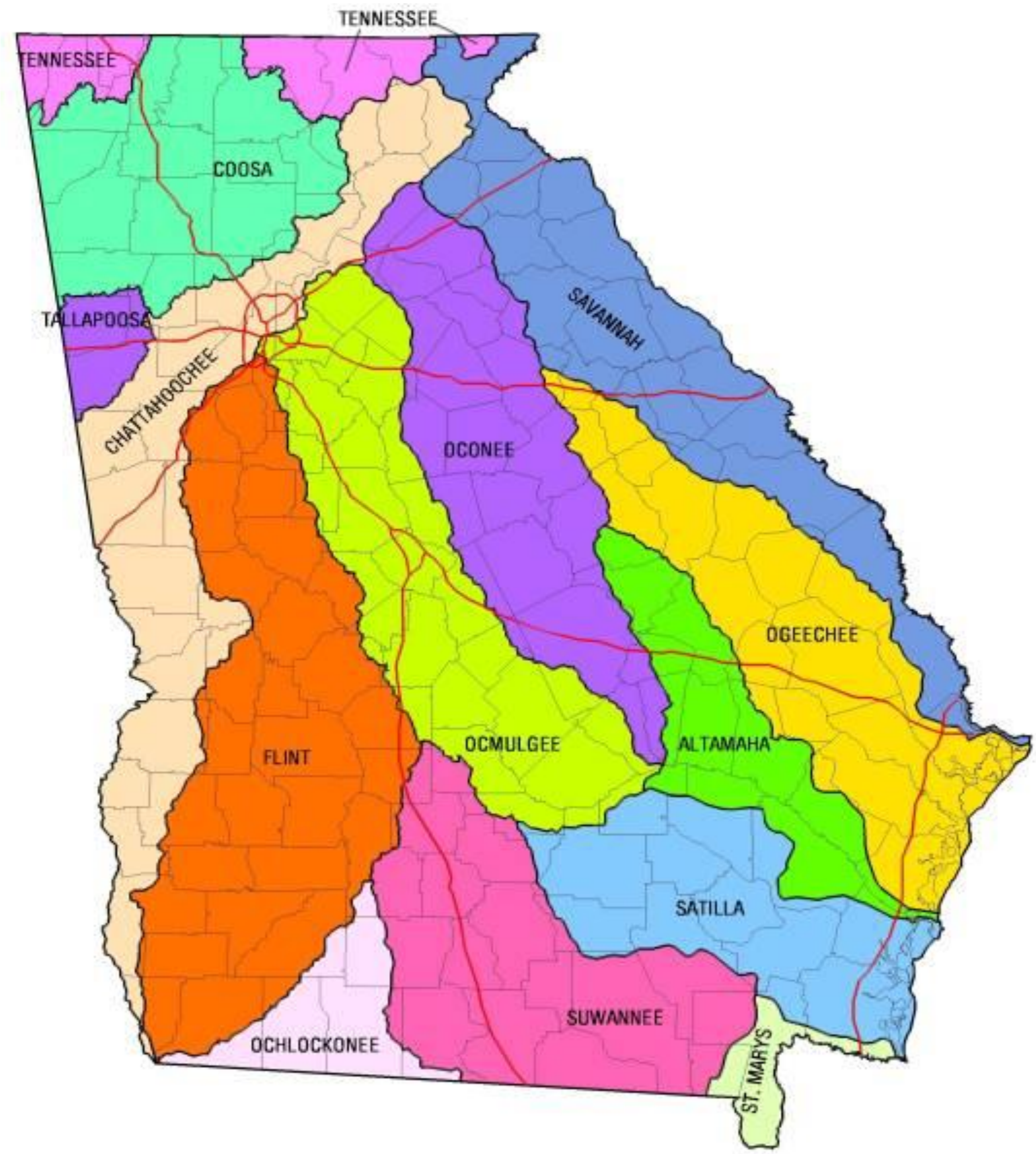
WATER QUALITY IN GEORGIA
2016-2017
(2018 Integrated 305b/303d Report)



Georgia Department of Natural Resources
Environmental Protection Division

WATER QUALITY IN GEORGIA
2016-2017
(2018 Integrated 305b/303d Report)

Preface

This report was prepared by the Georgia Environmental Protection Division (EPD), 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 may be available in EPD files.

This report covers a two-year period, January 1, 2016 through December 31, 2017. Comments or questions related to the content of this report are invited and should be addressed to:

Environmental Protection Division
Georgia Department of Natural Resources
Watershed Protection Branch
2 Martin Luther King, Jr. Drive, SE
Suite 1162 East Tower
Atlanta, Georgia 30334

This page is intentionally blank.

CHAPTER 1

Executive Summary

Purpose This report, *Water Quality in Georgia, 2016-20172016-2017*, was prepared by the Georgia Environmental Protection Division (EPD) of the Department of Natural Resources (DNR). The DNR Coastal Resources Division (CRD) and Wildlife Resources Division (WRD), the Georgia Forestry Commission, the Georgia Environmental Finance Authority, and the Georgia Soil and Water Conservation Commission also contributed portions of the report. In addition, water quality data was provided by a number of governmental agencies, environmental groups and universities.

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

This report provides an assessment of the water quality conditions of surface and groundwater in Georgia and includes a description of the nature, extent, and causes of documented water quality problems. This assessment of water quality problem areas serves as the basis for lists required by Sections 303(d), 314, and 319 of the Clean Water Act. The report also includes a review and summary of ongoing statewide water planning efforts; wetland, estuary, and coastal public health/aquatic life issues; and water protection, groundwater, and drinking water program summaries.

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

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

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

The GAEPD has designated the Georgia Soil and Water Conservation Commission as the lead agency for dealing with water quality problems caused by agriculture. The Georgia Forestry Commission has been designated by the GAEPD as the lead agency to deal with water quality problems due to commercial forestry operations.

Watershed Protection Programs

Background Georgia is rich in water resources. The State has approximately 44,056 miles of perennial streams, 23,906 miles of intermittent streams, and 603 miles of ditches and canals for a total of 70,150 stream miles. The State also has 4.8 million acres of wetlands (9% tidally affected), 425,582 acres of public lakes and reservoirs, 854 square miles of estuaries, and 100 miles of coastline. This rich water heritage is often taken for granted. However, unusual events such as the flood in the summer of 1994 and drought conditions experienced throughout Georgia in 1986, 1988, 1999-2002, 2007-2008, and 2012 serve as reminders that water resources cannot be taken for granted and sound regulatory programs are necessary to protect these resources.

In 2016-2017, the GAEPD placed emphasis on comprehensive statewide water management planning, monitoring and assessment, water quality modeling and TMDLs, TMDL implementation, State revolving and Georgia Fund loan programs, NPDES permitting and enforcement, nonpoint source pollution abatement, stormwater management, erosion and sediment control and public participation projects.

Comprehensive State-wide Water Management Planning In 2004 the Georgia General Assembly passed new water planning legislation to take the place of river basin planning. The 2004 Comprehensive State-wide Water Management Planning Act called for the preparation of a comprehensive statewide water plan and provided fundamental goals and guiding principles for the development of the plan. The Statewide Water Plan was completed in 2008 and the Regional Water Councils completed plans in 2011 and updated those plans in 2017. This work is discussed in Chapter 2.

Watershed Projects The GAEPD is working with USEPA and South Carolina on several Savannah River projects; with the USEPA and the Alabama Department of Environmental Management (ADEM) on water quality issues in the Coosa River and Lake Weiss; with the Florida Department of Environmental Protection (FDEP) on nutrient issues in Lake Talquin; and with the FDEP and the Suwannee River Water Management District to coordinate water protection efforts in the Suwannee River Basin. This work is discussed in Chapter 7.

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

Water Quality Modeling/ Wasteload Allocation/ TMDL Development The GAEPD conducted a significant amount of modeling in 2016-2017 in support of the development of wasteload allocations and total maximum daily loads (TMDLs). Over the 2016-2017 period, 147 TMDLs were finalized and approved by EPA, 106 TMDLs were developed and public noticed, and 5 TMDLs were revised and public noticed. To date more than 1880 TMDLs have been developed for 303(d) listed waters in Georgia. This work is discussed in Chapter 7.

TMDL Implementation As TMDLs are developed, plans are needed to guide implementation of pollution reduction strategies. TMDLs are implemented through changes in NPDES permits to address needed point source improvements and/or implementation of best management practices to address nonpoint sources of pollution. TMDL implementation is discussed in Chapter 7.

Clean Water Revolving and Georgia Fund Loan Programs In 2016-2017 funds were obligated to communities for a variety of wastewater infrastructure and pollution prevention projects through the Georgia Environmental Finance Authority (GEFA) in the form of low-interest, SRF and Georgia Fund loans. The loan programs are discussed in Chapter 7.

Metro District Planning The Metropolitan North Georgia Water Planning District (District) updated the comprehensive regional and watershed-specific plans to be implemented by local governments in the District in 2009. The EPD is charged with the enforcement of the District plans. State law prohibits the Director from approving any application by a local government in the District to issue, modify, or renew a permit, if such permit would allow an increase in the permitted water withdrawal, public water system capacity, or waste-water treatment system capacity of such local government, or any NPDES Phase I or Phase II General Stormwater permit; unless such local government is in compliance with the applicable provisions of the plan, or the Director certifies that such local government is making good faith efforts to come into compliance. This work is discussed in Chapter 7.

NPDES Permitting and Enforcement Significant resources were allocated to wastewater discharge permit reissuance activities in 2016-2017. NPDES permits were issued, modified or reissued for 98 municipal and private discharges and for 83 industrial discharges. Compliance and enforcement activities continued to receive significant attention in. 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.

Permitting, compliance and enforcement work is discussed in Chapter 7.

Concentrated Animal Feeding Operations Georgia adopted rules for swine feeding operations in 1999. Rules were adopted for animal (non-swine) feeding operations in 2001. During 2002 and 2003, rules were developed and implemented for large chicken feeding operations. Revisions of those rules, designed to reflect changes in the federal regulations and recent court decisions, are planned. Work was continued in 2016-2017 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 2016-2017 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 FY15-FY17, Georgia's Section 319(h) grant project funded 30 new projects for over $6.5 million. The nonpoint source programs are described in Chapter 7.

Stormwater Management The GAEPD developed its Phase 1 Storm Water Permitting Strategy in February 1991. In 1994-1995 a total of 58 NPDES permits were issued to large and medium municipal separate storm sewer systems (MS4s). The 45 NPDES permits covering the Atlanta metro area were reissued in 1999, 2004, and 2009, and 2014. The 12 NPDES permits for medium MS4s were reissued in 2000, 2005, 2010, and 2014. EPD expects to reissue the permits in 2019.

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 and 2013, corresponding to the 2000 and 2010 US Census population figures and urban area mapping. In December 2017 GAEPD reissued the NPDES General Permit for Phase II MS4s. This permit currently regulates 107 municipalities. In 2009, a Phase II MS4 General NPDES Permit was issued to seven Department of Defense (DOD) facilities. Two of the bases closed in 2011, reducing the number of permitted DOD facilities to five. The NPDES Permit for these facilities was reissued in 2014. In 2016, Fort Gillem Enclave was designated and obtained coverage under the DOD permit. In 2012, GAEPD issued a Phase II MS4 General Stormwater Permit to the Georgia Department of Transportation, which is applicable to post-construction runoff in jurisdictions with MS4 permits EPD reissued this permit in 2017.

In 1993, a general NPDES permit for storm water associated with industrial activity was issued. This permit was most recently reissued in 2017, with approximately 2,362 facilities retaining coverage. Stormwater management is discussed in Chapter 7.

Erosion and Sediment Control The Georgia Erosion and Sedimentation Act was signed into law in 1975, and has been amended several times. The intent of the Act was to establish a comprehensive and statewide soil, erosion and sedimentation control 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. EPD implements the program where there is no local ordinance. Erosion and sediment control work is discussed in Chapter 7.

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

In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act", O.C.G.A. § 12-5-522, which called for the development of a statewide water management plan. Work was completed on the Statewide Water Plan and the plan was approved by the General Assembly and Governor Perdue in February 2008. Regional Water Councils and the Metro District were charged with the responsibility of developing water plans to provide a roadmap for sustainable use of Georgia's water resources. The Councils submitted initial recommended plans to the GAEPD in May 2011. The plans were publicly noticed and comments received were thoroughly reviewed. Appropriate revisions were made to the initial plans and final recommended regional water plans were submitted to the GAEPD in September 2011. On November 15, 2011, by action of Director Barnes, the GAEPD officially adopted all ten Regional Water Plans.

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

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

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

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

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

CHAPTER 2
Comprehensive State-wide Water Management Planning

Legislation

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

State Water Plan Development

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

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

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

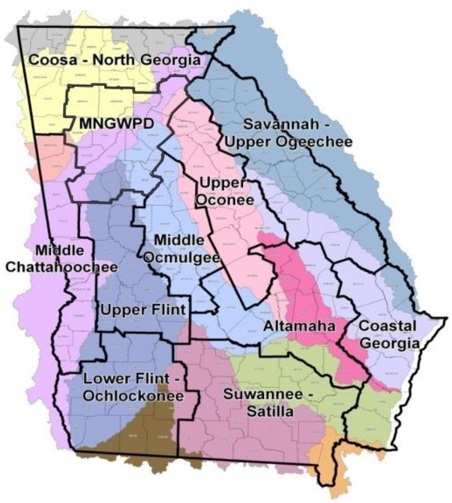
The Georgia General Assembly debated the provisions of the proposed water plan and both chambers approved the plan. Governor Perdue signed HR 1022, the Statewide Water Management Plan, on February 6, 2008. A copy of the plan is available at https://waterplanning.georgia.gov/.

State Water Plan Implementation

Introduction. The State Water Plan included several innovative concepts. One concept was the idea of appointing regional water planning councils whose responsibility would be to develop regional water plans. A second concept was the development of regional forecasts of water supply and wastewater demands based on forecasts of population and employment for a region. A third concept was the development of water resource assessments to provide information to each Council on available water supply and assimilative capacity. Each of these concepts is discussed below.

Regional Water Planning Councils. The regional water planning councils (Councils) represent regions in Georgia as designated in the State Water Plan and adjusted by approved petition. Each Council includes individuals appointed by the Governor, Lt. Governor, and Speaker of the House. The Metropolitan North Georgia Water Planning District (Metro District), a separate water planning entity created by the legislature in 2001, participated fully in the statewide planning process. A map of the water planning regions is shown below.

Final Delineation of Water Planning Regions



The role of each Water Council is to prepare a plan to manage available water resources within its region. Each plan was based on resource assessments and estimates of current and future water needs. More detailed information on each regional water planning council can be found athttps://waterplanning.georgia.gov/.

Forecasts of Water and Wastewater Demands. Understanding the capacities of water resources to meet the demands placed on them is critical to managing water for the future. In order for the Councils to produce regional water plans, forecasts of water and wastewater needs were needed. Long-range population and employment projections were prepared in order to forecast demand for municipal and industrial water and wastewater. Population and employment projections were provided to each water council by the Governor's Office of Planning and Budget (OPB). Local governments and Councils were provided an opportunity to comment on the forecasts and the methodologies, assumptions, and data sources used to produce the projections. This input was considered prior to the use of the projections in the water demand planning process. Using the vetted population and employment forecasts, projections of water and wastewater demand were prepared to support regional water planning, providing this information on a consistent, statewide basis for the first time. Water and wastewater demand forecasts were developed for the following water use sectors: Municipal, Industrial, Agricultural, and Energy. Each Council received draft forecasts developed in10 year increments through 2050 for consideration and use in the planning process. More detailed information on the population and employment projections and the water and wastewater demand forecasts can be found athttps://waterplanning.georgia.gov/.

Water Resource Assessments. Water resource assessments were also one of the building blocks for regional water planning. The assessments included the compilation and analysis of data and modeling to evaluate the capacity of water resources to meet current and future demands for water supply and wastewater discharge within thresholds selected to indicate the potential for local or regional impacts.

The GAEPD, with the assistance of other state agencies, the University System of Georgia and other research institutions, the U.S. Geological Survey and contractors conducted water resource assessments to determine Surface Water Availability, Groundwater Availability, and Surface Water Quality (Assimilative Capacity). The resource assessment results for current and future conditions were provided to each regional water planning council for their consideration and use in the planning process.

More detailed information on the water resource assessments can be found athttps://waterplanning.georgia.gov/.

Regional Water Plan Development

The Councils and the Metro District developed regional water plans that provide a roadmap for sustainable use of Georgia's water resources. The Councils' initials Regional Water Plans were publicly noticed and revised in 2011, and the final recommended regional water plans were adopted by GAEPD in November 2011. Beginning in late 2015, the Councils considered updates to water and wastewater demand forecasts for the Municipal, Agricultural and Energy sectors, as well as updated resource assessment information. Based on that review, the Councils updated their Regional Water Plans, which were adopted by GAEPD in July 2017.

The regional water plans represent solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities. The plans are based on consistent, statewide forecasts of needs and reflected the best available information on the capacities of Georgia's water resources. The tools used to assess the capacities were tested and refined, and will be further refined as the information for planning and management continues to improve. The process and results of regional planning, taken together, provide a solid footing for plan implementation and future plan updates. The full plans can be reviewed athttps://waterplanning.georgia.gov/.

Regional Water Plan Implementation

Local governments, utilities, industries, and other water users in each region help implement the plans, and the plans are used to guide state agency decisions on water permits and loans for water-related projects. Contractors support the regional water planning councils in assessing implementation conducted in their regions, and reports were completed in June 2014 regarding the status of plan implementation. GAEPD has also established a regional water plan seed grant program to administer funds each year to support implementation projects in the regions.

During the ongoing planning process, the State continues to make investments in water quality data collection and the development of modeling tools to extend and improve the information and tools used in water planning and management.

This work will continue to pay off over time, advancing the ability to manage Georgia's water resources in a sustainable manner to support the state's economy, to protect public health and natural systems, and to enhance the quality of life for all citizens (O.C.G.A. 12-5-522(a)).

.

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 Georgia Water Quality Control Act 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 (2016 Estimate)	10,097,340
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 adopted for chlorophyll-a,

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

	Bacteria		Dissolved Oxygen[1] (other than trout streams)[2]		pH	Temperature (other than trout streams)[2]	
Use Classification	**30-Day Geometric Mean[3] (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 fecal coliform (Nov-April) 200 fecal coliform (May-Oct)	4,000 fecal coliform (Nov-April)	5.0	4.0	6.0-8.5	5	90
Recreation	126 E coli (Freshwater) 35 Enterococci (Coastal)	410 E coli STV (Freshwater) 130 Entercocci STV (Coastal)	5.0	4.0	6.0-8.5	5	90
Coastal Fishing[4]	1,000 fecal coliform (Nov-Apr) 200 fecal coliform (May-Oct)	4,000 fecal coliform (Nov-Apr)	5.0 If it is determined that the "natural condition" in the waterbody is less than the values stated above, then the criteria will revert to the "natural condition" and the water quality standard will allow for a 0.1 mg/L deficit from the "natural" dissolved oxygen value. Up to a 10% deficit will be allowed if it is demonstrated that resident aquatic species shall not be adversely affected.	4.0	6.0-8.5	5	90
Fishing	1,000 fecal coliform (Nov-April) 200 fecal coliform (May-Oct)	4,000 fecal coliform (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]The dissolved oxygen criteria as specified in individual water use classifications shall be applicable at a depth of one meter below the water surface; in those instances where depth is less than two meters, the dissolved oxygen criterion shall be applied at a mid-depth. On a case specific basis, alternative depths may be specified.

[2]Standards for Trout Streams for dissolved oxygen are a daily average of 6.0 mg/L and a minimum of 5.0 mg/L. No temperature alteration is allowed in Primary Trout Streams and a temperature change of 2°F is allowed in Secondary Trout Streams.

[3]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.

[4]Standards are same as fishing with the exception of dissolved oxygen, which is site specific.

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 and other restoration activities, support enforcement actions, establish wasteload allocations for new and

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

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

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

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

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

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

[1] The in-stream criterion is expressed in terms of the dissolved fraction in the water column. Conversion factors used to calculate dissolved criteria are found in the EPA document – National Recommended Water Quality Criteria – EPA 2006.
[2] The in-stream criterion is lower than the EPD laboratory detection limits (A "*" indicates that the criterion may be higher than or lower than EPD laboratory detection limits depending upon the hardness of the water).
[3] The aquatic life criteria for these metals are expressed as a function of total hardness (mg/L) in a water body. Values in the table above assume a hardness of 50 mg/L CaCO3. For other hardness values, the following equations from the EPA document – National Recommended Water Quality Criteria – EPA 2006 should be used.

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

<u>Site-specific Copper criteria developed using the biotic ligand model (BLM):</u>

<u>Buffalo Creek (Richards Lake Dam to confluence with Little Tallapoosa River):</u>

Acute criteria $= 4.9X10^8 \ e^{\left(-0.5\left(\left(\frac{(\ln(pH)-2.316)}{-0.1816}\right)^2+\left(\frac{(\ln(DOC)-32.18)}{-5.458}\right)^2\right)\right)}$

Chronic criteria $= 3.043X10^8 \ e^{\left(-0.5\left(\left(\frac{(\ln(pH)-2.316)}{-0.1816}\right)^2+\left(\frac{(\ln(DOC)-32.18)}{-5.458}\right)^2\right)\right)}$

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 (CAS RN[1] 57749)	
	(a) Freshwater	0.0043 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.004 µg/L*
2.	Cyanide (CAS RN[1] 57125)	
	(a) Freshwater	5.2 µg/L*
	(b) Coastal and Marine Estuarine Waters	1.0 µg/L*
3.	Dieldrin (CAS RN[1] 60571)	
	(a) Freshwater	0.056 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0019 µg/L*
4.	4,4'-DDT (CAS RN[1] 50293)	0.001 µg/L*
5.	a-Endosulfan (CAS RN[1] 959988)	
	(a) Freshwater	0.056 µg/L*
	(b) Coastal and Marine Estuarine Waters	0.0087 µg/L*
6.	b-Endosulfan (CAS RN[1] 33213659)	
	(a) Freshwater	0.056 µg/L*

	(b) Coastal and Marine Estuarine Waters	0.0087 μg/L*
7.	Endrin (CAS RN[1] 72208)	
	(a) Freshwater	0.036 μg/L*
	(b) Coastal and Marine Estuarine Waters	0.0023 μg/L*
8.	Heptachlor (CAS RN[1] 76448)	
	(a) Freshwater	0.0038 μg/L*
	(b) Coastal and Marine Estuarine Waters	0.0036 μg/L*
9.	Heptachlor Epoxide (CAS RN[1] 1024573)	
	(a) Freshwater	0.0038 μg/L*
	(b) Coastal and Marine Estuarine Waters	0.0036 μg/L*
10	Pentachlorophenol (CAS RN[1] 87865)	
	(a) Freshwater[2]	15 μg/L*[2]
	(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 (CAS RN[1] 108952)	300 μg/L
13.	Toxaphene (CAS RN[1] 8001352)	0.0002 μg/L*

[1]"CAS RN" or the Chemical Abstract Service (CAS) Registry Number is a unique numerical identifier assigned to each chemical and some chemical mixtures.
[2]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 (CAS RN[1] 83329)	990 μg/L
2.	Acenaphthylene (CAS RN[1] 208968)	**
3.	Acrolein (CAS RN[1] 107028)	9.3 μg/L
4.	Acrylonitrile (CAS RN[1] 107131)	0.25 μg/L
5.	Aldrin (CAS RN[1] 309002)	0.000050 μg/L
6.	Anthracene (CAS RN[1] 120127)	40000 μg/L
7.	Antimony	640 μg/L
8.	Arsenic (Total)	
	(a) Drinking Water Supplies	10 μg/L
	(b) All Other Classifications	50 μg/L
9.	Benzidine (CAS RN[1] 92875)	0.0002 μg/L
10.	Benzo(a)Anthracene (CAS RN[1] 56553)	0.018 μg/L
11.	Benzo(a)Pyrene (CAS RN[1])	0.018 μg/L
12.	3,4-Benzofluoranthene (CAS RN[1] 205992)	0.018 μg/L
13.	Benzene (CAS RN[1] 71432)	51 μg/L
14.	Benzo(ghi)Perylene (CAS RN[1] 191242)	**
15.	Benzo(k)Fluoranthene (CAS RN[1] 207089)	0.018 μg/L
16.	Beryllium	**
17.	a-BHC-Alpha (CAS RN[1] 319846)	0.0049 μg/L
18.	b-BHC-Beta (CAS RN[1] 319857)	0.017 μg/L
19.	Bis(2-Chloroethyl)Ether (CAS RN[1] 111444)	0.53 μg/L
20.	Bis(2-Chloroisopropyl)Ether (CAS RN[1] 108601)	65000 μg/L
21.	Bis(2-Ethylhexyl)Phthalate (CAS RN[1] 117817)	2.2 μg/L
22.	Bromoform (Tribromomethane) (CAS RN[1] 75252)	140 μg/L
23.	Butylbenzyl Phthalate (CAS RN[1] 85687)	1900 μg/L
24.	Carbon Tetrachloride (CAS RN[1] 56235)	1.6 μg/L
25.	Chlorobenzene (CAS RN[1] 108907)	1600 μg/L
26.	Chlorodibromomethane (CAS RN[1] 124481)	13 μg/L
27.	2-Chloroethylvinyl Ether (CAS RN[1] 110758)	**
28.	Chlordane (CAS RN[1] 57749)	0.00081 μg/L
29.	Chloroform (Trichloromethane) (CAS RN[1] 67663)	470 μg/L
30.	2-Chloronaphthalene (CAS RN[1] 91587)	1600 μg/L
31.	2-Chlorophenol (CAS RN[1] 95578)	150 μg/L
32.	Chrysene (CAS RN[1] 218019)	0.018 μg/L
33.	Dibenzo(a,h)Anthracene (CAS RN[1] 53703)	0.018 μg/L
34.	Dichlorobromomethane (CAS RN[1] 75274)	17 μg/L

35.	1,2-Dichloroethane (CAS RN[1] 107062)	37 μg/L
36.	1,1-Dichloroethylene (CAS RN[1] 75354)	7100 μg/L
37	1,2 – Dichloropropane (CAS RN[1] 78875)	15 μg/L
38.	1,3-Dichloropropylene (CAS RN[1] 542756)	21 μg/L
39.	2,4-Dichlorophenol (CAS RN[1] 120832)	290 μg/L
40.	1,2-Dichlorobenzene (CAS RN[1] 95501)	1300 μg/L
41.	1,3-Dichlorobenzene (CAS RN[1] 541731)	960 μg/L
42.	1,4-Dichlorobenzene (CAS RN[1] 106467)	190 μg/L
43.	3,3'-Dichlorobenzidine (CAS RN[1])	0.028 μg/L
44.	4,4'-DDT (CAS RN[1] 50293)	0.00022 μg/L
45.	4,4'-DDD (CAS RN[1] 72548)	0.00031 μg/L
46.	4,4'-DDE (CAS RN[1] 72559)	0.00022 μg/L
47.	Dieldrin (CAS RN[1] 60571)	0.000054 μg/L
48.	Diethyl Phthalate (CAS RN[1] 84662)	44000 μg/L
49.	Dimethyl Phthalate(CAS RN[1] 131113)	1100000 μg/L
50.	2,4-Dimethylphenol (CAS RN[1] 105679)	850 μg/L
51.	2,4-Dinitrophenol (CAS RN[1] 51285)	5300 μg/L
52.	Di-n-Butyl Phthalate (CAS RN[1] 84742)	4500 μg/L
53.	2,4-Dinitrotoluene (CAS RN[1] 121142)	3.4 μg/L
54.	1,2-Diphenylhydrazine (CAS RN[1] 122667)	0.20 μg/L
55.	Endrin (CAS RN[1] 72208)	0.060 μg/L
56.	Endrin Aldehyde (CAS RN[1] 7421934)	0.30 μg/L
57.	alpha – Endosulfan (CAS RN[1] 959988)	89 μg/L
58.	beta – Endosulfan (CAS RN[1] 33213659)	89 μg/L
59.	Endosulfan Sulfate (CAS RN[1] 1031078)	89 μg/L
60.	Ethylbenzene (CAS RN[1] 100414)	2100 μg/L
61.	Fluoranthene (CAS RN[1] 206440)	140 μg/L
62.	Fluorene (CAS RN[1] 86737)	5300 μg/L
63.	Heptachlor (CAS RN[1] 76448)	0.000079 μg/L
64.	Heptachlor Epoxide (CAS RN[1] 1024573)	0.000039 μg/L
65.	Hexachlorobenzene (CAS RN[1] 118741)	0.00029 μg/L
66.	Hexachlorobutadiene (CAS RN[1] 87683)	18 μg/L
67.	Hexachlorocyclopentadiene (CAS RN[1] 77474)	1100 μg/L
68.	Hexachloroethane (CAS RN[1] 67721)	3.3 μg/L
69.	Indeno(1,2,3-cd)Pyrene (CAS RN[1] 193395)	0.018 μg/L
70.	Isophorone (CAS RN[1] 78591)	960 μg/L
71.	Lindane [Hexachlorocyclohexane (g-BHC-Gamma)](CAS RN[1] 58899)	1.8 μg/L
72.	Methyl Bromide (Bromomethane) (CAS RN[1] 74839)	1500 μg/L
73.	Methyl Chloride (Chloromethane) (CAS RN[1] 74873)	**
74.	Methylene Chloride (CAS RN[1] 75092)	590 μg/L
75.	2-Methyl-4,6-Dinitrophenol (CAS RN[1] 534521)	280 μg/L
76.	3-Methyl-4-Chlorophenol (CAS RN[1] 59507)	**
77.	Nitrobenzene (CAS RN[1] 98953)	690 μg/L
78.	N-Nitrosodimethylamine (CAS RN[1] 62759)	3.0 μg/L
79.	N-Nitrosodi-n-Propylamine (CAS RN[1] 621647)	0.51 μg/L
80.	N-Nitrosodiphenylamine (CAS RN[1] 86306)	6.0 μg/L
81.	PCBs	0.000064 μg/L
82.	Pentachlorophenol (CAS RN[1] 87865)	3.0 μg/L
83.	Phenanthrene (CAS RN[1] 85018)	**
84.	Phenol (CAS RN[1] 108952)	857000 μg/L
85.	Pyrene (CAS RN[1] 129000)	4000 μg/L
86.	1,1,2,2-Tetrachloroethane (CAS RN[1] 79345)	4.0 μg/L
87.	Tetrachloroethylene (CAS RN[1] 127184)	3.3 μg/L
88.	Thallium	0.47 μg/L
89.	Toluene (CAS RN[1] 108883)	5980 μg/L
90.	Toxaphene (CAS RN[1] 8001352)	0.00028 μg/L
91.	1,2-Trans-Dichloroethylene (CAS RN[1] 156605)	10000 μg/L
92.	1,1,2-Trichloroethane (CAS RN[1] 79005)	16 μg/L
93.	Trichloroethylene (CAS RN[1] 79016)	30 μg/L
94.	2,4,6-Trichlorophenol (CAS RN[1] 88062)	2.4 μg/L
95.	1,2,4-Trichlorobenzene (CAS RN[1] 120821)	70 μg/L
96.	Vinyl Chloride (CAS RN[1] 75014)	2.4 μg/L

[1]"CAS RN" or the Chemical Abstract Service (CAS) Registry Number is a unique numerical identifier assigned to each chemical and some chemical mixtures.
**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 0.0000000051 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 the chlorophyll a concentrations at the locations listed below more than once in a five-year period.

1. Upstream from the Dam in the Forebay	22 μg/L
2. LaGrange Water Intake	24 μg/L

(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) Total Phosphorus: Total lake loading shall not exceed 2.4 pounds per acre-foot of lake volume per year.
(v) 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)(iii).
2. New River to West Point Dam: E. coli 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: Not to exceed 90°F. At no time is the temperature of the receiving waters to be increased more than 5°F above intake temperature.
(viii) Major Lake Tributaries: For the following tributaries, the annual total phosphorus loading to West Point Lake shall not exceed the following:

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

(b) Lake Walter F. George: Those waters impounded by Walter F. George Dam and upstream to Georgia Highway 39 near Omaha.
(i) Chlorophyll a: For the months of April through October, the average of monthly photic zone composite samples shall not exceed 18 μg/L at mid-river at U.S. Highway 82 or 15 μg/L at mid-river in the dam forebay more than once in a five-year period.
(ii) pH: Within the range of 6.0-9.5 standard units.
(iii) Total Nitrogen: Not to exceed 3.0 mg/L as nitrogen in the photic zone.
(iv) Total Phosphorous: Total lake loading shall not exceed 2.4 pounds per acre-foot of lake volume per year.
(v) Bacteria:
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: E. coli shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).

(vi) Dissolved Oxygen: A daily average of no less than 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3-6-.03(5)(f).
(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).
(viii) Major Lake Tributary: The annual total phosphorous loading to Lake Walter F. George, monitored at the Chattahoochee River at Georgia Highway 39, shall not exceed 2,000,000 pounds.

(c) Lake Jackson: Those waters impounded by Lloyd Shoals Dam and upstream to Georgia Highway 36 on the South and Yellow Rivers, upstream to Newton Factory Bridge Road on the Alcovy River and upstream to Georgia Highway 36 on Tussahaw Creek.
(i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed 20 μg/L at a location approximately 2 miles downstream of the confluence of the South and Yellow Rivers at the junction of Butts, Newton and Jasper Counties more than once in a five-year period.
(ii) pH: Within the range of 6.0-9.5 standard units.
(iii) Total Nitrogen: Not to exceed 4.0 mg/L as nitrogen in the photic zone.
(iv) Total Phosphorous: Total lake loading shall not exceed 5.5 pounds per acre-foot of lake volume per year.
(v) Bacteria: E. coli shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).
(vi) Dissolved Oxygen: A daily average of 5.0 mg/L and no less than 4.0 mg/L at all times at the depth specified in 391-3-6-.03(5)(f).
(vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).
(viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading to Lake Jackson shall not exceed the following:

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

(d) Lake Allatoona: Those waters impounded by Allatoona Dam and upstream to State Highway 5 on the Etowah River, State Highway 5 on Little River, the Lake Acworth dam, and the confluence of Little Allatoona Creek and Allatoona Creek. Other impounded tributaries to an elevation of 840 feet mean sea level corresponding to the normal pool elevation of Lake Allatoona.
(i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. Upstream from the Dam	10 μg/L
2. Allatoona creek upstream from I-75	12 μg/L
3. Mid-Lake downstream from Kellogg Creek	10 μg/L
4. Little River upstream from Highway 205	15 μg/L
5. Etowah River upstream from Sweetwater Creek	14 μg/L

(ii) pH: within the range of 6.0-9.5 standard units
(iii) Total Nitrogen: Not to exceed a growing season average of 4 mg/L as nitrogen in the photic zone.
(iv) Total Phosphorous: Total lake loading shall not exceed 1.3 pounds per acre-foot of lake volume per year.
(v) Bacteria :
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; E. coli 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)	12,500 lbs/yr

(e) Lake Sidney Lanier: Those waters impounded by Buford Dam and upstream to Belton Bridge Road on the Chattahoochee River, 0.6 miles downstream from State Road 400 on the Chestatee River, as well as other impounded tributaries to an elevation of 1070 feet mean sea level corresponding to the normal pool elevation of Lake Sidney Lanier.
(i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:

1. Upstream from the Buford Dam forebay	5 μg/L
2. Upstream from the Flowery Branch confluence	6 μg/L

3. At Browns Bridge Road (State Road 369) 7 μg/L
4. At Bolling Bridge (State Road 53) on Chestatee River 10 μg/L
5. At Lanier Bridge (State Road 53) on Chattahoochee River 10 μg/L

(ii) pH: Within the range of 6.0-9.5 standard units.
(iii) Total Nitrogen: Not to exceed 4 mg/L as nitrogen in the photic zone.
(iv) Total Phosphorous: Total lake loading shall not exceed 0.25 pounds per acre-foot of lake volume per year.
(v) Bacteria: E. coli 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 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 10 μg/L
2. Carters Lake at Coosawattee River embayment mouth 10 μg/L

(ii) pH: within the range of 6.0 – 9.5 standard units.
(iii) Total Nitrogen: Not to exceed 4.0 mg/L as nitrogen in the photic zone.
(iv) Total Phosphorous: Total lake loading shall not exceed 172,500 pounds or 0.46 pounds per acre-foot of lake volume per year.
(v) Bacteria : E. coli 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 16,000 pounds

existing facilities, develop TMDLs, verify water pollution control plant compliance, collect data for criteria development, and document water use impairment and reasons for problems causing less than full support of designated water uses. Trend monitoring, targeted monitoring, probabilistic monitoring, intensive surveys, lake, estuary, biological, toxic substance monitoring, , and facility compliance sampling are some of the monitoring tools used by the GAEPD.

Long-Term Trend 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 has been 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.
In 2010, GAEPD added 41 flow gages to its monitoring network as part of the State Water Plan. Table 3-5 provides a list of the USGS stream gages funded by GAEPD. GAEPD also funds three continuous water quality monitors operated by the USGS on the Coosa River at the Georgia/Alabama Stateline, Chattahoochee River at HWY 92, and the Savannah Harbor at the Corps Dock.

TABLE 3-5. USGS STREAM GAGES FUNDED BY GAEPD

USGS Number	Station Name and Location
	Savannah River Basin
02177000	Chattooga River near Clayton, GA
02191300	Broad River above Carlton, GA
02192000	Broad River near Bell, GA
02193340	Kettle Creek near Washington, GA
02193500	Little River near Washington, GA
02197598	Brushy Creek at Campground Road near Wrens, GA
021964832	Savannah River above Augusta Canal, near Bonair, GA
02197830	Brier Creek near Waynesboro, GA
02198375	Savannah River near Estill, GA
021989792	Savannah River at Port Wentworth, GA
02198950	Middle River at GA 25, at Port Wentworth, GA
21989792	Little Back River at GA 25, at Port Wentworth, GA
02198980	Savannah River at Fort Pulaski
02197000	Savannah River at Augusta, GA
	Ogeechee River Basin
02201000	Williamson Swamp Creek at Davisboro, GA
02202190	Ogeechee River At GA 24, near Oliver, GA
02203518	Canoochee River at Bridge 38, at Fort Stewart
	Altamaha River Basin
02215000	Ocmulgee River at US 341, near Hawkinsville, GA
02215100	Tucsawhatchee Creek near Hawkinsville, GA
02215500	Ocmulgee River at Lumber City, GA
02216180	Turnpike Creek near McRae, GA
02214075	Echecommee Creek at Houston Road, near Byron, GA
02214590	Big Indian Creek at US 341, near Clinchfield, GA
02215900	Little Ocmulgee River at GA 149, at Scotland, GA
02208000	Yellow River at Rocky Plains Road, near Rocky Plains, GA
02212735	Ocmulgee River at GA 18, at Dames Ferry, GA
02211800	Towaliga River at GA 83, near Juliette, GA
02204520	South River at GA 81, at Snapping Shoal, GA
02223360	Big Sandy Creek at US 441, near Irwinton, GA
02223190	Commissioner Creek at US 441, at McIntyre, GA
02223110	Buffalo Creek at GA 272, near Oconee, GA
02225270	Ohoopee River at GA 297, near Swainsboro, GA
	Suwannee River Basin
02314500	Suwannee River at US 441, at Fargo, GA
02318000	Little River near Adel, GA*
02315920	Alapaha River at GA 125/32, near Irwinville, GA
02317797	Little River Near Ty Ty Road near Tifton, GA
	Satilla River Basin
02226362	Satilla River at GA 158, near Waycross, GA
02227270	Alabaha River at GA 203, nea Blackshear, GA
02228070	Satilla River at US 17, at Woodbine, GA
	St Mary's River Basin
02231254	St. Mary's River at I-95, near Kingsland, GA
	Ochlockonee River Basin
02327500	Ochlockonee River near Thomasville, GA
02327355	Ochlockonee River at GA 188 near Coolidge, GA
	Chattahoochee River Basin
23432415	Chattahoochee River 0.36 miles Downstream of WFG Dam, near Gaines, GA
02343805	Chattahoochee River at Mile 46, near Columbia, AL
02338840	Yellow Jacket Creek at Hammett Road, below Hogansville, GA

02342881	Chattahoochee River at Spur 39, near Omaha, GA
02331000	Chattahoochee River near Leaf, GA
23312495	Soque River at GA 197 near Clarkesville, GA
Flint River Basin	
02344700	Line Creek near Senoia, GA
02349900	Turkey Creek at Byromville,GA
02351500	Muckalee Creek near Americus, GA
02353265	Ichawaynochaway Creek at GA 37, near Morgan, GA
02353400	Pachitla Creek near Edison, GA
02353500	Ichawaynochaway Creek at Milford, GA
02355350	Ichawaynochaway Creek below Newton, GA
02355665	Flint River at Riverview Plantation, near Hopeful, GA
02357000	Spring Creek near Iron City, GA*
02350600	Kinchafoonee Creek at Preston. GA
02354410	Chickasawhatchee Creek near Leary, GA
02354475	Spring Creek near Leary, GA
02354800	Chickasawhatchee Creek at Elmodel, GA
02354800	Ichawaynochaway Creek near Elmodel, GA
02356638	Spring Creek Upstream of US27 near Colquitt, GA
Coosa River Basin	
02381090	Mountaintown Creek At Ga 76, Near Ellijay, Ga
02381600	Fausett Creek near Talking Rock, GA
02384540	Mill Creek near Crandall, GA
02385800	Holly Creek near Chatsworth, GA
02395000	Etowah River near Kingston, GA
Tennessee River Basin	
03568933	Lookout Creek near New England, GA
03550500	Nottely River near Blairsville, GA
03567340	West Chickamauga Creek at GA 146, near Lakeview, GA
Tallapoosa River Basin	
02413000	Little Tallapoosa at GA 27, at Carrolton, GA
02413210	Little Tallapoosa at GA 100 near Bowdon, GA

* Partially funded by another cooperator

Targeted Monitoring In addition to trend monitoring done through cooperative agreements, GAEPD associates collect monthly samples from a number of locations across the state in a targeted monitoring effort. In targeted monitoring, sites are monitored at least once a month for a year. A different set of targeted sites are then selected for monitoring the next year.

Figure 1 shows the monitoring network stations for the sample collection period 2016-2017. This figure includes the State-wide trend monitoring network stations (that are sampled every year), the targeted monitoring stations, probabilistic stations, as well as stations sampled by Georgia's Coastal Resources Division for 2016 and 2017. A list of all of these stations and a list of the parameters sampled is presented in Table 3-6, Tables 3-7, Table 3-8, Table 3-11 and Table 3-12.

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

FIGURE 1
GEORGIA MONITORING NETWORK
STATION LOCATIONS 2016-2017

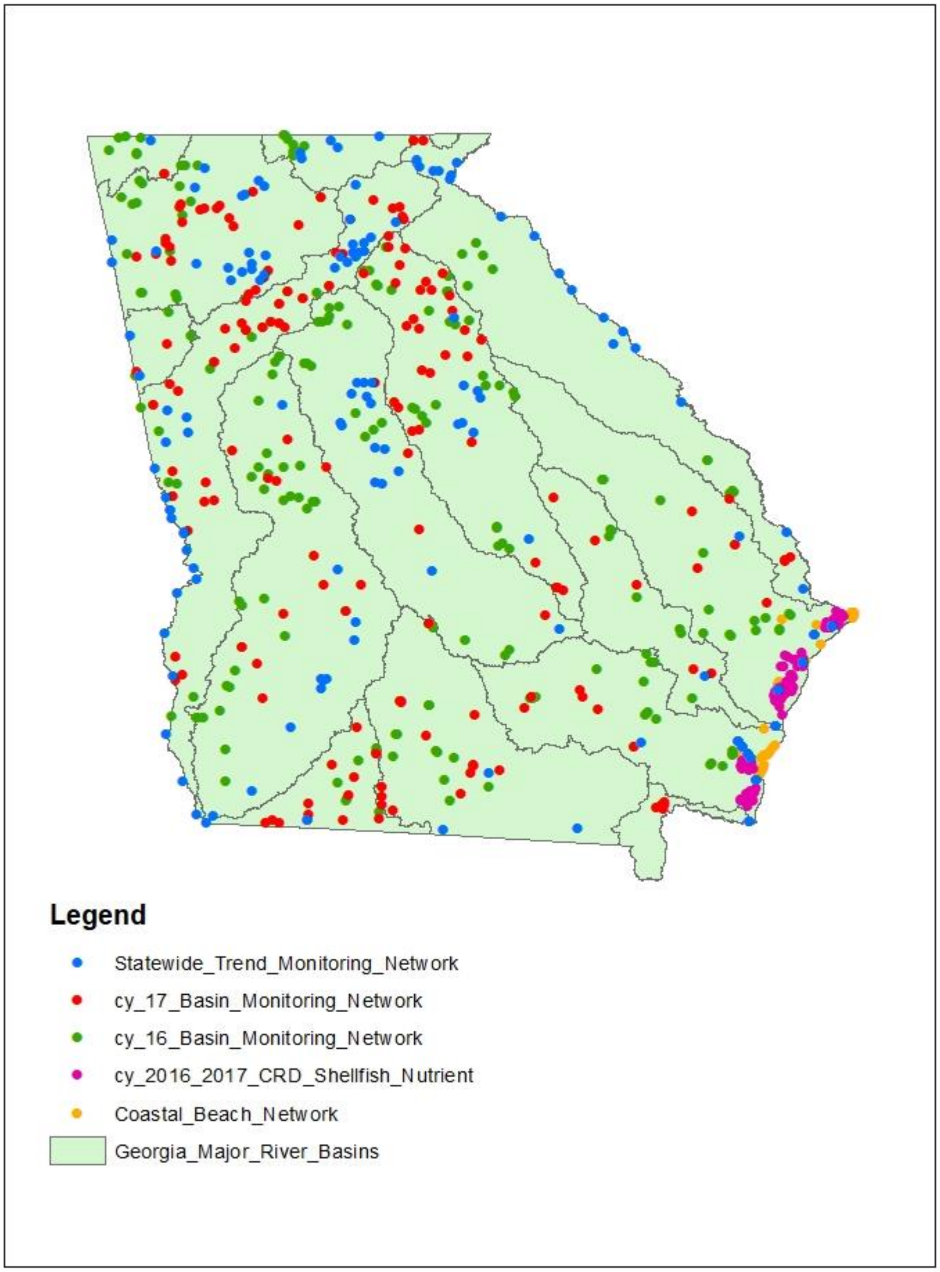


TABLE 3-6. STATEWIDE TREND MONITORING NETWORK (CORE): RIVERS/STREAMS; LAKE/RESERVOIR STANDARD TRIBUTARY STATIONS

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

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude
LK_01_7	Lake Burton - 1/4 mile South of Burton Island (aka Tallulah River)	Savannah	Cartersville WP	Lake Monitoring	34.835233	-83.553817
LK_01_8	Lake Burton - Dampool (aka Tallulah River u/s Lake Burton Dam)	Savannah	Cartersville WP	Lake Monitoring	34.795317	-83.5401
LK_01_9	Lake Rabun - Approx. 4.5 mi u/s Dam (Mid Lake)	Savannah	Cartersville WP	Lake Monitoring	34.763533	-83.455817
LK_01_10	Lake Rabun - Dampool (aka Tallulah River - Upstream From Mathis Dam)	Savannah	Cartersville WP	Lake Monitoring	34.764722	-83.417778
LK_01_11	Lake Hartwell @ Interstate 85	Savannah	Atlanta WP	Lake Monitoring	34.484167	-83.029833
LK_01_22	Lake Hartwell - Dam Forebay	Savannah	Atlanta WP	Lake Monitoring	34.358733	-82.824417
LK_01_67	Lake Tugalo - u/s Tugalo Lake Rd (aka Bull Sluice Rd.)	Savannah	Atlanta WP	Lake Monitoring	34.737805	-83.340555
LK_01_68	Lake Tugalo - Upstream From Tugaloo Dam	Savannah	Atlanta WP	Lake Monitoring	34.715	-83.351694
LK_01_27	Lake Russell Between Markers 42 and 44 (Mid Lake)	Savannah	Atlanta WP	Lake Monitoring	34.127778	-82.673611
LK_01_29	Lake Richard B. Russell - Dam Forebay	Savannah	Atlanta WP	Lake Monitoring	34.026333	-82.594167
LK_01_38	Clarks Hill Lake- Savannah River At U.S. Highway 378	Savannah	Atlanta WP	Lake Monitoring	33.857861	-82.399583
LK_01_39	Clarks Hill Lake- Savannah River At Dordon Crk.	Savannah	Atlanta WP	Lake Monitoring	33.765861	-82.271778
LK_01_40	Clarks Hill Lake - Dam Forebay	Savannah	Atlanta WP	Lake Monitoring	33.662694	-82.198528
LK_01_71	Clarks Hill Lake - Little River At Highway 47	Savannah	Atlanta WP	Lake Monitoring	33.692722	-82.338805
LK_03_520	Lake Oconee At Highway 44, Oconee River Arm	Oconee	Atlanta WP	Lake Monitoring	33.431394	-83.265734
LK_03_525	Lake Sinclair - Little River & Murder Creek Arm, U/S U.S. Hwy 441	Oconee	Atlanta WP	Lake Monitoring	33.189	-83.2953
LK_03_526	Lake Sinclair - 300 Meters Upstream Dam (Dam Forebay)	Oconee	Atlanta WP	Lake Monitoring	33.142817	-83.202617
LK_03_530	Lake Sinclair - Midlake, Oconee River Arm	Oconee	Atlanta WP	Lake Monitoring	33.1968	-83.2742
LK_03_538	Lake Oconee 300 Meters Upstream Wallace Dam (Dam Forebay)	Oconee	Atlanta WP	Lake Monitoring	33.351667	-83.160833
LK_03_545	Lake Oconee - Richland Creek Arm	Oconee	Atlanta WP	Lake Monitoring	33.3947	-83.1767
LK_04_893	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Ocmulgee	Atlanta WP	Lake Monitoring	33.368229	-83.863339
LK_04_897	Lake Jackson - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.322	-83.8409
LK_05_2076	High Falls Lake - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	33.1973	-84.031
LK_05_2078	High Falls Lake - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.1799	-84.0209

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude
LK_05_2131	Lake Juliette - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	33.0464	-83.8106
LK_05_2132	Lake Juliette - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.0338	-83.7572
LK_05_2144	Lake Tobesofkee - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	32.8346	-83.8161
LK_05_2146	Lake Tobesofkee - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	32.8215	-83.7706
LK_09_3199	Banks Lake - Near Lakeland, Ga.	Suwanee	Tifton WP	Lake Monitoring	31.026667	-83.105555
LK_11_3467	Lake Blackshear @ Midlake	Flint	Tifton WP	Lake Monitoring	31.9665	-83.9342
LK_11_3520	Lake Blackshear @ Dam Forebay	Flint	Tifton WP	Lake Monitoring	31.8479	-83.9394
LK_11_3534	Flint River Reservoir @ Midlake, Flint River Arm	Flint	Tifton WP	Lake Monitoring	31.6085	-84.119
LK_11_3535	Flint River Reservoir (Lake Worth) @ Dam Forebay	Flint	Tifton WP	Lake Monitoring	31.6033	-84.1365
LK_11_3551	Lake Worth (original) - Above Hwy 91 Bridge	Flint	Tifton WP	Lake Monitoring	31.6109	-84.15
LK_11_3569	Lake Seminole - Flint River Arm @ Spring Creek	Flint	Tifton WP	Lake Monitoring	30.7627	-84.8171
LK_12_3913	Lake Sidney Lanier - Little River Embayment, b/w M1WC & 3LR	Chattahoochee	Atlanta WP	Lake Monitoring	34.355	-83.8427
LK_12_3995	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.31235	-83.950103
LK_12_3998	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.32195	-83.880171
LK_12_4001	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Chattahoochee	Atlanta WP	Lake Monitoring	34.261666	-83.950662
LK_12_4005	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2587	-83.9198
LK_12_4007	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2504	-83.9244
LK_12_4010	Lake Sidney Lanier - Mud Crk Embayment, b/w Marina & Ramp	Chattahoochee	Atlanta WP	Lake Monitoring	34.2333	-83.9373
LK_12_4012	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Chattahoochee	Atlanta WP	Lake Monitoring	34.200278	-83.982869
LK_12_4019	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E M9SM	Chattahoochee	Atlanta WP	Lake Monitoring	34.2335	-84.0287
LK_12_4028	Lake Sidney Lanier upstream of Buford Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	34.162778	-84.067108
LK_12_4048	West Point Lake at LaGrange Water Intake near LaGrange, GA (aka Chatt. River at Lagrange Intake)	Chattahoochee	Atlanta WP	Lake Monitoring	33.0783	-85.110833
LK_12_4060	West Point Lake - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.9208	-85.1834
LK_12_4072	Lake Harding - Midlake, Main Body	Chattahoochee	Atlanta WP	Lake Monitoring	32.7379	-85.1125
LK_12_4074	Lake Harding - Dam Forebay (aka Chatt. River US Bartletts Ferry Dam)	Chattahoochee	Atlanta WP	Lake Monitoring	32.6633	-85.090278
LK_12_4078	Goat Rock Lake - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.6112	-85.0794
LK_12_4080	Lake Oliver - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.516	-85.0009
LK_12_4097	Lake Walter F. George @ U.S. Highway 82	Chattahoochee	Tifton WP	Lake Monitoring	31.891944	-85.120833

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude
LK_12_4103	Lake Walter F. George @ Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	31.629167	-85.0725
LK_12_4107	Lake Andrews @ Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	31.2632	-85.113
LK_12_4113	Lake Seminole @ Chattahoochee Arm, Lower	Chattahoochee	Tifton WP	Lake Monitoring	30.7662	-84.9201
LK_12_4115	Lake Seminole @ Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	30.7115	-84.8647
LK_14_4494	Lake Allatoona Upstream from Dam	Coosa	Cartersville WP	Lake Monitoring	34.160833	-84.725845
LK_14_4497	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Coosa	Cartersville WP	Lake Monitoring	34.085833	-84.711389
LK_14_4502	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Coosa	Cartersville WP	Lake Monitoring	34.19	-84.577778
LK_14_4523	Carters Lake (CR1) - Upper Lake, Coosawattee Arm	Coosa	Cartersville WP	Lake Monitoring	34.62087	-84.6212
LK_14_4524	Carters Lake - Midlake (upstream from Woodring Branch)	Coosa	Cartersville WP	Lake Monitoring	34.6076	-84.638
LK_14_4553	Lake Allatoona at Little River upstream from Highway 205	Coosa	Cartersville WP	Lake Monitoring	34.158611	-84.577222
LK_14_4556	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Coosa	Cartersville WP	Lake Monitoring	34.138611	-84.639167
LK_14_4895	Lake Chatuge LMP 12 at State Line (aka Hiawassee River)	Tennessee	Cartersville WP	Lake Monitoring	34.983333	-83.788611
LK_14_4899	Lake Nottely (LMP15A) at Reece Creek	Tennessee	Cartersville WP	Lake Monitoring	34.91152	-84.0506
LK_14_4900	Lake Nottely - Dam Forebay (aka Nottely River - Upstream From Nottely Dam)	Tennessee	Cartersville WP	Lake Monitoring	34.957778	-84.092222
LK_14_4907	Lake Blue Ridge (LMP18) - 300 Meter Upstream Of Dam	Tennessee	Cartersville WP	Lake Monitoring	34.881667	-84.28
LK_14_4908	Lake Blue Ridge (LMP18A) - 4 miles upsteam Dam	Tennessee	Cartersville WP	Lake Monitoring	34.84017	-84.2731
SH_01_56	Mouth of Wilmington River - Marker #19 Wassaw Sound	Savannah	Brunswick WP	Estuary Site	31.93242	-80.97711
SH_02_317	Little Ogeechee River @ Green Island	Ogeechee	Brunswick WP	Estuary Site	31.88823	-81.08798
SH_02_364	St Catherines Sound at Medway River near Midway, GA	Ogeechee	Brunswick WP	Estuary Site	31.71547	-81.1568
SH_02_374	Sapelo River - Mouth of Broro River - 1.4 miles South of Shellman's Bluff	Ogeechee	Brunswick WP	Estuary Site	31.54486	-81.31603
SH_06_2857	Altamaha River - channel marker #201 off Wolf Island	Altamaha	Brunswick WP	Estuary Site	31.31917	-81.325
SH_07_3008	St. Andrews Sound at Satilla Riv near	Satilla	Brunswick WP	Estuary Site	30.98316	-81.45324
SH_07_3029	Turtle River off Hermitage Island	Satilla	Brunswick WP	Trend Site	31.22028	-81.56417
SH_07_3032	Turtle River - Georgia Highway 303	Satilla	Brunswick WP	Trend Site	31.186944	-81.531389
SH_07_3035	Brunswick Harbor	Satilla	Brunswick WP	Trend Site	31.14361	-81.4975
SH_07_3036	Brunswick River - U.S. Highway 17	Satilla	Brunswick WP	Trend Site	31.1164	-81.4858
SH_07_3049	Cumberland Sound at St. Marys Riv nr St Marys, GA	Satilla	Brunswick WP	Estuary Site	30.72807	-81.48979
SH_01_56	Mouth of Wilmington River - Marker #19 Wassaw Sound	Savannah	Brunswick WP	Estuary Site	31.93242	-80.97711
SH_02_317	Little Ogeechee River @ Green Island	Ogeechee	Brunswick WP	Estuary Site	31.88823	-81.08798
SH_02_364	St Catherines Sound at Medway River near Midway, GA	Ogeechee	Brunswick WP	Estuary Site	31.71547	-81.1568

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude
SH_02_374	Sapelo River - Mouth of Broro River - 1.4 miles South of Shellman's Bluff	Ogeechee	Brunswick WP	Estuary Site	31.54486	-81.31603
SH_06_2857	Altamaha River - channel marker #201 off Wolf Island	Altamaha	Brunswick WP	Estuary Site	31.31917	-81.325
SH_07_3008	St. Andrews Sound at Satilla Riv near	Satilla	Brunswick WP	Estuary Site	30.98316	-81.45324
SH_07_3029	Turtle River off Hermitage Island	Satilla	Brunswick WP	Trend Site	31.22028	-81.56417
SH_07_3032	Turtle River - Georgia Highway 303	Satilla	Brunswick WP	Trend Site	31.186944	-81.531389
SH_07_3035	Brunswick Harbor	Satilla	Brunswick WP	Trend Site	31.14361	-81.4975
SH_07_3036	Brunswick River - U.S. Highway 17	Satilla	Brunswick WP	Trend Site	31.1164	-81.4858
SH_07_3049	Cumberland Sound at St. Marys Riv nr St Marys, GA	Satilla	Brunswick WP	Estuary Site	30.72807	-81.48979
SH_01_56	Mouth of Wilmington River - Marker #19 Wassaw Sound	Savannah	Brunswick WP	Estuary Site	31.93242	-80.97711
SH_02_317	Little Ogeechee River @ Green Island	Ogeechee	Brunswick WP	Estuary Site	31.88823	-81.08798
SH_02_364	St Catherines Sound at Medway River near Midway, GA	Ogeechee	Brunswick WP	Estuary Site	31.71547	-81.1568
SH_02_374	Sapelo River - Mouth of Broro River - 1.4 miles South of Shellman's Bluff	Ogeechee	Brunswick WP	Estuary Site	31.54486	-81.31603
SH_06_2857	Altamaha River - channel marker #201 off Wolf Island	Altamaha	Brunswick WP	Estuary Site	31.31917	-81.325
SH_07_3008	St. Andrews Sound at Satilla Riv near	Satilla	Brunswick WP	Estuary Site	30.98316	-81.45324
SH_07_3029	Turtle River off Hermitage Island	Satilla	Brunswick WP	Trend Site	31.22028	-81.56417
SH_07_3032	Turtle River - Georgia Highway 303	Satilla	Brunswick WP	Trend Site	31.186944	-81.531389
RV_01_66	Chattooga River at US Hwy. 76 near Clayton, GA	Savannah	USGS	Trend Monitoring	34.8140	-83.3064
RV_01_87	Savannah River at 0.5 mile downstream from Spirit Creek	Savannah	USGS	Trend Monitoring	33.3306	-81.9153
RV_01_109	Savannah River at Seaboard Coast Line Railway, north of Clyo, GA	Savannah	USGS	Trend Monitoring	32.5250	-81.2640
RV_01_120	Savannah River at US Hwy. 17 (Houlihan Bridge)	Savannah	USGS	Trend Monitoring	32.1658	-81.1539
RV_02_298	Ogeechee River at Georgia Hwy. 24 near Oliver, GA	Ogeechee	USGS	Trend Monitoring	32.4948	-81.5558
RV_03_502	Oconee River at Barnett Shoals Road near Athens, GA	Oconee	USGS	Trend Monitoring	33.8562	-83.3265
RV_03_640	Oconee River at Interstate Hwy. 16 near Dublin, GA	Oconee	USGS	Trend Monitoring	32.4804	-82.8582
RV_04_853	South River at Island Shoals Road near Snapping Shoals, Ga.	Upper Ocmulgee	USGS	Trend Monitoring (Lake Trib)	33.4527	-83.9271
RV_04_876	Yellow River at Georgia Hwy. 212 near Stewart, Ga.	Upper Ocmulgee	USGS	Trend Monitoring (Lake Trib)	33.4543	-83.8813
RV_04_888	Alcovy River at Newton Factory Bridge Road near Stewart, Ga.	Upper Ocmulgee	USGS	Trend Monitoring (Lake Trib)	33.4494	-83.8283
RV_04_892	Tussahaw Creek at Fincherville Road near Jackson, Ga.	Upper Ocmulgee	USGS	Trend Monitoring (Lake Trib)	33.3789	-83.9634
RV_05_2165	Ocmulgee River at New Macon Water Intake	Ocmulgee	USGS	Trend Monitoring	32.8992	-83.6641
RV_05_2203	Ocmulgee River at Hawkinsville, GA	Ocmulgee	USGS	Trend Monitoring	32.2818	-83.4628

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude
RV_05_2223	Ocmulgee River at US Hwy. 341 at Lumber City, GA	Ocmulgee	USGS	Trend Monitoring	31.9199	-82.6743
RV_06_2846	Altamaha River 6.0 miles downstream from Doctortown, GA	Altamaha	USGS	Trend Monitoring	31.6233	-81.7653
RV_07_2986	Satilla River at Georgia Hwy.15 and Hwy.121	Satilla	USGS	Trend Monitoring	31.2167	-82.1625
RV_09_3181	Suwannee River at US Hwy. 441 near Fargo, GA	St. Marys	USGS	Trend Monitoring	30.6806	-82.5606
RV_09_3236	Withlacoochee River at Clyattsville-Nankin Road near Clyattsville, GA	Suwannee	USGS	Trend Monitoring	30.6747	-83.3947
RV_10_3386	Ochlockonee River at Hadley Ferry Road near Calvary, Ga.	Ochlockonee	USGS	Trend Monitoring	30.7317	-84.2355
RV_11_3485	Flint River at SR 92 near Griffin, GA	Flint	USGS	Trend Monitoring	33.3089	-84.3931
RV_11_3511	Flint River at SR 26 near Montezuma	Flint	USGS	Trend Monitoring	32.2929	-84.0440
RV_11_3553	Flint River at SR 234 near Albany, GA	Flint	USGS	Trend Monitoring	31.5524	-84.1463
RV_11_3558	Flint River at SR 37 at Newton, GA	Flint	USGS	Trend Monitoring	31.3094	-84.3350
RV_11_3563	Flint River at US Hwy. 27-B near Bainbridge, GA	Flint	USGS	Trend Monitoring	30.9109	-84.5805
RV_12_3902	Chattahoochee River at Belton Bridge Road near Lula, Ga.	Chattahoochee	USGS	Trend Monitoring (Lake Trib)	34.4451	-83.6842
RV_12_4292	Dicks Creek at Forest Service Road 144-1 near Neels Gap, GA	Chattahoochee	USGS	Trend Monitoring (Lake Trib)	34.6797	-83.9372
RV_12_3925	Chestatee River at SR 400 near Dahlonega, Ga.	Chattahoochee	USGS	Trend Monitoring (Lake Trib)	34.4667	-83.9689
RV_12_4003	Flat Creek at McEver Road near Gainesville, Ga.	Chattahoochee	USGS	Trend Monitoring (Lake Trib)	34.2658	-83.8850
RV_12_4049	Yellow Jacket Creek at Hammet Road near Hogansville, GA	Chattahoochee	USGS	Trend Monitoring (Lake Trib)	33.1392	-84.9753
RV_12_4039	New River at SR 100 near Corinth, Ga.	Chattahoochee	USGS	Trend Monitoring	33.2353	-84.9878
RV_12_4041	Chattahoochee River at US Hwy. 27 near Franklin, Ga.	Chattahoochee	USGS	Trend Monitoring (Lake Trib)	33.2792	-85.1000
LK_12_4074	Lake Harding - Dam Forebay (aka Chatt. River US Bartletts Ferry Dam)	Chattahoochee	CWW	Trend Monitoring	32.6633	-85.09028
LK_12_4079	Lake Oliver - Chattahochee River at Columbus Water Intake near Columbus, GA	Chattahoochee	CWW	Trend Monitoring	32.5214	-84.9983
RV_12_4084	Chattahoochee River downstream from Columbus Water Treatment Facility	Chattahoochee	CWW	Trend Monitoring	32.4089	-84.9803
RV_12_4091	Chattahoochee River downstream Oswichee Creek	Chattahoochee	CWW	Trend Monitoring	32.3000	-84.9369
RV_12_4093	Chattahoochee River at Hichitee Creek (River Mile 127.6)	Chattahoochee	CWW	Trend Monitoring	32.2308	-84.9232

Georgia Station Number	Sampling Site	River Basin	Sampling Organization	Waterbody Type/ Project	Latitude	Longitude
RV_12_4094	Chattahoochee River at Spur 39 near Omaha, GA (Seaboard Railroad)	Chattahoochee	USGS	Trend Monitoring (Lake Trib)	32.1436	-85.0453
RV_12_4110	Chattahoochee River at SR 91 near Steam Mill, GA	Chattahoochee	USGS	Trend Monitoring	30.9775	-85.0053
RV_13_4353	Tallapoosa River at Georgia Hwy. 8 near Tallapoosa, Ga.	Tallapoosa	USGS	Trend Monitoring	33.7408	-85.3364
RV_13_4349	Little Tallapoosa River at Georgia Hwy. 100 near Bowden, GA	Tallapoosa	USGS	Trend Monitoring	33.4928	-85.2792
RV_14_4438	Conasauga River at US Hwy. 76 near Dalton, GA	Coosa	USGS	Trend Monitoring	34.7830	-84.8730
RV_14_4460	Conasauga River at Tilton Bridge near Tilton, GA	Coosa	USGS	Trend Monitoring	34.6667	-84.9283
RV_14_4518	Mountaintown Creek at SR 282 (US Hwy. 76) near Ellijay, Ga.	Coosa	USGS	Trend Monitoring	34.7034	-84.5398
RV_14_4520	Coosawattee River at Georgia Hwy. 5 near Ellijay, Ga.	Coosa	USGS	Trend Monitoring	34.6717	-84.5002
RV_14_4534	Oostanaula River at Rome Water Intake near Rome, GA	Coosa	USGS	Trend Monitoring	34.2703	-85.1733
RV_14_4549	Etowah River at SR 5 spur near Canton, Ga.	Coosa	USGS	Trend Monitoring (Lake Trib)	34.2397	-84.4944
RV_14_4550	Shoal Creek at SR 108 (Fincher Road) near Waleska, Ga.	Coosa	USGS	Trend Monitoring (Lake Trib)	34.2608	-84.5956
RV_14_4851	Noonday Creek at Georgia Hwy. 92 near Woodstock, Ga.	Coosa	USGS	Trend Monitoring (Lake Trib)	34.0861	-84.5306
RV_14_4555	Little River at Georgia Hwy. 5 near Woodstock, Ga.	Coosa	USGS	Trend Monitoring (Lake Trib)	34.1222	-84.5043
RV_14_4586	Etowah River at Hardin Bridge (FAS 829) near Euharlee, GA	Coosa	USGS	Trend Monitoring	34.18886	-84.9251
RV_14_4622	Coosa River - GA/Alabama State Line Monitor near Cave Springs	Coosa	USGS	Trend Monitoring	34.1983	-85.4439
RV_14_4640	Chattooga River at Holland-Chattoogaville Road (FAS1363) near Lyerly, Ga.	Coosa	USGS	Trend Monitoring	34.3356	-85.4453
RV_15_4918	West Chickamauga Creek - Georgia Highway 146 near Ringgold, Ga.	Coosa	USGS	Trend Monitoring	34.9572	-85.2056

Routine field parameters include: gage height, air temperature, water temperature, dissolved oxygen, pH, conductivity, turbidity.

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

TABLE 3-7. GEORGIA TARGETED MONITORING NETWORK 2016

Rivers and stream stations are sampled monthly for field and chemical parameters for one calendar year. For stations where fecal coliform bacteria is collected, four fecal coliform bacterial samples are collected each calendar quarter during the year. Basin lakes and reservoirs are sampled monthly during the growing season during the calendar year.

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_01_107	Buck Creek - Brannens Bridge Road (S1321) nr Sylvania, GA	Savannah	Brunswick WP	WQMU Data Collection, D/S GA0021385	32.768905	-81.586863	X				X								
RV_01_16309	Buck Creek at Friendship Rd near Sylvania, GA	Savannah	Brunswick WP	WQMU Data Collection, U/S GA0021385	32.764622	-81.616844	X												
RV_01_16310	Trib to Buck Creek at Rifle Rd near Sylvania, GA	Savannah	Brunswick WP	WQMU Data Collection, Secondary Trib D/S GA0021385	32.777471	-81.597213	X												
RV_01_16311	Chandlers Branch at Charles Perry Ave near Sardis, GA	Savannah	Brunswick WP	WQMU Data Collection, U/S GA0020893	32.96904	-81.753246	X												
RV_01_16312	Chandlers Branch near SR24 near Sardis, GA	Savannah	Brunswick WP	WQMU Data Collection, D/S GA0020893	32.970936	-81.750429	X	X			X		X						
RV_01_16345	Biger Creek at Diamond Hill Colbert Rd	Savannah	Atlanta WP	EPA BIO M	34.054	-83.241	1								X				
RV_01_16379	Trib to Hanna Creek at Brown Hendrix Rd. near Franklin Springs, GA	Savannah	Atlanta WP	Probabilistic	34.24	-83.14	1												
RV_01_16387	Broad River at GA Hwy 172 near Comer, GA	Savannah	Atlanta WP	Probabilistic	34.157	-83.083	1												
RV_01_244	Charlies Creek at Charlies Creek Rd East of Hiawassee, GA	Savannah	Atlanta WP	SEMN	34.95895	-83.57158	1				X		X	X	X	X	X	X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_01_248	Coleman River at Coleman River Rd nr Clayton, GA	Savannah	Atlanta WP	SEMN	34.95203324	-83.51659881	1				X		X	X	X	X	X	X	
RV_01_43	North Fork Broad River at State Road 51 near Carnesville, GA	Savannah	Atlanta WP	Probabilistic	34.322891	-83.186876	1												
RV_01_45	Hudson River at State Road 106 at Fort Lamar, GA	Savannah	Atlanta WP	Probabilistic	34.24866	-83.271042	1												
RV_02_16300	Little Ogeechee River Upstream of Larchmont near Georgetown, GA	Ogeechee	Brunswick WP	WQMU Data Collection, U/S GA0034819	32.013421	-81.241469	X												
RV_02_16301	Trib to Sterling Creek at Harris Trail Rd near Richmond Hill, GA	Ogeechee	Brunswick WP	WQMU Data Collection, D/S GA0037648	31.912192	-81.302667	X												
RV_02_16302	Williamson Swamp Creek at SR4 near Wadley, GA	Ogeechee	Brunswick WP	WQMU Data Collection, U/S GA0021024	32.85208	-82.403893	X												
RV_02_16303	Trib to Taylor Creek at Coe Ave near Fort Stewart, GA	Ogeechee	Brunswick WP	WQMU Data Collection, U/S GA0004308	31.878461	-81.604986	X						X						
RV_02_16304	Trib to Richardson Creek near SR 23 near Butts, GA	Ogeechee	Brunswick WP	Probabilistic	32.718	-82.04	X	X			X								
RV_02_16305	Canoochee River at Unnamed Rd near Fort Stewart, GA	Ogeechee	Brunswick WP	Probabilistic	31.969	-81.459	X												
RV_02_16306	Long Branch at Unnamed Road (Fort Stewart) nr Hinesville, GA	Ogeechee	Brunswick WP	CSU Reference Point Sampling	32.044106	-81.743825	X												
RV_02_288	Williamson Swamp Creek at U.S. Highway 1 East at Wadley, GA	Ogeechee	Brunswick WP	WQMU Data Collection, D/S GA0021024	32.850652	-82.396993	X												
RV_02_312	Sterling Creek at Harris Trail Road near Richmond Hill, GA	Ogeechee	Brunswick WP	WQMU Data Collection, U/S GA0037648	31.918177	-81.307358	X												
RV_02_359	Little Ogeechee River at U.S. Highway 17 near Burroughs, GA	Ogeechee	Brunswick WP	WQMU Data Collection, D/S GA0034819	32.007468	-81.238481	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_02_431	Little Lotts Creek D/S WPCP Discharge at Langston Chapel Rd near Statesboro, GA	Ogeechee	Brunswick WP	WQMU Data Collection, D/S GA0023108	32.393824	-81.772604	X												
RV_02_462	Mill Creek at Bulloch County Road 386 Old River Road near Brooklet, GA	Ogeechee	Brunswick WP	Trend	32.440012	-81.579074	X	X			X	X	X						
RV_02_468	Raccoon Branch nr Mount Olivet Church Rd nr Hinesville, GA	Ogeechee	Brunswick WP	CSU Reference Point Sampling	31.91321	-81.446836	X	X					X						
RV_02_483	Tributary to Cannoochee nr SR 67 (Fort Stewart) nr Hinesville, GA	Ogeechee	Brunswick WP	CSU Reference Point Sampling	31.98942	-81.38657	X												
RV_02_488	Tributary to Taylor's Creek nr Walthourville Rd nr Hinesville, GA	Ogeechee	Brunswick WP	CSU Reference Point Sampling	31.89725	-81.77377778	X	X											
RV_02_5056	South Fork Unnamed Tributary to Taylor's Creek at Hero Road near Hinesville, GA	Ogeechee	Brunswick WP	WQMU Data Collection, D/S GA0004308	31.886611	-81.609091	X	X					X						
RV_03_16307	Bluewater Creek at Mark Wood Rd near Rentz, GA	Oconee	Tifton WP	WQMU Data collection; D/S of GA0037630 (no U/S)	32.416758	-82.982739	X						X						
RV_03_16329	Turkey Creek Upstream of Dudley WPCP Near Dudley, GA	Oconee	Tifton WP	WQMU Data collection; U/S of GA0023957	32.552	-83.05552	X												
RV_03_16341	Barber Creek at Laurel Pt. near Athens, GA	Oconee	Atlanta WP	NH3-OCONEE CO ; Stressor ID	33.90006	-83.47482	X				X		X	X	X	X	X		
RV_03_16342	Barrow Creek at Hutchins Wolfskin Rd. near Crawford, GA	Oconee	Atlanta WP	303d; Bio F; Stessor ID	33.834	-83.231	X				X		X	X	X	X	X		
RV_03_16344	Beaverdam Creek at Beaver Dam Rd (CR 15)	Oconee	Atlanta WP	Stressor ID; LI	33.367236	-82.942669	X				X		X	X	X	X	X		
RV_03_16351	Deaton Creek at Oliver Road	Oconee	Atlanta WP	Stressor ID	34.143	-83.849	X				X		X	X	X	X	X		
RV_03_16352	East Sandy Creek at Nowhere Road	Oconee	Atlanta WP	Stressor ID	34.021	-83.369	X				X		X	X	X	X	X		
RV_03_16356	Kimbro Creek at Lanier Road	Oconee	Atlanta WP	Stressor ID; LI	33.43683	-83.128019	X				X		X	X	X	X	X	X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_03_16357	Little Mulberry River at Boss Hardy Road	Oconee	Atlanta WP	Stressor ID	34.061133	-83.804067	X				X		X	X	X	X	X		
RV_03_16358	Little Sandy Creek at Sailors Road	Oconee	Atlanta WP	Stressor ID; LI	34.116	-83.357	X				X		X	X	X	X	X	X	
RV_03_16362	Mulberry River at Union Circle Road	Oconee	Atlanta WP	Stressor ID	34.147007	-83.879011	X				X		X	X	X	X	X		
RV_03_16363	Noketchee Creek at Nokethcee Drive	Oconee	Atlanta WP	Stressor ID; LI	34.014139	-83.360988	X				X		X	X	X	X	X	X	
RV_03_16364	North Fork Wolf Creek at Smithboro Road	Oconee	Atlanta WP	Stressor ID	33.292	-83.581	X				X		X	X	X	X	X		
RV_03_16367	Rock Creek at Boss Hardy Road	Oconee	Atlanta WP	Stressor ID	34.056	-83.798	X				X		X	X	X	X	X		
RV_03_16368	Rocky Creek at Rocky Creek Road	Oconee	Atlanta WP	Stressor ID; LI	33.197	-83.494	X				X		X	X	X	X	X	X	
RV_03_16372	South Fork Wolf Creek at Armour Road	Oconee	Atlanta WP	Stressor ID	33.283	-83.568	X				X		X	X	X	X	X		
RV_03_16373	Stewart Creek at Veazey Rd. near White Plain, GA	Oconee	Atlanta WP	LI; SST 1257 Stressor ID	33.495582	-83.143711	X				X		X	X	X	X	X		
RV_03_16381	Trib to North Oconee River at Eberhart Cemetary Road	Oconee	Atlanta WP	Stressor ID	34.29	-83.744	X				X		X	X	X	X	X		
RV_03_16384	Whitten Creek Trib at CR 15	Oconee	Atlanta WP	Stressor ID; LI	33.392044	-82.951948	X				X		X	X	X	X	X		
RV_03_16385	Wildcat Creek at Oliver Bridge Rd.	Oconee	Atlanta WP	LI; SST 1299; Stressor ID	33.811	-83.316	X				X		X	X	X	X	X		
RV_03_16386	Wildcat Creek at Kirkland Rd near Watkinsville, GA	Oconee	Atlanta WP	Stressor ID	33.829	-83.348	X				X		X	X	X	X	X		
RV_03_5064	Turkey Creek at State Road 338 Near Dudley, GA	Oconee	Tifton WP	WQMU Data collection; D/S of GA0023957	32.551505	-83.054777	X												
RV_03_5065	Stitchihatchie Creek at Taylor Rowland Rd near Dexter, GA	Oconee	Tifton WP	WQMU Data collection; U/S of GA0048862	32.432279	-83.0488129	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_03_5067	Stitchihatchie Creek at State Road 257 near Dexter, GA	Oconee	Tifton WP	WQMU Data collection; D/S of GA0048862	32.4485069	-83.0267539	X												
RV_03_557	Little River at State Road 16 near Eatonton, GA	Oconee	Atlanta WP	PROBABILISTIC	33.313983	-83.436817	X												
RV_03_578	Cedar Creek - Georgia Highway 53; North Winder	Oconee	Atlanta WP	NH3-WINDER WPCP; Stressor ID	34.029722	-83.712222	X				X		X	X	X	X	X	X	
RV_03_790	Copeland Creek nr Edwards Rd nr White Plains, GA	Oconee	Atlanta WP	Stressor ID; LI	33.43474289	-83.04195251	X				X		X	X	X	X	X		
RV_03_800	Trib to Murder Creek at Kinder Lane nr Eatonton, GA	Oconee	Atlanta WP	Stressor ID; LI	33.24370667	-83.52437917	X				X		X	X	X	X	X		
RV_04_15916	Garner Creek at Five Forks Trickum Road nr Lawrenceville, GA	Upper Ocmulgee	Atlanta WP	303d FC; Need data	33.86194402	-84.09718204	X	X			X								
RV_04_2068	Stone Mountain Creek at Silver Hill Road near Stone Mountain, GA	Upper Ocmulgee	Atlanta WP	Nutrients-LOW-OCMULGEE; 303d FC	33.826111	-84.165278	X	X			X		X	X	X			X	
RV_04_818	Sweetwater Creek at U.S. Highway 29 near Luxomni, GA	Upper Ocmulgee	Atlanta WP	Nutrients-HIGH-OCMULGEE; 303d FC	33.913889	-84.098611	X	X					X	X	X				
RV_04_845	Big Cotton Indian Creek at Stockbridge Road near Stockbridge, GA	Upper Ocmulgee	Atlanta WP	Nutrients-HIGH-OCMULGEE	33.569444	-84.233056	X						X	X	X				
RV_04_857	Pew Creek at Patterson Road near Lawrenceville, GA	Upper Ocmulgee	Atlanta WP	303d FC	33.925833	-84.037778	X	X											
RV_04_862	Pounds Creek at Pucketts Drive near Lilburn, GA	Upper Ocmulgee	Atlanta WP	2010 Revisit	33.837222	-84.108889	X	X											
RV_04_865	Little Stone Mountain Creek at Old Stone Mountain Road near Stone Mountain, GA	Upper Ocmulgee	Atlanta WP	Nutrients-HIGH-OCMULGEE; 303d FC	33.830556	-84.139444	X	X			X		X	X	X				
RV_04_908	Big Haynes Creek at Lenora Rd	Upper Ocmulgee	Atlanta WP	303d FC	33.81513619	-83.99011974	X	X											
RV_04_974	Brush Creek at Pinehurst Dr	Upper Ocmulgee	Atlanta WP	NH3-STOCKBRIDGE	33.55281591	-84.20793329	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
				WPCP															
RV_04_995	Panther Creek d/s of Northeast WRF	Upper Ocmulgee	Atlanta WP	NH3-CLAYTON CO	33.574565	-84.254609	X				X		X	X	X				
RV_05_2089	Towaliga River - Georgia Highway 83	Ocmulgee	Atlanta WP	Nutrients-LOW-OCMULGEE	33.114722	-83.870556	X						X	X	X				
RV_05_2107	Town Branch at Watkins Park and Pool Road near Jackson, GA	Ocmulgee	Atlanta WP	Nutrients-HIGH-OCMULGEE	33.26207	-83.93777	X						X	X	X				
RV_05_2125	Gladesville Creek at New Pope Church Road near Monticello , GA	Ocmulgee	Atlanta WP	303d; Bio F; need WQ data	33.2	-83.77	X												
RV_05_2217	House Creek at Walker Road near Forest Glen, GA	Ocmulgee	Tifton WP	Assessment Re-Evaluation	31.848783	-83.2533	X	X											
RV_05_2222	Ocmulgee River at U.S. Highway 441 near Jacksonville, GA	Ocmulgee	Tifton WP	Probabilistic	31.7925	-82.98	X				X								
RV_05_2240	Ocmulgee River at Hwy 83 near Juliette, GA	Ocmulgee	Atlanta WP	Probabilistic	33.1591	-83.8241	X				X								
RV_05_2827	Red Bluff Creek at Dicksons Mill Pond Rd CR 190, Fitzgerald, GA	Ocmulgee	Tifton WP	CSU Reference Point Sampling	31.754202	-83.008101	X												
RV_06_16313	Trib to Beards Creek by Oaktown Rd near Glennville, GA	Altamaha	Brunswick WP	WQMU Data Collection, U/S GA0037982	31.916152	-81.921217	X												
RV_06_16314	Yam Grandy Creek at Grande Creek Rd near Swainsboro, GA	Altamaha	Brunswick WP	WQMU Data Collection, U/S GA0039225	32.53533	-82.353162	X												
RV_06_16315	Crooked Creek @ Old Nunez Rd near Swainsboro, GA	Altamaha	Brunswick WP	WQMU Data Collection, secondary trib U/S GA0039225	32.531404	-82.344001	X												
RV_06_2884	Yam Grandy Creek at Levilligar Pond Road (County Road 198) near Nunez, GA	Altamaha	Brunswick WP	WQMU Data Collection, D/S GA0039225	32.499162	-82.363275	X												
RV_06_2899	Ohoopee River at US 280/ SR 30 near Reidsville, GA	Altamaha	Brunswick WP	Probabilistic	32.117844	-82.189758	X	X			X								

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_06_2915	Spring Branch at CR 349 near Glennville, GA	Altamaha	Brunswick WP	WQMU Data Collection, D/S GA0037982	31.896219	-81.91091	X	X			X		X						
RV_06_2942	Little Creek nr Gardi Rd nr Jesup, GA	Altamaha	Brunswick WP	CSU Reference Point Sampling	31.491437	-81.846891	X	X											
RV_07_15791	Unnamed Tributary to 17 Mile River at Victor Beam Rd. near Douglas, GA	Satilla	Brunswick WP	Source Tracking, D/S Douglas WPCP	31.499095	-82.820840	X												
RV_07_16298	Trib to Trib to Raddcliffe Creek at Lake Erie Dr. near Brunswick, GA	Satilla	Brunswick WP	Probabilistic	31.148	-81.598	X												
RV_07_16299	Bishop Creek at Ernest Kesler Road near Baxley, GA	Satilla	Brunswick WP	Watershed Characterization	31.672843	-82.435887	X	X			X		X						
RV_07_16331	Unnamed Tributary to 17 Mile River at S. Pearson Ave near Douglas, GA	Satilla	Brunswick WP	Source Tracking, U/S Douglas WPCP	31.49139	-82.851078	X												
RV_07_16332	Unnamed Tributary to 17 Mile River at McDonald Rd near Douglas, GA	Satilla	Brunswick WP	Source Tracking, U/S Douglas WPCP	31.489999	-82.835779	X												
RV_07_16333	Unnamed Tributary to 17 Mile River at Lupo Ln near Douglas, GA	Satilla	Brunswick WP	Source Tracking, U/S Douglas WPCP	31.498288	-82.832316	X												
RV_07_16338	Little Satilla Creek nr County Line Rd nr Odum, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.761	-82.133	X												
RV_07_16339	Waverly Creek at SR 110 nr Waverly, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.081823	-81.726531	X	X					X						
RV_07_16340	Reedy Creek @ Gene Road near Odum, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.593652	-82.145155	X						X						
RV_07_3027	Sixty-foot Branch at SR32 near Patterson, GA	Satilla	Brunswick WP	WQMU Data Collection, D/S GA0037206	31.361171	-82.071783	X												
RV_07_3072	Unnamed Tributary of Seventeen Mile River at Waldroup Rd near Douglas, GA	Satilla	Brunswick WP	Source Tracking, U/S Douglas WPCP	31.496603	-82.825408	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_07_3096	Keene Bay Branch nr Tank Rd nr Odum, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.717332	-82.080366	X												
RV_07_3099	Mill Creek nr High Bluff Rock Rd nr Waycross, GA	Satilla	Brunswick WP	Trend	31.189994	-82.202803	X				X	X	X						
RV_07_3107	Trib Little Satilla River nr Ocean Hwy (US 17) nr Brunswick, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.134099	-81.599531	X												
RV_07_3108	Trib Radcliffe Creek at US 82 nr Brunswick, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.161349	-81.596293	X												
RV_07_3112	trib to Little Waverly Creek at Old Dixie Hwy nr White Oak, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.07333417	- 81.73597722	X												
RV_07_3113	Trib White Oak Creek at Horse Stamp Church Rd nr Waverly, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.065304	-81.657625	X												
RV_07_3115	Trib. To Little Satilla Creek @ nr Brentwood Rd nr Odum, GA	Satilla	Brunswick WP	CSU Reference Point Sampling	31.71471	-82.10523	X												
RV_07_5091	Unnamed Tributary to Sixty-foot Branch at Main st neat Patterson, GA	Satilla	Brunswick WP	WQMU Data Collection, U/S GA0037206	31.382776	-82.134315	X												
RV_07_5092	Sixty Foot Branch at US84 near Patterson, GA	Satilla	Brunswick WP	WQMU Data Collection, Secondary Stream U/S GA0037206	31.396863	-82.127938	X												
RV_07_5093	Unnamed Tributary to Sixty Foot Branch at US 84 near Patterson, GA	Satilla	Brunswick WP	WQMU Data Collection, Tertiary trib U/S GA0037206	31.403335	-82.119657	X												
RV_09_16153	New River @ Highway 319 Near Tifton, GA	Suwanee	Tifton WP	2015 follow-up; U/S of Tifton WPCP	31.448512	-83.482639	X												
RV_09_16154	Unnamed Trib to New River East @ Highway 19 near Tifton, GA	Suwanee	Tifton WP	2015 follow-up; Secondary trib U/S of Tifton WPCP	31.450101	-83.480705	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_09_16319	Trib to Mill Creek at Amaco Rd near Rochelle, GA	Suwanee	Tifton WP	WQMU Data collection; U/S of GA0024224 trib	31.955212	-83.477802	X												
RV_09_16320	Trib to Mill Creek at SR30 near Rochelle, GA	Suwanee	Tifton WP	WQMU Data collection; D/S of GA0024224 trib	31.949891	-83.480221	X												
RV_09_16321	Mill Creek at SR233 near Rochelle, GA	Suwanee	Tifton WP	WQMU Data collection; D/S of GA0024236	31.932354	-83.455066	X												
RV_09_16322	Grand Bay Creek at Old State Rd. near Naylor, GA	Suwanee	Tifton WP	Probabilistic	30.935	-83.109	X												
RV_09_16323	Tributary to Little Creek at Edmonson Road near Moultrie, GA	Suwanee	Tifton WP	WQMU Data collection; D/S of Moultrie WPCP (no U/S)	31.127076	-83.70089	X	X											
RV_09_16324	Unnamed trib to Franks Creek at Union Road near Hahira, GA	Suwanee	Tifton WP	WQMU Data collection; D/S of GA0037974 (no U/S)	30.983257	-83.381271	X												
RV_09_16325	Bear Creek at Kent Drive near Adel, GA	Suwanee	Tifton WP	WQMU Data collection; D/S of GA0021563	31.154876	-83.426943	X												
RV_09_16326	Bear Creek at Patterson St near Adel, GA	Suwanee	Tifton WP	WQMU Data collection; U/S of GA0021563	31.165996	-83.433297	X												
RV_09_16335	Withlacoochee River at SR 37 near Adel, GA	Suwanee	Tifton WP	Probabilistic	31.12	-83.321	X				X								
RV_09_16337	Reedy Creek at Serena Drive near Norman Park, GA	Suwanee	Tifton WP	WQMU Data collection; U/S of Norman Park WPCP	31.269788	-83.681287	X												
RV_09_3209	New River - U.S. Highway 82 Near Tifton	Suwanee	Tifton WP	2015 follow-up; D/S of Tifton WPCP	31.4425	-83.475833	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_09_3301	Little River at St Augustine Rd / SR 133 near Troupville, GA	Suwanee	Tifton WP	Probabilistic	30.8530662	-83.34655691	X												
RV_09_5070	Reedy Creek at East Broad Street near Norman Park, GA	Suwanee	Tifton WP	WQMU Data collection; D/S of Norman Park WPCP	31.268065	-83.680011	X	X											
RV_10_16316	Pine Creek at SR3 near Ochlocknee, GA	Ochlockonee	Tifton WP	WQMU Data collection; D/S of GA0046370 (no U/S)	30.963491	-84.045693	X						X						
RV_10_16317	Aucilla Creek D/S Boston WPCP near Boston, GA	Ochlockonee	Tifton WP	WQMU Data collection; D/S of Boston WPCP	30.781203	-83.785759	X												
RV_10_16318	Bay Pole Branch at Lower Meigs Rd near Moultrie GA	Ochlockonee	Tifton WP	Watershed Characterization	31.099492	-83.918695	X	X			X		X						
RV_10_16328	Ochlockonee River @ SR 37 near Moultrie, GA	Ochlockonee	Tifton WP	WQMU Data collection; Mainstem U/S of Moultrie WPCP	31.182903	-83.809738	X												
RV_10_16336	Trib to Ochlockonee River at West Blvd near Moultrie, GA	Ochlockonee	Tifton WP	WQMU Data collection; U/S of Moultrie WPCP	31.160324	-83.802943	X												
RV_10_3365	Ochlockonee River - FAS 1205 near Moultrie, GA	Ochlockonee	Tifton WP	WQMU Data collection; D/S of Moultrie WPCP	31.142333	-83.803611	X						X						
RV_10_3416	Oquina Creek at Old Albany Rd	Ochlockonee	Tifton WP	NH3 evaluation; US potential NH3 Contribution	30.855506	-83.995736	X												
RV_10_3424	Oquina Creek atNorth Pinetree Blvd near Thomasville, GA	Ochlockonee	Tifton WP	NH3 evaluation; D/S potential NH3 Contribution	30.869167	-83.983611	X	X					X						
RV_11_16293	Bay Branch at Bay Ave NW near Edison, GA	Flint	Tifton WP	WQMU Data collection; U/S of GA0037427	31.56427	-84.73124	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_11_16294	Pachitla Creek at Robin Factory Rd. near Cuthbert, GA	Flint	Tifton WP	Probabilistic	31.664	-84.687	X	X											
RV_11_16296	Bear Creek at Nicholson St near Richland, GA	Flint	Tifton WP	WQMU Data collection; U/S of GA0021539	32.087872	-84.658598	X												
RV_11_16330	Mossy Creek at Pleasant Hill Road near Bronwood, GA	Flint	Tifton WP	CSU Reference Point Sampling	31.878441	-84.375904	X	X											
RV_11_16334	Baptist Branch at US Hwy 27 near Blakely, GA	Flint	Tifton WP	WQMU Data collection; U/S of Blakely WPCP	31.37057	-84.92097	X												
RV_11_16343	Basin Creek at Old Alabama Rd near Thomaston, GA	Flint	Atlanta WP	Reference	32.926513	-84.38075	X	X			X		X	X	X				
RV_11_16365	Pigeon Creek at Shirley Rd near Manchester, GA	Flint	Atlanta WP	Need WQ data	32.866	-84.578	X	X											
RV_11_16369	Russell Branch at Jeff Hendricks Rd. near Woodland, GA	Flint	Atlanta WP	Probabilistic	32.784	-84.505	X	X											
RV_11_16371	Sheep Rock Hollow at Cove Rd near Woodbury, GA	Flint	Atlanta WP	Reference	32.92202	-84.535264	X	X			X		X	X	X				
RV_11_16375	Sullivan Creek at W. Lee's Mill Road near Atlanta, GA	Flint	Atlanta WP	No data	33.61	-84.411	X				X		X	X	X				
RV_11_16380	Trib to Morning Creek at GA 314 near Fayetteville, GA	Flint	Atlanta WP	Probabilistic	33.499	-84.449	X												
RV_11_3318	Spring Crk at SR 62 nr Blakely, GA	Flint	Tifton WP	319 Evaluation	31.414547	-84.775077	X	X					X						
RV_11_3447	Richland Creek	Flint	Atlanta WP	Reference	32.72178647	-84.37952582	X				X		X	X	X			X	
RV_11_3448	Barfield Creek	Flint	Atlanta WP	Reference	32.7472334	-84.33926868	X				X		X	X	X				
RV_11_3449	Ulcohatchee Creek at Charlie Reeves Road near Roberta, GA	Flint	Atlanta WP	2010 Revisit	32.708922	-84.187792	X						X	X	X				
RV_11_3480	Flint River - Lee's Mill Road	Flint	Atlanta WP	Old sample location, update	33.612222	-84.40667	X				X		X	X	X				

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
				data															
RV_11_3488	Flat Creek - Georgia Highway 74, South Of Peachtree City	Flint	Atlanta WP	Probabilistic; Nutrients-HIGH-FLINT	33.341111	-84.538889	X						X	X	X				
RV_11_3499	Elkins Creek at State Road 109 near Molena, GA	Flint	Atlanta WP	2010 Revisit	33.0125	-84.483056	X	X											
RV_11_3584	Spring Creek at State Road 91 near Colquitt, GA	Flint	Tifton WP	319 Evaluation	31.170556	-84.742778	X	X					X						
RV_11_3586	Spring Creek At U.S. Highway 84 near Colquitt, GA	Flint	Tifton WP	319 Evaluation	30.975278	-84.745556	X	X					X						
RV_11_3592	Tributary to Potato Creek at Rocky Botton Rd nr Thomaston, GA	Flint	Atlanta WP	Nutrients-HIGH-FLINT	32.93523	-84.28026	X	X					X	X	X				
RV_11_3632	Baptist Branch at SR 200 near Blakely, GA	Flint	Tifton WP	WQMU Data collection; D/S of Blakely WPCP	31.37279423	-84.91732226	X												
RV_11_3634	Dry Creek at Georgia Highway 200	Flint	Tifton WP	Watershed Characterization	31.373023	-84.882969	X	X					X						
RV_11_3773	Auchumpkee Crk at Old Minor Rd nr Roberta, GA	Flint	Atlanta WP	2010 Revisit	32.708359	-84.198271	X						X	X	X				
RV_11_3780	Camp Creek 319(h) nr Walker Rd, Creekview Cir, Riverdale, GA	Flint	Atlanta WP	319; Nutrients-MED-FLINT	33.57508	-84.4337	X				X		X	X	X			X	
RV_11_3789	Flint River @ Sprewell Bluff Sprewell Bluff State Park	Flint	Atlanta WP	Trend	32.855988	-84.476812	X	X			X	X	X	X	X				
RV_11_3799	Lanahassee Creek nr SR153 Wasington St nr Preston, GA	Flint	Tifton WP	CSU Reference Point Sampling	32.11212806	-84.49885639	X	X					X						
RV_11_3804	Lime Creek at Springhill Church Road east of Americus, GA	Flint	Tifton WP	Trend	32.035	-83.9925	X	X			X	X	X		X			X	
RV_11_3807	Little Ichawaynochaway Crk at CR 3 nr Shellman, GA	Flint	Tifton WP	Trend	31.803532	-84.640013	X	X			X	X	X		X			X	
RV_11_3808	Little Patsiliga Creek at Montford Rd nr Butler, GA	Flint	Atlanta WP	Reference	32.666907	-84.232452	X				X		X	X	X				

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_11_3835	trib to Flint River nr John Allen Carter Rd nr Talbotton, GA	Flint	Atlanta WP	Reference	32.73479444	-84.28516389	X				X		X	X	X				
RV_11_3837	Turkey Creek at Pasley Shoals Rd. near Thomaston, GA	Flint	Atlanta WP	Reference; Nutrients-LOW-FLINT	32.88144917	-84.47736111	X	X			X		X	X	X			X	
RV_11_5101	Bay Branch at Hartford St near Edison, GA	Flint	Tifton WP	WQMU Data collection; D/S of GA0037427	31.562271	-84.718333	X	X											
RV_11_5106	Bear Creek at Sundown Road near Richland, GA	Flint	Tifton WP	WQMU Data collection; D/S of GA0021539	32.069706	-84.642256	X												
RV_12_16327	North Prong Kolomoki Creek at Kolomoki Rd near Bluffton, GA	Chattahoochee	Tifton WP	Watershed Characterization	31.501361	-84.942894	X	X					X						
RV_12_16354	House Creek at Monument Rd	Chattahoochee	Atlanta WP	Need WQ data	32.825	-85.045	X	X			X								
RV_12_16370	Sandy Creek at Yates Rd near	Chattahoochee	Atlanta WP	Need WQ data	32.829	-85.096	X	X			X								
RV_12_3841	Chattahoochee River at McGinnis Ferry Road	Chattahoochee	Atlanta WP	AWW	34.050556	-84.097701	X	X	X										
RV_12_3849	Chattahoochee River – Mcclure Bridge	Chattahoochee	Atlanta WP	Probabilistic	34.007778	-84.179444	X	X	X		X								
RV_12_3859	Chattahoochee River - DeKalb County Water Intake	Chattahoochee	Atlanta WP	Probabilistic; AWW	33.9731	-84.2631	X	X	X		X								
RV_12_3870	Chattahoochee River at Cobb County Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	AWW	33.9443	-84.405	X	X	X										
RV_12_3891	Chattahoochee River - Atlanta Water Intake	Chattahoochee	Atlanta WP	AWW	33.8278	-84.455	X	X	X		X								
RV_12_3934	Chattahoochee River at Bankhead Highway	Chattahoochee	Atlanta WP	AWW	33.795278	-84.507778	X	X			X								
RV_12_3940	Chattahoochee River @ Sr 6 (Camp Creek Pkwy / Thorton Rd.) near Lithia Springs, GA	Chattahoochee	Atlanta WP	Probabilistic	33.737335	-84.582591	X	X			X								

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_12_3960	Chattahoochee River at Capps Ferry Road near Rico, GA	Chattahoochee	Atlanta WP	AWW	33.5778	-84.808611	X	X			X								
RV_12_4075	Mountain Oak Creek at State Road 103 near Hamilton, GA	Chattahoochee	Atlanta WP	2010 Revisit	32.741111	-85.068889	X	X											
RV_12_4123	Hillabahatchee Creek at CR 210 near Frolona, GA	Chattahoochee	Atlanta WP	Trend	33.311218	-85.187675	X	X			X	X	X	X	X			X	
RV_12_4242	Whitewater Creek at North Glenn Rd	Chattahoochee	Atlanta WP	Need WQ data	33.15225184	-85.15408858	X	X			X								
RV_12_4280	Big Creek at Roswell Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	AWW	34.017851	-84.352492	X	X	X					X	X				
RV_12_4313	Odom Creek at Odom Creek Rd nr Blakely, GA	Chattahoochee	Tifton WP	CSU Reference Point Sampling	31.377779	-85.074508	X												
RV_12_4316	Peachtree Creek at Northside Dr in Atlanta, GA	Chattahoochee	Atlanta WP	AWW	33.8194	-84.407778	X	X	X		X			X	X				
RV_12_4329	Sweetwater Creek at Interstate Highway 20	Chattahoochee	Atlanta WP	AWW	33.7728	-84.614722	X	X						X	X				
RV_12_4333	Town Creek nr Town Creek Rd nr Woodland, AL	Chattahoochee	Atlanta WP	REFERENCE	33.29817222	-85.26693722	X	X			X		X	X	X				
RV_12_4342	Wolf Creek At Wilson Road	Chattahoochee	Atlanta WP	2010 Revisit	33.539444	-84.833611	X	X											
RV_13_4393	Mud Branch at North Van Wert Rd near Villa Rica, GA	Tallapoosa	Cartersville WP	Villa Rica WPCP	33.74128947	-84.96086342	X	X			X		X						
RV_13_4397	Indian Creek at State Line Road near Bowdon, GA	Tallapoosa	Cartersville WP	FC (Cat 3 for pH)	33.489176	-85.30429	X	X											
RV_13_4407	Tallapoosa River at Rockmart Road near Draketown, Ga.	Tallapoosa	Cartersville WP	2011 Repeat	33.885359	-85.094873	X	X			X		X						
RV_14_15873	Town Creek at Villanow Street	Coosa	Cartersville WP	Need data	34.704323	-85.275973	X				X		X						
RV_14_15874	Dry Creek at Corinth Road	Coosa	Cartersville WP	Need data	34.68537	-85.257968	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_14_16346	Cedar Creek at SR 100	Coosa	Cartersville WP	Rural runoff	34.00539	-85.26463	X	X			X		X						
RV_14_16353	Euharlee Ck at Wayside Park Rockmart	Coosa	Cartersville WP	Rural runoff	33.99806	-85.05308	X	X			X		X						
RV_14_16355	Ketchum Branch at Underwood Road near Dalton, GA	Coosa	Cartersville WP	Need Data; WQMU	34.801	-84.917	X	X			X		X						
RV_14_16359	Mill Creek @ SR 3	Coosa	Cartersville WP	upstream water quality needed to compare with Mill Creek @ SR 3 BYPASS	34.80338	-85.02161	X				X								
RV_14_16360	Mill Creek @ SR 3 BYPASS	Coosa	Cartersville WP	Stream possibly impacted by construction of interchage, many industries in area including a transfer tank wash out station.	34.7976	-84.99376	X	X			X								
RV_14_16374	Stover Creek at Stover Creek Road near Dalton, GA	Coosa	Cartersville WP	BIO F; need WQ data	34.673	-85.026	X	X											
RV_14_4424	Camp Creek u/s SR136 near Resaca, GA	Coosa	Cartersville WP	319 (FC)	34.579167	-84.956111	X	X											
RV_14_4426	Oostanaula River at Georgia Highway 156 near Calhoun, GA	Coosa	Cartersville WP	Probabilistic	34.4919	-85.0136	X												
RV_14_4614	Coosa River at State Road 100 near Coosa, GA	Coosa	Cartersville WP	Probabilistic	34.2486	-85.3556	X												
RV_14_4777	Tanyard Branch at SR 100 / Canal St	Coosa	Cartersville WP	WA-High FC	34.00494021	-85.25937329	X	X											
RV_14_4788	Chattooga River South of Sucker Lake	Coosa	Cartersville WP	WA-City of Trion; need data	34.55737	-85.317355	X				X		X						
RV_14_4789	Spring Branch off Ridgeway Rd	Coosa	Cartersville WP	WA-City of Trion; need data	34.568017	-85.296601	X				X		X						

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_14_4811	Allen Creek at Harrisburg Rd nr LaFayette, GA	Coosa	Cartersville WP	Old BIO site; need data	34.601827	-85.388774	X							X	X				
RV_14_4829	Dykes Crk at Dykes Crk Xing nr Rome, GA	Coosa	Cartersville WP	Trend	34.263568	-85.08553	X	X			X	X	X	X	X			X	
RV_14_4837	Jones Creek nr Jones Creek Rd, Dahlonega, GA	Coosa	Atlanta WP	SEMN	34.602401	-84.150559	X				X		X	X	X	X	X	X	
RV_14_4880	Thompson Creek at Bramlett Rd nr Rockmart, GA	Coosa	Cartersville WP	Reference	33.97349613	-85.04021206	X							X	X				
RV_15_16347	Coke Oven Branch @ Lee Rd.	Tennessee	Cartersville WP	Never sampled possible impact by urban growth	34.87818	-85.2924	X	X			X								
RV_15_16348	Crawfish Spring @ Euclid Ave.	Tennessee	Cartersville WP	Possible ref site. Never sampled. Water flows into West Chickamauga Creek.	34.87039	-85.29264	X	X			X			X	X				
RV_15_16349	Cutcane Creek @ Lowery Rd	Tennessee	Cartersville WP	Never sampled Large Lake u/s	34.92091	-84.2567	X												
RV_15_16350	Daley Creek @ Curtis switch Rd. near Mineral Bluff	Tennessee	Cartersville WP	Never sampled	34.93322	-84.32011	X												
RV_15_16361	Mineral Springs Creek @ Stites Rd.	Tennessee	Cartersville WP	Headwater location possible impact by urban growth	34.85832	-84.31837	X				X								
RV_15_16366	Reservior Br @ Indian Forest	Tennessee	Cartersville WP	Never sampled chicken houses u/s	34.88336	-84.32487	X				X		X	X	X				
RV_15_16376	Toccoa River @ Harpertown Rd	Tennessee	Cartersville WP	Never sampled possible impact by urban growth	34.98722	-84.37071	X				X								
RV_15_16377	Trib to Black Branch at Carline Rd. near Midway, GA	Tennessee	Cartersville WP	Probabilistic	34.96957844	-85.2656587	X												

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	Pesticides	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions	Total Dissolved Solids	Gage	Chlorophyll
RV_15_16378	Trib to Chattanooga Creek @ Lula Lake Rd.	Tennessee	Cartersville WP	Never sampled possible impact by urban growth	34.97701	-85.3579	X				X								
RV_15_16382	Wauhatchie Branch @ Belk Rd.	Tennessee	Cartersville WP	Never sampled possible impact by urban growth	34.97071	-85.40154	X							X	X			X	
RV_15_16383	Weaver Creek @ McKinney Rd	Tennessee	Cartersville WP	Never sampled possible impact by urban growth	34.88172	-84.29545	X				X		X	X	X			X	
RV_15_4909	Toccoa River @ Hwy 76	Tennessee	Cartersville WP	Last sampled 1974	34.88914	-84.28677	X						X						
RV_15_4911	Fighting Town Creek @ Mobile Rd	Tennessee	Cartersville WP	Last sampled 2001	34.98505	-84.38517	X												
RV_15_4917	Lookout Creek @ Creek Rd	Tennessee	Cartersville WP	Last sampled 2011 large creek with impacts from lookout mountain. Floods easly.	34.8975	-85.46354	X												
RV_15_4961	East Chickamauga Crk at Lower Gordon Springs Rd nr Dalton, GA	Tennessee	Cartersville WP	Trend	34.746923	-85.12355	X	X			X	X	X	X	X			X	
RV_15_4983	Wolf Creek @ River Rd.	Tennessee	Cartersville WP	Last sampled 2001	34.96554	-84.35383	X												

[1] **Sampling Organization:** Atlanta WP = GAEPD Atlanta office; Brunswick WP = GAEPD Brunswick Regional office, Cartersville WP = GAEPD Cartersville Regional Office Tifton WP = GAEPD Tifton Regional office.

[2] **Routine field and chemical parameters include**: gage height / tape down or discharge measurement, air temperature, water temperature, dissolved oxygen, pH, specific conductance, turbidity, 5-day BOD, , alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, Kjeldahl nitrogen, total phosphorus, total organic carbon

Basin lakes field, chemical and biological parameters include: water depth, secchi disk transparency, photic zone depth, air temperature, depth profiles for dissolved oxygen, temperature, pH, and specific conductance, and chemical analyses for turbidity, specific conductance, 5-day BOD, pH, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, Kjeldahl nitrogen, total phosphorus, total organic carbon, and chlorophyll a.

[3] **Biomonitoring:** conducted for invertebrates and periphyton using Georgia EPD protocols.

TABLE 3-8. GEORGIA TARGETED MONITORING NETWORK 2017

Rivers and streams stations are sampled monthly for field and chemical parameters for one calendar year. For stations where fecal coliform bacteria is collected, four fecal coliform bacterial samples are collected each calendar quarter during the year. Basin lakes and reservoirs are sampled monthly during the growing season for the calendar year.

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_01_115	Ebenezer Creek @ Long Bridge Rd nr. Stillwell, GA	Savannah	Brunswick WP	WQMU Data Collection, Springfield WPCP	32.364583	-81.23075	X										
RV_01_116	Ebenezer Creek @ Log Landing Rd	Savannah	Brunswick WP	WQMU Data Collection, Springfield WPCP	32.350005	-81.267505	X										
RV_01_16766	Trib to Buck Creek at SR 21 nr Sylvania	Savannah	Brunswick WP	Probabilistic	32.725738	-81.608682	X	X			X						
RV_01_16768	Little Ebenezer Creek @ Hwy 21	Savannah	Brunswick WP	WQMU Data Collection, Springfield WPCP	32.345064	-81.265565	X										
RV_01_244	Charlies Creek at Charlies Creek Rd East of Hiawassee, GA	Savannah	Atlanta WP	SEMN	34.95895	-83.57158	X				X		X	X	X	X	X
RV_01_248	Coleman River at Coleman River Rd near Clayton, GA	Savannah	Atlanta WP	SEMN	34.952033	-83.516598	X				X		X	X	X	X	X
RV_02_16767	Lotts Creek at Jordan Rd near Register, GA	Ogeechee	Brunswick WP	Stream Reach Characterization	32.298	-81.814	X										
RV_02_292	Ogeechee River at Scarboro Rd nr Rocky Ford	Ogeechee	Brunswick WP	Probabilistic	32.649294	-81.840796	X	X			X						
RV_02_309	Ogeechee River at Morgans Bridge Rd nr Bloomingdale	Ogeechee	Brunswick WP	Probabilistic	32.079542	-81.384688	X	X			X						
RV_02_462	Mill Creek at Bulloch County Road 386 Old River Road near Brooklet, Ga	Ogeechee	Brunswick WP	Trend Site	32.440012	-81.579074	X	X			X		X	X	X		X
RV_03_16072	North Oconee Rive at Greenway Road near Lula, GA	Oconee	Atlanta WP	Stessor ID; potential LI	34.364633	-83.7317583	X				X		X	X	X	X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_03_16273	Trib to Little Indian Creek at Pierce Dairy Rd.	Oconee	Atlanta WP	Stessor ID; D/S of Madison Lakes LAS;	33.508	-83.472	X				X		X	X	X	X	
RV_03_16761	Whitewater Creek at Lowery School Rd	Oconee	Tifton WP	Probabilistic	32.334711	-82.815942	X	X			X						
RV_03_16780	Marshal Creek at CR 295 (Hillsboro Lake Rd) near Gray, GA	Oconee	Atlanta WP	Stessor ID; potential LI	33.148626	-83.584873	X				X		X	X	X	X	X
RV_03_16781	Cedar Creek at Union Hill Church Rd near Hillsboro, GA	Oconee	Atlanta WP	Stessor ID; List for FC	33.162	-83.543	X				X		X	X	X	X	
RV_03_16782	White Oak Creek at GA Hwy 16 near Monticello, GA	Oconee	Atlanta WP	Stessor ID; NH3-Monticello-White Oak Creek WPCP	33.296000	-83.666000	X				X		X	X	X	X	
RV_03_16783	Pearson Creek at College Street near Monitcello, GA	Oconee	Atlanta WP	Stessor ID; NH3-Monticello-Pearson Creek WPCP	33.326000	-83.691000	X				X		X	X	X	X	
RV_03_16784	Briar Creek at CR 167 (Briar Creek Rd)	Oconee	Atlanta WP	Stessor ID; Listed for BIO F; no WQ data; D/S of Georgia Pacific NPDES	33.621	-83.378	X				X		X	X	X	X	
RV_03_16785	Fishing Creek at CR 105 (Meadow St) near Maxeys, GA	Oconee	Atlanta WP	Stessor ID; potential LI	33.717539	-83.156035	X				X		X	X	X	X	
RV_03_16786	Falling Creek at CR 87 (Wire Bridge Rd)	Oconee	Atlanta WP	Stessor ID; Listed for BIO F; no WQ data	33.781	-83.256	X				X		X	X	X	X	X
RV_03_16787	Indian Creek at CR 301 (Preston Rd) near Goodhope, GA	Oconee	Atlanta WP	Stessor ID; potential LI	33.781617	-83.543094	X				X		X	X	X	X	X
RV_03_16788	Turkey Creek at CR 311 (Mount Caramel Church Rd) near Monroe, GA	Oconee	Atlanta WP	Stessor ID; potential LI	33.843779	-83.576930	X				X		X	X	X	X	
RV_03_16789	Hardeman Creek at CR 65 (Tal Phillips Rd)	Oconee	Atlanta WP	Stessor ID; Listed for BIO F; no WQ data	34.126	-83.395	X				X		X	X	X	X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_03_16790	Cane Creek at CR 111 (Cane Creek Rd) near Arcade, GA	Oconee	Atlanta WP	Stessor ID; potential LI	34.028907	-83.463729	X				X		X	X	X	X	
RV_03_16791	Cedar Creek at CR 814 (Cedar Creek Rd) near Gainesville, GA	Oconee	Atlanta WP	Stessor ID; potential LI	34.295909	-83.724132	X				X		X	X	X	X	X
RV_03_16801	Peterson Creek at US Hwy 280	Oconee	Tifton WP	US GA0021377 Glenwood WPCP	32.17367	-82.68047	X										
RV_03_501	Cedar Creek at Barnett Shoals Drive near Athens, GA	Oconee	Atlanta WP	Stessor ID; D/S of large residential neighborhoods	33.895278	-83.3325	X				X		X	X	X	X	
RV_03_508	Town Creek at CR 42 (Cold Springs Rd) near Greenboro, GA	Oconee	Atlanta WP	Stessor ID; potential LI	33.612982	-83.238978	X				X		X	X	X	X	
RV_03_515	Jacks Creek at Bearden Road near Monroe, GA	Oconee	Atlanta WP	Stessor ID; D/S of Monroe WPCP	33.79966	-83.61913	X				X		X	X	X	X	
RV_03_554	Big Indian Creek at GA 83 near Madison, GA	Oconee	Atlanta WP	Stessor ID; List for FC, on 2015 list but not sampled for fish	33.525556	-83.524444	X				X		X	X	X	X	
RV_03_570	Pond Fork at Wayne Poultry Road near Pendergrass, GA	Oconee	Atlanta WP	Stessor ID; List for FC	34.18073	-83.66086	X				X		X	X	X	X	
RV_03_603	Oconee River at Milledgeville Water Intake	Oconee	Atlanta WP	Probabilistic	33.083861	-83.214393	X				X						
RV_03_659	Peterson Creek at CR 58	Oconee	Tifton WP	DS GA0021377 Glenwood WPCP	32.162358	-82.645677	X										
RV_03_667	Trib to Mulberry River at Jackson Trail Road	Oconee	Atlanta WP	Stessor ID; most watershed drains Braselton Golf Club	34.066	-83.686	X				X		X	X	X	X	
RV_03_678	Lollis Creek at Spout Springs Rd	Oconee	Atlanta WP	Stessor ID; D/S of Spout Springs Reclamation LAS	34.128823	-83.879728	X				X		X	X	X	X	
RV_03_706	Curry Creek at Jeffereson River Rd	Oconee	Atlanta WP	Stessor ID; D/S of Jefferson LAS and NPDES	34.076666	-83.499176	X				X		X	X	X	X	

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_03_707	Redstone Creek at Lebanon Church Rd	Oconee	Atlanta WP	Stessor ID; D/S of Arcade LAS	34.026189	-83.533723	X				X		X	X	X	X	X
RV_03_720	West Fork Trail Creek at Hull Rd	Oconee	Atlanta WP	Stessor ID; List for FC; Two MHP outfalls upstream	33.989508	-83.35101	X				X		X	X	X	X	
RV_03_736	Peterson Creek at 3rd Ave	Oconee	Tifton WP	US GA0021377 Glenwood WPCP	32.178996	-82.691669	X										
RV_03_788	Candler Creek at Diamond Hill Rd near Gillsville, GA	Oconee	Atlanta WP	Stessor ID; List for FC	34.280249	-83.626928	X				X		X	X	X	X	
RV_04_2058	Bear Creek at McDonald Road near Mansfield ,GA	Upper Ocmulgee	Atlanta WP	Had metal data in 2010, but no TSS or hardness.	33.445923	-83.812818	X				X						
RV_05_16777	Echeconnee Creek at Rock Quarry Rd near Yatesville	Ocmulgee	Atlanta WP	Probabilistic	32.922939	-84.116989	X	X			X						
RV_05_16779	Trib to Walnut Creek at Chehaw Trail near Macon	Ocmulgee	Atlanta WP	Probabilistic	33.010562	-83.610971	X				X						
RV_05_2185	Ocmulgee River at Hwy 96	Ocmulgee	Tifton WP	Need current fecal data	32.5425	-83.536944	X	X									
RV_05_2229	Little Ocmulgee River at SR 134	Ocmulgee	Tifton WP	DS Scotland WPCP	32.008583	-82.752583	X										
RV_06_15207	Altamaha River at Jaycee Landing boat ramp	Altamaha	Brunswick WP	Probabilistic	31.666757	-81.838751	X	X			X						
RV_06_16760	Big Cedar Creek at Bartow Dublin Hwy	Altamaha	Tifton WP	Probabilistic	32.732922	-82.706965	X	X			X						
RV_06_2850	Fountain Branch at Logging Road near Ludowici, GA	Altamaha	Brunswick WP	WQMU Data Collection,NH3-Ludowici WPCP	31.646461	-81.720465	X	X			X		X				
RV_06_2871	Ohoopee River at SR 56 nr Nunez	Altamaha	Brunswick WP	Probabilistic	32.470859	-82.446815	X	X			X						
RV_06_2887	Ohoopee River at SR 292 nr Lyons	Altamaha	Brunswick WP	Probabilistic	32.194271	-82.191849	X	X			X						

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_07_16398	Unnamed Tributary to 17 Mile River at Gaskins Ave	Satilla	Brunswick WP	WQMU Data Collection,NH3-RW Griffin	31.502061	-82.845295	X						X				
RV_07_2661	Satilla River at SR 135	Satilla	Brunswick WP	Probabilistic	31.425888	-82.889088	X				X						
RV_07_2990	L. Hurricane Creek @ SR 32 near Alma, GA	Satilla	Brunswick WP	WQMU Data Collection, Miliken WPCP	31.54491	-82.54472	X										
RV_07_2991	L. Hurricane Creek @ CR 343 (SR 64) near Alma, GA	Satilla	Brunswick WP	WQMU Data Collection, Miliken WPCP	31.495556	-82.528056	X										
RV_07_2993	L. Hurricane Creek @ US Hwy 1 near Waycross, GA	Satilla	Brunswick WP	WQMU Data Collection, Miliken WPCP	31.423477	-82.432838	X										
RV_07_3099	Mill Creek @ High Bluff Rock Rd	Satilla	Brunswick WP	Trend Site	31.189994	-82.202803	X	X			X		X	X	X		X
RV_08_16769	Clay Branch @ Okefenokee Dr.	St Marys	Brunswick WP	Folkston Targeted FC Study	30.840673	-82.014125	X	X									
RV_08_16770	Long Branch @ Sardis/Spanish Creek Rd.	St Marys	Brunswick WP	Folkston Targeted FC Study	30.813087	-82.069331	X	X									
RV_08_3131	Spanish Creek @ SR 121 Okefenokee Parkway	St Marys	Brunswick WP	Folkston Targeted FC Study	30.804106	-82.027633	X	X									
RV_08_3144	Clay Branch @ Spanish Creek Rd.	St Marys	Brunswick WP	Folkston Targeted FC Study	30.828992	-82.019007	X	X									
RV_08_3146	Heather's Branch @ Post Rd	St Marys	Brunswick WP	Folkston Targeted FC Study	30.827145	-82.035421	X	X									
RV_09_16162	TyTy Creek at South Pickett Street	Suwannee	Tifton WP	DS GA0025500 TyTy WPCP	31.4619	-83.65208	X										
RV_09_16165	Trib of Ty Ty Creek West u/s of WPCP discharge	Suwannee	Tifton WP	trib US GA0025500 TyTy WPCP	31.46832	-83.65423	X										
RV_09_16320	Trib to Mill Creek at SR 30	Suwannee	Tifton WP	DS GA0024244 Rochelle	31.949891	-83.480221	X										

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
				Northwest WPCP; 2016 sample site													
RV_09_16752	Flat Branch at Kinard Bridge Rd	Suwannee	Tifton WP	DS GA0031950 Lenox WPCP	31.2587	-83.49347	X										
RV_09_16757	Cat Creek at Hwy 122	Suwannee	Tifton WP	DS GA0033553 Ray City WPCP	31.02563	-83.22433	X										
RV_09_16758	Cat Creek at SR 37	Suwannee	Tifton WP	US GA0033553	31.07393	-83.20504	X										
RV_09_16759	Beaverdam Creek at Park Street	Suwannee	Tifton WP	trib US GA0033553	31.07119	-83.20225	X										
RV_09_16763	Piscola Creek at SR 33	Suwannee	Tifton WP	GA NWQI	30.830549	-83.769923	X	X									
RV_09_16764	Piscola Creek at Hwy 122	Suwannee	Tifton WP	GA NWQI	30.939235	-83.768289	X	X									
RV_09_16765	Piscola Creek at Coffee Rd	Suwannee	Tifton WP	GA NWQI	30.881135	-83.771941	X	X									
RV_09_16800	Trib to Cherry Creek DS Oak St. Subdivision WPCP	Suwannee	Tifton WP	DS GA0030104	30.89499	-83.27701	X										
RV_09_3166	Alapaha River at US Hwy 82	Suwannee	Tifton WP	DS GA0033596 Alapaha WPCP	31.384167	-83.1925	X	X			X						
RV_09_3192	Alapaha River at US Hwy 129	Suwannee	Tifton WP	Probabilistic	31.046241	-83.043412	X										
RV_09_3230	Piscola Creek at US Hwy 84	Suwannee	Tifton WP	GA NWQI	30.793056	-83.706389	X	X									
RV_09_3246	Ty Ty Creek at US Hwy 82	Suwannee	Tifton WP	US GA0025500 TyTy WPCP	31.4736	-83.66348	X										
RV_10_16396	Aucilla River at Whitney Camp Rd	Ocklockonee	Tifton WP	DS Boston WPCP GA0033715; 2016 sample site	30.744	-83.78597	X										
RV_10_16754	Mill Creek DS Doerun WPCP	Ocklockonee	Tifton WP	DS GA0021717	31.30976	-83.9222	X										

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_10_16803	Slater Branch at Plantation Rd	Ocklockonee	Tifton WP	Probabilistic	30.733907	-84.013535	X	X			X		X				
RV_10_3365	Ochlockonee River at FAS 1205	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	31.142333	-83.803611	X						X				
RV_10_3371	Ochlockonee River at SR 188	Ocklockonee	Tifton WP	Probabilistic	31.002463	-83.939229	X										
RV_10_3384	Tired Creek at CR 151	Ocklockonee	Tifton WP	Evaluation for BioM delisting	30.763611	-84.229444	X										
RV_10_3386	Ochlockonee River at Hadley Ferry Rd	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	30.731717	-84.235533	X						X				
RV_10_3389	Attapulgus at US Hwy 27	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	30.732778	-84.453611	X						X				
RV_10_3390	Swamp Creek at US Hwy 27	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	30.719444	-84.411389	X						X				
RV_10_3415	Oquina Creek at Old Cassidy Rd	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	30.884714	-83.98171	X						X				
RV_10_3423	Little Attapulgus at SR 241	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	30.718056	-84.49	X						X				
RV_10_3425	Parkers Mill Creek at CR 324	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	30.838056	-84.22611	X						X				
RV_10_5099	Unnamed Trib to Oaky Woods at SR 3	Ocklockonee	Tifton WP	Ochlockonee Nutrient Study	31.07699	-84.080289	X						X				
RV_11_16755	Pessell Creek at Thrasher Rd	Flint	Tifton WP	DS GA0020931 Plains WPCP	32.014497	-84.384629	X										
RV_11_16756	Kell Creek at SR 62	Flint	Tifton WP	DS GA0026212 Leary WPCP	31.48577	-84.50654	X										
RV_11_16778	Kennel Creek D/S of Greenville WPCP	Flint	Atlanta WP	NH3-Greenville WPCP	33.025000	-84.701000	X	X									X
RV_11_16802	Cedar Creek at SR 90	Flint	Tifton WP	DS GA0048011	32.37803	-84.18865	X										

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_11_16804	Prison Branch	Flint	Tifton WP	DS Andersonville WPCP;	32.19455	-84.13317	X										
RV_11_3501	Flint River at SR 36 near Thomaston	Flint	Atlanta WP	Probabilistic	32.838463	-84.424492	X	X			X						
RV_11_3513	Turkey Creek at SR 90	Flint	Tifton WP	DS GA0025623 Byromville WPCP	32.195556	-83.900833	X										
RV_11_3571	Ichawaynochaway at Herod Dover Rd/CR167	Flint	Tifton WP	DS GA0032361 Shellman WPCP	31.70208	-84.545693	X										
RV_11_3691	Town Branch at SR 18	Flint	Atlanta WP	NH3-Zebulon WPCP	33.101825	-84.355752	X	X									
RV_11_3789	Flint River at Sprewell Bluff Sprewell Bluff State Park	Flint	Atlanta WP	Trend site	32.855988	-84.476812	X	X			X		X	X	X		
RV_11_3804	Lime Creek at Springhill Church Rd	Flint	Tifton WP	Trend site	32.035	-83.9925	X	X			X		X	X	X		X
RV_11_3807	Little Ichawaynochaway Creek at CR 3	Flint	Tifton WP	Trend site	31.803532	-84.640013	X	X			X		X	X	X		X
RV_12_15965	Noses Creek at Mount Calvary Road	Chattahoochee	Cartersville WP	Urban runoff	33.95317	-84.612	X				X		X				
RV_12_16762	Cemochechobee Creek at Coleman Rd	Chattahoochee	Tifton WP	Probabilistic	31.635659	-85.00806	X	X			X						
RV_12_16771	Roaring Branch at GA Hwy 22 near Columbus, GA	Chattahoochee	Atlanta WP	Industrial Permitting unit says that DMI Columbus has lots of metals in stormwater that comingles with noncontact cooling.	32.525827	-84.977956	X				X						
RV_12_16772	Mulberry Creek at Winfree Rd	Chattahoochee	Atlanta WP	Probabilistic	32.722155	-84.814867	X				X						

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_12_16773	Trib to Mountain Creek at Callaway Gardens near Pine Mountain, GA	Chattahoochee	Atlanta WP	NH3-Callaway Gardens WPCP	32.828000	-84.861000	X						X				
RV_12_16774	Chattahoochee River at Hollingsworth Ferry Rd	Chattahoochee	Atlanta WP	Probabilistic	33.394566	-85.032159	X	X									
RV_12_16792	Clear Creek at Piedmont Ave in Atlanta, GA	Chattahoochee	Atlanta WP	Listing based on info from Municipal Engineering. No data in database, need new data. Nutrients-???	33.796	-84.37	X	X	X		X		X				
RV_12_3841	Chattahoochee River at McGinnis Ferry Road	Chattahoochee	Atlanta WP	AWW	34.050556	-84.097701	X	X	X		X						
RV_12_3859	Chattahoochee River - DeKalb County Water Intake	Chattahoochee	Atlanta WP	AWW	33.9731	-84.2631	X	X	X								
RV_12_3870	Chattahoochee River at Cobb County Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	AWW	33.9443	-84.405	X	X	X								
RV_12_3891	Chattahoochee River - Atlanta Water Intake	Chattahoochee	Atlanta WP	AWW	33.8278	-84.455	X	X	X		X						
RV_12_3898	White Creek at New Bridge Road near Demorest, GA	Chattahoochee	Atlanta WP	Nutrients-HIGH	34.542636	-83.659694	X						X	X			
RV_12_3900	Little Mud Creek at Coon Creek Road near Alto, GA	Chattahoochee	Atlanta WP	Nutrients-MED	34.467333	-83.632333	X						X	X			
RV_12_3917	Tesnatee Creek at County Road 200 near Cleveland, GA	Chattahoochee	Atlanta WP	Nutrients-LOW	34.583333	-83.8225	X						X	X			
RV_12_3925	Chestatee River at State Road 400 near Dahlonega, GA	Chattahoochee	Atlanta WP	USGS; Nutrients-LOW	34.466667	-83.968889								X			
RV_12_3934	Chattahoochee River at Bankhead Highway	Chattahoochee	Atlanta WP	AWW	33.795278	-84.507778	X	X			X						
RV_12_3942	Sweetwater Creek at Powder Springs Road near Austell, GA	Chattahoochee	Atlanta WP	Nutrients-LOW	33.818788	-84.640703	X	X					X	X			

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_12_3949	Anneewakee Creek at State Road 166 near Douglasville, GA	Chattahoochee	Atlanta WP	Nutrients-MED	33.665278	-84.683611	X	X					X	X			X
RV_12_3960	Chattahoochee River at Capps Ferry Road near Rico, GA	Chattahoochee	Atlanta WP	AWW	33.5778	-84.808611	X	X			X						
RV_12_4003	Flat Creek at McEver Road near Gainesville, GA	Chattahoochee	Atlanta WP	USGS; Nutrients-HIGH	34.265833	-83.885								X			
RV_12_4016	Four Mile Creek at Browns Bridge Road near Cumming, GA	Chattahoochee	Atlanta WP	Nutrients-HIGH	34.249394	-84.011959	X						X	X			
RV_12_4017	Sixmile Creek at Burrus Mill Road near Coal Mountain, GA	Chattahoochee	Atlanta WP	Nutrients-HIGH	34.259111	-84.057805	X						X	X			X
RV_12_4039	New River at State Road 100 near Corinth, GA	Chattahoochee	Atlanta WP	USGS; Nutrients-LOW										X			
RV_12_4049	Yellow Jacket Creek at Hammet Road near Hogansville, GA	Chattahoochee	Atlanta WP	USGS; Nutrients-LOW										X			
RV_12_4069	Flat Shoals Creek at State Road 18 near West Point, GA	Chattahoochee	Atlanta WP	Nutrients-LOW	32.898056	-85.068889	X						X	X			
RV_12_4075	Mountain Oak Creek at State Road 103 near Hamilton, GA	Chattahoochee	Atlanta WP	Nutrients-LOW	32.741111	-85.068889	X						X	X			
RV_12_4101	Pataula Creek at US Hwy 82	Chattahoochee	Tifton WP	Probabilistic	31.747461	-85.054612	X	X			X						
RV_12_4114	Chattahoochee River at SR 37	Chattahoochee	Tifton WP	DS GA0026191 Fort Gaines WPCP	31.604167	-85.055278	X										
RV_12_4118	Mulberry Creek at US 27 near Hamilton, GA	Chattahoochee	Atlanta WP	Nutrients-HIGH	32.7085	-84.8698	X						X	X			X
RV_12_4123	Hillabahatchee Creek at CR 210 near Frolona, GA	Chattahoochee	Atlanta WP	Trend site, Nutrients-LOW	33.311218	-85.187675	X	X			X		X	X			X
RV_12_4124	Milligan Creek at Star Point Rd near Roopville, GA	Chattahoochee	Atlanta WP	Nutrients-MED	33.440331	-85.083574	X	X					X	X			
RV_12_4256	Cracker Creek at Maroney Mill Rd near Douglasville, GA	Chattahoochee	Atlanta WP	No data in listing folder. Nutrients-???	33.78371361	-84.739272	X	X			X		X				

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_12_4280	Big Creek at Roswell Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	AWW, Nutrients-HIGH	34.017851	-84.352492	X	X	X				X	X			
RV_12_4306	Mossy Creek at State Road 254 near Cleveland, GA	Chattahoochee	Atlanta WP	Nutrients-HIGH	34.535278	-83.699444	X						X	X			
RV_12_4309	Mud Creek at Crane Mill Road near Alto, GA	Chattahoochee	Atlanta WP	Nutrients-HIGH	34.482833	-83.638667	X						X	X			
RV_12_4316	Peachtree Creek at Northside Dr in Atlanta, GA	Chattahoochee	Atlanta WP	AWW, Nutrients-MED	33.8194	-84.407778	X	X	X		X		X	X			
RV_12_4329	Sweetwater Creek at Interstate Highway 20	Chattahoochee	Atlanta WP	AWW, Nutrients-LOW	33.7728	-84.614722	X	X					X	X			
RV_13_16775	Indian Creek at Sandy Flat Rd near Bowdon, GA	Tallapoosa	Atlanta WP	NH3-Bowdon LAS	33.518125	-85.292503	X	X					X				
RV_13_16776	Trib to Buck Creek at Hutches Rd near Bremen, GA	Tallapoosa	Atlanta WP	NH3-Bremen - Buck Creek WPCP	33.692000	-85.102000	X	X					X				
RV_14_15853	Ninety nine Branch at Irwin Mill Rd	Coosa	Cartersville WP	EPA request	34.417529	-84.68994	X										
RV_14_16687	Etowah River at South Broad Street Rome	Coosa	Cartersville WP	EPA request	34.251496	-85.176337	X										
RV_14_16793	Marlow Branch at Covington Bridge	Coosa	Cartersville WP	EPA request	34.471	-84.716	X										
RV_14_16794	Robins Creek at Miller's Ferry Road at Tressel	Coosa	Cartersville WP	EPA request	34.449186	-85.012284	X										
RV_14_16795	Tributary to Noonday Creek Chastain Meadows Pky	Coosa	Cartersville WP	Probabalistic	34.02816	-84.55701	X										
RV_14_16796	E. Branch Swamp Creek Below Big Canoe WPCP	Coosa	Cartersville WP	Ammonia	34.432	-84.291	X						X				
RV_14_16797	Noonday Creek at Roberts Blvd	Coosa	Cartersville WP	DS of Vulcan minerals and McCollum Field in Kennesaw; Urban runoff	34.00451	-84.59245	X				X		X				

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_14_16798	Badger Creek at S. Holly Springs Road	Coosa	Cartersville WP	Below old land fill, recycling center and new park; urban runoff	34.14333	-84.47826	X				X		X				
RV_14_16799	Town Creek at Newtown Creek Loop near Calhoun, GA	Coosa	Cartersville WP	NWQI	34.528	-84.899	X										
RV_14_4416	Dry Creek at Pleasant Hill Road	Coosa	Cartersville WP	Need data at normal flow	34.551944	-84.779167	X				X		X				
RV_14_4425	Snake Creek at Pocket Road in Sugar Valley	Coosa	Cartersville WP	EPA request	34.557222	-85.016389	X										
RV_14_4480	Bow Creek at Old Rome - Dalton Road	Coosa	Cartersville WP	EPA request	34.53859	-85.02672	X										
RV_14_4531	Woodland Creek at Bells Ferry Road	Coosa	Cartersville WP	EPA request	34.343244	-85.110348	X										
RV_14_4591	Spring Creek at SR 20	Coosa	Cartersville WP	Need metals data	34.206056	-85.07485	X				X		X				
RV_14_4608	Beech Creek at Mays Bridge	Coosa	Cartersville WP	Need data at normal flow	34.233315	-85.29329	X				X		X				
RV_14_4647	Rubes Creek at Arnold Mill Rd Woodstock	Coosa	Cartersville WP	Probabalistic	34.103855	-84.503804	X										
RV_14_4823	Crane Eater Creek at Pine Chappel Road	Coosa	Cartersville WP	EPA request	34.531111	-84.872222	X										
RV_14_4825	Dozier Creek at Bells Ferry Road	Coosa	Cartersville WP	EPA request	34.320833	-85.110278	X										
RV_14_4829	Dykes Creek at Dykes Creek Crossing	Coosa	Cartersville WP	Trend site	34.293568	-85.08553	X	X			X		X	X	X		
RV_14_4831	Flat Creek at Hwy 382 D/S Bridge 100 yds.	Coosa	Cartersville WP	Fecal needed	34.639854	-84.574449	X	X									
RV_14_4837	Jones Creek near Jones Creek Rd, Dahlonega, GA	Coosa	Atlanta WP	SEMN	34.602401	-84.150559	X				X		X	X	X	X	X

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Metals	OrthoPhosphorus	Diatoms[3]	Macroinvertebrates[3]	Anions/TDS	Gage	Chlorophyll
RV_14_4841	Lick Creek at Langford Road	Coosa	Cartersville WP	EPA request	34.534829	-84.796003	X										
RV_15_4961	E. Chickamauga Creek at Lower Gordon Springs Rd	Tennessee	Cartersville WP	Trend site	34.74717	-85.12429	X	X			X		X	X	X		
SH_07_3049	Cumberland Sound at St. Marys Riv nr St Marys, GA	Satilla	Brunswick WP	Estuary Site	30.72807	-81.48979	X										

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

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 or targeted 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. In addition to the six lakes with criteria, Georgia has 21 other major lakes (lakes over 500 acres). Prior to 2008, these lakes were monitored quarterly on a basin rotation cycle, so each lake was sampled once every 5 years. Beginning in 2008, EPD began to monitor these lakes monthly from April to October instead of quarterly. In addition, in 2008, EPD began to transition from monitoring these lakes on a basin rotation cycle to monitoring them each year. This transition was done over a period of time by adding a set of lakes (by basin) to the annual monitoring program each year. By 2012, EPD was monitoring all major lakes annually (except for those in the Savannah River Basin). Major lakes in the Savannah River Basin were added to the annual monitoring program in 2014. The data collected in the annual monitoring of lakes includes depth profiles for dissolved oxygen, temperature, pH, and specific conductance; secchi disk transparency and photic zone depth; and chemical analyses for turbidity, specific conductance, 5-day BOD, pH, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, total Kjeldahl nitrogen, total phosphorus, total organic carbon, bacteria (fecal coliform, E. coli, or enterococci depending on designated use), and chlorophyll a.

The monitoring of major lakes (> 500 acres) since 1984 has continued to use Carlson's Trophic State Index (TSI) as a tool to mark trophic state trends. Currently, all major lakes are monitored monthly April through October. Three measurements (secchi depth, chlorophyll-a and total phosphorus) are used to calculate TSIs each month using the equations below and are combined into a total trophic state index (TTSI). A growing-season average TTSI for the dampool location for each lake is then used to assess the trophic status. Other field data and observations are also used 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 average seasonal TSI.

$$TSI_{secchi} = 60 - (14.41)\ (\ln \text{Secchi disk (meters)})$$

$$TSI_{P} = (14.42)\ (\ln \text{Total phosphorus (ug/L)}) + 4.15$$

$$TSI_{chl} = (9.81)\ (\ln \text{Chlorophyll } a \text{ (ug/L)}) + 30.6$$

TABLE 3-9. MAJOR LAKES RANKED BY SUM OF TOTAL TROPHIC STATE INDEX VALUES 2017

Major Lake	TTSI Ranking	Major Lake	TTSI Ranking	Major Lake	TTSI Ranking
High Falls	180	Goat Rock	150	Chatuge	125
Blackshear	171	Harding	150	Lanier	125
Worth	164	Andrews	149	Carters	124
Seminole	162	West Point	138	Nottely	124
Chehaw	162	Russell	137	Burton	124
Tobesofkee	160	Allatoona	137	Hartwell	119
Walter F. George	158	Julliette	133	Blue Ridge	119
Jackson	152	Tugalo	132	Oconee	No Data
Oliver	151	Clarks Hill	127	Sinclair	No Data
Banks	151	Rabun	125		

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

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

TABLE 3-10. MERCURY IN FISH TREND MONITORING STATIONS

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

Toxic Substance Stream Monitoring The GAEPD has focused resources on the management and control of toxic substances in the State's waters for many years. Toxic substance analyses have been conducted on samples from selected trend monitoring stations since 1973. Wherever discharges were found to have toxic impacts or to include toxic pollutants, the GAEPD has incorporated specific limitations on toxic pollutants in NPDES discharge permits. In 1983 the GAEPD intensified toxic substance stream monitoring efforts. This expanded toxic substance stream monitoring project included facility effluent, stream, sediment, and fish sampling at specific sites downstream of selected industrial and municipal discharges. From 1983 through 1991, ten to twenty sites per year were sampled as part of this project. Continued work is performed on a site-specific basis and as part of the targeted 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 2003 and the GAEPD additionally developed a WET Strategy that provided more detail as to how the State would determine which facilities needed a WET limit in their permit. This strategy outlined minimum data requirements for different types of facilities.

The GAEPD conducted aquatic toxicity tests on municipal and industrial water pollution control plant effluents from 1985 through 1997. Funding for GAEPD's aquatic toxicity testing laboratory was redirected to TMDL monitoring and the toxicity testing requirements were turned over to the individual permittees.

Coastal Monitoring The Coastal Resources Division (CRD) conducts the majority of coastal monitoring in the State. CRD conducts water quality monitoring in estuarine and near-shore coastal waters through its Public Health Water Quality Monitoring Program. This Program has three distinct parts. The Shellfish Sanitation and Beach Water Quality Monitoring Programs are concerned with public health, while the Nutrient Sampling Program is designed to generate baseline-monitoring data for trends. A list of the beaches monitored in 2016 and 2017 can be found in Table 3-11. A list of the stations monitored under the Shellfish Sanitation program can be found in Table 3-12 (these stations are also included in Figure 1). The nutrient sampling that was performed was conducted at a subset of the Shellfish Sanitation monitoring stations. Table 3-12 indicates which stations were monitored for nutrients. More detail regarding the work conducted by CRD can be found in Chapter 5. GAEPD has, over the past few years, intensified its own coastal monitoring program. Currently, GAEPD monitors eight locations throughout Georgia's sounds. The data collected included depth profiles for dissolved oxygen, temperature, pH, and specific conductance, Secchi disk transparency, and chemical analyses for chlorophyll a, total phosphorus, nitrogen compounds, and turbidity.

Facility Compliance Sampling In addition to surface water quality monitoring, the GAEPD conducts evaluations and compliance sampling inspections of municipal and industrial water pollution control plants and State-permitted industrial pretreatment facilities. Compliance sampling inspections include collection of 24-hour composite samples, evaluation of the permittee's sampling and flow monitoring provisions and sampling documentation. In excess of 170 sampling inspections were conducted by the GAEPD in Fiscal Years 2016-2017. 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

Table 3-11 Beaches Monitored by CRD in 2016 & 2017

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

*Stations sampled monthly are monitored April – October.

Table 3-12 Stations Monitored by CRD under the Shellfish Sanitation and Nutrient Monitoring Programs in 2016 & 2017

Station ID	Latitude	Longitude	Description	Nutrients 2016	Nutrients 2017
1049	31.92866	-81.01839	southernmost tributary off Romerly Marsh Creek		
1050	31.92503	-81.00860	northern mouth of Habersham Creek		
1052	31.94317	-81.00914	northernmost tributary off Romerly Marsh Creek		
1152	31.92557	-80.98520	Old Romerly Marsh Creek		
1153	31.92993	-80.98919	Romerly Marsh Creek Chatham		
1154	31.97741	-80.96789	Halfmoon River at Beard Creek	X	X
1155	31.95172	-80.98532	Tybee Cut South	X	X
1159	31.96792	-80.93600	Pa Cooper Creek		
1200	31.94600	-80.93000	Mouth of House Creek Chatham	X	X
1201	31.95500	-80.93300	North of House Creek/Wassaw Sound Chatham		
1222	32.01500	-80.92400	Cut Oyster Creek to Bull River Chatham		
1223	32.01400	-80.91600	North Fork Oyster Creek Chatham	X	X
1224	31.99800	-80.91200	North Junction Lazaretto & Oyster Creeks Chatham		
1225	31.99500	-80.91000	South Junction Lazaretto & Oyster Creeks Chatham	X	X
1337	32.02829	-80.94725	Bull River upstream of Betz Creek	X	X
1338	32.02005	-80.94529	Betz Creek		
1352	31.96058	-81.01186	Priest Landing Chatham		
3242	31.68500	-81.29600	Medway River Near Sunbury	X	X
3249	31.68600	-81.27700	Halfmoon East		
3255	31.73400	-81.19400	Mouth of Jones Hammock Creek		
3273	31.74100	-81.16100	Bear River across from Newell Creek		
3275	31.77100	-81.16998	Bear River across from Kilkenny	X	X
3285	31.75680	-81.27240	Dickinson Creek Mouth	X	X
3286	31.74765	-81.25410	Jones Creek Mouth		
3288	31.72800	-81.22028	Medway River East of Sunbury Creek		
3291	31.68940	-81.19400	Van Dyke Creek Mouth	X	X
3319	31.68713	-81.15633	Walburg Northwest	X	X
4092	31.51000	-81.27800	Eagle Creek, McIntosh		
4100	31.53000	-81.33000	Back River at July Cut	X	X
4120	31.52777	-81.25732	Mud River at Dog Hammock		
4122	31.59343	-81.26117	Little Mud River at Barbour Island River	X	X
4123	31.53432	-81.22433	Sapelo Sound at Highpoint	X	X
4175	31.44200	-81.30600	Old Teakettle Creek, McIntosh	X	X
4177	31.47600	-81.33200	Shellbluff Creek, McIntosh	X	X
4178	31.48800	-81.32300	Creighton Narrows, McIntosh		
4179	31.48500	-81.29500	New Teakettle Creek, McIntosh		
4180	31.52300	-81.29100	Front River, McIntosh		
4184	31.55400	-81.31400	Julientiom River, McIntosh	X	X
4185	31.56360	-81.25778	Little Mud River, McIntosh		
4186	31.55775	-81.23293	South Mouth Barbour Island River, McIntosh	X	X
4187	31.59300	-81.23600	Middle Barbour Island River, McIntosh		
4188	31.61500	-81.21400	Middle Wahoo River, McIntosh		
4190	31.63200	-81.22400	South Swain River, McIntosh		
4191	31.63400	-81.23700	North Swain River, McIntosh	X	X
4195	31.56232	-81.21815	Todd River, McIntosh		

Station ID	Latitude	Longitude	Description	Nutrients 2016	Nutrients 2017
4196	31.50300	-81.33500	Crescent River, McIntosh	X	X
4197	31.49100	-81.33200	Crescent River, South-end of Creighton, McIntosh		
4304	31.55900	-81.27400	Julienton River mouth, McIntosh		
4305	31.54800	-81.30800	Julienton River middle, McIntosh		
4306	31.53900	-81.30200	Four Mile Island southwest, McIntosh	X	X
4330	31.55500	-81.29000	Jolly Creek		
4333	31.38741	-81.28912	South end of Sapelo Island	X	X
4400	31.55700	-81.29400	Julienton River, middle, McIntosh		
5069	31.05500	-81.46900	Jointer River Mouth, Glynn	X	X
5105	31.100	-81.516	Jointer River - Mac's Basin		
5198	31.08900	-81.47900	Mouth Cedar Creek, Glynn	X	X
5199	31.08000	-81.50600	Jointer River, Glynn		
5200	31.07100	-81.48300	Cobb Creek, Glynn		
5322	31.09100	-81.51500	Jointer Island West, Glynn		
5357	31.10200	-81.52700	Jointer Creek at Sage Dock, Glynn		
5358	31.10600	-81.53300	Jointer Creek upstream of Sage Dock, Glynn	X	X
5359	31.06400	-81.52600	Little Satilla River at Honey Creek, Glynn		
6201	31.03900	-81.49100	Little Satilla River, Camden	X	X
6210	30.89200	-81.51200	Cabin Bluff, Camden	X	X
6212	30.90400	-81.46100	North Brickhill River, Camden		
6213	30.86300	-81.49700	Delaroche Creek Mouth, Camden		
6214	30.85000	-81.47700	South Brickhill River, Camden		
6215	30.85800	-81.54100	Mouth Black Point Creek, Camden		
6216	30.84900	-81.54200	Crooked River, Camden	X	X
6217	30.84100	-81.52100	Crooked River South, Camden	X	X
6218	30.82300	-81.49800	South Crooked River Mouth, Camden	X	X
6300	30.92700	-81.45200	Cumberland River-Marker #39, Camden	X	X
6317	30.91100	-81.48500	Cumberland River East Shellbine, Camden		
6318	30.86100	-81.50800	Delaroche Creek Headwaters, Camden	X	X
6323	30.85500	-81.46700	Brickhill River Upstream 6214, Camden	X	X
6343	30.86800	-81.48500	Brickhill River West Bend, Camden		
6344	30.88300	-81.47900	Mumford Creek at Brickhill River, Camden		
6360	31.06930	-81.54500	Maiden Creek	X	X
6361	31.05470	-81.53900	Honey Creek	X	X
6411	30.88100	-81.51100	Downstream from Cabin Bluff @ marker 51A, Camden		
6412	30.87000	-81.49900	Upstream from DeLaroache ck @ marker 55, Camden		

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 all the USEPA probabilistic National Aquatic Resource Surveys including the National Lakes Assessment Surveys (2001, 2012 & 2017); the National Rivers and Streams Assessments (2009, 2013, & 2014); the National Wetlands Condition Assessments (2011 & 2016); and in cooperation with the DNR Coastal Resources Division, the National Coastal Condition Assessment (2015). The surveys consisted of 13 lake sites, 30 river/stream sites, 51 wetland sites, and 7 coastal sites.

In addition to participating in the National projects, beginning in 2010, GAEPD began to conduct probabilistic monitoring of the State's streams. Between 2013 and 2017 approximately 100 streams were sampled as part of the probabilistic monitoring project. The results of this work predict that approximately 66% of Georgia's streams are supporting their designated uses; that 3% of the streams are impaired due to low dissolved oxygen or pH; that approximately 0.1% are impaired for pH, and 78% are impaired for fecal coliform bacteria. None of the streams monitored as part of the probability survey were impaired for metals, so metals are not predicted to be source of impairment for many waters in the State. It is important to note that accuracy of predictions is highly dependent upon the sample size. The more sites that are sampled under the probabilistic study, the more likely it is that the results seen in the sampled sites will reflect the stream population as a whole. Typically, one would want a sample size of at least 30 to 50 sites. While approximately 100 sites were sampled as part of the probabilistic study, all the parameters reported above were not measured at each site. Dissolved oxygen, pH and temperature data were collected at each of the probablilistic sites, metals were collected at 45 sites and 36 of the sites had fecal coliform bacteria data collected. The lower sample size for fecal coliform bacteria causes there to be a very wide confidence interval in predicting the number of streams that may be impaired for bacteria in the State (the predicted percentage of impairment ranges from 64% to 91%).

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

Surface Water Quality Summary

Data Assessment Water quality data are assessed to determine if standards are met and if the water body supports its designated or classified water use. If monitoring data show that standards are not achieved, the water body is said to be "not supporting" the designated use. The data reviewed included GAEPD monitoring data, and data from other State, Federal, local governments, and data from groups with GAEPD approved QA/QC programs. Table 3-13 provides a list of agencies that contributed data used to develop the 2018 report. The data may have been submitted specifically for the 2018 list or for previous listing cycles.

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 2018 Listing Assessment Methodology which provides a description of how Georgia compares different types of water quality data with Georgia's water quality criteria in making assessment decisions.

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

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

Evaluation of Use Support Table 3-14 provides summary information from Appendix A on the total number of stream, coastal beach and freshwater beach miles; lake acres; or square miles of sounds/harbors that fall in each assessment category.

Assessment of Causes of Nonsupport of Designated Uses There are many potential pollutants that may interfere with the designated use of rivers, streams, lakes, beach, and coastal waters. These can be termed the causes of use nonsupport. Based on information presented in Appendix A, Table 3-15 summarizes the parameters of concern or the causes which contributed to nonsupport of water quality standards or designated uses of a particular water body type. When comparing causes of impairment to previous Integrated Reports, it is important to note that EPD removed Commercial Fishing Ban (CFB) as a cause of impairment in the 2018 305b/303d list of waters. These impairments were replaced by the cause FCG(PCBs). This change was made becasue

In 2018, U.S. EPA consolidated the list of pollutants that States could report as causes of impairments on their lists of impaired waters when submitting data to the EPA National Database (ATTAINS). This database contains the assessment data for all the States and the participating Tribes. CFB (Commercial Fishing Ban) is not a cause on the new consolidated list of pollutants. Georgia's 2016 305(b)/303(d) list of waters had 26 waters listed as impaired for CFB. These listings were based on a list of waters that are not open to commercial fishing found in Chapter 391-4-3-.04 of Georgia's Fishing Regulations. The commercial fishing ban is in place due to historical PCB contamination in the area which has led to elevated levels of PCBs in fish tissue. The TMDLs completed for waters impaired for CFB have been done for PCBs in fish tissue. The EPA National Database contains a pollutant cause of "PCBs in Fish Tissue". EPD is therefore changing the pollutant cause "CFB" to "FCG(PCBs)" in order to clarify the cause of impairment and to match allowable values in the EPA National Database (ATTAINS). EPD already had some waters listed as impaired for FCG(PCBs). Therefore if you compare table 3-15 in the 2016 and 2018 Integrated reports, it looks like there has been a large increase in the number of waters assessed as impaired for FCG(PCBs) when really the increase is a function of all CFB listings being changed to FCG(PCBs).

TABLE 3-14
EVALUATION OF USE SUPPORT BY WATER BODY TYPE AND ASSESSMENT CATEGORY
2016-2017

Degree of Use Support	**Streams/Rivers** (miles)	**Lakes/Reservoirs** (acres)	**Sounds/Harbors** (sq. miles)	**Coastal Streams/Rivers** (miles)	**Coastal Beaches** (miles)	**Freshwater Beaches**
Support	5,759.5	231,640	68	305	30.81	2.12
Not Support	8,701.5	103,300	11	69	3.64	0.1
Assessment Pending	822.3	56,705	10	95	0	0
Total	15,283.3	391,645	89	469	34.45	2.22

TABLE 3-15
CAUSES OF NONSUPPORT OF DESIGNATED USES BY WATER BODY TYPE
2016-2017

Cause Category	Rivers/Streams (miles) Contributions to Impairment[1]
Pathogens	**4,868**
Fecal Coliform	4,849
E. coli	65
Biologic Integrity (Bioassessments)	**3,172**
Maroinvertebrates (Bio M)	620
Fish (Bio F)	2,706
Oxygen Depletion	**1,179.5**
Dissolved Oxygen	1,179.5
Thermal Impacts	**17**
Temperature	17
Toxic Inorganics	**147**
Arsenic	3
Cadmium	9
Copper	42
Lead	69
Selenium	6
Zinc	36
Toxic Organics	**531**
1,1,2-Trichloroethane	1
Tetrachloroethylene	9
PCB in Fish Tissue	516
Chrysene	2
Trichloroethylene	1
Vinyl Chloride	2
Alpha-BHC	1
Beta-BHC	3
Benzo(a)Anthracene	2
Metals	**1,108**
Cadmium	9
Copper	42
Lead	69
Zinc	36
Mercury in Fish Tissue (TWR)	1,006
pH/Acidity/Caustic Conditions	**329**
pH	329
Nutrients (Macronutrients/Growth Factors)	**29**
Objectionable Algae	29
Pesticides	**3**
Alpha-BHC	1
Beta-BHC	3
Cause Category	**Lakes/Reservoirs (acres) Contributions to Impairment[1]**
Pathogens	**194**
Fecal Coliform	194
Oxygen Depletion	**750**
Oxygen Dissolved	750
Toxic Organics	**91,633**
PCB in Fish Tissue	91,613
DDE/DDD in Fish Tissue	20
Metals	**1,356**
Mercury in Fish Tissue (TWR)	1,356
Pesticides	**20**
DDD/ DDE in Fish Tissue	20
Observed Effects	**7,245**
Chlorophyll *a*	7,245

pH/Acidity/Caustic Conditions pH	**2,720** 2,720
Cause Category	**Coastal Streams (miles) Contributions to Impairment[1]**
Pathogens Fecal Coliform Enterococci	**23** 22 1
Oxygen Depletion Dissolved Oxygen	**33** 33
Toxic Organics Dieldrin in Fish Tissue PCB in Fish Tissue Toxaphene like Chlorinated Camphenes in Fish Tissue	**38** 3 30 5
Toxic Inorganics Selenium	**9** 9
Pesticides Dieldrin in Fish Tissue Toxaphene in Fish Tissue	**8** 3 5
Other Shellfish Ban (SB)	**28** 28
Cause Category	**Coastal Beaches (miles) Contributions to Impairment[1]**
Pathogens Enterococcus	**3.64** 3.64
Cause Category	**Sounds/Harbors (sq. miles) Contributions to Impairment[1]**
Oxygen Depletion Dissolved Oxygen	**5** 5
Toxic Inorganics Selenium	**6** 6
Cause Category	**Freshwater Beaches (miles) Contributions to Impairment[1]**
Pathogens E. coli	**0.1** 0.1

[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.

Assessment of Sources of Nonsupport of Designated Uses Pollutants that impact water bodies in Georgia may come from point or nonpoint sources. Point sources are discharges into waterways through discrete conveyances, such as pipes or channels. Municipal and industrial wastewater treatment facilities are the most common point sources. Point sources also include overflows of combined storm and sanitary sewers. Nonpoint sources are diffuse sources of pollution primarily associated with run off from the land following a rainfall event. Table 3-16 summarizes information presented in Appendix A concerning the sources of pollutants that prevent achievement of water quality standards and use support in various water bodies in Georgia.

TABLE 3-16
POTENTIAL SOURCES OF NONSUPPORT OF DESIGNATED USES BY WATER BODY TYPE
2016-2017

Source Category	Rivers/Streams (miles) Contributions to Impairment[1]
Hydromodification Dams of Impoundments (Dam)	**4** 4
Industrial Sources Industrial Point Source Discharge (I1) Industrial Stormwater Discharge (I2)	**285** 45 281
Municipal Permitted Discharges Combined Sewer Overflows Municipal Point Source Discharges	**286.5** 93 193.5
Nonpoint Sources Non-Point Source (NP) Urban Runoff (UR)	**8,627.5** 6,944 2,229.5

Source Category	Lakes/Reservoirs (acres) Contributions to Impairment[1]
Industrial Sources Industrial Stormwater Discharge (I2)	**55,950** 55,950
Nonpoint Sources Non-Point Source (NP) Urban Runoff (UR)	**46,600** 46,406 34,211
Hydromodification Dams of Impoundments (Dam)	**750** 750

Industrial Sources Industrial Point Source Discharge (I1) Industrial Stormwater Discharge (I2)	**35** 27 35
Municipal Permitted Discharges Municipal Point Source Discharges	**19** 19
Nonpoint Sources Non-Point Source (NP) Urban Runoff (UR)	**41** 14 33

Source Category	Sounds/Harbors (Sq. Miles) Contributions to Impairment[1]
Nonpoint Sources Urban Runoff (UR) Non-Point Source (NP)	**11** 5 6
Municipal Municipal Point Sources (M)	**5** 5
Industrial Sources Industrial Point Source Discharge (I1)	**5** 5

Source Category	Freshwater Beaches (Miles) Contribution to Impairment[1]
Nonpoint Sources	**0.1**
Non-Point Source (NP)	0.1

Source Category	Coastal Beaches (Miles) Contributions to Impairment[1]
Nonpoint Sources	**3.64**
Non-Point Source (NP)	3.64
Urban Runoff (UR)	1.8

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

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 supporting, not fully supporting, 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.

Georgia's Priority Waters Under U.S. EPA's Long-Term Vision In December 2013, U.S. EPA released a new Long-Term Vision for Assessment, Restoration, and Protection of waters under the Clean Water Act Section 303(d) Program. This Vision focuses on six elements including 1) Prioritization, 2) Assessment, 3) Protection, 4) Alternatives, 5) Engagement and 6) Integration. The Long-Term Vision is a 10-year plan that goes through the year 2022. According to U.S. EPA, as part of the element (Prioritization), States are to review, systematically prioritize, and report priority watershed or waters for restoration and protection in their biennial integrated reports to facilitate State strategic planning for achieving water quality goals. The thought behind this element is that there are many water quality issues facing States and the States need to prioritize what they plan to address by 2022 as States generally do not have the resources to focus on everything at once. Each State was to develop a Priority Framework that they would use to develop their list of priority waters. The list of priority waters are those waters that the States plan to have a TMDL, TMDL alternative, or protection plan written for by 2022. GAEPD developed our Priority Framework in February 2015 at which time it was placed on our website on both the TMDL and 305(b)/303(d) listing webpages.

GAEPD has historically done a good job in writing TMDLs for impaired waters in a timely manner. We have been writing TMDLs on a rotating river basin schedule. Since we cycle though all river basins in a 5-year period, a water is typically on the impaired list for 5 years or less before a TMDL is written for it. Since Georgia did not need to prioritize waters based on what TMDLs could be developed by 2022, we instead chose priority waters based on where we would be focusing a lot of our resources in the coming years. In selecting our priority waters, we used our 2012 305(b)/3039d) list as a baseline along with the Priority Framework we had developed. Factors we looked at in choosing priority waters included things such as impacts to public health, whether the impairment was on a water with a recreational use, whether the impairment was impacted by interstate issues, whether the impairments matched with national or regional EPA priorities (like reduction of nutrients) and whether there was stakeholder involvement present in the area. Based on these factors, Georgia chose the waters in Table 3-17 as our priority waters. The waters on the priority list can be organized into six groups.

1) Lake Lanier – Lake Lanier is composed of 5 segments. Only one of these segments (Lanier Lake – Browns Bridge Road (SR 369)) is on the 2012 303(d) list for chloropyhyll *a*. However, the TMDL for chlorophyll *a* will be written for the entire lake, so the other four segments of the lake were also added to the priority list. The TMDL for chlorophyll *a* that was developed addresses nutrients, which are a National priority.

2) Carters Lake – Carters Lake is composed of two segments. Both are on the 2012 303(d) list for chlorophyll a and total phosphorus. Georgia is putting both segment of the lake on the priority list for each parameter and plans to develop a TMDL to address them. This TMDL that was developed addresses nutrients, which are a National priority.

3) Savannah Harbor This segment is impaired for DO. Georgia EPD has been working with South Carolina DHEC and the Savannah River/Harbor Discharger Group to restore this water and has completed a TMDL alternative plan (5R).

4) Georgia has 4 coastal beaches on the 2012 303d list for enterococci. Georgia chose to put these beaches on the priority list to address human health concerns. TMDLs were developed to address these impairments.

5) Coosa River – A segment of the Coosa River is on the 2012 303(d) list for Temperature. The cause of the temperature violation is known and will be addressed through direct implementation. A wasteload allocation for heat loads was developed and an NPDES permit was issued in 2017.

6) Ochlockonee River Basin - Georgia is placing the Upper and Lower Ochlockonee Watersheds on our priority list due to chlorophyll and DO impairments in a downstream lake located in Florida. A TMDL is being developed for this Lake. In accordance with the Clean Water Act, waters in Georgia may not cause and contribute to water quality violations in Florida. Georgia will develop a protection plan to help ensure that Georgia's waters meet the necessary nutrient reductions at the State line. The protection plan will address nutrients which are a National priority.

While the waters on the list are considered our priorities under the new Vision, EPD plans to continue to develop TMDLs using the rotating basin approach as we have been doing in the past. Therefore, Georgia will be developing more TMDLs by 2022 than what is accounted for in our "priority" list.

Table 3-17
List of Priority Waters

Group	Water ID	Name/Location	Parameter of Concern	Approach to Address Parameter of Concern
Lake Lanier	GAR031300010819	Lanier Lake (Browns Bridge Road (SR 369))	Chlorophyll a	TMDL
	GAR031300010705	Lanier Lake (Bolling Bridge)	Chlorophyll a	Protection via TMDL
	GAR031300010818	Lanier Lake (Lanier Bridge Road (SR53))	Chlorophyll a	Protection via TMDL
	GAR031300010820	Lanier Lake (Flowery Branch)	Chlorophyll a	Protection via TMDL
	GAR031300010821	Lanier Lake (Dam Pool)	Chlorophyll a	Protection via TMDL
Carters Lake	GAR031501020406	Carters Lake (US Woodring Branch/Midlake)	Chlorophyll a & Phosphorus	TMDL
	GAR031501020408	Carters Lake (Coosawattee River Embayment)	Chlorophyll a & Phosphorus	TMDL
Savannah Harbor	GAR030601090318	Savannah Harbor (SR 25 (old US Hwy 17) to Elba Island Cut)	Dissolved Oxygen	TMDL Alternative (5R)
Coosa River	GAR031501050209	Coosa River (Beach Creek to Stateline)	Temperature	Direct to Implementation
Beaches	GAR030602040306	Kings Ferry County Park Beach (US Hwy 17 Kingsferry Bridge on Ogeechee River - Entire Beach)	Enterococci	TMDL
	GAR030701060506	Reimolds Pasture Beach (Eastern Shore of Buttermilk Sound)	Enterococci	TMDL
	GAR030702030230	Jekyll Island Clam Creek Beach (Clam Creek to Old North Picnic Area)	Enterococci	TMDL
	GAR030702030415	Jekyll Island – St. Andrews Beach (Macy Lane to St. Andrews Picnic Area)	Enterococci	TMDL
Ochlockonee Watershed	HUC 03120002	Upper Ochlockonee Watershed	Phosphorus, Nitrogen	Protection Plan
	HUC 03120002	Lower Ochlockonee Watershed	Phosphorus, Nitrogen	Protection Plan

CHAPTER 4
Wetland Programs

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

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

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

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

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

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

Extent of Wetland Resources

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

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

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

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

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

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

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

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

In addition, CRD completed an Impacted Wetland Inventory that was initiated to identify, assess, and inventory impacted wetlands in Chatham, Bryan, Liberty, McIntosh, Glynn, and Camden counties along the coast. The project area included all estuarine, marine and tidal fresh wetlands, as defined by Cowardin et. al (1979) and delineated by the NWI updates for the six coastal counties (completed in 2009, based on 2006 base imagery). For more information about the dataset, contact CRD.

Wetland Trends In Georgia

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

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

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

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

Integrity of Wetland Resources

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

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

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

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

The categories of freshwater wetlands and aquatic habitats to be identified, defined and mapped by the State and included in landuse planning are open water, non-forested emergent, scrub/shrub, forested and altered wetlands. Landuse plans must address at least the following considerations with regard to wetland classes identified in the database:

1) Whether impacts to an area would adversely affect the public health, safety, welfare, or the property of others.
2) Whether the area is unique or significant in the conservation of flora and fauna including threatened, rare or endangered species.
3) Whether alteration or impacts to wetlands will adversely affect the function, including the flow or quality of water, cause erosion or shoaling, or impact navigation.
4) Whether impacts or modification by a project would adversely affect fishing or recreational use of wetlands.
5) Whether an alteration or impact would be temporary in nature.
6) Whether the project contains significant state historical and archaeological resources, defined as "Properties On or Eligible for the National Register of Historic Places".
7) Whether alteration of wetlands would have measurable adverse impacts on adjacent sensitive natural areas.
8) Where wetlands have been created for mitigation purposes under Section 404 of the Clean Water Act, such wetlands shall be considered for protection.

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

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

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

Wildlife and fisheries management. Wetlands are an invaluable resource, both ecologically and economically. They are among the state's most biologically productive ecosystems and are crucial as habitats for wildlife. Wetlands function as essential breeding, spawning, nursery, nesting, migratory, and/or wintering habitat for much of the migratory and resident fauna. More than 40% of the state threatened and endangered plant and animal species depend heavily on wetlands. Coastal wetlands function as nursery and spawning grounds for 60-90% of commercial fin and shellfish catches. In addition, high levels of plant productivity in coastal wetlands contribute to corresponding levels of invertebrate organisms upon which fish and other animals feed. Plant decomposition in wetlands is also an important process in providing suitable habitat for waterfowl, which contributes to the economy through hunting-related expenditures.

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

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

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

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

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

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

Wetlands within the 6 coastal counties (all tidal and non-tidal) were evaluated for function based on the U.S. Fish and Wildlife Services' addition of hydrogeomorphic descriptors. These "LLWW" descriptors were added to the updated wetland inventory data (2006 base imagery) to create CRD’s NWI Plus database for the six coastal counties. The NWI Plus data is used to better characterize wetlands in this region and to be able to predict wetland functions at the landscape level. The functions for coastal Georgia used are:

- Surface Water Detention
- Coastal Storm Surge Detention
- Streamflow Maintenance
- Nutrient Transformation
- Carbon Sequestration

- Retention of Sediment and Other Particulates
- Bank and Shoreline Stabilization
- Provision of Fish and Aquatic Invertebrate Habitat
- Provision of Waterfowl and Waterbird Habitat
- Provision of Other Wildlife Habitat
- Provision of Habitat for Unique, Uncommon, or Highly Diverse Plant Communities

Wetland Monitoring. The state maintains monitoring and enforcement procedures for estuarine marshes under authority of the Coastal Marshlands Protection Act of 1970. Over-flights are made of the Georgia coastline to locate potential violations. Restoration and penalties are provided for in the Act.
CRD continues to monitor marsh dieback sites annually along the coast along with other project partners. This protocol was initiated in 2003 with the first reports of marsh dieback. In addition, CRD monitors shorelines along Georgia tidal creeks to quantify habitat use and restoration of shorelines. A working group of project partners, including WRD, NGOs, and local academic institutions was formed in order to address policy issues, identify funding sources, and better manage and monitor shoreline restoration projects within the state of Georgia. In 2011, CRD and EPD conducted field monitoring for the National Wetlands Condition Assessment (NWCA) effort initiated by EPA. The overall goal of the NWCA was to monitor freshwater and estuarine wetlands nationally during 2011 to determine their current condition. Pre-existing point locations were used to randomly select wetlands to be evaluated during this project. CRD sampled 32 estuarine wetland sites, and EPD sampled 18 palustrine forested wetland sites. Multiple indicators were used to assess wetland health including vegetation characterization, soil profiles, hydrology and algal community. In addition, a Rapid Assessment Method (RAM) was evaluated across regions and wetland classes to determine the effectiveness of RAMs in wetland management disciplines. Specifically, the RAM identifies stressors to the wetland. Collectively, these parameters provide an indication of overall wetland condition. Of the 1,179 wetlands sampled across the country in 2011, 48% were found to be in “good” condition. In Georgia, 50% of the Coastal Plain and 52% of the Eastern Mountain and Upper Midwest ecoregions were found to be in “good” condition. CRD successfully participated in the 2016 National Wetlands Condition Assessment and sampled 14 estuarine and freshwater wetlands within the 11 coastal counties. CRD continues to partner with EPA on wetland monitoring within the state of Georgia.

Also in 2011, EPD initiated a wetland monitoring and assessment program using an ecoregion-level approach. The goal of the program is to develop appropriate wetland assessment protocols. To date, seventy-five wetland sites within five ecoregions have been selected and monitored using various protocols, including NWCA protocols. This approach will again be applied in the Piedmont (Ecoregion 45) during 2016. Thereafter, an evolution of wetland monitoring approach will apply a more closely focused assessment of wetland soil and hydrology, particularly targeted at reference quality wetland habitats selected from statewide candidate sites. Wetland monitoring in Georgia, to the extent possible, is being coordinated with work being conducted by other Region 4 states within the same ecoregions.

Additional Wetland Protection Activities

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

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

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

Land Conservation.
To date, the Department of Natural Resources has protected in fee over 460,000 acres of conservation land and another 11,259 acres through permanent conservation easements. Between 2014 and February 2016, the Department of Natural Resources acquired 19,858 acres of conservation land. Notable acquisitions protecting stream and wetland habitat included additions to the Paulding Forest WMA, Chattahoochee Fall Line WMA, and Sheffield WMA.

Since 2008 the Department has acquired 25,547 acres of conservation lands along the lower Altamaha River in partnership with the US Marine Corps, Fish and Wildlife Service, US Forest Service, Georgia Forestry Commission, Nature Conservancy, and numerous other private foundations and donors. These acquisitions, along with others by various partners, bring the protection of properties in the lower Altamaha Delta to over 130,000 acres.

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

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

The Coastal Resources Division has one position within the Division that assumes the role of coastal educator. The largest coastal education gathering, Coastfest, is hosted by CRD each October.

Additionally, CRD frequently presents relevant work at regional and national conferences, local academic institutions, municipality meetings, and with various civic organizations. CRD also relies on partners such as the Sapelo Island National Estuarine Research Reserve to carry out messages important to CRD.

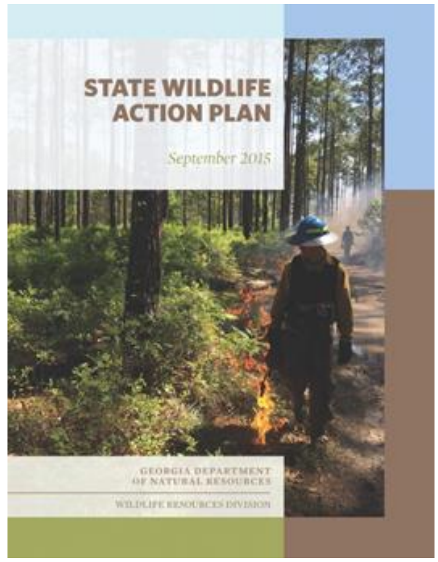
The Georgia EPD Adopt-a- Stream program facilitates volunteer-based monitoring of water quality in Georgia, and fosters a sense of personal and community responsibility. CRD routinely conducts chemical water quality training workshops with local riverkeepers, college students, and citizen scientists. To date, over 1700 volunteers have conducted chemical at 185 sites within the eleven coastal counties.

The Coastal Resources Division in collaboration with the Georgia Institute of Technology's Center for Geographic Information Systems has developed two interactive web portals: GCAMP (Georgia Coastal and Marine Planner) and G-WRAP (Georgia Wetlands Restoration Access Portal). These portals were designed to provide information on the Georgia coast to regulators, planners, and the public. Both of these portals are available through CRD's website at http://coastalgadnr.org/CMPWebMaps.

State Wildlife Action Plan

In 2005, the Wildlife Resources Division of Georgia DNR completed "A Comprehensive Wildlife Conservation Strategy for Georgia". This document, also known as the State Wildlife Action Plan, identified high priority species and habitats in Georgia, described problems affecting these species and habitats, and outlined specific research, conservation and monitoring needs to maintain the state's wildlife diversity. Protection of wetland and aquatic habitats was identified as a critical wildlife conservation need. The State Wildlife Action Plan was updated in 2015. The following goals represent important conservation themes in the plan:

-Maintain viable populations of all high-priority species and functional examples of all high priority habitats through voluntary land protection and incentive-based habitat management programs on private lands and habitat protection and management on public lands.
-Increase public awareness of high priority species and habitats by developing educational messages and lesson plans for use environmental education facilities, local schools, and other facilities.



-Facilitate restoration of important wildlife habitats through reintroduction of prescribed fire, hydrologic enhancements, and vegetation restoration.
-Conduct statewide assessments of rare natural communities and habitats that support species of conservation concern and complete a statewide habitat mapping effort to inform future land conservation efforts.
-Improve efforts to protect vulnerable and ecologically important habitats such as isolated wetlands, headwater streams, and caves.
-Combat the spread of invasive/noxious species in high priority natural habitats by identifying problem areas, providing technical and financial assistance, and working cooperatively on early detection and rapid response protocols.
-Minimize impacts from development and other activities on high-priority species and habitats by improving environmental review procedures and facilitating training for and compliance with best management practices.
-Update the state protected species list and work with conservation partners to improve management of these species and their habitats.
-Conduct targeted field inventories of neglected taxonomic groups, including invertebrates and nonvascular plants.

-Continue efforts to recover federally listed species through implementation of recovery plans, and restore populations of other high priority species.
-Work with other states and with the U.S. Fish & Wildlife Service to assess species proposed for federal listing and engage in proactive programs to conserve these species so as to preclude the need for federal listing.
-Establish additional funding mechanisms for land protection in order to support wildlife conservation, and increase availability and use of federal funds for land acquisition and management.
-Continue efforts to monitor land use changes statewide and in each ecoregion, and use predictive models to assess impacts to high priority species and habitats.
-Monitor high priority species and habitats as well as the results of conservation actions and share monitoring results to inform adaptive management programs.
-Enhance conservation efforts for high priority aquatic species and watersheds through protection of aquatic connectivity and streamflows, technical assistance to farmers and local governments, riparian forest restoration, targeted land protection strategies, outreach, and monitoring. The complete plan can be found at http://georgiawildlife.com/WildlifeActionPlan.

M.A.R.S.H. Projects

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

CHAPTER 5
Estuary and Coastal Programs

Background

The Georgia Department of Natural Resources (DNR) Coastal Resources Division (CRD) manages Georgia's coastal resources. The CRD's Coastal Management Section administers Georgia's Coastal Management Program and its enforceable authorities, manages Georgia's shellfish harvest program, and conducts water quality and wetlands 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 Shellfish and Water Quality Monitoring Program described below.

The Coastal Management Program has provided guidance and technical assistance to improve coastal water quality in general, 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.

Shellfish and Water Quality Monitoring Program

The CRD conducts water quality monitoring in estuarine and near-shore coastal waters through its Shellfish and Water Quality Monitoring Program. This Program has two distinct parts. The Shellfish Sanitation and Beach Water Quality Monitoring Programs are both based on public health.

Shellfish Sanitation Program

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

The US Food and Drug Administration's National Shellfish Sanitation Program (NSSP) establishes national standards to show that shellfish harvest areas are "not subject to contamination from human and/or animal fecal matter in amounts that in the judgment of the State Shellfish Control Authority may present an actual or potential hazard to public health." Water samples from each approved harvest area are collected by CRD and analyzed regularly to ensure the area is below the established fecal coliform threshold. Waters approved for shellfish harvest must have a geometric mean that does not exceed the threshold set forth by the NSSP.

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

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

Water quality sampling occurs monthly 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, March through November, and every other week for December through February; Tier 2 beaches are monitored monthly from April through October and Tier 3 beaches are not monitored. Beaches that exceed the threshold for Enterococcus are put under a swimming advisory that is not lifted until the levels of bacteria are sufficiently reduced, based on resampling. Beaches under a permanent swimming advisory are monitored quarterly.

Nutrient Sampling Program (discontinued)
Until 2017, CRD's Nutrient Sampling Program collected 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 collected nutrients at eighty-four (84) stations along the coast since 2000 to establish baseline trends in nitrite nitrogen, ammonia nitrogen, total dissolved phosphorus, ortho- phosphate, and silicate.

Due to budget reductions in 2010, changes were made to both the coastal river and estuarine sampling regimes. In response to drought conditions between 2011 and 2013, temperature, salinity, conductivity, dissolved oxygen and pH were collected monthly in the Ogeechee, Altamaha, Satilla, and St. Mary's Rivers at seven (7) sites in each river to provide data for the upper estuary/lower salinity environments. Due to continued budget reductions and higher rainfall totals in 2013, river sampling was terminated in 2014. Samples were also collected at thirty-five (35) of the eighty-eight (88) shellfish sample sites to provide nutrient, chlorophyll a and fecal coliform bacteria data from tidal rivers and sounds.

Coastal Streams, Harbors, and Sounds
This 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-eight (28) coastal beaches. Of these, twenty-five (25) are considered to be supporting their designated use of coastal recreation. Three (3) beaches are considered as not supporting their designated use. The three (3) beaches are all under a permanent swimming advisory and are sampled quarterly. Two (2) of the beaches are located on Jekyll Island, at the St. Andrews picnic area and at Clam Creek. The other one (1) beach is the Kings Ferry beach located at a small municipal park on the Ogeechee River in Chatham 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 (2000-2015) 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 help select sites for further monitoring and to augment existing data sets.

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

Commercial and Recreational Fisheries

CRD has several projects that produce information used to determine the status of commercially and recreationally important fish, crustaceans, and mollusks. The Ecological Monitoring Survey (EMS) conducts monthly assessment trawls (blue crabs, shrimp, and beginning in 2003, finfish) in the Wassaw, Ossabaw, Sapelo, St. Simons, St. Andrew and Cumberland estuaries. Data from this survey are used to describe the abundance, size composition, reproductive status of penaeid shrimp and blue crab. In addition, information collected on finfish and other invertebrate species since 2003 provides a broad ecologically based evaluation of species' abundance, distribution, and diversity in these estuaries. The EMS also conducts a small trawl survey targeting juvenile specimens in the upper creeks monthly in two sound systems, Ossabaw and Altamaha, using similar techniques and protocols (albeit on a smaller scale) as the EMTS. The Marine Sportfish Population Health Survey uses gill and trammel nets to capture recreational finfish in the Wassaw and Altamaha River Delta estuaries from June to November. These data have been used in regional stock assessments for red drum, southern flounder, and black drum.

The Fisheries Statistics Work Unit collects catch and effort information from the recreational and commercial fisheries in cooperation with the National Marine Fisheries Service. Total annual commercial landings in Georgia ranged from 6.74 to 12.69 million pounds of product during the period from 2007 to 2016, with an annual average of 9.09 million pounds. Penaeid shrimps are the most valuable catch in Georgia commercial landings, averaging nearly 9.13 million dollars (2.15 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 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. The 10-year average (2007 – 2016) of commercial blue crab harvest was 3.46

million pounds with an ex-vessel value of 3.66 million dollars. A severe drought from 1998 to 2002 reduced annual harvest to 80% of the long-term average. That drought resulted in a reduction in the quantity of oligohaline and mesohaline areas within Georgia’s estuaries. This effect was more pronounced in estuaries that did not receive direct freshwater inflow from rivers. It is believed this altered salinity profile resulted in: (1) higher blue crab predation; (2) increased prevalence of the fatal disease caused by the organism, *Hematodinium sp*; (3) reduction in the quantity of oligohaline nursery habitat and (4) recruitment failure. Blue crab harvest and fishery independent estimates of abundance continue to be low – most likely being driven by environmental variables.

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. 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. Previously, anecdotal evidence indicated participation in the American shad fishery was declining. However, in 2014 the Department implemented a program requiring shad harvesters to obtain a Letter of Authorization (LOA) thereby allowing it to positively identify participants. Landings data indicate participation has increased but this may be attributable to the LOA. The 10 year average (2007 2016) of shad trips is 661 with a high of 806 and a low of 540. Regulations enacted by the Atlantic States Marine Fisheries Commission’s Fishery Management Plan on American Shad (Amendment 3), mandated additional monitoring efforts. Additionally, sustainability plans were required of any water system where commercial fishing is conducted. In Georgia, only the Altamaha, Ogeechee, and Savannah Rivers have commercial fisheries. The commercial fishery on the Ogeechee is very small, with effort averaging < 10 reported trips, landings averaging < 500 lbs, and participation averaging < 3 fishers. No effort has been reported since 2011 and as such, the fishery has remained closed in recent years. By contrast, the Altamaha accounts for the majority of the harvest and reported trips. 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. The 10 year average (2007-2016) for clams was 178 thousand pounds of meat and shell while oyster harvest was 24.9 thousand pounds.

CHAPTER 6
Public Health & Aquatic Life Issues

Risk-Based Assessment for Fish Consumption In 1995, Georgia began issuing tiered recommendations for fish consumption. Georgia's fish consumption guidelines are "risk-based" and are conservatively developed using currently available scientific information regarding likely intake rates of fish and toxicity values for contaminants detected. One of four, simple, species-specific recommendations is possible under the guidelines: No Restriction, Limit Consumption to One Meal Per Week, Limit Consumption to One Meal Per Month, or Do Not Eat. In 2017, 59.1% of recommendations for fish tested in Georgia waters were for No Restriction28% were to Limit Consumption to One Meal Per Week, 11.1% were to Limit Consumption to One Meal Per Month, and 1.8% was Do Not Eat Advisories. It should be noted that the dramatic increase of waters not fully meeting designated uses as related to fish consumption was a result of converting to a conservative risk-based approach for evaluating contaminants data in 1995, and not a result of increased contaminant concentrations in Georgia's fish.

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

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

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

TABLE 6-1. PARAMETERS FOR FISH TISSUE TESTING

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

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

monitored annually. Mercury trend samples of individual fish muscle tissue are analyzed for mercury and other metals.

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

States across the southeast and the nation have detected mercury in fish at levels that have resulted in limits on fish consumption. In 1995, the USEPA updated guidance on mercury, which documented increased risks of consuming fish with mercury. The DNR reassessed all mercury data and added consumption guidelines in 1996 for a number of lakes and streams, which had no restrictions in 1995. The Georgia guidance for 2014 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 2016-2017305(b)/303(d) List for all fish tissue contaminants except mercury. Mercury in fish tissue was assessed and a segment or water body was listed if the trophic-weighted fish community tissue mercury was in excess of the USEPA water quality criterion (*Water Quality Criterion for the Protection of Human Health: Methylmercury*, EPA-823-R-01-001, January 2001). For mercury, waters were placed on the not support list if the calculated trophic-weighted residue value was greater than 0.3 µg/g wet weight total mercury. For contaminants other than mercury (PCBs, dieldrin, DDT/DDD/DDE) waters were placed on the not support list if the assessment indicated any limited consumption of fish. The USEPA criterion represents a national approach to address what mercury concentration is protective for fishing waters. The existence of risk-based recommendations to reduce consumption was used with respect to other contaminants detected in fish tissue. EPD formally adopted the 2001 EPA national human health criterion for methylmercury as a human health standard for total mercury in fish tissue in the Georgia water quality rules in December 2002.

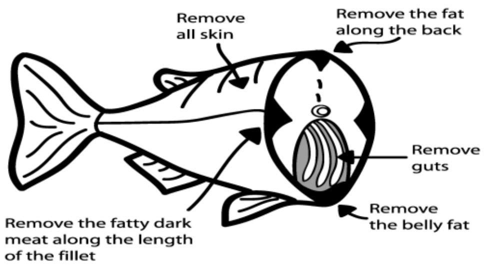
General Guidelines to Reduce Health Risks The following suggestions may help to reduce the risks of fish consumption:

<u>Keep smaller fish for eating</u>. 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.

<u>Vary the kinds of fish you eat</u>. 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.

<u>Eat smaller meals when you eat big fish and eat them less often</u>. 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.

<u>Clean and cook your fish properly.</u> 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 6-4, and 6-5 list the lakes, freshwater rivers and creeks, and estuaries, respectively, where consumption guidance has been issued by the DNR. This information is provided annually in Georgia's Freshwater and Saltwater Fishing Regulations, which is available from DNR and also supplied with each fishing license purchased. This information is also updated annually in the DNR publication *Guidelines for Eating Fish From Georgia Waters*.

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

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

Recreational Public Beach Monitoring

The U.S. Army Corps of Engineers conducts fecal coliform monitoring at its reservoir bathing beaches in Georgia. Tennessee Valley Authority (TVA), Georgia Power, the U.S. Forest Service, the National Park Service, Georgia State Parks, and counties and cities throughout the state have also conduct some sampling at the public beaches they operate. The Coastal Resources Division of DNR conducts enterococcus monitoring at public coastal beaches and other recreationally used estuarine locations such as boat ramps and sandbars, and works with the local County Health Department in issuance of swimming advisories.

Shellfish Area Closures

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

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

Cyanobacteria (Blue-Green Algae) Blooms

Cyanobacteria blooms are an increasing concern for Georgia’s citizens. Cyanobacteria occur naturally in low abundance in Georgia’s lakes and reservoirs. However, eutrophication results in conditions that are favorable for cyanobacteriagrowth. 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 - 2017

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

TABLE 6-3. FISH CONSUMPTION GUIDANCE FOR LAKES – 2017

LAKES	NO RESTRICTIONS	1 MEAL/ WEEK	1 MEAL/ MONTH
Acworth	Bluegill, Largemouth Bass <16"	Largemouth Bass >16"	
Allatoona	Carp, Crappie, Spotted Bass <16", Largemouth Bass 12-16", Channel Catfish, White Bass <12", G. Redhorse	Spotted Bass >16", Largemouth Bass >16", Hybrid Bass >16"	
Andrews	Channel Catfish, Spotted Sucker	Largemouth Bass >12"	
Banks	Bluegill		Largemouth Bass >12"
Bartlett's Ferry (Harding)	Black Crappie <12", Largemouth Bass <16", Spotted Bass <12"	Hybrid Bass >16", Striped Bass >16", Largemouth Bass >16", Channel Catfish, Black Crappie >12", Spotted Bass >12"	
Bear Cr. Reservoir	Sunfish	Largemouth Bass < 16", Channel Catfish >12"	
Bennett CEWC PFA	Largemouth Bass Redear Sunfish		
Black Shoals (Randy Poynter)	Channel Catfish <12", Redear	Largemouth Bass 12-16", Channel Catfish >12", Black Crappie	
Blackshear	Channel Catfish <12"	Channel Catfish >12", Largemouth Bass >12"	
Big Lazer PFA	Largemouth Bass 12-16", Channel Catfish	Largemouth Bass >16"	
Blue Ridge	Channel Catfish <16", Largemouth Bass <12", Bluegill	White Bass 12-16", Largemouth Bass 12-16", Channel Catfish >16"	
Burton	Largemouth Bass <16", Channel Catfish, Bluegill, White Catfish	Largemouth Bass >16", Spotted Bass 12-16", Walleye >16"	
Paradise PFA (Patrick, Horseshoe 4, & Bobben)	Channel Catfish, LM, Bullhead, Bluegill		
Pond N. Bush Field	Bluegill, Largemouth Bass <12"	Largemouth Bass 12-16"	
Carters	Largemouth Bass <16", Channel Catfish, Walleye Spotted Bass <16"	Spotted Bass >16", Largemouth Bass >16"	
Chatuge	Largemouth Bass 12"-16", Largemouth Bass >16", Channel Catfish	Spotted Bass 12-16" Hybrid Bass >16"	
Clarks Hill	Channel Catfish, Black Crappie, Redear, White perch, Striped Bass, Spotted sucker, Hybrid Bass, Largemouth Bass >16"		
Evans County PFA	Channel Catfish, Largemouth Bass 12-16"	Largemouth Bass >16"	

LAKES	NO RESTRICTIONS	1 MEAL/ WEEK	1 MEAL/ MONTH
Goat Rock	Black Crappie, Largemouth Bass 12-16”, Spotted sucker, Bluegill	Hybrid Bass <12”, Channel Catfish 12-16”	Channel Catfish <16, Largemouth Bass >16”, Hybrid Bass >12”, White Bass
Hartwell (Tugaloo Arm)	Black Crappie, Hybrid Bass <12”, Striped Bass < 12”, Channel Catfish < 16”	Largemouth Bass >12”, Carp > 16”	Hybrid Bass 12-16”, Striped Bass 12-16”
	DO NOT EAT Hybrid and Striped Bass > 16 inches in length		Channel Catfish
Hartwell – main body of lake	DO NOT EAT Hybrid and Striped Bass (S C Dept. Health and Environmental Control 1-888-849-7241)		Largemouth Bass, Channel Catfish
Hugh M. Gillis PFA	Channel Catfish, Bluegill	Largemouth Bass 12-16”	
Jackson	Black Crappie, Redear sunfish, Channel Catfish < 16” White Catfish	Channel Catfish >16”, Largemouth Bass	
Juliette	Largemouth Bass <12”; Largemouth Bass 12”-16”, Redear Sunfish, Bullhead, Striped Bass	Largemouth Bass >16”	
Ken Gardens	Channel Catfish, Brown bullhead, Bluegill	Largemouth Bass >12”	
Kolomoki (DNR S.P.)	Redear Sunfish	Largemouth Bass >12”	
Lanier	Channel Catfish <16”, Striped Bass <16", Bluegill, Black Crappie, White Catfish	Striped Bass, Carp>16", Walleye >16", Channel Catfish >16", Largemouth Bass, Spotted Bass	
L. Ocmulgee St. Pk.		Brown bullhead 12-16"	Largemouth Bass >16"
McDuffie PFA, West	Channel Catfish, Largemouth Bass		
Nottely	Channel Catfish, Black Crappie	Largemouth Bass >12", Striped Bass >16"	
Oliver	Hybrid Bass <12", Channel Catfish <16", Redear, Bluegill	Largemouth Bass > 12"	Channel Catfish >16"
Rabun	Largemouth Bass 12-16", Bluegill, White Catfish <16"	White Catfish >16” Largemouth Bass >16"	
Reed Bingham S.P.			Largemouth Bass >12", White Catfish >16"
Richard B. Russell	Black Crappie, Bluegill, White perch, Channel Catfish, Bullhead	Largemouth Bass >12"	
Seminole	Channel Catfish, Spotted sucker, Black Crappie, Redear Sunfish	Largemouth Bass >12"	
So. Slappy Blvd. Offramp (Albany)	Bluegill	Largemouth Bass 12-16"	Largemouth Bass >16"
Stone Mountain	Catfish	Largemouth Bass >16"	
Tobesofkee	Channel Catfish	Largemouth Bass >12"	
Tugalo	White Catfish 12-16", Bluegill	Walleye>16”	Largemouth Bass >12"

LAKES	NO RESTRICTIONS	1 MEAL/ WEEK	1 MEAL/ MONTH
Tribble Mill Park	Black Crappie, Bluegill, Largemouth Bass <12"	Largemouth Bass 12-16"	
West Point	, Carp, Spotted Bass, Black Crappie, Channel Catfish, Hybrid Bass <16"	Largemouth Bass >12” Hybrid Bass >16"	
Worth (Chehaw)	Spotted sucker, Redear	Largemouth Bass 12-16", Channel Catfish >16"	
Worth (Flint Res.)	Channel Catfish	Largemouth Bass >12"	
Yohola (DNR S.P.)	Bluegill	Largemouth Bass >12”	
Yonah	Bluegill	Largemouth Bass 12-16”, Catfish 12-16”	

Abbreviations used in table: < means "less than", > means "more than"

TABLE 6-4. FISH CONSUMPTION GUIDANCE FOR FRESHWATER RIVERS AND CREEKS– 2017

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Alapaha River	Redbreast sunfish	Spotted sucker	Largemouth Bass, Bullhead
Alapahoochee River		Bullhead	
Allatoona Creek, Cobb County		Spotted Bass, Alabama Hog Sucker	
Altamaha River (U.S Hwy 1)	Bluegill (US 1),	Flathead Catfish, Largemouth Bass, Channel Catfish	
Altamaha River (U.S Hwy 25/84)	Channel Catfish, Strpied Mullet (Altamaha Park)	Flathead Catfish	Largemouth Bass
Apalachee River	Channel Catfish	Largemouth Bass	
Beaver Creek (Taylor County)			Yellow bullhead
Brier Creek (Burke County)		Spotted sucker	Largemouth Bass
Canoochee River (Hwy 192 to Lotts Cr.)		Channel Catfish	Largemouth Bass, Redbreast, Snail Bullhead
Canoochee River (Lotts Cr. To Ogeechee River)			Largemouth Bass, Channel Catfish
Casey Canal	Largemouth Bass, Bluegill	Striped mullet	
Chattooga River (NE Ga., Rabun County)	Brown Trout	Northern Hog Sucker, Silver Redhorse, Redbreast Sunfish	
Chattahoochee River (Helen to Lanier)	Channel Catfish	Redeye Bass, Snail Bullhead Golden Redhorse Spotted bass Shoal bass	Largemouth Bass

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Chattahoochee River (Buford Dam to Morgan Falls Dam)	Brown trout, Carp, Rainbow trout, Yellow perch	Largemouth Bass	
Chattahoochee River (Morgan Falls Dam to Peachtree Creek)	Brown trout, Rainbow trout, Largemouth Bass, Bluegill, Spotted Bass, Shoal Bass	Jumprock sucker	Carp
Chattahoochee River (Peachtree Creek to Pea Creek)	Channel Catfish, White sucker	Bluegill, Black Bass	Carp
Chattahoochee River (Pea Creek to West Point Lake, below Franklin)	Channel Catfish	Largemouth Bass, Spotted Bass	
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	Largemouth Bass
Chattahoochee River (West Point dam to I-85)	Largemouth Bass, Bullheads	Spotted Bass	
Chestatee River (below Tesnatee River)	Channel Catfish, Redbreast	Spotted Bass	
Chickamauga Creek (West)	Redbreast sunfish	Spotted Bass	
Cohulla Creek (Praters Mill))		Blacktail Redhorse	
Conasauga River (Stateline to Hwy 286)		Spotted Bass	Smallmouth Buffalo
Conasauga River (Hwy 286 to Calhoun)			White Bass, Smallmouth Buffalo
Coosa River (Rome to Hwy 100, Floyd County)	White Bass	Spotted Bass	Largemouth Bass, Striped Bass
	DO NOT EAT SMALLMOUTH BUFFALO		
Coosa River (Hwy 100 to Stateline, Floyd County)	Spotted Bass	Largemouth Bass, Black Crappie	Striped Bass, Channel Catfish, Smallmouth 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)	Channel Catfish, Bluegill, Striped Bass (above Thompson Weinman dam)	Spotted Bass, Largemouth Bass	Smallmouth buffalo
Flint River (Spalding/Fayette Counties)	Spotted sucker	Largemouth Bass	
Flint River (Meriwether/Upson/Pike Counties)	Channel Catfish, Flathead Catfish, Redbreast Sunfish, Black Bass	Shoal Bass	
Flint River (Taylor County)	Channel Catfish, Shoal Bass	Largemouth Bass	

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Flint River (Macon/Dooly/Worth/Lee)	Channel Catfish	Largemouth Bass	
Flint River (Dougherty/Mitchell/Baker County)	Sucker, Flathead Catfish <16"	Largemouth Bass, Flathead Catfish 16-30"	Flathead Catfish >30"
Gum Creek (Crisp County)	Carp	Largemouth Bass	
Holly Creek (Murray County)		Blacktail Redhorse	
Ichawaynochaway Creek	Spotted Sucker	Largemouth Bass	
Kinchafoonee Creek (Sumter/Lee Counties)		Largemouth Bass, Spotted sucker	
Little River (Above and Below Rocky Cr., Wilkes County)	Spotted sucker, Silver Redhorse	Largemouth Bass	
Little River, (West of Valdosta, Lowndes County)	Spotted sucker	Largemouth Bass	
Mill Creek (Murray County)		Golden Redhorse	
Muckalee Creek (above Albany)		Largemouth Bass, Spotted sucker	
Ochlockonee River (Moultrie to Thomasville)		Spotted sucker, White Catfish, Redbreast Sunfish	Largemouth Bass
Ochlockonee River (Thomasville to Satate Line)	Redbreast Sunfish	Spotted Sucker	Largemouth Bass
Ocmulgee River (below Macon, Bibb County)	Channel Catfish, Flathead Catfish	Largemouth Bass	
Ocmulgee River (Houston/Twiggs Cos.)	Channel Catfish, Flathead Catfish	Largemouth Bass	
Ocmulgee River (Telfair/ Wilcox Counties)	Channel Catfish	Flathead Catfish, Largemouth Bass	
Oconee River (above Barnett Shoals)	Spotted Bass, Bluegill Sunfish, Channel Catfish	Silver Redhorse, Largemouth Bass	
Ogeechee River (Washington County; near Davisboro)		Spotted Sucker	Largemouth Bass
Ogeechee River (Jefferson County; Louisville)		Spotted Sucker, Redbreast Sunfsh	Largemouth Bass
Ogeechee River (Burke County Midville)		Redbreast Sunfish	Largemouth Bass
Ogeechee River (Jenkins County; Millen)		Sanil Bullhead, Redbreast Sunfish	Largemouth Bass
Ogeechee River (Bulloch County; near Statesboro)		Channel Catfish, Redbreast Sunfish, Snail Bullhead, Spotted Sucker	Largemouth Bass
Ogeechee River (Hwy 119)	Spotted Sucker	Largemouth Bass, Redbreast Sunfish	
Ogeechee River (Bryan County; near Ellabelle)		Redbreast sunfish, Channel Catfish,	Largemouth Bass
Ohoopee River (Near Oak Park, Ga .)		Redbreast Sunfish	Largemouth Bass
Ohoopee River (Near Reidsville, Ga., Tattnall County)		Redbreast Sunfish, Spotted Sucker, Channel Catfish	Largemouth Bass
Okefenokee Swamp (Billy's Lake)		Flier, Bluegill Sunfish	Bowfin, Chain Pickerel, Largemouth Bass
Oostanaula River, Hwy. 156, Calhoun	Bluegill Sunfish	Smallmouth buffalo	

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Oostanaula River, Hwy 140, to Coosa River	Bluegill Sunfish, Channel Catfish	Largemouth Bass, Spotted Bass, Smallmouth Buffalo	
Patsiliga Creek (Upstream of Beaver Creek, Taylor County)	Largemouth Bass, Spotted Sucker	Chain Pickerel	
Patsiliga Creek (Downstream of Beaver Creek)		Grayfin Redhorse, Spotted Sucker, Greater Jumprock	Largemouth Bass, Shoal Bass
Pipemaker Canal		Largemouth Bass	
Satilla River (Waycross, Ware/Pierce Counties)		Redbreast sunfish, Channel Catfish, Bullhead	Largemouth Bass
Satilla River (near Folkston, Camden County)	DO NOT EAT FLATHEAD CATFISH>30”		Largemouth Bass, Redbreast, Flathead Catfish <30”
Savannah River (Below Clarks Hill Dam, Columbia County)	Redear Sunfish, Redbreast Sunfish	Largemouth Bass, Spotted Sucker	
Savannah River (Richmond/Burke Countiesbelow New Savannah Bluff Lock & Dam)	Striped mullet Spotted Sucker	Largemouth Bass	
Savannah River (Screven County)	Redear Runfish, Channel Catfish	Bluegill Sunfish, Largemouth Bass	
Savannah River (Chatham County)	Channel Catfish, Striped Mullet	Largemouth Bass,	
Savannah River (Fort Howard)	Redbreast Sunfish	White Catfish	Bowfin, Largemouth Bass
Savannah River (Effingham County)	Channel Catfish, Redbreast Sunfish	Largemouth Bass	
Savannah River (Tidal Gate)	Red drum,	White Catfish	
Savannah River Special (New Savannah Bluff Lock and Dam to Savannah Estuary, Chatham County)	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 County)		Sunfish	
South River (DeKalb and , Rockdale Counties)		Snail bullhead, Bluegill Sunfish	
South River (Henry County, Snapping Shoals)	Silver Redhorse, Channel Catfish	Largemouth Bass	
Spring Creek (Seminole/Decatur/Miller Counties)		Largemouth Bass, Spotted sucker, Redear Sunfish	
St. Marys River (Camden County)	Redbreast, Striped mullet		Largemouth Bass
St. Marys River (Charlton County)	Redbreast sunfish		Largemouth Bass
Sugar Creek (Murray County)		Golden Redhorse	
Sumac Creek (Murray County)		Golden Redhorse	
Suwannee River (Clinch, Ware and Echols Counties)		Bullhead, Chain pickerel, Flier	Largemouth Bass
Swamp Creek (Redwine Cove Road, Whitefield County)		Redeye Bass	
Talking Rock Creek (Downtown Talking Rock, Pickens County)		Redeye Bass	
Tallapoosa River (U.S Hwy 27)	Bluegill Sunfish, Blacktail Redhorse		

RIVERS/CREEKS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH
Tallapoosa River (Ga. Hwy 100)		Blacktail Redhorse	
Trib. To Hudson Rive(Alto, Banks County)	Brown bullhead	Redeye Bass	
Withlacoochee River (Hwy 122)		Redbreast sunfish	
Withlacoochee River (Cyattville/Hwy 84)	Redbreast sunfish	Spotted Sucker	Largemouth Bass

TABLE 6-4. FISH CONSUMPTION GUIDANCE ESTUARINE SYSTEMS – 2017

ESTUARINE SYSTEMS	NO RESTRICTIONS	1 MEAL PER WEEK	1 MEAL PER MONTH	DO NOT EAT
Turtle River System (Purvis Cr., Gibson Cr.)		Red drum, Flounder, Shrimp, Striped Mullet	Blue crab, Spotted Seatrout, Southern Kingfish (whiting), Sheepshead, Spot Black Drum	, Atlantic Croaker, Bivalves*
Turtle & Buffalo Rivers (upriver Hwy 303)	White Shrimp, Flounder	Red drum, Blue crab, Sheepshead Black Drum, Striped Mullet	Spoted Seatrout, Southern Kingfish (whiting), Atlantic Croaker, Spot,	, Bivalves *
Turtle River (Hwy 303 - Channel Marker 9)	White Shrimp	Red drum, Flounder, Black Drum, Blue Crab	, Spotted Seatrout, Southern Kingfish (whiting), Sheepshead Striped Mullet	Spot, , Bivalves *
Turtle River (C. Marker 9 & So. Brunswick River to Dubignons & Parsons creeks)	White Shrimp, Flounder, Red Drum, Sheepshead, Striped Mullet, Blue Crab	, Black Drum, , Spotted Seatrout, Southern Kingfish (whiting)	Atlantic Croaker, , , Spot	Bivalves *
Terry Creek South of Torras Causeway to Lanier Basin	Spot, Stripped Mullet, Shrimp, Atlantic Croaker, Spotted Seatrout, Southern Kingfish (whiting), Blue crab	Yellowtail (Silver perch)		Bivalves *
Terry and Dupree Creeks North of Torras Causeway to Confluence w/ Back River	Blue crab, Shrimp	Red drum	Stripped Mullet, Atlantic Croaker, Spotted Seatrout, Southern Kingfish (whiting)	Spot, Bivalves *
Back River One mile above Terry Creek to Confluence with Torras Causeway	Stripped Mullet, Shrimp, Atlantic Croaker, Spotted Seatrout, Southern Kingfish (whiting), Blue crab, Red drum		Spot	Bivalves *
Back River South of Torras Causeway to St. Simons Sound	Spot, Stripped Mullet, Shrimp, Spotted Seatrout,	Atlantic croaker		Bivalves *

	Southern Kingfish (whiting), Blue crab, Red drum			
Floyd Creek	Blue crab, Southern Kingfish			
Academy Creek	Blue crab			
Altamaha Estuary	Striped mullet, Spotted Seatrout			
Cumberland Sound	Brown Shrimp			
Hayner's Creek (Savannah)	Blue crab			
Mud River	White Shrimp			
North Newport River	Striped Mullet	Blue Crab		
Sapelo Sound	Brown Shrimp			
Savannah Estuary	Striped mullet		Striped Bass >=27"	
St. Simon's Sound	Tripletail	Sheepshead		
Wassaw Sound	Brown Shrimp, Spotted Seatrout			

* Bivalves are all clams, mussels and oysters; Shellfish ban under National Shellfish Sanitation Program

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 National Pollutant Discharge Elimination System (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 2016-2017 high priority was placed on Comprehensive Statewide Water Management Planning, monitoring and assessment, water quality modeling and TMDL development, TMDL implementation, State revolving loan programs, NPDES permitting and enforcement, nonpoint source pollution abatement, stormwater management, erosion and sediment control, and public participation projects.

Comprehensive Statewide Water Planning

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

The Environmental Protection Division of the Georgia Department of Natural Resources, with the help of numerous stakeholders, produced and submitted to the Georgia Water Council an initial draft of the statewide water plan on June 28, 2007. Following several rounds of public input and changes in response to the input, the Georgia Water Council approved the “Georgia Comprehensive State-wide Water Management Plan” on January 8, 2008. The water plan was debated and approved in the 2008 session of the General Assembly and signed by Governor Perdue on February 6, 2008. The Regional Water Councils completed plans in 2011. This work is discussed in Chapter 2.

Watershed Projects

The Savannah Harbor was first listed as impaired for dissolved oxygen (DO) on the 2002 303(d) list. The USEPA issued a DO TMDL in 2006. GAEPD subsequently revised its DO criteria for the Harbor and the revised criteria were approved by USEPA in 2010. Since 2012, GAEPD, SCDHEC, and USEPA Region IV, along with Savannah River/Harbor Discharge Group, have been working together to develop an alternative restoration plan to meet the new DO criteria. On October 9, 2015, GAEPD public noticed its revised 305(b)/303(d) 2014 Sounds/Harbors list changing the assessment category for Savannah Harbor from 4a to 5R along with the “Subcategory 5R Documentation For Point Source Dissolved Oxygen Impaired Water in the Savannah River Basin, Georgia and South Carolina.” Changes were made to the Savannah Harbor 5R Restoration Plan document based on comments received and the revised 2014 Sounds/Harbors list and associated documents were submitted to EPA for approval on November 13, 2015. EPA approved the 2014 list on May 13, 2016 and withdrew the November 2006 EPA Savannah Harbor TMDL, which was based on the previous Georgia DO criteria. GAEPD intends to remove the Savannah Harbor from subcategory 5R once the alternative restoration plan has been implemented to meet applicable water quality standards.

U.S. EPA has requested each State develop a strategy for adopting nutrient water quality criteria to protect waters from the adverse effects of nutrient over-enrichment. The development of nutrient criteria is a very complex matter since some level of nutrients is necessary for the health of the aquatic ecosystem, while too high of a concentration can cause an imbalance in the natural aquatic flora and fauna. Therefore, in order to protect our natural resources, it is important that the criteria not be set too low or too high. Georgia first developed a plan for adopting nutrient criteria in 2005. This plan was subsequently revised in October 2008 and August 2013. In 2015, EPA, Georgia EPD, and South Carolina DHEC collaborated on a report intended to provide technical support in developing and establishing numeric water quality criteria under the Clean Water Act to support the applicable designated uses in Georgia and South Carolina estuaries from the effects of excess nitrogen and phosphorus. Georgia and South Carolina's estuaries are characterized by their high turbidity, widely varying residence times associated with high tidal amplitudes, lack of seagrasses, high ratios of tidal wetland to estuary surface area, and relatively low coastal anthropogenic land use. The estuaries generally can be classified into Piedmont riverine systems (headwaters above the fall line, with large inflow), blackwater systems (headwaters in the coastal plain with significant terrestrial contributions of organic matter), and coastal embayments (ocean-dominated systems with only freshwater contributions from land stormwater runoff and subterranean (e.g., shallow water aquifer) sources). Conceptual estuarine eutrophication models established for other U.S. estuaries are often based upon hypoxia below the pycnocline, production dominated by phytoplankton, and seagrass endpoints – none of which apply well to Georgia and South Carolina's estuaries, which tend to be well-mixed, mediated by heterotrophs, and have light-limited phytoplankton production. An alternative conceptual model was presented to derive nutrient targets (total nitrogen and total phosphorus), via measures (ecosystem primary production, chlorophyll *a*, dissolved oxygen, and indices of biological integrity) that are surrogates for designated use endpoints (aquatic community structure and function). The suite of indicators provides a flexible framework where a lack of data, or insensitivity of an indicator in a given location, can be overcome by using the remaining indicators to develop defensible criteria for that estuary. Criteria can be derived based on reference conditions, stressor-response relationships, and water quality simulation modeling.

GAEPD listed a 17-mile segment of the Coosa River as impaired for DO and in 2004 developed a DO TMDL for this segment. Comments received suggested that this section of the Coosa River is a river-reservoir transition zone, representing an upstream backwater of Weiss Reservoir, where vertical DO gradients may be present during the algal growing season. The EPD RIV-1 model used for the Coosa River modeling was thought to be suitable for free-flowing and well-mixed riverine systems and was successfully used to model the approximately 200 miles of the Coosa River from the headwaters at Allatoona Lake, Carter's Lake, and Conasauga River near Eton to State Road 100. However, other modeling approaches are expected to provide additional, useful information on the section of the river from State Road 100 to the Georgia/Alabama State Line due to potential hydrodynamic impacts of Lake Weiss. Alabama Department of Environmental Management (ADEM), GAEPD and USEPA worked together to develop and calibrate the Environmental Fluid Dynamics Code (EFDC) and the Water Quality Analysis Simulation Program (WASP) models for Lake Weiss, from Mayos Bar to the Dam. These models were used to develop the 2008 Nutrient TMDL for Lake Weiss. GAEPD continues to work on the Lake Weiss Model using both EFDC hydrodynamic and water quality models to simulate DO in the Lake transition zone. Model results will be used to revise the Coosa River DO TMDL and wasteload allocations for permitted discharges. GAEPD continues to implement Total Phosphorus reductions in the Coosa River Basin to meet downstream water quality standards in Alabama. This segment of the Coosa River was also listed for temperature on the 2012 303(d) list. The cause of the temperature violation was addressed through direct implementation by issuing a thermal WLA to Plant Hammond.

Lake Talquin, which covers nearly 9,000 acres and is known as a bass-fishing hot spot, was deemed impaired by Florida DEP in 2009. About 75 percent of the lake's watershed is in Georgia. Agriculture is the largest non-point source of the pollution, and chemical company BASF Catalysts in Attapulgus, Georgia, is the single largest point-source contributor. GAEPD has been working with USEPA, Florida DEP, as well as industry, county, and area municipal officials to develop a nutrient TMDL for Lake Talquin for over two years.

In order to address the nutrient problems, USEPA has developed a series of complex models that cover the entire watershed using Loading Simulation Program in C++ (LSPC) to estimate the nutrient loads within and discharged from each watershed subbasin, and EFDC to simulate three-dimensional movement of water mass in the rivers and lake. EFDC is calibrated to water surface elevation and temperature. The results of the LSPC models are passed WASP models and used to simulate the movement of pollutant mass in the rivers and lake. These models will provide a basis for setting nutrient limits that will affect those that discharge in the lake's watershed.

Several modeling stakeholders' meetings have been conducted to review the model calibration, discuss ways of streamlining the connection between models to facilitate scenario analyses, and better understand the post-processing of modeling results. GAEPD reviewed the models and provided comments to FL DEP to allow refinement of the models. FLDEP issued a draft TMDL on September 23, 2016, and a revised draft in May 2017. The revised draft TMDL was challenged by BASF, an industrial discharger located in Attapulgus, Georgia.

The GAEPD is also working with the Florida Department of Environmental Protection and the Suwannee River Water Management District to coordinate water protection efforts in the Suwannee River Basin.

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, water quality monitoring is necessary to establish baseline and trend data, document existing conditions, support the development of protective and scientifically defensible water quality standards, 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. Long-term trend monitoring, targeted and probabilistic monitoring, biological 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

In December 2013, USEPA released "A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program" for managing the Clean Water Act 303(d) program responsibilities. The Vision was designed to coordinate and focus EPA and State TMDL efforts to advance the effectiveness of the Clean Water Act Section 303(d) Program direction in the coming decade. To accomplish this, the Vision focuses on six elements including 1) Prioritization, 2) Assessment, 3) Protection, 4) Alternatives, 5) Engagement and 6) Integration. To address the prioritization element, GAEPD developed a list of priority waters for protection, “direct to implementation”, TMDL development, and/or TMDL alternative development. Georgia’s priorities reflect where GAEPD plans to spend a great deal of its resources in the upcoming years. The waters were selected using the USEPA-approved 2012 305(b)/303(d) list of waters as the baseline and our priority framework. Waters on the priority list will be addressed using a variety of approaches and can basically be organized into the following six groups:

1) Lake Lanier – Lake Lanier is composed of 5 segments, but only one of these segments, (Lanier Lake -Browns Bridge Road (SR 369)) is on the 2012 303d list for chlorophyll *a*. On December 21, 2017 the Final Lake Lanier Chlorophyll a TMDL was submitted to EPA Region IV for approval. The TMSL was ritten for the entire lane and addresses nutrients, a National priority.

2) Carters Lake – Carters Lake is composed of two segments. Both segments are on the 2012 303d list for chlorophyll *a* and total phosphorusOn February 8, 2016, the Final Chlorophyll a TMDL for Carters Lake was submitted to EPA Region IV for approval that addressed nutrients.

3) Savannah Harbor – This segment is impaired for DO. GAEPD has been working with SC DHEC and the Savannah River/Harbor Discharger Group to restore this water. On November 13, 2015 the GAEPD submitted Georgia”s Sounds/Harbors 305(b)/303(d) list to EPA Region IV listing the Savannah Harbor from Fort Pulaski to the Coastal Seaboard Railroad in Category 5R. EPA approved Georgia’s 305(b)/303(d) list 2014 on May 13, 2016.

4) Coosa River – A segment of the Coosa River is on the 2012 303d list for Temperature. The cause of the temperature violation was known and GAEPD addressed this impairment through direct implementation. A wasteload allocation for heat loads was developed and issued through an NPDES permit in December 2017. In January 2018 the permit was appealed..

5) Georgia has 4 coastal beaches on the 2012 303d list for enterococci. GAEPD has prioritized these beaches to address human health concerns. GAEPD Developed TMDLs to address the impairments. The Final Ogeechee River Basin Enterococci TMDL was subkitted to EPA Region IV on February 8, 2016. The three other TMDLS on the Satilla and Altamaha River Basins were submitted for approval to EPA on April 21, 2017. All four Enterococci TMDLs have been finalized and The GAEPD will work with partners conducting bacteria source tracking indentification to help address causes.

6) Ochlockonee River Basin – GAEPD placed the Upper and Lower Ochlockonee Watersheds on our priority list due to chlorophyll and DO impairments in Lake Talquin, a downstream lake located in Florida. FL DEP is developing a TMDL for this Lake. In accordance with the Clean Water Act, waters in Georgia may not cause and contribute to water quality violations in Florida; therefore, GAEPD will develop a protection plan to help ensure that Georgia’s waters meet the necessary nutrient reductions at the State line. The protection plan will address nutrients.

While the waters on the list are considered our priorities under the new Vision, GAEPD plans to continue to develop TMDLs using the rotating basin approach.
In 2016-2017, the GAEPD condcucted a significant amount of modeling in support of the development of wateload allocations and total maximum daily loads (TMDLs). In 2015, TMDLs were developed for 118

impaired waterbodies on the Georgia 2014 303(d0 list for the Coosa, Tennessee, Tallapoosa, Savannah, and Ogeechee River Basins for the following parameters: chlorophyll a (2), enterococci (1), fecal coliform (16), and sediment (99). These TMDLs were public noticed on August 31, 2015. TMDLs were also developed for 8 segments in the Satilla and Suwannee River Basins for fecal coliform. These TMDLs were public noticed on November 20, 2015. Both sets of TMDLS were submitted to USEPA for approval on September 29,, 2016.

In 2016, impaired waterbody segments on the Georgia 2014 303(d) list in the Suwannee, Satilla, Oconee, Ocmulgee, and Altamaha River Basins for the following parameters: fecal coliform (13), enterococci (3), cadmium (1), zinc (2), copper (2), lead (3) and sediment (21). These TMDLs were public noticed on June 30, 2016, with the public notice period extended on August 22, 2016. The public comment period ended September 30, 2016 after receiving one comment letter referencing 7 segments in the Oconee River Basin. Revisions were made where appropriate and the Final TMDLs were submitted to USEPA for approval on April 21, 2017. USEPA approval letters for TMDLs covering 23 impaired waterbody segments were received on September 21, 2017.

In 2017, two TMDLs were revised for a Dissolved Oxygen segment in the St. Marys River Basin and three Copper segments in the Tallapoosa River Basin. These TMDLs were public notice on May 25, 2017. The public notice period ended July 28, 2017, and the Final TMDLs were submitted to USEPA for final approval on August 18, 2017. TMDLs were developed for 61 segments on the 2014 303(d) list in the Chattahoochee and Flint River Basins for the following parameters: Fecal coliform (15), sediment (43), chlorophyll a (2), and dissolved oxygen (1). These TMDLs were public noticed on September 29, 2017. The comment period ended November 24, 2017, after receiving 6 comments referring to 2 segments in the Chattahoochee River Basin. After making appropriate revisions, the Final TMDLs were submitted to USEPA for approval on December 21, 2017. To date more than 1880 TMDLs have been developed for 303(d) listed waters in Georgia. To date more than 1880 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 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.

Plans include Watershed Improvement Plans (WIPs) and updates to existing plans prepared through contracts with Regional Commissions (RCs) and other public contractors.

Clean Water State Revolving and Georgia Fund Loan Programs

The Clean Water State Revolving Fund (CWSRF) is a federal loan program administered by the Georgia Environmental Finance Authority (GEFA) that provides funding for a variety of wastewater infrastructure and pollution prevention projects. Eligible projects include water quality, water conservation and wastewater treatment projects, such as constructing new wastewater treatment plants, repairing and replacing sewers, stormwater control projects and implementing water conservation projects and programs. The Georgia Fund is a state-funded loan program administered by GEFA for wastewater, water, and solid waste infrastructure improvements. The Georgia

Fund program is available to local governments for projects such as sewer and water lines, treatment plants, pumping stations, wells, water storage tanks and water meters. GEFA contracts with GAEPD to provide environmental/engineering review for these projects.

Founded in 1985, GEFA offers low-interest loans and grants for projects that improve Georgia's environment, protect its natural resources, and promote economic development. The CWSRF program was initiated in 1988 to the full extent allowed by the 1987 amendments to the Clean Water Act. Since 1985, GEFA has approved more than $3.9 billion for infrastructure improvements and more than 1,500 projects have been funded to date. The Clean Water State Revolving Fund awarded approximately $240 million with 53 executions and the Georgia Fund awarded $55 million to 37 executions for water supply and water quality projects in FY2016-2017.

Metro District Planning

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

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

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

GAEPD conducts audits to determine whether local governments are in compliance with the District Plans.

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.

The Georgia Land Conservation Program (GLCP) and Georgia Conservation Tax Credit Program continue to facilitate permanent protection for important natural, agricultural, historic and recreational areas throughout the state. Since its inception in 2005 and as of 2015, the GLCP assisted with the permanent protection of 346,950 acres. GLCP provides assistance to local governments, state agencies, and conservation groups in the form of competitive grants, due diligence grants, low-interest loans, and conservation tax credits to incentivize the permanent protection of the state's natural resources. Together with other state and federal agencies, private sector conservation groups, and generous landowners, the GLCP has leveraged $258.9 million in state funds to conserve approximately $1.32 billion worth of conservation land (2005-2015). More information on the program can be found at https://glcp.georgia.gov.

National Pollutant Discharge Elimination System (NPDES) Permit Program
The Federal Clean Water Act requires NPDES permits for point source wastewater dischargers, compliance monitoring for those permits and appropriate enforcement action for violations of the permits.

In 2016-2017, NPDES permits were issued, modified or reissued for 98 municipal and private discharges and for 83industrial discharges.

In addition to permits for point source wastewater discharges, the GAEPD has developed and implemented a permit system for land application systems. Land application systems are used as alternatives to surface water discharges when appropriate.

Concentrated Animal Feeding Operations
The Georgia rules require animal feeding operations with more than 300 animal units (AU) to apply for a wastewater permit under Georgia's Land Application System (LAS) permitting program id they are defined as a CAFO and discharge to waters of the state. GAEPD has been delegated the authority to administer the NPDES program in Georgia by the U.S. Environmental Protection Agency (EPA).

There are currently 115 farms which require a LAS or NPDES permit. That includes approximately 40 large farms (greater than 1000 AU) with <u>liquid</u> manure handling systems. Of these 4 have federal NPDES concentrated animal feeding operation (CAFO) permits and 36 have state LAS permits. These farms, with their liquid waste lagoons and spray fields, are important managers of water resources. It has been deemed more efficient to redirect these regulatory activities to the Georgia Department of Agriculture Livestock/Poultry Section (GDA) where appropriate. Therefore, the GAEPD has contracted with the GDA for inspections, complaint investigations, nutrient management plan reviews, permit administrative support, and enforcement assistance.

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

Activities include statewide and watershed-based demonstrations and BMP implementation of Comprehensive Nutrient Planning, lagoon maintenance or decommissioning, irrigation systems, and waste and effluent management systems. Projects using Section 319(h) funds that install agricultural BMPS are required to complete a CNMP. By the end of 2017 more than fifty CNMPS has been completed across Georgia.

Combined Sewer Systems (CSS)
A CSS is a sewer system that is designed to collect rainwater runoff, domestic sewage and industrial wastewater in the same pipe. GAEPD has issued NPDES permits to two of the cities in Georgia that have Combined Sewer Systems (CSS). These are Albany and Atlanta. The permit for the third CSS in Columbus was issued in 2017. The permits require that the CSS must not cause violations of Georgia Water Quality Control Standards.

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

As of October 2017, of 165 major municipal dischargers, 162 facilities were in general compliance with limitations. The remaining facilities are under compliance schedules to resolve the noncompliance or implementing infiltration/ inflow strategies. Enforcement action has been taken by the GAEPD to insure problems are alleviated.
Data evaluations (using annual reports, GAEPD sampling and biomonitoring results) were performed on NPDES permitted municipal facilities to determine the need to reopen specific permits for inclusion of numerical limits and monitoring for appropriate toxic pollutants.

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

Industries in Georgia achieved a high degree of compliance in 2016-2017. The thirty-six major industrial facilities were in compliance at the end of 2017.

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 2016 and2017, 209 Orders addressing wastewater issues were issued and approximately $708,072 in negotiated settlements was collected.

Stormwater compliance for municipalities and industries is most often reached through education and inspections. The vast majority of Enforcement Orders issued due to violations of stormwater permits are used in connection with construction activities. In 2016-2017 a total of 74 stormwater/erosion sedimentation orders were issued for a total of $729,496 in negotiated settlements.

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.

Stormwater Management

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

The Phase I Regulations set specific application submittal requirements for large (population 250,000 or more at the time of designation) and medium (population 100,000 to 250,000 at the time of designation) municipal separate storm sewer systems (MS4). GAEPD determined that the metropolitan Atlanta area is a large municipal system as defined in the regulations. As a result, Clayton, Cobb, DeKalb, Fulton and Gwinnett Counties and all the incorporated cities within these counties were designated Phase I Large MS4s and required to comply with the application submittal target dates for a large municipal area. Forty-five individual stormwater permits were issued to the Atlanta area municipalities on June 15, 1994 and reissued in 1999, 2004, 2009, and 2014. EPD expects to reissue the permits in 2019.

Augusta, Macon, Savannah, Columbus, the counties surrounding these cities and any other incorporated cities within these counties were identified as Phase I Medium MS4s as defined in the Phase I Stormwater Regulations. Thirteen individual stormwater permits were issued to the Phase I Medium MS4s in April and May, 1995. These permits were reissued in April 2000, 2005, 2010, 2012, and 2017. In 2014 the number of medium MS4s was reduced from 13 to 12 when the City of Macon and Bibb County became consolidated as Macon-Bibb County Consolidated Government.

On December 8, 1999 USEPA promulgated the Phase II Rules for Stormwater. Phase II required NPDES permitting and the development of Storm Water Management Programs for smaller cities and counties located within urbanized areas. 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 at the time of the Phase I designations that were 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 covered 86 Phase II MS4s, including 57 cities and 29 counties. This Permit was most recently reissued in December 2017 and currently covers 107 municipalities. The number of Phase II municipalities varies over time as cities, such as Payne City, are abolished and others, such as Peachtree Corners and Johns Creek, are created. The current number also includes 20 newly designated Phase II MS4s from the 2010 Census.

In 2009, EPD issued a Phase II MS4 General NPDES Permit to seven Department of Defense facilities. Two of those bases closed in 2011, reducing the number of permitted DOD facilities to five. The NPDES Permit for the remaining five facilities was reissued in 2014. In 2016, Fort Gillem Enclave was designated and obtained coverage under the DOD permit.

In 2011, GAEPD issued a Phase II MS4 General Stormwater Permit to the Department of Transportation (DOT), which is applicable to post-construction runoff in jurisdictions with MS4 permits. EPD reissued this permit in 2017. These Phase II MS4 NPDES General Permits do not contain specific effluent limitations. Instead, each Phase II MS4 permittee is required to institute best management practices to control stormwater pollution. As part of the NOI, the MS4 is required to develop a Stormwater Management Plant (SWMP) that includes best management practices in six different areas, also known as 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. In addition, all DOD facilities, DOT, and MS4 communities with populations over 10,000 that discharge to an impaired waterbody, are required to monitor for the pollutant of concern (POC) and evaluate their BMPs' effectiveness in reducing the POC in stormwater discharges from the MS4.

The Phase I and Phase II MS4 stormwater permits require the submittal of Annual Reports, which detail the municipality's implementation of its SWMP, to GAEPD. Each year, Georgia stormwater permitting program staff reviews each of these Annual Reports. GAEPD provides comments on the Annual Reports to the MS4 permittees, noting areas of noncompliance and recommending improvements to the SWMPs. GAEPD verifies the information in the SWMPs and Annual Reports at on-site inspections. Each MS4 is inspected at least once every five years.

GAEPD has issued general permits for the 11 industrial subcategories defined in the Phase I Federal Stormwater Regulations. During 1993, GAEPD issued NPDES General Permit No. GAR000000 to regulate the discharge of stormwater from ten categories of industrial activity (the other category, construction activities as defined in 122.26(b)(14)(x), is covered under the construction general permits). This permit was reissued in 1998 and 2006 as GAR000000, and was then reissued as GAR050000 in 2012 and 2017. Currently, this permit covers the stormwater discharge from 2,362 industrial facilities.

EPD's support of permit GAR050000's requirements through technical assistance to permittees is an important component of stormwater management in Georgia. EPD staff handle multiple calls and emails per day from permittees seeking to discuss the requirements for compliance or compliance strategies. EPD staff, and inspectors under contract to EPD, conducted inspections at approximately 132 industrial facilities to assess compliance with the industrial general stormwater permit during 2016-2017.

GAEPD will continue to regulate stormwater 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 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 that 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 when such construction disturbs less than one acre and is not part of a larger common plan of development or sale with a planned disturbance of equal to or greater than one acre, and minor activities, such as home landscaping and gardening, and water supply reservoirs.

Implementation of the Act involves local units of governments and State agencies. The Act provides for municipalities and Counties to adopt local ordinances and to become delegated "Issuing Authorities". GAEPD delegates local "Issuing Authority", administers GAEPD rules where there is no local authority, and oversees local program implementation. Currently 321 cities and counties have adopted erosion and sediment control ordinances which have been reviewed by the GAEPD for compliance with the Act.

House Bill 285 was passed during the 2003 legislative session. The legislation amended the Georgia Erosion and Sedimentation Act to create an integrated permitting program for erosion and sedimentation control for land disturbing activities of one acre or greater, thereby standardizing the requirements for local Land Disturbing Activity Permits and the NPDES Construction Storm Water Permits. The legislation also created Georgia's first NPDES permit fee system, and established training and education requirements for individuals involved in land development design, review, permitting, construction, monitoring or inspection of any land disturbing activity. During the 2016-2017 period, GAEPD decertified two Local Issuing Authorities. During this same period, EPD certified three new Local Issuing Authorities.

Senate Bill 460 was passed during the 2004 legislative session. The legislation amended the Georgia Erosion and Sedimentation Act to add three new criteria under which the EPD director can consider stream buffer variances. The legislation also required the Georgia Board of Natural Resources to adopt amendments to its Rules to implement the new criteria. In December 2004, the Georgia Board of Natural Resources adopted amendments to the Erosion and Sedimentation Control Rules which went into effect January 10, 2005.

The Act was amended by House Bill 463 in 2007 to give subcontrators an additional year to meet the training and education requirements established in HB 285. The Georgia Soil and Water Conservation Commission continues to administer the training and certification program. As of September 2017, 92,073 people have been certified and 62,580 re-certified. Senate Bill 155 amended the Act in 2009 to exempt 25-foot buffers along ephemeral streams. This legislation clarified the definition of ephemeral in the Erosion and Sedimentation Rules. The E&S Rules were amended in 2011 to add a new stream buffer variance criteria for projects that pipe or re-route waterways that are not jurisdictional waters of the U. S., and for new infrastructure projects that impact only the buffer and not the stream.

A NPDES general permit to regulate storm water discharges from construction activities was issued by GAEPD and subsequently appealed in 1992, 1994, 1995, 1996 and 1999. The permit, which regulated stormwater discharges associated with land disturbances of five acres or greater, was eventually issued on June 12, 2000 and became effective on August 1, 2000. The NPDES general permit for construction activities was reissued by GAEPD on August 13, 2003 as three distinct general permits: Stand Alone (GAR100001), Infrastructure (GAR100002) and Common Development (GAR100003). Coverage was required for projects disturbing one acre or more in accordance with the USEPA Phase II stormwater 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 EPD on September 24, 2013. The 2013 permits added additional stream buffer variance exemptions and amended tertiary permittee requirements. EPD modified the permits on July 1, 2016 and expects to reissue the permits in 2018.

In 2015, the Act was amended to provide for buffers on Coastal Marshes with SB 101. New Rules to implement the changes are expected in 2016.

During FY2016-FY2017, 21,233 primary, secondary and tertiary permittees submitted Notices of Intent for coverage under the NPDES General Permits. As of September 30,2017 there were 33,656 active construction sites in Georgia (i.e., primary, secondary and tertiary permittees with coverage under the NPDES General Permits that have not submitted Notices of Termination).

The GAEPD will continue to regulate stormwater 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.

The diffuse nature of nonpoint sources (e.g., agriculture, construction, mining, silviculture, urban runoff) and the variety of pollutants those sources generate makes effective control challenging. Although progress has been made in the protection and enhancement of water quality, additional work is 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 to address nonpoint source pollution, 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.

GAEPD has designated the Georgia Soil and Water Conservation Commission (GSWCC) as the lead agency for implementing the agricultural component of the State's *Nonpoint Source Management Program*. Similarly, GAEPD has designated the Georgia Forestry Commission (GFC) as the lead agency for implementing the silvicultural component of the State's *Nonpoint Source Management Program*, and the Department of Community Affairs (DCA) as 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 2014-2015*, as required by Section 305(b) of Public Law 92-500, serves as the current process to update the *Nonpoint Source Assessment Report*.

GAEPD revised the State's *Nonpoint Source Management Program* to update the goals, activities and implementation strategies of the Program. The revised plan 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. The revised plan was developed through a consultation process, incorporating input from myriad stakeholders involved in nonpoint source management activities throughout the State, including local, regional, State and Federal agencies, as well as private, non-governmental organizations. The *Nonpoint Source Management Program* is set to be revised by the end of 2019.

Under Section 319(h) of the Federal Clean Water Act, the USEPA awards a Nonpoint Source Implementation Grant to GAEPD to fund eligible projects that support the implementation of the State's *Nonpoint Source Management Program*. Section 319(h) Grant funds are made available annually to public agencies in Georgia for the prevention, control and/or abatement of nonpoint sources of pollution. 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 FY15 – FY17, Georgia's Section 319(h) grant project funded 30 new projects for over $6.5 million.

In 2017, Georgia's Nonpoint Source Program administered 50 Section 319(h) projects, totaling more than $10.8 million dollars in funds awarded to cooperating agencies. Priority projects include implementing the nonpoint source components of TMDL implementation plans and 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, developing integrated solutions that utilize the expertise and authority of multiple agencies, and measuring success through monitoring and other data gathering. Focusing Section 319(h) Grant funds on solving nonpoint source pollution problems will enable the State to make great strides in achieving water quality goals.

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, 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. Water quality in Georgia has benefited from voluntarily installed best management practices and the implementation of conservation incentive programs. These voluntary programs are enhanced by financial programs, technical assistance, education outreach and materials, demonstrations, 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 many 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, but 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 2017, approximately $2.2 million in new Section 319(h) Grant projects were implemented to target agricultural sources of nonpoint source pollution. In addition to the minimum 40% required non-federal in-kind match, the NRCS has contributed hundreds of hours of time worth many millions of dollars in technical assistance to support these projects. The UGACAES, GSWCC, FSA, GFC and other agencies have also contributed significant technical assistance to support these projects. These projects offer solutions, as well as financial and technical implementation assistance, in identified priority watersheds.

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

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

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

NRCS is the lead agency for EQIP and works with many State and local partners to identify local priorities and recommend priority areas and program policy. In Federal Fiscal Year 2017, the EQIP program provided over $35 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.

Silviculture

The Georgia Forestry Commission has been an integral partner to GAEPD since 1977 and is committed to protect and maintain the integrity and quality of the State's waters. 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 7 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 (BMPs) 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 BMPs. 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 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 BMPs 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 BMPs 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 BMPs by logging operations.

In 2017, 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 232 sites evaluated totaling 33,578 acres. GFC has started tracking the percent of stream length and forest road length in compliance. In 2017, 96.12% of miles of stream length were in compliance, and 95.96% of miles of forest road length were in compliance. Out of the 6,044 applicable, individual BMPs evaluated, 93.17% were implemented correctly. This is an improvement of 2.04 percentage points from 2015. Out of the 63.73 miles of streams evaluated, 96.12% were found to have no impacts or impairments from forestry practices.

During the State FY17, the Georgia Forestry Commission provided 96 BMP talks to approximately 3,022 individuals. In addition, the GFC has addressed and resolved over 47 different harvest complaints, requiring 101 separate site visits, and has conducted more than 126 one-to-one conferences with silviculture workers and professionals on-site or in the field.

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 increases in imperviousness results in increased stormwater volumes and altered hydrology in urban areas.

Consistent with the multiple pollutant sources interacting with 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, which considers the impacts of all the land draining into a waterbody and incorporates integrated management techniques. This approach 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 that go beyond traditional regulation, providing the regulated community with greater flexibility and responsibility for determining management practices. 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 effective. The major urban/industrial region of the State is highly dependent upon the limited surface water resources found in the northern portion of the State. With limited storage capacity and limited ground water resources in this region, it is imperative that these limited water resources be used wisely and their quality be maintained. In South Georgia, groundwater resources must be managed carefully to prevent contamination and salt water intrusion from excess water withdrawals. A stable, reliable framework and clearinghouse for regional cooperation, information sharing, and technical assistance is needed to prepare local governments and citizens to meet these challenges. The Georgia Department of Community Affairs' Water Resources Technical Assistance Program will fulfill this need.

Georgia Department of Community Affairs (DCA) is a key partner and point of contact for urban nonpoint source pollution. Georgia DCA provides technical assistance on many different aspects of water quality management. As an information and networking center, the Program provides water resources tools, one-on-one technical assistance, and workshops to address regional water quality issues to local elected officials currently serving 159 counties and 532 cities. Funding from the 319 program supports these activities in the 24 counties within the coastal region, as well as all of the cities within. The Program will also provide tools to link land-use and water quality in land-use planning, promote smart growth principles, and provide public education materials and programs on protecting water resources.

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 published Volume 3: Pollution Prevention in 2012. The Georgia Stormwater Management Manual was updated in 2016. Also, in partnership with GAEPD, ARC, numerous local governments and other stakeholders, the Savannah Metropolitan Planning Commission and the Center for Watershed Protection developed a Coastal Stormwater Supplement to the Georgia Stormwater Management Manual, to specifically address coastal stormwater, in 2009.

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

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

While the State has statutory responsibilities for water resources, local governments have the constitutional authority for the management of land activities. Therefore, forging cooperative partnerships between the State, local and regional governments, business and industry, and the public is necessary. Additionally, 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 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, three state coordinators and part time staff 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, approximately 11,000 Georgia teachers have been certified as Project WET educators, and approximately 1,100 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 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) 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 is invited to send one of its employees/members to attend the next scheduled Project WET Facilitator workshop 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. This supplement 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, approximately 2,600 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 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.

The Georgia River of Words is part of a larger, international River of Words poetry and art contest, part of St. Mary's University Center for Environmental Literacy in affiliation with The Library of Congress Center for the Book.

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. Georgia EPD receives an average of 1,685 River of Words entries each year. In addition to the students that are recognized nationally, Georgia Project WET conducts a State judging each year in which approximately 50 students are honored as State winners.

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

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

Georgia Adopt-A-Stream Program

The Georgia Adopt-A-Stream Program is a citizen monitoring and stream protection program that focuses on what individuals and communities can do to mitigate nonpoint sources of pollution. The Program consists of two staff positions in the Georgia EPD and over 70 local community and watershed Adopt-A-Stream coordinators. The community and watershed coordinators are a network of college, watershed, or local based training centers located throughout Georgia. The network of local programs provides training workshops and educational presentations that allow the Georgia Adopt-A-Stream Program to be accessible to all areas of the State. In cooperation with the

Georgia State Coordinators, the programs ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control.

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

Providing technical assistance and supporting water quality data collection is a key Adopt-a-Stream goal. Since 1995, Adopt-a-Stream held 327 Trainer Workshops, resulting in 866 Trainers Certifications. In that same timeframe, Adopt-a-Stream help 3,409 QA/QC workshops, resulting in 33,170 QA/QC certifications.

Currently, more than 3,000 volunteers participate in 270 community sponsored Adopt-A-Stream Programs. Volunteers conduct clean ups, stabilize streambanks, monitor waterbodies using physical, chemical and biological methods, and evaluate habitats and watersheds at over 720 sites throughout the State. These activities lead to a greater awareness of water quality and nonpoint source pollution, active cooperation between the public and local governments in protecting water resources, and the collection of basic water quality data.

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

The Georgia Adopt-A-Stream Program provides volunteers with additional resources such as the *Getting to Know Your Watershed, Visual Stream Survey*, *Macroinvertebrate and Chemical Stream Monitoring*, *Bacterial Monitoring, Adopt-A-Wetland*, *Adopt-A-Lake*, Amphibian Monitoring and *Adopt-A-Stream Educator's Guide* manuals, PowerPoint presentations, and promotional and instructional training videos. Every quarter, a newsletter is published and distributed to 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.

Starting in 2010, Georgia Adopt-A-Stream brought back their annual conference, called Confluence. The Conference, held each year in the spring, has grown from an initial registration of 150 participants to average over 200 participants annually. The conference provides volunteers with an opportunity to further their knowledge of water related issues, choosing from multiple concurrent tracks including topics such as: visual monitoring, invasive species, program development and social media; advance macroinvertebrate monitoring; and green infrastructure and stream stabilization workshops. In addition to the education opportunities, the conference provides a venue for recognizing the outstanding achievements of our volunteers and local trainers through our awards ceremony.

The Adopt-A-Stream website supports a database to house all volunteer monitoring water quality data and programmatic information. It is a database drive website, with real time stats and graphs automatically generated by the information volunteers submit. Several formats are used to display monitoring data, including charts, graphs and basic GIS using a maps page that displays terrain, topographical and photographic layers. Data sharing developments like this website improve volunteer monitors' capacity to learn about and protect local water bodies. Presently, there are over 270 groups actively monitoring over 720 sites.

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

Rivers Alive Program

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 2017 waterway cleanup, 26,000 volunteers cleaned over 1,600 miles of waterways and removed over 423,000 pounds of trash and garbage including vehicles, boats, refrigerators, tires, plastic bottles and thousands of lost balls. Rivers Alive receives key support in the form of corporate sponsorship for the purchase of t-shirts and other materials to support local organizers. The cleanup events also share educational watershed posters and bookmarks, and public service announcements to advertise in local newspapers and on the radio.

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

Rivers Alive maintains an online database for registering cleanups and submitting cleanup data. All cleanups are listed on an interactive maps page that shares individual organizer information. The cleanup results are displayed on maps and in graphs for each group to view and share. Additional information about Rivers Alive is available on the website: https://riversalive.georgia.gov/.

Emergency Response Network

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

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

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

Environmental Radiation

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

The GAEPD 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.

CHAPTER 8

Ground and Surface Water Withdrawals, Availability and 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 Georgia Environmental Protection Division (EPD) 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 EPD. 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 EPD 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 EPD.

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, after USEPA approval in September of 1997.This document was EPD’s submission to the USEPA as a "core" CSGWPP.

Groundwater is extremely important to the life, health, and economy of Georgia. For example, in 2017, groundwater supplied some 2,200 of Georgia’s over 2,400 public water systems (which is about 60% of the municipal withdrawal permits totaling 419 million gallons per day annual average day (MGD-AAD). About two-thirds of industrial and commercial permits are for groundwater use, comprising some 415 MGD-AAD. About 12,504 of the over 24,978 agricultural water withdrawal permits in Georgia are groundwater permits. In the rural parts of the state, virtually all individual homes not served by public water systems use wells as their 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. Currently, the vast majority of Georgia's population is not at risk from ground water pollution of drinking water. Data on the sources of groundwater contamination are provided in Table 8-1.

The EPD’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 of land-use planning by local governments, (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, to ensure that the resource is

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

sustainably used and continues to be productively 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 ultimately recharged by precipitation, and use of groundwater may 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.

Groundwater Monitoring Network 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 EPD monitors ambient groundwater quality through the Georgia Groundwater Monitoring Network. From 1984 through January 2004, this network regularly sampled wells and springs, tapping important aquifers throughout the State. From February 2004 through 2010, the network focused on various specialized situations: the Coastal area (102 wells), the Piedmont/Blue Ridge area (120 wells and springs), small public water systems (180 wells and springs, statewide), uranium in ground water (310 wells and springs), and arsenic in ground water in South Georgia (67 wells). In 2011, the network returned to the regular sampling of wells and springs drawing from important aquifers. Figure 8-2 shows locations of stations for the groundwater monitoring network during calendar years 2016 through 2017.

One of the purposes of the network is to allow the EPD to identify groundwater quality trends before they become problems. To date, most potential water quality issues that have been illuminated through monitoring efforts are either natural in origin (e.g. arsenic and uranium), or limited to one well, such as the VOC contamination issues found within a well located in Atlanta. The 2016 ambient monitoring program found 23 wells with iron, manganese, or aluminum exceedances. In addition, the program uncovered one well with VOC contamination, potentially due to a neighboring underground petroleum storage tank. Another well, with nitrogen in excess of the primary MCL, is located in the surficial layer, and is used only for non-potable activities such as gardening. The 2017 ambient monitoring program continued to monitor the VOC contaminated well on a quarterly basis. Lead was found in excess of the Primary MCL at two locations; it is suspected that rarely utilized plumbing fixtures at the sample point are the source. 43 wells were found to contain iron, manganese, or aluminum in excess of secondary MCLs. Well owners with exceedances were notified, and, if the well was a public supply well or a private drinking water source, follow-up sampling was performed upon request. Results of aquifer monitoring data for calendar years 2016 and 2017 are provided in Tables 8-3 through 8-5.

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 EPD 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.

TABLE 8-2
SUMMARY OF STATE GROUND WATER PROTECTION PROGRAMS

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

FIGURE 8-1
HYDROLOGIC PROVINCES OF GEORGIA

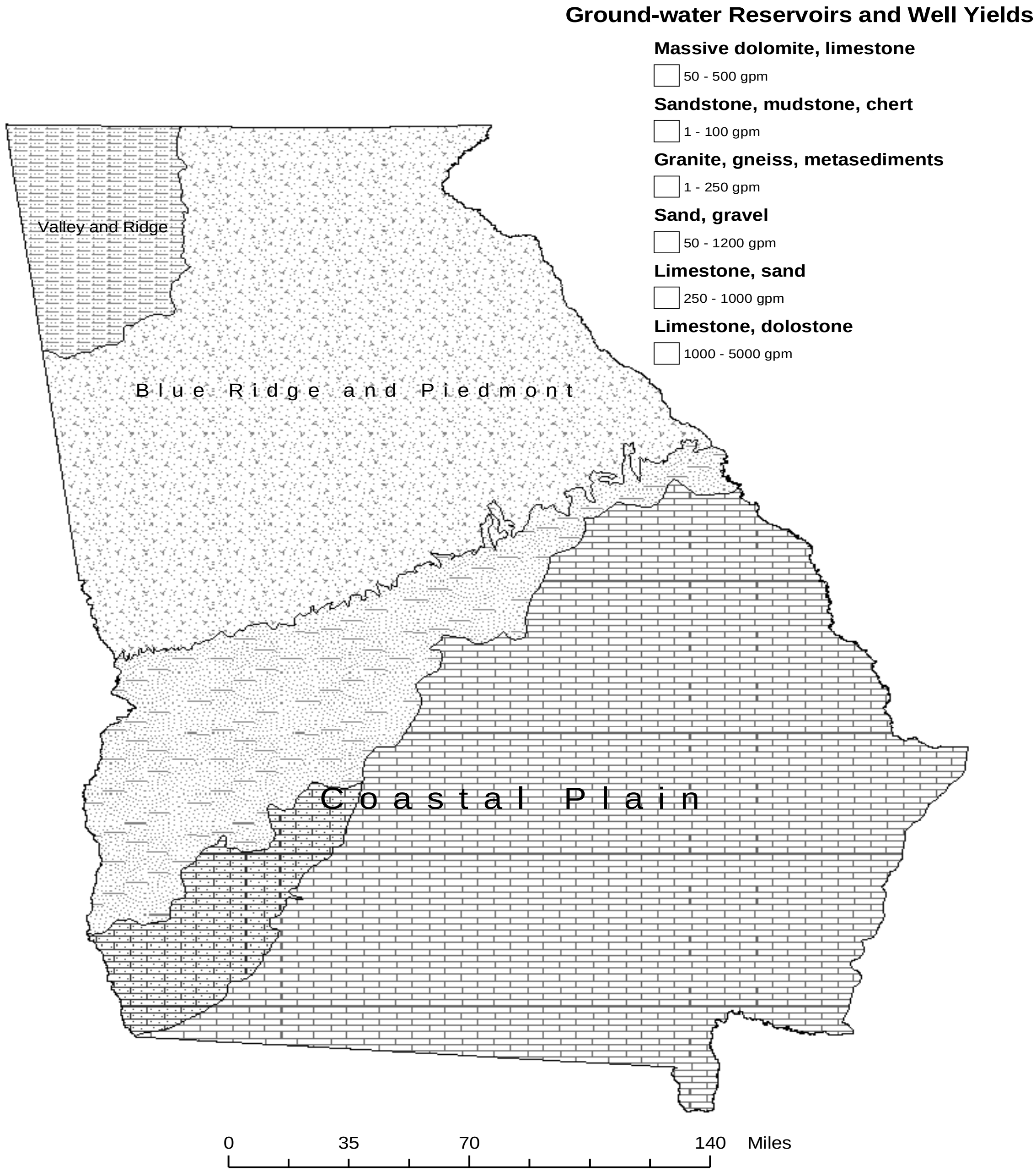


FIGURE 8-2

GROUNDWATER MONITORING NETWORK, 2016-2017

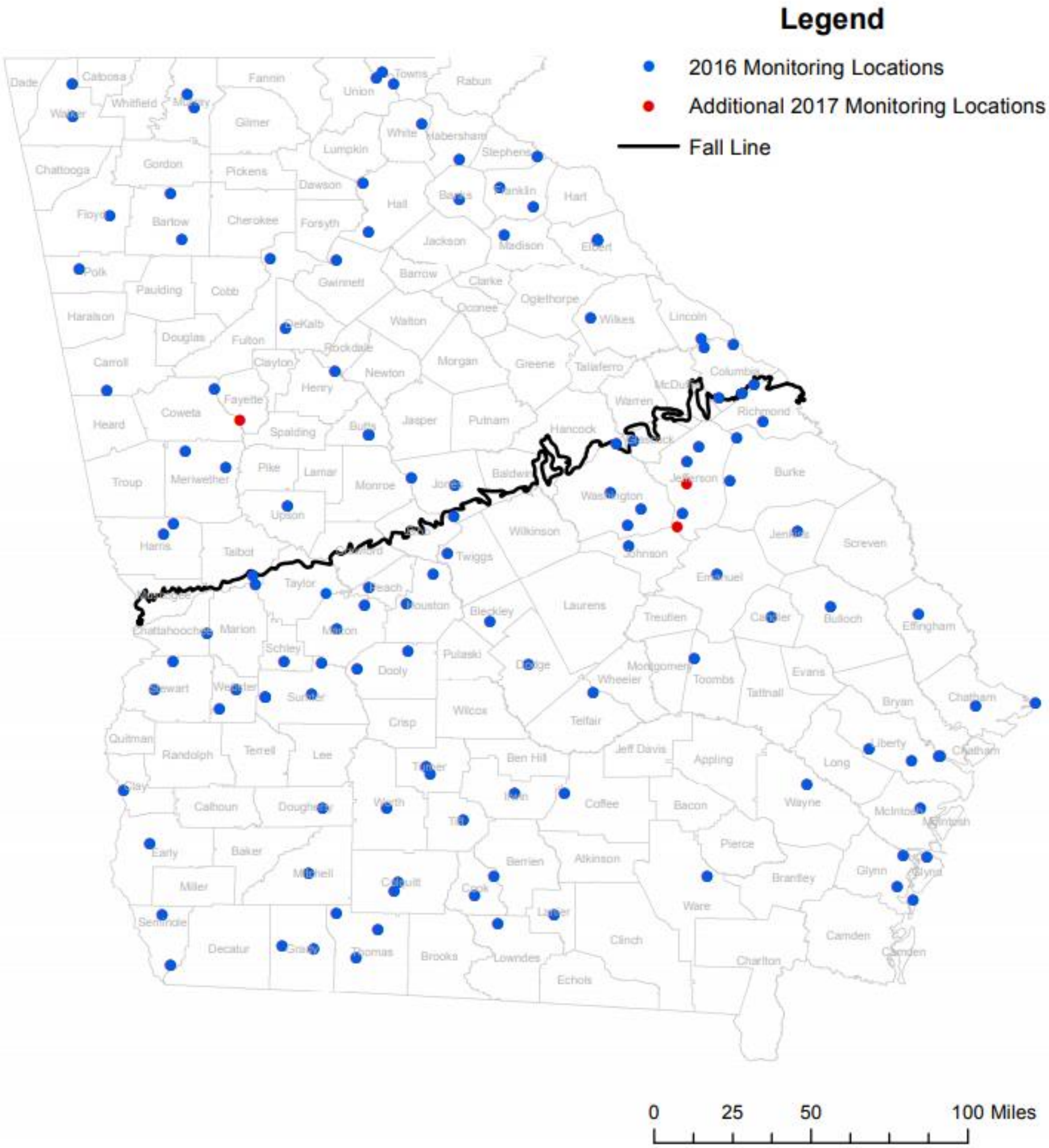


TABLE 8-3A

SUMMARY OF GROUND-WATER MONITORING RESULTS FOR CY 2016

125 Aquifer Monitoring Stations						
	Nitrate/ Nitrite	VOCs	Arsenic	Uranium	Copper or Lead	Fe, Mn, or Al
Detections	111	15	5	5	28	120
Exceedances	1	2	0	0	0	56

TABLE 8-3B

SUMMARY OF GROUND-WATER MONITORING RESULTS FOR CY 2017

126 Aquifer Monitoring Stations						
	Nitrate/ Nitrite	VOCs	Arsenic	Uranium	Copper or Lead	Fe, Mn, or Al
Detections	109	13	4	8	31	131
Exceedances	1	1	0	1	0	61

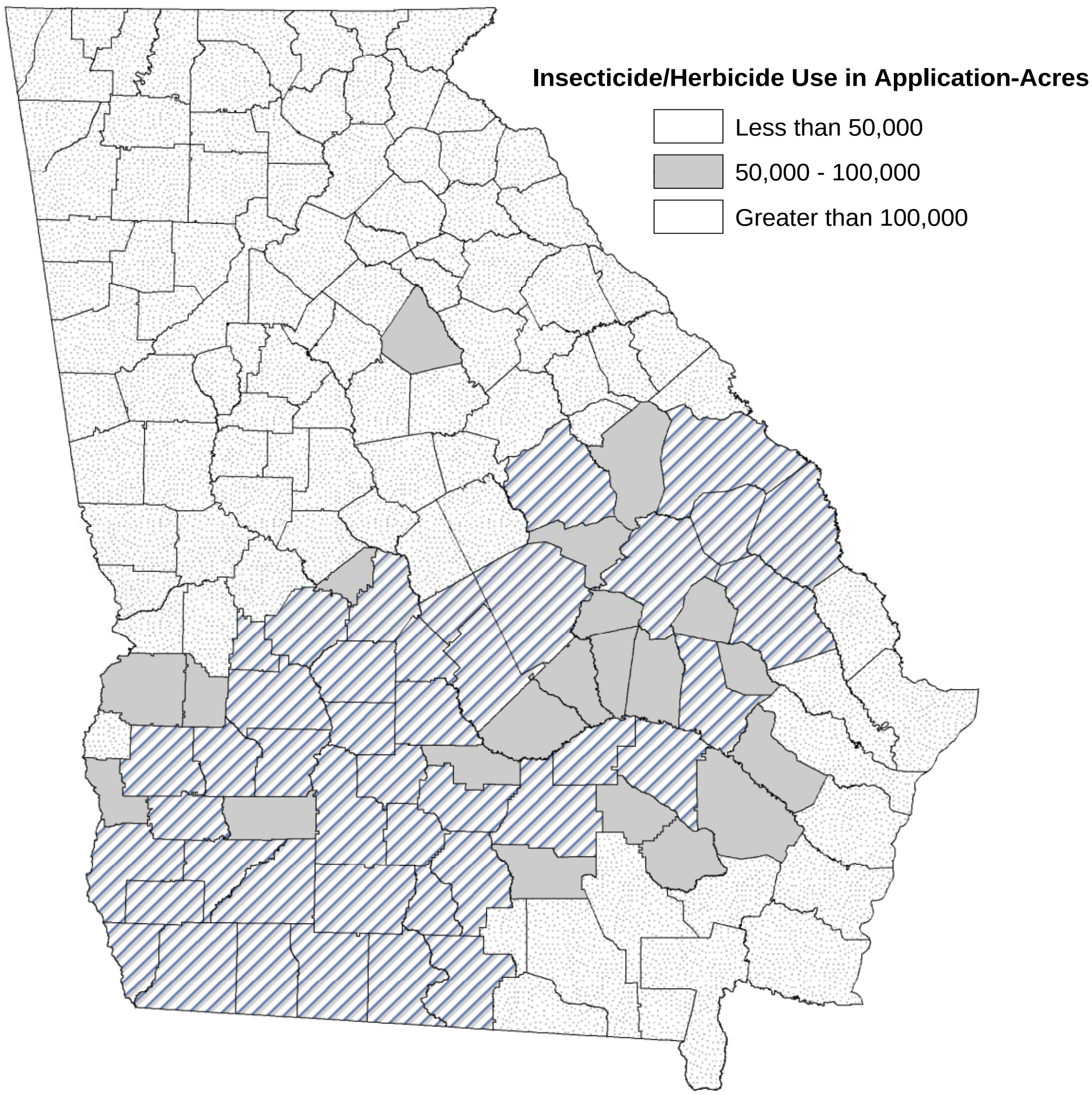
TABLE 8-4
GROUND-WATER MONITORING DATA FOR CY 2016

Aquifer	Number of Stations	Number of Samples	Number of Samples Showing:					
			Nitrate/Nitrite Detection// Exceedance	VOCs Detection// Exceedance	Arsenic Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Cretaceous/ Providence	22	22	13 // 0	0 // 0	0 // 0	0// 0	5 // 0	15// 7
Clayton	3	3	3 // 0	0 // 0	0 // 0	0 // 0	3 // 0	3 // 2
Claiborne	3	3	1 // 0	0 // 0	0 // 0	0 // 0	0 // 0	2 // 2
Jacksonian	8	8	4 // 0	1 // 0	0 // 0	0 // 0	0 // 0	5 // 1
Floridan	35	65	22 // 0	7 // 0	5 // 0	0 // 0	4 // 0	29 // 9
Miocene	7	7	3 // 1	0 // 0	0 // 0	0 // 0	2 // 0	6 // 4
Piedmont/ Blue Ridge	40	74	55 // 0	6 // 2	0 // 0	5 // 0	14 // 0	55 // 30
Valley and Ridge	7	10	10 // 0	1 // 0	0 // 0	0 // 0	0 // 0	5 // 1

TABLE 8-5
GROUND-WATER MONITORING DATA FOR CY 2017

Aquifer	Number of Stations	Number of Samples	Number of Samples Showing:					
			Nitrate/Nitrite Detection// Exceedance	VOCs Detection// Exceedance	Arsenic Detection// Exceedance	Uranium Detection// Exceedance	Copper or Lead Detection// Exceedance	Fe, Mn, or Al Detection// Exceedance
Cretaceous/ Providence	21	21	11 // 0	0 // 0	0 // 0	0 // 0	6// 0	15 // 8
Clayton	3	3	3 // 0	1 // 0	0 // 0	0 // 0	3 // 0	3 // 2
Claiborne	3	3	1 // 0	0 // 0	0 // 0	0 // 0	0 // 0	2 // 2
Jacksonian	10	10	7 // 0	1 // 0	0 // 0	0 // 0	1 // 0	5 // 2
Floridan	35	65	21 // 0	2 // 0	4 // 0	0 // 0	5 // 0	33 // 9
Miocene	7	7	2 // 1	1 // 0	0 // 0	0 // 0	3 // 0	5 // 4
Piedmont/ Blue Ridge	41	75	55 // 0	7 // 1	0 // 0	8 // 1	12 // 0	65 // 33
Valley and Ridge	6	9	9 // 0	1 // 0	0 // 0	0 // 0	1 // 0	3 // 1

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.

Salt Water Intrusion 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. Use of groundwater in the 24 counties of the Georgia coast has enabled some groundwater containing high levels of dissolved solids to enter freshwater aquifers either vertically or laterally. Salt-water intrusion into the Floridan Aquifer threatens groundwater supplies in Hilton Head, South Carolina and Savannah, Georgia and Brunswick, Georgia. Salt-water intrusion rates, however, are quite slow, with salt-contaminated water at the north end of Hilton Head, South Carolina projected to take more than a hundred years to reach Savannah. On April 23, 1997, the EPD 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 2006 "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 2006 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.

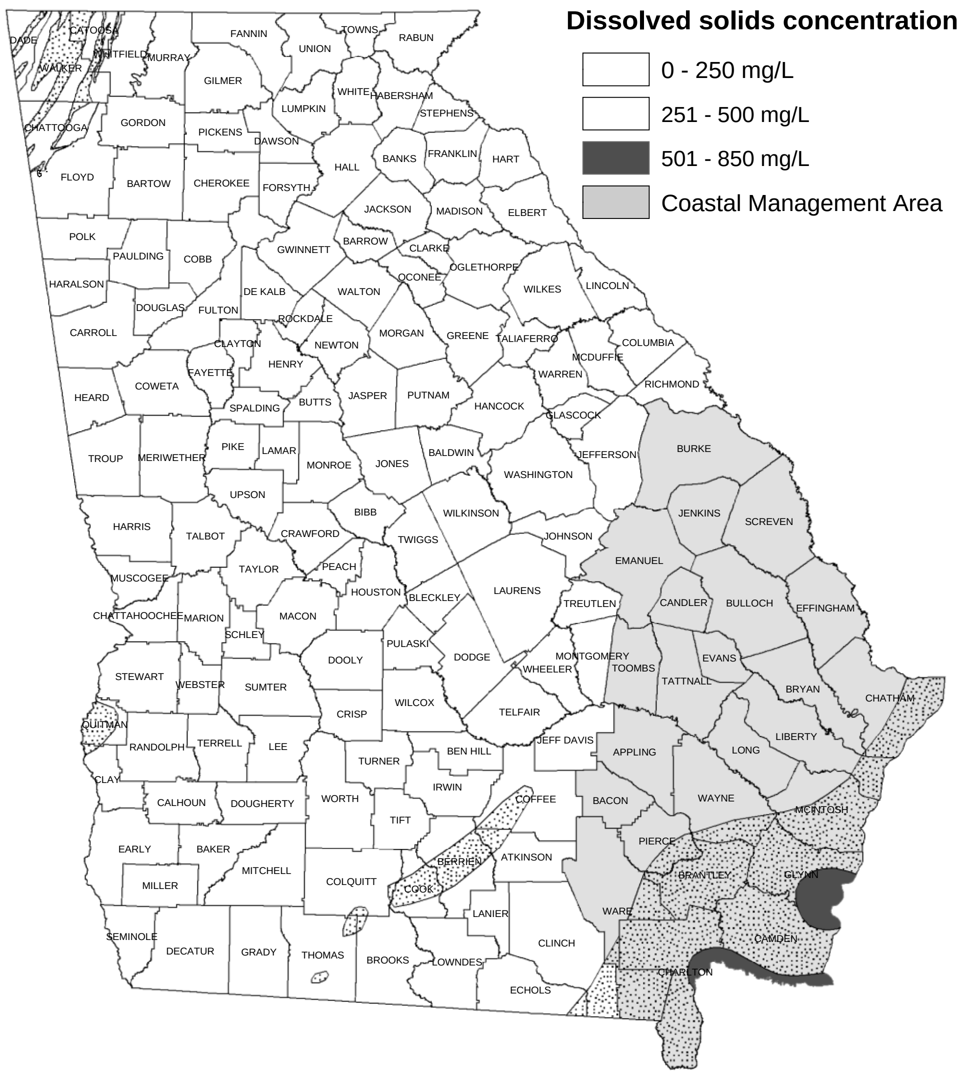
The primary focus of the final Plan recognizes the intrusion of saltwater into the Upper Floridan aquifer at Hilton Head Island, South Carolina. The plan recognizes that actions taken to slow down the intrusion of additional salt water into the aquifer will not result in the halting of the migration of the salt water that has already entered the aquifer. As of 2017 work continues to be conducted to characterize the extent of salt water intrusion in the Florida aquifer, as well as study potential mechanisms for slowing its movement inland. Modeling work has indicated that the EPD requested reduction in withdrawals from the aquifer will effectively reduce the hydraulic gradient and rate of movement of the salt water plume.

This 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 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.

FIGURE 8-4

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

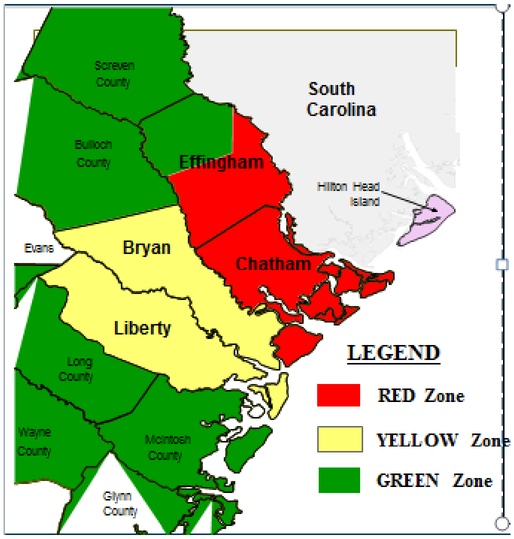


In May 2013 EPD's Director issued a prohibition of new or increased permitted withdrawals from the Floridan aquifer in four coastal Georgia counties (shown on the map above as red and yellow zones). EPD determined the interconnectivity between the upper and lower Floridan permeable zones influence the saltwater intrusion into the upper Floridan permeable zone. Applicants for new water withdrawals may use alternate aquifers such as the Miocene or Cretaceous aquifers or may use surface water. In 2017 a large percentage of Floridan aquifer wells with existing withdrawal permits in the red and yellow zones have been issued new permits. The new permits have reduced limits that become effective in 2020 and 2025.

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 Statewide Water Management Plan that was adopted by the General Assembly in January 2008.

The initial round of regional water planning under 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 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 EPD sampling in Burke County aquifers. While the greatest amount of tritium thus far measured is only 15 percent of the US EPA MCL for tritium, the wells in which it has been found lie across the Savannah River from the Savannah River was 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 EPD'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 evapotranspiration of triturated water. The water vapor is condensed to form triturated precipitation over Georgia and reaches the shallow aquifers through normal infiltration and recharge.

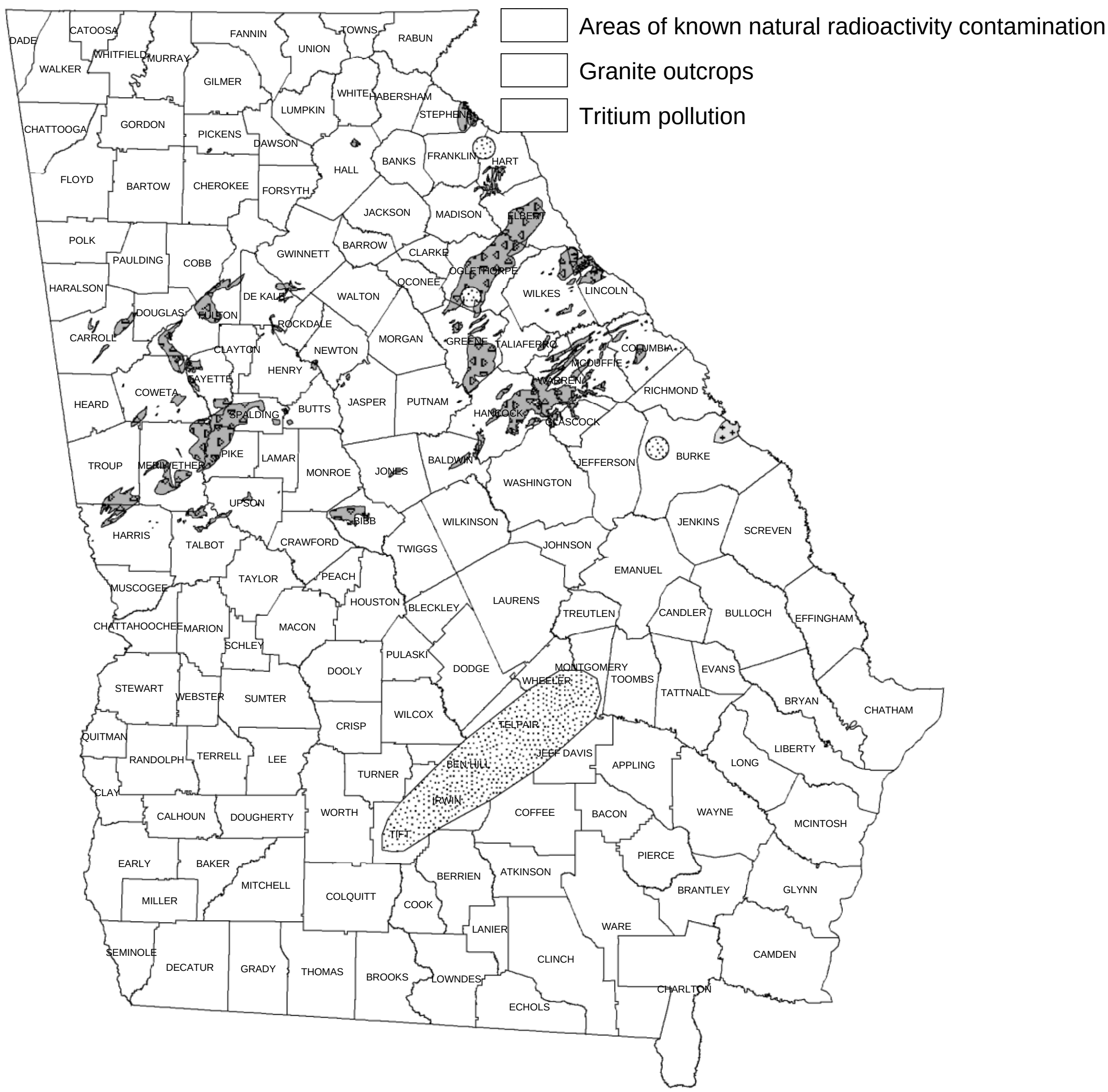
Man-made pollution of groundwater can come from a number of sources, such as business and industry, agriculture, and homes (e.g., septic systems). Widespread annual testing of public water supply wells for volatile organic chemicals (VOCs, e.g. solvents and hydrocarbons) is performed by the EPD. Only 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.

Groundwater Under the Direct Influence of Surface Water Groundwater Under the Direct Influence of Surface Water (GWUDI) is defined as water beneath the surface of the ground with: 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. The EPD evaluates public groundwater sources (wells and springs) to determine if they are likely to have direct surface water influence.

Several factors are considered for risk of GWUDI, including location, historical sampling data, microbiological quality, chemical quality, physical parameters, well/spring construction, hydrogeology,

FIGURE 8-5

AREAS SUSCEPTIBLE TO NATURAL AND HUMAN INDUCED RADIATION



geology, and aquifer type. Sources with the greatest risk are those in karst areas (where water-soluble limestone is perforated by channels, caves, sinkholes, and underground caverns); springs without filtration; old wells with broken sanitary seals, cracked concrete pads, or faulty well casings; and wells not grouted into the unweathered rock formation. In Georgia, the northwest and portions of the southwest and south central parts of the state contain areas of karst topography.

The EPD requires water systems considered to be at risk of GWUDI to make arrangements with a private contractor to complete Microscopic Particulate Analysis (MPA). MPA is a method of sampling and testing for significant indicators of GWUDI. In cases where the water system has a contract with the EPD Laboratory for water analysis, the EPD performs the analysis of the MPA sample. If sample analysis indicates GWUDI, Division district office personnel work with the affected water systems and provide technical assistance in identifying and correcting the deficiencies contributing to the contamination.

Protecting Groundwater 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 cleanup leaking underground storage tanks. As of December 22, 2017, there are a total of 29,116 underground storage tanks (USTs) at a total of 9,705 UST facilities. Additional information on the UST management program can be found at the following site https://epd.gov/publications.

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. As of July 1, 2017, there are 528 sites listed on the Georgia Hazardous Site Inventory (HSI). 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. Additional information on the HSI is available at the following GAEPD website https://epd.georgia.gov/hazardous-siteinventory

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 EPD 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 EPD standards for groundwater monitoring. Information on permitted solid waste facilities can be found at the following site https://epd.georgia.gov/permitted-solid-waste-facilities.

The EPD 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 EPD program. The EPD 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 EPD has an active Underground Injection Control Program. As of September 30, 2017, the program has issued 703 UIC permits covering 15,347 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, 2017, Georgia had 222 active licensed water well contractors 38 bonded drillers and 63 certified pump installers and that are required to follow strict well construction and repair standards. The EPD 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 EPD 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 EPD 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 EPD 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 EPD has identified the most significant recharge areas for the main aquifer systems in the State (Figure 8-6). The EPD 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 EPD 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 EPD 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.

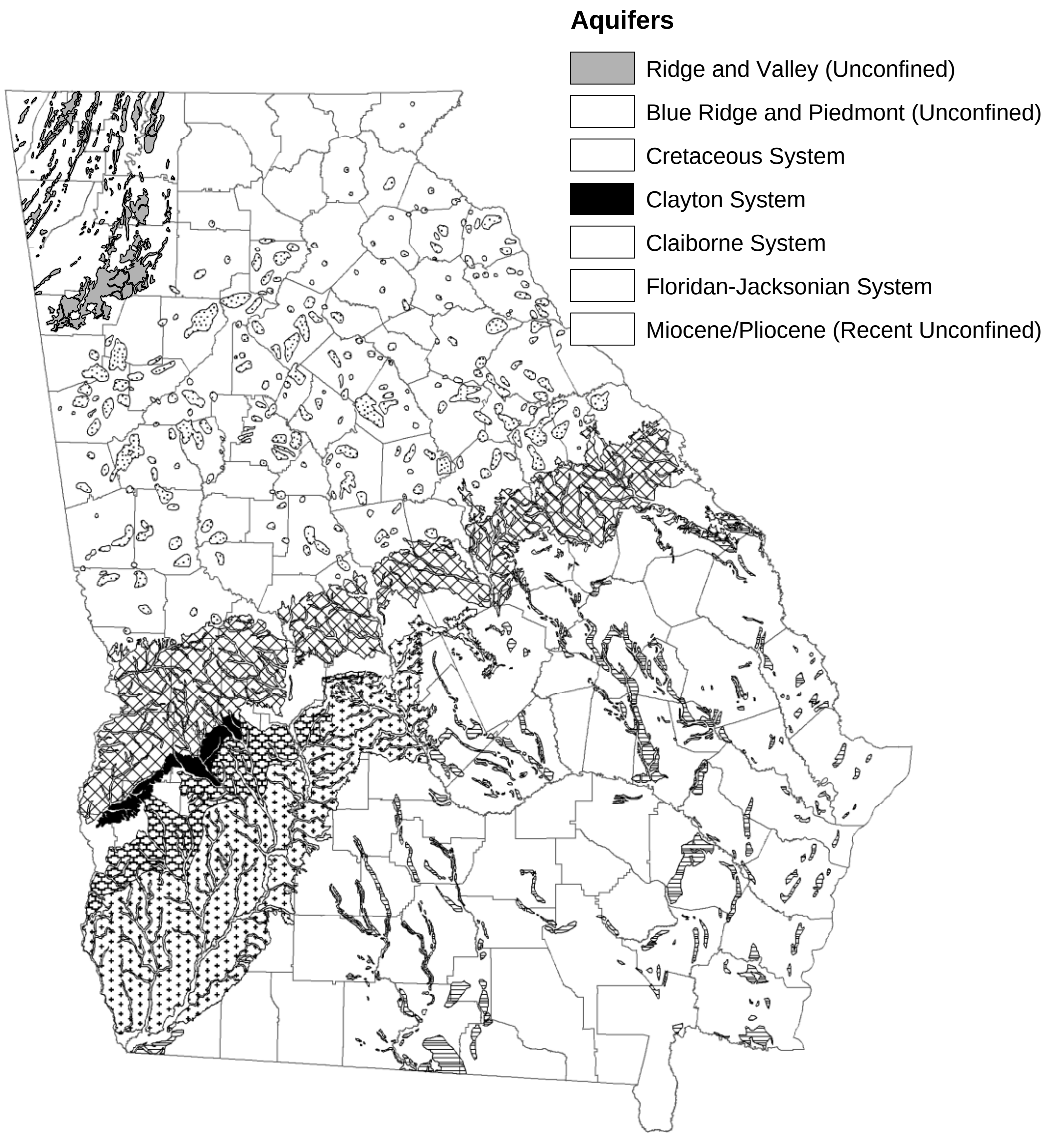
Some areas, where recharge to individual wells using the surficial or unconfined aquifers is taking place, are also significant recharge areas. To protect such wells, the EPD implemented a Wellhead Protection Program for municipal drinking water wells in 1993. Wells in confined aquifers have a small 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 1724 active municipal ground water wells with Wellhead Protection Plans. The ten-year update schedule for Wellhead Protection Plants continues to date. The WHP Plan update includes the addition of pertinent well information and an update of potential pollution sources. In addition, the EPD 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

FIGURE 8-6

GENERALIZED MAP OF SIGNIFICANT GROUNDWATER RECHARGE AREAS OF GEORGIA



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 EPD, has delegated authority for all federal environmental 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 2016 and 2017. The data presented were developed from the Georgia Groundwater Monitoring Network reports.

As previously mentioned there are some wells and springs that EPD 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 Supply 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 EPD prior to any such withdrawal. Through the beginning of 2018 EPD had 288 active municipal and industrial surface water withdrawal permits (193 municipal, 80 industrial and 15 golf courses), and approximately 24,978 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 EPD. 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. An EPD-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 EPD. 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. An EPD-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. An EPD-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.

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 EPD 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 EPD 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 2016-2017, no surface water supply system reported an outbreak of waterborne disease. Since the Federal and State Surface Water Treatment Regulations (SWTR) went into effect on June 29, 1993, approximately 140 surface water plants around the state have taken steps to optimize their treatment processes not only to meet the current SWTRs tougher disinfection and turbidity treatment technique requirements, but also to meet more stringent future drinking water regulations. The most recent regulations mandated by the U.S. Environmental Protection Agency 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 2016-2017, the majority (94%) of all drinking water violations involved failure to submit a sample, failure to report test results, or failure to provide an annual Consumer Confidence Report. These administrative violations do not mean there were any problems with the quality of the drinking water being served. Most violations were brief in duration and quickly resolved. Drinking water facilities' information can be reviewed on drinking water watch at: http://gadrinkingwater.net.

LT2 and Stage 2 Surface Water Treatment
Amendments to the SDWA in 1996 require EPA to develop rules to balance the risks between microbial pathogens and disinfection byproducts (DBPs). The Stage 1 Disinfectants and Disinfection Byproducts Rule and Interim Enhanced Surface Water Treatment Rule, promulgated in December 1998, were the first phase in a rulemaking strategy required by Congress as part of the 1996 Amendments to the Safe Drinking Water Act.

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

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

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

Current regulations require filtered water systems to reduce source water

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

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

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

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

Public Water System Supervision Program
This program is designed to ensure that Georgia residents, served by public water systems, are provided high quality and safe drinking water. Its legal basis is the Georgia Safe Drinking Water Act and Rules. For the reporting period ending June 30, 2017, the State of Georgia had approximately 2,458 active public water systems serving a population over 10.6 million people. Based on the latest census figures, this means 87% of the citizens get their drinking water from one of the regulated public water systems in the State. The rest obtain water from their privately owned water sources.

Approximately 75% provide water to residential customers. These systems are referred to as community water systems and serve at least 15 service connections used by year-round residents or regularly serve at least 25 year-round residents daily. Approximately one-eighth of the community water systems are from surface water supplies (248 out of the total 1,793 community water systems); the remaining 86% (1545CWSs) are served by groundwater sources.

In addition, there are 183 non-transient non-community water systems that regularly serve at least 25 of the same persons over 6 months per year. Examples of these systems are hospitals, day care centers, major shopping centers, children's homes, institutions, factories, office and industrial parks, schools, and so forth.

Furthermore, there are 465 transient non-community water systems that do not regularly serve at least 25 of the same persons over six months per year, such as restaurants, highway rest areas, campgrounds, roadside stops, and hotels. With a few exceptions, practically all of the non-transient non-community water systems and the transient non-community water systems use groundwater sources for their drinking water needs. All public water systems are issued a Permit to Operate a Public Water System, in accordance with the Georgia Safe Drinking Water Act and Rules.

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

The program is funded from State and Federal appropriations and grants respectively on a year-to-year basis and a Drinking Water Laboratory and Related Services Fee (DWLRSF), which has been in effect since July 1992. The DWLRSF 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 EPD for this testing are billed annually based on the system population. Participation in the DWLRSF is voluntary to the extent that a system may elect to use a public or certified commercial laboratory to analyze their required samples. The DWLRSF was expanded in July 2009 to incorporate bacteriological testing, for an additional fee, and updated in 2016 to a Terms and Conditions Agreement.

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 2017, no public water systems had a treatment technique violation for failure to take the required actions for exceeding the action level for lead (i.e., over 10% of samples exceeded 15 ppb lead) and/or copper (i.e., over 10% of samples exceed 1,300 ppb copper).

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). In 2017 there were no systems that had results over the MCL for individual volatile organic contaminants.

A majority of Georgia's water systems, which are currently contracted with the State (participating in DWLRSF) 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, EPD conducts vulnerability studies for all public water sources. The studies are conducted to assist EPD 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 EPD has issued statewide monitoring waivers for asbestos, cyanide, dioxin and most synthetic organic compounds. EPD, 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, EPD 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, 2017, the EPD 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. The EPD completed initial surface water source water assessments (SWAPs) in 2003. Initial groundwater SWAPs were completed for community and non-transient non-community systems in 2005 and for transient non-community systems in 2006. SWAPs for privately-owned groundwater systems are updated every 10 years. During the current reporting period, for the calendar years of 2016 and 2017, the following numbers of SWAPs were completed for each type of privately-owned groundwater system: 260 community, 38 non-transient non-community, and 120 transient non-community.

CHAPTER 9

Major Issues and Challenges

Comprehensive State and Regional Water Planning

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

In 2004 the Georgia General Assembly passed the "Comprehensive State-wide Water Management Planning Act", O.C.G.A. § 12-5-522, which called for the development of a statewide water management plan. Work was completed on the Statewide Water Plan and the plan was approved by the General Assembly and Governor Perdue in February 2008. Regional Water Councils and the Metro District were charged with the responsibility of developing water plans to provide a roadmap for sustainable use of Georgia's water resources. The Councils submitted initial recommended plans to the GAEPD in May 2011. The plans were publicly noticed and comments received were thoroughly reviewed. Appropriate revisions were made to the initial plans and final recommended regional water plans were submitted to the GAEPD in September 2011. On November 15, 2011, by action of Director Barnes, the GAEPD officially adopted all ten Regional Water Plans.

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

Nonpoint Source Pollution

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

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

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

Toxic Substances

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

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

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

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

Nutrients

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

Additionally, GAEPD, US EPA, and SC DHEC collaborated on a report intended to provide technical support in developing and establishing numeric water quality criteria under the Clean Water Act to support the applicable designated uses in Georgia and South Carolina estuaries from the effects of excess nitrogen and phosphorus. The report entitled "*An Approach to Develop Numeric Nutrient Criteria for Georgia and South Carolina Estuaries*" was finalized in 2015. Estuaries along Georgia and South Carolina's coasts exhibit unique combinations of characteristics and a great deal of diversity among systems so the development of a specifically-designed approach was necessary for these important areas.

The GAEPD has forged a partnership with EPA, UGA, and Tetra Tech to develop and calibrate two water quality models (EFDC and FVCOM) to will be used to help derive numeric nutrient criteria and possibly dissolved oxygen criteria for Georgia's estuaries. In 2017, several intensive surveys were conducted throughout the Altamaha, Sapelo and Doboy estuaries. Data collected including continuous dissolved oxygen, temperature, and conductivity measurements; monthly water sampling for nutrients and chlorophyll *a;* quarterly SOD measurements; and quarterly dissolved organic carbon measurements. This data will be utilized to characterize marsh loadings, an important contributor to Georgia's estuaries, and in the calibration of the models. After calibration and validation, FVCOM can be used to quantify the effects of changes in land use and various climate scenarios on water quality. UGA's validated FVCOM model can then be utilized in conjunction with Tetra Tech's EFDC model of the Altamaha Sound to help develop dissolved oxygen and numeric nutrient criteria for this estuary system.

Public Involvement

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

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

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

APPENDIX A

WATERS ASSESSED FOR COMPLIANCE WITH DESIGNATED USES

The attached tables present Georgia's 2018 Integrated 305(b)/303(d) List of Waters. EPD issued a public notice on February 20, 2017 soliciting data from any outside sources to be included in the assessment of water quality data for the 2018 305(b)/303(d) List. All available data, including that which was collected by the Department of Natural Resources, were considered and determinations were made for compliance with designated uses. Information as to the specific data sources and an explanation for the various codes used with the 2018 listing assessment are included in the "Data Source Code/Key for Abbreviations" Table that follows this narrative.

Collected data and information were compared against applicable water quality standards to make listing assessment decisions. Assessed waters were placed into one or more of the five categories as described below:

Category 1 – Data indicate that waters are meeting their designated use(s).

Category 2 – A water body has more than one designated use and data indicate that at least one designated use is being met, but there is insufficient evidence to determine that all uses are being met.

Category 3 – There were insufficient data or other information to make a determination as to whether or not the designated use(s) is being met.

Category 4a – Data indicate that at least one designated use is not being met, but TMDL(s) have been completed for the parameter(s) that are causing a water not to meet its use(s).

Category 4b - Data indicate that at least one designated use is not being met, but there are actions in place (other than a TMDL) that are predicted to lead to compliance with water quality standards.

Category 4c - Data indicate that at least one designated use is not being met, but a pollutant does not cause the impairment.

Category 5 - Data indicate that at least one designated use is not being met and TMDL(s) need to be completed for one or more pollutants.

Category 5R – Data indicate that at least one designated use is not being met; however, TMDL development is deferred while an alternative restoration plan is pursued. If the alternative restoration plan is not successful, then the water will be placed back in Category 5 and a TMDL will be developed.

In the 5-part categorization method, waters that are assessed as "not supporting" their uses were either placed in Category 4a, 4b, 4c, 5 or 5R. The federally mandated 303(d) list is made up of those waters in Category 5 (including Category 5R). Waters that are assessed as "supporting" their uses were placed in Category 1. Waters for which there were insufficient data to make a use assessment were placed in Category 2 or 3.

Georgia's Integrated List of Waters is organized by water type (streams, lakes, coastal streams, sounds/harbors, and coastal beaches). Each water type is organized by river basin. Water bodies within a river basin are alphabetized. Information provided in the List of Waters includes a description of the water's location, data source, designated water use classification, use assessment, criterion violated, potential cause, estimates of extent affected and the assessment category (1-5). For waters within category 5, an entry in the priority column indicates the year by which a TMDL will be drafted for the pollutant of concern. A "Notes" column has been included to provide additional information for some water bodies such listing any TMDLs have been completed. Finally, each listed water has a unique Reach ID assigned to it. The Reach ID is a thirteen digit code made up of the letters "GAR" followed by the Hydrologic Unit Code (HUC 10) in which the waterbody falls followed by two sequential digits (i.e. 01, 02, 03).

In providing the information for the evaluated causes as listed in the tables on the following pages, many potential sources which may have caused the violation of the indicated criterion were considered. These sources are identified as the most likely candidates for affecting a particular stream segment. One potential source may be largely responsible for the criterion violated or the impact may be the result of a combination of sources.

Georgia contains a vast number of waterbodies. While EPD has assessed a large number of these waters, there are many waters (especially smaller creeks and lakes) that have not been assessed due to a lack of data. Waters that do not appear in the 305(b)/303(d) list of waters are to be considered to be in Category 3 (no data).

EPD developed a listing assessment methodology to use in the assessment of State waters. This methodology describes the different types of data that EPD evaluates and explains how the evaluation of the data results in water being placed in one or more of the 5 categories described above.

Georgia's 2018 305(b)/303(d) Listing Assessment Methodology

The outline below provides the listing assessment methodology used for the solicitation, review, consideration, and assessment of data for Georgia's 2018 305(b)/303(d) List of Waters. Each biennial listing cycle, the listing assessment methodology is updated to include needed changes and to reflect the most current Listing Guidance provided by the USEPA. Each listing cycle brings new challenges in the review and assessment of data. The information that follows is intended as a guide. The methodology does not cover all possible scenarios, so best professional judgment is used along with the listing assessment methodology, as needed. A best professional judgment approach is also used where insufficient information or data were available to making listing decisions.

I. Data Solicitation

On February 20, 2017, a letter was sent by postal mail or electronic mail to the U.S. Environmental Protection Agency (USEPA), and individuals and/or organizations on the mailing list that is maintained by the Georgia Environmental Protection Division (EPD) for notifying interested parties regarding proposed changes to EPD's Rules. This letter stated that the EPD was gathering water quality data and information to be used in the development of Georgia's draft 2018 305(b)/303(d) List of Waters. Any comments, data, or other information were requested to be submitted to EPD by June 30, 2017. The letter included a link to a document on EPD's website that provides information as to the requirements for the submission and acceptance of water quality data for EPD's use in 305(b)/303(d) listing assessments. A copy of the notification letter was also included on EPD's 305(b)/303(d) webpage.

II. Data Acceptability Requirements

In accordance with 40 CFR Part 130.7(b)(4), EPD is to evaluate all existing and readily available water quality data when assessing waters for the 305(b)/303(d) list of waters. However, water quality data can vary in both quality and quantity. Data used for assessing waters can be placed into 3 Tiers based upon its quantity and quality.

Tier 1 data is high in both quality and quantity and is used for assessing whether a waterbody is meeting its designated uses or not. In regards to data quality, this data will have been collected and analyzed in accordance with the Quality Control/Quality Assurance requirements in the Georgia Environmental Protection Division's Quality Assurance Manual and Quality Assurance Project Plan. In the case of data collected by our sister agencies (Wildlife Resources Division, Coastal Resources Division, and USGS), the data will have been collected in accordance with their quality assurance/quality control guidelines. In the case of data collected by third parties, the data would have been collected in accordance with an EPD approved Sampling and Quality Assurance Plan (SQAP) as described in Chapter 391-3-6-.03(13) of *Georgia Rules and Regulations for Water Quality Control*. As for data quantity, Tier 1 data will meet or exceed the "preferred minimum data set" provided in Section VII below.

Tier 2 data is still of high quality (it meets the same quality standards as Tier 1 data), but does not meet the "preferred minimum data set." Tier 2 data are evaluated closely to determine whether the data quantity is sufficient to be used to assess the condition of the waterbody (i.e. determine if the designated use is being met or not) or if the waterbody needs to be placed in Category 3 (assessment pending) until additional data are collected. EPD needs to consider a number of factors when making this determination. These includes evaluating: how close the data set is to the preferred minimum set; the reason the data set did not meet the preferred minimum (i.e. did the stream dry up part of the year making sampling impossible some months); the seasonality of the data with regards to the parameter being assessed; the data values in relation to the water quality criteria for that parameter; and results of other data including historical data at the site.

Tier 3 data is data that does not meet data quality requirements described under Tier 1. This data is not used for 305(b)/303(d) listing purposes, but may be used for screening purposes to help EPD select sites for future sampling. Data that is collected by third parties that was not collected under an approved SQAP and who do not show that their data was collected and analyzed in such a manner that it would have received SQAP approval fall into Tier 3. In addition, when EPD, USGS or other agencies collect data and these data do not meet their respective quality guidelines, then these data are not used for listing purposes.

III. Data Assessment Period

All readily available data and information for the calendar years 2015-2017 were considered in development of Georgia's 2018 305(b)/303(d) List of Waters. For data collected in 2017, typically only data from January thru June are available for assessment. Currently, Georgia has around 2,500 waterbodies on its 305(b)/303(d) list of waters. It is not possible to obtain new data on all of these waters every two years. In cases where no new data has been collected between 2015 and 2017, EPD continues to use the older available data for the waterbodies to make their assessments. In addition, data from 2012 through 2014 are considered along with the 2015 through 2017 data, when assessing a waterbody, if the data set is continuous. For instance, if data were collected every year from 2012-2017, then the data from all these years are used in the assessment. On the other hand, if data was collected in 2012, but not again until 2016, then only the 2016 data are used in the assessment, since conditions may have changed in the intervening years. There are instances where EPD may choose not to use all years of consecutive data in the assessment of a waterbody. For example, where a local government or group has conducted specific water quality improvement efforts in the watershed of a waterbody and the data collected before and after the improvement projects provide a clear indication that the project has succeeded in improving water quality, EPD may choose only to use data collected after implementation of the water quality improvements. It is the responsibility of the local government or group to submit specific documentation to EPD including a description of the improvement project, its location, the date of implementation, along with the water quality data supporting the assertion that the project has been successful.

IV. Data Collection and Areas of Focus

Section 305b of the Clean Water Act requires States to assess the quality of their waters. To meet this goal, Georgia collects water quality data for a number of physical/chemical parameters such as dissolved oxygen, pH, temperature, bacteria, metals, pesticides, etc. Biological data is also collected at some sites (fish or macroinvertebrates) to assess the health of the aquatic community. Fish tissue data is collected at some sites to enable the State to detect concentrations of toxic chemicals in fish that may be harmful to consumers and guide appropriate future actions to protect public health and the environment. The goal of the State's monitoring program is to collect data that accurately represents the condition of the waterbody that can vary throughout the year. The State's monitoring program is designed to collect data in different seasons to capture the impact of seasonality on the data. In addition, water quality samples are collected in both wet and dry weather, with the exception that samples are not taken if conditions are dangerous to personnel or if there is no visible water flow in a stream to be sampled.

EPD used data collected from across the State to develop its 2018 305(b)/303(d) list of waters. EPD currently has monitoring staff located in four offices across the State (Atlanta, Cartersville, Brunswick and Tifton). By spreading its monitoring staff out in different regions of the State, EPD is better able to monitor waters throughout the State each year. In addition, EPD receives data from other GA DNR Divisions such as Georgia's Wildlife Resources Division and Georgia's Coastal Resources Division. EPD also accepts data from outside groups. This data may have been taken from anywhere in the State. Finally, EPD may conduct special projects and the data from these special projects can also be used for assessment purposes.

V. Data Rounding

When assessing State waters, EPD compares water quality data with their respective water quality criteria. Water quality data for a given parameter will be rounded to the same number of significant digits as the criterion for that parameter before the two are compared for the purpose of making listing determinations. Should it be necessary to perform mathematical operations with the data before comparison with the appropriate criterion (such as the calculation of an average of a number of data points), EPD will keep extra decimal places throughout the calculations and then round to the appropriate number of decimal places at the end. This practice prevents the propagation of rounding errors throughout the calculation.

VI. Assessment of Waters Using the 5-Part Categorization System

The USEPA has strongly encouraged States to move to a five-part categorization of their waters. EPD first adopted the five-part categorization system with the 2008 305(b)/303(d) report. Assessed waters are placed into one or more of five categories as described below:

Category 1 – Data indicate that waters are meeting their designated use(s).
Category 2 – A waterbody has more than one designated use and data indicate that at least one designated use is being met, but there is insufficient evidence to determine whether all uses are being met.
Category 3 – There is insufficient data/information to make a determination as to whether or not the designated use(s) is being met.
Category 4a – Data indicate that at least one designated use is not being met, but a TMDL(s) has been completed for the parameter(s) that is causing a waterbody not to meet its use(s).
Category 4b - Data indicate that at least one designated use is not being met, but there are actions in place (other than a TMDL) that are predicted to lead to compliance with water quality standards.
Category 4c - Data indicate that at least one designated use is not being met, but the impairment is not caused by a pollutant.
Category 5 - Data indicate that at least one designated use is not being met and TMDL(s) need to be completed for one or more pollutants.
Category 5R (Category 5 Alt) - Data indicate that at least one designated use is not being met; however, TMDL development is deferred while an alternative restoration plan is pursued. If the alternative restoration plan is not successful, then the water will be placed back in Category 5 and a TMDL will be developed.

A waterbody will be assessed as supporting its designated use (Category 1); not supporting its use (Category 4 or 5); or use assessment pending (Category 2 or 3). It is possible for a waterbody to be in category 4 and 5 at the same time if it is impaired by more than one pollutant. For instance, if a waterbody were impaired for fecal coliform bacteria and dissolved oxygen and a TMDL had been completed only for dissolved oxygen, then the waterbody will be placed in category 4a for dissolved oxygen and category 5 for fecal coliform bacteria.

VII. Assessment Methodology for Making Use Support Decisions (Listing/Delisting Strategies)

The following provides an outline of the assessment methodology employed during the 2018 Listing Cycle. The conditions under the header "listing" describe what data are needed to place a waterbody on the "not supporting" list for a specific parameter. The conditions under the header "delisting" describe what data are needed to remove a specific parameter from the "not supporting" list. Generally, the data required to "delist" a parameter are the same as would be required to assess a waterbody as "supporting" its use for the parameter in question. The methodology below also describes a number of situations that would result in a waterbody being placed in Category 3 "assessment pending."

A "preferred minimum data set" is provided for a number of the parameters below. If the quantity of data available is less than the "preferred minimum set," EPD uses best professional judgment to determine if there are sufficient data available to make an assessment of use support or if the waterbody should be placed in Category 3 until more data are collected. Best professional judgment is also used in cases where data are determined to be suspect.

A. Fecal Coliform Bacteria: Preferred minimum data set – 4 geometric means (2 collected in winter months and 2 in summer months). Each geometric mean consisted of at least 3 samples collected in a 30-day period.

   1. Listing –

      a. One year of available data (Geometric Mean):

         1. Waterbodies are determined not to be supporting their use designation if more than 10% of the geometric means exceed the water quality criteria.

      b. Multiple consecutive years of available data (Geometric Mean):

         1. Waterbodies are determined not to be supporting use designation if (a) more than 10% of the geometric means exceed the water quality criteria or (b) if 10% of the geometric means exceed the water quality criteria and one or more winter maximum violations occurred in the 30 day data set(s) where the geometric mean meet the water quality criteria.

      c. Single Sample Data: In the absence of sufficient data in a data set to calculate a geometric mean, the USEPA's Listing Guidance is used to assess bacterial data as described below. EPD uses its best professional judgment when determining whether to use the single sample data to make a use assessment or to place the waterbody in Category 3 until sufficient data can be collected for use determination. Some factors in making this determination include the size of the data set, the time of year samples were collected, the consistency of the data (i.e. were most of the samples well over the single sample criteria), etc. If it is determined that the single sample data are sufficient for making a use determination:

         1. Waterbodies are determined not to be supporting use designation if more than 10% of the single samples exceed the USEPA's recommended review criteria for bacteria of 400/100 mL during the months of May-October, and 4,000/100 mL during the months of November-April with the exception of waters classified as "Recreation" where the review criteria are 400/100 mL January-December.

      d. Waters within "shellfish growing areas": Georgia's Coastal Resources Division (CRD) designates certain waters of the State as being shellfish growing areas. CRD designates shellfish harvesting areas within the growing areas. CRD monitors these waters for fecal coliform contamination in accordance with FDA requirements. A geometric mean using the most recent 30 data points is calculated and this mean is compared against FDA's criterion of 14 MPN/100 mL. In addition, the 90^{th} percentile of the 30 samples is calculated and compared with FDA's criteria of 43 MPN/100 mL for a five-tube decimal dilution test; 49 MPN/100 mL for a three-tube decimal dilution test or 31 CFU/100 mL for a MF (mTEC) test.

1. Waterbodies are determined not to be supporting their designated use if the geometric mean of the most recent 30 samples is greater than 14/100 mL MPN or if the 90th percentile exceeds the values provided above based upon the testing method used.

2. Delisting –

   a. One year of available data:

      1. Waters are eligible for delisting for fecal coliform if 10% or less of the geometric means exceed the water quality criteria. If fewer than 4 geometric means are available for assessment, EPD may consider a waterbody eligible for delisting if there are at least two summer geometric means available for assessment and they comply with the water quality criteria.

   b. Multiple consecutive years of available data:

      1. Waters are eligible for delisting for fecal coliform bacteria if 10% or fewer of the geometric means exceed the water quality criteria.

   c. Single Sample Data: Single sample data are typically not used for delisting purposes as the preferred data set would include the ability to calculate geometric means. However, EPD may consider using single sample data for delisting using best professional judgment. Some factors to be taken into consideration are the size of the data set, the time of year samples were taken and/or whether the original “not supporting” designation was based on single sample data or geometric means. If it is determined that the single sample data are sufficient for making a use determination:

      1. Waterbodies are eligible for delisting for fecal coliform if 10% or fewer of the single samples exceed the USEPA’s recommended review criteria for bacteria of 400/100 mL during the months of May-October, and 4,000/100 mL during the months of November-April with the exception of waters classified as “Recreation” where the review criteria are 400/100 mL January-December.

   d. Waters within “shellfish growing areas”

      1. Waters are eligible for delisting for fecal coliform bacteria if the geometric mean of the last 30 data points is less than or equal to 14 MPN/100 mL and the 90th percentile of the last 30 data points does not exceed the values provided above based upon the testing method used.

B. Enterococci – Georgia has adopted new bacteria criteria for waters with a designated use of “Recreation”. Enterococci is the bacterial indicator species used for coastal waters. The criteria consist of both a geometric mean and a statistical threshold value (STV). Depending upon how frequently bacteria data are collected, EPD uses the geometric mean, STV, or both to assess water quality. Coastal beaches are sampled at different frequencies depending upon how many people use them for recreation and their proximity to potential pollution sources. Beaches are sampled either weekly (year-round); monthly (from April to October) or quarterly (if they are under a permanent advisory). Preferred minimum data set –10 geometric means for coastal waters sampled weekly under the BEACH Act and 10 months of data for those sampled monthly under the BEACH ACT.

1. Listing –

    a. Monthly Samples: Since only 1 sample is taken per month, there is not enough data available to calculate a meaningful geometric mean. Instead, the results of each monthly sample are compared with the STV.

        1. If more than 10% of the monthly data exceed the STV of 130 CFU/100 mL, a beach is assessed as not supporting its use designation.

    b. Weekly Samples: A geometric mean is calculated for each calendar month (if there were at least 3 samples taken during the calendar month). Each geometric mean is compared with the criteria. In addition, it is determined how many calendar months had data that exceeded the STV.

        1. Beaches are determined not to be supporting their designated use if more than 10% of the geometric means exceed the criterion of 35 CFU/100 mL and/or if more than 10% of the monthly data sets have values that exceed the STV of 130 CFU/100 mL.

    c. Mixture of Monthly and Weekly Samples

        1. If during the last five years, data are collected monthly some years and weekly other years, then EPD assesses each data type separately as described above. If both the monthly and weekly data types indicate that a beach is not in compliance with the Enterococci criterion as described above, then the beach is assessed as not supporting its use. If the monthly and weekly data types support different listing decisions, then EPD uses its best professional judgment in making the listing determination. Generally, more weight is placed on the weekly data and on the most recent data set.

    d. Quarterly Samples: Beaches under a permanent beach advisory are only sampled quarterly. Beaches under a permanent beach advisory are assessed not supporting their use designation.

2. Delisting –

    a. Monthly Samples: Since only 1 sample is taken per month, there is not enough data available to calculate a meaningful geometric mean. Instead, the results of each monthly sample are compared with the STV.

        1. If 10% or less of the monthly data exceed the STV of 130 CFU/100 mL, a beach is assessed as supporting its use designation.

b. Weekly Samples: A geometric mean is calculated for each calendar month (if there were at least 3 samples taken during the calendar month). Each geometric mean is compared with the criteria. In addition, it is determined how many calendar months had data that exceeded the STV.

1. If 10% or less of the geometric means exceed the criterion of 35 CFU/100 mL and if 10% or less of the monthly data sets have values that exceed the STV, the beach is eligible for delisting.

c. Mixture of Monthly and Weekly Samples

1. If during the last five years, data are collected monthly some years and weekly other years, then EPD assesses each data type separately as described above. If both the monthly and weekly data types indicate that a beach is in compliance with the Enterococci criteria as described above, then the beach is eligible for delisting.

d. Quarterly Samples: Beaches under a permanent beach advisory are not eligible for delisting.

3. Swimming Advisories -

a. Beach swimming advisories are issued when either the most recent Enterococci data exceeds the Beach Action Value (BAV) of 70 CFU/100 mL.

b. The swimming advisory is lifted when new data shows the Enterococci concentration is less than 70 CFU/100 mL.

C. E. Coli – Georgia has adopted new bacteria criteria for waters with a designated use of “Recreation”. E. coli is the bacterial indicator species used for freshwater. The criteria consist of both a geometric mean and a statistical threshold value (STV). Depending upon how frequently bacteria data are collected, EPD uses the geometric mean, STV, or both to assess water quality. EPD typically measures E. coli in lakes monthly (April – October). These samples are taken offshore (not at a beach). E coli is typically sampled quarterly in streams (each quarter four samples are collected in a 30-day period). The Georgia Parks, Recreation and Historic Sites Division collects 5 samples of E. coli in April/May of each year at the public beaches in their Parks. Preferred minimum data set for data collected as geometric means: 4 geometric means. Each geometric mean is to consist of at least 3 samples collected in a 30-day period. Preferred minimum data set for data collected monthly: 10 monthly samples.

1. Listing –

a. Monthly Samples: Since only 1 sample is taken per month, there is not enough data available to calculate a meaningful geometric mean. Instead, the results of each monthly sample are compared with the STV.

1. If more than 10% of the monthly data exceed the STV of 410 CFU/100 mL, a water is assessed as not supporting its use designation.

b. Data collected for Geometric Means: A geometric mean is calculated for each 30 – day sampling period (if there were at least 3 samples taken). Each geometric mean is compared with the criteria. In addition, it is determined how many 30-day sampling periods had data that exceeded the STV.

    1. Waters are determined not to be supporting their designated use if more than 10% of the geometric means exceed the criterion of 126 CFU/100 mL and/or if more than 10% of the 30-day sampling periods have values that exceed the STV of 410 CFU/100 mL.

c. Mixture monthly and Geometric Mean Data

    1. If during the last five years, some years have geometric means available and other years only have monthly data available, then EPD assesses each data type separately as described above. Waters are determined not to be supporting their designated use if more than 10% of the geometric means exceed the criterion of 126 CFU/100 mL and/or if more than 10% of the 30-day sampling periods have values that exceed the STV of 410 CFU/100 mL.

2. Delisting –

    a. Monthly Samples: Since only 1 sample is taken per month, there is not enough data available to calculate a meaningful geometric mean. Instead, the results of each monthly sample are compared with the STV.

        1. If 10% or less of the monthly data exceed the STV of 410 CFU/100 mL, a water is assessed as supporting its use designation.

    b. Data collected for Geometric Means: A geometric mean is calculated for each 30 – day sampling period (if there were at least 3 samples taken). Each geometric mean is compared with the criteria. In addition, it is determined how many 30-day sampling periods had data that exceeded the STV.

        1. If 10% or less of the geometric means exceed the criterion of 126 CFU/100 mL and if 10% or less of the 30-day sampling periods have values that exceed the STV of 410 CFU/100 mL, the water is eligible for delisting.

    c. Mixture monthly and Geometric Mean Data

        1. If during the last five years, some years have geometric means available and other years only have monthly data available, then EPD assesses each data type separately as described above. If 10% or less of the geometric means exceed the criterion of 126 CFU/100 mL and if 10% or less of the 30-day sampling periods have values that exceed the STV of 410 CFU/100 mL, the water is eligible for delisting.

D. Dissolved Oxygen (DO), pH, Water Temperature: preferred minimum data set - 12 samples in a 12 month period with 1 or 2 samples collected per month. In the case of continuous data (where a probe is left in the water for a long period of time and data is recorded multiple times per day), EPD may choose not to monitor the water for an entire year. Data need to be available for the critical period to be used for listing decisions (e.g. summer data needed for DO and temperature assessment).

1. Listing* –

   a. Dissolved Oxygen - One year of available data or multiple consecutive years of available data:

      1. Waterbodies are determined not to be supporting use designation if more than 10% of the data do not meet the water quality criteria. In the case of continuous data a waterbody would be determined not to be supporting its use if more than 10% of the data in the critical period exceeds the criteria.

      2. In the case where the DO criteria are not met more than 10% of the time, but where a “natural” dissolved oxygen concentration has been established, then the dissolved oxygen data are compared against the established “natural” dissolved oxygen concentration. If any of the data points are less than the “natural” dissolved oxygen concentration, then the waterbody is determined not to be supporting its designated use. If none of the DO data are less than the “natural” DO, then the waterbody is determined to be “supporting” its use (as far as DO is concerned).

      3. Chapter 391-3-6-.03(7) of the Rules and Regulations for Water Quality Control recognizes that some waters of the State “naturally” will not meet the instream criteria in the Rules and that this situation does not constitute a violation of water quality standards. Many waters in Georgia, specifically areas in South Georgia and near the Coast, have “natural” dissolved oxygen concentrations below the State’s standard dissolved oxygen criteria (daily average of 5.0 mg/l and an instantaneous minimum of 4.0 mg/l). If a waterbody does not meet the DO criteria more than 10% of the time and the waterbody is located in an area of the State where it is anticipated that the low dissolved oxygen condition is natural, then EPD will place the waterbody in Category 3 until work is completed that establishes the “natural” dissolved oxygen concentration for the waterbody. The measured dissolved oxygen data is then compared with the “natural” dissolved oxygen concentration and an assessment is made as to whether the waterbody is meeting its designated use.

   b. Water Temperature, pH - One year or multiple consecutive years of available data:

      1. Waterbodies are determined not to be supporting use designation if more than 10% of the data do not meet water quality criteria. In the case of continuous data a waterbody would be determined not to be supporting its use if more than 10% of the data in the critical period exceeds the criteria.

2. Chapter 391-3-6-.03(7) of the Rules and Regulations for Water Quality Control recognizes that some waters of the State "naturally" will not meet the instream criteria in the Rules and that this situation does not constitute a violation of water quality standards. Georgia has many blackwater streams. The pH of blackwater streams is naturally low. If a waterbody has been identified as a blackwater stream, then it is not listed as impaired if greater than 10% of the pH measurements are less than minimum pH criterion of 6.0, as long as there is no point source or land use issues that may be contributing to the low pH status of the stream.

2. Delisting –

   a. Dissolved Oxygen - One year or multiple consecutive years of available data:

      1. Waters are eligible for delisting for DO if 10% or less of the data are lower than the water quality criteria. In the case of continuous data a waterbody would be eligible for delisting if 10% or less of the data in the critical period exceeds the criteria.

      2. In the case where the DO criteria are not met more than 10% of the time, but where a "natural" dissolved oxygen concentration has been established, the instream DO data is compared against the "natural" DO. If no violations of the natural dissolved oxygen concentration occur, the segment is eligible for delisting.

   b. Water Temperature, pH - One year or multiple consecutive years of available data:

      1. Waters are eligible for delisting for temperature or pH if 10% or less of the data does not meet the water quality criteria. In the case of continuous data a waterbody would be eligible for delisting if 10% or less of the data in the critical period exceeds the criteria.

E. Metals: preferred minimum data set – 2 samples in a 12 month period (1 winter, 1 summer)

1. Listing –

   a. Waterbodies are determined not to be supporting their use designation if one sample exceeds the acute criteria in a three-year period or if more than one sample exceeds the chronic criteria in three years.

2. Delisting –

   a. Waters are eligible for delisting of metals if no exceedences of the acute criteria occur and no more than one exceedence of the chronic criteria occurs in three years.

F. Priority Pollutant/Organic Chemicals: preferred minimum data set – 2 samples in a 12 month period (1 winter, 1 summer)

1. Listing –

a. Waterbodies are determined not to be supporting their use designation if more than one sample exceeds the criteria in a three-year period.

2. Delisting –

a. Waters are eligible for delisting for priority pollutants/organic chemicals if no more than one exceedence of the criteria occurs in a three-year period.

G. Toxicity:

1. Listing –

a. Acute or Chronic toxicity tests conducted on municipal or industrial effluent samples and receiving waters – Waterbodies are determined not to be supporting use designation if:

1. Effluent toxicity test(s) consistently predict in-stream toxicity at critical 7Q10 low stream flow and/or if toxicity tests performed on receiving waters consistently indicate that the waterbody is toxic.

2. Delisting –

a. New data with a facility consistently passing WET test(s) (if listing originated based on effluent toxicity test results) are eligible for delisting.

b. New data with receiving waters consistently passing toxicity test(s) (if listing originated based on stream toxicity test results) are eligible for delisting.

H. Fish/Shellfish Consumption Guidelines:

1. Listing –

a. All Fish/Shellfish Tissue Contaminants Except Mercury:

1. Waterbodies are determined not to be supporting use designation if the State's fish consumption guidelines document recommends that consumption needs to be limited or if no consumption is recommended.

b. Fish/Shellfish Tissue - Mercury:

1. Waterbodies are determined not to be supporting their use designation if the Trophic-Weighted Residue Value (as described in the October 19, 2001 EPD "Protocol"), is in excess of Georgia's water quality criterion of 0.3 mg/kg wet weight mercury. Waters where the calculated Trophic-Weighted Residue Value for mercury is equal to 0.3 mg/kg wet weight total are put in Category 3.

2. Delisting –

a. All Fish/Shellfish Tissue Contaminants Except Mercury:

1. Waters are eligible for delisting if there is no consumption restrictions and fish/shellfish can be consumed in unlimited amounts.

b. Fish/Shellfish Tissue - Mercury:

1. Waters are eligible for delisting if the calculated Trophic-Weighted Residue Values for mercury in fish tissue is less than or equal to 0.3 mg/kg wet weight total. Waters where the calculated Trophic-Weighted Residue Value for mercury is equal to 0.3 mg/kg wet weight total are put in Category 3.

I. Biotic Data (Fish Bioassessments):

1. Listing –Fish Bioassessments are based on Fish Index of Biotic Integrity (IBI) data. Waterbodies are determined not to be supporting use designation if:

a. The IBI ranking is “Poor” or “Very Poor”;

2. Delisting –

a. Waters are eligible for delisting if the waterbody has a Fish IBI rank of “Excellent”, “Good”, or “Fair”

J. Biotic Data (Macroinvertebrate Bioassessments):

1. Listing –Benthic Macroinvertebrate Bioassessments based on a multi-metric index.

a. Waterbodies are determined not to be supporting use designation if the narrative rankings are “Poor” or “Very Poor”.

b. If the narrative ranking is “Fair”, then the waterbody is placed in Category 3.

2. Delisting –

a. Waterbodies are eligible for delisting if the waterbody scores a narrative ranking of “Very Good” or “Good”. If a waterbody scores “Fair”, it is placed in Category 3.

K. Data from Lakes with Site-Specific Criteria:
Site-specific numeric criteria have been established for 6 major lakes in Georgia including 1) West Point Lake, 2) Lake Walter F. George, 3) Lake Jackson, 4) Lake Allatoona, 5) Lake Sidney Lanier and 6) Carters Lake. These lakes are monitored annually and assessed for these parameters as described below:

1. Listing –

a. Chlorophyll _a_ (lake stations): The last five calendar years of chlorophyll _a_ data collected at each site-specific lake criteria station are assessed.

1. If during the five-year assessment period, the growing season average exceeds the site-specific growing season criteria 2 (or more)

out of the last 5 years, the lake area representative for that station is assessed as not supporting its designated uses. If the average exceeds the site-specific growing season criteria for 1 out of last 5 years, the waterbody is placed in Category 3.

b. Total Nitrogen (lake stations): The last five calendar years of total nitrogen concentrations collected at each site-specific lake criteria station are assessed.

1. For Lakes other than Lake Allatoona: If greater than 10% of the total nitrogen values exceed the site-specific criteria, the lake area representative for that station is assessed as not supporting its designated uses.

2. For Lake Allatoona: A growing season average for each of the last five years is calculated for each site-specific lake criteria station. If any of the five growing season averages exceed the criterion, then the lake area is represented by that station is assessed as not supporting designated uses.

c. Bacteria: Lakes with site-specific criteria have bacteria criteria of E. coli or a combination of E. coli and Fecal Coliform. The data from the last 5 years are evaluated using the procedures describes in Part VII.A. and VII.C. above.

d. Dissolved Oxygen, pH, Water Temperature: The last five calendar years of available data are assessed.

1. Waterbodies are determined not to be supporting use designation if more than 10% of the data do not meet water quality criteria

e. Major Lake Tributary Annual Total Phosphorous Loading Criteria: Annual total phosphorous loadings for each major lake tributary standard station are calculated for each of the last five calendar years.

1. If the average of the annual total phosphorous loadings exceeds the site-specific criteria, the site is assessed as not supporting designated uses.

f. Major Lake Annual Total Phosphorous Loading Criteria: The annual total phosphorus loading for each lake is calculated for each of the last five calendar years.

1. If the average of the annual total phosphorous loadings exceeds the site-specific criteria, the site is assessed as not supporting its designated uses.

2. Delisting –

a. Chlorophyll _a_ (lake stations): The last five calendar years of chlorophyll _a_ data collected at each site-specific lake standard station are assessed.

1. If during the five-year assessment period, there are no chlorophyll *a* growing season averages exceeding the site-specific growing season criteria, the lake area representative for that station is eligible for delisting. If the average exceeds the site-specific growing season criteria for 1 out of 5 years, the waterbody is placed in Category 3.

b. Total Nitrogen (lake stations): The last five calendar years of total nitrogen concentrations collected at each site-specific lake standard station are assessed.

1. For Lakes other than Lake Allatoona: If 10% or less of the total nitrogen values exceed the site-specific criteria, the lake area representative for that station is eligible for delisting.

2. For Lake Allatoona: A growing season average for each of the last five years is calculated for each site-specific lake criteria station. If none of the five growing season averages exceed the criterion, then the lake area that is represented by that station is eligible for delisting.

c. Bacteria: Lakes with site-specific criteria have bacteria criteria of E. coli or a combination of E. coli and Fecal Coliform. The data from the last 5 years are evaluated using the procedures describes in Part VII.A. and VII.C. above

d. Dissolved Oxygen, pH, Water Temperature: The last five calendar years of available data are assessed.

1. If 10% or less of the data do not meet water quality criteria, the water is eligible for delisting.

e. Major Lake Tributary Annual Total Phosphorous Loading Criteria: Annual total phosphorous loadings for each major lake tributary standard station were calculated for each of the last five calendar years.

1. If the average of the annual total phosphorous loadings does not exceed the site-specific criteria then the site was eligible for delisting.

f. Major Lake Annual Total Phosphorous Loading Criteria: The annual total phosphorus loading for each lake is calculated for each of the last five calendar years.

1. If the average of the annual total phosphorous loadings does not exceed the site-specific criteria then the site is eligible for delisting.

L. Objectionable Algae (Nutrients)

1. Listing –

a. A waterbody is listed for objectionable algae based upon visual observation of excessive algae, duckweed, or other aquatic plant life by field staff along with other factors including high concentrations of nutrients in the waterbody compared with other waters in the same river basin, and diurnal DO and pH swings indicative of high algae or plant activity (higher DO and pH later in the day and lower DO in the early morning).

2. Delisting –

   a. A waterbody is considered for delisting for objectionable algae if visual observation by field staff reveal that algae, duckweed, or other aquatic plant life is no longer excessive compared to other streams in the area, and the DO, pH, and nutrient data are at levels that no longer indicated a problem with excessive algae/plant life.

VIII. Priorities for Action

Section 303(d)(1) of the Clean Water Act requires each State to "establish a priority ranking" for the segments it identifies on the 303(d) list (i.e. those waters in Category 5). This ranking is to take into account the severity of the pollution and the uses to be made of such segments. The State is to establish TMDLs in accordance with the priority ranking. States are given considerable flexibility in establishing their ranking system. Georgia typically uses a basin rotation approach when it comes to drafting TMDLs. There are some cases where EPD may choose to draft a TMDL outside of the basin rotation schedule. Factors influencing this decision could include the severity of the pollution and whether development of the TMDL may require additional data collection and complex analysis. TMDLs are typically finalized sometime during the year after they are proposed. EPD has chosen to implement the priority ranking by indicating the year by which the TMDL for each segment on the 303(d) list will be drafted. TMDLs may be drafted before the year indicated in the report.

All dates provided are within the 13-year timeframe that is allowed for TMDL development as provided in the US EPA 1997 Interpretative Guidance for the TMDL Program. This guidance states that States should develop schedules for establishing TMDLs expeditiously, generally within 8-13 years of being listed.

In addition, US EPA has developed a new Long-Term Vision for Assessment, Restoration, and Protection of waters. This Vision focuses on six elements including 1) Prioritization, 2) Assessment, 3) Protection, 4) Alternatives, 5) Engagement, and 6) Integration. In accordance with this Vision, EPD has developed a Priority Framework that describes how GA EPD prioritizes waters on the 303(d) list for development of TMDLs or TMDL alternatives. The framework, along with the State's list of Priority Waters can be found on the EPD website at:
http://epd.georgia.gov/georgia-305b303d-list-documents

Data Source Code/ Key for Abbreviations

Data Source	
1 = DNR-EPD, Watershed Planning & Monitoring Program	39 = St. Johns River Water Mgmt. District
2 = DNR-EPD, Wastewater Regulatory Program (Municipal)	40 = Town of Trion
3 = DNR-EPD, Wastewater Regulatory Program (Industrial)	41 = Cherokee County Water & Sewerage Authority
4 = DNR, Wildlife Resources Division	42 = Clayton County Water Authority
5 = DNR, Coastal Resources Division	43 = City of Atlanta
6 = State University of West Georgia	44 = City of Cartersville
7 = Gainesville College	45 = Georgia Ports Authority
8 = Georgia Institute of Technology	46 = Chattahoochee/Flint RDC
9 = U.S. Environmental Protection Agency	47 = Upper Etowah Adopt-A-Stream
10 = U.S. Geological Survey	48 = Middle Flint RDC
11 = U.S. Army Corps of Engineers	49 = Central Savannah RDC
12 = U.S. Forest Service	50 = Chatham County
13 = Tennessee Valley Authority	51 = City of Savannah
14 = Cobb County	52 = Heart of Georgia RDC
15 = Dekalb County	53 = City of Augusta
16 = Douglas County Water & Sewer Authority	54 = Southwire Company
17 = Fulton County	55 = DNR-EPD, Brunswick Coastal District
18 = Gwinnett County	56 = DNR-EPD, Hazardous Waste Mgmt. Branch
19 = City of Clayton	57 = Ellijay High School
20 = City of Gainesville	58 = DNR, Georgia Parks Recreation & Historic Sites Division.
21 = City of LaGrange	59 = DNR-EPD, Ambient Monitoring Unit (Macroinvertebrate Team)
22 = Georgia Mountains R.D.C.	60 = Forsyth County
23 = City of Conyers	61 = Tyson Foods, Inc
24 = Lake Allatoona (Kennesaw State University)	62 = South Georgia RDC
25 = Lake Blackshear (Lake Blackshear Watershed Association)	63 = Northeast GA RDC
26 = Lake Lanier (University of Georgia)	64 = Ogeechee Canoochee Riverkeeper
27 = West Point (LaGrange College/ Auburn University)	65 = Screven County
28 = Georgia Power Company	66 = Coastal GA RDC
29 = Oglethorpe Power Company	67 = City of Roswell
30 = South Carolina Electric & Gas Company	68 = City of Alpharetta
31 = South Carolina DHEC	69 = Columbia County
32 = Jones Ecological Research Center	70 = Southwest GA RDC
33 = Alabama DEM	71 = Southeast GA RDC
34 = City of College Park	72 = Coweta County
35 = Kennesaw State University	73 = Middle GA RDC
36 = University of Georgia	74 = Bartow County keeper
37 = Columbus Water Works	75 = Atlanta Regional Commission
38 = Columbus Unified Government	76 = Soquee River Watershed Partnership

77 = Upper Chattahoochee River	80 = City of Dacula
78 = Henry County	81 = City of Sandy Springs
79 = City of Suwanee	82 = Athens Clarke County
83 = LandTec Southeast, Inc.	

Note: The above is a list of all historical data sources. All sources were not necessarily used in compilation of the 2018 list.

Criterion Violated Codes	**Potential Cause Codes**
As = Arsenic	CSO = Combined Sewer Overflow
Algae = Objectionable Algae	I1 = Industrial Point Source Discharge
Bio F = Biota Impacted (Fish Community)	I2 = Industrial Site Runoff
Bio M = Biota Impacted (Macroinvertebrate Community)	M = Municipal Point Source Discharges
Cd = Cadmium	NP = Nonpoint Sources
Cu = Copper	UR = Urban Runoff
1,1-DCE = 1,1- Dichloroethylene	
DO = Dissolved Oxygen	
FC = Fecal Coliform Bacteria	
FCG = Fish Consumption Guidance	
Hg = Mercury	
P = Phosphorus	
Pb = Lead	
PCE = Tetrachloroethylene	
SB = Shellfishing Ban*	
Se = Selenium	
Temp = Temperature	
TCA = 1,1,2 - Trichloroethane	
TCE = Trichloroethylene	
Tox = Toxicity Indicated	
TWR = Trophic-Weighted Residue Value of mercury in fish tissue exceeding the EPD human health standard of 0.3 mg/kg	
Zn = Zinc	

* Shellfishing Ban (SB) is listed as an impairment for waters where shellfish should not be harvested/eaten due to concerns about pollutant contamination. It is important to note that public and commercial shellfishing in coastal waters is only permissible in designated "Approved Harvest Areas" throughout the coastal region. 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. Georgia's Coastal Resources Division maintains a maps of approved public shellfishing areas which can be found at the following website: https://coastalgadnr.org/approvedrecharvestareas.