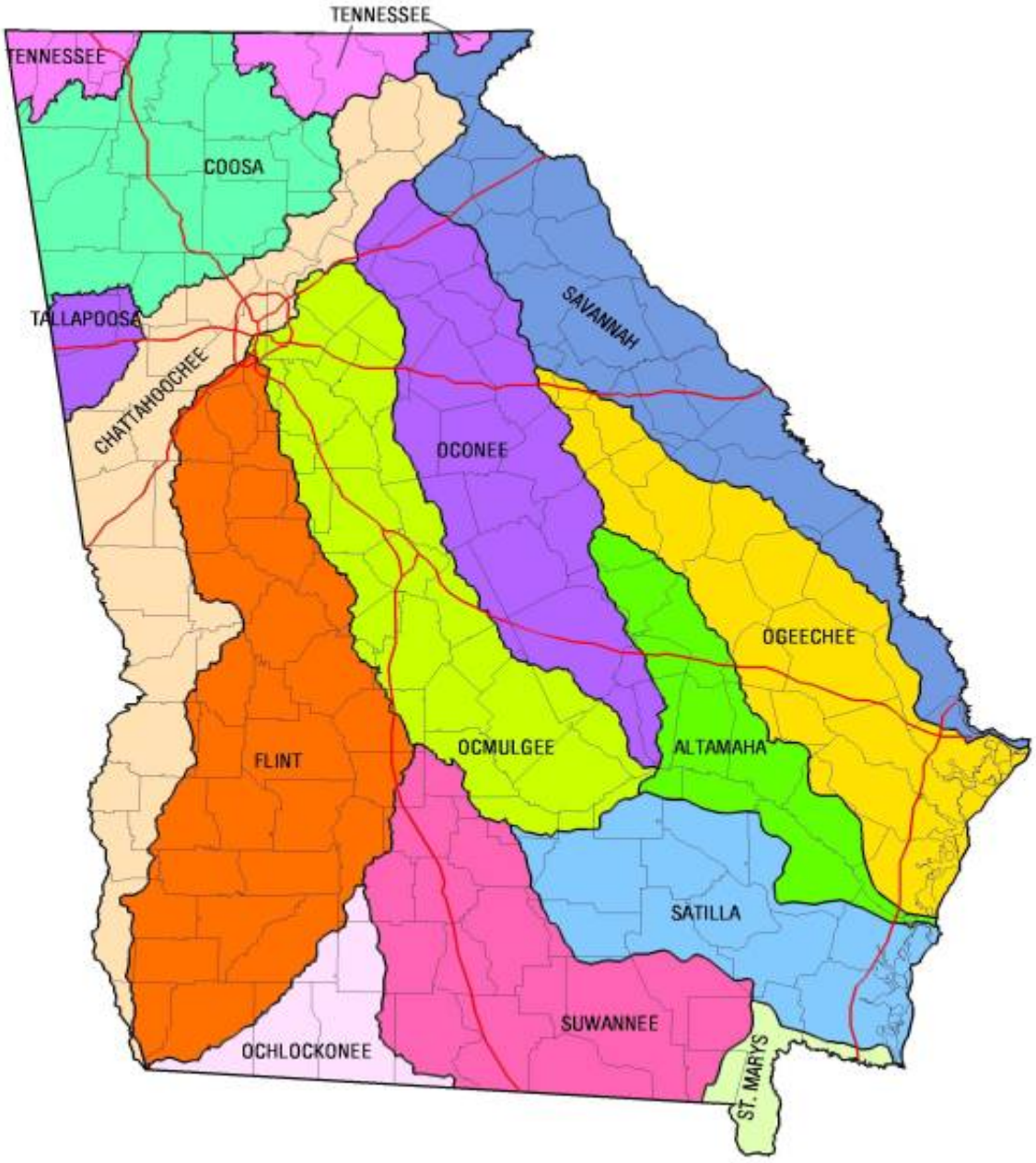
WATER QUALITY IN GEORGIA 2008-2009



Georgia Department of Natural Resources
Environmental Protection Division

WATER QUALITY IN GEORGIA 2008-2009

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, 2008 through December 31, 2009. Comments or questions related to the content of this report are invited and should be addressed to:

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TABLE OF CONTENTS

CHAPTER 3 – SURFACE WATER QUALITY MONITORING AND ASSESSMENT

CHAPTER 4 – WETLAND PROGRAMS

CHAPTER 5 – ESTUARY AND COASTAL PROGRAMS

CHAPTER 6 – PUBLIC HEALTH/AQUATIC LIFE ISSUES

CHAPTER 7 – WATER 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, 2008-2009*, was prepared by the Georgia Environmental Protection Division (GAEPD) of the Department of Natural Resources (DNR). The DNR Coastal Resources (CRD) and Wildlife Resources Divisions (WRD), the Georgia Forestry Commission, 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 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 regulatory programs for water 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 through watershed improvement plans; the continuing planning process; water quality standards; local watershed assessment and watershed protection plans; nonpoint source management; erosion and sedimentation; stormwater management; the State revolving loan process for funding drinking water facilities and municipal water pollution control plant construction; 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 and regulation of concentrated animal feedlot operations (CAFOs).

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 the resources.

In 2008-2009, the GAEPD placed emphasis on comprehensive statewide water management planning, monitoring and assessment, water quality modeling and TMDLs, TMDL implementation plan development, 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 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. 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.

Monitoring and Assessment. Georgia's waters are currently classified 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.

Water Quality Modeling/Wasteload Allocation/TMDL Development. The GAEPD conducted a significant amount of modeling in 2008-2009 in support of the development of wasteload allocations and total maximum daily loads (TMDLs). In 2007, TMDLs were developed for segments on the Georgia 2006 303(d) list for the Chattahoochee and Flint River Basins and these TMDLs were finalized and submitted to EPA and approved in early 2008. In 2008, TMDLs were developed for segments on the Georgia 2008 303(d) list for the Coosa, Tallapoosa, and Tennessee River Basins. These TMDLs were finalized and submitted to EPA and approved in early 2009. In 2009, TMDLs were developed for segments on the 2008 303(d) list for the Savannah and Ogeechee River Basins. Over the 2008-2009 period, more than 133 TMDLs were developed. To date more than 1400 TMDLs have been developed for 303(d) listed waters in Georgia. This work is discussed in Chapter 7.

TMDL Implementation Plan Development. 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. The following number of TMDL implementation plans were developed during 2008-2009 for specific river basin groups. For the St. Mary's, Ochlockonee, Satilla and Suwannee River Basins, a total of 92 new TMDL implementation plans, revisions, water quality

monitoring reports, and watershed improvement plans were completed. For the Oconee, Ocmulgee and Altamaha River Basins, a total of 260 new TMDL implementation plans, status reports and monitoring reports were completed while eight watershed improvement plans were initiated. For the Chattahoochee-Flint River Basins, a total of 135 TMDL implementation plans and status reports were completed while five watershed improvement plans were initiated. For the Coosa, Tallapoosa and Tennessee River Basins, a total of 103 TMDL implementation plans were completed, with two watershed improvement plans initiated. To date a total of 590 new plans, revisions, monitoring reports, status reports and improvemen t plans have been prepared to implement TMDLs in Georgia. TMDL implementation is discussed in Chapter 7.

State Revolving Loan Fund and Georgia Loan Fund. In 2008-2009 more than 476 million dollars were obligated to communities for wastewater system improvements through the Georgia Environmental Facilities Authority (GEFA) in the form of low-interest, SRF and Georgia Fund loans. The loan programs are discussed in Chapter 7.

GEFA Implementation Unit. The Metropolitan North Georgia Water Planning District (District) was created on April 5, 2001 (2001 S.B. 130) 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 has become a priority.

The EPD was charged with the enforcement of these plans. SB 130 states that the EPD Director shall not approve 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.

EPD, upon application for a permit for an increase in the water withdrawal, public water system capacity, or wastewater treatment system capacity, or renewal of any NPDES Phase I or Phase II General Stormwater permit, will conduct an audit to determine whether the local government is in compliance with the District Plans. This audit process was initiated in the fall of 2005.

NPDES Permitting and Enforcement. A considerable amount of time was allocated to treated wastewater discharge permit reissuance activities in 2008-2009. NPDES permits were modified or reissued to 287 municipal/private dischargers and to 86 industrial dischargers.

Compliance and enforcement activities continued to receive significant attention in 2008-2009. By the end of 2009, of 144 major municipal discharges, 141 facilities were in general compliance with final limitations. The remaining 3 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 37 major industrial discharges, all facilities were achieving permit compliance at the end of 2009.

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 2008-2009, 672 Orders were issued and a total of $2,787,318 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, excluding stormwater In 2008-2009 a total of 346 stormwater Orders were issued and a total of $1,579,147 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. Work was continued in 2008-2009 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 2008-2009 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 FY08 – FY09, Georgia's Section 319(h) grant project funded 32 new projects for over $9.3 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 2009. The 13 NPDES permits for medium MS4s were reissued in 2000 and 2005. 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 facilities.

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 2600 facilities retaining coverage. In addition, 500 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 by GAEPD on August 13, 2003. The permit was re-issued 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 new program, which is being administered by the Georgia Soil and Water Conservation Commission, required those individuals to obtain the applicable certification by December 31, 2006. 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. Local issuing authorities were required to amend their local ordinances to implement the changes in the Act by July 1, 2004. 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 legislation also required the Georgia Board of Natural Resources to adopt amendments to the Erosion and Sedimentation Control Rules to implement the new criteria. These amendments were effective on 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. Storm water management and erosion and sediment control are discussed in Chapter 7.

Major Issues and Challenges

Georgia is one of the fastest growing states in the nation. The burgeoning population places considerable demands on Georgia's ground

and surface water resources in terms of water supply, water quality and assimilative capacity. The problems and issues are further complicated by the fact that surface water resources are limited in South Georgia and groundwater resources are limited in North Georgia. In some locations, the freshwater resources are approaching their sustainable limits. Thus, several key issues and challenges to be addressed now and in the future years include (1) minimizing withdrawals of water by increasing conservation, efficiency and ruse, (2) maximizing returns to the basin through reducing interbasin transfers and limiting use of septic tanks and land application of treated wastewater where water is limited, (3) meeting instream and offstream water demands through storage, aquifer management and reducing water demands, (4) protecting water quality by reducing wastewater discharges and runoff from land to below the assimilative capacity of the streams. The implementation of the Comprehensive Statewide Water Management Planning process in Georgia provides a framework for addressing each of the key issues.

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.

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.

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

Background. 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 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.

Responsibility. The legislation assigned the responsibility for developing the draft plan to the Georgia Environmental Protection (EPD) and established a planning oversight committee, the Georgia Water Council, composed of legislators, legislative appointees, and state agency heads with water related responsibilities. The EPD and the Georgia Water Council initiated work on the Comprehensive Management Plan shortly after the 2004 legislation was signed by Governor Perdue. The legislation called for the EPD 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

Stakeholder Participation. The process used to develop the statewide plan provided for meaningful participation, coordination, and cooperation among interested and affected stakeholders and citizens as well as all levels of governmental and other entities managing or utilizing water. 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.

Plan Development. The process of preparing the initial draft plan involved the preparation of draft policies for each of four management objectives: minimizing withdrawals, maximizing returns, meeting instream and offstream demands, and protecting water quality.

The policy options were drafted by the EPD, drawing on research from the Carl Vinson Institute of Government at the University of Georgia, and presented to each basin advisory committee for review and input. The input from the BACs was considered and appropriate changes were made in the policy options. The revised policy options were then presented to the State Advisory Committee for review and comment. The input from the SAC was considered and changes were made. Each of the policy option packages were then presented to the public for input at a series of Town Hall Meetings across the state hosted by the Water Council. Based on input from the Town Hall Meetings the policy option packages were revised once again and a final set of policy options emerged for each of the management planning priorities. The policy options packages served as the basis for the initial draft of the statewide water plan, "Georgia's Water Resources: A Blueprint for the Future" 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. EPD staff reviewed and summarized the initial input for the Water Council at its August, 2007 meeting. The Council discussed and

approved a number of revisions to the initial plan. A second draft of the plan was prepared and noticed for public input on September 13, 2007.

The Water Council hosted thirteen public hearings across Georgia in November 2007 to solicit public comment on the draft water plan. A working group of Water Council designees reviewed each comment submitted and made recommendations for revisions to the Water Council. The Water Council considered and acted on recommendations from the designees and deliberated on individual member suggestions. The Council voted on each proposed change 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 and solicit public input. The Water Council designees reviewed comments received and provided recommendations for changes to the Water Council. The Council reviewed the designee recommendations, discussed individual member suggestions and a vote was taken regarding each proposed change. Changes approved by the Water Council were made and a final draft of the plan was prepared and approved by the Water Council on January 8, 2008. 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 January 8, 2008 Water Council draft of the statewide water plan. Both chambers approved the plan on February 5. Governor Perdue signed HR1022, the Statewide Water Plan, on February 6, 2008. In signing the resolution, one of the Governor's comments was as follows; "Water management is one of the most critical issues facing Georgia today. This plan was created by an inclusive process, allowing all parties to contribute. Georgia now has a comprehensive, statewide plan for managing and conserving this precious resource." A copy of the plan is available at www.georgiawaterplanning.org.

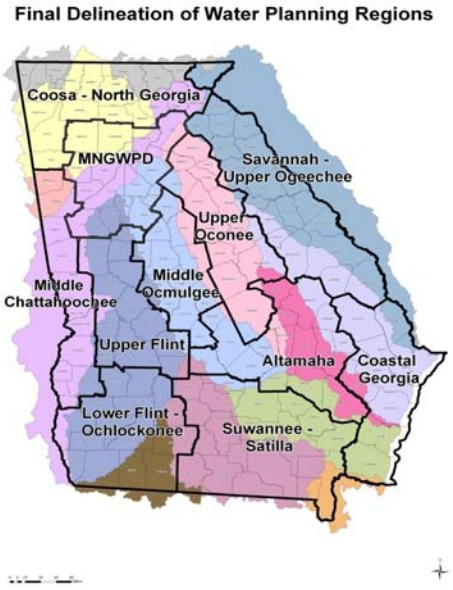
Statewide Water Plan Implementation Introduction. The State Water Plan ushered in a new era of comprehensive regional water planning for Georgia. Isolated regional water planning efforts aimed at addressing localized water challenges had been attempted in several regions in Georgia since the early 1970s, but not until the current directive from the Governor and Legislature has Georgia embarked upon statewide comprehensive regional water planning. Through the development of regional water plans, the regional water councils will determine the preferred water management practices to meet each region's future water resources needs. The recommended regional water plans, which will be submitted to the EPD in initial form by January 31, 2011 and final form by June 30, 2011, will identify a range of expected future water needs and management practices to meet those needs for each region.

Water Planning Councils. The water planning councils (Councils) represent regions in Georgia as designated in the 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 is a separate water planning entity created by the legislature in 2001 (O.C.G.A. §12-5-572), will participate in the planning process consistent with the State Water Plan and its enabling legislation.

The EPD supports the regional Councils, by providing guidance as well as contractors who specialize in water resource planning and working with public stakeholder groups.

The operation of each Council is defined in a Memorandum of Agreement (MOA) between the council, EPD, and the Georgia Department of Community Affairs (DCA). These agreements establish how each council conducts its affairs including the procedures for decision-making. Members of each of the state's ten regional water

planning councils met for a kick-off meeting on March 12, 2009 at the Georgia Aquarium in Atlanta where they were addressed by Governor Perdue and provided with a shared understanding of basic water resource issues, and the purposes and process for regional water planning council activities. Since that time, each regional council convened their first four meetings, taking place in May, June, September and November 2009 respectively. 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.

Regional Water Plans must support the region's (and state's) economy, protect the public health and natural systems, and enhance the quality of life for all citizens. In order to do so the Regional Water Plans must promote sustainable use, conservation and reuse of water, guard against a shortage of water, and promote the efficient use of the water resource. They must also be based upon detailed scientific analysis of the water resources, the projected future condition of the resources, current demand, and estimated future demands on the resource.

More detailed information on each individual regional water planning council can be found at www.georgiawaterplanning.org.

Resource Assessments

Introduction. The EPD with the assistance of other state agencies, the University System of Georgia and other research institutions, the U.S. Geological Survey and contractors is conducting water resource assessments to determine Surface Water Availability, Groundwater Availability, and Suface Water Quality. The assessments include modeling, monitoring, and the compilation and management of data. Assessments are being provided to each regional water planning council as a starting point for the development of a recommended Water Development and Conservation Plan (Regional Water Plan).

Groundwater Availability Assessment. This assessment will provide information on the ability of water from aquifers in Georgia to meet current and future needs. Together with the Surface Water Availability Assessment, they form the "consumptive use assessment" described in the State Water Plan.

The EPD prioritizes the aquifers for Groundwater Availability assessment based on the current condition of an aquifer and expected future demands on that aquifer. For the prioritized aquifers, EPD, with contractor support, is developing groundwater hydrogeologic models to determine sustainable yields (the amount of water that can be withdrawn without creating an unacceptable impact such as dropping aquifer level, salt-water intrusion, or significantly lowered surface water).

For the other aquifers, groundwater budget models, essentially input and output balances, were used to help establish a planning level assessment of groundwater resource sustainability. Management of

these aquifers will focus on monitoring of aquifer response, and the response of other connected water resources, to future increases in withdrawal.

Surface Water Availability Assessment. This assessement will measure the amount of water that can be used from the rivers and lakes of Georgia without substantially altering the desired hydrologic flow regime and the opportunities for both instream and offstream use of water supported by that flow regime.

EPD and its contractors are using the "River Basin Planning Tool," developed by the Georgia Water Resources Management Institute at Georgia Tech, to model flows in Georgia's river systems. The River Basin Planning Tool allows EPD to convert existing data on the 14 river basins in Georgia into smaller planning units or sub-basins, and measure the degree of deviation, if any, from the desired hydrologic flow regime with current and future water uses. Consumptive use refers to the amount of water used but not returned without undue delay from either surface water or groundwater.

Critical inputs for the model include: the desired flow of the river system, expected return of treated wastewater to the system, the desired water supply, and the amount of storage upstream.

Surface Water Quality Assessement. This assessment will model the capacity of Georgia's surface waters to absorb pollutants without unacceptable degradation of water quality. This process includes basic modeling of all of Georgia's 52 watersheds. More complex models are being developed for watersheds where the assimilative capacity may not be adequate to support projected needs for wastewater discharge or assimilation of nonpoint source pollution. The water quality models are being used to evaluate the impacts of forecasted wastewater flows, proposed discharge locations, and future land use patterns.

In January and February 2010, EPD conducted Joint Meetings of the Regional Water Planning Councils to present the preliminary results of the draft baseline resource assessments. In March 2010, EPD released for public review a synopsis of each of three draft water resource assessments. Refinements and adjustments to the draft water resource assessments are expected and will be based on input from regional water planning council members, interested groups, the general public and a scientific and engineering advisory panel.

Summaries of the Joint Meetings as well as the resource assessment synopsis are available at www.georgiawaterplanning.org.

Forecasting

Introduction. EPD is developing regional forecasts of water and wastewater demands. The four areas of major water use addressed in developing the required 10-, 20-, 30-, and 40-year forecasts of future regional water and wastewater demands are:

Agricultural Water Use
Municipal Water Use
Energy Water Use
Industrial Water Use

Because major land use changes can also affect the demands on water resources to assimilate pollutants, regional water councils will also be provided land use forecasts for these time frames.

Agricultural Water Use. Agricultural forecasts, by county, quantify the anticipated irrigation demand over the planning period for years 2011, 2020, 2030, 2040, and 2050. The University of Georgia, under contract to Georgia Environmental Protection Division, forecasted a range of irrigation demands.

Municipal Water Use. Experts under contract with EPD are producing the forecasts of municipal water and wastewater demand, which include residential, commercial, and light industrial water use. In the development of the municipal forecasting methodology, EPD and its contractors are consulting local governments, members of the regional

water planning councils and representatives of water and wastewater service providers.

One component of estimating future domestic water resource demand is population projections. Population projections for the counties in each water planning region will provide the basis for estimates of future growth. These projections are produced by the Governor's Office of Planning and Budget (OPB), the state agency charged with producing population projections. The municipal forecasting methodology also includes anticipated per capita water use rates for each county, the impact that transient populations may have on water and wastewater demands within the water planning region, and any necessary weather adjustments.

Energy Water Use. Experts under contract to EPD and with the input of a group of Georgia energy companies are forecasting the water needsfor the States energy sector. Forecasts will be developed for expected state-wide power demand, likely fuel sources to meet the demand, the water needs of those fuel sources, and finally the likely locations where those water demands may be met.

Industrial Water Use. Experts under contract to EPD are producing water and wastewater demand forecasts for the largest industrial water users in Georgia. In the development of the industrial forecasting methodology, EPD and its contractors are consulting representatives of the largest industrial water users. Depending on the data available, two alternate methodologies are used to forecast industrial water and wastewater needs. One methodology uses consideration of future growth in workforce (employment projections) for each of the industrial sectors, as an estimate of expected growth in industrial water use. The other methodology uses the growth in industrial output for each sector (where data were available), as an estimate of expected growth in industrial water use.

Water Development and Conservation Plans

The Water Development and Conservation Plans (Regional Water Plans) will be drafted by the regional planning councils. EPD will provide technical assistance to the Councils in preparation of Water Development and Conservation Plans. EPD will also contract for services needed to support the preparation of the plans. Regional planning councils will direct contractors' activities, including identification of water quantity and water quality management objectives and recommendation of appropriate management practices to meet those objectives.

Regional Water Plans will include forecasts through 2050 of population, and domestic and commercial water use, as well as a comparison of these forecasts with the water resource assessments for each region. Based on these comparisons, the Regional Water Plans will recommend regionally appropriate management practices. The plans will also outline additional data and information needs and determine benchmarks for assessing the effectiveness of each plan.

All of the water planning regions border other regions or share surface or groundwater resources with other regions; therefore, each regional planning council will interact extensively with adjacent, upstream and/or downstream Councils to ensure that the recommended practices do not negatively impact water users in other regions. Through an iterative process of recommendation and testing through the resource assessment models, the Councils will arrive at a set of management practices that they understand to meet the region's future needs while supporting the region's (and state's) economy, protecting the public health and natural systems, and enhancing the quality of life for all citizens.

Each Council will submit a draft Regional Water Plan to the Director of EPD, who will adopt the plan or suggest changes so that it can be adopted. The Regional Water Plans are to be finalized and adopted by June 30, 2011.

After a Regional Water Plan is adopted for a region, all EPD permits and Georgia Environmental Facilities Authority (GEFA) grants and loans for water projects must be guided by the Plan.

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 an 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, 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. Figure 1 shows the monitoring network stations for the sample collection period 2008-2009.

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	290μg/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	0.0036μg/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	990μg/l
2.	Acenaphthylene	**
3.	Acrolein	9.3μg/l
4.	Acrylonitrile	0.25μg/l
5.	Aldrin	0.000050 μg/l
6.	Anthracene	40000μg/l
7.	Antimony	640μg/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	0.018μg/l
11.	Benzo(a)Pyrene	0.018μg/l
12.	3,4-Benzofluoranthene	0.018μg/l
13.	Benzene	51μg/l
14.	Benzo(ghi)Perylene	**
15.	Benzo(k)Fluoranthene	0.018μg/l
16.	Beryllium	**
17.	a-BHC-Alpha	0.0049μg/l
18.	b-BHC-Beta	0.017μg/l
19.	Bis(2-Chloroethyl)Ether	0.53μg/l
20.	Bis(2-Chloroisopropyl)Ether	65000μg/l
21.	Bis(2-Ethylhexyl)Phthalate	2.2 μg/l
22.	Bromoform (Tribromomethane)	140μg/l
23.	Butylbenzyl Phthalate	1900 μg/l
24.	Carbon Tetrachloride	1.6μg/l
25.	Chlorobenzene	1600μg/l
26.	Chlorodibromomethane	13μg/l
27.	2-Chloroethylvinyl Ether	**
28.	Chlordane	0.00081μg/l
29.	Chloroform (Trichloromethane)	470 μg/l
30.	2-Chloronaphthalene	1600μg/l
31.	2-Chlorophenol	150μg/l
32.	Chrysene	0.018μg/l
33.	Dibenzo(a,h)Anthracene	0.018μg/l
34.	Dichlorobromomethane	17μg/l
35.	1,2-Dichloroethane	37μg/l
36.	1,1-Dichloroethylene	7100 μg/l
37	1,2 – Dichloropropane	15μg/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
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 ug/l at mid-river at U.S. Highway 82 or 15 ug/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 ug/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 ug/l
2. Allatoona creek upstream form I-75	10 ug/l
3. Mid-Lake downstream from Kellogg Creek	10 ug/l
4. Little River upstream from Highway 205	15 ug/l
5. Etowah River upstream from Sweetwater Creek	12 ug/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 ug/l
2.Upstream from the Flowery Branch confluence	5 ug/
3.At Browns Bridge Road (State Road 369)	5 ug/l
4.At Bolling Bridge (State Road 53) on Chestatee River	10 ug/l
5.At Lanier Bridge (State Road 53) on Chattahoochee River	10 ug/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 ug/l
2. Carters Lake at Coosawattee River embayment mouth	10 ug/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

A list of the Statewide trend monitoring network stations, which consists of the "core" stations that are sampled every year, is presented in Table 3-6. In 2008, flow monitoring was conducted at three additional locations: Mountaintown Creek, Hannahatchee Creek and Pataula Creek. In March 2008 GAEPD installed a continuous water quality monitor at Capps Ferry south of Metro Atlanta. The monitor records dissolved oxygen, pH, temperature and conductivity data every 15 mins. The data collected is updated every week and uploaded to GAEPD's website.

In addition to work done through cooperative agreements, GAEPD associates collect monthly samples from a number of locations across the state as part of the rotating basin program. Table 3-5 provides the focused monitoring years for Georgia's major river basins since the rotating river basin strategy was employed.

In 2005, water quality monitoring efforts were intensified in locations where data was needed

During the calendar years 2005 and 2006, data was collected in the Coosa River Basin to support the development of a Dissolved Oxygen and Temperature model for the Coosa River at the State Line. During 2007 and 2008, additional data collection efforts are being focused on Lake Lanier and Carters Lake for TMDL development of nutrient criteria. In 2009 GAEPD added additional staff in Tifton, GA. This was to expand and develop GAEPD's water quality monitoring network in order to provide better spatial coverage and flexibility water quality monitoring.

Figure 1 shows the monitoring network stations for the sample collection period 2008-2009. A list of the Statewide 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 2008 and 2009 rotating basin networks.

TABLE 3-5. MAJOR RIVER BASIN MONITORING GROUPS

Major River Basin Grouping	Focus Year for Water Quality Monitoring
Chattahoochee, Flint	1995; 2000; 2006; 2010
Coosa, Tallapoosa, Oconee	1996; 2001; 2011
Savannah, Ogeechee	1997; 2002; 2007; 2012
Ochlockonee, Satilla, St. Marys, Suwannee	1998; 2003; 2008, 2013
Altamaha, Ocmulgee, Oconee	1999; 2004; 2009; 2014

FIGURE 1
GEORGIA TREND AND LAKE TRIBUTARY MONITORING NETWORK (USGS & CWW)
STATION LOCATIONS 2008-2009

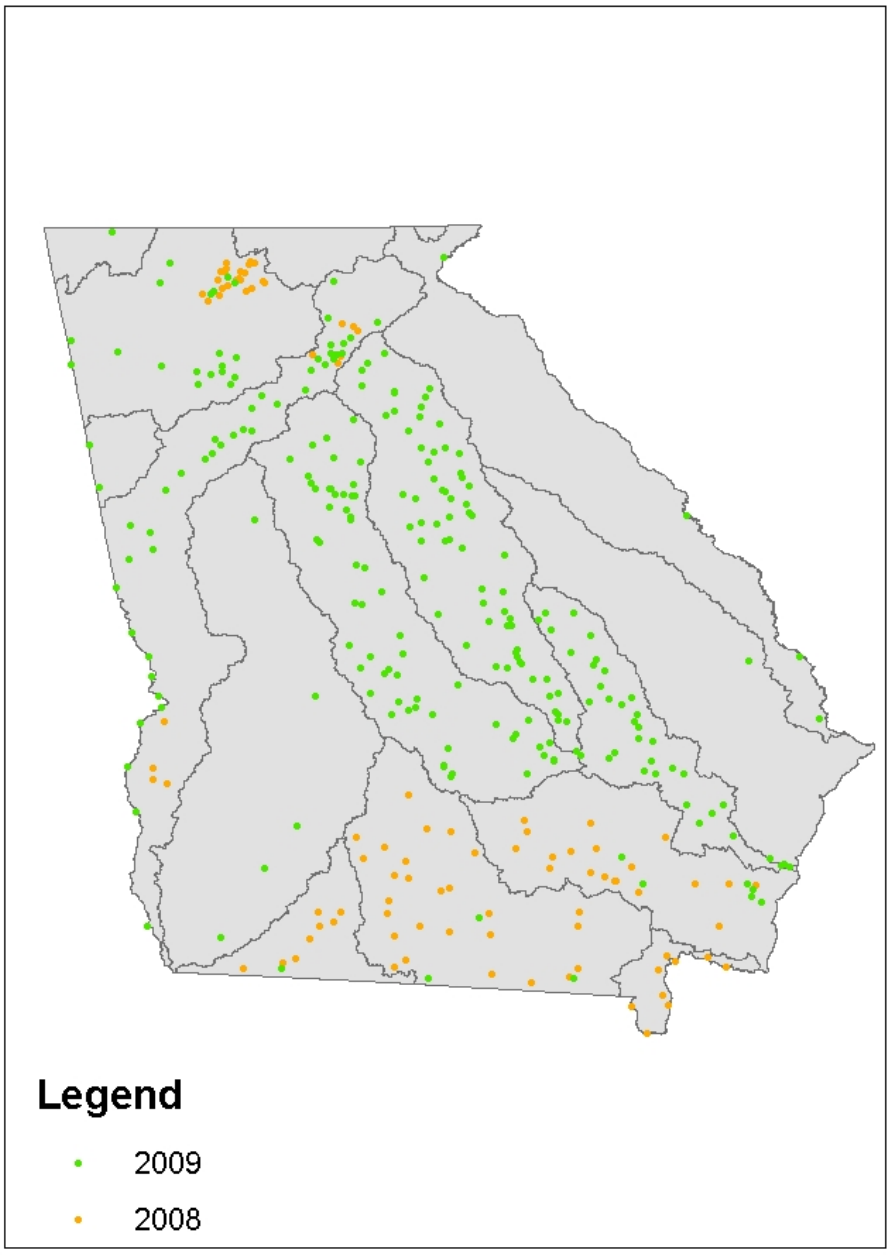


TABLE 3-6. STATEWIDE TREND MONITORING NETWORK (CORE): RIVERS/STREAMS; LAKES/RESERVOIRS

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.

Station Number	Location	River Basin	Parameters[1]
01001001	Chattooga River - U.S. Highway 76 near Clayton, GA	Savannah	Standard
01011001	Savannah River - 0.5 Mile Downstream from Spirit Creek	Savannah	Standard
01014001	Savannah River - Seaboard Coast Line Railway, North of Clyo	Savannah	Standard
02023001	Ogeechee River - GA Highway 24 nr Oliver, GA	Ogeechee	Standard
03035001	Oconee River at Barnett Shoals Road near Athens, GA	Oconee	Standard
03051001	Oconee River at Interstate Highway 16 near Dublin, GA	Oconee	Standard
04220111	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Ocmulgee	Standard
04500001	Lake Jackson - Dam Forebay	Ocmulgee	Standard
05009901	Ocmulgee River - New Macon Water Intake	Ocmulgee	Standard
05015001	Ocmulgee River - 6.0 Miles Downstream from Tobesofkee Creek	Ocmulgee	Standard
05025001	Ocmulgee River - U.S. Highway 341 at Lumber City	Ocmulgee	Standard
06016001	Altamaha River - 6.0 Miles Downstream From Doctortown	Altamaha	Standard
07021001	Satilla River - GA Highways 15 and 121	Satilla	Standard
09001001	Suwannee River - U.S. Highway 441 near Fargo, GA	Suwannee	Standard
09044501	Withlacoochee River at Clyattsville-Nankin Rd nr Clyattsville, GA	Suwannee	Standard
10017001	Ochlockonee River @ Hadley Ferry Rd. nr Calvary, GA	Ochlockonee	Standard
11018001	Flint River at State Road 92 near Griffin, GA	Flint	Standard
11060011	Flint River at SR 26 near Montezuma	Flint	Standard
11090401	Flint River at State Road 234 near Albany, GA	Flint	Standard
11102001	Flint River at State Road 37 at Newton, GA	Flint	Standard
11109001	Flint River at U.S. Highway 27-B near Bainbridge, GA	Flint	Standard
12030141	West Fork Little River at Jess Helton Road near Clermont, GA	Chattahoochee	Standard
12030151	East Fork Little River at Honeysuckle Road near Clermont, GA	Chattahoochee	Standard
12030161	Lake Sidney Lanier - Little River Embayment, Betw M1WC & 3LR	Chattahoochee	Standard
12030171	Wahoo Creek at Ben Parks Road near Murrayville, GA	Chattahoochee	Standard
12030201	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Chattahoochee	Standard
12033201	Dicks Creek at Forest Service Road 144-1 near Neels Gap, GA	Chattahoochee	Standard
12037001	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Chattahoochee	Standard
12038001	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Chattahoochee	Standard
12038610	Balus Creek at McEver Road near Oakwood, GA	Chattahoochee	Standard
12038651	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Chattahoochee	Standard
12038681	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Chattahoochee	Standard
12038781	Mud Creek at McEver Road near Flowery Branch, GA	Chattahoochee	Standard
12039601	Sixmile Creek at Burrus Mill Road near Coal Mountain, GA	Chattahoochee	Standard
12038801	Lake Sidney Lanier - Mud Crk Embayment, Betw Marina & Ramp	Chattahoochee	Standard
12039401	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Chattahoochee	Standard
12039621	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E		Standard

Station Number	Location	River Basin	Parameters[1]
	M9SM	Chattahoochee	
12040001	Lake Sidney Lanier upstream of Buford Dam Forebay	Chattahoochee	Standard
12048001	Chattahoochee River at McGinnis Ferry Road	Chattahoochee	Standard
12055001	Chattahoochee River - DeKalb County Water Intake	Chattahoochee	Standard
12060001	Big Creek at Roswell Water Intake near Roswell, GA	Chattahoochee	Standard
12070001	Chattahoochee River at Cobb County Water Intake near Roswell	Chattahoochee	Standard
12080001	Chattahoochee River - Atlanta Water Intake	Chattahoochee	Standard
12090001	Peachtree Creek at Northside Drive near Atlanta, GA	Chattahoochee	Standard
12106001	Chattahoochee River at Bankhead Highway	Chattahoochee	Standard
12120001	Sweetwater Creek at Interstate Highway 20	Chattahoochee	Standard
12140001	Chattahoochee River - GA Highway 92	Chattahoochee	Standard
12180001	West Point Lake at LaGrange Water Intake near LaGrange, Georgia (aka Chatt. River at Lagrange Intake)	Chattahoochee	Standard
12189001	West Point Lake - Dam Forebay	Chattahoochee	Standard
12210001	Chattahoochee River upstream from Bartlett's Ferry Dam	Chattahoochee	Standard
12212001	Lake Oliver (Columbus Water Intake near Columbus, GA)	Chattahoochee	Standard
12216001	Chattahoochee River - Downstream from Columbus WTF	Chattahoochee	Standard
12218001	Chattahoochee River - Downstream Oswichee Creek	Chattahoochee	Standard
12218501	Chattahoochee River at Hichitee Creek (River Mile 127.6)	Chattahoochee	Standard
12219001	Chattahoochee River at Spur 39 near Omaha, GA (Seaboard RR)	Chattahoochee	Standard
12219101	Lake Walter F. George at U.S. Highway 82 (aka Chatt. River at Hwy 82)	Chattahoochee	Standard
12219501	Lake Walter F. George at Dam Forebay	Chattahoochee	Standard
12230001	Chattahoochee River at State Road 91 near Steam Mill, GA	Chattahoochee	Standard
13010001	Little Tallapoosa River - GA Highway 100 near Bowden, GA	Tallapoosa	Standard
14010051	Conasauga at U.S. Highway 76 near Dalton, GA	Coosa	Standard
14030001	Conasauga River at Tilton Bridge near Tilton, GA	Coosa	Standard
14119301	Carters Lake (CR1) - Upper Lake, Coosawattee Arm	Coosa	Standard
14119401	Carters Lake - Midlake (upstream from Woodring Branch)	Coosa	Standard
14250001	Oostanaula River at Rome Water Intake near Rome, GA	Coosa	Standard
14302001	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Coosa	Standard
14304801	Lake Allatoona at Little River upstream from Highway 205	Coosa	Standard
14305801	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Coosa	Standard
14307501	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Coosa	Standard
14309001	Lake Allatoona Upstream from Dam	Coosa	Standard
14330001	Etowah River at Hardin Bridge (FAS 829) near Euharlee, GA	Coosa	Standard
14450001	Coosa River - GA/Alabama State Line Monitor near Cave Springs	Coosa	Standard
14560001	Chattooga River at Holland-Chattoogaville Rd (FAS1363)	Coosa	Standard
15090001	West Chickamauga Creek - GA Highway 146 near Ringgold, GA	Tennessee	Standard

[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 2008

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 on a five-year rotational schedule. Samples are collected quarterly for non-standard basin lakes and reservoirs within the river basin of focus for the calendar year.

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1202110104	Lake Harding - Dam Forebay (aka Chatt. River US Bartletts Ferry Dam)	Columbus WW	Lake	-85.0903	32.6633
1202130502	Lake Oliver (aka Chatt River at Columbus Water Intake near Columbus, Ga.)	Columbus WW	Lake	-84.9983	32.5214
1203010104	Chattahoochee River - Downstream from Columbus WTF	Columbus WW	Stream	-84.9803	32.4089
1203060101	Chattahoochee River - Downstream Oswichee Creek	Columbus WW	Stream	-84.9369	32.3
1203060601	Chattahoochee River at Hichitee Creek (River Mile 127.6)	Columbus WW	Stream	-84.9232	32.23083
0102060101	Chattooga River - U.S. Highway 76 near Clayton, Ga.	USGS	Stream	-83.3064	34.81398
0106050209	Savannah River - 0.5 Mile Downstream from Spirit Creek	USGS	Stream	-81.9153	33.3306
0109020701	Savannah River - Seaboard Coast Line Railway, North of Clyo	USGS	Stream	-81.264	32.525
0109060602	Savannah River - U.S. Highway 17 (Houlihan Bridge)	USGS	Stream	-81.1539	32.16583
0202030701	Ogeechee River - Georgia Highway 24 nr Oliver, Ga.	USGS	Stream	-81.5558	32.49475
0301060102	Oconee River at Barnett Shoals Road near Athens, Ga.	USGS	Stream	-83.3265	33.8562
0302090102	Oconee River at Interstate Highway 16 near Dublin, Ga.	USGS	Stream	-82.8582	32.48037
0403030501	South River at Island Shoals Road near Snapping Shoals, Ga.	USGS	Stream	-83.9271	33.45265
0403060301	Yellow River - Georgia Highway 212 near Stewart, GA	USGS	Stream	-83.8813	33.45427
0403080201	Alcovy River - Newton Factory Bridge Road near Stewart	USGS	Stream	-83.8283	33.4494
0403090301	Tussahaw Creek at Fincherville Road near Jackson, Ga.	USGS	Stream	-83.9634	33.37887
0503160201	Ocmulgee River - New Macon Water Intake	USGS	Stream	-83.6641	32.89925
0504030101	Ocmulgee River at Hawkinsville, GA	USGS	Stream	-83.4628	32.28176
0504080601	Ocmulgee River - U.S. Highway 341 at Lumber City	USGS	Stream	-82.6743	31.91993
0606040104	Altamaha River - 6.0 Miles Downstream From Doctortown	USGS	Stream	-81.7653	31.6233
0701070405	Satilla River - Georgia Highways 15 and 121	USGS	Stream	-82.1625	31.2167

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
0901010508	Suwannee River - U.S. Highway 441 near Fargo, Ga.	USGS	Stream	-82.5606	30.6806
0902020501	Deep Creek at County Road 250 near Rebecca, Ga.	USGS	Stream	-83.5058	31.73222
0902040101	Alapaha River at State Road 35 near Tifton, Ga.	USGS	Stream	-83.3992	31.5325
0902060201	Reedy Creek at County Road 57 (Firecracker Road) near Ocilla, Ga.	USGS	Stream	-83.261	31.51565
0903020301	New River at State Road 76 near Nashvillel, Ga	USGS	Stream	-83.3222	31.17694
0903050203	Okapilco Creek at Wesley Chapel Road near Berlin, GA	USGS	Stream	-83.6303	31.04722
0903050402	Okapilco Creek at Coffee Road near Morven, GA	USGS	Stream	-83.5867	30.91667
0903060301	Okapilco Creek - U.S. Highway 84 near Quitman, Ga.	USGS	Stream	-83.5258	30.78611
0903070302	Piscola Creek at SR 76 near Quitman, GA	USGS	Stream	-83.5911	30.745
0903080302	Withlacoochee River at Clyattsville-Nankin Road near Clyattsville, Ga.	USGS	Stream	-83.3947	30.67472
0904010601	Little River at County Road 424 (Omega-Eldorado Road) near Omega, Ga.	USGS	Stream	-83.5217	31.35083
0904010602	Little River at County Road 246 (Kinard Bridge Road) near Lenox, Ga.	USGS	Stream	-83.5089	31.25417
0904020302	Ty Ty Creek at Woods Road near Ty Ty, GA	USGS	Stream	-83.6422	31.43278
0904020501	Ty Ty Creek at Livingston Bridge Rd. near Omega, GA	USGS	Stream	-83.5853	31.26861
0904030201	Town Creek at County Road 169 near Sylvester, Ga.	USGS	Stream	-83.8061	31.48667
0904030501	Warrior Creek at Sumner Road near Norman Park, GA	USGS	Stream	-83.7688	31.36283
0904040402	Bear Creek at Cannon Road near Berlin, GA	USGS	Stream	-83.6239	31.12194
0904050301	Little River at S-1780 (Morven Road) near Hahira, Ga.	USGS	Stream	-83.4425	30.97306
1002010501	Ochlockonee River at Zion Grove Church Rd. near Coolidge, GA	USGS	Stream	-83.8995	31.0565
1002030102	Ochlockonee River at SR 188 near Coolidge, GA	USGS	Stream	-83.9392	31.00222
1002040401	Little Ochlockonee River at State Rd 188 nr Ochlockonee, GA	USGS	Stream	-84.02	30.97667
1002040502	Big Creek at Stage Road near Meigs, GA	USGS	Stream	-84.0247	31.05889
1002050401	Barnetts Creek at Pendergast Rd. / Old Thomasville Rd. near Thomasville, GA	USGS	Stream	-84.0763	30.90607
1002070301	Ochlockonee River - SR 93 near Cairo, GA	USGS	Stream	-84.155	30.79167

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1002080401	Tired Creek at County Road 151 near Reno, GA	USGS	Stream	-84.2294	30.76361
1003010102	Ochlockonee River @ Hadley Ferry Rd. nr Calvary, Ga.	USGS	Stream	-84.2355	30.73172
1003020201	Attapulgus Creek at U.S. Hwy 27 near Attapulgus, GA	USGS	Stream	-84.4536	30.73278
1105010601	Flint River at State Road 92 near Griffin, Ga.	USGS	Stream	-84.3931	33.3089
1106010701	Flint River at SR 26 near Montezuma	USGS	Stream	-84.0441	32.29295
1108010102	Flint River at State Road 234 near Albany, Ga.	USGS	Stream	-84.1463	31.5524
1108040101	Flint River at State Road 37 at Newton, Ga.	USGS	Stream	-84.335	31.30944
0904010602	Little River at County Road 246 (Kinard Bridge Road) near Lenox, Ga.	USGS	Stream	-83.5089	31.25417
1108070302	Flint River at U.S. Highway 27-B near Bainbridge, GA.	USGS	Stream	-84.5805	30.91095
1201030401	Chattahoochee River at Belton Bridge Road near Lula, GA	USGS	Stream	-83.6842	34.44515
1201050101	Dicks Creek at Forest Service Road 144-1 near Neels Gap, Ga.	USGS	Stream	-83.9372	34.6797
1201060401	Chestatee River at State Road 400 near Dahlonega, GA	USGS	Stream	-83.9689	34.46667
1201080302	Flat Creek at McEver Road near Gainesville, GA	USGS	Stream	-83.885	34.26583
1202050501	New River at State Road 100 near Corinth, Ga.	USGS	Stream	-84.9878	33.23528
1202060101	Chattahoochee River at U.S. Highway 27 near Franklin, Ga.	USGS	Stream	-85.1	33.2792
1202060802	West Point Lake at LaGrange Water Intake near LaGrange, Ga. (aka Chatt. River at Lagrange Intake)	USGS	Lake	-85.1108	33.0783
1202070301	Yellow Jacket Creek at Hammet Road near Hogansville, GA	USGS	Stream	-84.9753	33.13917
1203060602	Chattahoochee River at Spur 39 near Omaha, Ga. (Seaboard RR)	USGS	Stream	-85.0453	32.1436
1203070501	Hannahatchee Creek at Toby Road near Union, Ga.	USGS	Stream	-84.9058	32.15278
1203140501	Hodghodkee Creek at Lower Lumpkin Road near Georget, GA	USGS	Stream	-84.9733	31.88639
1203150701	Holanna Creek at CR 31 near Springdale, GA	USGS	Stream	-84.8947	31.79833
1203150801	Pataula Creek at State Road 50 near Georgetown, Ga.	USGS	Stream	-84.9739	31.81833
1204080101	Chattahoochee River at State Road 91 near Steam Mill, Ga.	USGS	Stream	-85.0053	30.9775
1308020601	Tallapoosa River - Georgia Highway 8 below Tallapoosa, Ga.	USGS	Stream	-85.3364	33.74083
1308090601	Little Tallapoosa River - Georgia Highway 100 near Bowden, Georgia	USGS	Stream	-85.2792	33.49278

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1401020703	Conasauga at U.S. Highway 76 near Dalton, Ga.	USGS	Stream	-84.873	34.783
1401050106	Conasauga River at Tilton Bridge near Tilton, Ga.	USGS	Stream	-84.9283	34.6667
1402030502	Mountaintown Creek at State Road 282 (US Hwy 76) near Ellijay, Ga.	USGS	Stream	-84.5398	34.70338
1402040103	Coosawattee River at Georgia Highway 5 near Ellijay, Ga.	USGS	Stream	-84.5002	34.6717
1403060401	Oostanaula River at Rome Water Intake near Rome, Ga.	USGS	Stream	-85.1733	34.2703
1404060301	Etowah River at State Road 5 spur near Canton, Ga.	USGS	Stream	-84.4944	34.23972
1404070401	Shoal Creek at State Road 108 (Fincher Rd.) near Waleska, Ga.	USGS	Stream	-84.5956	34.26083
1404080802	Noonday Creek at Georgia Highway 92 (prorate for North Rope Mill Rd.) near Woodstock, Ga.	USGS	Stream	-84.5294	34.08547
1404080904	Little River at Georgia Highway 5 near Woodstock, Ga.	USGS	Stream	-84.5043	34.1222
1404150101	Etowah River at Hardin Bridge (FAS 829) near Euharlee, Ga.	USGS	Stream	-84.9251	34.18886
1405010601	Coosa River - Georgia/Alabama State Line Monitor near Cave Springs, Ga.	USGS	Stream	-85.4439	34.1983
1405050401	Chattooga River at Holland-Chattoogaville Road (FAS1363) near Lyerly, Ga.	USGS	Stream	-85.4453	34.3356
1501080101	West Chickamauga Creek - Georgia Highway 146 near Ringgold, Ga.	USGS	Stream	-85.2056	34.9572
0302080102	Oconee River - Beaver Dam WMA u/s CR 597 near Wrightsville, GA	Atlanta WP	Stream	-82.9403	32.69798
0302090102	Oconee River at Interstate Highway 16 near Dublin, Ga.	Atlanta WP	Stream	-82.8582	32.48037
0302090103	Oconee River - 1.5mi u/s U.S. Hwy 80, Dublin, GA	Atlanta WP	Stream	-82.8798	32.5602
0302090104	Oconee River 1.8 mi d/s U.S. Hwy 80, Dublin, GA	Atlanta WP	Stream	-82.8853	32.5194
0302090105	Oconee River- 1.08 mi u/s I-16/SR 44 near Dublin, Ga	Atlanta WP	Stream	-82.8683	32.49158
0403090302	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Atlanta WP	Lake	-83.8633	33.36823
0403090306	Lake Jackson - Dam Forebay	Atlanta WP	Lake	-83.8409	33.322
1201040101	Wahoo Creek at Ben Parks Road near Murrayville, GA	Atlanta WP	Stream	-83.8862	34.43483
1201040201	West Fork Little River at Jess Helton Road near Clermont, GA	Atlanta WP	Stream	-83.8213	34.41528
1201040301	East Fork Little River at Honeysuckle Road near Clermont, GA	Atlanta WP	Stream	-83.7979	34.39406
1201040404	Lake Sidney Lanier - Little River Embayment, Betw M1WC & 3LR	Atlanta WP	Lake	-83.8427	34.355

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1201070501	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Atlanta WP	Lake	-83.9501	34.31235
1201080103	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Atlanta WP	Lake	-83.8802	34.32195
1201080203	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Atlanta WP	Lake	-83.9507	34.26167
1201080304	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Atlanta WP	Lake	-83.9198	34.2587
1201080306	Balus Creek at McEver Road near Oakwood, GA	Atlanta WP	Stream	-83.8929	34.25042
1201080307	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Atlanta WP	Lake	-83.9244	34.2504
1201080401	Lake Sidney Lanier - Mud Crk Embayment, Betw Marina & Ramp	Atlanta WP	Lake	-83.9373	34.2333
1201080402	Mud Creek at McEver Road near Flowery Branch, GA	Atlanta WP	Stream	-83.9148	34.20594
1201080403	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Atlanta WP	Lake	-83.9829	34.20028
1201080601	Sixmile Creek at Burrus Mill Road near Coal Mountain, GA	Atlanta WP	Stream	-84.0578	34.25911
1201080603	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E M9SM	Atlanta WP	Lake	-84.0287	34.2335
1201080902	Lake Sidney Lanier upstream of Buford Dam Forebay	Atlanta WP	Lake	-84.0671	34.16278
1201090205	Chattahoochee River at McGinnis Ferry Road	Atlanta WP	Stream	-84.0977	34.05056
1201090705	Chattahoochee River - DeKalb County Water Intake	Atlanta WP	Stream	-84.2631	33.9731
1201110101	Big Creek at Roswell Water Intake near Roswell, Ga.	Atlanta WP	Stream	-84.3525	34.01785
1201110109	Chattahoochee River at Cobb County Water Intake near Roswell, Ga.	Atlanta WP	Stream	-84.405	33.9443
1201110609	Chattahoochee River - Atlanta Water Intake	Atlanta WP	Stream	-84.455	33.8278
1201120403	Peachtree Creek at Northside Drive near Atlanta, Ga.	Atlanta WP	Stream	-84.4078	33.8194
1202010104	Chattahoochee River at Bankhead Highway	Atlanta WP	Stream	-84.5078	33.79528
1202010402	Chattahoochee River @ Sr 6 (Camp Creek Pkwy / Thorton Rd.) near Lithia Springs, GA	Atlanta WP	Stream	-84.5826	33.73734
1202020802	Sweetwater Creek at Interstate Highway 20	Atlanta WP	Stream	-84.6147	33.7728
1202030101	Chattahoochee River at State Road 166 near Ben Hill, Ga.	Atlanta WP	Stream	-84.6303	33.69278
1202030102	Chattahoochee River - Georgia Highway 92	Atlanta WP	Stream	-84.6736	33.6567
1202031202	Chattahoochee River at Capps Ferry Road near Rico, Ga.	Atlanta WP	Stream	-84.8086	33.5778

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1202040101	Chattahoochee River at State Road 16 near Whitesburg, Ga.	Atlanta WP	Stream	-84.9011	33.4769
1202060802	West Point Lake at LaGrange Water Intake near LaGrange, Ga. (aka Chatt. River at Lagrange Intake)	Atlanta WP	Lake	-85.1108	33.0783
1202080208	West Point Lake - Dam Forebay	Atlanta WP	Lake	-85.1834	32.9208
1203130102	Lake Walter F. George at U.S. Highway 82 (aka Chatt. River at Hwy 82)	Atlanta WP	Lake	-85.1208	31.89194
1203160102	Lake Walter F. George at Dam Forebay	Atlanta WP	Lake	-85.0725	31.62917
1402010401	Royston Creek at Big Creek Road	Atlanta WP	Stream	-84.3374	34.67517
1402010402	Tickanetly Creek at Macedonia Road	Atlanta WP	Stream	-84.3336	34.66946
1402010404	Cartecay River at Lower Cartecay Road	Atlanta WP	Stream	-84.4089	34.63861
1402010502	Clear Creek at Blackberry Mountain Road	Atlanta WP	Stream	-84.437	34.61959
1402010601	Cartecay River at State Road 2 Connector near Ellijay, Ga.	Atlanta WP	Stream	-84.4744	34.6858
1402020201	Elijay River at Goose Island Road	Atlanta WP	Stream	-84.4102	34.78772
1402020202	Rock Creek at Rock Creek Road	Atlanta WP	Stream	-84.39	34.7785
1402020301	Boardtown Creek at Whitepath Road	Atlanta WP	Stream	-84.4199	34.77253
1402020401	Big Turniptown Creek at Northcutt Road	Atlanta WP	Stream	-84.445	34.72762
1402020501	Kells Creek at Kells Ridge Drive	Atlanta WP	Stream	-84.4741	34.73064
1402020502	Ellijay River at SR 52 (River Street) near Ellijay, Ga.	Atlanta WP	Stream	-84.4784	34.69204
1402030101	Mountaintown Creek at CR64 (Sam Hill Road)	Atlanta WP	Stream	-84.5546	34.78419
1402030201	Little Mountaintown Creek at Hidden Valley Trail	Atlanta WP	Stream	-84.5521	34.75288
1402030301	Conasauga Creek at Mountaintown Road	Atlanta WP	Stream	-84.5644	34.73055
1402030401	Davis Creek at Private Drive off Mountaintown Road	Atlanta WP	Stream	-84.5804	34.73514
1402030501	Mountaintown Creek at Craigtown Road	Atlanta WP	Stream	-84.5618	34.73225
1402030502	Mountaintown Creek at State Road 282 (US Hwy 76) near Ellijay, Ga.	Atlanta WP	Stream	-84.5398	34.70338
1402040104	Coosawattee River at Industrial Blvd at Ellijay, GA	Atlanta WP	Stream	-84.4924	34.68264
1402040201	Coosawattee River at Bridge in Coosawattee Resort	Atlanta WP	Stream	-84.5422	34.65554
1402040202	Flat Creek at SR 382	Atlanta WP	Stream	-84.5744	34.63985
1402040301	Tails Creek at SR282 / US Hwy 76 near Ellijay, Ga.	Atlanta WP	Stream	-84.6002	34.68618
1402040401	Carters Lake (CR1) - Upper Lake, Coosawattee Arm	Atlanta WP	Lake	-84.6212	34.62087
1402040402	Carters Lake - Midlake (upstream from Woodring Branch)	Atlanta WP	Lake	-84.638	34.6076

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1402040403	Harris Creek at East Harris Branch Road	Atlanta WP	Stream	-84.5947	34.59796
1402050802	Reregulation Reservoir (for Carters Lake) upstream Dam	Atlanta WP	Lake	-84.6928	34.60269
1402050803	Talking Rock Creek at Talking Rock Resort Community	Atlanta WP	Stream	-84.6606	34.56184
1404080902	Lake Allatoona at Little River upstream from Highway 205	Atlanta WP	Lake	-84.5772	34.15861
1404090401	Lake Allatoona Upstream from Dam	Atlanta WP	Lake	-84.7258	34.16083
1404090404	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Atlanta WP	Lake	-84.7114	34.08583
1404100104	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Atlanta WP	Lake	-84.5778	34.19
1404100409	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Atlanta WP	Lake	-84.6392	34.13861
0701020301	Satilla River at SR 135 near	Brunswick WP	Stream	-82.8889	31.42529
0701030102	Satilla River at CR 247 Minchew Road near	Brunswick WP	Stream	-82.7011	31.30792
0701040101	Broxton Creek at County Road 358 (Broxton Road) near Douglas, Ga.	Brunswick WP	Stream	-82.8431	31.58194
0701050101	Seventeen Mile River at SR32 / U.S. Hwy 121 near Douglas, GA	Brunswick WP	Stream	-82.8239	31.51958
0701060102	Seventeen Mile River - Georgia Highway 64 near Pearson, Ga.	Brunswick WP	Stream	-82.6788	31.37333
0701060401	Hog Creek at County Road 467 (Telmore-Dixie Union Road) at Bickley, Ga.	Brunswick WP	Stream	-82.5731	31.40472
0701070201	Cox Creek at Pineview Church Road near Waycross, GA	Brunswick WP	Stream	-82.4618	31.28698
0701070302	Kettle Creek at Hwy 1 near Waycross, GA	Brunswick WP	Stream	-82.3782	31.25705
0701070402	Satilla River - U.S. Highway 82 near Waycross, Ga.	Brunswick WP	Stream	-82.3247	31.23806
0701070403	Waycross Drainage Canal, 100ft u/s of Mouth, Waycross, Ga	Brunswick WP	Stream	-82.3198	31.23283
0701070501	Big Creek at SR 520 / U.S. Hwy 82 near Hoboken, Ga.	Brunswick WP	Stream	-82.1881	31.17444
0701090401	Little Hurricane Creek at Hwy 1 near Waycross, GA	Brunswick WP	Stream	-82.4328	31.42348
0701100101	Hurricane Creek - U.S. Highway 1 Near Alma	Brunswick WP	Stream	-82.4639	31.56667
0701100401	Alabaha River at US Hwy 84 near Blackshear, Ga.	Brunswick WP	Stream	-82.2257	31.31625
0701110202	Satilla River - U.S. Highway 82 nr Atkinson, Ga. (formerly identified as Hwy 84)	Brunswick WP	Stream	-81.8675	31.22111
0701120101	Satilla River at U.S. Highway 17 at Woodbine, Ga.	Brunswick WP	Stream	-81.7258	30.97444
0702040402	Little Satilla Creek at County Road 390 (Nine Run Road) near Screven, Ga.	Brunswick WP	Stream	-82.0325	31.49028
0703010201	Turtle River at SR 99 near	Brunswick WP	Stream	-81.6687	31.21588

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
0703020102	Yellow Bluff Creek at U.S. 25 near Brunswick, GA	Brunswick WP	Stream	-81.5169	31.21508
0804010201	North Prong Saint Marys River at State Road 94 at Moniac, Ga.	Brunswick WP	Stream	-82.2306	30.5175
0804010202	North Prong Saint Marys River at State Road 121 near Macclenny, Florida	Brunswick WP	Stream	-82.135	30.36194
0804020201	Boone Creek at State Road 121 near Saint George, Ga.	Brunswick WP	Stream	-82.0531	30.57611
0804020202	Saint Marys River at State Road 94 at Saint George, Ga.	Brunswick WP	Stream	-82.0186	30.52444
0804030201	Corn House Creek at State Road 121 near Saint George, Ga.	Brunswick WP	Stream	-82.0708	30.72278
0804030401	Spanish Creek at State Road 121 near Folkston, Ga.	Brunswick WP	Stream	-82.0278	30.80278
0804040102	Horsepen Creek at County Road 55 (Greenville Road) near Kingsland, Ga.	Brunswick WP	Stream	-81.7947	30.795
0804040103	Saint Marys River - U.S. Highway 301 near Folkston, Ga.	Brunswick WP	Stream	-81.9789	30.77639
0804040202	Saint Marys River at U.S. Highway 17 near Gross, Florida	Brunswick WP	Stream	-81.6881	30.74139
0901010502	Suwannee Creek at Jordan Ford Road near Waycross, GA	Brunswick WP	Stream	-82.5253	31.05508
0901010505	Cane Creek at County Road 149 near Homerville, Ga.	Brunswick WP	Stream	-82.5344	30.98056
0901020202	Jones Creek at Williamsburgh Road near Fargo, GA	Brunswick WP	Stream	-82.5381	30.73184
0901030502	Suwannoochee Creek at US441/SR89/SR94 near Fargo, Ga.	Brunswick WP	Stream	-82.5831	30.68306
0901050301	Toms Creek at Tap Deloach Road near Fargo, GA	Brunswick WP	Stream	-82.8002	30.65288
0902050401	Willacoochee River at St. Luke Church Road near Alapaha, GA	Brunswick WP	Stream	-83.1288	31.39483
0902070401	Alapaha River at SR 129 near Lakeland, GA	Brunswick WP	Stream	-83.0434	31.04623
0902090201	Alapaha River at U.S. Highway 84 near Naylor, Ga	Brunswick WP	Stream	-83.0375	30.92417
0902090501	Alapaha River - Georgia Highway 94 nr Statenville	Brunswick WP	Stream	-83.0333	30.70389
0902100101	Banks Lake - Near Lakeland, Ga.	Brunswick WP	Lake	-83.1056	31.02667
0903010401	Withlacoochee River at State Road 76 (Adel Rd.) near Nashville, Ga	Brunswick WP	Stream	-83.2725	31.19833
0903040401	Withlacoochee River - McMillian Road Near Bemiss, Ga.	Brunswick WP	Stream	-83.2728	30.94722

[1] **Sampling Organization: Atlanta WP = GAEPD Atlanta office; Brunswick WP = GAEPD Brunswick Regional office; Columbus WW = Columbus Water Works; USGS = U.S. Geological Survey.**

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.

Basin lakes field and chemical 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 3-8. GEORGIA BASIN MONITORING NETWORK 2009

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 on a five-year rotational schedule. Samples are collected quarterly for non-standard basin lakes and reservoirs within the river basin of focus for the calendar year.

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1202110104	Lake Harding - Dam Forebay (aka Chatt. River US Bartletts Ferry Dam)	Columbus WW	Lake	-85.0903	32.6633
1202130502	Lake Oliver (aka Chatt River at Columbus Water Intake near Columbus, Ga.)	Columbus WW	Lake	-84.9983	32.5214
1203010104	Chattahoochee River - Downstream from Columbus WTF	Columbus WW	Stream	-84.9803	32.4089
1203060101	Chattahoochee River - Downstream Oswichee Creek	Columbus WW	Stream	-84.9369	32.3
1203060601	Chattahoochee River at Hichitee Creek (River Mile 127.6)	Columbus WW	Stream	-84.9232	32.23083
0102060101	Chattooga River - U.S. Highway 76 near Clayton, Ga.	USGS	Stream	-83.3064	34.81398
0106050209	Savannah River - 0.5 Mile Downstream from Spirit Creek	USGS	Stream	-81.9153	33.3306
0109020701	Savannah River - Seaboard Coast Line Railway, North of Clyo	USGS	Stream	-81.264	32.525
0109060602	Savannah River - U.S. Highway 17 (Houlihan Bridge)	USGS	Stream	-81.1539	32.16583
0202030701	Ogeechee River - Georgia Highway 24 nr Oliver, Ga.	USGS	Stream	-81.5558	32.49475
0301060102	Oconee River at Barnett Shoals Road near Athens, Ga.	USGS	Stream	-83.3265	33.8562
0302090102	Oconee River at Interstate Highway 16 near Dublin, Ga.	USGS	Stream	-82.8582	32.48037
0403030501	South River at Island Shoals Road near Snapping Shoals, Ga.	USGS	Stream	-83.9271	33.45265
0403060301	Yellow River - Georgia Highway 212 near Stewart, GA	USGS	Stream	-83.8813	33.45427
0403080201	Alcovy River - Newton Factory Bridge Road near Stewart	USGS	Stream	-83.8283	33.4494
0403090301	Tussahaw Creek at Fincherville Road near Jackson, Ga.	USGS	Stream	-83.9634	33.37887
0503160201	Ocmulgee River - New Macon Water Intake	USGS	Stream	-83.6641	32.89925
0503160502	Ocmulgee River - 6.0 Miles Downstream from Tobesofkee Creek	USGS	Stream	-83.5535	32.643
0504080601	Ocmulgee River - U.S. Highway 341 at Lumber City	USGS	Stream	-82.6743	31.91993
0606040104	Altamaha River - 6.0 Miles Downstream From Doctortown	USGS	Stream	-81.7653	31.6233
0701070405	Satilla River - Georgia Highways 15 and 121	USGS	Stream	-82.1625	31.2167
0901010508	Suwannee River - U.S. Highway 441 near Fargo, Ga.	USGS	Stream	-82.5606	30.6806
0903080302	Withlacoochee River at Clyattsville-Nankin Road near Clyattsville, Ga.	USGS	Stream	-83.3947	30.67472

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1003010102	Ochlockonee River @ Hadley Ferry Rd. nr Calvary, Ga.	USGS	Stream	-84.2355	30.73172
1105010601	Flint River at State Road 92 near Griffin, Ga.	USGS	Stream	-84.3931	33.3089
1106010701	Flint River at SR 26 near Montezuma	USGS	Stream	-84.0441	32.29295
1108010102	Flint River at State Road 234 near Albany, Ga.	USGS	Stream	-84.1463	31.5524
1108040101	Flint River at State Road 37 at Newton, Ga.	USGS	Stream	-84.335	31.30944
1108070302	Flint River at U.S. Highway 27-B near Bainbridge, GA.	USGS	Stream	-84.5805	30.91095
1201030401	Chattahoochee River at Belton Bridge Road near Lula, GA	USGS	Stream	-83.6842	34.44515
1201050101	Dicks Creek at Forest Service Road 144-1 near Neels Gap, Ga.	USGS	Stream	-83.9372	34.6797
1201060401	Chestatee River at State Road 400 near Dahlonega, GA	USGS	Stream	-83.9689	34.46667
1201080302	Flat Creek at McEver Road near Gainesville, GA	USGS	Stream	-83.885	34.26583
1202050501	New River at State Road 100 near Corinth, Ga.	USGS	Stream	-84.9878	33.23528
1202060101	Chattahoochee River at U.S. Highway 27 near Franklin, Ga.	USGS	Stream	-85.1	33.2792
1202060802	West Point Lake at LaGrange Water Intake near LaGrange, Ga. (aka Chatt. River at Lagrange Intake)	USGS	Lake	-85.1108	33.0783
1202070301	Yellow Jacket Creek at Hammet Road near Hogansville, GA	USGS	Stream	-84.9753	33.13917
1203060602	Chattahoochee River at Spur 39 near Omaha, Ga. (Seaboard RR)	USGS	Stream	-85.0453	32.1436
1204080101	Chattahoochee River at State Road 91 near Steam Mill, Ga.	USGS	Stream	-85.0053	30.9775
1308020601	Tallapoosa River - Georgia Highway 8 below Tallapoosa, Ga.	USGS	Stream	-85.3364	33.74083
1308090601	Little Tallapoosa River - Georgia Highway 100 near Bowden, Georgia	USGS	Stream	-85.2792	33.49278
1401020703	Conasauga at U.S. Highway 76 near Dalton, Ga.	USGS	Stream	-84.873	34.783
1401050106	Conasauga River at Tilton Bridge near Tilton, Ga.	USGS	Stream	-84.9283	34.6667
1402030502	Mountaintown Creek at State Road 282 (US Hwy 76) near Ellijay, Ga.	USGS	Stream	-84.5398	34.70338
1402040103	Coosawattee River at Georgia Highway 5 near Ellijay, Ga.	USGS	Stream	-84.5002	34.6717
1403060401	Oostanaula River at Rome Water Intake near Rome, Ga.	USGS	Stream	-85.1733	34.2703
1404060301	Etowah River at State Road 5 spur near Canton, Ga.	USGS	Stream	-84.4944	34.23972
1404070401	Shoal Creek at State Road 108 (Fincher Rd.) near Waleska, Ga.	USGS	Stream	-84.5956	34.26083
1404080802	Noonday Creek at Georgia Highway 92 (prorate for North Rope Mill Rd.) near Woodstock, Ga.	USGS	Stream	-84.5294	34.08547
1404080904	Little River at Georgia Highway 5 near Woodstock, Ga.	USGS	Stream	-84.5043	34.1222
1404150101	Etowah River at Hardin Bridge (FAS 829) near Euharlee, Ga.	USGS	Stream	-84.9251	34.18886

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1405010601	Coosa River - Georgia/Alabama State Line Monitor near Cave Springs, Ga.	USGS	Stream	-85.4439	34.1983
1405050401	Chattooga River at Holland-Chattoogaville Road (FAS1363) near Lyerly, Ga.	USGS	Stream	-85.4453	34.3356
1501080101	West Chickamauga Creek - Georgia Highway 146 near Ringgold, Ga.	USGS	Stream	-85.2056	34.9572
0301010304	Allen Creek at Fuller Road near Talmo ,GA	Atlanta WP	Stream	-83.7386	34.21043
0301010502	Walnut Creek at Cooper Bridge Road near Talmo ,GA	Atlanta WP	Stream	-83.773	34.16381
0301010602	Middle Oconee River at Etheridge Road near Arcade, Ga.	Atlanta WP	Stream	-83.5878	34.04175
0301020201	Mulberry River at Old Covered Bridge Road near Hoschton, Ga.	Atlanta WP	Stream	-83.7766	34.07832
0301020502	Mulberry River at SR 319 / Etheridge Road near Arcade ,GA	Atlanta WP	Stream	-83.588	34.03814
0301030401	Barber Creek at Barber Creek Road near Bogart ,GA	Atlanta WP	Stream	-83.5916	33.93259
0301030501	Barber Creek at Daniels Bridge Road near Athens, Ga.	Atlanta WP	Stream	-83.4434	33.89935
0301030709	Middle Oconee River at Mitchell Bridge Road near Athens ,GA	Atlanta WP	Stream	-83.4378	33.9569
0301040202	North Oconee River at Diamond Hill Church Road (CR266) near Maysville ,GA	Atlanta WP	Stream	-83.6457	34.25989
0301050101	North Oconee River at Newton Bridge Road near Athens ,GA	Atlanta WP	Stream	-83.4071	34.01094
0301050301	Sandy Creek at Highway 334 near Athens ,GA	Atlanta WP	Stream	-83.3888	34.05812
0301070101	Oconee River at Georgia Highway 15 near Penfield, Ga.	Atlanta WP	Stream	-83.2956	33.72111
0301070102	Greenbriar Creek at Johnny Carson Road near Bostwick ,GA	Atlanta WP	Stream	-83.3577	33.69996
0301070302	Fishing Creek at Conger Road near Woodville ,GA	Atlanta WP	Stream	-83.2176	33.68953
0301080501	Apalachee River at Sims Bridge Road near Bethlehem ,GA	Atlanta WP	Stream	-83.636	33.90411
0301090101	Apalachee River at SR 186 / Snows Mill Road near Bishop ,GA	Atlanta WP	Stream	-83.5058	33.81781
0301090601	Apalachee River at State Road 24 near Apalachee, Ga.	Atlanta WP	Stream	-83.4344	33.71889
0301100102	Lake Oconee At Highway 44, Oconee River Arm	Atlanta WP	Lake	-83.2657	33.43139
0301100202	Sugar Creek at Seven Island Road near Madison ,GA	Atlanta WP	Stream	-83.3607	33.54209
0301100402	Lake Oconee - Confluence of Little Sugar and Sugar Creeks	Atlanta WP	Lake	-83.316	33.47861
0301100403	Lake Oconee - Sugar Creek Arm	Atlanta WP	Lake	-83.2957	33.46853
0301100602	Lake Oconee 300 Meters Upstream Wallace Dam (Dam Forebay)	Atlanta WP	Lake	-83.1608	33.35167
0301100603	Oconee River - Georiga Highway 16	Atlanta WP	Stream	-83.1439	33.33472
0301110102	Town Creek at Ga. Hwy 44 near Greensboro, Ga.	Atlanta WP	Stream	-83.2004	33.55172
0301110105	Richland Creek at U.S. Hwy 278 / SR 12 near Greensboro ,GA	Atlanta WP	Stream	-83.2104	33.57663

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
0301110301	Beaverdam Creek at County Road 66 near Veazey, Ga.	Atlanta WP	Stream	-83.1557	33.50463
0301110502	Lake Oconee - Richland Creek Arm	Atlanta WP	Lake	-83.1767	33.3947
0301130701	Hard Labor Creek at Lower Apalachee Road near Madison ,GA	Atlanta WP	Stream	-83.398	33.64026
0301140402	Little River at Little River Road (Ga. 213) near Godfrey, Ga.	Atlanta WP	Stream	-83.5366	33.45117
0301140901	Big Indian Creek at Hearn Road near Eatonton, Ga.	Atlanta WP	Stream	-83.4669	33.43278
0301150302	Little River at Glenwood Springs Road near Eatonton ,GA	Atlanta WP	Stream	-83.4325	33.28901
0301160703	Murder Creek at Hillsborough Road near Eatonton ,GA	Atlanta WP	Stream	-83.4973	33.26819
0301170401	Big Cedar Creek at U.S. Highway 129 near Eatonton, Ga.	Atlanta WP	Stream	-83.4372	33.18611
0301170701	Lake Sinclair - Little River & Murder Creek Arm, U/S U.S. Hwy 441	Atlanta WP	Lake	-83.2953	33.189
0301170702	Lake Sinclair - 300 Meters Upstream Dam (Dam Forebay)	Atlanta WP	Lake	-83.2026	33.14282
0301180104	Lake Sinclair - Midlake, Oconee River Arm	Atlanta WP	Lake	-83.2742	33.1968
0301180202	Crooked Creek at Oconee Springs Road near Eatonton ,GA	Atlanta WP	Stream	-83.275	33.32248
0301180302	Rooty Creek at County Road 89 near Eatonton, Ga.	Atlanta WP	Stream	-83.3456	33.28806
0302080102	Oconee River - Beaver Dam WMA u/s CR 597 near Wrightsville, GA	Atlanta WP	Stream	-82.9403	32.69798
0302090102	Oconee River at Interstate Highway 16 near Dublin, Ga.	Atlanta WP	Stream	-82.8582	32.48037
0302090103	Oconee River - 1.5mi u/s U.S. Hwy 80, Dublin, GA	Atlanta WP	Stream	-82.8798	32.5602
0302090104	Oconee River 1.8 mi d/s U.S. Hwy 80, Dublin, GA	Atlanta WP	Stream	-82.8853	32.5194
0302090105	Oconee River- 1.08 mi u/s I-16/SR 44 near Dublin, Ga	Atlanta WP	Stream	-82.8683	32.49158
0302120101	Oconee River - Shady Field Boat Ramp / Riverbend WMA near Soperton, GA	Atlanta WP	Stream	-82.7985	32.39533
0403010501	South River - Georgia Highway 155 near Lithonia, Ga.	Atlanta WP	Stream	-84.1867	33.65389
0403010704	South River at Oglesby Road near Stockbridge ,GA	Atlanta WP	Stream	-84.0815	33.55649
0403020401	Big Cotton Indian at Hwy 20 near McDonough ,GA	Atlanta WP	Stream	-84.0634	33.51984
0403030101	South River - Georgia Highway 81 at Snapping Shoals	Atlanta WP	Stream	-83.958	33.4844
0403030301	Walnut Creek at North Ola Road near McDonough ,GA	Atlanta WP	Stream	-84.0454	33.4887
0403030405	Snapping Shoals Creek at SR 212 near Porterdale ,GA	Atlanta WP	Stream	-83.9515	33.48748
0403050104	Yellow River at Pleasant Hill Road near Lithonia ,GA	Atlanta WP	Stream	-84.0616	33.73382
0403050203	Yellow River at Gees Mill Road near Conyers ,GA	Atlanta WP	Stream	-83.9377	33.66683
0403050501	Big Haynes Creek at State Road 20 near Conyers, Ga.	Atlanta WP	Stream	-83.9797	33.77778
0403070402	Alcovy River at State Road 81 near Loganville, Ga.	Atlanta WP	Stream	-83.8242	33.88167

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
0403070702	Alcovy River at Alcovy Tressle Road near Social Circle ,GA	Atlanta WP	Stream	-83.779	33.63954
0403080202	Alcovy River at Henderson Mill Road near Mansfield ,GA	Atlanta WP	Stream	-83.8241	33.50729
0403080301	Bear Creek at McDonald Road near Mansfield ,GA	Atlanta WP	Stream	-83.8128	33.44592
0403090302	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Atlanta WP	Lake	-83.8633	33.36823
0403090306	Lake Jackson - Dam Forebay	Atlanta WP	Lake	-83.8409	33.322
0503100106	Ocmulgee River at SR 16 near Jackson ,GA	Atlanta WP	Stream	-83.8367	33.30607
0503110606	High Falls Lake - Midlake	Atlanta WP	Lake	-84.031	33.1973
0503110608	High Falls Lake - Dam Forebay	Atlanta WP	Lake	-84.0209	33.1799
0503130703	Lake Juliette - Midlake	Atlanta WP	Lake	-83.8106	33.0464
0503130704	Lake Juliette - Dam Forebay	Atlanta WP	Lake	-83.7572	33.0338
0503140503	Lake Tobesofkee - Midlake	Atlanta WP	Lake	-83.8161	32.8346
0503140505	Lake Tobesofkee - Dam Forebay	Atlanta WP	Lake	-83.7706	32.8215
1201040404	Lake Sidney Lanier - Little River Embayment, Betw M1WC & 3LR	Atlanta WP	Lake	-83.8427	34.355
1201070501	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Atlanta WP	Lake	-83.9501	34.31235
1201080103	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Atlanta WP	Lake	-83.8802	34.32195
1201080203	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Atlanta WP	Lake	-83.9507	34.26167
1201080304	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Atlanta WP	Lake	-83.9198	34.2587
1201080307	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Atlanta WP	Lake	-83.9244	34.2504
1201080401	Lake Sidney Lanier - Mud Crk Embayment, Betw Marina & Ramp	Atlanta WP	Lake	-83.9373	34.2333
1201080403	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Atlanta WP	Lake	-83.9829	34.20028
1201080603	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E M9SM	Atlanta WP	Lake	-84.0287	34.2335
1201080902	Lake Sidney Lanier upstream of Buford Dam Forebay	Atlanta WP	Lake	-84.0671	34.16278
1201090205	Chattahoochee River at McGinnis Ferry Road	Atlanta WP	Stream	-84.0977	34.05056
1201090705	Chattahoochee River - DeKalb County Water Intake	Atlanta WP	Stream	-84.2631	33.9731
1201110101	Big Creek at Roswell Water Intake near Roswell, Ga.	Atlanta WP	Stream	-84.3525	34.01785
1201110109	Chattahoochee River at Cobb County Water Intake near Roswell, Ga.	Atlanta WP	Stream	-84.405	33.9443
1201110609	Chattahoochee River - Atlanta Water Intake	Atlanta WP	Stream	-84.455	33.8278
1201120403	Peachtree Creek at Northside Drive near Atlanta, Ga.	Atlanta WP	Stream	-84.4078	33.8194
1202010104	Chattahoochee River at Bankhead Highway	Atlanta WP	Stream	-84.5078	33.79528
1202010402	Chattahoochee River @ Sr 6 (Camp Creek Pkwy / Thorton Rd.) near Lithia Springs, GA	Atlanta WP	Stream	-84.5826	33.73734
1202020802	Sweetwater Creek at Interstate Highway 20	Atlanta WP	Stream	-84.6147	33.7728

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
1202030101	Chattahoochee River at State Road 166 near Ben Hill, Ga.	Atlanta WP	Stream	-84.6303	33.69278
1202030102	Chattahoochee River - Georgia Highway 92	Atlanta WP	Stream	-84.6736	33.6567
1202031202	Chattahoochee River at Capps Ferry Road near Rico, Ga.	Atlanta WP	Stream	-84.8086	33.5778
1202040101	Chattahoochee River at State Road 16 near Whitesburg, Ga.	Atlanta WP	Stream	-84.9011	33.4769
1202060802	West Point Lake at LaGrange Water Intake near LaGrange, Ga. (aka Chatt. River at Lagrange Intake)	Atlanta WP	Lake	-85.1108	33.0783
1202080208	West Point Lake - Dam Forebay	Atlanta WP	Lake	-85.1834	32.9208
1203130102	Lake Walter F. George at U.S. Highway 82 (aka Chatt. River at Hwy 82)	Atlanta WP	Lake	-85.1208	31.89194
1203160102	Lake Walter F. George at Dam Forebay	Atlanta WP	Lake	-85.0725	31.62917
1402040401	Carters Lake (CR1) - Upper Lake, Coosawattee Arm	Atlanta WP	Lake	-84.6212	34.62087
1402040402	Carters Lake - Midlake (upstream from Woodring Branch)	Atlanta WP	Lake	-84.638	34.6076
1404080902	Lake Allatoona at Little River upstream from Highway 205	Atlanta WP	Lake	-84.5772	34.15861
1404090401	Lake Allatoona Upstream from Dam	Atlanta WP	Lake	-84.7258	34.16083
1404090404	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Atlanta WP	Lake	-84.7114	34.08583
1404100104	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Atlanta WP	Lake	-84.5778	34.19
1404100409	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Atlanta WP	Lake	-84.6392	34.13861
0302120701	Oconee River at Georgia Highway 46 near Soperton, Ga.	Brunswick WP	Stream	-82.6969	32.295
0302130603	Ochwalkee Creek - SR 19 near	Brunswick WP	Stream	-82.6693	32.20337
0302140101	Limestone Creek - N. Old River Road near Vidalia, GA	Brunswick WP	Stream	-82.6018	32.15165
0302140102	Peterson Creek - CR 58 near Glenwood, GA	Brunswick WP	Stream	-82.6457	32.16236
0302140501	Oconee River at Bells Ferry Road near Uvalda, Ga.	Brunswick WP	Stream	-82.5461	31.98083
0307040503	Pendleton Creek - SR 152 near Lyons, GA	Brunswick WP	Stream	-82.2826	32.24749
0504030101	Ocmulgee River at Hawkinsville, GA	Brunswick WP	Stream	-83.4628	32.28176
0504070301	Big Horse Creek at State Road 117 near Lumber City, Ga.	Brunswick WP	Stream	-82.8269	31.85194
0505020301	Little Ocmulgee River at State Road 134 near Towns, Ga.	Brunswick WP	Stream	-82.7526	32.00858
0505020302	Little Ocmulgee River - U.S. Hwy 280 / SR 30	Brunswick WP	Stream	-82.8881	32.08086
0505030601	Alligator Creek at State Road 134 near Alamo, Ga.	Brunswick WP	Stream	-82.6956	32.02639
0505040401	Sugar Creek at State Road 27 near Lumber City, Ga.	Brunswick WP	Stream	-82.7272	31.95972
0505040402	Sugar Creek - U.S. Hwy 280 / SR 30 near	Brunswick WP	Stream	-82.9076	32.05354
0604050101	Darien River - near Darien	Brunswick WP	Stream	-81.4361	31.36722
0606010101	Altamaha River - U.S. Highway 221	Brunswick WP	Stream	-82.5172	31.9575

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
0606010501	Cobb Creek at State Road 147 near Reidsville, Ga.	Brunswick WP	Stream	-82.3233	31.97167
0606010601	Altamaha River - U.S. Highway 1	Brunswick WP	Stream	-82.3569	31.93889
0606020401	Ten Mile Creek at Ten Mile Road (S603) near Baxley, Ga.	Brunswick WP	Stream	-82.1545	31.86506
0606030101	Altamaha River at State Road 121 near Surrency, Ga.	Brunswick WP	Stream	-82.0942	31.85389
0606030301	Watermelon Creek - SR 196 near Glenville, GA	Brunswick WP	Stream	-81.9955	31.88151
0606030601	Beards Creek at State Road 23 near Glennville, Ga.	Brunswick WP	Stream	-81.9297	31.84806
0606030701	Goose Creek at Woods Road (County Road 30) near Jesup, Ga.	Brunswick WP	Stream	-81.9083	31.67639
0606040301	Penholoway Creek at U.S. 341 near Jesup, Ga.	Brunswick WP	Stream	-81.8383	31.56667
0606040502	Doctors Creek at State Road 99 near Ludowici, Ga.	Brunswick WP	Stream	-81.7053	31.67278
0606050103	Altamaha River - Sansaville Wildlife Management Area	Brunswick WP	Stream	-81.6438	31.4915
0606050204	Altamaha River - channel marker #201 off Wolf Island	Brunswick WP	Estuary	-81.325	31.31917
0606050205	Altamaha River - U.S. Hwy 17 Bridge	Brunswick WP	Estuary	-81.3577	31.33209
0606050206	Buttermilk Sound - South Side of Broughton Island	Brunswick WP	Estuary	-81.368	31.32127
0607010802	Ohoopee River - SR 56 near Nunez, GA	Brunswick WP	Stream	-82.4468	32.47077
0607020602	Little Ohoopee River at State Road 56 near Covena, Ga.	Brunswick WP	Stream	-82.4297	32.50583
0607030401	Ohoopee River at State Road 292 near Lyons, Ga.	Brunswick WP	Stream	-82.1922	32.19417
0607040502	Pendleton Creek at State Road 86 near Ohoopee, Ga.	Brunswick WP	Stream	-82.2116	32.15172
0607050401	Rocky Creek at Todd Brothers Road (County Road 180) near Reidsville, Ga.	Brunswick WP	Stream	-82.1858	32.05111
0607050501	Thomas Creek at Lester Durrence Road (County Road 259) near Reidsville, Ga.	Brunswick WP	Stream	-82.1036	32.03389
0607050601	Ohoopee River at State Road 178 near Glennville, Ga.	Brunswick WP	Stream	-82.1128	31.92028
0701100301	Alabaha River - SR 203	Brunswick WP	Stream	-82.2887	31.37547
0703020101	Turtle River off Hermitage Island	Brunswick WP	Estuary	-81.5642	31.22028
0703020106	Turtle River - Georgia Highway 303	Brunswick WP	Estuary	-81.5314	31.18694
0703020110	Brunswick River - U.S. Highway 17	Brunswick WP	Estuary	-81.4858	31.1164
0703020114	South Brunswick River - near Fancy Bluff Creek	Brunswick WP	Estuary	-81.5429	31.14452
0902100101	Banks Lake - Near Lakeland, Ga.	Brunswick WP	Lake	-83.1056	31.02667
0302020701	Black Creek at Beaverdam WMA near Toomsboro, GA	Tifton WP	Stream	-83.0841	32.91538
0302030401	Buffalo Creek at Linton Rd. near Sandersville, GA	Tifton WP	Stream	-82.9594	33.10739
0302040701	Buffalo Creek at Georgia Highway 272 near Oconee, Ga.	Tifton WP	Stream	-82.9609	32.89162
0302050202	Commisioner Creek at SR 49 near Gray, GA	Tifton WP	Stream	-83.4221	32.97589
0302050601	Commissioner Creek at Georgia Highway 112 near Toomsboro, Ga.	Tifton WP	Stream	-83.0791	32.83082
0302060302	Big Sandy Creek at SR 18 near Jeffersonville, GA	Tifton WP	Stream	-83.3342	32.7696

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
0302070501	Big Sandy Creek at State Road 112 near Toomsboro, Ga.	Tifton WP	Stream	-83.0491	32.7235
0302080101	Oconee River at Georgia Highway 57	Tifton WP	Stream	-82.9582	32.78167
0302080301	Deep Creek at Buckeye Rd/ CR 520 near Dublin, GA	Tifton WP	Stream	-82.9208	32.74132
0302080302	Buckeye Creek at Buckeye Rd/ CR 520 near Dublin, GA	Tifton WP	Stream	-82.9135	32.69978
0302090101	Oconee River at U.S. Highway 80 near Dublin, Ga.	Tifton WP	Stream	-82.8947	32.54444
0302100601	Rocky Creek at State Road 257 near Dexter, Ga.	Tifton WP	Stream	-83.0036	32.46333
0302110201	Turkey Creek at Ellington Rd near Allentown, GA	Tifton WP	Stream	-83.1775	32.59129
0302110401	Turkey Creek at U.S. Highway 441 near Dublin, Ga.	Tifton WP	Stream	-82.9422	32.45583
0302120301	Mercer Creek at State Road 199 near Soperton, Ga.	Tifton WP	Stream	-82.7164	32.38972
0302120601	Red Bluff Creek at Red Bluff Creek Rd./CR 171 near Soperton, GA	Tifton WP	Stream	-82.6492	32.31148
0302130602	Ochwalkee Creek at U.S. Highway 280 near Glenwood, Ga.	Tifton WP	Stream	-82.6452	32.1887
0504010701	Ocmulgee River - Georgia Highway 96	Tifton WP	Stream	-83.5369	32.5425
0504020101	Big Indian Creek at Moss Oak Rd near Perry, GA	Tifton WP	Stream	-83.7793	32.45482
0504020401	Big Indian Creek at US 341 near Perry, GA	Tifton WP	Stream	-83.6441	32.42641
0504020501	Mossy Creek at SR 49 near Ft. Valley, GA	Tifton WP	Stream	-83.8512	32.58536
0504020601	Mossy Creek at SR 247 near Perry, GA	Tifton WP	Stream	-83.6236	32.45134
0504020602	Mossy Creek at SR 41 near Perry, GA	Tifton WP	Stream	-83.7231	32.52116
0504020701	Big Indian Creek at US 129 near Kathleen, Ga.	Tifton WP	Stream	-83.5714	32.41444
0504040203	Big Creek at Elko Rd near Unadilla, GA	Tifton WP	Stream	-83.7236	32.31155
0504040401	Cedar Creek at Wesley Chapel Rd near Hawkinsville, GA	Tifton WP	Stream	-83.6044	32.18848
0504040402	Cedar Creek at SR 257/CR 357 near Hawkinsville, GA	Tifton WP	Stream	-83.5076	32.21749
0504040501	Big Creek at U.S. Highway 129 near Hawkinsville, Ga.	Tifton WP	Stream	-83.4697	32.22806
0504040502	Big Creek at SR 230 near Hawkinsville, GA	Tifton WP	Stream	-83.5622	32.26187
0504050301	Mosquito Creek at Ga. Hwy. 230 near Hawkinsville, Ga.	Tifton WP	Stream	-83.3691	32.192
0504050701	Ocmulgee River - U.S. Highway 280	Tifton WP	Stream	-83.2786	31.99639
0504060202	Little House Creek at Bethelehem Rd near Abbeville, GA	Tifton WP	Stream	-83.262	31.83847
0504060301	House Creek at Sea Graves Road near Forest Glen, Ga.	Tifton WP	Stream	-83.2533	31.84878
0504060302	Ball Creek at Sibbie Rd/ CR 144 near Abbeville, GA	Tifton WP	Stream	-83.3025	31.89262
0504060303	House Creek at Sibbie Rd/ CR 144 near Abbeville, GA	Tifton WP	Stream	-83.3037	31.89743
0505010202	Gum Swamp Creek at SR 257/CR 357 near Chester, GA	Tifton WP	Stream	-83.2231	32.36298
0505020201	Gum Swamp Creek at Jaybird Springs Rd near Eastman, GA	Tifton WP	Stream	-83.0036	32.13467

Station Number	Sampling Site	Sampling Organization[1]	Water Body Type	Latitude	Longitude
0505020303	Little Ocmulgee River at SR 19 near Lumber City, GA	Tifton WP	Stream	-82.6707	31.93532
0505030501	Alligator Creek at CR 175 near Alamo, GA	Tifton WP	Stream	-82.822	32.1617
0607010202	Ohoopee River at SR 57 near Wrightsville, GA	Tifton WP	Stream	-82.7645	32.73686
0607010301	Big Cedar Creek at Donovan Rd near Wrightsville, GA	Tifton WP	Stream	-82.726	32.7717
0607010401	Big Cedar Crk at Liberty Grove Church Rd (CR 175) near Wrightsville, Ga.	Tifton WP	Stream	-82.687	32.68067
0607010701	Ohoopee River at U.S. Highway 80 near Adrian, Ga.	Tifton WP	Stream	-82.5772	32.54467
0607020301	Little Ohoopee at New Home Church Rd near Bartow , GA	Tifton WP	Stream	-82.5573	32.77256
0607020501	Little Ohoopee River at Cow Ford Bridge Rd near Swainsboro, GA	Tifton WP	Stream	-82.4636	32.64708
0607030101	Ohoopee River at State Road 297 near Swainsboro, Ga.	Tifton WP	Stream	-82.3822	32.44028
0607030402	Ohoopee River at SR 152 near Lyons, GA	Tifton WP	Stream	-82.2293	32.28453
0607040203	Pendleton Creek at SR 297 near Oak Park, GA	Tifton WP	Stream	-82.4092	32.35379
0607040402	Ochwalkee Creek at Hwy 46 near Soperton, GA	Tifton WP	Stream	-82.4682	32.26564
0607040501	Tiger Creek at Old Normantown Rd. near Normantown, Ga.	Tifton WP	Stream	-82.3589	32.28056
0607050102	Ohoopee River at US 280/ SR 30 near Reidsville, GA	Tifton WP	Stream	-82.1898	32.11784

[1] **Sampling Organization: Atlanta WP = GAEPD Atlanta office; Brunswick WP = GAEPD Brunswick Regional office; Columbus WW = Columbus Water Works; USGS = U.S. Geological Survey; Tifton WP = GAEPD Tifton office.**

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.

Basin lakes field and chemical 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.

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 are 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. 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.

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.

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. As no new resources were provided in support of the mercury in fish trend monitoring, the general contaminants program has been reduced. The mercury in

fish trend monitoring sites is provided in Table 3-10.

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.

TABLE 3-9. MAJOR LAKES RANKED BY SUM OF TROPHIC STATE INDEX VALUES (2005-2009)

Major Lake	TTSI Ranking	Major Lake	TTSI Ranking	Major Lake	TTSI Ranking
Banks (2008)	203	Allatoona (2009)	162	Tugalo (2007)	143
Oconee (2009)	198	West Point (2009)	161	Chatuge (2005)	143
Worth (2006)	178	Nottely (2005)	161	Hartwell (2007)	139
Sinclair (2009)	176	Jackson (2009)	159	Blue Ridge (2005)	139
High Falls (2009)	173	Blackshear (2006)	157	Rabun (2007)	138
Seminole (2006)	172	Carters (2009)*	154	Juliette (2009)	134
Goat Rock (2006)	165	Russell (2007)	152	Clarks Hill (2007)	133
Tobesofkee (2009)	162	Harding (2006)	151	Lanier (2009)	132
Oliver (2006)	162	Walter F. George (2009)	148	Burton (2007)	128

*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.

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

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. This work includes the national coastal assessment program, beach water quality monitoring, estuarine nutrient monitoring, shellfish sanitation monitoring and monitoring for harmful algae including Pfiesteria. This work is discussed in Chapter 5.

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 300 sampling inspections were conducted by the GAEPD in Fiscal Year 2008-2009. 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 and USEPA's National Rivers and Streams Assessment in 2009. In addition, GAEPD's future monitoring plan calls for the State to choose a percentage of the sites that we are sampling in a given year randomly from a list of existing sites. The results of the probabilistic sampling are not adequate at this time to make an assessment of all the State's waters, but GAEPD should be able to do so in the future as the dataset grows.

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 3-11 provides a list of agencies that

TABLE 3-11. CONTRIBUTORS OF WATER QUALITY DATA FOR ASSESSMENT OF GEORGIA WATERS

GAEPD Ambient Monitoring Unit	City of Gainesville
GAEPD Watershed Planning and Monitoring Program	Tyson Foods, Inc
GAEPD Permitting and Compliance Program	City of LaGrange
GAEPD Brunswick District Office	City of Savannah
GAEPD Hazardous Waste Branch	Chatham County
DNR, Georgia Parks Recreation & Historic Sites Division	City of Augusta
DNR Coastal Resources Division	Georgia Mountains RDC
DNR Wildlife Resources Division	City of Conyers
State University of West Georgia	Kennesaw State University
Gainesville College	Lake Allatoona (Kennesaw State University)
Georgia Institute of Technology	Lake Lanier (University of Georgia)
Chattahoochee/Flint RDC	West Point (LaGrange College/Auburn University)
Upper Etowah Adopt-A-Stream	Lake Blackshear Watershed Association
Middle Flint RDC	University of Georgia

Heart of Georgia RDC	Southwire Company
Central Savannah RDC	Ellijay High School
Middle Georgia RDC	Screven County
Southeast Georgia RDC	South Georgia RDC
Southwest Georgia RDC	Northeast Georgia RDC
U.S. Environmental Protection Agency	LaGrange College/Auburn University
U.S. Geological Survey	Georgia Power Company
U.S. Army Corps of Engineers	Oglethorpe Power Company
U.S. Forest Service	South Carolina Electric & Gas Co.
Tennessee Valley Authority	South Carolina DHEC
Cobb County	Jones Ecological Research Center
DeKalb County	Alabama DEM
Douglas County WSA	City of College Park
Fulton County	Columbus Water Works
Gwinnett County	Columbus Unified Government
Coweta County	Coastal Georgia RDC
Columbia County	Ogeechee Canoochee Riverkeeper
City of Clayton	St. Johns WMD
Cartersville	Town of Trion
Georgia Ports Authority	Clayton County Water Authority
Cherokee County	City of Atlanta
Forsyth County	
City of Alpharetta	City of Roswell

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 2010 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.

Evaluation of Use Support. Table 3-12 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 3-13 summarizes the parameters of concern or the causes which contributed to nonsupport of water quality standards or designated uses of a particular water body type.

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

pollution primarily associated with run off from the land following a rainfall event.

Table 3-14 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.

TABLE 3-12
EVALUATION OF USE SUPPORT BY WATER BODY TYPE AND ASSESSMENT CATEGORY
2008-2009

Degree of Use Support	Streams/Rivers (miles)	Lakes/Reservoirs (acres)	Sounds/Harbors (sq. miles)	Coastal Streams/Rivers (miles)	Coastal Beaches (miles)
Support	5,610	244,947	49	247	30
Not Support	7,779	104,418	14	66	4
Assessment Pending	844	55,395	9	131	0
Total	14,233	404,760	72	444	34

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 3-13
CAUSES OF NONSUPPORT OF DESIGNATED USES BY WATER BODY TYPE
2008-2009

Cause Category	Rivers/Streams (miles) Contributions to Impairment[1]
Pathogens	**4,293**
Fecal Coliform	4,293
Biologic Integrity (Bioassessments)	**2,583**
Maroinvertebrates (Bio M)	636
Fish (Bio F)	2,084
Bioassays	**22**
Whole Effluent Toxicity	22
Oxygen Depletion	**1,274**
Dissolved Oxygen	1.274
Thermal Impacts	**17**
Temperature	17
Toxic Inorganics	**51**
Arsenic	3
Copper	34
Lead	5
Mercury	2
Zinc	20
Toxic Organics	**367**
1,1,2-Trichloroethane	1

Carbon Tetrachloride	1
Tetrachloroethylene	7
Trichloroethylene	1
PCB in Fish Tissue	357
Metals	**1,039**
Copper	34
Lead	5
Mercury	2
Zinc	2
Mercury in Fish Tissue (TWR)	991
pH/Acidity/Caustic Conditions	**190**
pH	190
Other	**218**
Commercial Fishing Ban (CFB)	218
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	**92,555**
PCB in Fish Tissue	92,555
Metals	**4,067**
Mercury in Fish Tissue (TWR)	4,067
Pesticides	**20**
DDD	20
DDE	20
Observed Effects	**6,932**
Chlorophyll *a*	6,932
Other	**4,067**
Mercury in Fish Tissue	4,067
Cause Category	**Coastal Streams (miles) Contributions to Impairment[1]**
Pathogens	**27**
Fecal Coliform	27
Oxygen Depletion	**40**
Dissolved Oxygen	40
Toxic Organics	**26**
Polychlorinated biphenyls	4
PCB in Fish Tissue	26
Metals/Toxic Inorganics	**4**
Cadmium	2
Mercury	4
Pesticides	**8**
Dieldrin in Fish Tissue	3
Toxaphene in Fish Tissue	5
Other	**30**
Commercial Fishing Ban (CFB) & Shellfish Ban (SB)	30
Cause Category	**Coastal Beaches (miles) Contributions to Impairment[1]**
Pathogens	**4.34**
Enterococcus	4.34
Cause Category	**Sounds/Harbors (sq. miles) Contributions to Impairment[1]**
Oxygen Depletion	**14**
Dissolved Oxygen	14

[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 3-14
POTENTIAL SOURCES OF NONSUPPORT OF DESIGNATED USES BY WATER BODY TYPE
2008-2009

Source Category	Rivers/Streams (miles) Contributions to Impairment[1]
Hydromodification	**4**
Dams of Impoundments (Dam)	4
Industrial Sources	**297**
Industrial Point Source Discharge (I1)	57
Industrial Stormwater Discharge (I2)	274
Municipal Permitted Discharges	**272**
Combined Sewer Overflows (CSO)	93
Municipal Point Sources (M)	179
Nonpoint Sources	**7688**
Non-Point Source (NP)	5841
Urban Runoff (UR)	2189

Source Category	Sounds/Harbors (Sq. Miles) Contributions to Impairment[1]
Nonpoint Sources	**14**
Non-Point Source (NP)	10
Urban Runoff (UR)	14
Municipal	**14**
Municipal Point Sources (M)	14

Source Category	Lakes/Reservoirs (acres) Contributions to Impairment[1]
Industrial Sources	**56,600**
Industrial Point Source Discharge (I1)	650
Industrial Stormwater Discharge (I2)	55,950
Nonpoint Sources	**47,818**
Non-Point Source (NP)	47,624
Urban Runoff (UR)	34,809

Source Category	Coastal Beaches (Miles) Contributions to Impairment[1]
Nonpoint Sources	**4.34**
Non-Point Source (NP)	4.34

Source Category	Coastal Streams (Miles) Contributions to Impairment[1]
Industrial Sources	**31**
Industrial Point Source Discharge (I1)	29
Industrial Stormwater Discharge (I2)	10
Nonpoint Sources	**38**
Non-Point Source (NP)	11
Urban Runoff (UR)	33

[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 sourcess 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

Introduction
Various assessments of Georgia's wetlands have identified from 4.9 to 7.2 million acres, including more than 600,000 acres of open water habitat found in estuarine, riverine, palustrine, and lacustrine environments. Estimates of wetland losses since colonial settlement beginning in 1733 and expanding over the next two and one-half centuries are between 20-25% of the original wetland acreage.

Georgia has approximately 100 miles of shoreline along the south Atlantic, with extensive tidal marshes separating the barrier island sequences of Pleistocene and Holocene age from the mainland. Georgia's coastline and tidal marshes are well preserved compared to other South Atlantic states.

Georgia's interior ranges in elevation 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 great Okefenokee Swamp, a 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 Atlantic Coastal Flatwoods, 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 carried out with varying degrees of success by the USDA Natural Resources Conservation Service, the USFWS National Wetland Inventory, and the state 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, but most of these data sets are not yet available. However, 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 National Wetland Inventory (NWI) of the U.S. Fish and Wildlife Service 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 the Cowardin system, 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 is based on classification of Landsat TM satellite imagery. Due to the limitations of remote sensing technology, the classification scheme is simplified in comparison to the Cowardin system used with NWI. Integration of this digital information with Geographic Information System technology is straight-forward. The inclusion of other upland landcover classes adds to the utility of this database in environmental analysis and landuse planning.

A summary of wetland acreages derived from this database is as follows: open water = 647,501; emergent wetlands = 351,470; scrub/shrub wetlands = 387,793; forested wetlands = 3,194,593; salt marshes = 241,242; brackish marshes = 91,951; and tidal flats/beaches = 14,750. The total wetland acreage based on Landsat TM imagery is 4,929,300 acres or 13.1% of Georgia's land area. This data underestimates the acreage of forested wetlands in the Piedmont and Coastal Plain, where considerable acreage may have been classified as hardwood or mixed forest. The data overestimates emergent and scrub/shrub wetlands in the pine flatwoods because of wet surface soils associated with clear-cuts or young pine plantations. The data under-estimates the tidal marshes and tidal flats because of a high tide stage that flooded considerable acreage. 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.

Georgia reported landcover statistics by county in 1996 that included acreage occurrences for 15 landcover classes derived from early spring Landsat TM satellite imagery from 1988-1990. This document (Project Report 26) and accompanying landcover map of the state at a scale of 1:633,600 (1 inch = 10 miles) are available to the public from the Georgia Geologic Survey, Map Sales office.

Similar Landsat-based landcover databases have been produced with more recent imagery. The Federal government completed mapping in Georgia using imagery form the mid-1990s as part of the National Landcover Database. The Georgia Gap Analysis Program, supported in part by Georgia DNR, completed an 18-class database using imagery from 1997-1999. Both these databases include wetland landcover classes.

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, we have often treated wetlands 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 (1991) has been developed by the U.S. Fish and Wildlife Service's National Wetland Inventory efforts. This statistically sound study was 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 better quality photography.

Georgia's total wetland area covers an estimated 20 percent of the State's landscape. This total (7.7 mil. ac.) 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 seven (7) year period, 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 frequency of wetland alterations by class or type.

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 Use Support. 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 centers 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" or tidal salt marshes 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:

- Whether impacts to an area would adversely affect the public health, safety, welfare, or the property of others.
- Whether the area is unique or significant in the conservation of flora and fauna including threatened, rare or endangered species.
- 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.
- Whether impacts or modification by a project would adversely affect fishing or recreational use of wetlands.
- Whether an alteration or impact would be temporary in nature.
- Whether the project contains significant state historical and archaeological resources, defined as "Properties On or Eligible for the National Register of Historic Places".
- Whether alteration of wetlands would have measurable adverse impacts on adjacent sensitive natural areas.
- 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.

The acceptable uses of wetlands without long term impairment of function 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 important for waterfowl production, which contributes to the economy through hunting-related expenditures.

Water Quality Protection. 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. Those wetlands hydrologically connected to ground water could also be a source of recharge for underground water supplies, in which case the natural settling and filtering of pollutants would

increase the purity of the water resource. 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 altogether. Wetlands are areas 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.
- 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.

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.

The State does not maintain a specific monitoring program for freshwater wetlands because of the size of the area (>37 million acres), lack of resources, and weak public support for a state-managed regulatory program.

Additional Wetlands Protection Activities
Georgia is protecting its wetlands through aggressive land acquisition, public education, land use planning, regulatory programs, and wetland restoration. Since 1987, the state has acquired more than 200,000 acres through program expansion and the Preservation 2000 and RiverCare 2000 acquisition efforts. 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
- 401 Water Quality Certification
- Water Quality Control Act
- Ground Water Use Act
- Safe Drinking Water Act
- Erosion and Sedimentation Control Act
- Metropolitan Rivers Protection Act

Land Acquisition. Recent land acquisition activities that represent significant protection of wetland acreage include Chickasawhatchee Swamp WMA in southwest Georgia, where combined wetland and upland acreage totals 19,680 acres. In the Altamaha River basin, a total of 3,600 acres containing significant floodplain acreage is jointly managed by DNR and The Nature Conservancy at Moody Forest Natural Area. Preservation by DNR of a Carolina bay at Big Dukes Pond NA added 1,220 acres, including a wood stork rookery site. Other wetland acres have recently been protected through the establishment of

Conasauga River Natural Area in northwest Georgia.

Education And Public Outreach. WRD has one full-time person involved in aquatic education, providing training for educators in wetland values and acting as a resource person for developing and coordinating teaching materials. The Aquatic Education Program consists of three key components: Youth Education, Adult Education, and Kids Fishing. 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 age children About 1,000 educators are trained annually to use APW in the classroom. 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.

State Protected Species in Wetlands. With assistance from the USFWS, Section 6 Federal Aid Program, and USDA-FS Stewardship Program, WRD developed and published a descriptive handbook of Georgia's 103 protected plant species that include endangered, threatened, unusual, and rare plant species found in the state. Forty percent of the protected species are dependent on wetland or aquatic habitats in the vast majority known occurrences. The "Protected Plants of Georgia" book includes illustrations, descriptions, threats to species or their habitats, range in adjoining states, historical notes, and recommendations for management of protected species habitats. The protected plant book has been distributed to all DNR personnel and wildlife biologists involved in the management of state properties. It has been distributed to the Georgia Forestry Commission, USDA-Natural Resource Conservation Service, Forest Service, USFWS, Corps of Engineers, US EPA, major utility companies, forest products corporations, consulting biologists, educators, and private citizens. The book calls the public's attention to the need to protect wetlands on private property as well as public property in the state. In addition, the following species are subjects of continuing research funded through Section 6 USFWS grant-in-aid programs:

- Loggerhead sea turtle - nest survey and protection, educational material
- Wood stork - aerial surveys of rookeries and educational material
- Bald eagle - nest surveys, monitoring, and management
- Manatee - comprehensive management plan implementation, investigate and analyze habitat use and movements
- Wood stork - ecology of coastal colonies
- Listed aquatic species - Conasauga River corridor identification and mapping of essential habitats
- Listed animal species - protected animal book for the State of Georgia (111 species)
- Goldline darter - life history and status in Coosawattee River system
- Tennessee Yellow-eyed Grass - surveys for undocumented populations
- Whorled Sunflower - habitat management plan development
- Pitcherplant Bogs - habitat management plan development
- Swamp Buckthorn - status survey

Federal funds made available through USFWS were used to complete an assessment of Carolina bays in Georgia. A combination of aerial photography and field surveys were used to evaluate these wetlands for value in protecting wetland functions and in providing significant habitat to support wetland-

dependant ecosystems. A final report on this effort was completed in 2005.

Managing Wetlands on State WMAs, PFAs, Parks, Heritage Preserves, and Natural Areas. M.A.R.S.H. Project. Georgia DNR-WRD 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 MARSH 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. Since 1985, more than 1.2 million dollars have been spent on habitat projects in the state of Georgia involving thousands of acres of wetlands. Completed projects include:

Altamaha WMA - 4,500 acres
Arrowhead - 28 acres
Ansley-Hodges Memorial Marsh - 42 acres
Blanton Creek WMA - 50 acres
B.F. Grant WMA - 45 acres
Clark Hill - 70 acres
Crockford-Pigeon Mtn WMA - 35 acres
Dyar Pasture - 60 acres
Fishing Creek WMA - 50 acres
Grand Bay WMA - 8,730 acres
Horse Creek WMA - 110 acres
Joe Kurz WMA - 50 acres
Mayhaw WMA - 45 acres
Oconee WMA - 150 acres
Rum Creek WMA - 25 acres
West Point WMA - 20 acres

Assessment of DNR-Managed Wetlands. In 1990, while developing a state wetland conservation plan and strategy for mitigation of impacts from water supply reservoirs and public fishing lakes, Georgia DNR/WRD made an assessment of wetlands on DNR-managed state-owned lands. As part of this assessment, an effort was made to identify degraded wetland acreage suitable for mitigation. Degraded wetlands were identified as having potentials for restoration or enhancement of wetland functions and values.

Table 4-1 summarizes DNR-managed lands (as of 1990) by various categories. This plan was developed by DNR and Law Environmental, Inc. to mitigate potential impacts from future development of regional water supply reservoirs and public fishing areas. DNR still has under study and evaluation a potential regional water supply reservoir in the Tallapoosa River basin. To date there has been implementation of mitigation on state lands at a mitigation site at Horse Creek WMA for wetlands losses associated with the construction of the Dodge County PFA. Mitigation is being pursued for wetland impacts associated with the development of a public fishing area at Ocmulgee WMA.

TABLE 4-1. ASSESSMENT OF DNR LANDS (1990).

Categories	Total Acreage	Total Wetland Acreage	Acreage Suitable for Mitigation	
			Restoration	Enhancement
WMA/PFA Sites	128,106	38,754	1,782	9,749
Park Sites	43,850	6,158	509	86
Other Sites*	58,712	12,126	83	2,322
	230,668	57,038	2,374	12,157

*Includes natural areas, heritage preserves, and some barrier islands (Ossabaw, Sapelo)

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 sixteen (16) 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 November; 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.

Nutrient samples are collected monthly in the Ogeechee, Altamaha, and St. Marys Rivers at six (6) sites in each river to provide data for the upper estuary/lower salinity environments. Samples are also collected at thirty (30) of the eighty-four (88) shellfish sample sites to provide both nutrient and fecal coliform bacteria data from tidal rivers and sounds. Nutrient data for the lower sounds are collected at twenty-four (24) sites in conjunction with the monthly Ecological Monitoring Survey performed by the Marine Fisheries Section with the Research Vessel ANNA. Altamaha and Doboy Sounds, which are not routinely sampled on the Ecological Monitoring Survey, are also sampled monthly with an additional six (6) sites per sound system. Due to budget reductions in July 2009, the frequency of nutrient sampling has been reduced to every other month for all river and sound stations.

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-one (21) are considered to be supporting their designated use of coastal recreation. Six (6) 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; and one (1) beach is on St. Simons Island near Gould's inlet. All three (3) of these beaches are Tier 1 and are sampled weekly year-round. The other three (3) "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. The Blythe Island sandbar is located in the South Brunswick River in Glynn County.

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 is 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 from March to November in three sound systems, Ossabaw, Altamaha, St. Andrews using similar techniques and protocols (albeit on a smaller scale) as the assessment survey; and a beach seine survey of St. Simons and St. Andrews Sounds. The Marine Sportfish Population Health Survey uses gill and trammel nets to capture finfish in the Wassaw and Altamaha River Delta estuaries from March to November. These data have been used in coast-wide stock assessments for red drum.

The Fisheries Dependent 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 6.98 to 9.78 million pounds of product during the period from 1999 to 2008, with an annual average of 7.87 million pounds. Penaeid shrimps are the most valuable catch in Georgia commercial landings, typically totaling nearly 11 million dollars (2.99 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 2008 were above the most recent 10-year average of 3.38 million pounds (2008 = 4.18 million pounds). A severe drought from 1998 to 2002 reduced annual harvest 80% of the long-term average of 7.99 million pounds. The 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.

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 887 trips in 2003 to a low of 700 trips in 2008. However, in 2006 effort increased to 1073 trips and was likely related to the relatively strong shad run that occurred that spring. Regulations have remained fairly constant over the past 15 years. The only modifications were a 15-day season extension in 1983, change in commercial fishing regulations in 1984 to clarify open and closed areas on the Altamaha River, and 15-day season extensions on the Savannah River from 2003-2007. No changes have been made to shad sportfishing regulations.

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. 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

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.

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. Additional resources were not available to support this initiative and reductions in the general contaminants program were required.

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.

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	

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 reduced consumption guidelines in 1996 for a number of lakes and streams, which had no restrictions in 1995. The Georgia guidance for 2008 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 or no consumption of fish. The USEPA criterion represents a national approach to address what mercury levels 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.

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 2007, 57.5% of recommendations for fish tested in Georgia waters were for No Restriction, 27.9% were to Limit Consumption to One Meal Per Week, 13.1% were to Limit Consumption to One Meal Per Month, and 1.5% was Do Not Eat Advisories. Eighty-five percent of the recommendations available in 2007 were for no, or only minor restrictions (allowing more than 50 meals to be consumed per year). 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.

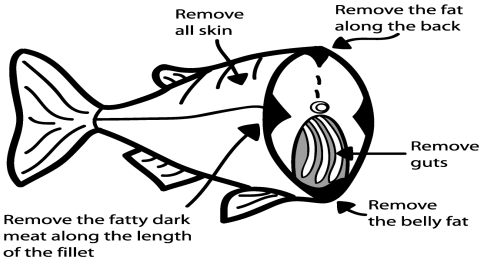
General Guidelines to Reduce Health Risks. The following suggestions may help to reduce the risks of fish consumption:

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 gros 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 cluch, 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 cyanobacterial 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 - 2009

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) Chickasawhatchee Creek Coleman River Conasauga River in Cohutta Forest Daniels Creek (Cloudland Canyon State Park) Dukes Creek East and South Chickamauga Creek Flint River (Dougherty, Baker & Mitchell Cos.) 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 (Pine Log WMA) Stekoa Creek Tallulah River Upatoi Creek Yahoola Creek Yellow River

TABLE 6-3. FISH CONSUMPTION GUIDANCE FOR LAKES – 2009

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 – 2009

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, Gibson Cr.s)		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	White Shrimp, Flounder	Blue crab, BDR, RDR, SST,	ACR, STM,SKF, Spot	Bivalves *

Dubignons & Parsons creeks)		Sheepshead		
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			
Hayner's Creek (Savannah)	Blue crab			
Savannah Estuary	Striped mullet		Striped bass >=27"	

* 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 2008-2009 high priority was placed on Comprehensive Statewide Water Management Planning, monitoring and assessment, water quality modeling and TMDL development, TMDL implementation plan development, 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. In addition, GAEPD conducted detailed monitoring of the Carters Lake Watershed in 2008 and the Jackson and Oconee/Sinclair Watersheds in 2009. 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 2008-2009 in support of the development of wasteload allocations and total maximum daily loads (TMDLs). In 2007, TMDLs were developed for segments on the Georgia 2006 303(d) list for the Chattahoochee and Flint River Basins and these TMDLs were finalized and submitted to EPA for approved in early 2008. In 2008, TMDLs were developed for segments on the Georgia 2008 303(d) list for the Coosa, Tallapoosa, and Tennessee River Basins. These TMDLs were finalized and submitted to EPA for approved in early 2009. In 2009, TMDLs were developed for segments on the 2008 303(d) list for the Savannah and Ogeechee River Basins. Over the 2008-2009 period, more than 133 TMDLs were developed. To date more than 1400 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 and revisions, Watershed Improvement Plans (WIPs), Monitoring Reports, and Status Reports/Updates to existing TMDL implementation 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.

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.

Monitoring Reports involve sampling, testing, analyzing and reporting data for fecal coliform or dissolved oxygen levels where monitoring data are outdated.

Status Reports/Updates to existing TMDL implementation plans provide information through internal contractor resources and

from local governments and stakeholders about the progress of previously developed TMDL implementation plans. Original plans are revised to record what recommended activities have been implemented or not implemented, or to add or propose any alternatives to original recommendations. Based on updated information, the contractor advocates a segment for a possible Watershed Improvement Plan.

Another type of plan is Tier 3 level (Unit) TMDL implementation plan which is developed in-house by GAEPD staff for water bodies listed as "impaired" due to natural conditions, fish consumption advisories, legacy sediment, or where TMDL models estimate a zero percent load reduction would be necessary to achieve standards.

The following number of TMDL implementation plans were developed during 2008-2009 for specific river basin groups.

For the St. Mary's, Ochlockonee, Satilla and Suwannee River Basins, a total of 92 new TMDL implementation plans, revisions, water quality monitoring reports, and watershed improvement plans were completed.

For the Oconee, Ocmulgee and Altamaha River Basins, a total of 260 new TMDL implementation plans, status reports and monitoring reports were completed while eight watershed improvement plans were initiated. For the Chattahoochee-Flint River Basins, a total of 135 TMDL implementation plans and status reports were completed while five watershed improvement plans were initiated.

For the Coosa, Tallapoosa and Tennessee River Basins, a total of 103 TMDL implementation plans were completed, with two watershed improvement plans initiated.

To date a total of 590 new plans, revisions, monitoring reports, status reports and improvement plans have been prepared to implement TMDLs in Georgia.

State Revolving Loan and Georgia Fund Loan Programs

Georgia presently administers loans through the Georgia Environmental Facilities Authority (GEFA) and the GAEPD a State Revolving Loan Fund (SRF) and a Georgia Fund program that provide low interest loans for the construction of municipal wastewater treatment facilities and nonpoint source pollution control projects. The SRF program was initiated in1988 to the full extent allowed by the 1987 amendments to the Clean Water Act. With the initiation of SRF, the federal Construction Grants program has been phased out and all federal monies received through the Environmental Protection Agency are being used to capitalize the SRF program. Considerable amounts of money have been required for water pollution abatement in Georgia and additional expenditures will be needed in the future. Local governments have the responsibility of securing funding for water pollution control projects including CSO controls. In addition to the SRF program and the Georgia Fund program, other funding sources are available, grants and loans from the Rural Economic and Community Development Administration (RECD), the Appalachian Regional Commission, and various programs administered by the Georgia Department of Community Affairs. Table 7-1 lists the State Revolving Loan Fund and Georgia Environmental Facilities Authority- Georgia Fund funding for Georgia communities in 2008-2009 for wastewater treatment system and CSO control construction and improvements.

TABLE 7-1
Municipal Facility Sources of Investment
2008-2009

SRF Loans	$285,513,6002
GEFA Georgia Fund	$3 $191,120,747
TOTAL	**$476,634,34**

The Clean Water State Revolving Fund provided funding for 41 projects during 2008-2009. The GEFA –Georgia Fund provided funding for 80 projects over the same time period. Upgrading the level of wastewater treatment produces direct benefits by reducing pollutant discharges to Georgia streams, rivers, and lakes/reservoirs. In 2008 and 2009, 62 wastewater treatment projects were reviewed and approved to upgrade, expand or construct new wastewater facilities. This represents treatment capacity for approximately 41MGD that is improved or maintained.

The majority of the projects funded by SRF in 2008-2009 were related to point source wastewater treatment; however, the need for non-point source improvement has been recognized and the number of non-point source projects funded by SRF in Georgia is starting to increase. These projects include stream bank restoration and storm water best management practices to restore or protect stream buffers and the water quality of the receiving streams by reducing sediment and other constituents in runoff, and by reducing the quantity of runoff. Five non-point source projects were funded in 2008-2009.

GEFA Implementation Unit. The Metropolitan North Georgia Water Planning District (District) was created on April 5, 2001 (2001 S.B. 130) 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 has become a priority.

The EPD was charged with the enforcement of these plans. SB 130 states that the EPD Director shall not approve 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.

EPD, upon application for a permit for an increase in the water withdrawal, public water system capacity, or wastewater treatment system capacity, or renewal of any NPDES Phase I or Phase II General Stormwater permit, will conduct an audit to determine whether the local government is 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 will protect Georgia's valued resources by developing a process that will strategically align 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 2008, the Land Conservation Program funded 16 projects, protecting 13,526 acres of land through fee-title land purchases and conservation easements. The Program also approved 59 tax credits covering 20,985 acres. To date, the Program has completed a total of 133 projects covering 100,344 acres in 71 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 a critical funding source for the Land Conservation Program. The Program completed five loans using $14.3 million to preserve 6,941 acres in 2008. No additional property was protected during 2009 with State Revolving Fund loans; however the State was successful in acquiring 13 donated conservation easements from private landowners, totaling more than 21,000 acres.

Funds came from a variety of sources including U.S. Forest Service Forest Legacy Grant, The Nature Conservancy (TNC), and state bond funds.

National Pollutant Discharge Elimination System (NPDES) Permit Program

The NPDES permit program provides a basis for municipal and industrial discharge permits, monitoring compliance with limitations, and appropriate enforcement action for violations.

In 2008-2009, a significant amount of personnel time was allocated to the reissuance of NPDES permits. Permits were issued, modified or reissued for 287 municipal and private discharges and for 86 industrial discharges. In contrast to many other areas in the nation, Georgia had a very small backlog of permits to be issued.

In addition to permits for point source discharges, the GAEPD has developed and implemented a permit system for land application systems. Land application systems for final disposal of treated wastewaters have been encouraged in Georgia. Land application systems are used as alternatives to advanced levels of treatment or as the only alternative in some environmentally sensitive areas. A total of 109 (municipal and private) and 15 (industrial and Federal) permits for land application systems were issued, reissued or modified in 2008-2009..

Concentrated Animal Feeding Operations

On June 10, 1999, Georgia adopted Rule 391-3-6-.20 "Swine Feeding Operation Permit Requirements". On January 24, 2001, Georgia adopted rule 391-3-6-.21, "Animal (Non-Swine) Feeding Operation Permit Requirements." 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).

On December 15, 2002, EPA promulgated greatly expanded NPDES permit regulations and effluent limitation guidelines for CAFOs (40 CFR 122 and 40 CFR 412). Dry manure poultry operations larger than 125,000 broilers or 82,000 layers were added, as well as other changes. In order to implement the new Federal rules, the GAEPD completed necessary State rule amendments on September 15, 2003. Dry litter poultry and swine nursery permit applications were due by October 31, 2005. Where possible, permits were issued and nutrient management plans implemented for dry litter poultry and swine nurseries by October 31, 2006.

The USEPA CAFO regulation was successfully appealed on February 28, 2005 [decision by the Second Circuit Court of Appeals issued in Waterkeeper v. EPA, 399 F.3d 486 (2nd Cir. 2005)]. The EPA is in the process of developing options for revising their CAFO regulation to comply with the Second Circuit Court of Appeals' decision. However, the Georgia rules are enforceable irrespective of changes in the USEPA CAFO regulation. GAEPD has deferred issuing permits where allowed in order to give the Georgia Board of Natural Resources time to reconsider its rules if and when the USEPA revisions become available. The Georgia general LAS and NPDES CAFO permits expired on April 30, 2007, but have been administratively extended due to the delays in Federal rule promulgation.

There are currently 766 farms which require general LAS or NPDES permits. That includes approximately 185large farms with liquid manure handling systems. Of these, 44 have federal NPDES concentrated animal feeding operation (CAFO) permits and 141 have state LAS permits. These farms, with their liquid waste lagoons and spray fields, are important managers of water resources. Also included are 581 large dry manure (chicken litter) poultry farms which require NPDES CAFO permits. The Division would need 5 additional full-time professional staffers to regulate this community. However, 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). Georgia has over 5000 livestock and poultry farms. 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. In 2006 more than 200 CNMPs were completed, covering 300,000 acres.

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. The GSWCC, using Section 319(h) Grant funds and local inkind funds have worked in the Upper Chattahoochee and Upper Oconee Watersheds to demonstrate the effectiveness of Comprehensive Nutrient Management Planning. Over the course of these projects numerous CNMPs have been developed with cooperating landowners.

Combined Sewer Overflows

The 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). The permits require that the CSO must not cause violations of Georgia Water Quality Control Standards. In

addition, the CSOs must be controlled to prevent the following conditions for waters downstream of the CSO:

- materials which settle to form sludge deposits that become putrescent, unsightly or to interfere with legitimate water uses;
- oil, scum and floating debris in amounts sufficient to be unsightly or to interfere with legitimate water uses;
- materials which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses;
- toxic, corrosive, acidic and caustic substances in amounts, concentrations or combinations which are harmful to humans, animals or aquatic life.

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 in 2007 which was extended to 2008. 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. Some of the other tasks required by the Consent Decree include: installation of warning signs along the streams receiving CSO discharges, a one-time stream cleanup, greenway acquisition plan, and creating Maintenance, Operations, and Management Systems (MOMS) Plans to provide guidance to City personnel regarding the operations and maintenance requirements of each of the City's CSO facilities as well as management strategies to control CSOs.

The City of Atlanta submitted their long-term control plan in April 2001. The selected option calls for 27% sewer separation including the elimination of two CSO facilities, additional storage for the eastside CSOs to an upgraded CSO treatment facility at the current Intrenchment Creek facility and a tunnel connecting the westside CSOs to a new CSO treatment facility on the Chattahoochee River near the R. M. Clayton Water Reclamation Center. In 2007, the City eliminated/separated the greensferry/Proctor Creek CSO and the McDaniel Street CSO and completed the East Area CSOs providing additional storage. In 2008, the City completed the construction of the West Area Tunnel, connecting the west side CSOs with the West Area CSO treatment facility. On November 23, 2009, EPD authorized the City to operate the West Area CSO Facility in accordance with the Consent Decree.

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 which specifies 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 2009, of the 144major municipal water pollution control plants (facilities with design flow equal to or greater than 1.0 mgd), tree were in significant noncompliance with the final limitations. These eight 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 the new requirements for pretreatment established in the November 1988 Amendments to the Federal General Pretreatment Regulations (40 CFR Part 403).

Industries in Georgia achieved a high degree of compliance in 2008-2009. The thirty-even major industrial facilities were in compliance at the end of 009.

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 2008, 366 Orders were issued and approximately $771,507 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 2008-2009 a total of 449 stormwater Orders were issued and a total of $2,376,883 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. In addition to the enforcement strategy, inspections and surveillance activities were also increased.

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 and 2005.

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. 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, the 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 2600 facilities retaining coverage. An additional 500 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 275 industrial facilities to assess compliance with the industrial general storm water permit during 2008-2009. Approximately 30 of these inspections involved coordination with GAEPD Regional Office personnel.

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, and minor activities such as home landscaping and gardening.

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 333 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. .

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. These amendments went into effect on 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 2009, more than 60,000 people have been 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.

During the 2008-2009 period, the GAEPD decertified as issuing authorities 5 counties and 6 cities. All eleven requested decertification. During this same period, 6 cities and 3 counties were certified as local issuing authorities.

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 6000 active NOIs have been received by GAEPD as of September 30, 2009.

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.

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 FY 08 – FY09, Georgia's Section 319(h) grant project funded 32 new projects for over $9.3 million. For FY10, Georgia is poised to award $4.5 million to local governments and agencies to support streambank restoration, watershed planning, TMDL implementation, and support of Georgia's Coastal Nonpoint Source Management Program.

Through 2009, Georgia's Nonpoint Source Program administered more than 150 Section 319(h) projects, totaling more than $40.5 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 2008-2009, approximately $3.8 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.

The 2002 Farm Bill contains conservation provisions that will have far reaching impacts on the protection of water quality from nonpoint source pollution in Georgia. The conservation provisions seek to improve the flexibility and efficiency of existing programs by diversifying agency participation in the delivery of conservation programs that protect water quality and related natural resources.

2002 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 2008 - 2009, the EQIP program provided over $18 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' Urban Nonpoint Source Management 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 is developing an Urban Nonpoint

Source Management Program to foster regional watershed approaches to protect and enhance water quality. The Program will establish a single point of contact for local governments to use when they are seeking state or federal support to address issues related to water quality in their community. As an information and networking center, the Program will provide water resources tools, one-on-one technical assistance, and workshops to address regional water quality issues to more than 2,500 local elected officials currently serving 159 counties and 532 cities. The Urban Nonpoint Source Management 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.

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 2008-2009. 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.

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 8,750 Georgia teachers have been certified as Project WET educators, and over 630 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 also receives a Project WET certification workshop for its staff at no charge.

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 1,000 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 15-20 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, and (3) provide educational resources and technical assistance for addressing nonpoint source pollution problems statewide.

Currently, thousands of volunteers participate in the 50 community sponsored Adopt-A-Stream Programs. Volunteers conduct clean ups, stabilize streambanks, monitor waterbodies using biological and chemical 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 levels of involvement. Each level involves an education and action component on a local waterbody. In addition to the introductory level, advanced levels of involvement include biological and chemical monitoring, habitat improvement and/or riparian restoration projects.

The Georgia Adopt-A-Stream Program provides volunteers with additional resources such as the *Getting to Know Your Watershed, Visual Stream Survey*, *Biological and Chemical Stream Monitoring*, *Bacterial Monitoring, Adopt-A-Wetland*, *Adopt-A-Lake*, 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.

Georgia Adopt-A-Stream partnered with the Georgia River Network to present the Watershed Track at their 2008 and 2009 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 100 sites were tested in 2009 on the Coosawattee and Oostanaula Rivers. 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 2009 waterway cleanup, more than 25,000 volunteers cleaned over 2,000 miles of waterways and removed some 800,000 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 press releases through public service announcements to advertise in local newspapers and on the radio. 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.

New for 2009, Rivers Alive now has an online database for registering cleanups and submitting cleanup data. All cleanups are now listed on an interactive maps page, that shares individual organizer information, including driving directions. The results for each year are now 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 Program

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. The majority of the team members are located in Atlanta in order to facilitate rapid access to the major interstates. Additional team members operate out of the Environmental Protection Division office in Savannah to provide rapid response to water quality concerns along the coast of Georgia and to assist the United States Coast Guard Marine Safety Office when needed.

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 routine 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 Program 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).

The results of the GAEPD monitoring around Plant Hatch indicate very little evidence of releases of radioactive materials, with the exception of monitoring related to a 1986 spill of spent fuel pool

water, as discussed in the GAEPD Environmental Monitoring Reports. Slightly elevated levels of 60Co, 65Zn, 134Cs, and 137Cs have been detected in fish and river sediment from the Altamaha River downstream to the coastal area near Darien. Slightly elevated levels of 137Cs are observed in vegetation samples from a background station plant cannot be attributed to plant operations, as similar levels are not found at indicator stations closer to the plant. Overall, it appears that Plant Hatch operations have not added significant quantities of radioactive materials to the environment.

The results of the GAEPD monitoring around Plant Farley indicate little evidence of releases of radioactive materials, with the exception of slightly elevated levels of tritium (3H) in surface water and slight traces of 58Co and 60Co in river sediment.

Results of the GAEPD monitoring around SRS and Plant Vogtle show evidence of current and previous releases of radioactive materials from SRS. Elevated levels of tritium (3H) due to airborne and liquid releases are routinely detected in fish, milk, precipitation, surface water and vegetation. Elevated levels of 137Cs and 60Co, attributed to releases from previous SRS operations, are found in sediments from the Savannah River. Elevated 137Cs, gross beta, and 90Sr levels are also found in fish from the Savannah River. Staff of the Environmental Radiation Program are working with SRS personnel on a study of the effects on human health from consumption of contaminated fish. The GAEPD monitoring results also show evidence of current and previous releases of radioactive materials from Plant Vogtle. Slightly elevated concentrations of 54Mn, 58Co, and 60Co have been detected in aquatic vegetation and sediment downstream of Plant Vogtle, and 134Cs has been detected in fish downstream of the plant.

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. This network regularly samples wells and springs, tapping important aquifers throughout the State. Recently, 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), and most recently, uranium in ground water (305 wells and springs near wells yielding uraniferous ground water). Figure 8-2 shows locations of stations for the uranium study and the small public water system study sampled during calendar years 2008 and 2009. The Uranium Monitoring Project used wells with uranium detections from the small public water system and the Piedmont/Blue Ridge studies as base stations, around which step-out stations were located, usually within a radius of about two miles. The step-out stations form the sampling network for the uranium study. Preliminary indications from the Uranium Monitoring Project suggest that granites and certain gneisses are associated with ground waters with uranium exceeding the Primary MCL. Overall for the uranium study in 2008-2009, 70 of 305 stations, or about 23 percent, gave water with detectable uranium, of which seven, or 2.3 percent, gave water with uranium in excess of the Primary MCL. Owners of wells that gave excessively uraniferous water were notified of the condition and their wells resampled if used for drinking water. Reports of water quality are issued periodically.

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 8-3-5.

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

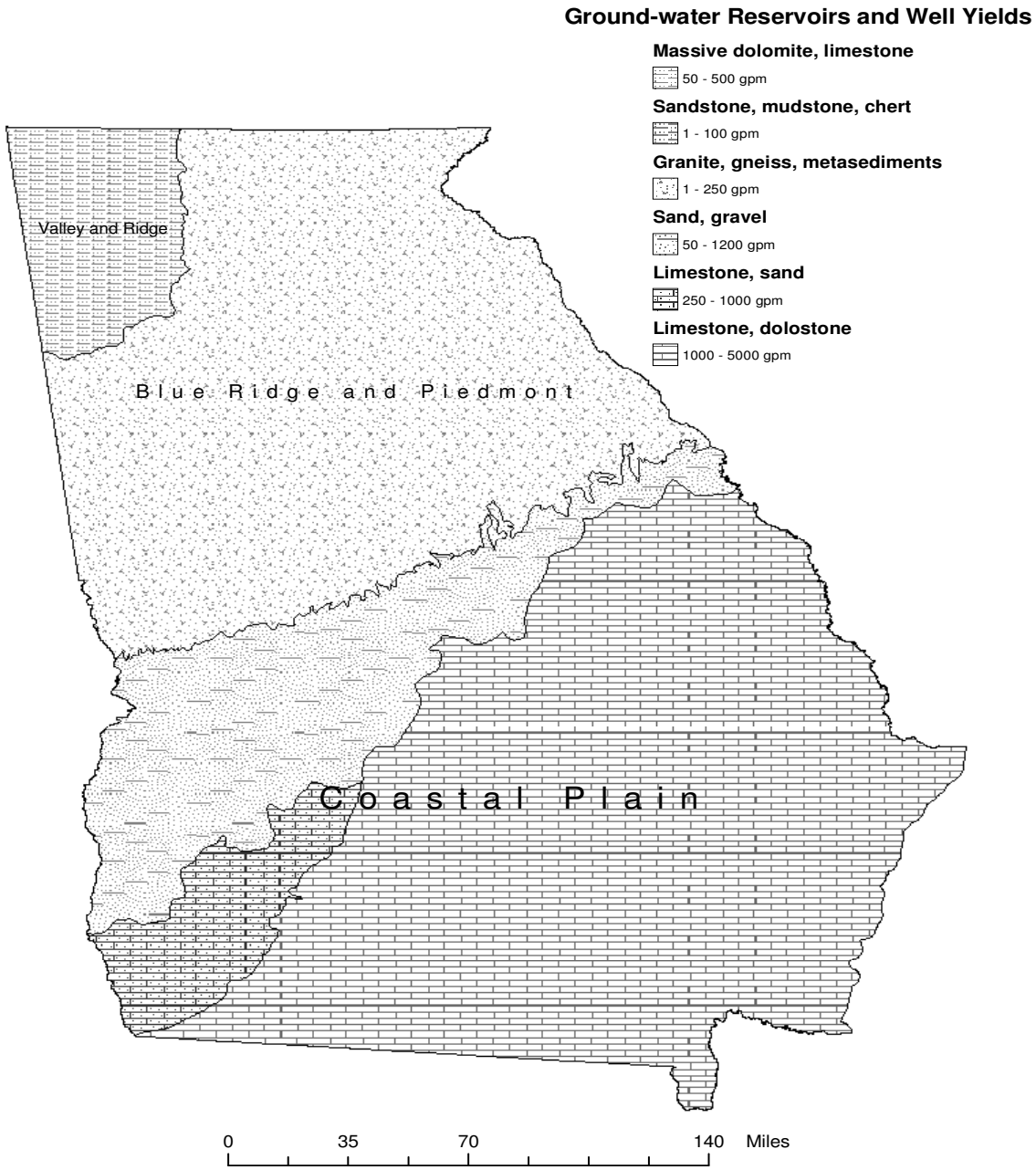


FIGURE 8-2
AMBIENT GROUNDWATER MONITORING NETWORK, 2008-2009

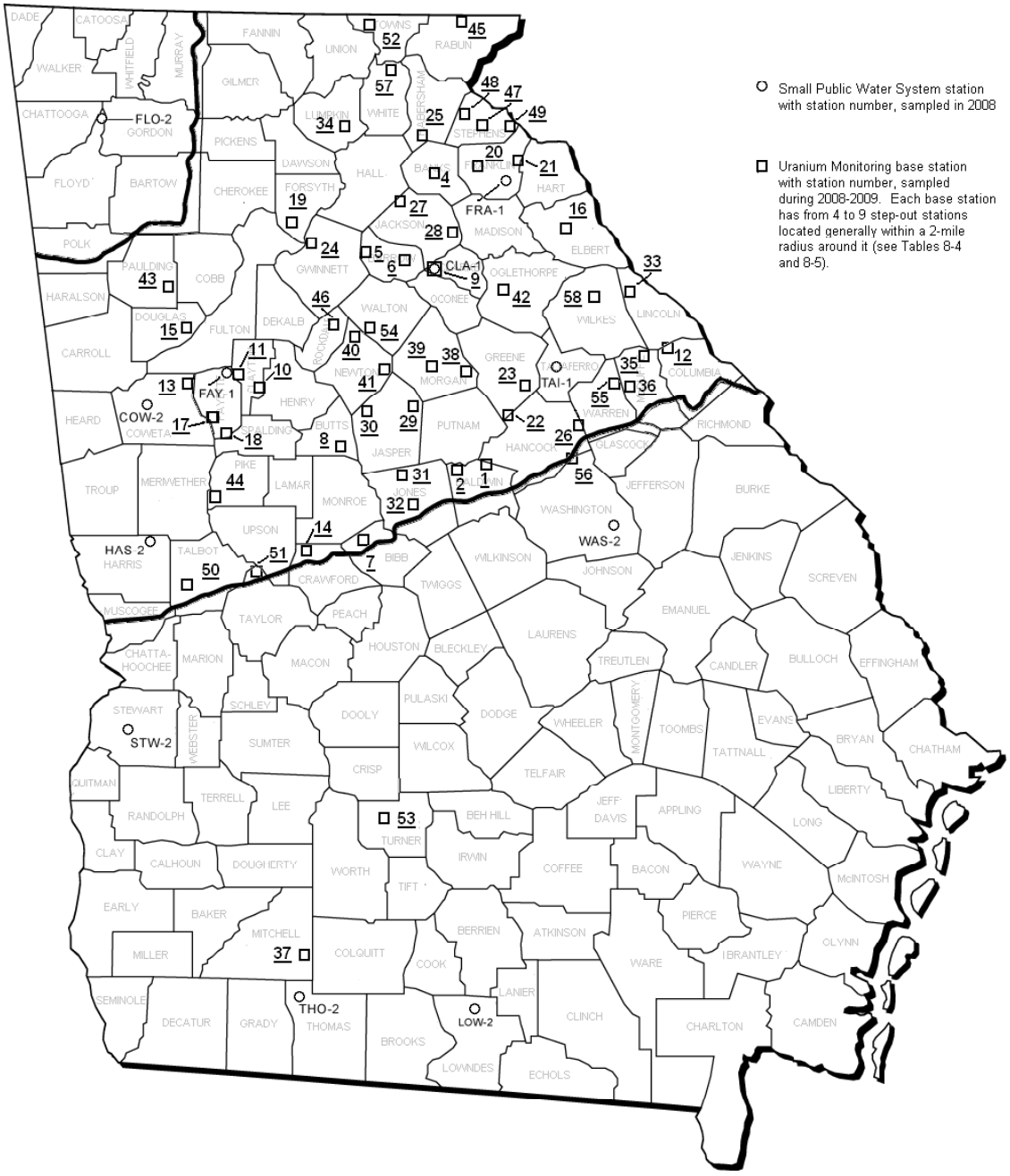


TABLE 8-3A
SUMMARY OF GROUND-WATER MONITORING RESULTS CY 2008

Eleven Small Public Water System Monitoring Stations					
	Nitrate/ Nitrite	VOCs	Uranium	Copper or Lead	Fe, Mn, or Al
Detections	5	0	1	4	10
Exceedances	0	0	1	0	7
One Hundred and Sixteen Uranium Monitoring Stations					
	Nitrate/ Nitrite	VOCs	Uranium	Copper or Lead	Fe, Mn, or Al
Detections	93	8	28	61	73
Exceedances	1	0	0	0	33

TABLE 8-3B
SUMMARY OF GROUND-WATER MONITORING RESULTS FOR CY 2009

188 Uranium Monitoring Stations					
	Nitrate/ Nitrite	VOCs	Uranium	Copper or Lead	Fe, Mn, or Al
Detections	162	14	42	109	126
Exceedances	3	0	6	0	61

TABLE 8-4
GROUND-WATER MONITORING DATA FOR CY 2008

Small Public Water System Monitoring

County	No. of Stations	Number of Stations Showing:				
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Clarke	1	1 // 0	0 // 0	1 // 1	1 // 0	1 // 1
Coweta	1	1 // 0	0 // 0	0 // 0	1 // 0	1 // 1
Fayette	1	1 // 0	0 // 0	0 // 0	0 // 0	1 // 1
Floyd	1	1 // 0	0 // 0	0 // 0	1 // 0	1 // 1
Franklin	1	0 // 0	0 // 0	0 // 0	0 // 0	1 // 1
Harris	1	0 // 0	0 // 0	0 // 0	0 // 0	0 // 0
Lowndes	1	0 // 0	0 // 0	0 // 0	0 // 0	1 // 0
Stewart	1	0 // 0	0 // 0	0 // 0	0 // 0	1 // 1
Taliaferro	1	0 // 0	0 // 0	0 // 0	1 // 0	1 // 1
Thomas	1	0 // 0	0 // 0	0 // 0	0 // 0	1 // 1
Washington	1	1 // 0	0 // 0	0 // 0	0 // 0	1 // 0

Uranium Monitoring

County-Base Station No.	No. of Step-out Stations	Number of Stations Showing:				
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Baldwin-1	3	2 // 0	0 // 0	0 // 0	2 // 0	3 // 3
Baldwin-2	5	1 // 0	1 // 0	3 // 0	2 // 0	5 // 1
Barrow-6	6	6 // 0	1 // 0	1 // 0	4 // 0	4 // 1
Bibb-7	7	6 // 0	0 // 0	0 // 0	6 // 0	2 // 0
Butts-8	2	2 // 0	0 // 0	2 // 0	2 // 0	1 // 0
Clayton-10	4	4 // 0	0 // 0	2 // 0	0 // 0	2 // 1
Clayton-11	3	3 // 0	1 // 0	2 // 0	1 // 0	0 // 0
Columbia-12	7	6 // 0	0 // 0	4 // 0	4 // 0	4 // 2
Douglas-15	2	2 // 0	0 // 0	0 // 0	1 // 0	2 // 1
Elbert-16	3	2 // 0	0 // 0	2 // 0	2 // 0	3 // 1
Fayette-17	3	3 // 0	0 // 0	1 // 0	2 // 0	1 // 0
Fayette-18	2	1 // 0	0 // 0	0 // 0	1 // 0	1 // 0

TABLE 8-4

GROUND-WATER MONITORING DATA FOR CY 2008, CONTINUED

Uranium Monitoring						
County-Base Station	No. of Step-out Stations	Number of Stations Showing:				
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Forsyth-19	6	5 // 0	2 // 0	0 // 0	4 // 0	5 // 3
Morgan-38	7	7 // 0	0 // 0	1 // 0	1 // 0	4 // 1
Morgan-39	6	4 // 0	0 // 0	2 // 0	2 // 0	4 // 2
Newton-41	9	9 // 0	1 // 0	2 // 0	6 // 0	4 // 1
Oglethorpe-42	6	4 // 0	0 // 0	0 // 0	2 // 0	4 // 3
Pike-44	4	4 // 0	1 // 0	0 // 0	3 // 0	1 // 0
Stephens-47	3	3 // 1	0 // 0	2 // 0	3 // 0	2 // 2
Talbot-50	2	2 // 0	0 // 0	0 // 0	0 // 0	1 // 0
Taylor-51	8	6 // 0	0 // 0	2 // 0	1 // 0	6 // 2
Towns-52	3	0 // 0	0 // 0	0 // 0	2 // 0	2 // 1
Warren-55	4	3 // 0	1 // 0	1 // 0	3 // 0	4 // 1
Washington-56	4	3 // 0	0 // 0	1 // 0	2 // 0	3 // 2
Wilkes-58	7	6 // 0	0 // 0	0 // 0	5 // 0	6 // 3

TABLE 8-5
GROUND-WATER MONITORING DATA FOR CY 2009

Uranium Monitoring						
County-Base Station No.	No. of Step-out Stations	Number of Stations Showing:				
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Baldwin-1	1	1 // 0	0 // 0	0 // 0	0 // 0	1 //0
Baldwin-2	3	2 // 0	0 // 0	1 // 0	2 // 0	2 // 1
Banks-4	4	4 // 0	0 // 0	1 // 0	3 // 0	1 // 0
Barrow-5	6	6 // 0	3 // 0	0 // 0	6 // 0	6 // 4
Butts-8	2	2 // 0	0 // 0	0 //0	1 // 0	1 // 0
Clarke-9	8	8 // 0	1 // 0	2 // 0	6 // 0	6 // 1
Clayton-11	1	1 // 0	0 // 0	0 // 0	1 // 0	1 // 1
Coweta-13	4	3 // 0	0 // 0	0 // 0	4 // 0	4 // 1
Crawford-14	4	4 // 0	0 // 0	0 // 0	0 // 0	2 // 0
Douglas-15	2	2 // 0	0 // 0	0 // 0	2 // 0	1 // 0
Elbert-16	1	1 // 0	0 // 0	1 // 0	0 // 0	1 // 0
Fayette-17	5	5 // 0	0 // 0	1 // 0	2 // 0	1 // 0
Fayette-18	3	3 // 0	1 // 0	2 // 1	3 // 0	2 // 2
Franklin-20	8	7 // 0	1 // 0	3 // 1	3 // 0	7 // 3
Franklin-21	4	4 // 0	0 // 0	0 // 0	4 // 0	4 // 4
Greene-22	8	8 // 2	1 // 0	4 // 1	5 // 0	6 // 0
Greene-23	8	8 // 0	0 // 0	2 // 0	6 // 0	6 // 3
Gwinnett-24	4	4 // 0	1 // 0	0 // 0	4 // 0	3 // 0
Habersham-25	4	3 // 0	1 // 0	0 // 0	3 // 0	3 // 1
Hancock-26	4	3 // 0	0 // 0	0 // 0	2 // 0	3 // 1
Jackson-27	4	4 // 1	0 // 0	3 // 0	1 // 0	2 // 2
Jackson-28	4	4 // 0	0 // 0	0 // 0	1 // 0	1 // 0
Jasper-29	4	4 // 0	0 // 0	0 // 0	3 // 0	2 // 0
Jasper-30	4	4 // 0	1 // 0	0 // 0	3 // 0	3 // 3
Jones-31	4	4 // 0	0 // 0	0 // 0	4 // 0	3 // 1
Jones-32	4	4 // 0	0 // 0	1 // 0	3 // 0	4 // 4
Lincoln-33	4	4 // 0	0 // 0	1 // 0	1 // 0	2 // 0
Lumpkin-34	4	1 // 0	0 // 0	0 // 0	1 // 0	2 // 0
McDuffie-35	4	2 // 0	0 // 0	0 // 0	2 // 0	2 // 2
McDuffie-36	4	4 // 0	2 // 0	0 // 0	0 // 0	3 // 1
Mitchell-37	4	0 // 0	0 // 0	3 // 0	2 // 0	2 // 0

TABLE 8-5

GROUND-WATER MONITORING DATA FOR CY 2009, CONTINUED

Uranium Monitoring						
County-Base Station	No. of Step-out Stations	Number of Stations Showing:				
		Nitrate/ Nitrate Detection// Exceedance	VOCs Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Newton-40	5	5 // 0	1 // 0	1 // 0	3 // 0	4 // 3
Oglethorpe-42	3	3 // 0	0 // 0	2 // 1	1 // 0	3 // 1
Paulding-43	3	2 // 0	0 // 0	0 // 0	0 // 0	3 // 3
Pike-44	4	4 // 0	0 // 0	1 // 0	2 // 0	2 // 1
Rabun-45	6	1 // 0	0 // 0	0 // 0	1 // 0	2 // 1
Rockdale-46	8	7 // 0	1 // 0	2 // 2	5 // 0	8 // 5
Stephens-47	1	1 // 0	0 // 0	0 // 0	1 // 0	1 // 1
Stephens-48	4	4 // 0	0 // 0	3 // 0	3 // 0	4 // 4
Stephens-49	4	4 // 0	0 // 0	1 // 0	3 // 0	1 // 0
Talbot-50	2	2 // 0	0 // 0	0 // 0	1 // 0	1 // 0
Towns-53	1	0 // 0	0 // 0	0 // 0	1 // 0	1 // 1
Turner-53	4	1 // 0	0 // 0	1 // 0	0 // 0	2 // 2
Walton-54	11	11 // 0	1 // 0	6 // 1	7 // 0	6 // 3
White-57	4	2 // 0	0 // 0	0 // 0	3 // 0	1 // 0
Wilkes-58	1	1 // 0	0 // 0	0 // 0	0 // 0	0 // 0

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.

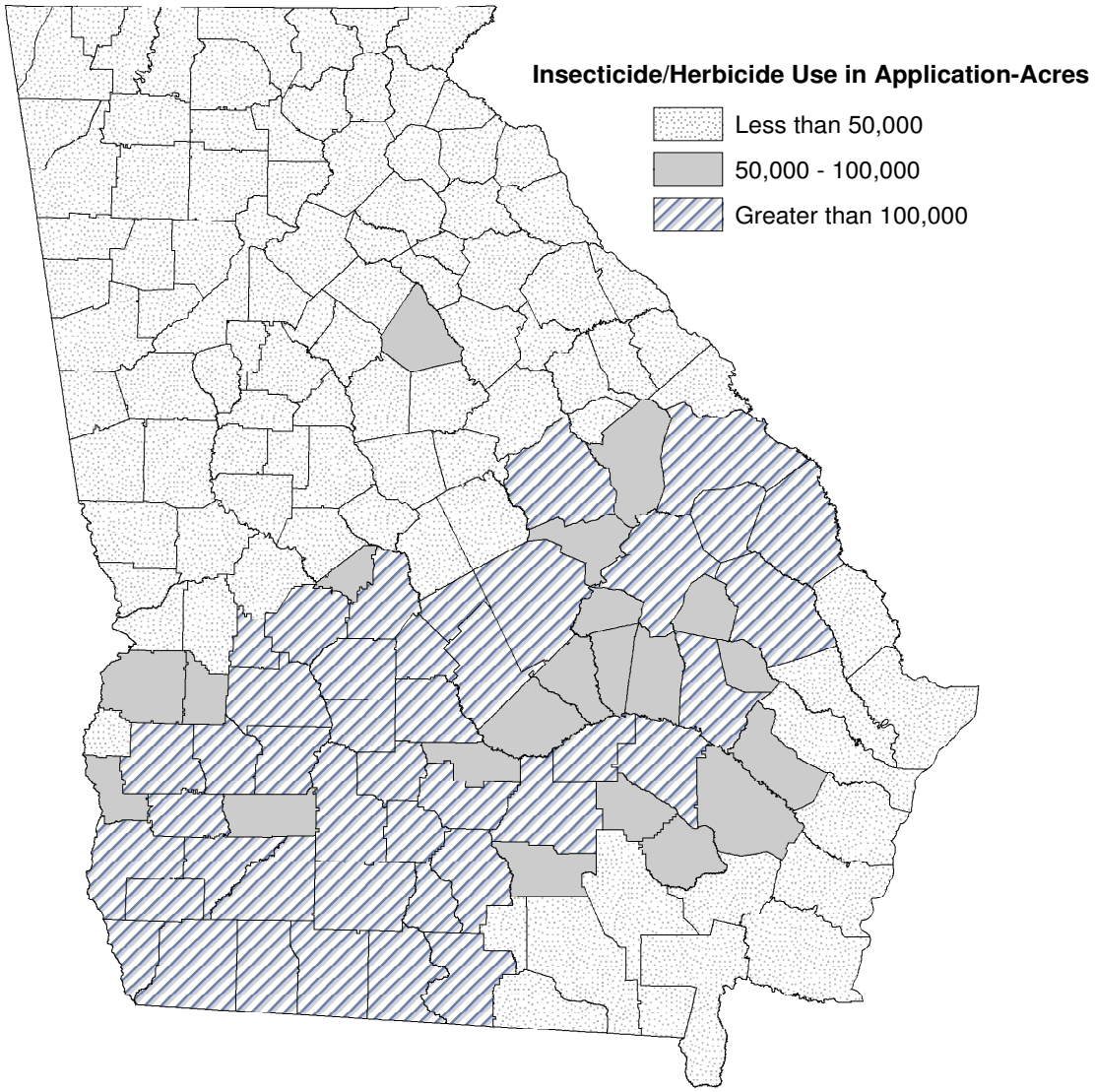
The new and final "Coastal Georgia Water & Wastewater Permitting Plan for Managing Salt Water Intrusion" describes the goals, policies, and actions the Environmental Protection Division (EPD) will undertake to manage the water resources of the 24-county area of coastal Georgia. The Plan is designed to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

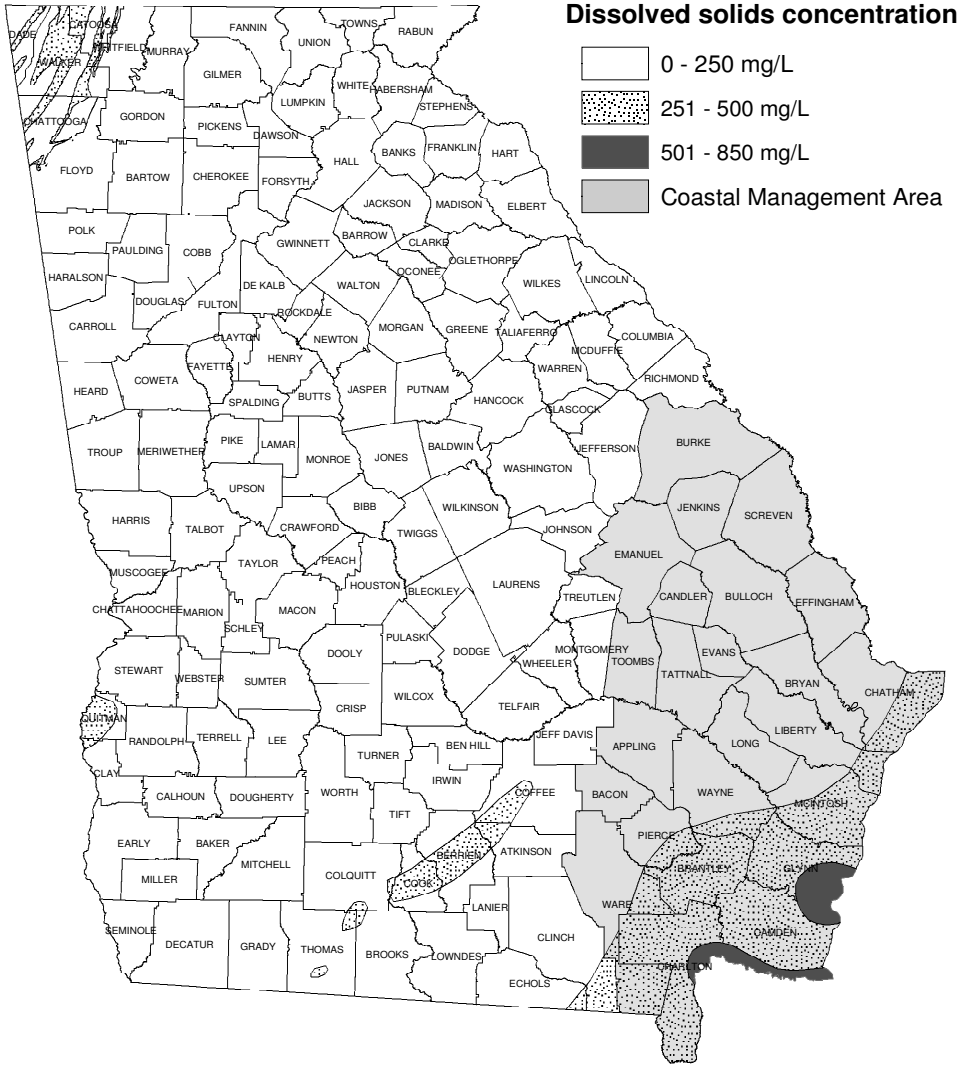
This final Plan for managing coastal Georgia salt water intrusion, withdrawal permitting, and wastewater management reflects the State's goal of sustainable use of both groundwater and surface waters, it supports regional economic growth and development, and contributes to protecting the short-term and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

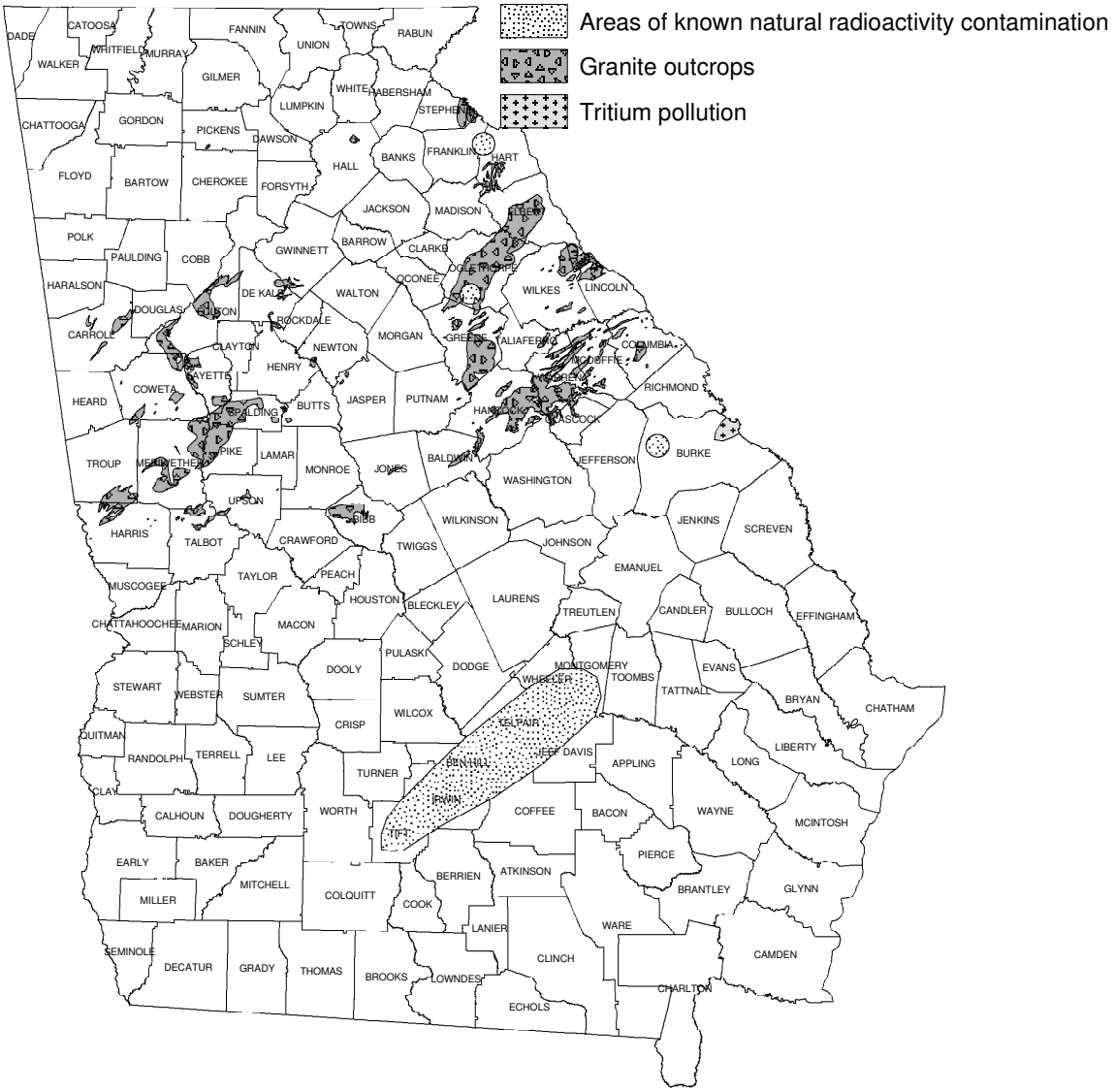
Some wells in Georgia produce water containing relatively high levels of naturally occurring iron and manganese. Another natural source of contamination is from radioactive minerals that are a minor rock constituent in some Georgia aquifers. While natural radioactivity may occur anywhere in Georgia (Figure 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, six (6) 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, 2009, the program has issued 431 UIC permits covering 9,771 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, 2009 Georgia had 215 active licensed water well drillers and 70 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.

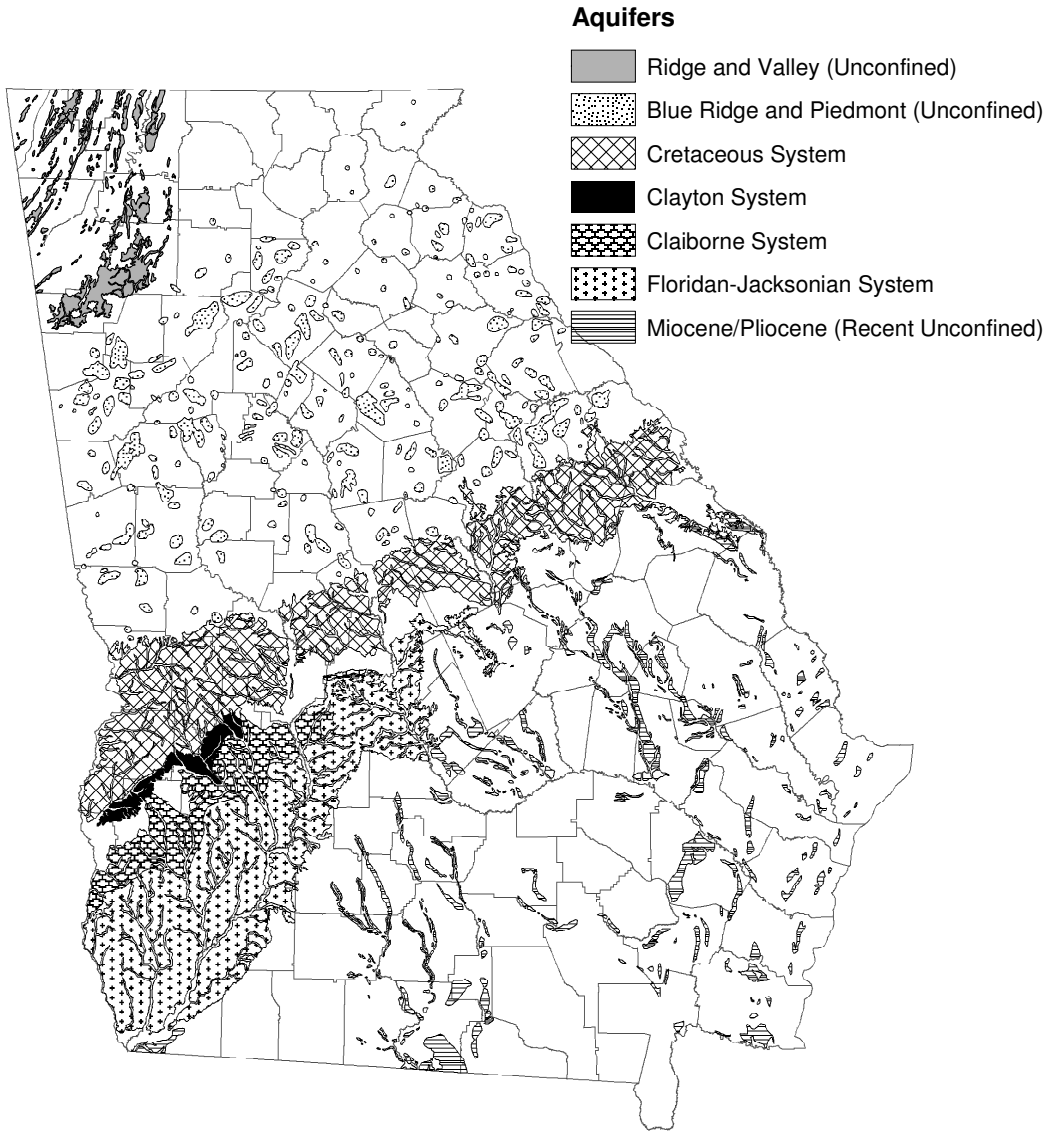
Some areas, where recharge to individual wells using the surficial or unconfined aquifers is taking place, are also significant recharge areas. To protect such wells, the GAEPD implemented a Wellhead Protection Program for municipal drinking water wells in 1993. Wells in confined aquifers have a small 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 1,604 active municipal ground water wells with Wellhead Protection Plans. A ten-year review of plans completed in 1998 and 1999 was completed in 2008 and 2009. 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 227 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*.

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. As of June 30, 2007, the State of Georgia had approximately 2,462 active PWS serving a population over 8.7 million people. Of the 2,462 public water systems, approximately 70% (1,737) provide water to residential customers. These systems are referred to as CWSs and serve at least 15 service connections used by year-round residents or regularly serve at least 25 year-round residents daily at least 60 days out of the year. Of the 1,737 community water systems, 227 (13%) of them are served by surface water sources and the rest 1,510 (87%) are served

by groundwater sources. 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 2008, the total number of systems exceeding the action level for lead and copper was 47. Out of the 47 systems, 5 of those systems exceeded both lead and copper (Pb/Cu) including 2 systems with a population between 3,301-10,000, 15 exceeded for copper only and 27 exceeded for lead only. Thirty of the systems that exceeded were community water systems (population less than 3,300) and 12 were non-transient-non-community water system (population less than 3,300). Ninety-seven percent of the systems that exceeded either parameter have completed the required water quality parameter and source water monitoring and all systems have performed the public education requirements.

During 2009, the total number of systems that exceeded the action level for Pb/Cu was 26. Twenty-four of those systems are community water systems with population less than 3,301 and 2 of those systems are non-transient-non-community system with a population less than 3,301). Out of the 26 systems that exceeded, 3 systems exceeded for both lead and copper, 8 systems exceeded for copper only and 15 systems exceeded for lead only. Over 30% of the systems that exceeded have conducted the required water quality parameters and source water monitoring and has also completed the public education requirements. These systems will remain in full monitoring until they have completed two consecutive rounds of monitoring without an exceedance.

The number of systems exceeding has dropped tremendously from years past.

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, 2008 through June 30, 2009, the following number of SWAPs were completed for each type of privately–owned ground water system: 164 community, 10 non-transient non-community, and 29 transient non-community.

CHAPTER 9

Major Issues and Challenges

Comprehensive Statewide Water Management Planning

Georgia is one of the fastest growing states in the nation. The burgeoning population places considerable demands on Georgia's ground and surface water resources in terms of water supply, water quality and assimilative capacity. The problems and issues are further complicated by the fact that surface water resources are limited in South Georgia and groundwater resources are limited in North Georgia. In some locations, the freshwater resources are approaching their sustainable limits.

Thus, several key issues and challenges to be addressed now and in the future years include (1) minimizing withdrawals of water by increasing conservation, efficiency and reuse, (2) maximizing returns to the basin by managing interbasin transfers and the use of septic tanks and land application of treated wastewater where water is limited, (3) meeting instream and offstream water demands through storage, aquifer management and reducing water demands, and (4) protecting water quality by reducing wastewater discharges and runoff from land to below the assimilative capacity of the streams.

The implementation of the Comprehensive Statewide Water Management Plan signed into law by Governor Perdue on February 6, 2008 provides Georgia a framework for addressing each of these key issues.

Nonpoint Source Pollution

The pollution impact on Georgia streams has radically shifted over the last two 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 hydrological systems. Nonpoint source pollution, although somewhat less dramatic than raw sewage, must be reduced and controlled to fully protect Georgia's streams. In addition to structural pollution controls, the use of 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, erosion and sedimentation controls, street cleaning and perhaps eventual limitations on pesticide and fertilizer usage.

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. 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.

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 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. Adding more pavement and other impervious surfaces, littering, driving cars which drip oils and antifreeze, applying fertilizers and pesticides 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 through Georgia Project WET (Water Education for Teachers) and Adopt-A-Stream programs.