83.45361	X	X		X		
0904030402	Horse Creek at County Road 178 near Gordy, GA	Suwannee	Tifton WP	Stream Targeted	31.397778	-83.80528	X					
1308010401	Tallapoosa River at Rockmart Road near Draketown, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.885359	-85.09487	X		X			
1308010501	Little River at East Church Road near Buchanan, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.853228	-85.16952	X	X	X			

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1308010601	Tallapoosa River at U.S. Highway 27 near Felton, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.863333	-85.21361	X	X	X			
1308010602	Cochran Creek at Bennett Street near Buchanan, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.85746	-85.19689	X		X			
1308080301	Little Tallapoosa River at Muses Bridge Road near Carrollton, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.648376	-85.03146	X	X	X	X		
1308080401	Little Tallapoosa River at U.S. Highway 27 near Carrollton, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.597222	-85.08028	X		X			
1308080601	Buck Creek at State Road 16 near Carrollton, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.592379	-85.1293	X	X	X	X		
1308090202	Buffalo Creek At U.S. Highway 27	Tallapoosa	Atlanta WP	Stream Targeted	33.561667	-85.07306	X	X	X	X		
1308090204	Buffalo Creek at Bethesda Church Road near Roopville, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.505	-85.14306	X	X	X	X		
1308100301	Turkey Creek at Hwy 100 (Rome St.) near Carrollton, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.565378	-85.25132	X		X			
1308100401	Big Indian Creek at State Line Road near Bowdon, GA	Tallapoosa	Atlanta WP	Stream Targeted	33.489176	-85.30429	X	X	X	X		
1501090101	East Chickamauga Crk at Lower Gordon Springs Rd nr Dalton, GA	Tennessee	Cartersville WP	Stream Targeted	34.746923	-85.12355	X	X	X	X	X	
1501110303	McFarland Branch - North of State Line Road, Rossville	Tennessee	Cartersville WP	Stream Targeted	34.984444	-85.29944	X	X	X			
1501120501	Lookout Creek - Creek Road Near New England	Tennessee	Cartersville WP	Stream Targeted	34.8975	-85.46306	X	X	X			
1502010205	Hiawassee River at Streak Hill Road (CR87) near Presley, GA	Tennessee	Cartersville WP	Stream Targeted	34.911925	-83.70893	X	X	X			
1502010301	Hightower Creek at Jay Tee Road near Hiawassee, GA	Tennessee	Cartersville WP	Stream Targeted	34.925065	-83.66819	X		X			
1502010501	Lake Chatuge LMP 12 at State Line (aka Hiawassee River)	Tennessee	Cartersville WP	Lake Monitoring	34.983333	-83.78861	X					
1502080301	Nottely River - Morgan Bridge near Blairsville	Tennessee	Cartersville WP	Stream Targeted	34.841111	-83.93611	X		X			
1502080501	Coosa Creek at Blue Ridge Hwy near Blairsville, GA	Tennessee	Cartersville WP	Stream Targeted	34.851594	-83.99388	X		X			
1502080601	Lake Nottely (LMP15A) at Reece Creek	Tennessee	Cartersville WP	Lake Monitoring	34.91152	-84.0506	X					
1502080602	Lake Nottely - Dam Forebay (aka Nottely River - Upstream From Nottley Dam)	Tennessee	Cartersville WP	Lake Monitoring	34.957778	-84.09222	X					
1502080701	Youngcane Creek at Byers Road near Youngcane, GA	Tennessee	Cartersville WP	Stream Targeted	34.870248	-84.0761	X	X	X			
1502080801	Ivylog Creek at Ivylog Gap Road near Blairsville, GA	Tennessee	Cartersville WP	Stream Targeted	34.93544212	-83.98021	X	X	X			
1503010602	Toccoa River at Shallowford Bridge near Dial, GA	Tennessee	Cartersville WP	Stream Targeted	34.783999	-84.25959	X		X			
1503010701	Lake Blue Ridge (LMP18) - 300 Meter Upstream Of Dam	Tennessee	Cartersville WP	Lake Monitoring	34.881667	-84.28	X					
1503010702	Lake Blue Ridge (LMP18A) - 4 miles upsteam Dam	Tennessee	Cartersville WP	Lake Monitoring	34.84017	-84.2731	X					
1503020102	Toccoa River at Curtis Switch Road near Mineral Bluff, GA	Tennessee	Cartersville WP	Stream Targeted	34.925724	-84.33316	X	X	X	X		

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude	Routine[2]	Fecal coliform	Metals	Pesticides	OrthoPhosporus	Biomonitoring[3]
1503020301	Hemptown Creek at State Road 245 near Mineral Bluff, GA	Tennessee	Cartersville WP	Stream Targeted	34.915712	-84.27938	X	X	X			

[1] **Sampling Organization**: Atlanta WP = GAEPD Atlanta office; Brunswick WP = GAEPD Brunswick Regional office; Cartersville WP = GAEPD Cartersville, Office; Tifton WP = GAEPD Tifton Office; Columbus WW = Columbus Water Works; USGS = U.S. Geological Survey.
[2]**Standard field parameters include:** gage height / tape down or discharge measurement, air temperature, water temperature, dissolved oxygen, pH, specific conductance.
[2]**Standard chemical parameters include:** turbidity, specific conductance, 5-day BOD, pH, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, Kjeldahl nitrogen, total phosphorus, total organic carbon, and fecal coliform.
[2]**Basin lakes field and chemical parameters include:** water depth, secchi disk transparency, photic zone depth, air temperature, depth profiles for dissolved oxygen, temperature, pH, and specific conductance, and chemical analyses for turbidity, specific conductance, 5-day BOD, pH, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, Kjeldahl nitrogen, total phosphorus, total organic carbon, and chlorophyll a.
[3]**Biomonitoring:** conducted for invertebrates and periphyton using Georgia EPD protocols.

Intensive Surveys Intensive surveys complement long term fixed station monitoring as these studies focus intensive monitoring on a particular issue or problem over a shorter period of time. Several basic types of intensive surveys are conducted including model calibration surveys and impact studies. The purpose of a model calibration survey is to collect data to calibrate a mathematical water quality model. Models are used for wasteload allocations and/or TMDLs and as tools for use in making regulatory decisions. Impact studies are conducted where information on the cause and effect relationships between pollutant sources and receiving waters is needed. In many cases biological information is collected along with chemical data for use in assessing environmental impacts.

Biological Monitoring Biological monitoring is performed in order to assess the biological integrity of the States waters. The Department of Natural Resources' Wildlife Resource Division has been conducting bioassessments using fish as the indicator species since the early 1990's. The primary technique for determining the quality of fish communities is called the Index of Biotic Integrity (IBI). This index utilizes the numbers and types of fish species present in a stream to produce a stream score or rating for comparison across streams within a particular ecoregion or to the same stream over time. Biological monitoring is useful in detecting intermittent sources of pollution that may not be caught in trend monitoring of water quality parameters. The Tennessee Valley Authority has also collected fish IBI data in Georgia. In 2007, the GAEPD began utilizing macroinvertebrate biological data in addition to fish data for assessing the biotic integrity of wadeable streams in Georgia.

Lake Monitoring The GAEPD has maintained monitoring programs for Georgia's public lakes since the late 1960's. Currently, Georgia has six major lakes that have standard criteria approved by legislature, which include: Sydney Lanier, Allatoona, West Point, Walter F. George, Jackson and Carters. These lakes are sampled every year from April to October when primary productivity is highest. All other major lakes are sampled according to a basin rotation schedule.
Prior to 2008, lakes in the basin rotation schedule were sampled once per quarter in accordance with which basin is targeted that year. Beginning in 2008, major basin lakes were sampled each month from April to October. In 2008, the basins of focus were the Suwannee, St. Mary's, Satilla, and Ocklocknee. Banks Lake is the only major lake in this basin group. In 2009, lakes in the Oconee, Ocmulgee, and Altamaha basins were targeted. These lakes included Oconee, Sinclair, High Falls, Juliette, and Tobesofkee. Banks Lake was also sampled again in 2009. Lakes in the Flint and Chattahoochee Basins were added in 2010,

and those in the Coosa, Tallapoosa, and Tennessee Basins were added in 2011. It is GAEPD's goal to monitor all major lakes each year throughout the growing season. The data collected included depth profiles for dissolved oxygen, temperature, pH, and specific conductance, Secchi disk transparency, and chemical analyses for chlorophyll *a*, total phosphorus, nitrogen compounds, and turbidity.

The monitoring of major lakes (> 500 acres) since 1984 has continued to use Carlson's Trophic State Index (TTSI) as a tool to mark trophic state trends. Three measures are combined into a single trophic state index (TTSI) and used with other field data and observations to assess the trophic condition of each lake and to establish categories of lakes relative to need for restoration and/or protection. The major lakes listed in Table 3-9 are ranked according to the TTSI. Work on major lakes is conducted as a part of the basin rotation or lakes standards monitoring projects. Data are either from the second quarter or May for basin or standards lakes, respectively.

TABLE 3-9. MAJOR LAKES RANKED BY SUM OF TROPHIC STATE INDEX VALUES (2007-2011)

Major Lake	TTSI Ranking	Major Lake	TTSI Ranking	Major Lake	TTSI Ranking
High Falls (2011)	169	Russell (2007)	152	Blue Ridge (2011)	139
Carters (2011)*	165	Oliver (2011)	149	Rabun (2011)	138
Seminole (2011)	164	Harding (2011)	147	Jackson (2011)	137
Blackshear (2011)	162	Tugalo (2007)	143	Clarks Hill (2007)	133
Oconee (2011)	161	Nottely (2011)	141	Lanier (2011)	129
Worth (2011)	161	Allatoona (2011)	141	Banks (2011)	129
Sinclair (2011)	160	Walter F. George (2011)	140	Burton (2007)	128
West Point (2011)	158	Goat Rock (2011)	140	Chatuge (2011)	125
Tobesofkee (2011)	153	Hartwell (2007)	139	Juliette (2011)	117

*Carters Lake does not have a dam pool site due to the pump-back activity from the re-regulation reservoir. Data listed is from the mid-lake station. Sample for Lake Chatuge taken at State line.

Fish Tissue Monitoring This general contaminants assessment project is focused on fish tissue sampling and analyses, risk-based data assessment, and annual publication of consumption guidance in Georgia's Freshwater & Saltwater Sport Fishing Regulations and in Guidelines for Eating Fish from Georgia Waters. Fish tissue samples are typically collected in the fall from Georgia lakes and rivers, and analyzed in the winter and spring. Site-specific sampling in Georgia estuaries occurs between the spring and fall on a case specific basis. The sampling is conducted by either the GADNR Wildlife Resources Division (WRD), or the Coastal Resources Division (CRD), depending on whether the site is freshwater (WRD), or estuarine/marine waters (CRD). Samples are catalogued and transported to GAEPD or University of Georgia laboratories and results are reported to the GAEPD the following late summer or early fall. The data from the annual collections are utilized in reassessments that are incorporated annually into the *Guidelines for Eating Fish for Georgia Waters* and *Georgia's Freshwater and Saltwater Sport Fishing Regulations*. The first risk-based consumption guidance was published in 1995. As part of the implementation of the Federal Clean Air Mercury Rule (CAMR), it was recognized that a more rigorous monitoring program of mercury in fish tissue would be required to support trend analysis and the efficacy of future reductions in air mercury emissions. A subproject was designed and implemented in 2006 consisting of 22 fish mercury trend stations, which will be monitored annually. Nineteen stations are fresh water and 3 are estuarine. The mercury in fish trend monitoring sites is provided in Table 3-10.

TABLE 3-10. MERCURY IN FISH TREND MONITORING STATIONS

Antioch Lake at Rocky Mtn. PFA	Flint River below Ichawaynochaway Creek
Oostanaula River at Georgia Hwy. 140	Lake Kolomoki at Kolomoki State Park
Lake Acworth	Satilla River below U.S. Hwy. 82
Lake Tugalo	Okefenokee Swamp National Wildlife Refuge
Bear Creek Reservoir	Banks Lake National Wildlife Refuge
Randy Pointer Lake (Black Shoals Reservoir)	Savannah River at U.S. Hwy. 301
Chattahoochee River below Morgan Falls	Savannah River at I-95
Chattahoochee River Below Franklin	Ogeechee River at Ga. Hwy. 204
Lake Tobesofkee	Wassaw Sound
Ocmulgee River below Macon at Ga. Hwy. 96	Altamaha Delta and Sound
Lake Andrews	St. Andrews Sound

Toxic Substance Stream Monitoring The GAEPD has focused resources on the management and control of toxic substances in the State's waters for many years. Toxic substance analyses have been conducted on samples from selected trend monitoring stations since 1973. Wherever discharges were found to have toxic impacts or to include toxic pollutants, the GAEPD has incorporated specific limitations on toxic pollutants in NPDES discharge permits. In 1983 the GAEPD intensified toxic substance stream monitoring efforts. This expanded toxic substance stream monitoring project included facility effluent, stream, sediment, and fish sampling at specific sites downstream of selected industrial and municipal discharges. From 1983 through 1991, ten to twenty sites per year were sampled as part of this project. Continued work is performed on a site-specific basis and as part of the rotating river basin monitoring program.

Aquatic Toxicity Testing Biomonitoring requirements are currently addressed in all municipal and industrial NPDES permits. In January 1995, the GAEPD issued approved NPDES Reasonable Potential Procedures that further delineate required conditions for conducting whole effluent toxicity (WET) testing for municipal and industrial discharges. The Reasonable Potential Procedures were updated in 2001 and the GAEPD additionally developed a WET Strategy that provided more detail as to how the State would determine which facilities needed a WET limit in their permit. This strategy outlined minimum data requirements for different types of facilities. The GAEPD conducted aquatic toxicity tests on municipal and industrial water pollution control plant effluents from 1985 through 1997. Funding for GAEPD's aquatic toxicity testing laboratory was redirected to TMDL monitoring and the toxicity testing requirements were turned over to the individual permittees.

Coastal Monitoring The Coastal Resources Division (CRD) conducts the majority of coastal monitoring in the State. CRD conducts water quality monitoring in estuarine and near-shore coastal waters through its Public Health Water Quality Monitoring Program. This Program has three distinct parts. The Shellfish Sanitation and Beach Water Quality Monitoring Programs are concerned with public health, while.the Nutrient Sampling Program is designed to generate baseline-monitoring data for trends. A list of the beaches monitored in 2010 and 2011 can be found in Table 3-11. A list of the stations monitored under the Shellfish Sanitation program can be found in Table 3-12 (these stations are also included in Figure 1). The nutrient sampling that was performed was conducted at a subset of the Shellfish Sanitation monitoring stations. Table 3-12 indicates which stations were monitored for nutrients. More detail regarding the work conducted by CRD can be found in Chapter 5.

Table 3-11 Beaches Monitored by CRD in 2010 & 2011

Station ID	Beach Name	County	Frequency
BIRP	Blythe Island Sandbar Beach	Glynn	Monthly
BOSS	Ossabaw Island Bradley Beach	Chatham	Monthly
CNBF	Contentment Bluff Sandbar Beach	McIntosh	Monthly
DALL	Dallas Bluff Sandar Beach	McIntosh	Monthly
JICC	Jekyll Island - Clam Creek Beach	Glynn	Weekly
JIM	Jekyll Island - Middle Beach at Convention Center	Glynn	Weekly
JIN	Jekyll Island - North Beach at Dexter Lane	Glynn	Weekly
JIS	Jekyll Island - South Beach at 4-H Camp	Glynn	Weekly
JISA	Jekyll Island - St. Andrews Beach	Glynn	Weekly
JISD	Jekyll Island - South Dunes Picnic Area Beach	Glynn	Weekly
JIWY	Jekyll Island - Captain Wylly Road Crossover Beach	Glynn	Weekly
KING	Kings Ferry County Park Beach	Chatham	Monthly
REIM	Reimolds Pasture Beach	Glynn	Monthly
SEN	Sea Island - North Beach	Glynn	Monthly
SES	Sea Island - South Beach	Glynn	Monthly
SIF	Saint Simons Island - 5th Street Crossover Beach	Glynn	Weekly
SIM	Saint Simons Island - Middle Beach (aka East Beach Old Coast Guard Station)	Glynn	Weekly
SIMA	Saint Simons Island - Massengale Park Beach	Glynn	Weekly
SIN	Saint Simons Island - North Beach at Goulds Inlet	Glynn	Weekly
SIS	Saint Simons Island - South Beach at Lighthouse	Glynn	Weekly
SKID	Skidaway Narrows County Park Beach (aka Butterbean Beach)	Chatham	Monthly
SOSS	Ossabaw Island South Beach	Chatham	Monthly
TYM	Tybee Island - Middle Beach at Center Terrace	Chatham	Weekly
TYN	Tybee Island - North Beach at Gulick Street	Chatham	Weekly
TYP	Tybee Island - Polk Street Beach	Chatham	Weekly
TYS	Tybee Island - South Beach at Chatham Street	Chatham	Weekly
TYST	Tybee Island - Strand Beach at Pier	Chatham	Weekly

Table 3-12 Stations Monitored by CRD under the Shellfish Sanitation and Nutrient Monitoring Programs in 2010 & 2011

Station ID	Latitude	Longitude	Description	Nutrients up to May 2010	Nutrients started Back in 2011
1049	31.92866	81.01839	southernmost tributary off Romerly Marsh Creek		
1050	31.92503	-81.00860	northern mouth of Habersham Creek		
1052	31.94317	-81.00914	northernmost tributary off Romerly Marsh Creek		
1152	31.92557	-80.98520	Old Romerly Marsh Creek		
1153	31.92993	-80.98919	Romerly Marsh Creek Chatham		
1154	31.97741	80.96789	Halfmoon River at Beard Creek		X
1155	31.95172	80.98532	Tybee Cut South		X
1159	31.96792	80.93600	Pa Cooper Creek		
1200	31.94600	80.93000	Mouth of House Creek Chatham		X
1201	31.95500	80.93300	North of House Creek/Wassaw Sound Chatham	X	
1222	32.01500	80.92400	Cut Oyster Creek to Bull River Chatham		
1223	32.01400	80.91600	North Fork Oyster Creek Chatham	X	X
1224	31.99800	80.91200	North Junction Lazaretto & Oyster Creeks Chatham	X	
1225	31.99500	80.91000	South Junction Lazaretto & Oyster Creeks Chatham		X
1337	32.02829	80.94725	Bull River upstream of Betz Creek		X
1338	32.02005	80.94529	Betz Creek		
1352	31.96058	-81.01186	Priest Landing Chatham		
3242	31.68500	81.29600	Medway River Near Sunbury	X	X
3249	31.68600	81.27700	Halfmoon East		
3255	31.73400	81.19400	Mouth of Jones Hammock Creek	X	
3273	31.74100	81.16100	Bear River across from Newell Creek		
3275	31.77100	81.16998	Bear River across from Kilkenny	X	X
3285	31.75680	81.27240	Dickinson Creek Mouth	X	X
3286	31.74765	81.25410	Jones Creek Mouth	X	
3288	31.72800	81.22028	Medway River East of Sunbury Creek		
3291	31.68940	81.19400	Van Dyke Creek Mouth	X	X
3319	31.68713	81.15633	Walburg Northwest	X	X
4092	31.51000	81.27800	"Eagle Creek, McIntosh"	X	
4100	31.53000	81.33000	Back River at July Cut		X
4120	31.52777	81.25732	Mud River at Dog Hammock		
4122	31.59343	81.26117	Little Mud River at Barbour Island River		X
4123	31.53432	81.22433	Sapelo Sound at Highpoint		X
4175	31.44200	81.30600	"Old Teakettle Creek, McIntosh"	X	X
4177	31.47600	81.33200	"Shellbluff Creek, McIntosh"		X
4178	31.48800	81.32300	"Creighton Narrows, McIntosh"	X	
4179	31.48500	81.29500	"New Teakettle Creek, McIntosh"		
4180	31.52300	81.29100	"Front River, McIntosh"		
4184	31.55400	81.31400	"Juliention River, McIntosh"	X	X
4185	31.56360	81.25778	"Little Mud River, McIntosh"		
4186	31.55775	81.23293	"South Mouth Barbour Island River, McIntosh"		X
4187	31.59300	81.23600	"Middle Barbour Island River, McIntosh"	X	
4188	31.61500	81.21400	"Middle Wahoo River, McIntosh"	X	
4190	31.63200	81.22400	"South Swain River, McIntosh"		
4191	31.63400	81.23700	"North Swain RIver, McIntosh"	X	X
4195	31.56232	81.21815	"Todd River, McIntosh"		

4196	31.50300	81.33500	"Crescent River, McIntosh"		X
4197	31.49100	81.33200	"Crescent River, South-end of Creighton, McIntosh"		
4304	31.55900	81.27400	"Julienton River mouth, McIntosh"	X	
4305	31.54800	81.30800	"Julienton River middle, McIntosh"		
4306	31.53900	81.30200	"Four Mile Island southwest, McIntosh"	X	X
4330	31.55500	81.29000	Jolly Creek		
4333	31.38741	81.28912	South end of Sapelo Island	X	X
4400	31.55700	81.29400	"Julienton River, middle, McIntosh"		
5069	31.05500	81.46900	Jointer River Mouth Glynn	X	X
5198	31.08900	81.47900	Mouth Cedar Creek Glynn	X	X
5199	31.08000	81.50600	Jointer River Glynn	X	
5200	31.07100	81.48300	Cobb Creek Glynn		
5233	31.23260	81.32594	Hampton River at Village Creek		
5234	31.21660	81.31281	Hampton River @ Sea Island Golf Course		
5235	31.25884	81.32811	West Mouth Pine Creek		
5236	31.21800	81.30391	Mouth of Bungalow Creek		
5237	31.21575	81.32851	Big Bend in Village Creek, Glynn County		
5238	31.20996	81.34580	Village Creek Basin		
5239	31.20756	81.34088	Village Creek Basin		
5240	31.19683	81.35100	Village Creek South		
5241	31.18277	81.35378	Village Creek @ Black Banks Creek		
5301	31.28776	81.31921	Upstream of Old House Creek		
5302	31.26809	81.31002	Hampton River at Mosquito Creek		
5303	31.26581	81.32535	Hampton River Across From Pine Creek		
5322	31.09100	81.51500	Jointer Island West Glynn		
5357	31.10200	81.52700	Jointer Creek at Sage Dock Glynn		
5358	31.10600	81.53300	Jointer Creek upstream of Sage Dock Glynn	X	X
5359	31.06400	81.52600	Little Satilla River at Honey Creek Glynn	X	
6201	31.03900	81.49100	Little Satilla River Camden		X
6210	30.89200	81.51200	Cabin Bluff Camden		X
6212	30.90400	81.46100	North Brickhill River Camden		
6213	30.86300	81.49700	Delaroche Creek Mouth Camden	X	
6214	30.85000	81.47700	South Brickhill River Camden		
6215	30.85800	81.54100	Mouth Black Point Creek Camden	X	
6216	30.84900	81.54200	Crooked River Camden		X
6217	30.84100	81.52100	Crooked River South Camden		X
6218	30.82300	81.49800	South Crooked River Mouth Camden	X	X
6300	30.92700	81.45200	Cumberland River-Marker #39 Camden	X	X
6317	30.91100	81.48500	Cumberland River East Shellbine Camden		
6318	30.86100	81.50800	Delaroche Creek Headwaters Camden		X
6323	30.85500	81.46700	Brickhill River Upstream 6214 Camden		X
6343	30.86800	81.48500	Brickhill River West Bend Camden		
6344	30.88300	81.47900	Mumford Creek at Brickhill River Camden	X	
6360	31.06930	81.54500	Maiden Creek		X
6361	31.05470	81.53900	Honey Creek		X
6411	30.88100	81.51100	Downstream from Cabin Bluff @ marker 51A Camden		
6412	30.87000	81.49900	Upstream from DeLaroache ck @ marker 55 Camden		

GAEPD has, over the past few years, intensified its own coastal monitoring program. Currently, GAEPD monitors eight locations throughout Georgia's sounds. The data

collected included depth profiles for dissolved oxygen, temperature, pH, and specific conductance, Secchi disk transparency, and chemical analyses for chlorophyll *a*, total phosphorus, nitrogen compounds, and turbidity.

Facility Compliance Sampling In addition to surface water quality monitoring, the GAEPD conducts evaluations and compliance sampling inspections of municipal and industrial water pollution control plants and State-permitted industrial pretreatment facilities. Compliance sampling inspections include collection of 24-hour composite samples, evaluation of the permittee's sampling and flow monitoring provisions and sampling documentation. In excess of 240 sampling inspections were conducted by the GAEPD in Fiscal Years 2010-2011. The results were used to confirm validity of permittee self-monitoring data and as supporting evidence in enforcement actions.

Probabilistic Monitoring In order to determine the quality of all the waters in the State, the GAEPD would either have to sample and assess each individual waterbody (which is not possible due to the resources that would be needed) or would have to develop a scientific survey that would be representative of all the State's waters. Probabilistic monitoring provides a scientifically defensible way to sample a subset of all waters and then to use the results of this sampling to provide an estimate of the quality of all waters of the State. GAEPD has participated in various probabilistic monitoring in the past including USEPA's 2007 National Lakes Assessment Survey. In 2009, Georgia participated in a USEPA's National Rivers and Streams Assessment. Sampling sites were randomly selected nationally and each state was given the opportunity to participate in sampling sites selected within their respective states. GAEPD participated in the wadeable portion only. Eighteen randomly selected sites were identified in Georgia and were sampled by the GAEPD using the USEPA's national wadeable stream protocol from July through November 2009. Data obtained from the survey will be assessed by the USEPA and conclusions will be published in a report on the quality of the Nation's rivers and streams.

GAEPD also participated in USEPA's National Wetlands Condition Assessment in 2011. This project was similar in scope to the National Rivers and Streams Assessment, but focused on wetlands. In cooperation with CRD, Georgia sampled 51 wetland sites using EPA's national protocol.

In addition, beginning in 2010, GAEPD began to conduct probabilistic monitoring of the State's streams. Between 2010 and 2011 approximately 50 sites were randomly chosen from our list of existing stations. The results of the first two years of probabilistic monitoring predict that approximately 63% of Georgia's streams are supporting their designated uses; that 23% of the streams are impaired due to low dissolved oxygen and approximately 2% are impaired for pH. None of the streams monitored as part of the probability survey were impaired for high temperature, so temperature is not predicted to be source of impairment for many waters in the State.

Georgia EPD is currently in the process of reevaluating the State's instream criteria for dissolved oxygen. There are places in the State (particularly in South Georgia) where dissolved oxygen concentrations are often naturally lower than the State's current criteria. The percentage of streams assessed as impaired for dissolved oxygen may change once the new criteria are adopted.

Surface Water Quality Summary

Data Assessment 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.

Appendix A includes an integrated list of waters for which data have been assessed. This list includes waters that have been assessed as "supporting" their designated uses and those assessed as "not supporting" their designated uses. In addition, some waters were placed in a third category called "assessment pending". Waters were placed in the "assessment pending" group when the data available for a water were insufficient to make an assessment as to whether the water was supporting its designated uses or not. Appendix A also includes Georgia's 2012 Listing Assessment Methodology which provides a description of how Georgia compares different types of water quality data with Georgia's water quality criteria in making assessment decisions.

TABLE 3-13. CONTRIBUTORS OF WATER QUALITY DATA FOR ASSESSMENT OF GEORGIA WATERS

DNR-EPD, Watershed Planning & Monitoring Program
DNR-EPD, Permitting Comp. & Enf. Program (Municipal)
DNR-EPD, Permitting Comp. & Enf. Program (Industrial)
DNR, Wildlife Resources Division
DNR, Coastal Resources Division
State University of West Georgia
Gainesville College
Georgia Institute of Technology
U.S. Environmental Protection Agency
U.S. Geological Survey
U.S. Army Corps of Engineers
U.S. Forest Service
Tennessee Valley Authority
Cobb County
Dekalb County
Douglas County Water & Sewer Authority
Fulton County
Gwinnett County
City of Clayton
City of Gainesville
City of LaGrange
Georgia Mountains R.D.C.
City of Conyers
Lake Allatoona (Kennesaw State University)
Lake Blackshear (Lake Blackshear Watershed Association)
Lake Lanier (University of Georgia)
West Point (LaGrange College/Auburn University)
Georgia Power Company
Oglethorpe Power Company
South Carolina Electric & Gas Company
South Carolina DHEC
Jones Ecological Research Center
Alabama DEM
City of College Park
Kennesaw State University
University of Georgia
Columbus Water Works
Columbus Unified Government
St. Johns River Water Mgmt. District
Town of Trion
Cherokee County
Clayton County Water Authority
City of Atlanta
City of Cartersville
Georgia Ports Authority
Chattahoochee/Flint RDC
Upper Etowah Adopt-A-Stream
Middle Flint RDC
Central Savannah RDC
Chatham County
City of Savannah
Heart of Georgia RDC
City of Augusta
Southwire Company
DNR-EPD, Brunswick Coastal District
DNR-EPD, Hazardous Waste Mgmt. Branch
Ellijay High School
DNR, Georgia Parks Recreation & Historic Sites Division
DNR-EPD, Ambient Monitoring Unit (Macroinvertebrate Team
Forsyth County
Tyson Foods, Inc.
South Georgia RDC
Northeast GA RDC
Ogeechee Canoochee Riverkeeper
Screven County
Coastal GA RDC
City of Roswell
City of Alpharetta
Columbia County
Southwest GA RDC
Southeast GA RDC
Coweta County
Middle GA RDC
Bartow County
Atlanta Regional Commission
Soquee River Watershed Partnership
Upper Chattahoochee Riverkeeper

Evaluation of Use Support Table 3-14 provides summary information from Appendix A on the total number of stream miles, lake acres, or square miles of sounds/harbors that fall in each assessment category. Many additional streams, particularly in urban areas may not meet all standards, but monitoring resources are not adequate to sample all streams.

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.

TABLE 3-14
EVALUATION OF USE SUPPORT BY WATER BODY TYPE AND ASSESSMENT CATEGORY
2010-2011

Degree of Use Support	**Streams/Rivers** (miles)	**Lakes/Reservoirs** (acres)	**Sounds/Harbors** (sq. miles)	**Coastal Streams/Rivers** (miles)	**Coastal Beaches** (miles)
Support	5,337	232,617	66	290	31
Not Support	8,143	128,625	4	68	3
Assessment Pending	419	32,106	9	57	0
Total	13,899	393,348	79	415	34

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.

Priorities for Action 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.

TABLE 3-15
CAUSES OF NONSUPPORT OF DESIGNATED USES BY WATER BODY TYPE
2010-2011

Cause Category	Rivers/Streams (miles) Contributions to Impairment[1]
Pathogens	**4,613**
Fecal Coliform	4,613
Biologic Integrity (Bioassessments)	**2,707**
Maroinvertebrates (Bio M)	636
Fish (Bio F)	2,208
Bioassays	**10**
Whole Effluent Toxicity	10
Oxygen Depletion	**1,251**
Dissolved Oxygen	1,251
Thermal Impacts	**17**
Temperature	17
Toxic Inorganics	**82**
Arsenic	3
Cadmium	21
Copper	23
Lead	5
Mercury	2
Zinc	58
Toxic Organics	**368**
1,1,2-Trichloroethane	1
Carbon Tetrachloride	1
Tetrachloroethylene	7
Trichloroethylene	1
PCB in Fish Tissue	358
Metals	**1,070**
Cadmium	21
Copper	23
Lead	5
Mercury	2
Zinc	58
Mercury in Fish Tissue (TWR)	991
pH/Acidity/Caustic Conditions	**184**
pH	184
Observed Effects	**20**
Color	20
Other	**225**
Commercial Fishing Ban (CFB)	225
Cause Category	**Lakes/Reservoirs (acres)** **Contributions to Impairment[1]**
Pathogens	**194**
Fecal Coliform	194
Thermal Impacts	**650**
Temperature	650
Nutrients (Macornutrients/Growth Factors)	**2,752**
Phosphorus	2,752
Toxic Organics	**91,613**
PCB in Fish Tissue	91,613
Metals	**4,067**
Mercury in Fish Tissue (TWR)	4,067
Pesticides	**20**
DDD	20
DDE	20
Observed Effects	**12,884**
Chlorophyll *a*	12,884
pH/Acidity/Caustic Conditions	**19,197**
pH	19,197
Cause Category	**Coastal Streams (miles)** **Contributions to Impairment[1]**
Pathogens	**24**
Fecal Coliform	24

Oxygen Depletion Dissolved Oxygen	**40** 40
Toxic Organics Polychlorinated biphenyls PCB in Fish Tissue	**26** 4 26
Metals/Toxic Inorganics Cadmium Mercury Selenium	**92** 4 5
Pesticides Dieldrin in Fish Tissue Toxaphene in Fish Tissue	**8** 3 5
Other Commercial Fishing Ban (CFB) & Shellfish Ban (SB)	**30** 30
Cause Category	**Coastal Beaches (miles) Contributions to Impairment[1]**
Pathogens Enterococcus	**3.04** 3.04
Cause Category	**Sounds/Harbors (sq. miles) Contributions to Impairment[1]**
Oxygen Depletion Dissolved Oxygen	**4** 4

[1]The total mileage/acreage provided for each impairment category (e.g. Pathogens, Toxic Organics, Metals, etc.) is a summation of the mileage/acreage of all the waters impaired by one or more of the pollutants in the category. Since a water may be negatively affected by more than one pollutant in a given impairment category, the total mileage/acreage for the impairment category may be less than the sum of the miles of each of the individual pollutants in that category.

TABLE 3-16
POTENTIAL SOURCES OF NONSUPPORT OF DESIGNATED USES BY WATER BODY TYPE
20010-2011

Source Category	Rivers/Streams (miles) Contributions to Impairment[1]
Hydromodification Dams of Impoundments (Dam)	**20** 20
Industrial Sources Industrial Point Source Discharge (I1) Industrial Stormwater Discharge (I2)	**318** 65 287
Municipal Permitted Discharges Combined Sewer Overflows Municipal Point Source Discharges	**270** 93 177
Nonpoint Sources Non-Point Source (NP) Urban Runoff (UR)	**8030** 6181 2220

Source Category	Coastal Streams (Miles) Contributions to Impairment[1]
Industrial Sources Industrial Point Source Discharge (I1) Industrial Stormwater Discharge (I2)	**31** 29 10
Municipal Permitted Discharges Municipal Point Source Discharges	**21** 21
Nonpoint Sources Non-Point Source (NP) Urban Runoff (UR)	**40** 13 35

Source Category	Lakes/Reservoirs (acres) Contributions to Impairment[1]
Industrial Sources Industrial Point Source Discharge (I1) Industrial Stormwater Discharge (I2)	**56,600** 650 55,950
Nonpoint Sources Non-Point Source (NP) Urban Runoff (UR)	**72,025** 71,831 39,819

Source Category	Sounds/Harbors (Sq. Miles) Contributions to Impairment[1]
Nonpoint Sources Urban Runoff (UR)	**4** 4
Municipal Municipal Point Sources (M)	**4** 4
Industrial Sources Industrial Point Source Discharge (I1)	**4** 4

Source Category	Coastal Beaches (Miles) Contributions to Impairment[1]
Nonpoint Sources	**3.04**
Non-Point Source (NP)	3.04

[1]The total mileage/acreage provided for each source category (e.g. Industrial, Municipal, Nonpoint, etc.) is a summation of the mileage/acreage of all the waters impaired by one or more of the sources in the category. Since a water may be negatively affected by more than one source in a given source category, the total mileage/acreage for the source category may be less than the sum of the miles of each of the individual sources in that category.

CHAPTER 4
Wetland Programs

Estimates of the total extent of Georgia's wetlands have varied from 4.9 to 7.7 million acres, including more than 600,000 acres of open water habitat found in estuarine, riverine, palustrine, and lacustrine environments. Estimates of wetland losses in the state from colonial times to the present range between 20-25% of the original wetland acreage.

Georgia has approximately 100 miles of shoreline along the south Atlantic coast, with extensive tidal marshes separating barrier islands composed of Pleistocene and Holocene sediments from the mainland. Georgia's barrier islands and tidal marshes are well preserved compared to other South Atlantic states. Georgia's coastline and tidal marshes are managed under the Coastal Marshlands Protection and Shore Protection Acts of 1970 and 1979 respectively, and are considered to be well preserved compared to other South Atlantic states.

Elevations within Georgia's boundaries range from sea level to 4,788 feet at Brasstown Bald in the Blue Ridge Mountain Province. At the higher elevations, significant, pristine cool water streams originate and flow down steep to moderate gradients until they encounter lower elevations of the Piedmont Province. Many of the major tributaries originating in the mountains and Piedmont have been impounded for hydropower and water supply reservoirs. These man-made lakes constitute significant recreational resources and valuable fishery habitat. At the Fall Line, streams flowing southeasterly to the Atlantic, or south-southwesterly to the Gulf, have formed large floodplains as each encounters the soft sediments of the upper Coastal Plain.

Other significant wetlands found in the state are associated with blackwater streams originating in the Coastal Plain, lime sink-holes, spring heads, Carolina bays, and the Okefenokee Swamp, a vast bog-swamp measuring approximately one-half million acres in south Georgia and north Florida. The swamp drains to the east by the St. Marys River into the Atlantic, and to the west by the Suwannee River into the Gulf.

The lower Coastal Plain has frequently been referred to as the Atlantic Coastal Flatwoods region, where seven tidal rivers headwater in the ancient shoreline terraces and sediments of Pleistocene age. Scattered throughout the flatwoods are isolated depressional wetlands and drainageways dominated by needle-leaved and broad-leaved tree species adapted to long hydroperiods.

Due to considerable variation in the landscape in topography, hydrology, geology, soils, and climatic regime, the state has one of the highest levels of biodiversity in the eastern United States. The state provides a diversity of habitats for nearly 4,000 vascular plant species and slightly less that 1,000 vertebrate species. Numerous plant and animal species are endemic to the state. Many of the rarer species are dependent upon wetlands for survival.

Extent of Wetland Resources

Assessments of wetland resources in Georgia have been conducted by the USDA Natural Resources Conservation Service, the U.S. Fish and Wildlife Service (USFWS), and the Georgia Department of Natural Resources. The extent and location of specific tidal marsh types have been reported in numerous scientific papers and reports. Estimates of other specific wetlands types, such as bottomland hardwood swamps, are also reported in studies on a regional scale.

Hydric soils as mapped in county soil surveys are useful indicators of the location and extent of wetlands for the majority of Georgia counties with complete surveys. The dates of photography from which the survey maps are derived vary widely across the state. There is an ongoing effort by NRCS to develop digital databases at the soil mapping unit level. Published soil surveys have proven useful in wetland delineation in the field and in the development of wetland inventories. County

acreage summaries provide useful information on the distribution of wetlands across the state.

The USFWS National Wetland Inventory (NWI) utilizes soil survey information during photo-interpretation in the development of the 7.5 minute, 1:24,000 scale products of this nationwide wetland inventory effort. Wetlands are classified according to a system developed by Cowardin et al. (1979), providing some level of detail as to the characterization of individual wetlands. Draft products are available for the 1,017 7.5-minute quadrangles in the state of Georgia, and many final map products have been produced. All of these quadrangles are available in a digital format, and an effort is underway to combine them into a single, seamless database for Georgia. Although not intended for use in jurisdictional determinations of wetlands, these products are invaluable for site surveys, trends analysis, and landuse planning.

A complementary database was completed by Georgia DNR in 1991 and was based on classification of Landsat TM satellite imagery. Due to the limitations of remote sensing technology, the classification scheme was simplified in comparison to the Cowardin system used with NWI. The targeted accuracy level for the overall landcover assessment using Landsat imagery was 85%. However, the classification error was not necessarily distributed equally throughout all classes.

Similar Landsat-based landcover databases have been produced with more recent satellite imagery. The Federal government completed mapping in Georgia using imagery from the mid-1990s as part of the National Landcover Database. The Georgia Gap Analysis Program, supported in part by funding from Georgia DNR, completed an 18-class database using imagery from 1997-1999. Both these databases include wetland landcover classes. More recently, the Natural Resources Spatial Analysis Laboratory at the University of Georgia completed an updated landcover dataset using 2008 imagery. This dataset is available from the Georgia GIS Clearinghouse.

Additional habitats have been mapped through the Georgia Coastal Land Conservation Initiative that may be helpful in identifying wetlands. Mapping was done by botanists with the Wildlife Resources Division (WRD) for the 11 coastal county area in 2010 to show the NatureServe classification of habitats within this area.

NWI for Georgia's six coastal counties was updated by the Coastal Resources Division (CRD) using 2006 base imagery. This dataset represents an approximately 25-year update considering the inventory was originally mapped in the early 1980s. A summary of wetland acreages derived from this database is as follows: Estuarine: Emergent=351,236, Unconsolidated Shore=10,700, Scrub-Shrub=4,495, and Forested=2,053; Lacustrine: Aquatic Bed=108, Uncosolidated Shore=32, Emergent=10; Marine: Uncosolidated Shore=3,084; Palustrine: Forested=339,743, Emergent=52,511, Scrub-Shrub=30,899, Unconsolidated Bottom=8,242, Aquatic Bed=832, Unconsolidated Shore=193; Riverine: Unconsolidated Shore=90. A full report can be found on CRD's website and the data from NWI can be found at www.fws.gov.

CRD also produced an NWI Plus database, which adds additional descriptors to the updated NWI dataset and provides a functional component to wetlands in the six-county area. Wetlands are rated as having either a High Potential, Moderate Potential, or Low to No Potential to function in a given capacity. Eleven functions are identified for the six coastal counties.

In addition, CRD completed an Impacted Wetland Inventory that was initiated to identify, assess, and inventory impacted wetlands in Chatham, Bryan, Glynn, and Camden counties along the coast. The project area includes all estuarine and marine wetlands, as defined by Cowardin et. Al (1979) and delineated by the NWI updates for the six coastal counties (completed in 2009, based on 2006 base imagery). This dataset is currently being expanded to include Liberty and McIntosh counties as well as tidal fresh wetlands. The completion date for these is October 2012.

Wetland Trends In Georgia

The loss of wetlands has become an issue of increasing concern to the general public because of associated adverse impacts to flood control, water quality, aquatic wildlife habitat, rare and endangered species habitat, aesthetics, and recreation. Historically, wetlands were often treated as "wastelands" that needed "improvement". Today, "swamp reclamation" acts are no longer funded or approved by Congress and wetland losses are in part lessened. However, we still lack accurate assessments for current and historic wetland acreages. For this reason, we have varying accounts of wetland losses, which provide some confusion in the public's mind as to trends.

The most precise measure of Georgia's wetland acreage has been developed by the USFWS's National Wetland Inventory Status and Trends projects. The *Status And Trends in the Conterminous United States, Mid-1970 's to Mid-1980' s* report (1991), provides details of a statistically sound study based upon 206 sample plots of four (4) square miles each that were delineated and measured from 1975 and 1982 aerial photography. The total acreage of wetlands for Georgia was estimated at 7,714,285 acres in 1982 as compared to earlier estimates of 5.2 million acres. This estimate is considerably higher than the total shown in a 1984 trend study and is due in part to higher quality photography and an increase in the number of man-made ponds.

Georgia's total wetland area covers an estimated 20 percent of the State's landscape. This total includes approximately 367,000 acres of estuarine wetlands and 7.3 million acres of palustrine wetlands (forested wetlands, scrub-shrub, and emergents). A net wetland loss due to conversion of approximately 78,000 acres was estimated for the 7-year period (1975 – 1982), while 455,000 acres were altered by timber harvesting. These latter estimates are less reliable than the total acreage and are slightly higher than the 1984 study. Regardless of the method used to measure total acreage or wetland losses, Georgia still retains the highest percentage of pre-colonial wetland acreage of any southeastern state. The state lacks the resources to conduct an independent monitoring program on the rate of freshwater wetland loss or degradation. The most recent NWI report, *Status and Trends of Wetlands in the Conterminous United States, 2004 to 2009*, provides information on a national scale.

All dredge and fill activities in freshwater wetlands are regulated in Georgia by the U.S. Army Corps of Engineers (COE). Joint permit procedures between the COE and DNR, including public notices, are carried out in tidally influenced wetlands. Separate permits for alterations to salt marsh and the State's waterbottoms are issued by the Coastal Marshlands Protection Committee, a State permitting authority. Enforcement is carried out by the State, COE and EPA in tidal waters, and by the COE and EPA in freshwater systems. Normal agricultural and silvicultural operations are exempted under Section 404 regulations with certain conditions.

Integrity of Wetland Resources

Wetland Functions and Uses. In Georgia, wetland uses are tied to both the state water quality standards through the definition of "water" or "waters of the state," and to established criteria for wetlands protection (Chap. 391-3-16-.03) associated with the Comprehensive Planning Act of 1989 (O.C.G.A. § 12-2-8).

The definition of "water" or "waters of the State" (Chap. 391-3-6) means "any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wells, wetlands, and all other bodies of surface or subsurface water, natural or artificial, lying within or forming a part of the boundaries of the state which are not entirely confined and retained completely upon the property of a single individual partnership, or corporation". The waters use classifications and general criteria for all waters are discussed elsewhere in this report.

The Comprehensive Planning Act requires all local governments and regional development

commissions to recognize or acknowledge the importance of wetlands for the public good in the landuse planning process. All local governments (municipalities and county governments) were required, beginning in 1990 and ending in 1995, to meet minimum criteria for wetland use and protection. Each government is required to map wetlands using DNR or NWI maps, and describe how wetlands will be protected from future development.

The wetlands protection criteria define freshwater "wetlands" as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (33 CFR 32.93)." This definition is not intended to include "coastal marshlands" as defined by the Coastal Marshlands Protection Act. The minimum area of wetlands to be identified in landuse planning is not to exceed five acres.

The categories of freshwater wetlands and aquatic habitats to be identified, defined and mapped by the State and included in landuse planning are open water, non-forested emergent, scrub/shrub, forested and altered wetlands. Landuse plans must address at least the following considerations with regard to wetland classes identified in the 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.
8) Where wetlands have been created for mitigation purposes under Section 404 of the Clean Water Act, such wetlands shall be considered for protection.

The mapping of altered wetlands – defined as "areas with hydric soils that have been denuded of natural vegetation and put to other uses, such as pasture, row crops, etc., but that otherwise retain certain wetland functions and values" – has not been completed due to a lack of resources. It is unlikely that there will be any significant resources committed at the state or federal levels for monitoring wetland alterations and conversions in the near future.

Acceptable uses of wetlands were identified in wetland protection criteria as the following:

Timber production and harvesting. The socio-economic value of wetlands for consumptive uses such as timber and wood products production is extremely high. High quality hardwoods are produced along the major river corridors throughout the state. There are established "best management practices" for harvesting in wetlands; the level of compliance with these voluntary standards is monitored by the Georgia Forestry Commission in cooperation with the DNR-EPD.

Wildlife and fisheries management. Wetlands are an invaluable resource, both ecologically and economically. They are among the state's most biologically productive ecosystems and are crucial as habitats for wildlife. Wetlands function as essential breeding, spawning,

nursery, nesting, migratory, and/or wintering habitat for much of the migratory and resident fauna. More than 40% of the state threatened and endangered plant and animal species depend heavily on wetlands. Coastal wetlands function as nursery and spawning grounds for 60-90% of commercial fin and shellfish catches. In addition, high levels of plant productivity in coastal wetlands contribute to corresponding levels of invertebrate organisms upon which fish and other animals feed. Plant decomposition in wetlands is also an important process in providing suitable habitat for waterfowl, which contributes to the economy through hunting-related expenditures.

Wastewater treatment. Wetlands help to maintain water quality and improve degraded water by removing, transforming, or retaining nutrients; processing chemical and organic wastes and pollutants; and reducing sediment loads. Wetlands function as sediment, toxic substance, and nutrient traps, performing functions similar to a waste treatment plant. Wetland vegetation filters and retains sediments which otherwise enter lakes, streams, and reservoirs, often necessitating costly maintenance dredging activities. Wetlands may also perform similar purification functions with respect to ground water. Wetlands that are hydrologically connected to ground water can also be a source of aquifer recharge, in which case the natural settling and filtering of pollutants can help protect groundwater quality. As with any filter, wetlands can be damaged, overloaded, or made nonfunctional. Wetlands conservation and careful management of point and non-point pollutants can provide good wetland filtration of materials.

Recreation. The non-consumptive uses of wetlands may contribute most significantly and positively to quality of life, yet these uses are often undervalued or unrecognized. Wetlands are habitats of great diversity and beauty and provide open space for recreational and visual enjoyment. They support a myriad of recreational activities including boating, swimming, birdwatching, and photography. In addition, tidal, coastal, and inland wetlands provide educational opportunities for nature observation and scientific study.

Natural water quality treatment or purification. (See "Wastewater treatment" above). Maintaining the biological and ecological integrity of wetlands is essential to the capitalization of these natural systems for the improvement of water quality and quantity. The polluting, filling, silting, channelizing, draining, dredging, and converting to other uses of wetlands are destructive to the ecological functions of wetlands.

Other uses permitted under Section 404 of the Clean Water Act. Such uses must have an overwhelming public interest. Unacceptable uses of wetlands include:

- Receiving areas for toxic or hazardous waste or other contaminants;
- Hazardous or sanitary waste landfills; and
- Other uses unapproved by local governments.

The criteria established by the State for freshwater wetlands are designed to assist in the identification and protection of wetlands, and do not constitute a state or local permit program. The protection of coastal marshlands, seashores, and tidal waterbottoms is described under the Estuary and Coastal Assessment section of this report.

LLWW descriptors were added to the updated wetland inventory data (2006 base imagery) to create CRD's NWI Plus database for the six coastal counties. The NWI Plus data will be used to better characterize wetlands in this region and to be able to predict wetland functions at the landscape level. The functions used are:

- Surface Water Detention
- Coastal Storm Surge Detention
- Streamflow Maintenance
- Nutrient Transformation
- Carbon Sequestration
- Retention of Sediment and Other Particulates
- Bank and Shoreline Stabilization
- Provision of Fish and Aquatic Invertebrate Habitat

- Provision of Waterfowl and Waterbird Habitat
- Provision of Other Wildlife Habitat
- Provision of Habitat for Unique, Uncommon, or Highly Diverse Plant Communities

Wetland Monitoring. The state maintains monitoring and enforcement procedures for estuarine marshes under authority of the Coastal Marshlands Protection Act of 1970. Over-flights are made of the Georgia coastline to locate potential violations. Restoration and penalties are provided for in the Act.

In 2011, CRD and EPD conducted field monitoring for the National Wetlands Condition Assessment (NWCA) effort initiated by EPA. The overall goal of the NWCA was to monitor freshwater and estuarine wetlands nationally during 2011 to determine their current condition. Pre-existing point locations were used to randomly select wetlands to be evaluated during this project. CRD sampled 32 estuarine wetland sites, and EPD sampled 18 palustrine forested wetland sites. Multiple indicators were used to assess wetland health including vegetation characterization, soil profiles, hydrology and algal community. In addition, a Rapid Assessment Method (RAM) was evaluated across regions and wetland classes to determine the effectiveness of RAMs in wetland management disciplines. Specifically, the RAM identifies stressors to the wetland. Collectively, these parameters provide an indication of overall wetland condition.

Also in 2011, EPD initiated a wetland monitoring and assessment program using an ecoregion-level approach. The goal of the program is to develop appropriate wetland assessment protocols. Fifteen wetland sites in the Piedmont ecoregion (45) were selected and monitored using various protocols, including NWCA protocols. This approach will be continued in other ecoregions in Georgia, and to the extent possible, is being coordinated with wetland monitoring being conducted by other Region 4 states within the same ecoregions.

Additional Wetland Protection Activities

Georgia is protecting its wetlands through land acquisition, public education, land use planning, regulatory programs, and wetland restoration. Additional protection to wetlands is provided either directly or indirectly by several statutes listed below, but described elsewhere in this report. These state laws are as follows:

- Coastal Marshlands Protection Act
- Shore Protection Act
- Water Quality Control Act
- Ground Water Use Act
- Safe Drinking Water Act
- Erosion and Sedimentation Control Act
- Metropolitan Rivers Protection Act

In 2011, a Wetlands Management Unit was formed within EPD to enhance the capabilities of EPD's regulatory functions (401 water quality certification review/issuance for Section 404 permits, and compensatory mitigation program oversight) and to coordinate and advance EPD's wetlands program.

Land Conservation. To date, the Department of Natural Resources has protected in fee over 437,000 acres of conservation land and another 11,122 acres through permanent conservation easements (through February 2012). Included in the numbers above, in just the past five years (2007 through 2011) the Department of Natural Resources has acquired over 56,000 acres of conservation land. Many of these acquisition sites included significant wetland or stream habitats. Notable examples include the Altamaha Wildlife Management Area (WMA), River Creek WMA, Oaky Woods WMA, Silver Lake WMA, Paulding Forest WMA, and Townsend WMA, In addition, Georgia DNR staff helped implement the Georgia Land Conservation Program and Georgia Conservation Tax Credit Program to facilitate permanent protection for important wetland and aquatic habitats throughout the state.

Since 2008, the Coastal and Estuarine Land Conservation Program through CRD has assisted in acquiring 11,000 acres at Ft. Barrington and the Murff Tracts along the

Altamaha River. These acquisitions, along with others by various partners, bring the protection of properties in the lower Altamaha Delta to just over 100,000 acres.

Through its Private Lands Program, Georgia DNR provides technical assistance to private landowners to encourage protection and restoration of natural habitats. Working with other state and federal agencies as well as non-governmental organizations, DNR biologists assist private landowners in the development of management plans that will protect important wildlife habitats, including wetlands and streams. An online publication entitled "Landowner's Guide to Conservation Incentives" can be found at the following web address:
http://www.georgiawildlife.com/node/2275

Education And Public Outreach. The Wildlife Resources Division is involved in aquatic education, providing training for educators in wetland values and developing and coordinating teaching materials. The Aquatic Education Program consists of three key components: Youth Education, Adult Education, and Kids Fishing Events. Youth Education involves training educators to use Aquatic Project Wild (APW), which consists of instructional workshops and supplementary conservation curriculum materials for teachers of K-12 grade children. Adult Education consists primarily of producing educational materials such as the annual Freshwater and Saltwater Sport Fishing Regulations, Reservoir and Southeast Rivers Fishing Predictions, Small Georgia Lakes Open to Public Fishing, Introduction to Trout Fishing, news releases, brochures, radio Public Service Announcements, videos, and staff presentations to sportsmen and civic organizations, as well as large events. The purpose of Kids Fishing Events (KFEs) is to introduce youth and their families to the joys of recreational fishing. The Aquatic Education Program touches tens of thousands of youths and adults each year, bringing these people closer to the environment, and teaching them conservation principles that are important to sustaining wetlands and healthy fish populations.

The Coastal Resources Division has two positions within the Division that assume the roles of coastal educators. The largest coastal education gathering, Coastfest, is hosted by CRD each October. In addition, CRD relies on partners such as the Coastal Adopt-a-Wetland program and the Sapelo Island National Estuarine Research Reserve to carry out messages important to CRD.

The Adopt-a-Wetland (AAW) program facilitates volunteer-based monitoring of wetlands in Georgia, and fosters a sense of personal and community responsibility. The program provides training for volunteers to perform monitoring in freshwater and coastal wetlands. To date, over 150 volunteers have conducted chemical and biological monitoring at over 30 coastal sites.

State Wildlife Action Plan

In 2005, the Wildlife Resources Division of Georgia DNR completed "A Comprehensive Wildlife Conservation Strategy for Georgia". This document, also known as the State Wildlife Action Plan, identified high priority species and habitats in Georgia, described problems affecting these species and habitats, and outlined specific research, conservation and monitoring needs to maintain the state's wildlife diversity. Protection of wetland and aquatic habitats was identified as a critical wildlife conservation need. The following are some specific conservation challenges that are being addressed by Georgia DNR and its conservation partners:

1. Protection and Maintenance of Healthy Vegetated Stream Buffers
Establishment and maintenance of vegetated riparian buffers is one of the most important and cost-effective conservation measures for protection of water quality and aquatic ecosystem health. Many of Georgia's streams suffer from insufficient stream buffers and are thus at risk of water quality impairment resulting from land-disturbing activities, introduction of toxic chemicals or excess nutrients, and thermal impacts from lack of shading. These impacts can greatly influence

the aquatic biodiversity within a watershed. Establishment of substantial vegetated buffers is highly recommended for all high priority streams.

Strategies to protect and maintain healthy stream buffers include working with state and county road departments to improve placement and design of road turnouts, developing standards for stream corridor protection on public lands, and providing information on high priority streams to mitigation bankers to encourage restoration and enhancement of vegetated buffers. Other strategies include providing financial incentives to private landowners to fence livestock out of streams and working with local governments and developers to ensure protection of stream buffers when development plans are considered.

2. Protection of Isolated Wetlands
Isolated wetlands comprise an important group of habitats for wildlife, including more than 45 Georgia species of conservation concern (Comer et al., 2005). Studies of the extent and condition of isolated wetlands indicate a consistent trend toward degradation and loss. A study of Carolina bays in Georgia indicated that the majority of the smaller bays showed evidence of hydrologic alterations or other forms of degradation (VandeGenachte and Cammack, 2002). Other examples of important isolated wetlands include solution pits on granite outcrops, shallow depressions in pine flatwoods, Grady ponds, limesink ponds, and sandhill ponds. Depression wetlands that have direct connections to groundwater may be significantly impacted by excessive groundwater withdrawals. Other isolated wetlands have been impacted by introduction of predatory fish, excessive inputs of sediments or nutrients, ditching and draining, or conversion to agricultural uses.

Georgia DNR and other organizations are working to protect examples of these wetland habitats through fee-simple acquisition or conservation easements. Programs providing financial and other incentives are being directed to private landowners to encourage the protection, restoration, and management of these important wetlands. Permits for groundwater and surface water withdrawals should be administered with careful consideration of resulting impacts to these and other wetlands.

3. Protection of Headwater Streams
Headwater streams are found in the upper reaches of watersheds and may have flowing water for only a portion of the year. Headwater streams account for the majority of stream miles in a given watershed. Like isolated wetlands, these habitats are important for a wide variety of wildlife species, including several rare species of concern. These headwater systems are also important for maintenance of habitat quality in the higher-order perennial streams which they feed (Meyer et al 2003). Intermittent/ephemeral streams and associated seepage wetlands are often overlooked when streams and wetlands are mapped. In areas where development pressures are high or agricultural uses are prevalent, these habitats may be adversely affected by land disturbing activities.

Protection of headwater streams and associated wetlands is critical for protection of wildlife diversity and maintenance of water quality. Greater emphasis should be placed on accurate mapping and delineation of headwater streams. The effects of groundwater and surface water withdrawals on headwater streams and associated wetlands should be monitored.

4, Control of Invasive Species
The long-term effects of nonnative species on native wildlife species are generally considered to be second only to direct habitat destruction or conversion. Approximately 42% of the species listed as Endangered or Threatened under the federal Endangered Species Act are significantly impacted by invasive exotic species. Feral hogs, red shiners, and flathead catfish are examples of nonnative animals that can cause serious impacts to wetland or aquatic communities. A number of nonnative plants such as Nepal grass, Chinese tallow tree, hydrilla, water hyacinth, common reed, and Chinese privet also pose serious threats to Georgia's streams and wetlands.

In response to these threats, Georgia DNR coordinated the development of a statewide invasive species strategy, which was completed in 2009. Implementation of this strategy will be coordinated by the Georgia Invasive Species Task Force, which was formally established through a memorandum of understanding between the Georgia Forestry Commission, Georgia DNR, Georgia Department of Agriculture, and the University of Georgia in 2009. The Georgia Invasive Species Strategy can be found at: http://www.georgiawildlife.com/conservation/invasives-pests.

5. Protection of Caves and Other Karst Environments

Caves, limesinks, sagponds, and springs represent some of the most sensitive natural habitats in Georgia. These karst environments harbor many of Georgia's rarest and most imperiled species, and are susceptible to impacts from a wide variety of human activities, from residential and commercial development to road and utility construction, excessive groundwater withdrawal, recreational activities, and altered water quality. Protection of karst environments is essential for maintenance of Georgia's biological diversity. Georgia's Cave Protection Act of 1977 (O.C.G.A. § 12-4-140) provides for protection of caves, sinkholes, and speleothems (cave formations), prohibits the storage of hazardous materials and dumping of litter, garbage, or other materials in caves, and prohibits the harming, killing or removal of wildlife found within caves except by authorized personnel.

6. Reducing Impacts from Development and Other Activities

Continued growth of Georgia's human population and associated loss or fragmentation of natural habitats will result in additional impacts to native species found in wetland and aquatic habitats. Of particular concern are habitat specialist species adapted to rare or sensitive habitats. The highest rated conservation actions related to reduction or avoidance of impacts from development and other activities on wetland and aquatic habitats include:

- Decrease the impact of poorly designed road crossings on fish passage. Work with FEMA, Georgia DOT, and county road departments to improve fish passage with bottomless culverts or free-span bridges.
- Expand use of WRD biodiversity data for environmental review, public outreach, permitting, and development of site management plans to minimize impacts on rare species and sensitive habitats.
- Reduce impacts of unpaved roads, parking lots, boat ramps, and camping areas on aquatic habitats.
- Work with Georgia DOT and federal agencies to minimize impacts from highway construction and facilitate protection and mitigation of high priority habitats.
- Facilitate training for and compliance with Best Management Practices for erosion and sedimentation control, stormwater runoff, and stream buffer protection.

Specific programs and funding mechanisms for protection of natural habitats in Georgia are outlined in the State Wildlife Action Plan, which can be found at the following website: http://www.georgiawildlife.com/conservation/wildlife-action-plan

M.A.R.S.H. Projects

The Wildlife Resources Division has a cooperative agreement with Ducks Unlimited (DU) for the purpose of acquiring, developing, restoring, or enhancing waterfowl habitat. A major aspect of this agreement is the M.A.R.S.H. program (Matching Aid to Restore States Habitat). Under the M.A.R.S.H. program, 7.5% of the money raised by DU in Georgia is made available as matching funds for work to develop, improve, or restore waterfowl habitat.

CHAPTER 5
Estuary and Coastal Programs

Background
The Georgia Department of Natural Resources (DNR) Coastal Resources Division (CRD) manages Georgia's coastal resources. The CRD's Ecological Services Section administers Georgia's Coastal Management Program and its enforceable authorities, manages Georgia's shellfish harvest program, and conducts water quality monitoring based on specific grants and programmatic requirements. The CRD's Marine Fisheries Section manages Georgia's marine fisheries, balancing the long-term health of fish populations with the needs of those who fish for commercial and recreational purposes. The Section conducts scientific surveys of marine organisms and their habitats; collects harvest and fishing effort information; and assesses, restores and enhances fish habitats; along with other responsibilities. The DNR Wildlife Resources (WRD) and Environmental Protection Divisions (GAEPD) each play additional roles to manage resources in the Georgia coastal environment.

Georgia Coastal Management Program
Recognizing the economic importance of environmentally sensitive coastal areas, the Federal Coastal Zone Management Act of 1972 encourages states to balance sustainable development with resource protection in their coastal zone. As an incentive, the federal government awards states financial assistance to develop and implement coastal zone management programs that fulfill the guidelines established by the Act. Georgia entered this national framework in 1998 upon the approval of the Georgia Coastal Management Program (GCMP) by the National Oceanic and Atmospheric Administration. Financial assistance under the federal grant to the GCMP has been used, in part, to support the Public Health Water Quality Monitoring Program described below.

The Coastal Management Program has provided guidance and technical assistance to improve coastal water quality in general, and in the development of a Coastal Non-Point Source Control Program in particular. Under the Coastal Zone Management Act Reauthorization Amendments of 1990, Congress added a section entitled "Protecting Coastal Waters." That section directs states with federally approved coastal management programs to develop a Coastal Non-Point Source Program. To that end, the GAEPD is assisting the GCMP in l) identifying land uses which may cause or contribute to the degradation of coastal waters, 2) identifying critical coastal areas adjacent to affected coastal waters, 3) identification of appropriate measures related to land use impacts to achieve and maintain water quality standards and designated uses, and 4) identifying management boundaries to more effectively manage land use impacts and water uses to protect coastal waters.

Public Health Water Quality Monitoring Program
The CRD conducts water quality monitoring in estuarine and near-shore coastal waters through its Public Health Water Quality Monitoring Program. This Program has three distinct parts. The Shellfish Sanitation and Beach Water Quality Monitoring Programs are concerned with public health. The Nutrient Sampling Program is designed to generate baseline-monitoring data for trends.

Shellfish Sanitation Program
CRD's Shellfish Sanitation Program monitors the quality of Georgia's shellfish harvest waters for harmful bacteria that might affect the safety of shellfish for human consumption. Seven (7) harvest areas are designated for recreational picking of oysters and clams by the general public. An additional seventeen (17) harvest areas are designated for the commercial harvest of oysters and clams.

The US Food and Drug Administration's National Shellfish Sanitation Program (NSSP) establishes national standards to show that shellfish harvest areas are "not subject to contamination from human and/or animal fecal

matter in amounts that in the judgment of the State Shellfish Control Authority may present an actual or potential hazard to public health." Water samples from each approved harvest area are collected by CRD and analyzed regularly to ensure the area is below the established fecal coliform threshold. Waters approved for shellfish harvest must have a geometric mean that does not exceed the threshold set forth by the NSSP.

County	Approved	Leased	Public
Chatham	15,351 acres	4,887 acres	1,267 acres
Bryan/Liberty	55,747 acres	1,706 acres	936 acres
McIntosh	50,170 acres	13,756 acres	1,974 acres
Glynn/Camden	37,018 acres	4,855 acres	4,355 acres

TABLE 5-1. LOCATION AND SIZE OF AREAS APPROVED FOR SHELLFISH HARVEST

Water quality sampling occurs every other month at eighty- eight (88) stations in five (5) counties on the coast including Chatham, Liberty, McIntosh, Glynn, and Camden counties. These stations are located to provide representative coverage of all the approved harvest areas along the coast.

Beach Monitoring Program

The Beach Monitoring Program was developed in response to the federal Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000. The BEACH Act is an amendment to the Federal Clean Water Act. The Act requires states to: 1) identify and prioritize their coastal recreational beaches; 2) monitor the beaches for the presence of the bacterial indicator Enterococcus; 3) notify the public when the EPA threshold for Enterococcus has been exceeded; and 4) report the location, monitoring, and notification data to EPA.

Georgia's recreational beaches have been identified and prioritized into three (3) tiers based on their use and proximity to potential pollution sources. Tier 1 beaches are high-use beaches. Tier 2 beaches are lower-use beaches. Tier 3 beaches are lowest-use or at low probability for potential pollution. Water quality sampling occurs regularly depending upon the tier: Tier 1 beaches are monitored weekly year-round; Tier 2 beaches are monitored monthly from April through October and Tier 3 beaches are not monitored. Beaches that exceed the threshold for Enterococcus are put under a swimming advisory that is not lifted until the levels of bacteria are sufficiently reduced, based on resampling. Beaches under a permanent swimming advisory are monitored quarterly.

Nutrient Sampling Program

The Nutrient Sampling Program collects nutrient baseline data in coastal sounds and estuaries. High nutrient loads have been linked to outbreaks of harmful algal blooms in other states and can result in large kills of fish and other marine life as well as human sickness. CRD has been collecting nutrients at eighty-four (84) stations along the coast since 2000 to establish baseline trends in nitrite nitrogen, ammonia nitrogen, total dissolved phosphorus, ortho- phosphate, and silicate.

Due to budget reductions in 2010, changes were made to both the coastal river and estuarine sampling regimes. Temperature, salinity, conductivity, dissolved oxygen and pH are collected monthly in the Ogeechee, Altamaha, Satilla, and St. Mary's Rivers at seven (7) sites in each river to provide data for the upper estuary/lower salinity environments. Samples are also collected at thirty-five (35) of the eighty-eight (88) shellfish sample sites to provide nutrient, chlorophyll a and fecal coliform bacteria data from tidal rivers and sounds. Currently, through a memorandum of understanding, Coastal Resources Division has agreed to collect the samples and ship them to the contract laboratory in Athens, GA and the Georgia Environmental Protection Division has agreed to pay for the analysis of the nutrient samples.

Coastal Streams, Harbors, and Sounds
This 305(b) report contains information on many coastal streams, harbors, and sounds. Several water bodies have been shown to have low dissolved oxygen (DO) readings over discrete periods of time during an annual cycle. EPD has categorized these streams as needing further assessment. A large percentage of the low dissolved oxygen readings occurred in the late summer and early fall of 2003, a period of prolonged, extreme drought. In addition to the dry conditions, water temperatures and salinities during this period were noted to be well above average for all of the water quality monitoring stations in coastal Georgia. To more accurately represent and report on natural dissolved oxygen levels in coastal water bodies, additional directed effort will be required at each location to increase the general state of knowledge for these estuarine systems.

Coastal Beaches
This report contains information on twenty-seven (27) coastal beaches. Of these, twenty-three (23) are considered to be supporting their designated use of coastal recreation. Four(4) beaches are considered as not supporting their designated use. Two (2) are located on Jekyll Island at the St. Andrews picnic area and at Clam Creek These beaches are Tier 1 and are sampled weekly year-round. The other two (2) "not supporting" beaches are Tier 2 beaches, which are sampled less frequently. The Kings Ferry beach is located at a small municipal park on the Ogeechee River in Chatham County. Reimold's Pasture is a small island in Buttermilk sound at the mouth of the Altamaha River.

Data Not Included in Assessment
Much of the data used to generate the 305(b)/303(d) list for coastal streams, harbors, and sounds were collected by CRD for the programs as described earlier in this chapter. Other data are used by CRD to address fisheries management or recreational use in specific areas along the coast, but much of these data do not meet the minimum spatial or temporal (frequency) criteria of the GAEPD 2010 listing methodology guidance document and cannot be used to assess the ability of a water body to support its designated use(s). Data from the Georgia National Coastal Assessment (NCA) Program (2000-2006) were not included for this listing period. NCA data are based on a probabilistic, random sampling design with only one sample per year at each location. For the purposes of 305(b)/303(d), these data may be used in the future to augment existing data sets.

The state's list of assessed waters for beaches does not contain all the coastal beaches that have been identified and prioritized by CRD. Tier 3 beaches are not monitored, so no data are available for assessment. Tier 3 beaches have few potential pollution sources.

Commercial and Recreational Fisheries
CRD has several projects that produce information used to determine the status of commercially and recreationally important fish, crustaceans, and mollusks. The Ecological Monitoring Survey (EMS) conducts monthly assessment trawls (blue crabs, shrimp, and beginning in 2003, finfish) in the Wassaw, Ossabaw, Sapelo, St. Simons, St. Andrew and Cumberland estuaries. Data from this survey are used to describe the abundance, size composition, reproductive status of penaeid shrimp and blue crab. In addition, information collected on finfish and other invertebrate species since 2003 provides a broad ecologically based evaluation of species' abundance, distribution, and diversity in these estuaries. The EMS conducts several other surveys including: a small trawl survey targeting juvenile specimens in the upper creeks monthly in three sound systems, Ossabaw, Altamaha, St. Andrews using similar techniques and protocols (albeit on a smaller scale) as the assessment survey; and the American Eel young-of-the-year YOY survey used to assess annual recruitment success of glass eels. The Marine Sportfish Population Health Survey uses gill and trammel nets to capture finfish in the Wassaw and Altamaha River Delta estuaries from June to November. These data have been used in coast-wide stock assessments for red drum.

The Fisheries Statistics Work Unit collects catch and effort information from the

recreational and commercial fisheries in cooperation with the National Marine Fisheries Service. Total annual commercial landings in Georgia ranged from 6.65 to 8.18 million pounds of product during the period from 2000 to 2010, with an annual average of 7.57 million pounds. Penaeid shrimps are the most valuable catch in Georgia commercial landings, typically totaling nearly 9.43 million dollars (2.76 million pounds of tails) in unadjusted, ex-vessel value during recent years. Catches are composed primarily of white shrimp (*Litopenaeus setiferus*) during the fall, winter and spring, and brown shrimp (*Farfantepenaeus aztecus*) during the summer. These shrimp spawn in oceanic waters, but depend on the salt marsh wetlands to foster their juvenile and sub-adult stages. White shrimp landings have varied over the last 50 years with a recent downward trend due to declining fishing effort. Research has shown that densities of spawning stock, and to a lesser extent fall harvest, respond strongly to cold air outbreaks during the early winter that can produce wide scale kills of white shrimp, and to a suite of environmental variables impacting the salt marsh ecosystem that produce a range of growing conditions. Cold weather kills have been associated with abnormally cold winters in 1984, 1989, and 2000.

Blue crabs live longer than penaeid shrimps (3-4 years versus 1-2 years), and also exhibit less extreme fluctuations in annual abundance from one year to the next. Reported annual blue crab (*Callinectes sapidus*) landings in 2010 were below the most recent 10-year average of 3.25 million pounds (2010 = 2.27 million pounds). A severe drought from 1998 to 2002 reduced annual harvest 80% of the long-term average of 7.99 million pounds. That drought resulted in a reduction in the quantity of oligohaline and mesohaline areas within Georgia's estuaries. This effect was more pronounced in estuaries that did not receive direct freshwater inflow from rivers. It is believed this altered salinity profile resulted in (1) higher blue crab predation, (2) increased prevalence of the fatal disease caused by the organism, *Hematodiniun* sp*,* (3) reduction in the quantity of oligohaline nursery habitat, and (4) recruitment failure. Drought conditions have been prevalent in the past 18 months (2010-11) resulting in a decline in abundance, albeit not as extreme as that earlier in the previous decade.

Commercial finfish landings fluctuate annually depending on market conditions and the impacts of management. American shad populations in the Altamaha River have fluctuated over the past 30 years. Anecdotal evidence indicates that participation in the American shad fishery continues to decline. Apparently, as older fishermen leave, there are few new entrants into the fishery. Since 2001, effort estimates have been collected using a trip ticket system with effort being recorded as the number of trips for both the set and drift gill net fisheries. Effort generally declined from a high of 538 trips in 2006 to a low of 281trips in 2010. New regulations enacted by the Atlantic States Marine Fisheries Commission's fishery Management Plan on American Shad (Amendment 3), mandate additional monitoring efforts. Additionally, sustainability plans are required of any water system where commercial fishing is conducted. In Georgia, only the Altamaha, Ogeechee, and Savannah Rivers have commercial fisheries at this time. The commercial fishery on the Ogeechee is very small, with effort (average < 10), landings (average < 500 lbs) and participation (average < 3 fishers) annually over the past ten years. By contrast, the Altamaha has the largest fishery comprising 82% of the harvest and 76% of the trips over the past ten years.

Total landings of bivalve mollusks have fluctuated greatly over the last 30 years. During the 1970's landings were totally dominated by oysters (*Crassostrea sp.*), generally over 50,000 pounds of raw meats per annum. During the early 1980's fishermen increasingly focused on hard clams (*Mercenaria sp.*) due to stock declines in other areas along the east coast and their market value. This combined with increasing acreages available for harvest activities due to water quality certifications, allowed the replacement of oysters by clams as the premier species from 1986-1988. From 1988-1992 clam landings again declined and oyster landings grew. Since 1990, the clam landings have shown a general increase in contrast to the

oyster fishery that, after large catches from 1989-92, have shown a steady decline since. In 2009, clam harvest was approximately 73,254 lbs of meat, while oyster harvest was only approximately 9,676 lbs of meat. Shellfish harvest landings have increased in both 2010 and 2011. In 2011, clam harvest was approximately 129,305 lbs. of meat and oyster harvest totaled 20,100 lbs. of meat. Labor costs have effected this change in combination with temporary inaccessibility to some grounds because of conflicts over harvest rights. No acreage has been lost due to deteriorating water quality. Current research is focusing on improvements in stock genetics (growth and appearance enhancements), cultch substrate comparisons, and establishing new populations.

CHAPTER 6

Public Health & Aquatic Life Issues

Risk-Based Assessment For Fish Consumption In 1995, Georgia began issuing tiered recommendations for fish consumption. Georgia's fish consumption guidelines are "risk-based" and are conservatively developed using currently available scientific information regarding likely intake rates of fish and toxicity values for contaminants detected. One of four, simple, species-specific recommendations is possible under the guidelines: No Restriction, Limit Consumption to One Meal Per Week, Limit Consumption to One Meal Per Month, or Do Not Eat. In 2010, 51.6% of recommendations for fish tested in Georgia waters were for No Restriction, 31% were to Limit Consumption to One Meal Per Week, 13.4% were to Limit Consumption to One Meal Per Month, and 4% was Do Not Eat Advisories. It should be noted that the dramatic increase of waters not fully meeting designated uses as related to fish consumption was a result of converting to a conservative risk-based approach for evaluating contaminants data in 1995, and not a result of increased contaminant concentrations in Georgia's fish.

Fish Consumption Guidelines
Georgia has more than 44,000 miles of perennial streams and more than 421,000 acres of lakes. It is not possible for the DNR to sample every stream and lake in the state. However, high priority has been placed on the 26 major reservoirs, which make up more than 90% of the total lake acreage. These lakes will continue to be monitored to track any trends in fish contaminant levels. The DNR has also made sampling fish in rivers and streams downstream of urban and/or industrial areas a high priority. In addition, DNR focuses attention on public areas that are frequented by a large number of anglers.

The general contaminants program includes testing of edible fish and shellfish tissue samples for the substances listed in Table 6-1. Of the 43 constituents tested, only PCBs, dieldrin, DDT and its metabolites, and mercury have been found in fish at concentrations above what may be safely consumed at an unlimited amount or frequency.

The use of PCBs, chlordane, DDT and dieldrin have been banned in the United States, and, over time, the levels are expected to continue to decline. Currently there are no restricted consumption recommendations due to chlordane. One water segment has a restriction in consumption recommended for one species due to dieldrin residues, and one pond has restrictions recommended due to DDT/DDD/DDE residues.

TABLE 6-1. PARAMETERS FOR FISH TISSUE TESTING

Antimony	b-BHC	Toxaphene
Arsenic	d-BHC	PCB-1016
Beryllium	g-BHC (Lindane)	PCB-1221
Cadmium	Chlordane	PCB-1232
Chromium, Total	4,4-DDD	PCB-1242
Copper	4,4-DDE	PCB-1248
Lead	4,4-DDT	PCB-1254
Mercury	Dieldrin	PCB-1260
Nickel	Endosulfan I	Methoxychlor
Selenium	Endosulfan II	HCB
Silver	Endosulfan Sulfate	Mirex
Thallium	Endrin	Pentachloroanisole
Zinc	Endrin Aldehyde	Chlorpyrifos
Aldrin	Heptachlor	
a-BHC	Heptachlor Epoxide	

Mercury in Fish Trend Project
In response to regulatory actions requiring reductions in air emissions of mercury, DNR recognized the need to establish a mercury in fish trend network that would provide a database for evaluating potential changes that may result in fish body burdens. Twenty-two stations were established in 2006 having spatial relevance to major air-emission sources in Georgia (coal-fired electric generating units and a chlor-alkali plant), waters with TMDLs for mercury in fish, and near State boundaries for out-of-state sources. Each station has a designated predator species that will be monitored annually. Mercury trend samples of

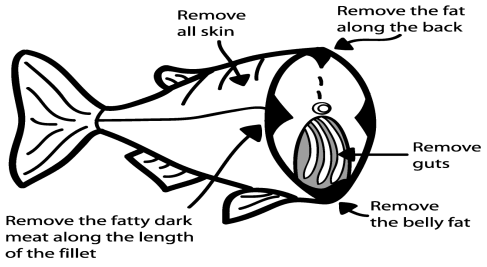
individual fish muscle tissue are analyzed for mercury and other metals.

Mercury is a naturally occurring metal that cycles between the land, water, and the air. As mercury cycles through the environment it is absorbed and ingested by plants and animals. It is not known where the mercury in Georgia's fish originates. Mercury may be present due to mercury content in natural environments such as in South Georgia swamps, from municipal or industrial sources, or from fossil fuel uses. It has been shown that mercury contamination is related to global atmospheric transport. The EPA has evaluated the sources of mercury loading to several river basins in Georgia as part of TMDL development, and has determined that 99% or greater of the total mercury loading to these waters occurs via atmospheric deposition.

States across the southeast and the nation have detected mercury in fish at levels that have resulted in limits on fish consumption. In 1995, the USEPA updated guidance on mercury, which documented increased risks of consuming fish with mercury. The DNR reassessed all mercury data and added consumption guidelines in 1996 for a number of lakes and streams, which had no restrictions in 1995. The Georgia guidance for 2010 reflects the continued use of the more stringent USEPA risk level for mercury.

Evaluation Of Fish Consumption Guidance for Assessment Of Use Support USEPA guidance for evaluating fish consumption advisory information for 305(b)/303(d) use support determinations has been to assess a water as fully supporting uses if fish can be consumed in unlimited amounts. If consumption needs to be limited, or no consumption is recommended, the water is not supporting this use. Georgia followed this guidance in evaluating the fish consumption guidelines for the 2000 and earlier 305(b)/303(d) lists. This assessment methodology was followed again in developing the 2008-2009 305(b)/303(d) List for all fish tissue contaminants except mercury. Mercury in fish tissue was assessed and a segment or water body was listed if the trophic-weighted fish community tissue mercury was in excess of the USEPA water quality criterion (*Water Quality Criterion for the Protection of Human Health: Methylmercury*, EPA-823-R-01-001, January 2001). For mercury, waters were placed on the not support list if the calculated trophic-weighted residue value was greater than 0.3 µg/g wet weight total mercury. For contaminants other than mercury (PCBs, dieldrin, DDT/DDD/DDE) waters were placed on the not support list if the assessment indicated any limited consumption of fish. The USEPA criterion represents a national approach to address what mercury concentration is protective for fishing waters. The existence of risk-based recommendations to reduce consumption was used with respect to other contaminants detected in fish tissue. EPD formally adopted the 2001 EPA national human health criterion for methylmercury as a human health standard for total mercury in fish tissue in the Georgia water quality rules in December 2002.

General Guidelines to Reduce Health Risks
The following suggestions may help to reduce the risks of fish consumption:
Keep smaller fish for eating. Generally, larger older fish may be more contaminated than younger, smaller fish. You can minimize your health risk by eating smaller fish (within legal size limits) and releasing the larger fish.
Vary the kinds of fish you eat. Contaminants build up in large predators and bottom-feeding fish, like bass and catfish, more rapidly than in other species. By substituting a few meals of panfish, such as perch, sunfish and crappie, you can reduce your risk.
Eat smaller meals when you eat big fish and eat them less often. If you catch a big fish, freeze part of the catch (mark container or wrapping with species and location), and space the meals from this fish over a period of time.
Clean and cook your fish properly. How you clean and cook your fish can reduce the level of contaminants by as much as half in some fish. Some chemicals have a tendency to concentrate in the fatty tissues of fish. By removing the fish's skin and trimming fillets according to the diagram, you can reduce the level of chemicals substantially. Mercury is bound to the meat of the fish, so these precautions will not help reduce this contaminant.



Remove the skin from fillets or steaks. The internal organs (intestines, liver, roe, and so forth), and skin are often high in fat and contaminants.
Trim off the fatty areas shown in black on the drawing below. These include the belly fat, side or body fat, and the flesh along the top of the back. Careful trimming can reduce some contaminants by 25 to 50%.
Cook fish so fat drips away. Broil, bake or grill fish and do not use the drippings. Deep-fat frying removes some contaminants, but you should discard and not reuse the oil for cooking. Pan frying removes few, if any, contaminants.

Specific Water body Consumption Guidelines These guidelines are designed to protect you from experiencing health problems associated with eating contaminated fish. It should be noted that these guidelines are based on the best scientific information and procedures available. As more advanced procedures are developed these guidelines may change.

PCBs, chlordane, dieldrin, DDT and methylmercury build up in your body over time. It may take months or years of regularly eating contaminated fish to accumulate levels that would affect your health. It is important to keep in mind that these guidelines are based on eating fish with similar contamination over a period of 30 years or more. These guidelines are not intended to discourage people from eating fish. They are intended to help fishermen choose safe fish for the table.

Table 6-2 lists the lakes and streams where the fish have been tested and found to contain little or no contamination. There are no problems with eating fish from these water bodies. Tables 6-3 and 6-4 list the lakes and streams where consumption guidance has been issued by the DNR. This information is provided annually in Georgia's Freshwater and Saltwater Fishing Regulations, which is available from DNR and also supplied with each fishing license purchased. This information is also updated annually in the DNR publication *Guidelines for Eating Fish From Georgia Waters*.

Special Notice For Pregnant Women, Nursing Mothers, and Children If you plan to become pregnant in the next year or two, are pregnant now, or are a nursing mother, you and your children under 6 years of age are especially sensitive to the effects of some contaminants. For added protection, women in these categories and children may wish to limit consumption to a greater extent than recommended in Tables 6-3 and 6-4. Fish tissue consumption guidelines are discussed in detail in the DNR publication *Guidelines for Eating Fish from Georgia Waters-2007 Update* that is reproduced in Appendix C.

Development Of New Risk Communication Tools For Women of Child-bearing Age and Children In 2003, new approaches to spatial analyses were used to assess fish tissue contaminants by species and trophic level, and across distinct geographic areas including hydrologic unit codes, river basins, and hydrogeologic provinces of Georgia. The analyses were used to generate simple brochures with specific information targeting women of child-bearing age and children for distribution through health and nutrition related outlets. Brochures were generated for four distinct areas of Georgia, and English versions were released in November 2003, followed by publication of Spanish brochures in March of 2004. The College of Family and Consumer Sciences, Cooperative Extension Services, University of Georgia and the Chemical Hazards Program, Georgia Division of Public Health collaborated in the development of the brochures. The information will be updated as needed, and all brochures are currently available on the DNR website.

Recreational Public Beach Monitoring The U.S. Army Corps of Engineers conducts fecal coliform monitoring at its reservoir bathing beaches in Georgia. Tennessee Valley Authority (TVA), Georgia Power, the U.S. Forest Service, the National Park Service, Georgia State Parks, and counties and cities throughout the state have also conduct some sampling at the public beaches they operate. The Coastal Resources Division of DNR conducts enterococcus monitoring at public

coastal beaches and other recreationally used estuarine locations such as boat ramps and sandbars, and works with the local County Health Department in issuance of swimming advisories.

Shellfish Area Closures

Georgia's one hundred linear mile coastline contains approximately 500,000 acres of potential shellfish habitat. Most shellfish in Georgia grows in the narrow intertidal zone and are exposed between high water and low water tide periods. Only a limited amount of that area, however actually produces viable shellfish populations. Lack of suitable cultch, tidal amplitudes, disease, littoral slope, and other unique geomorphologic features contribute to the limited occurrence of natural shellfish resources along the Georgia Coast.

The Coastal Resources Division currently monitors and maintains five shellfish growing areas comprised of commercial leases and public recreational harvest areas. Shellfish waters on the Georgia coast are classified as "Approved" or "Prohibited" in accordance with the criteria of the National Shellfish Sanitation Program. Specific zones within shellfish growing areas may be closed to shell fishing because of the proximity to a marina or a municipal or industrial discharge. Georgia maintains approximately 33,000 acres approved for the harvest of shellfish for commercial and/or personal consumption. Only those areas designated as Public Recreational Harvest or those areas under commercial lease are classified as "Approved for shellfish harvest". Shellfish growing area waters are monitored regularly to ensure that these areas remain in compliance with the FDA fecal coliform thresholds. All other waters of the state are classified as "Prohibited", and are closed to the taking of shellfish. It is important to note that, even though some of these areas could potentially meet the criteria to allow for harvesting, they have been classified as "Prohibited" due to the lack of available water quality data**.**

Cyanobacteria (Blue-Green Algae) Blooms

Cyanobacteria blooms are an increasing concern for Georgia's citizens. Cyanobacteria occur naturally in low abundance in Georgia's lakes and reservoirs. However, eutrophication results in conditions that are favorable for cyanobacteria growth. Cyanobacteria blooms can cause a variety of water quality issues including, the potential to produce toxins and taste-and-odor compounds. These compounds are produced naturally by cyanobacteria, but their function or what causes their production is still currently unknown. EPD is in the process of developing a means to better detect blooms, assess whether toxins are present, and better inform the public on this issue.

TABLE 6-2
NO CONSUMPTION RESTRICTIONS - 2010

LAKES	RIVERS	
Allen Creek WMA (Ponds A & B) Bowles C. Ford Lake Brasstown Valley (Kid's Fish Pond) Carters City of Adairsville Pond Clayton Co. Water Auth. (Lakes Blalock, Smith and Shamrock) Dodge County PFA Fort Yargo State Park Lake Hard Labor Creek (Rutledge) High Falls Juliette Mayer (Savannah) McDuffie PFA East Watershed Ponds Nancy Town Lake Oconee Olmstead Paradise PFA (Patrick & Horseshoe 4) Payton Park Pond Rocky Mountain PFA (Lakes Antioch & Heath) Seed Sinclair Shepherd CEWC Varner Walter F. George	Alcovy River Boen Creek (Rabun Co.) Brasstown Creek (Towns Co.) Broad River Buffalo Creek (Carroll Co.) Butternut Creek (Union Co.) Cane Creek (Lumpkin Co.) Chattahoochee River (Chattahoochee, Early, & Stewart Cos.) Chattanooga Creek Chattooga River (NW Ga.) Chestatee River (Headwaters to Tesnatee River) Chickamauga Creek (East & South) Chickasawhatchee Creek Coleman River Conasauga River in Cohutta Forest Daniels Creek (Cloudland Canyon State Park) Dukes Creek Goldmine Branch Hart Co. WMA (Tributary to Cedar Creek) Hayner's Creek Jacks River Jones Creek Little Dry Creek (Floyd Co.) Little Tallapoosa River Little Tennessee River Middle Oconee River	Mill Creek (Whitfield Co.) Moccasin Creek (Lake Burton Trout Hatchery) Mud Creek (Cobb County) Nickajack Creek Noonday Creek (Cobb Co.) North Oconee River Ocmulgee River (Butts, Monroe, Houston & Pulaski Cos.) Oconee River (Below Barnett Shoals to Lake Oconee, & Laurens Co. & Milledgeville to Dublin) Ogeechee River (Ft. McAllister) Olley Creek Ponder Branch (Walker Co.) Proctor Creek Sewell Mill Creek Slab Camp Creek (Oconee Co.) South River (Butts Co., Hwy. 36) Spirit Creek Stamp Creek (Cherokee Co.) Stekoa Creek Tallulah River Upatoi Creek Yahoola Creek Yellow River (Porterdale Dam)

TABLE 6-3. FISH CONSUMPTION GUIDANCE FOR LAKES – 2010

LAKES	NO RESTRICTIONS	1 MEAL/ WEEK	1 MEAL/ MONTH
Albany By-Pass	Redear	LMB, Catfish	Carp
Acworth	Bluegill, LMB < 16"	LMB > 16"	
Allatoona	Carp, Crappie, SPB< 16", LMB 12-16", CCF, White bass < 12", G. redhorse	SPB > 16", LMB > 16", HB >16"	
Andrews	CCF, Spotted Sucker	LMB > 12"	
Banks	Bluegill		LMB > 12"
Bartlett's Ferry	Blk crappie <12", LMB <16", SPB <12"	HB & Striped bass & LMB > 16", CCF, Blk crappie & SPB >12"	
Bear Cr. Reservoir	Sunfish	LMB < 12", CCF >12"	
Bennett CEWC PFA		LMB > 12"	
Black Shoals (Randy Poynter)	CCF < 12", Redear	LMB 12-16", CCF >12", Blk crappie	
Blackshear	CCF < 12"	CCF > 12", LMB > 12"	
Big Lazer PFA	LMB 12-16", CCF	LMB > 16"	
Blue Ridge	CCF < 16", LMB < 12"	White bass & LMB 12-16", CCF > 16"	
Burton	LMB <16", CCF, Bluegill, White catfish	LMB > 16", SPB 12-16"	
Pond N. Bush Field	Bluegill, LMB < 12"	LMB 12-16"	
Chatuge	LMB >12", CCF >12"	SPB 12-16"	
Clarks Hill	CCF, Blk crappie, Redear, White perch, Striped bass, Spotted sucker, HB, LMB <16"	LMB > 16"	
Evans County PFA	CCF, LMB 12-16"	LMB > 16"	
Goat Rock	Blk crappie, LMB 12-16", Spotted sucker, Bluegill	HB < 12", CCF 12-16"	CCF & LMB > 16", HB >12", White bass
Hartwell (Tugaloo Arm)	Blk crappie, HB/Striped bass < 12", CCF < 16"	LMB < 16", Carp > 16"	HB/Striped bass 12-16"
	DO NOT EAT Hybrid and Striped bass > 16 inches in length		CCF & LMB > 16"
Hartwell - main body of lake	DO NOT EAT Hybrid and Striped bass (S C Dept. Health and Environmental Control 1-888-849-7241)		LMB, CCF
Hugh M. Gillis PFA	Channel catfish, Bluegill	Largemouth bass 12-16"	
Jackson	Blk crappie, Redear sunfish, Catfish < 16"	Catfish > 16", LMB	
Ken Gardens	<16" Channel catfish, Brown bullhead, Bluegill	Largemouth bass >12"	
Kolomoki (DNR S.P.)	Redear Sunfish	Largemouth Bass > 12"	
Lanier	CCF & Striped bass < 16", Bluegill, Blk crappie White catfish	Striped bass, Carp & CCF > 16", LMB, SPB	
L. Ocmulgee St. Pk.		Brown bullhead 12-16"	LMB > 16"
McDuffie PFA, West	CCF	LMB	
Nottely	CCF, Blk crappie	LMB > 12", Striped bass > 16"	
Oliver	Hybrid bass < 12", CCF < 16", Redear, Bluegill	LMB > 12"	CCF > 16"
Rabun	LMB 12-16", Bluegill, White catfish < 16"	White catfish & LMB > 16"	
Reed Bingham S.P.			LMB > 12"Catfish > 16"
Richard B. Russell	Crappie, Bluegill, White perch, Catfish	LMB > 12"	
Seminole	CCF, Spotted sucker, Blk crappie, Redear	LMB > 12"	

LAKES	NO RESTRICTIONS	1 MEAL/ WEEK	1 MEAL/ MONTH
So. Slappy Blvd. Offramp (Albany)	Bluegill	Largemouth bass 12-16"	Largemouth bass > 16"
Stone Mountain	Catfish	LMB > 16"	
Tobesofkee	CCF	LMB > 16"	
Tugalo	White catfish 12-16", Bluegill		LMB > 12"
Tribble Mill Park	Blk Crappie, Bluegill, LMB < 12"	LMB 12-16"	
West Point	LMB, Carp, SPB, Crappie, CCF & HB < 16"	CCF & HB > 16"	Striped bass
Worth (Chehaw)	Spotted sucker, Redear	LMB 12-16", Channel catfish > 16"	
Worth (Flint Res.)	CCF > 12"	LMB > 12"	
Yohola (DNR S.P.)	Bluegill	Largemouth Bass > 12"	
Yonah	Bluegill	LMB 12-16", catfish 12-16"	

Abbreviations used in table: < means "less than", > means "more than", Blk = Black, CCF = Channel catfish, HB = Hybrid bass, LMB = Largemouth bass, SPB = Spotted bass

TABLE 6-4. FISH CONSUMPTION GUIDANCE FOR RIVERS, CREEKS AND ESTUARINE SYSTEMS – 2010

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Alapaha River	Redbreast sunfish	Spotted sucker	LMB, Bullhead
Alapahoochee River		Bullhead	
Allatoona Creek, Cobb Co.		Spotted bass, Alabama Hog Sucker	
Altamaha River	Bluegill (US 1), CCF (below US 25), Striped mullet	Flathead catfish, LMB, CCF	
Apalachee River	CCF	LMB	
Beaver Creek (Taylor Co.)			Yellow bullhead
Brier Creek (Burke Co.)		Spotted sucker	LMB
Canoochee River			LMB, Catfish, Redbreast
Casey Canal	LMB, Bluegill	Striped mullet	
Chattooga River (NE Ga., Rabun County)		Northern Hog Sucker, Silver Redhorse	
Chattahoochee River (Helen to Lanier)	CCF	Redeye bass, Bullhead, Redhorse	LMB
Chattahoochee River (Buford Dam to Morgan Falls Dam)	Brown trout, Carp, Rainbow trout, Yellow perch	LMB	
Chattahoochee River (Morgan Falls Dam to Peachtree Creek)	Brown trout, Rainbow trout, LMB, Bluegill	Jumprock sucker	Carp
Chattahoochee River (Peachtree Creek to Pea Creek)	CCF, White sucker	Bluegill, Black bass	Carp
Chattahoochee River (Pea Creek to West Point Lake, below Franklin)	CCF	LMB, Spotted bass	

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Chattahoochee River Special Striped Bass (Morgan Falls Dam to West Point Lake)	This striped bass population migrates annually between West Point Lake and Morgan Falls Dam. DNR recommends the general public restrict consumption to one meal per month.		
Chattahoochee River (Oliver Dam to Upatoi Creek)		Bullhead catfish	LMB
Chattahoochee River (West Point dam to I-85)	LMB, Bullheads	Spotted bass	
Chestatee River (below Tesnatee River)	Channel catfish, Redbreast	Spotted Bass	
Chickamauga Creek (West)	Redbreast sunfish	Spotted bass	
Cohulla Creek (Whitfield County)		Blacktail redhorse	
Conasauga River (below Stateline)		Spotted bass	White bass, Buffalo
Coosa River (Rome to Hwy 100, Floyd Co.)		Spotted bass	LMB, Striped bass
	DO NOT EAT SMALLMOUTH BUFFALO		
Coosa River (Hwy 100 to State line, Floyd Co.)	Spotted bass	LMB	Striped bass, CCF, Buffalo
Coosa River Zero River Mile to Stateline	Blue Catfish: < 18” one meal per week; 18-32” one meal per month; and >32” do not eat.		
Coosa River System Special (Coosa, Etowah below Thompson-Weinman dam, Oostanaula)	Special Striped Bass: this population migrates annually between Weiss Lake and the Coosa River system. DNR recommends the general public restrict consumption of fish less than 20 inches to one meal per month, and to not eat any striped bass 20 inches or greater in length.		
Coosawattee River below Carters	Bluegill		Smallmouth buffalo
Etowah River (Dawson County)		Blacktail Redhorse	
Etowah River (above Lake Allatoona)	Golden redhorse	Spotted bass	
Etowah River (below Lake Allatoona dam)	CCF, Bluegill, Striped bass (above Thompson Weinman dam)	Spotted bass, LMB	Smallmouth buffalo
Flint River (Spalding/Fayette cos.)	Spotted sucker	LMB	
Flint River (Meriwether/Upson/Pike cos.)	CCF, Flathead catfish	Shoal bass	
Flint River (Taylor co.)	CCF, Shoal bass	LMB	
Flint River (Macon/Dooly/Worth/Lee)	CCF	LMB	
Flint River (Dougherty/Mitchell/Baker Co.)	Sucker, Flathead Catfish <16”	LMB, Flathead Catfish 16-30”	Flathead Catfish >30”
Gum Creek (Crisp Co.)	Carp	LMB	
Holly Creek (Murray County)		Blacktail redhorse	
Ichawaynochaway Creek	Spotted Sucker	LMB	
Kinchafoonee Creek (above Albany)		LMB, Spotted sucker	
Little River (above Clarks Hill Lake)	Spotted sucker, Silver Redhorse	LMB	
Little River, (above Ga. Hwy 133, Valdosta)	Spotted sucker	LMB	
Mill Creek (Murray County)		Golden redhorse	
Muckalee Creek (above Albany)		LMB, Spotted sucker	
Ochlockonee River (near Thomasville)	Redbreast sunfish	Spotted sucker, White catfish	LMB

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Ocmulgee River (below Macon, Bibb co.)	CCF	LMB	Flathead catfish
Ocmulgee River (Telfair/Wheeler cos.)	CCF	Flathead catfish, LMB	
Oconee River (above Barnett Shoals)		Silver redhorse, LMB	
Gum Creek (Crisp Co.)	Carp	LMB	
Ogeechee River (all to Ft. McAllister)		Redbreast sunfish, CCF, Spotted sucker, Snail bullhead	LMB
Ohoopee River (Emanuel/Toombs Cos.)		Spotted sucker, Redbreast	LMB
Okefenokee Swamp (Billy's Lake)		Flier	Bowfin
Oostanaula River, Hwy. 156, Calhoun	Bluegill	Smallmouth buffalo	
Oostanaula River, Hwy 140, to Coosa River	Bluegill	LMB, CCF, Spotted bass, Buffalo	
Patsiliga Creek (Taylor Co.)		Suckers, Chain Pickerel	Bass
Pipemaker Canal		LMB	
Satilla River (Waycross, Ware/Pierce Cos.)		Redbreast sunfish, CCF	LMB
Satilla River (near Folkston, Camden Co.)			LMB, Redbreast, Flathead catfish < 36"
Savannah River (above & below New Savannah Bluff Lock & Dam)	Redear, Redbreast, Striped mullet	Spotted sucker, LMB	
Savannah River (Chatham/Screven cos.)	CCF, Redear sunfish	LMB, Bluegill	
Savannah River (Effingham Co.)	CCF	White catfish, Redbreast	LMB, Bowfin
Savannah River (Tidal Gate)	Red drum, Striped mullet	White catfish	
Savannah River Special (New Savannah Lock and Dam to Savannah Estuary)	DNR recommends the general public restrict consumption of legal size striped bass 27 inches and larger to one meal per month. Women who are pregnant or nursing and young children may wish to further restrict their consumption due to the variable mercury levels in these striped bass.		
Short Creek (Warren Co.)		Sunfish	
South River (Panola Shoals, Rockdale Co.)		Snail bullhead, Bluegill	
South River (Henry Co., Snapping Shoals)	Silver redhorse, CCF	LMB	
Spring Creek (Seminole/Decatur/Miller Cos.)		LMB, Spotted sucker, Redear	
St. Marys River (Camden Co.)	Redbreast, Striped mullet		LMB
St. Marys River (Charlton Co.)	Redbreast sunfish		LMB
Sugar Creek (Murray Co.)		Golden redhorse	
Sumac Creek (Murray Co.)		Golden redhorse	
Suwannee River		Bullhead, Chain pickerel	LMB
Swamp Creek (Redwine Cove Road)		Redeye bass	
Talking Rock Creek		Redeye bass	
Tallapoosa River	Bluegill	Blacktail Redhorse	
Trib. To Hudson River, Alto, Banks Co.	Brown bullhead	Redeye bass	
Withlacoochee River (Berrien/Lowndes Cos.)		Redbreast sunfish	LMB

ESTUARINE SYSTEMS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH	DO NOT EAT
Turtle River System (Purvis Cr., Gibson Cr.)		Black & Red drum, Flounder	Shrimp, Blue crab, SST, SKF, Sheepshead, Spot	STM, ACR, Bivalves*
Turtle & Buffalo Rivers (upriver Hwy 303)	White Shrimp	Red drum, Blue crab, Flounder, SST	SKF, BDR, ACR, Spot, Sheepshead	Striped Mullet, Bivalves *
Turtle River (Hwy 303 - Channel Marker 9)	White Shrimp	Red drum, Flounder	Blue crab, ACR, BDR, SST, SKF, Sheepshead	Spot, STM, Bivalves *

Turtle River (C. Marker 9 & So. Brunswick River to Dubignons & Parsons creeks)	White Shrimp, Flounder	Blue crab, BDR, RDR, SST, Sheepshead	ACR, STM,SKF, Spot	Bivalves *
Terry Creek South of Torras Causeway to Lanier Basin	Spot, STM, Shrimp, ACR, SST, SKF, Blue crab	Yellowtail (Silver perch)		Bivalves *
Terry and Dupree Creeks North of Torras Causeway to Confluence w/ Back River	Blue crab, Shrimp	Red drum	STM, ACR, SST, SKF	Spot, Bivalves *
Back River One mile above Terry Creek to Confluence with Torras Causeway	STM, Shrimp, ACR, SST, SKF, Blue crab, Red drum		Spot	Bivalves *
Back River South of Torras Causeway to St. Simons Sound	Spot, STM, Shrimp, SST, SKF, Blue crab, Red drum	Atlantic croaker		Bivalves *
Floyd Creek	Blue crab, Southern kingfish			
Academy Creek	Blue crab			
Altamaha Estuary	Striped mullet, Spotted Seatrout			
Hayner's Creek (Savannah)	Blue crab			
North Newport River	Striped Mullet	Blue Crab		
Savannah Estuary	Striped mullet		Striped bass >=27"	
St. Simon's Sound	Tripletail			

* Bivalves are all clams, mussels and oysters; Shellfish ban under National Shellfish Sanitation Program; Species codes used above are: SST = Spotted Seatrout; ACR = Atlantic Croaker; SKF = Southern Kingfish (whiting); STM = Striped Mullet; BDR = Black Drum; RDR = Red Drum; SHH = Sheepshead

King Mackerel Special Joint State Guidance Issued by Georgia, North Carolina, South Carolina and Florida For South Atlantic Ocean

Size Range (Fork Length, Inches)	**Recommendations for Meal Consumption of King Mackerel Caught Offshore Georgia Coast**
24 To Less Than 33 Inches	No Restrictions
33 To 39 Inches	1 meal per month for pregnant women, nursing mothers and children age 12 and younger. 1 meal per week for other adults
Over 39 Inches	Do Not Eat

CHAPTER 7

Watershed Protection Programs

Program Perspective

The first major legislation to deal with water pollution control in Georgia was passed in 1957. The Act was ineffective and was replaced by the Water Quality Control Act of 1964. This Act established the Georgia Water Quality Control Board, the predecessor of the Environmental Protection Division of the Georgia Department of Natural Resources which was established in 1972. Early efforts by the Board in the late 1960's and early 1970's included documenting water quality conditions, cleanup of targeted pollution problems and the establishment of water use classifications and water quality standards. Trend monitoring efforts were initiated and a modest State construction grants program was implemented.

In 1972 the Federal Water Pollution Control Act of 1972 was enacted by Congress. Today, this law is known as the Clean Water Act (CWA). The CWA set the national agenda for water protection and launched the national objective to provide "for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water". The CWA established the NPDES permit system for regulation of municipal and industrial water pollution control plants, a water use classifications and standards process, and a construction grants process to fund the construction of municipal water pollution control facilities.

Most industries in Georgia had installed modern, effective water pollution control facilities by the end of 1972. In the mid/late 1970's emphasis was placed on the design and construction of municipal facilities through the federal Construction Grants Program. First and second round NPDES permits were negotiated and operation and maintenance, compliance monitoring, and enforcement programs initiated. Basin planning, trend monitoring, intensive surveys, modeling and wasteload allocation work was well underway.

In 1987 Congress made significant changes to the Clean Water Act. The Water Quality Act of 1987 placed increased emphasis on toxic substances, control of nonpoint source pollution, clean lakes, wetlands and estuaries. The Act required that all States evaluate water quality standards and adopt numeric criteria for toxic substances to protect aquatic life and public health. This work was initiated and completed by the GAEPD in the late 1980s. The Act also required each State to evaluate nonpoint source pollution impacts and develop a management plan to deal with documented problems.

In the late 1980s and early 1990s, the Georgia General Assembly passed a number of laws that set much of the agenda for the GAEPD in the early 1990s. Laws such as the Growth Strategies Act which helps protect sensitive watersheds, wetlands, and groundwater recharge areas and the ban on high phosphate detergents to reduce nutrient loading to rivers and lakes were enacted. Legislation was passed in 1990 that required the GAEPD to conduct comprehensive studies of major publicly owned lakes and establish specific water quality standards for each lake. In addition in 1991 the General Assembly passed a law requiring a phosphorus limit of 0.75 mg/l for all major point sources discharging to the Chattahoochee River between Buford Dam and West Point Lake. Major river corridors were accorded additional protections with laws passed in 1991. Also in 1991, the General Assembly passed the Georgia Environmental Policy Act that requires an environmental effects report be developed for major State funded projects. In 1992, the General Assembly passed the River Basin Management Planning Act that required the GAEPD develop and implement plans for water protection for each major river basin in Georgia.

In 2004, the General Assembly passed the Statewide Comprehensive Water Management Planning Act. This legislation replaced the river basin management planning legislation and charged the EPD with the responsibility of developing a comprehensive statewide water management plan for Georgia in accordance with the following policy statement: "Georgia manages water resources in a sustainable manner to support the state's economy, protect public health and natural systems, and to enhance the quality of life for all citizens."

In 2010-2011 high priority was placed on Comprehensive Statewide Water Management Planning, monitoring and assessment, water quality modeling and TMDL development, TMDL implementation, State revolving loan programs, NPDES permitting and enforcement, nonpoint source pollution abatement, stormwater management, erosion and sediment control, and public participation projects.

Comprehensive Statewide Water Planning

Georgia's future relies on the protection and sustainable management of the state's limited water resources. In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act" which called for the development of a statewide water management plan. The legislation created a framework for developing Georgia's first comprehensive statewide water management plan by providing a vision for water management in Georgia, guiding principles for plan development and the assignment of responsibility for developing the plan. A copy of the planning act can be found at www.georgiawatercouncil.org.

The Environmental Protection Division of the Georgia Department of Natural Resources, with the help of numerous stakeholders, produced and submitted to the Georgia Water Council an initial draft of the statewide water plan on June 28, 2007. Following several rounds of public input and changes in response to the input, the Georgia Water Council approved the "Georgia Comprehensive State-wide Water Management Plan" on January 8, 2008. The water plan was debated and approved in the 2008 session of the General Assembly and signed by Governor Perdue on February 6, 2008. This work is discussed in Chapter 2.

Watershed Projects

The GAEPD is working with the United States Environmental Protection Agency (USEPA) and South Carolina on several Savannah River projects; with the USEPA and the Alabama Department of Environmental Management (ADEM) on water quality issues in the Coosa River and Lake Weiss; and with the Florida Department of Environmental Protection and the Suwannee River Water Management District to coordinate water protection efforts in the Suwannee River Basin. Significant work was also done by Alabama, Florida and Georgia in cooperation with the Corps of Engineers to conduct studies of the Apalachicola/ Chattahoochee/Flint and Alabama/Coosa/Tallapoosa River Basins to facilitate efforts to develop agreements regarding water allocations. The GAEPD supports these projects to avoid duplication of effort and to effectively leverage resources to accomplish watershed protection in interstate river basins.

Water Quality Monitoring

The goal of the water 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 total maximum daily loads (TMDLs), verify water pollution control plant compliance, and document water use impairment and reasons for problems

causing less than full support of designated water uses. Trend monitoring, intensive surveys, toxic substances monitoring, aquatic toxicity testing and facility compliance sampling are some of the monitoring tools used by the GAEPD. Monitoring programs are discussed in Chapter 3.

Water Quality Modeling/Wasteload Allocations/TMDL Development

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, 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, 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, 46 TMDLs were approved. To date more than 1450 TMDLs have been developed for 303(d) listed waters in Georgia.

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.

Clean Water State Revolving and Georgia Fund Loan Programs

The Clean Water State Revolving Fund (CWSRF) is a federal loan program administered by the Georgia Environmental Finance Authority (GEFA) that provides funding for a variety of wastewater infrastructure and pollution prevention projects. Eligible projects include water quality, water conservation and wastewater treatment projects, such as constructing new wastewater treatment plants, repairing and replacing sewers, stormwater control projects and implementing water conservation projects and programs. The Georgia Fund is a state-funded loan program administered by GEFA for wastewater, water, and solid waste infrastructure improvements. The Georgia Fund program is available to local governments for projects such as sewer and water lines, treatment plants, pumping stations, wells, water storage tanks and water meters. GEFA contracts with GAEPD to provide environmental/engineering review and construction management services for these projects.

Founded in 1985, GEFA offers low-interest loans and grants for projects that improve Georgia's environment, protect its natural resources, and promote economic development. The CWSRF program was initiated in1988 to the full extent allowed by the 1987 amendments to the Clean Water Act. Since 1985, GEFA has approved more than $3 billion for infrastructure improvements and more than 1,400 projects have been funded to date. The Clean Water State Revolving Fund awarded approximately $269.9 million to 54 projects and the Georgia Fund awarded $64.2 million to 50 water quality projects in FY2010-2011. The Construction Management Unit (CMU) of GAEPD currently overviews some 126 projects in various stages of activity with a loan value of $790.7 million.

Under the American Recovery and Reinvestment Act (ARRA) in FY2010, GEFA awarded $84.3 million in CWSRF contracts to 38 local governments. Georgia was recognized as the first state in the nation to start construction on 100% of its CWSRF-ARRA contracts. Communities used these funds to fund new/expanded treatment plants (including energy efficiency improvements), large-diameter tunnels, biogas cogeneration facilities, sewer lines, sewer rehabilitation, pervious pavements, and even a low-flow toilet rebate program. Because of the need to start construction in a relatively short time period, it was observed that the preponderance of the projects were either sewer lines or sewer rehabilitation. All of the CWSRF-ARRA construction funds have now been expended. ARRA brought several new elements to CWSRF program such as loan subsidization, extensive Davis-Bacon Act and Buy American monitoring and documentation requirements, jobs reporting requirements for the communities, and significant additional federal overview activities. Going forward, it appears that only the loan subsidization and the new Davis-Bacon Act expectations will remain a part of the "base" CWSRF program.

Metro District Planning

The Metropolitan North Georgia Water Planning District (District) updated the comprehensive regional and watershed-specific plans to be implemented by local governments in the District in 2009.

Limited water resources combined with the region's growth places the District in a unique position relative to other areas in Georgia. With a finite water resource and a population of nearly 4 million, the need to carefully and cooperatively manage and protect Metropolitan Atlanta's rivers and streams has become a priority.

GAEPD is charged with the enforcement of the District plans. State law prohibits the Director from approving any application by a local government in the District to issue, modify, or renew a permit, if such permit would allow an increase in the permitted water withdrawal, public water system capacity, or waste-water treatment system capacity of such local government, or any NPDES Phase I or Phase II General Stormwater permit; unless such local government is in compliance with the applicable provisions of the plan, or the Director certifies that such local government is making good faith efforts to come into compliance.

GAEPD conducts audits to determine whether local governments are in compliance with the District Plans. This audit process was initiated in the fall of 2005.

Georgia's Land Conservation Program
On April 14, 2005, Governor Sonny Perdue signed House Bill 98, creating the Land Conservation Program. The act created a flexible framework within which cities and counties, the Department of Natural Resources, other state and federal agencies, and private partners can protect the state's valuable natural resources. The Land Conservation Program protects Georgia's valued resources by strategically aligning the state's conservation needs with the ability to steward the land through public/private partnerships.

The land conservation goals set forth in the Act include: water quality protection for rivers, streams, and lakes; flood protection; wetlands protection; reduction of erosion through protection of steep slopes, erodible soils, and stream banks; protection of riparian buffers, natural habitats and corridors for native plant and animal species; protection of prime agricultural and forestry lands; protection of cultural sites, heritage corridors, and archaeological and historic resources; scenic protection; provision of recreation and outdoor activities; and connection of existing or planned areas.

During 2010-2011, the Land Conservation Program funded 150 projects, protecting 90,000 acres of land through state income tax credits, fee-title land purchases and micro-grants for state-held conservation easements acquisitions. To date, the Program has completed a total of 392 projects covering 222,848 acres in 113 counties. Funded projects include urban nature preserves, rural farmlands, coastal wetlands, wildlife management areas, and historical sites.

Monies from the Clean Water State Revolving Fund comprise an important funding option for the Land Conservation Program. The Program completed eleven loans using $11 million to preserve 5,600 acres. One property on the Etowah River has been protected using SRF funds since 2009.

Funds came from a variety of sources including federal, conservation programs, local governments, private organizations like The Nature Conservancy (TNC) and other state funding sources.

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.

An important goal of Georgia's Nonpoint Source Management Program is to encourage and support all animal feeding operations to develop and implement Comprehensive Nutrient Management Plans (CNMPs). Cooperating organizations working toward this goal include the GSWCC, GSWCD, GA Milk Producers Association, Georgia Farm Bureau Federation, GA Pork Producers Association, CES, and NRCS.

Activities include statewide and watershed-based demonstrations and BMP implementation of Comprehensive Nutrient Planning, lagoon maintenance or decommissioning, irrigation systems, and waste and effluent management systems. Projects using Section 319(h) funds that install agricultural BMPS are required to complete a CNMP. For 2010-2011, 9 projects will require CNMPs which could equal up to 50 CNMPS prepared around the State.

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.

In 1998 the City of Atlanta signed a Consent Decree that requires a long-term control plan be implemented to remediate the overflow from combined sewers. The Consent Decree stipulated, among other things, the development and implementation of short-term remedial measures to improve operations, maintenance and treatment performance of the existing CSO facilities.

Compliance and Enforcement
The Georgia Water Quality Control Act requires that every point source discharge obtain a NPDES permit, and that zero discharge systems obtain a Land Application System Permit from the GAEPD. The permits specify allowable discharge limits for the receiving streams or land application sites. Insuring compliance with permit limitations is an important part of the Georgia water pollution control program. Staff review discharge and groundwater monitoring reports, inspect water pollution control plants, sample effluents, investigate citizen complaints, provide on-site technical assistance and, if necessary, initiate enforcement action.

As of December 2011, of the 164 major municipal water pollution control plants (facilities with design flow equal to or greater than 1.0 mgd), four were in significant noncompliance with the final limitations. These four facilities are under compliance schedules and/or enforcement actions to resolve the noncompliance, or implementing infiltration/ inflow strategies which will allow compliance at the plant to be achieved. Enforcement action has been taken by the GAEPD to insure problems are alleviated.

Data evaluations (using annual reports, GAEPD sampling and biomonitoring results) were performed on NPDES permitted municipal facilities to determine the need to reopen specific permits for inclusion of numerical limits and monitoring for appropriate toxic pollutants.

Increased emphasis was placed on the industrial pretreatment programs for municipalities to ensure that the cities comply with applicable requirements for pretreatment.

Industries in Georgia achieved a high degree of compliance in 2010-2011. The thirty-nine major industrial facilities were in compliance at the end of 2011.

The GAEPD utilizes all reasonable means to obtain compliance, including technical assistance, noncompliance notification letters, conferences, consent orders, administrative orders, and civil penalties. Emphasis is placed on achieving compliance through cooperative action. However, compliance cannot always be achieved in a cooperative manner. The Director of the GAEPD has the authority to negotiate consent orders or issue administrative orders. In fiscal year 2010 and 2011, 357 Orders addressing wastewater issues were issued and approximately $2,192,634 in negotiated settlements was collected.

Storm water compliance for municipalities and industries is most often reached through education and inspections. The vast majority of storm water enforcement Orders are used in connection with construction activities. In 2010-20011 a total of 168 stormwater Orders were issued and a total of $954,616 in negotiated settlements was collected.

Zero Tolerance

In January 1998, the Georgia Board of Natural Resources adopted a resolution requiring that regulatory initiatives be developed to ensure polluters are identified, and that appropriate enforcement action is taken to correct problems. The resolution also directed EPD to provide the "best quality of effort possible in enforcing Georgia's environmental laws". High growth areas that have been identified as in need of enhanced protection include the Chattahoochee River Basin (from the headwaters through Troup County), Coosa River Basin, Tallapoosa River Basin, and the greater metropolitan Atlanta area. EPD developed a "zero tolerance" strategy for these identified geographic areas. This strategy requires enforcement action on all violations of permitted effluent limitations, with the exception of flow, and all sanitary sewer system overflows into the waters of the State. The strategy includes simple orders (Expedited Enforcement Compliance Order and Settlement Agreement) with a directive to correct the cause of noncompliance with a monetary penalty for isolated, minor violations, and more complex orders (consent orders, administrative orders, emergency orders) with conditions and higher monetary penalties for chronic and/or major violations.

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.

The Phase I Regulations set specific application submittal requirements for large (population 250,000 or more) and medium (population 100,000 to 250,000) municipal separate storm sewer systems (MS4). The GAEPD has determined that the metropolitan Atlanta area is a large municipal system as defined in the regulations. Clayton, Cobb, DeKalb, Fulton and Gwinnett Counties and all the incorporated cities within these counties were required to comply with the application submittal target dates for a large municipal area. Forty-five individual storm water permits were issued to the Atlanta area municipalities on June 15, 1994 and reissued in 1999, 2004 and 2009.

Augusta, Macon, Savannah, Columbus, the counties surrounding these cities and any other incorporated cities within these counties were identified as medium municipal systems as defined in the Phase I Storm Water Regulations. Thirteen individual storm water permits were issued to the medium municipal systems in April and May, 1995. These permits were reissued in April 2000, 2005 and 2010.

On December 8, 1999 USEPA promulgated the Phase II Rules for Storm Water. Phase II requires NPDES permitting and the development of Storm Water Management Programs for a large number of smaller cities and counties. Construction sites from 1 to 5 acres and municipally-owned industrial facilities also became regulated.

The Phase II regulations for MS4s required permit coverage for all municipalities with a population less than 100,000 and located within an urbanized area, as defined by the latest Decennial census. In addition, EPD was required to develop criteria to designate any additional MS4s which had the potential to contribute to adverse water quality impacts. In December 2002, EPD issued NPDES General Permit No. GAG610000 which covers 86 Phase II MS4s, including 57 cities and 29 counties. This Permit was reissued in December 2007 and covers 87 municipalities. In 2009, EPD issued a General NPDES Permit to seven Department of Defense facilities, which were designated as Phase II MS4s. Two of those bases closed in 2011, reducing the number of permitted DOD facilities to five. In 2011, GAEPD issued a Phase II MS4 General Storm Water Permit to the Department of Transportation, which is applicable to post-construction runoff in jurisdictions with MS4 permits. The NPDES General Permits do not require any monitoring or contain specific effluent limitations. Instead, each Phase II MS4 permittee is required to institute best management practices that will control stormwater pollution. As part of the NOI, the MS4 was required to develop a SWMP that included best management practices in six different areas or minimum control measures. These six minimum control measures are Public Education, Public Involvement, Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, Post-Construction Storm Water Management, and Pollution Prevention.

The storm water permits for MS4s require the submittal of Annual Reports to GAEPD. Each year, the Georgia storm water permitting program reviews the Annual Reports from all of these municipalities. Among other things, the Annual Report includes a detailed description of the municipality's implementation of its Storm Water Management Program. The GAEPD provides comments on the Annual Reports to the MS4 permittees, noting areas of noncompliance and recommending improvements to the local Storm Water Management Programs.

The GAEPD has issued general permits for the eleven industrial subcategories defined in the Phase I Federal Storm Water Regulations. During 1993, GAEPD issued NPDES General Permit No. GAR000000 that regulates the discharge of storm water from 10 categories of industrial activity. This permit was reissued in 1998 and 2006, with approximately 2900 facilities retaining coverage. An additional 600 facilities have

submitted an Industrial No Exposure Exclusion Certification Form.

An important component of storm water management in Georgia is information exchange/technology transfer. GAEPD staff participated in many meetings and seminars throughout Georgia in an effort to disseminate information concerning Georgia's storm water requirements to the regulated community. In addition, staff from the central Atlanta office conducted inspections at approximately 226 industrial facilities to assess compliance with the industrial general storm water permit during 2010-2011.

The GAEPD will continue to regulate storm water runoff from industrial facilities and urban areas as a part of the point-source permitting process to protect water quality.

Erosion and Sedimentation Control

The Georgia Erosion and Sedimentation Act (Act) was signed into law in April 1975. This legislation was the result of over five years of work, debate, and legislative compromise. Agencies and groups that coordinated their efforts to this end included the Georgia Association of Conservation Districts, the State Soil and Water Conservation Commission, and the GAEPD.

The intent of the Act is to establish a statewide and comprehensive program for erosion and sedimentation control to conserve and protect air, water and land resources of the State. The Act provides a mechanism for controlling erosion and sedimentation as related to certain land disturbing activities. Land disturbing activities are any activities which may result in soil erosion and the movement of sediments into State waters and onto lands within the State. Such activities may include, but are not limited to, clearing, dredging, grading, excavating, transporting, and filling of land. Activities not regulated under the Act include surface mining, construction of single family homes being constructed by the owner or under contract to an owner, minor activities such as home landscaping and gardening, and water supply reservoirs.

Implementation of the Act involves local units of governments and State agencies. The Act provides for municipalities and Counties to adopt local ordinances and to become delegated "Issuing Authorities". The GAEPD delegates local "Issuing Authority" and administers the GAEPD rules where there is no local authority, and oversees local program implementation. Currently 326 cities and counties have adopted erosion and sediment control ordinances which have been reviewed by the GAEPD for compliance with the Act.

House Bill 285 was passed during the 2003 legislative session. The legislation amended the Georgia Erosion and Sedimentation Act to create an integrated permitting program for erosion and sedimentation control for land disturbing activities of one acre or greater, thereby standardizing the requirements for local Land Disturbing Activity Permits and the NPDES Construction Storm Water Permits. The legislation also created Georgia's first NPDES permit fee system, and established training and education requirements for individuals involved in land development design, review, permitting, construction, monitoring or inspection of any land disturbing activity. During the 2010-2011 period, the GAEPD decertified as issuing authorities 4 counties and 8 cities. All twelve requested decertification. During this same period, 26 cities were certified as local issuing authorities.

Senate Bill 460 was passed during the 2004 legislative session. The legislation amended the Georgia Erosion and Sedimentation Act to add three new criteria under which the EPD director can consider stream buffer variances. The legislation also required the Georgia Board of Natural Resources to adopt amendments to its Rules to implement the new criteria. In December 2004, the Georgia Board of Natural Resources adopted amendments to the Erosion and

Sedimentation Control Rules which went into effect January 10, 2005.

The Act was amended by House Bill 463 in 2007 to give subcontrators an additional year to meet the training and eduacation requirements established in HB 285. The Georgia Soil and Water Conservation Commission continues to administer the training and certification program. As of September 2011, 68,660 people have been certified and 25,505 re-certified. Senate Bill 155 amended the Act in 2009 to exempt 25-foot buffers along ephemeral streams. This legislation clarified the definition of ephemeral in the Erosion and Sedimentation Rules. The E&S Rules were amended in 2011 to add a new stream buffer variance criteria for projects that pipe or re-route waterways that are not jurisdictional waters of the U. S., and for new infrastructure projects that impact only the buffer and not the stream.

A NPDES general permit that would regulate storm water discharges from construction activities was issued by GAEPD and subsequently appealed in 1992, 1994, 1995, 1996 and 1999. The permit was eventually issued on June 12, 2000 and became effective on August 1, 2000, and regulated storm water discharges associated with land disturbances of five acres or greater
The NPDES general permit for construction activities was reissued by GAEPD on August 13, 2003. The permit was re-issued as three distinct general permits: Stand Alone, Infrastructure and Common Development, and required coverage for projects disturbing one acre or more in accordance with the USEPA Phase II storm water regulations. Changes to the permit included a reduction in monitoring requirements, and the addition of a plan submittal requirement for projects located in areas that do not have a local issuing authority or are exempt from local issuing authority ordinances.

The permits were most recently reissued by GAEPD on August 1, 2008. The 2008 permits added additional requirements for projects that discharge to impaired stream segments and for projects that disturb 50 acres of more at one time.

Approximately 19,000 active NOIs have been received by GAEPD as of September 30, 2011.

The GAEPD will continue to regulate storm water runoff from construction sites as a part of the point-source permitting process to protect water quality.

Nonpoint Source Management Program
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.

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.

GAEPD has been designated as the administering or lead agency for implementing the State's *Nonpoint Source Management Program*. This 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, non-governmental organizations and individual citizens.

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 as the lead agency for implementing the silvicultural component of the State's *Nonpoint Source Management Program*, and the Department of Community Affairs (DCA) has been designated the lead agency and point of contact for urban/rural nonpoint source pollution.

Georgia's initial *Nonpoint Source Assessment Report* was completed in compliance with the Federal Clean Water Act and approved by the USEPA in January 1990. This report, *Water Quality in Georgia 2006-2007*, as required by Section 305(b) of Public Law 92-500, serves as the current process to update the *Nonpoint Source Assessment Report*.

Currently, GAEPD is in the process of revising the State's *Nonpoint Source Management Program* to update the goals, activities and implementation strategies of the Program. The plan update will focus on the comprehensive categories of nonpoint sources of pollution identified by the USEPA: Agriculture, Silviculture, Construction, Urban Runoff, Hydrologic/Habitat Modification, Land Disposal, Resource Extraction and Other Nonpoint Sources, and will be developed through a consultation process, incorporating input from a wide range of stakeholders involved in nonpoint source management activities throughout the State: local, regional, State and Federal agencies, as well as private, non-governmental organizations. This revision of the State's *Nonpoint Source Management Program* will encourage new partnerships and strengthened existing partnerships in the development and implementation of nonpoint source strategies. GAEPD will complete the revision in 2012.

Under Section 319(h) of the Federal Clean Water Act, the USEPA awards a Nonpoint Source Implementation Grant to the GAEPD to fund eligible projects that support the implementation of the State's *Nonpoint Source Management Program*. Section 319(h) Grant funds for the prevention, control and/or abatement of nonpoint sources of pollution are made available annually to public agencies in Georgia. Section 319(h) of the Clean Water Act provides grants to the States to implement nonpoint source projects. The funds are distributed via competitive process to public agencies and governmental agencies. Receiving agencies are required to show substantial local commitment by providing at least 40% of the total project cost in local match or in-kind efforts. In FY10 – FY11, Georgia's Section 319(h) grant project funded 50 new projects for over $9 million. For FY12, Georgia is poised to award $3.66 million to local governments and agencies to support streambank restoration, watershed planning, TMDL implementation, and support of Georgia's Coastal Nonpoint Source Management Program.

In 2011, Georgia's Nonpoint Source Program administered more than 100 Section 319(h) projects, totaling more than $26 million dollars in funds awarded to cooperating agencies. Projects activities include implementing TMDL implementation plans and Watershed Management Plans, watershed planning, monitoring and assessment, enforcement, technical assistance, and information and education.

Priorities for projects include projects implementing the nonpoint source components of TMDL implementation plans, or projects addressing the violated criteria of listed streams. Education, demonstration, and technical assistance projects are also eligible for funding, subject to restrictions. In addition, priority is given to projects that encompass or support a watershed management approach and result in measurable improvements in water quality. A watershed approach is a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. Major features of a watershed management approach are: targeting priority problems, promoting a high level of stakeholder involvement, integrated solutions that make use of the expertise and authority of multiple agencies, and measuring success through monitoring and other data gathering. The

application of increased Section 319(h) Grant funds to focus on solving nonpoint source pollution problems will enable the State to make great strides in achieving water quality goals.

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(h) 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 the general scope and purpose of the grant program, general terms and conditions of the grant, eligible recipients of the grant, criteria for the award, and directions and deadlines for applications.

Eligible recipients of Section 319(h) Nonpoint Source Implementation Grant funds include local, regional and State units of government, local authorities which operate local government service 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.

Agriculture

Georgia's Agriculture Nonpoint Source Management Program is implemented through a statewide non-regulatory approach. Benefits have accrued to Georgia as a result of voluntarily installed best management practices and the implementation of conservation incentive programs. These voluntary programs are enhanced by numerous financial, technical assistance, education, demonstration, and research activities delineated in the State's *Nonpoint Source Management Program*. Implementation of the Agriculture Nonpoint Source Management Program is a critical State initiative to identify priority waters and to target nonpoint source management activities.

The statewide non-regulatory approach uses cooperative partnerships with various agencies and a variety of activities and programs. Agencies that form the basis of the partnerships include the GSWCC (designated lead agency administrating the Agriculture Nonpoint Source Management Program), SWCD, NRCS, UGACAES, CES, FSA, GFC and the GDA. These agencies work closely with Georgia agricultural commodity commissions and organizations such as the GFBF, GAC, RC&D Councils, Cattleman's Association, Milk Producers, Pork Producers Association, Poultry Federation, Goldkist, The Georgia Conservancy, and GWF as well as other producer groups and agriculture support industries to prevent and solve water quality problems. In addition to the agriculture agencies and interest groups, a working partnership with individual land users is the cornerstone of soil and water conservation in Georgia.

The cooperating agencies have specific functions and directions. All have an information, education, and public participation component to support their objective to improve and maintain water quality. Of the agriculture agencies, only the GDA has enforcement authority. The GSWCC works with GAEPD, the enforcement agency for the Georgia Water Quality Control Act, to resolve agricultural water quality complaints, where appropriate. The UGACAES and NRCS produce and distribute numerous brochures and fact sheets dealing with agriculture best management practices and water quality.

The GSWCC has continued to sponsor local demonstration projects, provide farmers with visual demonstrations and information on the use and installation of best management practices, and collect data and generate computer databases on land use, animal units and agricultural BMP implementation. The GSWCC has published and continues

to distribute the following guidebooks for implementing agricultural best management practices to protect the State's waters: *Agricultural Best Management Practices for Protecting Water Quality in Georgia*, *Planning Considerations for Animal Waste Systems*, *A Georgia Guide to Controlling EROSION with Vegetation*, and *Guidelines for Streambank Restoration*.

In 2010-2011, approximately $2.1 million in new Section 319(h) Grant projects were implemented to target agricultural sources of nonpoint source pollution. In addition to the minimum 40% required non-federal in-kind match, the NRCS has contributed hundreds of hours of time worth many millions of dollars in technical assistance to support these projects. The UGACAES, GSWCC, FSA, GFC and other agencies have also contributed significant technical assistance to support these projects. These projects offer solutions, as well as financial and technical implementation assistance, in identified priority watersheds.

Farm Bill Programs under NRCS supervision include the Forestry Incentive Program (FIP), Wetland Reserve Program (WRP), the Environmental Quality Incentives Program (EQIP), the Wildlife Habitats Incentives Program (WHIP), the Conservation Reserve Program (CRP), the Farmland Protection Program and the Conservation Security Program (CSP). Collectively these programs, will continue to have a significant and positive impact on Georgia's natural resources.

These Federal cost-share programs bring millions of dollars to Georgia. By requiring priority areas to be identified and ranked, conservation assistance will maximize the environmental benefit per dollar expended. Therefore, capital funding and technical expertise can be leveraged to enhance ongoing State and local efforts to more efficiently manage our natural resources.

The Environmental Quality Incentive Program (EQIP) is a voluntary conservation program that promotes environmental quality to producers and helps farmers and ranchers reduce soil erosion, improve water use efficiency and protect grazing land by installing conservation practices that protect natural resources. EQIP provides technical, financial and educational assistance.

NRCS is the lead agency for EQIP and works with many State and local partners to identify local priorities and recommend priority areas and program policy. In 2010 - 2011, the EQIP program provided over $20 million in incentive payments and cost-sharing for conservation practices.

The Conservation Security Program (CSP) is a voluntary conservation program that supports ongoing stewardship of working agricultural lands by providing payments for maintaining and enhancing natural resources. CSP identifies and rewards those farmers who are meeting the highest standards of conservation and environmental management on their operations.

Watersheds that are selected to participate contain a variety of land uses and input intensities, have high-priority resource issues to be addressed, including issues that meet State priorities, have a history of good land stewardship on the part of landowners, and have the technical tools necessary to streamline program implementation. Additional information may be found at: www.nrcs.usda.gov/programs/csp/.

Silviculture

The Georgia Forestry Commission has been an integral partner with the GAEPD since 1977, committed to protect and maintain the integrity and quality of the State's waters. The GAEPD designated the Georgia Forestry Commission (GFC) as the lead agency for the silviculture portion of the State's *Nonpoint Source Management Program*. The Silviculture Nonpoint Source Management Program is managed and implemented by the GFC, with the support of the forestry industry, for the voluntary

implementation of best management practices.

This program is managed by a Statewide Water Quality Coordinator and 12 foresters serving as District Water Quality Coordinators. The GFC Statewide and District Water Quality Coordinators have received specialized training in erosion and sediment control, forest road layout and construction, stream habitat assessment and wetland delineation. The Statewide and District Water Quality Coordinators provide local and statewide training to forest community through workshops, field demonstrations, presentations, management advice to landowners and distribution of *Georgia's Best Management Practices for Forestry* manual and brochures.

The GFC also investigates and mediates complaints involving forestry operations. After notifying the landowner, the GFC District Coordinators conduct field inspections to determine if best management practices were followed, if the potential for water quality problems exists, if a contract was used and who purchased the timber. If a written contract was executed, the GFC District Coordinators will verify if the contractual agreement contains a clause specifying the implementation of BMP. If problems do exist, the GFC District Coordinator will work with the timber buyer and/or logger on behalf of the landowner to correct the problems. However, the GFC is not a regulatory authority. Therefore, in situations when the GFC cannot get satisfactory compliance, the case is turned over to the GAEPD for enforcement action as provided under the Georgia Water Quality Control Act.

The State Board of Registration for Foresters has adopted procedures to sanction or revoke the licenses of registered foresters involved in unresolved complaints where actions or lack of supervision to implement best management practices have resulted in violations of the Board's land ethic criterion, Georgia Water Quality Control Act, or Federal wetlands regulations.

A long-term goal of Georgia's Nonpoint Source Management Program is to achieve 100% compliance in implementation of recommended Best Management Practices for silviculture. To determine the success of educational programs, and the effectiveness of recommended BMPs, the GFC (with financial support from Section 319(h) funds) conducts a biennial Statewide BMP Compliance Survey. The survey assesses the application of best management practices by logging operations.

In 2009, the GFC completed a standardized survey of BMP compliance, including the rates of BMP implementation, units (areas, miles, crossings) in BMP compliance, effectiveness of BMPs, and areas to target for future BMP training. Overall, there were 221 sites evaluated totaling 27,004 acres. The number of acres in BMP compliance was 99.7%. This is 0.07 percent better than 2007. Out of the 5,776 applicable, individual BMPs evaluated, 94.1% were implemented. This is a 2.35 percent increase from 2007. Out of the 68.97 miles 68.97 miles of streams evaluated, more than 93.8% were found to have no impacts or impairments from forestry practices. This is however, a slight increase from the 2007 survey, which was at nearly 92% no impact.

During the State FY 09, the Georgia Forestry Commission provided 87 BMP talks to approximately 2,073 individuals. In addition, the GFC has addressed and resolved over 88 different logging complaints, and has conducted more than 78 one-to-one conferences with silviculture workers and professionals on-site or in the field. The Georgia Forestry Commission is currently working off of a FY09 319(h) grant and will not conduct another Statewide BMP Compliance Surveys until 2012.

The Georgia Forestry Association (GFA) and the forestry industry have played a significant role in encouraging the voluntary implementation of BMPs in Georgia. The forest industry has initiated numerous education workshops and training programs.

The American Forest and Paper Association (AFPA) has adopted the Sustainable Forestry Initiative Program. The objective of the Sustainable Forestry Initiative Program is to induce and promote a proactive approach to forest management, including the protection of water resources. Two pertinent aspects of this program are: 1) a continuing series of 2½ day Master Timber Harvester Workshops with a component devoted to the protection of water resources and the implementation of best management practices, and 2) a Land Owner Outreach Program which endeavors to deliver information about forestry management and the protection of water resources to forest land owners.

Urban Runoff

The water quality in an urban and/or developing watershed is the result of both point source discharges and the impact of diverse land activities in the drainage basin (i.e., nonpoint sources). Activities which can alter the integrity of urban waterbodies include habitat alteration, hydrological modification, erosion and sedimentation associated with land disturbing activities, stormwater runoff, combined sewer overflows, illicit discharges, improper storage and/or disposal of deleterious materials, and intermittent failure of sewerage systems. During urbanization, pervious, vegetated ground is converted to impervious, unvegetated surfaces such as rooftops, roads, parking lots and sidewalks. Increases in pollutant loading generated from human activities are associated with urbanization, and imperviousness results in increased stormwater volumes and altered hydrology in urban areas.

Consistent with the multiple sources of urban runoff, strategies to manage urban runoff have multiple focuses. Some programs focus on specific sources of urban runoff, targeting implementation of structural and/or management BMPs on individual sites or systemwide. Other programs treat corridors along waterbodies as a management unit to prevent or control the impacts of urban runoff on urban streams. Additional programs focus on comprehensive watershed management. This approach, which considers the impacts of all the land draining into a waterbody and incorporates integrated management techniques, is particularly critical to protecting and enhancing the quality of urban streams. Urban waterbodies cannot be effectively managed without controlling the adverse impacts of activities in their watersheds.

While the State continues to have an important regulatory role, cooperative intergovernmental partnerships have emerged and are being strengthened. GAEPD is implementing programs which go beyond traditional regulation, providing the regulated community with greater flexibility and responsibility for determining management practices. The GAEPD is also expanding its role in facilitation and support of local watershed management efforts.

In this next decade, water resource management and the regulatory issues pertaining to water will be the most critical environmental issues faced by many local governments. Unlike many of the environmental issues local governments have faced in the past, water issues must be addressed on a regional or watershed basis to be truly effective. The major urban/industrial region of the State is highly dependent upon limited surface water resources found in the northern portion of the State. With limited storage capacity and limited ground water resources in this region, it is imperative that these limited water resources be used wisely and their quality be maintained. In South Georgia, groundwater resources must be managed carefully to prevent contamination and salt water intrusion from excess water withdrawals. A stable, reliable framework and clearinghouse for regional cooperation, information sharing, and technical assistance is needed to prepare local governments and citizens to meet these challenges. The Georgia Department of Community Affairs' Water Resources

Technical Assistance Program will fulfill this need.

Georgia Department of Community Affairs (DCA) is a key partner and point of contact for urban nonpoint source pollution. Georgia DCA provides technical assistance on many different aspects of water quality management. As an information and networking center, the Program provides water resources tools, one-on-one technical assistance, and workshops to address regional water quality issues to local elected officials currently serving 159 counties and 532 cities. The Program will also provide tools to link land-use and water quality in land-use planning, promote smart growth principles, and provide public education materials and programs on protecting water resources. In an effort to renew NPS assistance efforts, GAEPD provided Section 319(h) funding to DCA in 2011 to augment its technical assistance capabilities.

Additionally, an array of programs to manage urban runoff are under development or being implemented in a variety of locales. The development and implementation of Total Maximum Daily Loads for waterbodies not meeting water quality standards will continue to spur local and regional watershed management initiatives.

Other initiatives have been implemented to further statewide coordination and implementation of urban runoff best management practices. The Atlanta Regional Commission (ARC) and the GAEPD published the *Georgia Stormwater Management Manual – Volume 1, Stormwater Policy Guide and Volume 2, Technical Handbook* in August 2001. This guidance manual for developers and local governments illustrates proper design of best management practices for controlling stormwater and nonpoint source pollution in urban areas in Georgia. The ARC will be developing Volume 3: Pollution Prevention in 2012. Also, in partnership with GAEPD, ARC, numerous local governments and other stakeholders, the Savannah Metropolitan Planning Commission and the Center for Watershed Protection are currently developing a Coastal Stormwater Supplement to the Georgia Stormwater Management Manual, to specifically address coastal stormwater. The supplement will be complete September 2008.

The University of Georgia's Marine Extension Service (MAREX) has partnered with local government officials to improve water quality through the Nonpoint Education for Municipal Officials (NEMO) program, part of the national Nonpoint Education for Municipal Officials (NEMO) network. The project is funded with a Coastal Incentive grant funds, and is also working closely with the Department of Community Affairs on their overall Statewide nonpoint source education efforts. MAREX provides educational programming, applied research, and technical assistance to communities along Georgia's coast.

In 2011, the GAEPD updated its Green Growth Guidelines. These are intended to provide information to local governments on how to grow in a more environmentally sustainable manner. Much of the information is focused on water quality and management measures to address potential impairments.

While the State has statutory responsibilities for water resources, local governments have the constitutional authority for the management of land activities. Therefore, it is necessary to forge cooperative partnerships between the State, local and regional governments, business and industry, and the general public. Watershed planning and management initiatives are necessary to identify local problems, implement corrective actions and coordinate the efforts of cooperating agencies.

Outreach Unit

The Outreach Unit consists of four primary programs that support the education and involvement of Georgia citizens in activities to protect our waterways from nonpoint source pollution. The four programs,

highlighted below, include Georgia Project WET, River of Words, Georgia Adopt-A-Stream and Rivers Alive. A program manager and four state coordinators provide the leadership necessary to implement the Outreach Unit programs.

Georgia Project WET (Water Education for Teachers) Program

In October 1996, Georgia EPD selected Project WET (Water Education for Teachers) curriculum as the most appropriate water science and nonpoint source education curriculum for the State. The Project WET curriculum is an interdisciplinary water science and education curriculum that can be easily integrated into the existing curriculum of a school, museum, university pre-service class, or a community organization. The mission of Project WET is to reach children, parents, educators, and communities of the world with water education.

The success of the Georgia Project WET Program has been phenomenal. Since 1997, over 10,100 Georgia teachers have been certified as Project WET educators, and over 727 have volunteered to be facilitators and train other adults in their communities.

Certified Project WET instructors receive *The Dragonfly Gazette* twice a year, an electronic newsletter for educators brimming with water education resources and news. Georgia Project WET Program provides educators with resources such as the Enviroscape Nonpoint Source, Wetlands, Stormwater and Groundwater Flow Models – demonstration tools used to emphasize the impacts of nonpoint source pollution to surface and ground waters, scripted theatrical performances and costumes for *Mama Bass and the Mudsliders*, and promotional and instructional training videos. Information is also available on the Georgia Project WET website, www.GaProjectWET.org

Each year, the Georgia Project WET Program partners with the Environmental Education Alliance of Georgia to conduct a statewide conference and awards ceremony. During the conference, Georgia Project WET recognizes a Facilitator, Educator and Organization of the Year. Awardees are selected based on their efforts to increase awareness about water issues and their commitment to water education. The Project WET Organization of the Year can choose to receive either a WET educator workshop for 25 individuals or $400 worth of water education materials to use for workshops or with students.

Georgia Project WET has also partnered with the City of Atlanta's Department of Watershed Management to produce *The Urban Watershed: A Supplement to the Project WET Curriculum and Activity Guide.* This supplement includes twelve real-world, engaging activities that have been designed for 4-8th grade students. The activities address topics such as water quality, non-point source pollution, drinking water systems, wastewater systems and impervious surfaces. It is the first curriculum of its kind, focusing on the Chattahoochee River watershed and the unique issues that face an urban watershed. Since its first printing in August of 2005, over 1,388 educators have been trained to implement the curriculum in their classrooms and in the field.

The Georgia Project WET Program offers educators in Georgia the opportunity to participate in the *River of Words*, an international poetry and art contest for students (K-12). This contest provides students with the opportunity to explore their own watersheds and to learn their "ecological" addresses through poetry and art. The Georgia Project WET Program offers a free River of Words Teacher's Guide for educators with specific information about Georgia's watersheds. In addition, several nature centers throughout Georgia offer *River of Words* field trips for students and teachers.

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 at the Library of Congress in Washington DC or in San Francisco, California.

Over 20,000 entries are submitted to the *River of Words* contest each year, and every year since 1997 Georgia students have been selected as National Grand Prize Winners and/or Finalists. In addition to the students that are recognized nationally, Georgia Project WET conducts a State judging each year in which approximately 50 students are honored as State winners.

The State and National winners' work is on display in the *Georgia River of Words Exhibition*. Each year, Georgia Project WET partners with the Chattahoochee Nature Center to conduct the *Georgia River of Words Awards Ceremony* recognizing State and National winners from across the State. All River of Words state and national winners' poetry and art can be found on the project website, www.GaProjectWet.org.

In partnership with the Georgia Center for the Book, Georgia Project WET coordinates an additional River of Words traveling exhibit through the library system, which visits 25-35 sites per year. In addition, over 70,000 students and teachers each year will view the River of Words exhibit when they visit the Education floor of the Georgia Aquarium.

Georgia Adopt-A-Stream Program

The Georgia Adopt-A-Stream Program is a citizen monitoring and stream protection program that focuses on what individuals and communities can do to mitigate nonpoint sources of pollution. The Program consists of two staff positions in the Georgia EPD and over 50 local community and watershed Adopt-A-Stream coordinators. The community and watershed coordinators are a network of college, watershed, or local based training centers located throughout Georgia. The network of local programs provides training workshops and educational presentations that allow the Georgia Adopt-A-Stream Program to be accessible to all areas of the State. In cooperation with the Georgia State Coordinators, the programs ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control.

The Georgia Adopt-A-Stream Program's objectives are: (1) increase individual's awareness of how they contribute to nonpoint source pollution problems, (2) generate local support for nonpoint source management through public involvement and monitoring of waterbodies, (3) provide educational resources and technical assistance for addressing nonpoint source pollution problems statewide, and (4) collect and share baseline water quality data.

Currently, thousands of volunteers participate in the 50 community sponsored Adopt-A-Stream Programs. Volunteers conduct clean ups, stabilize streambanks, monitor waterbodies using physical, chemical and biological methods, and evaluate habitats and watersheds at over 300 sites throughout the State. 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.

Volunteers are offered different options of involvement. Each option involves an education and action component on a local waterbody. In addition to water quality monitoring, volunteers are encouraged to engage in habitat improvement, riparian restoration and rain garden construction projects.

The Georgia Adopt-A-Stream Program provides volunteers with additional resources such as the *Getting to Know Your Watershed, Visual Stream Survey*, *Macroinvertebrate and Chemical Stream Monitoring*, *Bacterial Monitoring, Adopt-A-Wetland*, *Adopt-A-Lake*, Amphibian Monitoring and *Adopt-A-Stream Educator's Guide* manuals, PowerPoint presentations,

and promotional and instructional training videos. Every two months a newsletter is published and distributed to over 5,000 volunteers statewide with program updates and information about available resources. Additional information about the Georgia Adopt-A-Stream Program, watershed investigation and water quality monitoring information is available on the website, www.GeorgiaAdoptAStream.org.

All Georgia Adopt-A-Stream Program activities have been correlated to the Georgia Performance Standards (GPS) for grades K – 12 and certified teachers in Georgia participating in Georgia Adopt-A-Stream Program training workshops receive Professional Learning Unit (PLU) credits. Additional information about the GPS correlations and PLU credits can be found online.

The website Adopt-A-Stream now supports an online database to house all volunteer monitoring water quality data and programmatic information. The website is now "database" driven, with real time stats and graphs automatically generated by the information volunteers submit. Several formats are used to display monitoring data, including charts, graphs and basic GIS using a maps page that displays terrain, topographical and photographic layers. Data sharing developments like this website improve volunteer monitors' capacity to learn about and protect local water bodies. Presently there 200 groups actively monitoring 400 sites.

Georgia Adopt-A-Stream partnered with the Georgia River Network to present the Watershed Track at their annual conference. In another partnership activity with Georgia River Network, Adopt-A-Stream trained citizen monitors and led the scientific monitoring team for Paddle Georgia (a weeklong paddle down a major Georgia waterway). Over 75 sites were tested in 2011 on the Oconee River. These events helped connect citizens with activities that help protect and improve Georgia waters.

The Outreach Unit coordinates Georgia's annual volunteer waterway cleanup event, Rivers Alive, held in late summer through fall. Rivers Alive is a statewide event that includes streams, rivers, lakes wetlands and coastal waters. The mission of Rivers Alive is to create awareness of and involvement in the preservation of Georgia's water resources.

During the 2011 waterway cleanup, more than 29,000 volunteers cleaned over 1,800 miles of waterways and removed some 660,000 pounds of trash and garbage including motorcycles, cars, televisions, refrigerators, tires, shingles and general trash. Rivers Alive receives key support in the form of corporate sponsorship for the purchase of t-shirts, banners, and other materials to support local organizers. The cleanup events also share educational watershed posters and bookmarks, and public service announcements to advertise in local newspapers and on the radio.

Rivers Alive also produces a how to organize a cleanup guide and a quarterly e-newsletter to provide updated information and helpful cleanup tips for organizers. In addition to protecting and preserving the State's waterways, Rivers Alive cleanup events involve participants in diverse activities such as storm drain stenciling, water quality monitoring and riparian restoration workshops, riverboat tours, wastewater treatment facility tours and general environmental education workshops.

Rivers Alive maintains an online database for registering cleanups and submitting cleanup data. All cleanups are listed on an interactive maps page that shares individual organizer information, including driving directions. The results for each year are displayed on maps and in graphs for each group to view and share. Additional information about Rivers Alive is available on the website, www.RiversAlive.org.

Emergency Response Network

The GAEPD maintains a team of Environmental Emergency Specialists capable of responding to oil or hazardous materials spills 24-hours a day. Each team member is cross-trained to address and enforce all environmental laws administered by the GAEPD. The team members interact at the command level with local, state and federal agency personnel to ensure the protection of human health and the environment during emergency and post emergency situations. These core team members are supplemented with additional trained Specialists who serve as part-time Emergency Responders.

A significant number of reported releases involve discharges to storm sewers. Many citizens and some industries do not understand the distinction between storm and sanitary sewers and intentional discharge to storm sewers occurs all too frequently. A problem which arises several times a year involves the intentional discharge of gasoline to storm sewers, with a resulting buildup of vapors to explosive limits. A relatively small amount of gasoline can result in explosive limits being reached in a storm sewer. The resulting evacuations and industry closures cost the citizens of Georgia hundreds of thousands of dollars each year.

The GAEPD is designated in the Georgia Emergency Operations Plan as the lead state agency in responding to hazardous materials spills. Emergency Response Team members serve in both a technical support and regulatory mode during an incident. The first goal of the Emergency Response Team is to minimize and mitigate harm to human health and the environment. In addition, appropriate enforcement actions including civil penalties are taken with respect to spill incidents. Emergency Response Team members work directly with responsible parties to coordinate all necessary clean-up actions. Team members can provide technical assistance with clean-up techniques, as well as guidance to ensure regulatory compliance.

Environmental Radiation

In 1976, the Georgia Radiation Control Act was amended to provide the GAEPD with responsibility for monitoring of radiation and radioactive materials in the environment. The Environmental Radiation Program was created to implement these responsibilities for environmental monitoring. Since that time, the Program has also been assigned responsibility for implementing the GAEPD lead agency role in radiological emergency planning, preparedness and response, and for analyzing drinking water samples collected pursuant to the Safe Drinking Water Act for the presence of naturally-occurring radioactive materials such as uranium, 226Ra, 228Ra and gross alpha activity.

The Environmental Radiation Program monitors environmental media in the vicinity of nuclear facilities in or bordering Georgia to determine if radioactive materials are being released into the environment in quantities sufficient to adversely affect the health and safety of the citizens of Georgia or the quality of Georgia's environment. Among the more important of the facilities monitored by the Program are:

- Georgia Power Company Edwin I. Hatch Nuclear Plant, located in Appling County, Georgia;
- Alabama Power Company Joseph M. Farley Nuclear Plant, located in Houston County, Alabama;
- Georgia Power Company Vogtle Electric Generating Plant, located in Burke County, Georgia;
- U.S. Department of Energy Savannah River Site, located in Aiken and Barnwell Counties, South Carolina;

On a periodic basis, associates in the Environmental Radiation Program collect

samples of groundwater, surface water, stream sediment and/or aquatic species (i.e. fish, shellfish) from each of these facilities. The GAEPD contracts with the Environmental Radiation Laboratory (ERL) at Georgia Tech for laboratory analysis of these samples for natural and man-made radionuclides such as 90Sr, 131I, 137Cs and 3H (tritium).

CHAPTER 8

Ground and Surface Water Withdrawals & Availability, and Ground and Surface Water Drinking Water Supplies

Groundwater

Georgia began the development of its Comprehensive State Groundwater Protection Program (CSGWPP) in the 1970s with enactment of the Ground Water Use Act in 1972. By the mid-1980s, groundwater protection and management had been established by incorporation in a variety of environmental laws and rules. In 1984, the GAEPD published its first Groundwater Management Plan, in which the various regulatory programs dealing with groundwater were integrated.

Most laws providing for protection and management of groundwater are administered by the GAEPD. Laws regulating pesticides are administered by the Department of Agriculture, environmental planning by the Department of Community Affairs, and on-site sewage disposal by the Department of Human Resources. The GAEPD has established formal Memoranda of Understanding (MOU) with these agencies. The Georgia Groundwater Protection Coordinating Committee was established in 1992 to coordinate groundwater management activities between the various departments of state government and the several branches of the GAEPD.

The first version of Georgia's Groundwater Management Plan (1984) has been revised several times to incorporate new laws, rules and technological advances. The current version, Georgia Geologic Survey Circular 11, was published in February 1998. This document was GAEPD's submission to the USEPA as a "core" CSGWPP. The USEPA approved the submittal in September of 1997.

Groundwater is extremely important to the life, health, and economy of Georgia. For example, in 2005, groundwater made up approximately 21.5 percent of the public water supply, 100 percent of rural drinking water sources, 65 percent of the irrigation use and 48 percent of the industrial and mining use. Total estimated groundwater withdrawals in 2005 were approximately 1.2 billion gallons per day. This information is updated every 5 years. Outside the larger cities of Georgia, groundwater is the dominant source of drinking water. The economy of Georgia and the health of millions of persons could be compromised if Georgia's groundwater were to be significantly polluted.

Relatively few cases of ground water contamination adversely affecting public drinking water systems or privately owned drinking water wells have been documented in Georgia, and currently the vast majority of Georgia's population is not at risk from ground water pollution of drinking water. However, there are various old petroleum underground storage tanks, old landfills and other sites with known ground water contamination which (1) pose a threat to public drinking water systems or individual drinking water wells, or (2) render the existing ground water on or near those sites unusable for drinking water should that use be considered in the future. These sites are being addressed primarily through State laws and programs dealing with underground storage tanks, hazardous waste management or hazardous site remediation. Data on the major sources of groundwater contamination are provided in Table 8-1.

The GAEPD's groundwater regulatory programs follow an anti-degradation policy under which regulated activities will not develop into significant threats to the State's groundwater resources. This anti-degradation policy is implemented through three principal elements:

- Pollution prevention,
- Management of groundwater quantity,
- Monitoring of groundwater quality and quantity.

The prevention of pollution includes (1) the proper siting, construction and operation of environmental facilities and activities through a permitting system, (2) implementation of environmental planning criteria by incorporation

in land-use planning by local government, (3) implementation of a Wellhead Protection Program for municipal drinking water wells, (4) detection and mitigation of existing problems, (5) development of other protective standards, as appropriate, where permits are not required, and (6) education of the public to the consequences of groundwater contamination and the need for groundwater protection. Management of groundwater quantity involves allocating the State's groundwater, through a permitting system, so that the resource will be available to present and future generations. Monitoring of groundwater quality and quantity involves continually assessing the resource so that changes, either good or bad, can be identified and corrective action implemented when and where needed. Table 8-2 is a summary of Georgia groundwater protection programs.

The State of Georgia possesses a groundwater supply that is both abundant and of high quality. Except where aquifers in the Coastal Plain become salty at great depth, all of the State's aquifers are considered as potential sources of drinking water. For the most part, these aquifers are remarkably free of pollution. The aquifers are continuously recharged by precipitation, and continue to help meet future water needs. While water from wells is safe to drink without treatment in most areas of Georgia, water to be used for public supply is required to be chlorinated (except for very small systems). Water for domestic use can also be treated if required.

Ambient groundwater quality, as well as the quantity available for development, is related to the geologic character of the aquifers. Georgia's aquifers can, in general, be characterized by the five main hydrologic provinces in the State (Figure 8-1). In addition to sampling of public drinking water wells as part of the Safe Drinking Water Act and sampling of monitoring wells at permitted facilities, the GAEPD monitors ambient groundwater quality through the Georgia Groundwater Monitoring Network. From 1984 through January 2004, this network regularly sampled wells and springs, tapping important aquifers throughout the State. From February 2004 through 2010, the network focused on various specialized situations: the Coastal area (102 wells), the Piedmont/Blue Ridge area (120 wells and springs), small public water systems (180 wells and springs, statewide), uranium in ground water (310 wells and springs), and arsenic in ground water in South Georgia (67 wells). In 2011, the network returned to the regular sampling of wells and springs drawing from important aquifers. Figure 8-2 shows locations of stations for the arsenic study and for the important aquifer study sampled during calendar years 2010 and 2011. The Arsenic Monitoring Project sought to address the probable origin and extent of arsenic contamination found in waters from existing and prospective public supply wells in Grady County. Previous studies had suggested that a subsurface geologic feature termed the Gulf Trough, which extends across the State from southern Decatur County to northern Effingham County, was associated with water naturally contaminated with arsenic. The arsenic study concluded that the arsenic contamination was likely natural and likely associated with the Gulf Trough. The study found eight stations giving water with arsenic in excess of the Primary MCL (Table 8-3A). The Important Aquifer study found one well with a uranium exceedance, one well with a lead exceedance, and 30 wells with iron, manganese, or aluminum exceedances (Table 8-3B). Owners of wells giving exceedances were notified, and, if the well was a public supply well or a private drinking water source, a follow-up sampling was done.

One of the purposes of the network is to allow the GAEPD to identify groundwater quality trends before they become problems. The only adverse temporal trend noted to date is that nitrate, while still at very low levels, has slightly increased in concentration in the recharge areas of some Coastal Plain aquifers since 1984. From 1996 through 2009, 1,643 water samples from Groundwater Monitoring Network wells were analyzed for nitrate/nitrite, or during 2005 for nitrate. Water from 1.03 percent of these samples exceeded the MCL value. Nitrate can come from non-point sources such as natural and artificial fertilizer, natural sources, feedlots and animal enclosures. Septic tanks and land application of treated wastewater and sludge are other potential sources of nitrate. The GAEPD's extensive sampling program demonstrates that nitrates, from non-point sources, are not a significant contributor to groundwater pollution in Georgia. Results of aquifer monitoring data for calendar years 2008 and 2009 are provided in Tables 8-3 through 8-5.

TABLE 8-1
MAJOR SOURCES OF GROUND WATER CONTAMINATION

Contaminant Source	Contaminant Source Selection Factors	Contaminants
Agricultural Activities		
Agricultural chemical facilities		
Animal feedlots		
Drainage wells		
Fertilizer applications		
Irrigation practices		
Pesticide applications		
Storage and Treatment Activities		
Land application		
Material stockpiles		
Storage tanks (above ground)		
Storage tanks (underground)*	C, D, F	D
Surface impoundments		
Waste piles		
Waste tailings		
Disposal Activities		
Deep injection wells		
Landfills*	C, D, F	D, H
Septic systems*	C	E, K, L
Shallow injection wells		

Contaminant Source	Contaminant Source Selection Factors	Contaminants
Other		
Hazardous waste generators		
Hazardous waste sites*	F	C, H
Industrial facilities*	C, F	C, D, H
Material transfer operations		
Mining and mine drainage		
Pipelines and sewer lines*	F	D
Salt storage and road salting		
Salt water intrusion*	B, C, E, F	G
Spills*	F	D
Transportation of materials		
Urban runoff*	D, E	Variable
Natural iron and manganese* Natural radioactivity	F	H, I

*10 highest-priority sources

Factors used to select each of the contaminant sources.

A. Human health and/or environmental risk (toxicity)
B. Size of the population at risk
C. Location of the sources relative to drinking water sources
D. Number and/or size of contaminant sources
E. Hydrogeologic sensitivity
F. State findings, other findings

Contaminants/classes of contaminants considered to be associated with each of the sources that were checked.

A. Inorganic pesticides
B. Organic pesticides
C. Halogenated solvents
D. Petroleum compounds
E. Nitrate
F. Fluoride
G. Salinity/brine
H. Metals
I. Radio nuclides
J. Bacteria
K. Protozoa
L. Viruses

TABLE 8-2
SUMMARY OF STATE GROUND WATER PROTECTION PROGRAMS

Programs or Activities	Check (X)	Implementation Status	Responsible State Agency
Active SARA Title III Program	X	Fully Established	GAEPD
Ambient ground water monitoring system	X	Fully Established	GAEPD
Aquifer vulnerability assessment	X	Ongoing	GAEPD
Aquifer mapping	X	Ongoing	GAEPD
Aquifer characterization	X	Ongoing	GAEPD
Comprehensive data management system	X	Ongoing	GAEPD
EPA-endorsed Core Comprehensive State Ground Water Protection Program (CSGWPP)	X	Fully Established	GAEPD
Ground water discharge		Prohibited	
Ground water Best Management Practices	X	Pending	GAEPD
Ground water legislation	X	Fully Established	GAEPD
Ground water classification		Not applicable	
Ground water quality standards	X	Ongoing	GAEPD
Interagency coordination for ground water protection initiatives	X	Fully Established	GAEPD
Nonpoint source controls	X	Pending	GAEPD
Pesticide State Management Plan	X	Fully Established	DOA
Pollution Prevention Program	X	Fully Established	DNR
Resource Conservation and Recovery Act (RCRA) Primacy	X	Fully Established	GAEPD
State Superfund	X	Fully Established	GAEPD
State RCRA Program incorporating more stringent requirements than RCRA Primacy	X	Fully Established	GAEPD
State septic system regulations	X	Fully Established	DHR
Underground storage tank installation requirements	X	Fully Established	GAEPD
Underground Storage Tank Remediation Fund	X	Fully Established	GAEPD
Underground Storage Tank Permit Program		Not applicable	
Underground Injection Control Program	X	Fully Established	GAEPD
Vulnerability assessment for drinking water/wellhead protection	X	Fully Established	GAEPD
Well abandonment regulations	X	Fully Established	GAEPD
Wellhead Protection Program (EPA-approved)	X	Fully Established	GAEPD
Well installation regulations	X	Fully Established	GAEPD

FIGURE 8-1
HYDROLOGIC PROVINCES OF GEORGIA

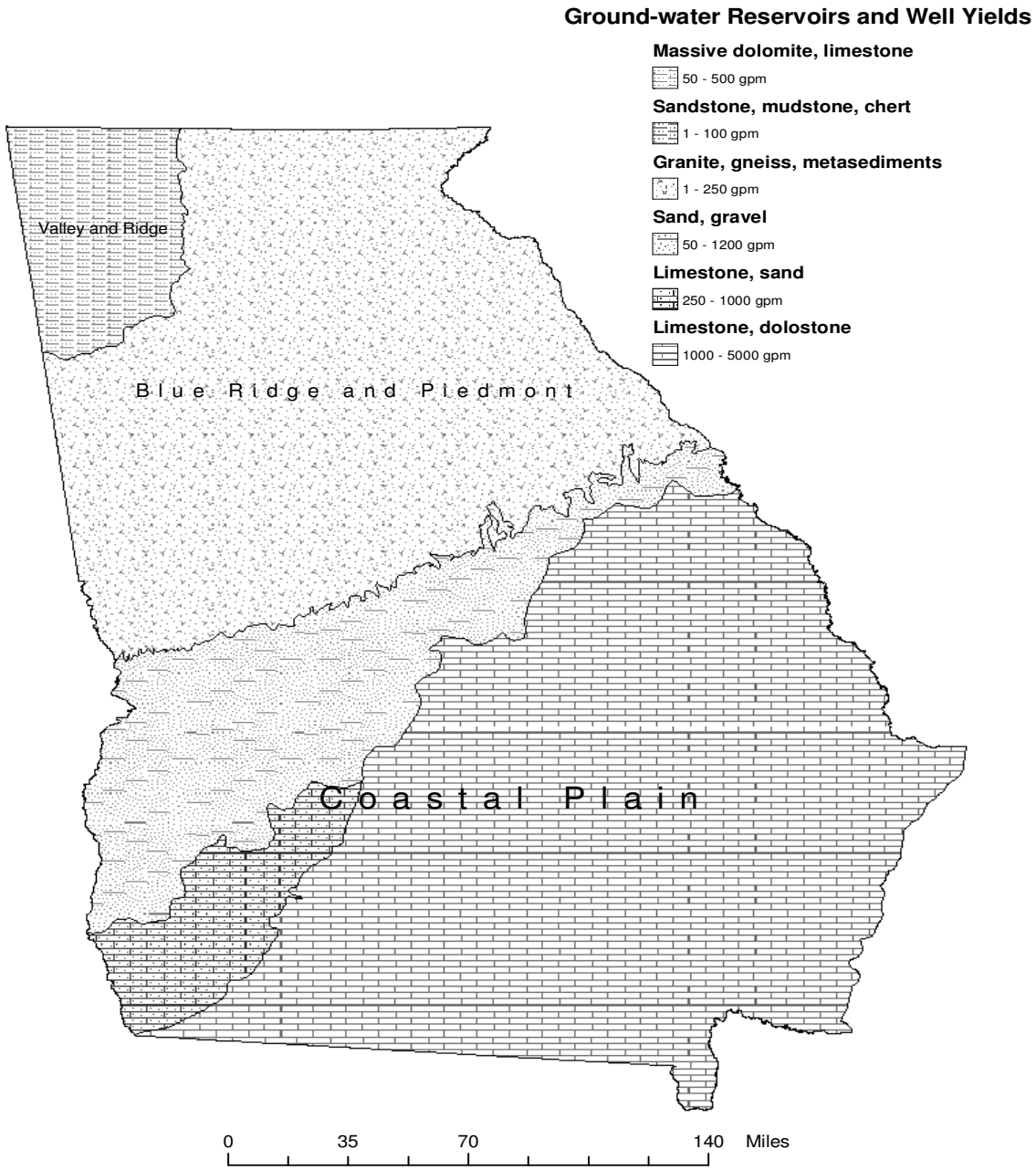


FIGURE 8-2
GROUNDWATER MONITORING NETWORK, 2010-2011

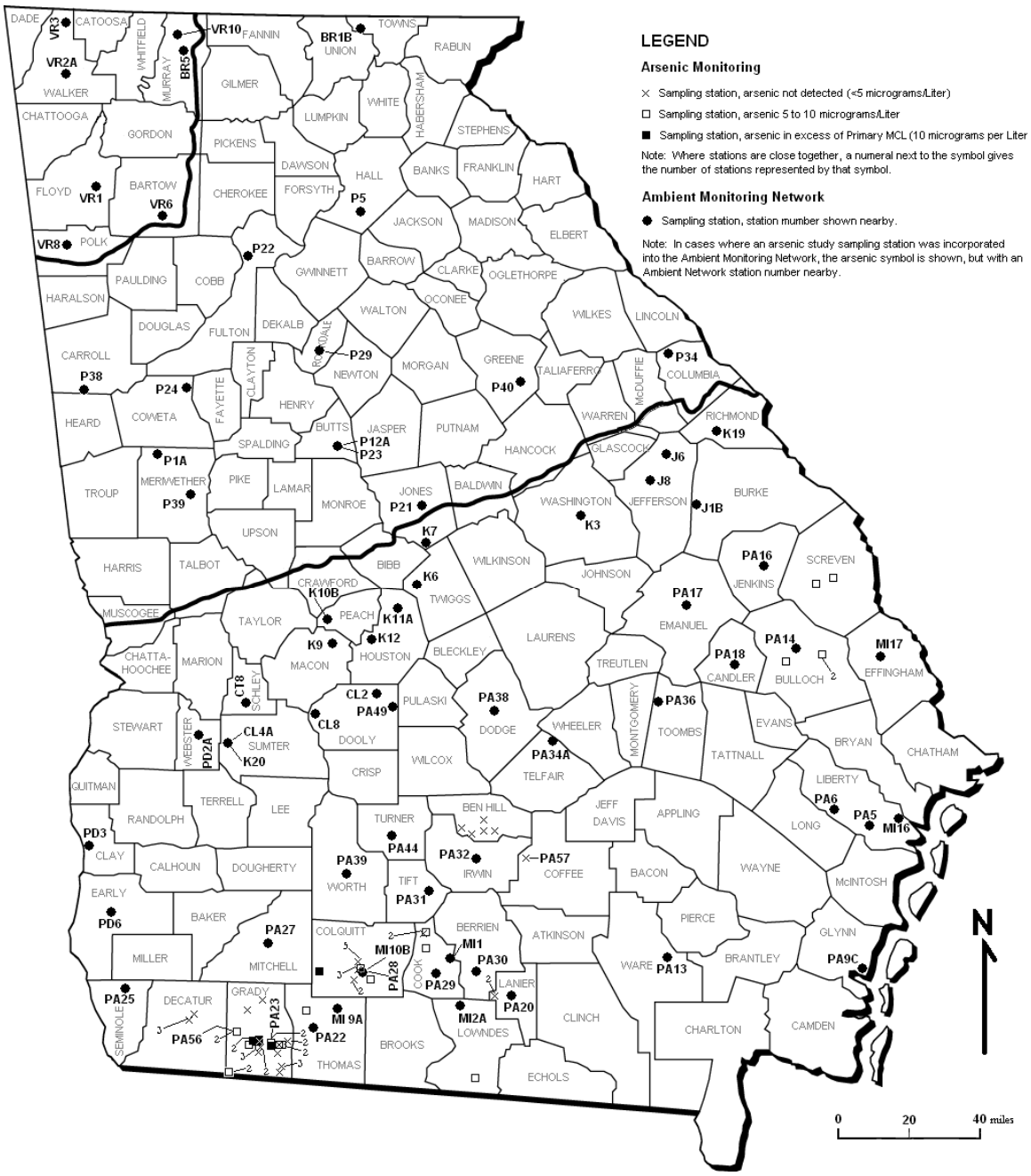


TABLE 8-3A
SUMMARY OF GROUND-WATER MONITORING RESULTS CY 2010

	Sixty Seven Arsenic Monitoring Stations					
	Nitrate/ Nitrite	VOCs	Arsenic	Uranium	Copper or Lead	Fe, Mn, or Al
Detections	35	6	26	7	20	39
Exceedances	0	1	8	0	0	5

TABLE 8-3B
SUMMARY OF GROUND-WATER MONITORING RESULTS FOR CY 2011

	Seventy Seven Important Aquifer Monitoring Stations					
	Nitrate/ Nitrite	VOCs	Arsenic	Uranium	Copper or Lead	Fe, Mn, or Al
Detections	50	5	1	17	31	45
Exceedances	0	0	0	1	1	30

TABLE 8-4
GROUND-WATER MONITORING DATA FOR CY 2010

Arsenic Monitoring							
County	Number of Stations	Number of Stations Showing:					
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Arsenic Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Ben Hill	5	2 // 0	2 // 0	0 // 0	0 // 0	0 // 0	3 // 1
Bulloch	3	0 // 0	0 // 0	3 // 0	0 // 0	0 // 0	3 // 0
Coffee	1	0 // 0	0 // 0	0 // 0	0 // 0	0 // 0	0 // 0
Colquitt	13	4 // 0	0 // 0	3 // 1	0 // 0	3 // 0	7 // 0
Cook	4	0 // 0	1 // 1	1 // 0	1 // 0	3 // 0	1 // 0
Decatur	4	4 // 0	0 // 0	0 // 0	0 // 0	1 // 0	1 // 0
Grady	31	21 // 0	3 // 0	15 // 7	6 // 0	11 // 0	19 // 4
Lanier	2	1 // 0	0 // 0	0 // 0	0 // 0	0 // 0	1 // 0
Lowndes	1	1 // 0	0 // 0	1 // 0	0 // 0	1 // 0	1 // 0
Screven	2	1 // 0	0 // 0	2 // 0	0 // 0	1 // 0	2 // 0
Thomas	1	1 // 0	0 // 0	1 // 0	0 // 0	0 // 0	1 // 0

TABLE 8-5
GROUND-WATER MONITORING DATA FOR CY 2011

Important Aquifer Monitoring							
Aquifer	Number of Stations	Number of Stations Showing:					
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Arsenic Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Cretaceous/ Providence	12	8 // 0	0 // 0	0 // 0	1 // 0	7 // 1	10 // 9
Clayton	1	1 // 0	0 // 0	0 // 0	0 // 0	1 // 0	1 // 1
Claiborne	3	1 // 0	0 // 0	0 // 0	0 // 0	0 // 0	3 // 3
Jacksonian	3	2 // 0	0 // 0	0 // 0	0 // 0	1 // 0	3 // 3

TABLE 8-5
GROUND-WATER MONITORING DATA FOR CY 2011, CONTINUED

Ambient Ground-Water Monitoring							
Aquifer	Number of Stations	Number of Stations Showing:					
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Arsenic Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Floridan	28	13 // 0	3 // 0	1 // 0	7 // 0	11 // 0	14 // 7
Miocene	6	3 // 0	0 // 0	0 // 0	0 // 0	2 // 0	3 // 1
Piedmont/ Blue Ridge	18	16 // 0	1 // 0	0 // 0	9 // 1	8 // 0	9 // 5
Valley and Ridge	6	6 // 0	1 // 0	0 // 0	0 // 0	1 // 0	2 // 1

Agricultural chemicals are commonly used in the agricultural regions of the State (Figure 8-3). In order to evaluate the occurrence of agricultural chemicals in groundwater, the GAEPD has sampled:

- A network of monitoring wells located downgradient from fields where pesticides are routinely applied,
- Domestic drinking water wells for pesticides and nitrates, and
- Agricultural Drainage wells and sinkholes in the agricultural regions of Georgia's Coastal Plain for pesticides.

Only a few pesticides and herbicides have been detected in groundwater in these studies. There is no particular pattern to their occurrence, and most detections have been transient; that is, the chemical is most often no longer present when the well is resampled. Prudent agricultural use of pesticides does not appear to represent a significant threat to drinking water aquifers in Georgia at this time.

The most extensive contamination of Georgia's aquifers is from naturally occurring mineral salts (i.e., high total dissolved solids, or TDS levels). Areas generally susceptible to high TDS levels are shown in Figure 8-4. Intensive use of groundwater in the 24 counties of the Georgia coast has caused some groundwater containing high levels of dissolved solids to enter freshwater aquifers either vertically or laterally. Salt-water intrusion into the Upper Floridan Aquifer threatens groundwater supplies in the Hilton Head-Savannah and Brunswick areas. Intrusion rates, however, are quite slow, with salt-contaminated water taking more than a hundred years to reach Savannah. This has effectively slowed the rate of additional contamination. On April 23, 1997, the GAEPD implemented an Interim Strategy to protect the Upper Floridan Aquifer from salt-water intrusion in the 24 coastal counties.

The strategy, developed in consultation with South Carolina and Florida, continued until June 2006, when the final coastal Plan was adopted for implementation.

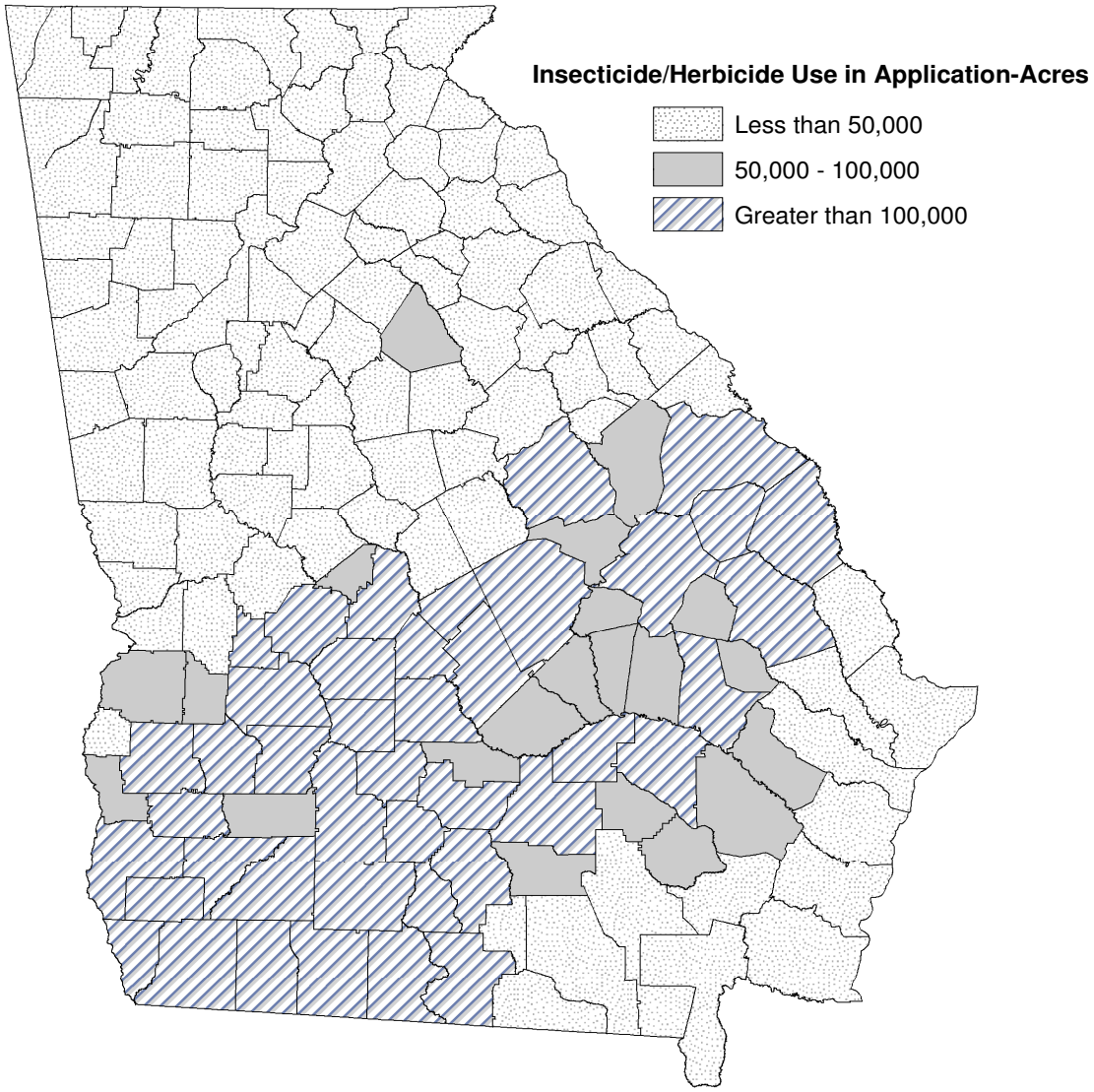
The new and final "Coastal Georgia Water & Wastewater Permitting Plan for Managing Salt Water Intrusion" describes the goals, policies, and actions the Environmental Protection Division (EPD) will undertake to manage the water resources of the 24-county area of coastal Georgia. The Plan is designed to support the continued growth and development of coastal Georgia while implementing sustainable water resource management.

The final Plan replaces the "Interim Strategy for Managing Salt Water Intrusion in the Upper Floridan Aquifer of Southeast Georgia" and sets forth how EPD will conduct ground and surface water withdrawal permitting, and management and permitting of wastewater discharges. It advances requirements for water conservation, water reclamation and reuse, and wastewater management. Based on the findings of the Coastal Sound Science Initiative (CSSI), the Plan will guide EPD water resource management decisions and actions.

The primary focus of the final Plan recognizes the intrusion of salt water into the Upper Floridan aquifer at Hilton Head Island, South Carolina. The Plan recognizes that actions taken to halt the intrusion of additional salt water into the aquifer will not result in the halting of the migration of the salt water that has already entered the aquifer.

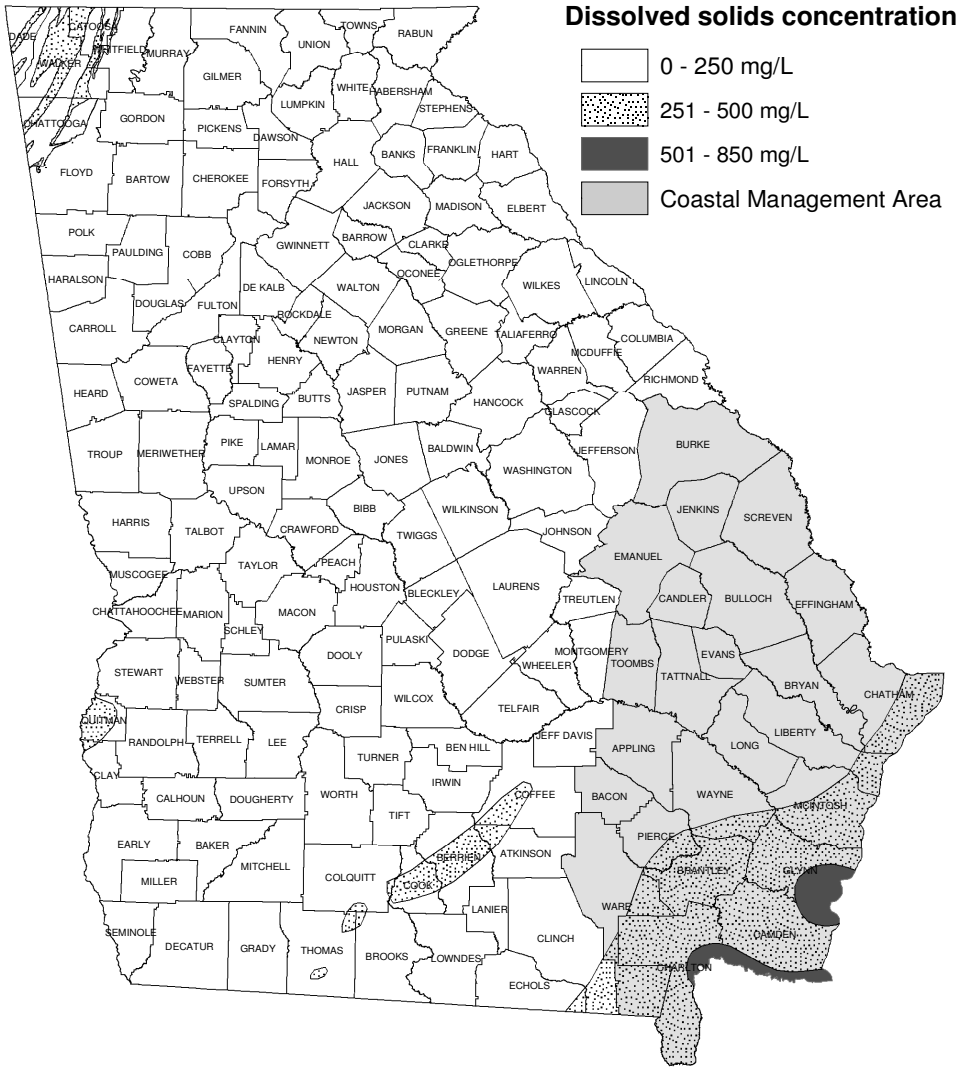
This final Plan for managing coastal Georgia salt water intrusion, withdrawal permitting, and wastewater management reflects the State's goal of sustainable use of both groundwater and surface waters, it supports regional economic growth and development, and contributes to protecting the short-term and long-term health of both the public and natural systems. It is based on the best

FIGURE 8-3
INSECTICIDE/HERBICIDE USE IN GEORGIA, 1980



Note: An application-acre represents one application of insecticide-herbicide to one acre of land. Some crops may require multiple applications.

FIGURE 8-4
AREAS SUSCEPTIBLE TO NATURAL HIGH DISSOLVED SOLIDS AND 24 COUNTY AREA COVERED BY THE INTERIM COASTAL MANAGEMENT STRATEGY



available scientific data and information on the stresses on the water resources within the region.

Management strategies that abate the intrusion of salt water are primarily concerned with quantity and supply, but water supply strategies are incomplete without a corresponding array of actions that will address related wastewater issues. The additional water supply available through the water withdrawal permitting conducted under this Plan will increase the amount of wastewater to be discharged into the sensitive ecosystems of coastal Georgia. Therefore, the final Plan also incorporates policies and actions needed to begin solving the wastewater discharge limitations that have become evident as coastal Georgia continues to grow.

The Comprehensive State-wide Water Management Planning Act (the Water Planning Act), passed by the General Assembly and signed into law by Governor Perdue in 2004, defines general policy and guiding principles for water resource management that guide this Coastal Georgia Water & Wastewater Permitting Plan for Managing Salt Water Intrusion. The incorporation of these policies and guiding principles into this Plan will facilitate its alignment with the Comprehensive State-wide Water Management Plan that was adopted by the General Assembly in January 2008.

To date the State water plan has completed assessments of the quantity and quality of surface waters in major streams and rivers in Georgia, and the ranges of sustainable yields of prioritized aquifers in Georgia. Most of the aquifers prioritized for determination of ranges of sustainable yield were aquifers within the Coastal Plain physiographic province of Georgia where most groundwater use within the State occurs. Ranges of sustainable yields of Coastal Plain aquifers were determined using finite difference and finite element numerical modeling methods. The range of sustainable yield was determined for the Paleozoic carbonate aquifer in a study basin of the Valley and Ridge physiographic province of northwestern Georgia using finite difference modeling, and ranges of sustainable yield were determined for the crystalline rock aquifer in selected basins in the Piedmont and Blue Ridge physiographic provinces of northern Georgia using basin water budgets.

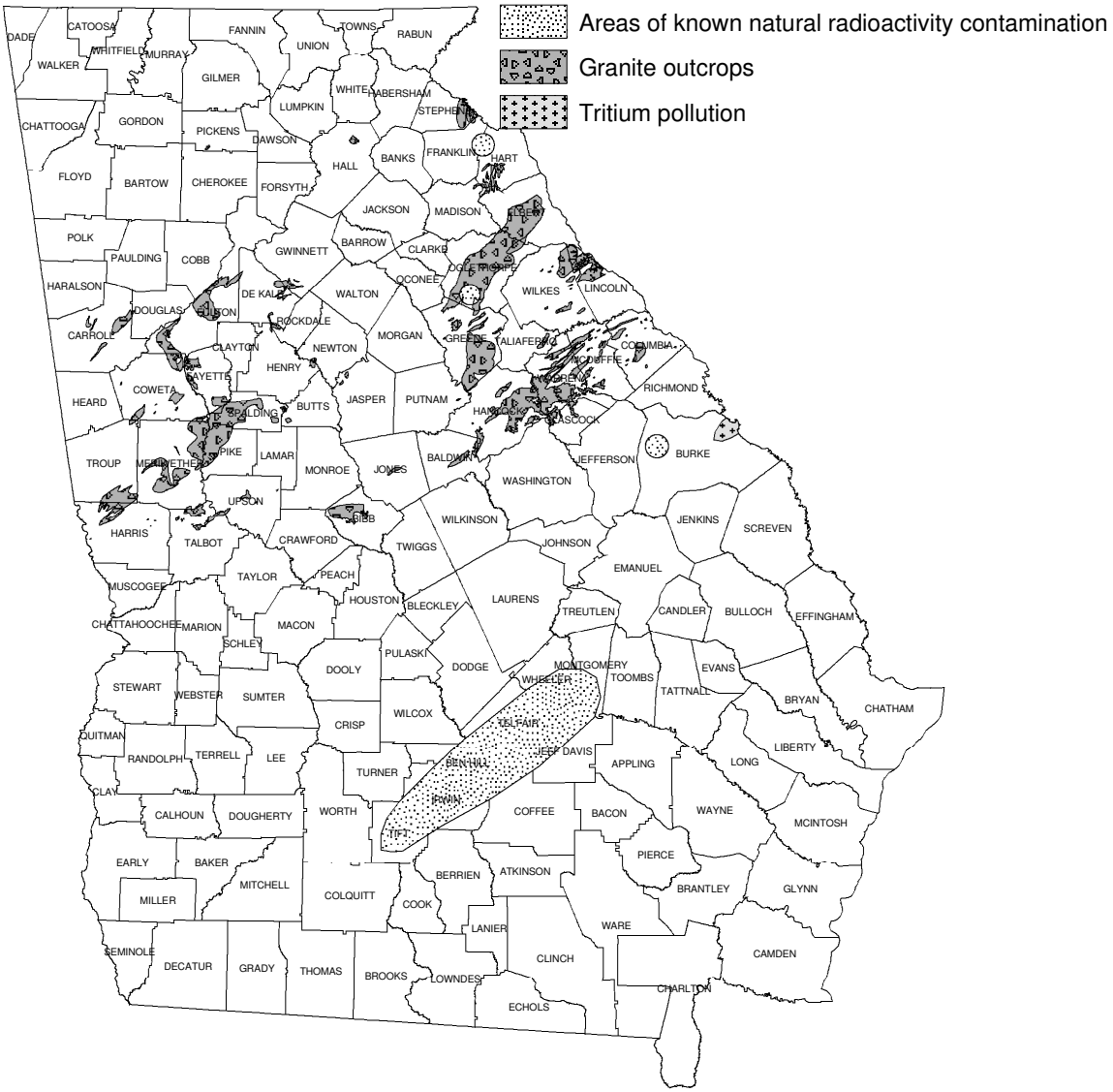
Some wells in Georgia produce water containing relatively high levels of naturally occurring iron and manganese. Another natural source of contamination is from radioactive minerals that are a minor rock constituent in some Georgia aquifers. While natural radioactivity may occur anywhere in Georgia (Figure 8-5), the most significant problems have occurred at some locations near the Gulf Trough, a geologic feature of the Floridan Aquifer in the Coastal Plain. Wells can generally be constructed to seal off the rocks producing the radioactive elements to provide safe drinking water. If the radioactive zones in a well cannot be sealed off, the public water may have to connect to a neighboring permitted public water system(s). Treatment to remove radionuclides and uranium from water is a problem due to concerns for the disposal of the concentrated residue.

However, certain treatment firms (e.g. Water Remediation Technology, LLC) have arrangements to remove certain radionuclides from ground water and dispose of residues properly. In particular, uranium-rich residues are turned over to processors, which extract the metal. Radon, a radioactive gas produced by the radioactive minerals mentioned above, also has been noted in highly variable amounts in groundwater from some Georgia wells, especially in the Piedmont region. Treatment systems may be used to remove radon from groundwater.

Tritium, a radioactive isotope of hydrogen, was found in 1991 in excess of expected background levels by GAEPD sampling in Burke County aquifers. While the greatest amount of tritium thus far measured is only 15 percent of the USEPA MCL for tritium, the wells in which it has been found lie across the

FIGURE 8-5

AREAS SUSCEPTIBLE TO NATURAL AND HUMAN INDUCED RADIATION



Savannah River from the Savannah River produced for nuclear weapons (Figure 8-5).

The tritium does not exceed MCLs for drinking water; therefore it does not represent a health threat to Georgia citizens at the present time. Results of the GAEPD's studies to date indicate the most likely pathway for tritium to be transported from the Savannah River Plant is through the air due to evapo-transpiration of triturated water. The water vapor is condensed to form triturated precipitation over Georgia and reaches the shallow aquifers through normal infiltration and recharge.

Man-made pollution of groundwater can come from a number of sources, such as business and industry, agriculture, and homes (e.g., septic systems). Widespread annual testing of public water supply wells for volatile organic chemicals (VOCs, e.g. solvents and hydrocarbons) is performed by the GAEPD. Only a very few water systems have had a VOC level high enough to exceed the MCL and become a violation. The sources of the VOCs most commonly are ill-defined spills and leaks, improper disposal of solvents by nearby businesses, and leaking underground fuel-storage tanks located close to the well. Where such pollution has been identified, alternate sites for wells are generally available or the water can be treated.

The GAEPD evaluates public groundwater sources (wells and springs) to determine if they have direct surface water influence. Ground Water Under the Direct Influence of Surface Water (GWUDI) is defined as "Water beneath the surface of the ground with: (1) Significant occurrence of insects or other macro organisms, algae, or large diameter protozoa and pathogens such as Giardia lamblia or Cryptosporidium; and significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH which closely correlate to climatological or surface conditions." Microscopic Particulate Analysis (MPA) is a method of sampling and testing for significant indicators. All of the known existing sources have been evaluated either on site or from information gathered from our files. Some are being re-evaluated as better information becomes available.

The GWUDI program has been restructured so that sample analyses are now performed by EPD laboratory personnel instead of Drinking Water Program personnel. Since the EPD lab began processing these samples in September 2009, thirty-two water sources have been analyzed for surface water influence. All were determined to be under some degree of risk of surface water contamination. Results for each source were forwarded to EPD personnel, both at the Regional Office level and at the central Drinking Water Engineering Program in Atlanta, for follow-up.

Groundwater protection from leaking underground storage tanks was enhanced with the enactment of the Georgia Underground Storage Tank Act in 1988. The program established a financial assurance trust fund and instituted corrective action requirements to clean up leaking underground storage tanks. Through December 31, 2009, confirmed releases have been identified at 12,365 sites and site investigation and corrective action procedures have been completed at 10,575 sites and initiated at the remaining 1,790 sites.

In 1992, the Georgia Legislature enacted the Hazardous Site Response Act to require the notification and control of releases of hazardous materials to soil and groundwater. Currently, there are 573 sites listed on the Georgia Hazardous Site Inventory (HSI). Since the initial publication of the HSI, cleanups and investigations have been completed on 260 sites. 426 Sites have cleanups in progress and 130 sites are under investigation. No action has been taken on 17 sites. During the previous year there were 9 additions to the inventory and

11 sites were removed. As with underground storage tanks, Georgia has established a trust fund raised from fees paid by hazardous waste generators for the purpose of cleaning abandoned hazardous waste sites. Using a combination of site assessment, and removal and transportation/disposal contractors, the Hazardous Site Response Program has issued over 196 contracts to investigate and cleanup abandoned sites, of which approximately 185 have been completed. Eleven contracts/sites remain "open".

Leachate leaking from solid waste landfills is also a potential groundwater pollutant. Georgia has a program, utilizing written protocols, to properly site, construct, operate, and monitor such landfills so that pollution of groundwater will not become a threat to drinking water supplies. In this regard, the GAEPD has completed a set of maps generated by a Geographic Information System that show areas geotechnically unsuitable for a municipal solid waste landfill. Maps at the scale of 1:100,000 have been distributed to all of the State's Regional Development Centers. In addition, all permitted solid waste landfills are required to have an approved groundwater monitoring plan and monitoring wells installed in accordance with the GAEPD standards for groundwater monitoring. As of November 2009 in Georgia, there were 106 permitted active (operational) waste disposal landfills, including 50 lined and 4 unlined municipal solid waste landfills, 48 construction and demolition landfills (26 publicly owned & 22 privately owned), 0 waste-to-energy facility (Montenay Savannah Limited Partnership closed 12/08), 1 commercial industrial landfill, and 1 carpet baler facility. In addition, 5 landfills have ceased accepting waste (In-Closure) and are currently closing the facility and no landfills released from post closure care in FY 2009.
There are 178 landfills in post-closure care required to conduct groundwater monitoring, 1 MSWL landfill (private commercial) ceased accepting waste in FY 09 and 320 SW landfills have an operational status of closed as FY09.

The GAEPD also actively monitors sites where treated wastewaters are further treated by land application methods. Agricultural drainage wells and other forms of illegal underground injection of wastes are closed under another GAEPD program. The GAEPD identifies non-domestic septic systems in use in the State, collects information on their use, and has implemented the permitting of systems serving more than 20 persons. Relatively few of the systems are used for the disposal of non-sanitary waste, and the owners of those systems are required to obtain a site specific permit or stop disposing of non-sanitary waste, carry out groundwater pollution studies, and clean up any pollution that was detected. None of these sources represents a significant threat to the quality of Georgia's groundwater at the present time.

The GAEPD has an active Underground Injection Control Program. As of December 31, 2011, the program has issued 506 UIC permits covering 10,912 Class V wells. Most of the permits are for remediation wells for UST sites, petroleum product spills, hazardous waste sites, or for non-domestic septic systems.

Georgia law requires that water well drillers constructing domestic, irrigation and public water supply wells and all pump installers be licensed and bonded. As of December 31, 2011 Georgia had 261 active licensed water well drillers and 71 certified pump installers and that are required to follow strict well construction and repair standards. The GAEPD actively pursues and works closely with the Courts to prosecute unlicensed water well contractors and uncertified pump installers. The GAEPD continues to work with various drilling associations, licensed drillers, and certified pump installers to uphold and enforce the construction standards of the Water Well Standards Act. The GAEPD has taken an active role in informing all licensed drillers of the

requirement that all irrigation wells must be permitted, and that such permits must be issued prior to the actual drilling of any irrigation well. All drillers constructing monitoring wells or engineering and geologic boreholes must be bonded, and such well construction or borings must be performed under the direction of a Professional Engineer or Professional Geologist registered in Georgia. The GAEPD maintains an active file of all bonded drilling and pump installing companies and makes every attempt to stop the operations of all drillers and pump installers who fail to maintain a proper bond. The GAEPD issues permits and regulates all oil and gas exploration in the state under the Oil & Gas and Deep Drilling Act.

Activities affecting groundwater quality that take place in areas where precipitation is actively recharging groundwater aquifers are more prone to cause pollution of drinking water supplies than those taking place in other areas. In this regard, Georgia was one of the first states to implement a state-wide recharge area protection program. The GAEPD has identified the most significant recharge areas for the main aquifer systems in the State (Figure 8-6). The GAEPD has completed detailed maps showing the relative susceptibility of shallow groundwater to pollution by man's activities at the land surface. These maps at the scale of 1:100,000 have been distributed to the State's Regional Development Centers, and a state-wide map at the scale of 1:500,000 has been published as Hydrologic Atlas 20. In addition, the GAEPD is geologically mapping the recharge zones of important Georgia aquifers at a large scale of 1:24,000.

Recharge areas and areas with higher than average pollution susceptibility are given special consideration in all relevant permit programs. The GAEPD has developed environmental criteria to protect groundwater in significant recharge areas as required by the Georgia Comprehensive Planning Act of 1989. These criteria also reflect the relative pollution susceptibility of the land surface in recharge areas. Local governments are currently incorporating the pollution prevention measures contained in the criteria in developing local land use plans.

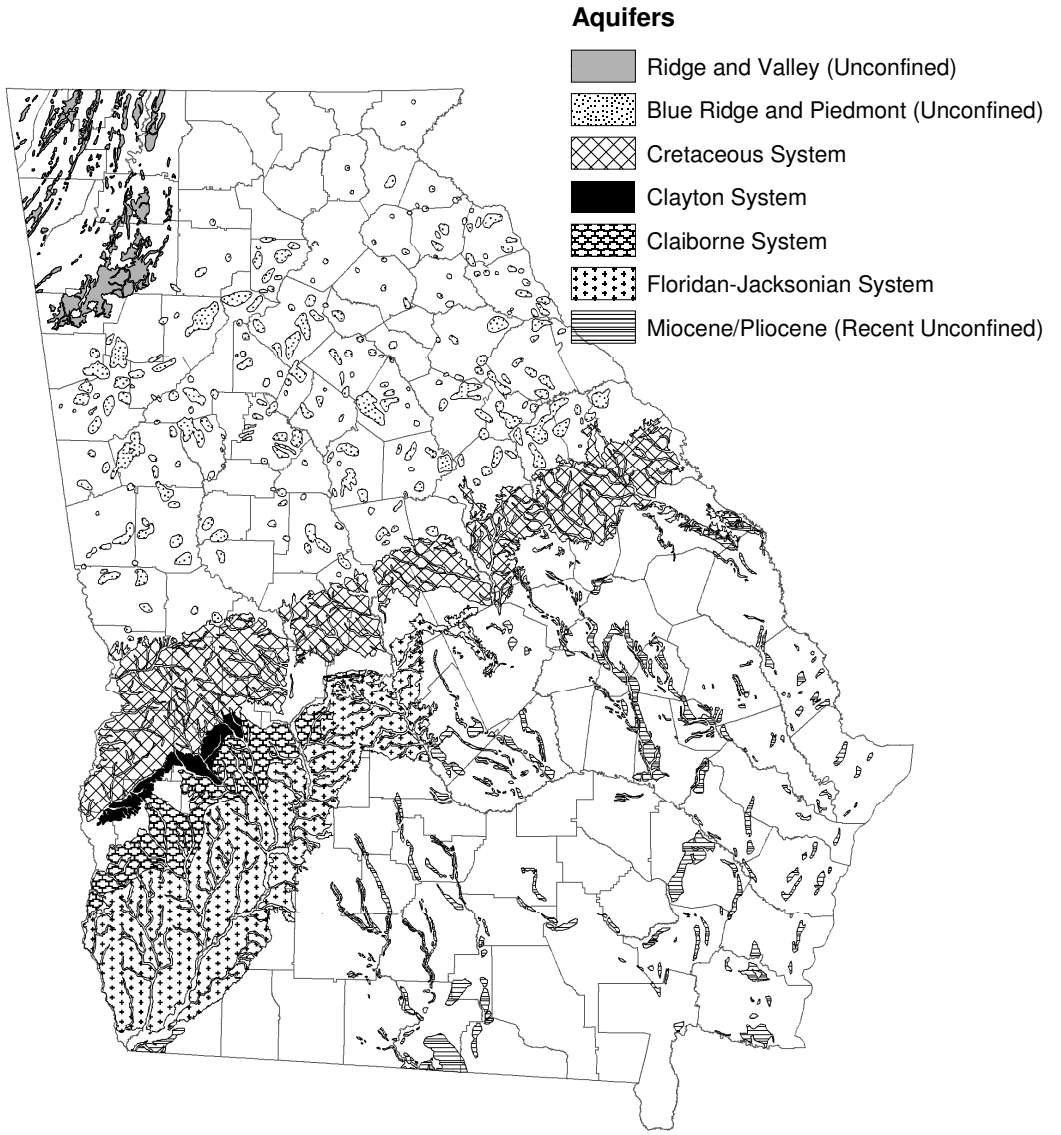
Some areas, where recharge to individual wells using the surficial or unconfined aquifers is taking place, are also significant recharge areas. To protect such wells, the GAEPD implemented a Wellhead Protection Program for municipal drinking water wells in 1993. Wells in confined aquifers have a small Wellhead Protection Area, generally 100 feet from the well. Wells using unconfined aquifers have Wellhead Protection Areas extending several hundred to several thousand feet from the well. Wells in karstic areas require even larger protection areas, which are defined using hydrogeologic mapping techniques.

Wellhead Protection Plans have been completed for all permitted municipal wells in Georgia. There are currently 1,616 active municipal ground water wells with Wellhead Protection Plans. A ten-year review of plans completed in 2000 and 2001 was completed in 2010 and 2011. The review includes the addition of pertinent well information and an update of potential pollution sources. In addition, the GAEPD has carried out vulnerability studies for non-municipal public water systems.

Table 8-1 summarizes the sources and nature of groundwater contamination and pollution in Georgia. In Table 8-1, an asterisk indicates that the listed source is one of the 10 highest sources in the state. Of these, the most significant source is salt-water intrusion in the 24 coastal counties. The second most significant source is naturally occurring iron, manganese, and radioactivity. Agricultural applications of pesticides and fertilizers are not significant sources.

Table 8-2 is a summary of Georgia groundwater protection programs. Georgia, primarily the GAEPD, has delegated authority for all federal environmental

FIGURE 8-6
GENERALIZED MAP OF SIGNIFICANT GROUNDWATER RECHARGE AREAS OF GEORGIA



groundwater protection statutes that are more stringent than federal statutes. Of the 28 programs, identified by USEPA, only three are not applicable to Georgia: discharges to groundwater are prohibited; the State's hydrogeology is not compatible to classification; and, while managed through construction standards, actual permits for underground storage tanks are not issued.

Tables 8-3, 8-4, and 8-5 summarize ambient groundwater quality monitoring results for calendar years 2008 and 2009. The data presented were developed from the Georgia Groundwater Monitoring Network reports.

As previously mentioned there are some wells and springs that GAEPD has determined to be under the influence of surface water. There are no documented cases in Georgia of groundwater polluting surface water sources.

Ground and Surface Water Withdrawals (including water availability analysis and conservation planning)

The Water Withdrawal Permitting Program of the Watershed Protection Branch currently has three (3) major water withdrawal permitting responsibilities: (a) permitting of municipal and industrial ground water withdrawal facilities; (b) permitting of municipal and industrial surface water withdrawal facilities; and (c) permitting of both surface and groundwater agricultural irrigation water use facilities.

Any person who withdraws more than 100,000 gallons of surface water per day on a monthly average or more than 100,000 gallons of groundwater on any day or uses a 70 gpm pump or larger for agricultural irrigation, must obtain a permit from the GAEPD prior to any such withdrawal. Through the end of December 2009, GAEPD had 292 active municipal and industrial surface water withdrawal permits (192 municipal, 100 industrial), 483 active groundwater withdrawal permits (287 municipal/public supply, 176 industrial, 20 golf course irrigation permits) and approximately 22,000 agricultural water use permits (encompassing both groundwater and surface water sources). Future efforts will focus on improving long-term permitting, water conservation planning, drought contingency planning and monitoring and enforcement of existing permits.

The Georgia Ground Water Use Act of 1972 requires all non-agricultural groundwater users of more than 100,000 gpd for any purpose to obtain a Ground Water Use Permit from GAEPD. Applicants are required to submit details relating to withdrawal location, historic water use, water demand projections, water conservation, projected water demands, the source aquifer system, and well construction data. A GAEPD issued Ground Water Use Permit identifies both the allowable monthly average and annual average withdrawal rate, permit expiration date, withdrawal purpose, number of wells, and standard and special conditions for resource use. Standard conditions define legislative provisions, permit transfer restrictions and reporting requirements (i.e., semi-annual groundwater use reports); special conditions identify such things as the source aquifer and conditions of well replacement. The objective of groundwater permitting is the same as that defined for surface water permitting.

The 1977 Surface Water Amendments to the Georgia Water Quality Control Act of 1964 require all non-agricultural surface water users of more than 100,000 gallons per day (gpd) on a monthly average (from any Georgia surface water body) to obtain a Surface Water Withdrawal Permit from the GAEPD. These users include persons, municipalities, governmental agencies, industries, military installations, and all other non-agricultural users. The 1977 statute “grandfathered" all pre-1977 users who could establish the quantity of their use prior to 1977. Under this provision these pre-1977 users were permitted at antecedent withdrawal levels with no minimum flow conditions. Applicants for surface water withdrawal permits are required to submit details relating to withdrawal source, historic water use, water demand projections, water conservation, low flow protection (for non-grandfathered withdrawals), drought contingency, raw water storage, watershed protection, and reservoir management. A GAEPD issued Surface Water Withdrawal

Permit identifies withdrawal source and purpose, monthly average and maximum 24-hour withdrawal limits, standard and special conditions for water withdrawal, and Permit expiration date. Standard conditions define legislative provisions, permit transfer restrictions and reporting requirements (i.e., usually annual water use reports); special conditions identify withdrawal specifics such as the requirement for protecting non-depletable flow (NDF). The NDF is that minimum flow required to protect instream uses, (e.g., waste assimilation, fish habitat, and downstream demand). The objective of surface water permitting is to provide a balance between resource protection and resource need.

The 1988 Amendments to both the Ground Water Use Act and the Water Quality Control Act require all agricultural groundwater and surface water users of more than 100,000 gpd on a monthly average to obtain an Agricultural Water Use Permit. “Agricultural Use" is specifically defined as the processing of perishable agricultural products and the irrigation of recreational turf (i.e., golf courses) except in certain areas of the state where recreational turf is considered as an industrial use. These areas are defined for surface water withdrawals as the Chattahoochee River watershed upstream from Peachtree Creek (North Georgia), and for groundwater withdrawals in the coastal counties of Chatham, Effingham, Bryan and Glynn. Applicants for Agricultural Water Use Permits who were able to establish that their use existed prior to July 1, 1988 and whose applications were received prior to July 1, 1991, are "grandfathered" for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with consideration for protecting the integrity of the resource and the water rights of permitted, grandfathered users. Currently, agricultural users are not required to submit any water use reports. A GAEPD issued Agricultural Water Use Permit identifies among other things the source, the purpose of withdrawal, total design pumping capacity, installation date, acres irrigated, inches of water applied per year, and the location of the withdrawal. Special conditions may identify minimum surface water flow to be protected or the aquifer and depth to which a well is limited. Agricultural Water Use Permits may be transferred and have no expiration date.

Since January, 1992, the states of Alabama, Florida, Georgia, and the United States Army Corps of Engineers - Mobile District have been cooperating partners in an interstate water resources management study. The study area encompasses the Alabama-Coosa-Tallapoosa River system (shared by Alabama and Georgia), and the Apalachicola-Chattahoochee-Flint River system (shared by the three states). These river basins make up 38 percent of Georgia’s total land area, provide drinking water to over 60 percent of Georgia’s people, and supply water for more than 35 percent of Georgia’s irrigated agriculture. Significant portions of Georgia’s industrial production and recreation-based economy are dependent on the water in these basins. The fish and wildlife resources that depend on these waters are also vital to Georgia. The goals of the study include, (a) forecasts of water demands for a myriad of uses in the two river systems through the year 2050; (b) estimates of ability of already developed water sources to meet the projected water demands; and (c) development of a conceptual framework for the basin wide management of the water resources of the two basins in a manner that would maximize the potential of the systems to meet expected water demands. At the end of December, 1997, the study was essentially completed. Work on most of the detailed scopes of work were completed, and the states along with the federal government, had executed river basin compacts for the two basins. The compacts are providing the framework under which the states and the federal government continue to negotiate water allocation formulas that will equitably apportion the waters of these basins. Once these allocation formulas are developed and agreed upon, the state and federal partners will manage the two river systems to comply with the formulas.

Under Georgia’s comprehensive water management strategy, permit applicants for more than 100,000 gallons per day of surface

water or groundwater for public drinking water have been required for a number of years to develop comprehensive water conservation plans in accordance with GAEPD guidelines. These plans primarily address categories such as system unaccounted-for water (leakage, un-metered use, flushing, etc.), metering, plumbing codes, water shortage planning, water reuse, public education, and so forth. Such plans must be submitted in conjunction with applications for new or increased non-agricultural ground and surface water withdrawals. Key provisions of the plans include the required submittal of water conservation progress reports 5 years after plan approval, the submittal of yearly “unaccounted-for" water reports, and greater emphasis on incorporating water conservation into long-term water demand projections.

Georgia law also requires the use of ultra-low flow plumbing fixtures (1.6 gpm toilets, 2.5 gpm shower heads and 2.0 gpm faucets) for all new construction. Local governments must adopt and enforce these requirements in order to remain eligible for State and Federal grants or loans for water supply and wastewater projects.

During times of emergency, the GAEPD Director is authorized to issue orders to protect the quantity and safety of water supplies. In general, municipal water shortage plans follow a phased reduction of water use based on the implementation of restrictions on non-essential water uses such as lawn watering, and so forth. These demand reduction measures typically include odd/even and/or time of day restrictions and progress from voluntary to mandatory with appropriate enforcement procedures. Severe shortages may result in total restriction on all nonessential water use, cut-backs to manufacturing and commercial facilities, and eventual rationing if the shortage becomes critical enough to threaten basic service for human health and sanitation. Water conservation efforts are extremely important to Georgia's future particularly in the north and central regions of the State.

Ground and Surface Drinking Water Supplies

Similar to groundwater, Georgia’s surface water sources provide raw water of excellent quality for drinking water supplies. During 2008-2009, no surface water supply system reported an outbreak of waterborne disease. Since the Federal and State Surface Water Treatment Regulations (SWTR) went into effect on June 29, 1993, approximately 140 surface water plants around the state have taken steps to optimize their treatment processes not only to meet the current SWTRs tougher disinfection and turbidity treatment technique requirements, but also to meet more stringent future drinking water regulations. The most recent regulations mandated by the U.S.E.P.A. include the control of disinfection byproducts and the microbial contaminants in drinking water.

The purpose of the Interim Enhanced Surface Water Treatment Rule (IESWTR) and the Long Term 1 Enhanced Surface Water Treatment Rule is to improve public health protection through the control of microbial contaminants, particularly *Cryptosporidium* (including Giardia and viruses) for those public water systems that use surface water or ground water under the direct influence of surface water. The purpose of the new Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) is to improve public health protection by reducing exposure to disinfection by products in drinking water (total trihalomethanes and haloacetic acids). Stage 1 DBPR applies to all sizes of community and non-transient and non-community water systems that add a disinfectant to the drinking water during any part of the treatment process and transient non-community water systems that use chlorine dioxide. During 2008-2009, no surface water production systems were required to issue “boil water" advisories to their customers due to significant SWTR treatment technique violations, other than events due to water main breaks. However, several surface and ground water systems that have been monitoring for TTHMs and HAA5s during this period experienced exceedances of the established MCLs.

LT2 AND STAGE 2 ISSUES

Amendments to the SDWA in 1996 require EPA to develop rules to balance the risks between microbial pathogens and disinfection byproducts (DBPs). The Stage 1 Disinfectants and Disinfection Byproducts Rule and Interim Enhanced Surface Water Treatment Rule, promulgated in December 1998, were the first phase in a rulemaking strategy required by Congress as part of the 1996 Amendments to the Safe Drinking Water Act.

The Long Term 2 Enhanced Surface Water Treatment Rule builds upon earlier rules to address higher risk public water systems for protection measures beyond those required for existing regulations.

The Long Term 2 Enhanced Surface Water Treatment Rule and the Stage 2 Disinfection Byproduct Rule are the second phase of rules required by Congress. These rules strengthen protection against microbial contaminants, especially *Cryptosporidium*, and at the same time, reduce potential health risks of DBPs. These two new regulations went into effect in December 2005. EPD is prepared to fully implement these regulations in Georgia, including the "early Implementation" provisions of the regulations.

The purpose of Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) is to reduce illness linked with the contaminant *Cryptosporidium* and other pathogenic microorganisms in drinking water. The LT2ESWTR will supplement existing regulations by targeting additional *Cryptosporidium* treatment requirements to higher risk systems. This rule also contains provisions to reduce risks from uncovered finished water reservoirs and provisions to ensure that systems maintain microbial protection when they take steps to decrease the formation of disinfection byproducts that result from chemical water treatment.

Current regulations require filtered water systems to reduce source water *Cryptosporidium* levels by 2-log (99 percent). Recent data on *Cryptosporidium* infectivity and occurrence indicate that this treatment requirement is sufficient for most systems, but additional treatment is necessary for certain higher risk systems. These higher risk systems include filtered water systems with high levels of *Cryptosporidium* in their water sources and all unfiltered water systems, which do not treat for *Cryptosporidium*. Based on the initial bin classifications for Cryptosporidium, there are no surface water sources in Georgia that require additional treatment to comply with the LT2ESWTR.

The LT2ESWTR is being promulgated simultaneously with the Stage 2 Disinfection Byproduct Rule to address concerns about risk tradeoffs between pathogens and DBPs.

The Stage 2 Disinfection Byproducts Rule will reduce potential cancer and reproductive and developmental health risks from disinfection byproducts (DBPs) in drinking water, which form when disinfectants are used to control microbial pathogens. Over 260 million individuals are exposed to DBPs.

This Stage 2 Disinfection Byproducts Rule strengthens public health protection for customers by tightening compliance monitoring requirements for two groups of DBPs, trihalomethanes (TTHM) and haloacetic acids (HAA5). The rule targets systems with the greatest risk and builds incrementally on existing rules. This regulation will reduce DBP exposure and related potential health risks and provide more equitable public health protection.

Public Water System Supervision Program

This program is designed to ensure that Georgia residents, served by public water systems, are provided high quality and safe drinking water. Its legal basis is the Georgia Safe Drinking Water Act and Rules. For the reporting period ending June 30, 2011, the State of Georgia had approximately 2,484 active public water systems serving a population over 8.4 million people. Based on the latest census figures, this means 87% of the citizens get their drinking water from one of the regulated public water systems in the State. The rest obtain water from their privately owned water sources.

Approximately 72% (1,778 out of the total 2,484 public water systems) provide water to residential customers. These systems are referred to as community water systems and serve at least 15 service connections used by year-round residents or regularly serve at least 25 year-round residents daily. Approximately 13% (224 out of the total 1,778 community water systems) are supplied by surface water sources and the remaining 87% (1,554 CWSs) are served by groundwater sources.

In addition, there are 209 non-transient non-community water systems that regularly serves at least 25 of the same persons over 6 months per year. Examples of these systems are hospitals, day care centers, major shopping centers, children's homes, institutions, factories, office and industrial parks, schools, and etc.
Furthermore, there are 497 transient non-community water systems that do not regularly serve at least 25 of the same persons over six months per year, such as restaurants, highway rest areas, campgrounds, roadside stops, and hotels. With a few exceptions, practically all of the non-transient non-community water systems and the transient non-community water systems use groundwater sources for their drinking water needs. All public water systems are issued a Permit to Operate a Public Water System, in accordance with the Georgia Safe Drinking Water Act and Rules.

These permits set forth operational requirements for wells, surface water treatment plants and distribution systems for communities, industries, trailer parks, hotels, restaurants and other public water system owners. Georgia's community and non-transient, non-community public water systems are currently monitored for 92 contaminants. Georgia closely follows the Federal Safe Drinking Water Act and implements the National Primary and Secondary Drinking Water Standards, involving about 92 contaminants (turbidity, 8 microbial or indicator organisms, 20 inorganic, 60 organic, 4 radiological contaminants). Maximum Contaminant Levels (MCLs) are set for 83 contaminants, treatment technique requirements are established for 9 contaminants to protect public health, and secondary standards for 15 contaminants are issued to ensure aesthetic quality.

The program is funded from State and Federal appropriations and grants respectively on a year-to-year basis and a Drinking Water Service Fee (DWSF), which has been in effect since July 1992. The DWSF was necessary to provide the resources to implement testing for (a) lead and copper and (b) Phase II and V Synthetic Organic and Inorganic Chemicals in public water systems. Water system owners who contract with the GAEPD for this testing are billed annually based on the system population. Fees range from $30 per year for a transient non-community system to a maximum of $24,000 per year for a large water system with three or more entry points. Participation in the DWSF is voluntary to the extent that a system may elect to use a public or certified commercial laboratory to analyze their required samples. The DWSF has been expanded in July 2009 to incorporate bacteriological testing, for an additional fee.

Testing for lead and copper in accordance with the Federal Lead and Copper Rule (LCR) began on January 1, 1992. On January 12, 2000 EPA published minor revisions to the existing 1991 Lead and Copper Rule. It was called Lead and Copper Minor Rule Revision (LCRMR). The purpose of this revision was to eliminate unnecessary requirements, streamline and reduce burden and also to promote consistent implementation. All systems that are required to monitor for lead and copper are initially required to perform two, six-month consecutive rounds of lead and copper monitoring starting from January–December of the required year, all 19 large systems are still required to maintain a corrosion control plan and have continued to do so.

In 2010, the total number of public water systems exceeding the action level for lead and/or copper was 38. Out of the 38 systems, 5 systems were non-transient non-community (NTNC) systems with population less than 3,300, and 32 were community (C) water

systems with population less than 3,300, and 1 system was a large community water system with a population between 50,000-100,000. Of the 5 NTNC systems, 4 exceeded the Lead action level and 1 exceeded the Copper action level. Of the 33 community water systems, 15 exceeded the Lead action level and 18 exceeded the Copper action level. The 1 large community water system was one that exceeded the Lead action level. 71% of these 38 water systems (including the 1 large water system) returned to compliance with the Lead/Copper action levels in the 2 subsequent six-month rounds of monitoring. The other 29% will remain on an increased Lead/Copper monitoring schedule until they have successfully completed two consecutive 6-month rounds of monitoring with no action levels exceeded. 98% of these 38 water systems that exceeded either parameter have completed the required water quality parameter testing and source-water Lead/Copper monitoring, and 100% of the systems exceeding the Lead action level have performed the public education requirements.

During 2011, the total number of systems that exceeded the action level for Lead and/or Copper was 16. 13 of these systems are community water systems with population less than 3,301 and 3 of these systems are non-transient-non-community system with a population less than 3,301. Out of the 16 systems that exceeded, 1 system exceeded for both Lead and Copper, 8 systems exceeded for Copper only and 7 systems exceeded for Lead only. Of the 8 systems that exceeded for Copper, 4 systems had exceeded for Copper in 2010 as well. Of the 7 systems that exceeded for Lead, 2 systems had exceeded for Lead in 2010 as well. So far, 87% of the systems that exceeded either parameter have completed the required water quality parameter testing and source-water Lead/Copper monitoring. Also, 85% of the systems exceeding the Lead action level have completed the public education requirements. All of these 16 systems will remain on an increased Lead/Copper monitoring schedule until they have successfully completed two consecutive 6-month rounds of monitoring with no action levels exceeded.

Monitoring for the 16 inorganic chemicals, 55 volatile organic chemicals and 43 synthetic organic chemicals, pesticides, herbicides and polychlorinated biphenyls is still required for systems that are considered a public water system. New systems are still required to initiate baseline monitoring (quarterly for all organic monitoring and surface water nitrate monitoring, annual for surface water inorganic monitoring and once every three years for groundwater inorganic monitoring). There were 3 systems that had results over the MCL for individual volatile organic contaminants in a particular quarter, however these system didn't received a violation due to compliance being based on four consecutive quarters results being higher than the established maximum contaminant level (MCL). The systems however are being monitored quarterly for VOCs.

A majority of Georgia's water systems, which are currently contracted with the State (participating in DWSF) have been issued monitoring waivers for SOCs and therefore are not required to monitor for those contaminants. New sources however, for existing systems are still required to establish base line monitoring for SOCs. After establishing the four quarters baseline monitoring they will be eligible for a waiver.

In order to reduce the Federal chemical monitoring requirements, the GAEPD conducts vulnerability studies for all public water sources. The studies are conducted to assist the GAEPD with the issuance of chemical monitoring waivers to public water systems. Water sources at low risk to contamination are issued waivers from the chemical monitoring requirements as specified by the Federal Phase II/Phase V regulations. To date, the GAEPD has issued statewide monitoring waivers for asbestos, cyanide, dioxin and most synthetic organic compounds. The GAEPD, however, does continue to monitor a representative number of water systems deemed to be of high vulnerability to contamination for asbestos, cyanide, dioxin and all waived synthetic organic compounds to obtain the chemical data needed to issue and maintain these state-wide waivers. The

issuance of waivers from monitoring for the above chemical parameters has saved Georgia's public water systems millions of dollars in monitoring costs over the duration of the waiver terms.

In addition, the GAEPD also prepared vulnerability studies for individual water sources. These studies included the preparation of countywide and site specific maps of the area immediately surrounding the water source, and a report about the water source. The maps included water wells, potential pollution sources around the wells, cultural information such as roads, and bodies of water. As of December 31, 2003, the GAEPD had prepared site specific maps for approximately 723 privately owned ground water public water systems. Additional maps have not been completed since the information is included in the SWAP documents.

USEPA approved Georgia's Source Water Assessment and Protection Implementation Plan on May 1, 2000. Georgia's deadline for completion of surface water source water assessments (SWAPs) was November 1, 2003. Georgia's deadline for completion of ground water SWAPs was June 2005 for community systems, December 2005 for non-transient non-community systems, and December 2006 for transient non-community systems. Source Water Assessments (SWAPs) for privately-owned ground water systems are currently being updated as the drinking water permit for each comes up for renewal. During the current reporting period of July 1, 2009 through June 30, 2010, the following number of SWAPs were completed for each type of privately–owned ground water system: 270 community, 28 non-transient non-community, and 135 transient non-community.

CHAPTER 9

Major Issues and Challenges

Comprehensive State and Regional Water Planning

Georgia is one of the fastest growing states in the nation. Between 2000 and 2010, Georgia gained 1.5 million new residents, ranking 4th nationally. The increasing population places considerable demands on Georgia's ground and surface water resources in terms of water supply, water quality, and assimilative capacity.

In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act", O.C.G.A. § 12-5-522, which called for the development of a statewide water management plan. Work was completed on the Statewide Water Plan and the plan was approved by the General Assembly and Governor Perdue in February 2008. In the three years since the adoption of the State Water Plan, more than 30.000 volunteer hours have been contributed and the State has invested $30 million in technical work and activities to support regional water planning. The Councils and the District have developed regional water plans that together provide a roadmap for sustainable use of Georgia's water resources. The Councils submitted initial recommended plans to the GAEPD in May 2011. The plans were publicly noticed and comments received were thoroughly reviewed. Appropriate revisions were made to the initial plans and final recommended regional water plans were submitted to the GAEPD in September 2011. On November 15, 2011, by action of Director Barnes, the GAEPD officially adopted all ten Regional Water Plans.

The regional water plans are not themselves an end. The plans present solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities. The plans are based on consistent, statewide forecasts of needs and reflect the best available information on the capacities of Georgia's waters. The tools used to assess the capacities have been tested and refined, and will be further refined as the information for planning and management is improved. The process and results of regional planning, taken together, provide solid footing for plan implementation and the five-year review and revision required by the State Water Plan. It is now time to put the regional water plans into action, building on the progress made through collaboration within and among the Water Planning Councils and the Metro Water District. Water users, water providers, local governments, state agencies, and elected leaders all have an important role in actions to ensure that Georgia's waters are sustainably managed to support the state's economy, protect public health and natural systems, and enhance the quality of life for all citizens.

Nonpoint Source Pollution

The pollution impact on Georgia streams has radically shifted over the last several decades. Streams are no longer dominated by untreated or partially treated sewage discharges that resulted in little or no oxygen and little or no aquatic life. The sewage is now treated, oxygen levels have returned and fish have followed.

However, another source of pollution affecting Georgia streams is nonpoint sources that include mud, litter, bacteria, pesticides, fertilizers, metals, oils, detergents and a variety of other pollutants being washed into rivers and lakes by stormwater. Even stormwater runoff itself, if rate and volume is uncontrolled, can be extremely detrimental to aquatic habitat and hydrological systems.

Nonpoint source pollution must be reduced and controlled to fully protect Georgia's streams. In addition to structural pollution controls, the use of nonstructural techniques, should be significantly expanded to minimize nonpoint source pollution. Some controls that should be considered include: green infrastructure, appropriate building densities, low impact development, buffer zones, erosion and sedimentation controls, street cleaning and limitations on pesticide and fertilizer usage. Some of these best management practices can be implemented through local government planning and zoning.

Toxic Substances
The reduction of toxic substances in rivers, lakes, sediment, and fish tissue is extremely important in protecting both human health and aquatic life.

The sources of toxic substances are widespread. Stormwater runoff may contain metals or toxic organic chemicals, such as pesticides (chlordane, DDE) or PCBs. Even though the production and use of PCB and chlordane is outlawed, the chemicals still persist in the environment as a result of previous use. One of the primary sources of mercury detected in fish tissue in Georgia and other states may be from atmospheric deposition. Some municipal and industrial treated wastewaters may contain concentrations of metals coming from plumbing (lead, copper, zinc) or industrial processes.

The concern over toxic substances is twofold. First, aquatic life is very sensitive to metals and small concentrations of metals can cause impairment. Fortunately, metals at low concentrations are not harmful to humans. Second, the contrary is true for carcinogenic organic chemicals. Concentrations of these chemicals may accumulate in fish flesh without damage to the fish but may increase a person's cancer risk if the fish are eaten regularly.

The most effective method to reduce the release of toxic substances into rivers is pollution prevention which consists primarily of eliminating or reducing the use of toxic substances, or at least reducing the exposure of toxic materials to drinking water, wastewater and stormwater. Although, it is very expensive and difficult to reduce low concentrations of toxic substances in wastewaters by treatment technologies, it is virtually impossible to treat large quantities of stormwater for toxic substance reductions. Therefore, toxic substances must be controlled at the source.

Nutrients
Nutrients serve a very important role in our environment. They provide the essential building blocks necessary for growth and development of healthy aquatic ecosystems. However, if not properly managed, nutrients in excessive amounts can have detrimental effects on human health and the environment, creating such water quality problems as excessive growth of macrophytes and phytoplankton, harmful algal blooms, dissolved oxygen depletion, and an imbalance of flora and fauna. In Georgia, site specific nutrient criteria have been adopted for several major lakes and their tributaries. Some of these lakes are currently listed for chlorophyll *a*, which is the primary biological indicator in lakes for nutrient overenrichment. TMDLs, based on watershed modeling, have been completed or are in development to address the nutrient issues for these lakes. Currently, the GAEPD is in the process of collecting the necessary data and information for use in developing nutrient standards for rivers, streams and other waterbodies in Georgia. Determining the relationship of nutrient levels and biological response is necessary in order to develop appropriate nutrient criteria.

Public Involvement
It is clear that local governments and industries, even with well funded efforts, cannot fully address the challenges of nonpoint source pollution control, nutrients, and toxic substances. Citizens must individually and collectively be part of the solution to these challenges.

The main focus is to achieve full public acceptance of the fact that what we do on the land has a direct impact on water quality. Human activities that contribute to nonpoint source pollution, nutrients, and toxics, include adding more pavement and other impervious surfaces, littering, driving cars that drip oil and antifreeze, applying fertilizers and pesticides. If streams and lakes are to be pollutant free, then some of the everyday human activities must be modified.

The GAEPD will be emphasizing public involvement; not only in decision-making, but also in direct programs of stream improvement. This work includes education through Georgia Project WET (Water Education for Teachers) and Adopt-A-Stream programs.