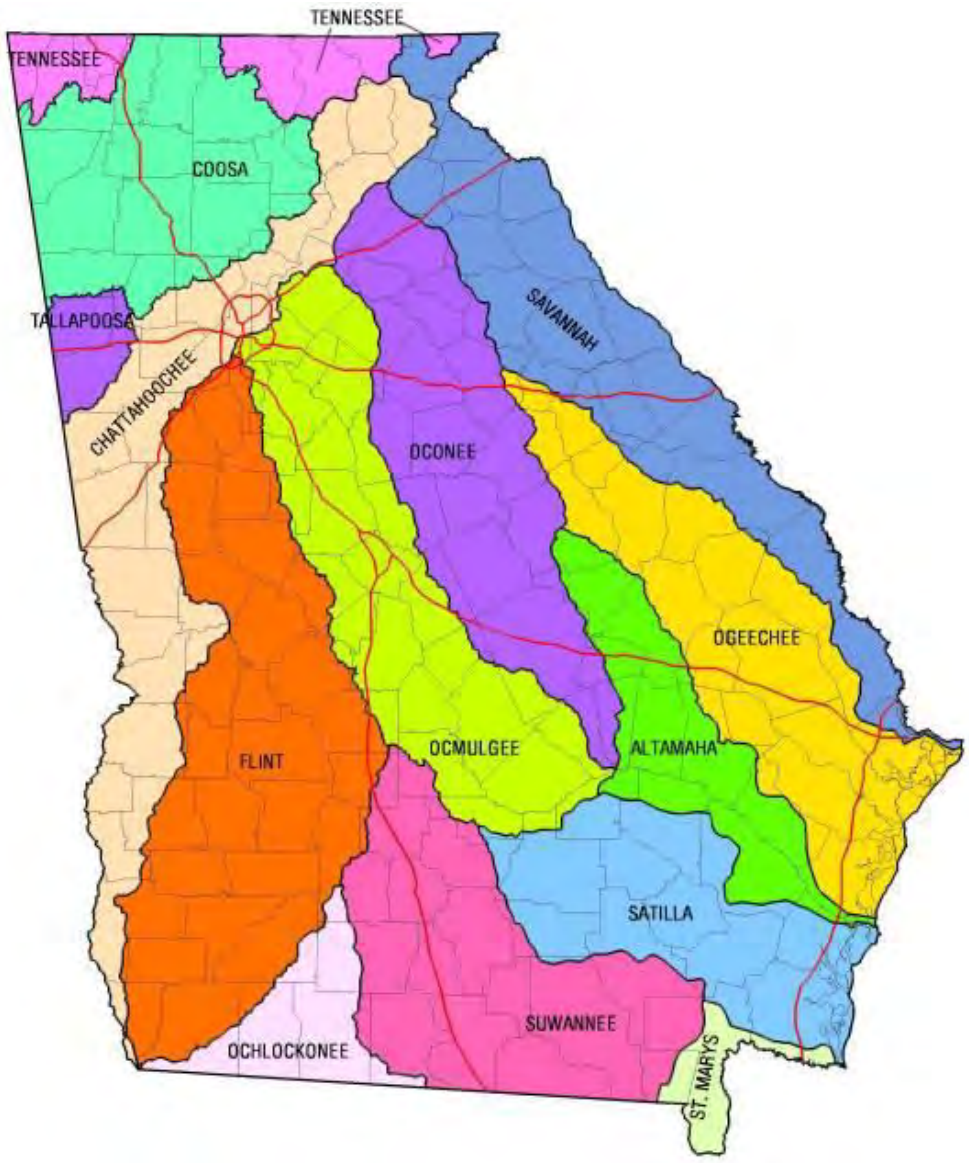
WATER QUALITY IN GEORGIA 2018-2019

(2020 Integrated 305b/303d Report)



Georgia Department of Natural Resources
Environmental Protection Division

WATER QUALITY IN GEORGIA 2018-2019
(2020 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, 2018 through December 31, 2019. Comments or questions related to the content of this report are invited and should be addressed to:

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Executive Summary

Purpose
This report, *Water Quality in Georgia, 2018-2019*, was prepared by the Georgia Environmental Protection Division (EPD) of the Department of Natural Resources (DNR) with the assistance of the Georgia Coastal Resources Division (CRD), Georgia Wildlife Resources Division (WRD), the Georgia Forestry Commission (GFC), the Georgia Environmental Finance Authority (GEFA), and the Georgia Soil and Water Conservation Commission (GSWCC). This report, often referred to as the Georgia 305(b) Report, describes water quality conditions of navigable waters across the State and provides an assessment of the water quality conditions of surface and groundwater in Georgia.

The report includes a description of the nature, extent, and causes of documented water quality problems and serves as the basis for the integrated 305(b)/303(d) list.

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.

The major objective of this report is to provide Georgians a broad summary of water quality information and the programs implemented by EPD and its partners to protect water resources across the State.

Watershed Protection in Georgia
EPD is the state agency charged with protecting Georgia's air, land, and water resources. EPD is responsible for environmental protection, management, regulation, permitting, and enforcement in Georgia. EPD administers programs for planning, water pollution control, water supply and groundwater management, hazardous waste management, air quality control, solid waste management, strip mining, erosion control, radiation control, underground storage tanks, and safe dams. EPD issues and enforces all state permits in these areas and has full delegation for federal environmental programs, except Section 404 (wetland) permits and Section 405, 40 CFR Part 503 *Standards for the Use or Disposal of Sewage Sludge*.

The Watershed Protection Branch of EPD, addresses most aspects of drinking water supply and water pollution control including: comprehensive statewide water planning; water quality standards; monitoring; water quality modeling to develop wasteload allocations and total maximum daily loads (TMDLs); TMDL implementation; the continuing planning process; local watershed assessment and watershed protection plans; nonpoint source management; erosion and sedimentation control; stormwater management; the NPDES permit and enforcement program for wastewater and stormwater 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.

EPD has designated GSWCC as the lead agency for addressing water quality problems caused by agriculture and the GFC as the lead agency to address water quality problems due to commercial forestry operations.

Surface Water Quality Assessment
Water quality data are assessed to determine if standards are met and if the water body supports its designated use using Georgia's 2020 305(b)/303(d) Listing Assessment Methodology. If monitoring data show that standards are not met, the water body is said to be "not supporting" the designated use. If the monitoring data show that standards are being met, then the water body is supporting its designated use. Occasionally, additional data is needed to make an assessment, and the water body is assessment pending. The following 2020 305(b)/303(d) List of Waters can be found in Appendix A:

- 2020 River/Streams
- 2020 Lakes/Reservoirs
- 2020 Coastal Streams
- 2020 Sounds/Harbors
- 2020 Coastal Beaches
- 2020 Freshwater Beaches

Watershed Protection Programs
EPD uses several Watershed Protection Programs to improve Georgia's water quality that are described in Chapter 7. These include:

- Watershed Projects
  - Savannah Harbor Restoration
  - Coosa River Nutrient and DO Levels
  - Ochlockonee River Basin and Lake Talquin Nutrient Reductions
- Numeric Nutrient Criteria
- Water Quality Monitoring
- Water Quality Modeling, Wasteload Allocation and TMDL Development
- TMDL Implementation
- Clean Water Revolving and Georgia Fund Loan Programs
- Metropolitan North Georgia Water Planning District (Metro District)
- Wastewater Permitting Program
  - NPDES Permitting
  - Concentrated Animal Feeding Operations (CAFOs)
  - Combined Sewer Systems (CSS)
- Stormwater Permitting Program
- Compliance and Enforcement Program
  - Zero Tolerance
- Nonpoint Source Management Program
  - Agriculture
  - Silviculture
  - Urban Runoff
  - Erosion and Sediment Control
  - Grants
  - Outreach
- Land Protection Programs
  - Georgia Outdoor Stewardship Program
  - Land Conservation Program
  - Private Lands Program
- Georgia Emergency Response Network
- Environmental Radiation

Major Issues and Challenges
Georgia is one of the fastest growing states in the nation. The increasing population places considerable demands on Georgia's water resources. The major issues and challenges with regard to water quality are described in Chapter 9 and include:

- Nonpoint Source Pollution
- Toxic Substances
- PFAS
- Nutrients
- Harmful Algal Blooms (HABs)

CHAPTER 2

Regional Water Planning in Georgia

Georgia is one of the fastest growing states in the nation, and Georgia's future relies on the protection and sustainable management of the State's water resources.

State Water Plan Development

Water planning in Georgia began with a 2001 Act that created the Metro Water District, and the District adopted their first plans in 2003. 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 new water planning legislation replaced river basin planning and provided fundamental goals and guiding principles for the development of the Statewide Water Plan, which was completed in 2008. A copy of the plan is available at https://waterplanning.georgia.gov/state-water-plan. The State Water Plan called for a regional water planning approach.

Regional Water Planning Councils

At the beginning of 2009, Regional Water Planning Councils were formed. The Councils were established roughly along watershed areas, but also along county boundaries. Each Council includes individuals appointed by the Governor, Lt. Governor, and Speaker of the House. The role of each Council is to prepare a plan to manage available water resources within its region. The Regional Water Councils worked through 2011 to complete the first Regional Water Plans that were adopted by EPD 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 EPD in July 2017. All Regional Water Plans are subject to periodic review and revision on a 5-year cycle.

Water Planning Process

The Councils primarily focus on developing plans using a consensus-based planning process. EPD provides forecasts of water and wastewater demand, based on long-range population and employment projections, and assessments of the capacity of water resources to meet those demands. The water resource assessments include current and future surface water and groundwater demands and available water quality assimilative capacity. Councils work with these technical products and identify the actions necessary to accomplish their goals and manage the region's water resources for the long-term (i.e. meet water resource needs for each region through 2050).

Metro District and Regional Water Plans

The Councils and Metro District developed Regional Water Plans that provide a roadmap for sustainable use of Georgia's water resources. Because the regions share water resources, the planning process is designed to provide the Metro District and the Councils with the opportunity to discuss items of shared concern in Joint Council meetings.

The Regional Water Plans present solutions identified by regional leaders drawing from regional knowledge and priorities. The regional water planning process and resultant plans provide specific tasks for implementation and a science-based foundation for future updates.

Regional Water Plan Implementation

Local governments, utilities, industries, and other water users implement the plans, and State agencies use the plans to guide decisions on water permits and loans for water-related projects. The full plans can be reviewed at https://waterplanning.georgia.gov/. The highlights from each of the Regional Water Plans are as follows:

Coosa-North Georgia Region

2015 Population: 759,880

18 Counties

68% of water demands (2015) used for energy production

Key Water Resource Issues:

1. Groundwater resources in the region are generally limited; most of the water supply needs are met with surface water sources.
2. The region covers multiple river basins including the Chattahoochee, Tennessee, and Coosa basins which can complicate water resource management.
3. Regional topography makes it a challenge to share resources and water supply infrastructure cost effectively.
4. Targeted water quality concerns in Lake Weiss, Lake Allatoona, Carters Lake and Lake Lanier.
5. Coordination with neighboring water councils to effectively manage water resources by basin.
6. Improved implementation of Best Management Practices (BMPs) to address water conservation, wastewater management, and water quality across the region.

Summary of Management Practices and Recommendations to the State:

Water Conservation: Support implementation of water conservation activities that are required by state law (Stewardship Act practices), and practices that are beneficial for all communities such as education and public awareness programs.

Water Supply Management: Practices include encouraging the development of water master plans, mapping existing reservoirs and considering expansions, considering new groundwater wells, encouraging indirect potable reuse, considering construction of new WTP or expansion of existing facilities, encouraging the implementation of asset management, and source water protection.

Wastewater Management: Practices include encouraging the development of wastewater master plans, implementing education and awareness programs, promoting septic system management, implementing sewer system mapping, maintenance and rehabilitation programs, implementing grease management programs and develop a sanitary sewer overflow (SSO) emergency response program.

Water Quality: Practices include implementing of nutrient management programs, promoting forestry BMPs, encouraging local government participation, considering post-development stormwater BMPs, encouraging pollution prevention and good housekeeping practices, stormwater education and awareness programs, considering regional BMPs, encouraging stream buffer protection, implementing comprehensive land use planning, supporting TMDL implementation, considering credit trading, sampling and testing 303(d) listed streams, and supporting nontraditional NPDES permitting.

Recommendation to the State: Identify long-term funding mechanisms, provide coordination between the Council and local and state agencies, coordinate planning efforts and Alabama, Coosa, Tallapoosa (ACT) Basin negotiations, support local monitoring efforts by volunteer groups, develop program to meter agricultural withdrawals, develop regulatory framework to implement nutrient trading and interbasin transfer, support BMP demonstration projects, and support commercial water audits.

Middle Chattahoochee Region

2015 Population: 497,369

11 counties

56% of water demands (2015) are municipal

Key Water Resource Issues:

1. Water demand and supply management to address potential gaps in water availability.
2. Evaluation of changes in the operation of Chattahoochee Basin reservoirs to support higher lake levels and improved instream flows.
3. Coordination with neighboring water councils.
4. Improved implementation of BMPs.
5. Targeted water quality concerns

Summary of Management Practices and Water Policy Recommendations:

Demand Management: Support implementation of water conservation activities.

Returns Management: Encourage use of point source discharges for wastewater treatment effluent.

Supply Management: Study the development of new or enhancement of existing water storage reservoirs and implement as necessary.
Instream Use: Improve reservoir release quantity and timing in the Chattahoochee River; assess the potential to modify Chattahoochee River operations to protect instream uses and increase conservation storage.

Water Quality: Improve water quality monitoring.

Water Policy Recommendations: The Plan makes several recommendations regarding policies and programs to support plan implementation. The Plan also includes joint recommendations that the Council developed with neighboring regional water planning councils to address shared resources and concerns (see the Plan for more details).

Upper Flint Region

2015 Population: 244,586

13 counties

76% of water demands (2015) used for agriculture

Key Water Resource Issues:

1. Water demand and supply management to address potential gaps in water availability.
2. Improvement to the agricultural water withdrawal metering program.
3. Targeted water quality concerns and increasing public education about water quality.
4. Coordination with neighboring water planning councils.

Summary of Management Practices and Water Policy Recommendations

Demand Management: Continue to improve the agricultural water withdrawal metering program.

Supply Management and Flow Augmentation: Evaluate storage options in the Upper Flint that can provide for supply and flow augmentation in dry periods.

Water Quality: Increase education directed toward improving water quality.

Information Needs: The Plan identifies information needs to improve regional water planning and recommends that the State develop additional information to support future water plan updates.

Water Policy Recommendations: The Plan makes several recommendations regarding policies and programs to support plan implementation. The Plan also includes joint recommendations that the Council developed with neighboring regional water planning councils to address shared resources and concerns

Lower Flint-Ochlockonee Region

2015 Population: 357,619

14 Counties

69% of water demands (2015) used for agriculture

Key Water Resource Issues:

1. Water demand and supply management to address potential gaps in water availability.
2. Regional economic activities that are dependent on water availability.
3. Coordination with neighboring water planning councils.
4. Targeted water quality issues.

Summary of Management Practices and Water Policy Recommendations:

Demand Management: Improve agricultural water use efficiency.

Supply Management and Flow Augmentation: Evaluation storage options; replace surface water withdrawals with groundwater withdrawals where

practical and not harmful to environmental resources.
Water Quality: Improve enforcement of existing permits and regulations and implementation of existing plans and practices.

Information Needs: The Plan identifies information needs to improve regional water planning and recommends that the State develop additional information to support future water plan updates.

Water Policy Recommendations: The Plan makes several recommendations regarding policies and programs to support plan implementation. The Plan also includes joint recommendations that the Council developed with neighboring regional water planning councils to address shared resources and concerns.

Altamaha Region

2015 Population: 256,305

16 counties

50% of water demands (2015) used for agriculture

Key Water Resource Issues:

1. Current and future groundwater supplies for municipal/domestic, industrial and agricultural water use.
2. Sufficient surface water quantity and quality to accommodate current and future surface water demands.
3. Low dissolved oxygen and other water quality issues in streams during periods of low flow.
4. Collaboration with other regions that share water resources to ensure that activities do not adversely impact water resources of either region.
5. Climate and water supply variability and extremes

Summary of Management Practices and Recommendations to the State:

Water Conservation: Implement practices in Water Stewardship Act; evaluate practices for agricultural water use in areas with shortfalls in streamflow; promote conservation education programs.
Water Supply: Provide incentives for dry-year releases from farm ponds, groundwater development, wetland restoration, and increases in wastewater returns.

Wastewater and Water Quality: Increase permitted wastewater capacity; monitor nutrient pollution; implement nutrient management practices.

Information Needs: Study human impacts on water quality; refine agricultural consumption data; research groundwater potential to address surface water shortfalls; irrigation efficiency education and research; study impacts of wetland restoration on streamflow; monitor and evaluate estuaries.

Recommendations to the State: Focus on education, incentives, collaboration, cooperation, and enabling and supporting plan implementers; institutionalize and fund water planning; focus funding and assistance on areas with shortfalls; continue monitoring to help conserve Georgia's natural, historic, and cultural resources.

Suwannee Satilla Region

2015 Population: 416,372

18 counties

76% of water demands (2015) used for agriculture

Key Water Resource Issues:

1. Periodic gaps in modeled surface water availability in the Suwannee and Satilla river basins.
2. Sufficient surface water quantity and quality to accommodate future municipal and industrial wastewater needs.
3. Low dissolved oxygen reaches in the Suwannee, Satilla and Saint Mary's river basins and other water quality issues.
4. Development of groundwater and surface water resources to meet future needs.
5. Protection of recreational and environmental resources in the region

Summary of Management Practices and Recommendations to the State:

Water Conservation: The Suwannee-Satilla Council supports the 25 water conservation goals contained in the 2010 Water Conservation Implementation Plan (WCIP), including adherence to Tier 1/Tier 2 measures. Other recommendations include irrigation audits and metering of irrigation systems.

Water Supply: Provide incentives for dry-year releases from farm ponds, groundwater development, wetland restoration, and increases in wastewater returns. Study feasibility of seasonal surface water permit conditions.

Wastewater and Water Quality: Increase permitted wastewater capacity; monitor nutrient pollution; upgrade or replace treatment facilities.

Information Needs: Acquire additional data/information on agricultural consumptive use to confirm or refine if it is less than 100% consumptive; Refine surface water agricultural forecasts & Resource Assessments to improve data on source of supply and timing/ operation of farm ponds and dual source irrigation systems.

Recommendation to the State: Focus on education, incentives, collaboration, cooperation, and enabling and supporting plan implementers; institutionalize and fund water planning; focus funding and assistance on areas with shortfalls. Work with EPD's Agricultural Water Metering Program, as well as other partners to improve agricultural water use data collection and management.

Coastal Region

2015 Population: 683,803

9 counties

60% of water demands (2015) used for industrial uses

Key Water Resource Issues:

1. Long-term sustainable water supplies for municipal and industrial growth in the region while protecting the unique coastal environment.
2. Current and potential future groundwater withdrawals in and around Effingham, Chatham, Bryan and Liberty counties for future water supply.
3. Integration with ongoing efforts including salt water intrusion, Savannah River 5R Process, demands for water upstream of the region, and interstate activities with South Carolina and Florida.
4. Low dissolved oxygen in Savannah and Brunswick Harbors and other water quality issues.

Summary of Management Practices and Recommendations to the State:

Water Conservation: The Coastal Council supports the 25 water conservation goals contained in the 2010 Water Conservation Implementation Plan (WCIP), including adherence to Tier 1/Tier 2 measures. Other recommendations include use of reclaimed water, water audits, irrigation metering, and water loss control.

Water Supply: Multi-jurisdictional groundwater development outside red/yellow zones, surface water storage, use of additional regional and local aquifers and other additional/alternate sources.

Wastewater and Water Quality: Increase permitted wastewater capacity; data collection on loadings; and construct new or expanded and/or replace/ upgrade existing treatment facilities.

Information Needs: Acquire additional data/information on agricultural consumptive use to confirm or refine if it is less than 100% consumptive; Refine surface water agricultural forecasts & Resource Assessments to improve data on source of supply and timing/operation of farm ponds. Research to determine the feasibility and potential benefits and limitations of aquifer storage and recovery.

Recommendation to the State: Focus on education, incentives, collaboration, cooperation, and enabling and supporting plan implementers; institutionalize and fund water planning; focus funding and assistance on areas with shortfalls.

Middle Ocmulgee Region

2015 Population: 586,189

12 counties

Roughly 1/3 of water demands (2015) are for each municipal and agriculture

Key Water Resource Issues:

1. Effects of Metropolitan North Georgia Water Planning District withdrawals and discharges, as well as land use, on tributaries of Lake Jackson
2. Future water supply sources for areas above the Fall Line
3. Zones of possible low dissolved oxygen in the lower Ocmulgee River and tributaries
4. More efficient use of water in the region

Summary of Management Practices and Recommendations to the State:

Water Conservation (Demand Management): Includes practices to further manage and reduce municipal, industrial, energy, and agricultural demands in the entire region.

Water Supply: Management practices include development of local water master plans, and a coordinated regional effort evaluating the quantity and quality impacts of metro Atlanta's discharges into Lake Jackson.

Water Quality: Management practices include development of local wastewater master plans, adoption and coordination of statewide regional and local water quality monitoring programs, upgrade of existing wastewater treatment facilities, construction of advanced treatment facilities, and promotion of coordinated environmental planning.

Water Quality (Enhanced Pollution - Non-point Source Management): Recommended practices for improving the existing impaired streams, including reduction of runoff from impervious surfaces, adoption of ordinances or incentive programs to protect sensitive lands, development/implementation of watershed assessment and protection plans, encouragement of total maximum daily load implementation and watershed improvement/restoration projects. In addition to the priority practices, the plan also recommends close to 20 additional management practices to be considered by local governments and water users based on needs identified in detailed local master planning studies.

Recommendations to the State: Focus on additional data collection and modeling needs for improving future regional water planning efforts, evaluating current and future policy, funding and coordination.

Upper Oconee Region

2015 Population: 577,039

13 counties

37% of water demands (2015) used for industrial uses

44% of water demands (2015) are for municipal

Key Water Resource Issues:

1. Efficient use of the water by all sectors, recognizing the diverse characteristics of the Upper Oconee.
2. Strategic wastewater management in fast growing counties (Barrow, Jackson, Oconee, and Walton Counties).
3. Potential limitations placed on future surface water supplies in existing impoundments.
4. Protecting the water quality of Lakes Oconee and Sinclair and the Oconee River by reducing both point and nonpoint source nutrient loads.
5. The natural capacity of the water bodies to process pollutants is exceeded in the middle (Morgan and Putnam Counties) and lower (Laurens and Wilkinson Counties) portion of the basin due to zones of low dissolved oxygen.

Summary of Management Practices and Recommendations to the State:

Water Conservation: To prevent potential shortages in meeting instream flow needs, the Upper Oconee Plan encourages conservation

pricing and development of water conservation goals.

Water Supply: Practices include expansion of existing reservoirs and construction of new water supply reservoirs.

Wastewater and Water Quality: The Upper Oconee Plan calls for implementation of centralized sewer in developing areas where density warrants and development of local wastewater master plans to evaluate wastewater treatment and disposal options to meet future demands. Comprehensive land use planning and local government participation in construction erosion and sediment control are also encouraged.

Recommendations to the State: Focus on incentives, collaboration and cooperation with state and local planning agencies, support plan implementers; fund water planning; focus funding and assistance on areas with shortfalls; continue monitoring to help conserve Georgia's natural, historic, and cultural resources.

Savannah-Upper Ogeechee Region

2015 Population: 629,734

20 counties

28-29% of water demands (2015) used for each municipal, industrial, agriculture

Key Water Resource Issues:

1. Low dissolved oxygen levels in the Savannah River and Harbor and the sharing of substantial load reductions between Georgia and South Carolina dischargers.
2. Coordination with South Carolina on shared water resources in the Savannah Basin.
3. Potential gaps in surface water availability in the Ogeechee Basin.
4. Concerns about interbasin transfers of water out of the Savannah Basin.
5. Long-term operating procedures at the USACE reservoirs and the use of adaptive management to maintain conservation pools at the highest possible levels.
6. More efficient use of water in the region.

Summary of Management Practices and Recommendations to the State:

Water Conservation: To prevent potential gaps in meeting instream flow needs, the Savannah-Upper Ogeechee Plan calls for more aggressive water conservation practices and development of drought management practices for the agricultural users/permittees in the Upper Ogeechee River Basin. The plan also recommends instream flow studies and additional streamflow monitoring in the Ogeechee River Basin.

Wastewater and Water Quality: Priority practices include development of local water and wastewater plans to identify local infrastructure needs and address watershed-related issues. The Council further supports State implementation of the 5R plan for NPDES permitting to restore water quality in the Savannah River Basin and Harbor.

Recommendations to the State: The Plan recommends that EPD continue to update and refine its water resources database and use this data in subsequent updates to the resource assessments. This information will help guide more localized planning and decision making, as well as strengthen the appropriate and scientifically sound application of management practices.

Interstate Water Planning: The ongoing discussion between the states of Georgia and South Carolina is a defining issue of the Savannah River Basin. Future updates of the USACE Comprehensive Study are recommended to emphasize the need for maintaining maximum storage in the reservoirs when possible, in light of the economic benefits the lakes bring to the region. The Comprehensive Study is a cost share with Georgia EPD, SCDHEC and The Nature Conservancy. With respect to water sharing, the Council has incorporated a preliminary assessment of South Carolina's projected water use into its planning efforts.

Metropolitan North Georgia Water Planning District

2015 Population: 5.2 million

15 counties

40% of water demands (2015) used for single family residential

Plan Action Items:

1. Set 2025 goals for water loss control and reduction for utilities with real water losses above the metro average.
2. Encourage future returns flows to Lake Lanier, Lake Allatoona, the Chattahoochee River basin and the Flint River basin to promote their sustainable use and expand water supplies.

CHAPTER 3

Water Quality Monitoring And Assessment

Background

Water Resources Atlas

The State of Georgia 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 geological stream miles. based on the U.S. Geological Survey (USGS) 1:100,000 Digital Line Graph (DLG). The estimate for the number of lakes in Georgia is 11,813 with a total acreage of 425,382. This information is summarized in Table 3-1.

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 14 major river basins that include 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 recreational opportunities, is used for industrial purposes, drives turbines to provide electricity, and assimilates waste.

Water Use Classifications

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.

All of Georgia's waters are classified as one or more of the following designated uses: Fishing, Recreation, Drinking Water, Wild River, Scenic River, or Coastal Fishing.

Water Quality Criteria

General Water Quality Criteria for All Waters

Georgia has five narrative criteria that apply to all waters. The narrative criteria can be found in GA Rule 391-3-6-.03 Paragraph (5)(a)-(e)

Georgia has also adopted 31 numeric standards for protection of aquatic life and 92 numeric standards for the protection of human health. The general criteria apply to all waters in Georgia and can be found in GA Rule 391-3-6-.03 Paragraph (5)(i)-(iv).

Specific Water Quality Criteria for the various Designated Uses

Georgia has specific water quality criteria for each water use classification as shown in Table 3-2. These criteria establish the framework used by EPD to make water use regulatory decisions.

Georgia also has eight large publicly owned lakes that have specific water quality standards. These lakes are West Point, Jackson, Walter F. George, Lanier, Allatoona, Carter's, Oconee, and Sinclair. Criteria have been adopted for chlorophyll *a*, total nitrogen, phosphorus, bacteria, dissolved oxygen, pH, and temperature. Standards for major tributary phosphorus loading were also established. Specific Lake Criteria can be found in GA Rule 391-3-6-.03 Paragraph (17).

Criteria do not apply until approved by USEPA. The most recent approved version of Georgia's water quality standards can be found on the GAEPD water quality standards webpage.

Table 3-2.
Water Use Classifications and Instream Water Quality Standards

Parameter	Specific Criteria	Water Use Classifications						
		Drinking Water	Recreation	Fishing	Wild River	Scenic River	Coastal Fishing	Specified Lakes[1]
DO	No Change from Natural				X	X		
	Trout Streams| Daily Avg of 6.0 mg/L, Not < 5.0 mg/L	X	X	X				
	Warm Water Species| Daily Avg of 5.0 mg/L, Not < 4.0 mg/L	X	X	X				X
	Daily Avg of 5.0 mg/L, Not < 4.0 mg/L. If natural DO is less than these values, then 0.1 mg/L deficit from natural condition is allowable.						X	
pH	No change from Natural				X	X		
	6.0-8.5	X	X	X			X	
	6.0-9.5							X
Temperature	No change from Natural				X	X		
	Not to exceed 90°F	X	X	X			X	X
	Primary Trout Streams| No increase >0°F	X	X	X				
	Secondary Trout Streams| No increase >2°F	X	X	X				
	Warm Water Species - Freshwater| No increase >5°F above intake temp	X	X	X				X
	Warm Water Species - Estuarine| No increase >1.5°F above intake temp		X	X			X	
Bacteria	No change from Natural				X	X		
	Freshwater: 30-day geometric mean | 126 CFU/100 mL of *E. coli* 30-day STV | 410 CFU /100 mL of *E. coli*		X					X
	Estuarine: 30-day geometric mean | 35 CFU/100 mL of enterococci 30-day STV | 130 CFU/100 mL of enterococci		X					
	Freshwater; May - Oct.: 30-day geometric mean | 200 count/100 mL of fecal coliform Non-human, lakes/reservoirs | 300 counts/100 mL fecal coliform Non-human, rivers/streams |500 counts/100 mL fecal coliform	X		X				
	Freshwater; Nov. - April: 30-day geometric mean | 1000 counts/100 mL of fecal coliform Max | 4000 counts/100 mL of fecal coliform	X		X				
	Freshwater[2]; May - Oct.: 30-day geometric mean | 126 counts/100 mL of *E. coli* 30-day STV | 410 counts/100mL of *E. coli* Non-human, lakes/reservoirs | 189 counts/100 mL of *E. coli* Non-human, rivers/streams |315 counts/100 mL of *E. coli*	X		X				
	Freshwater[2]; Nov. - April: 30-day geometric mean | 630 counts/100 mL of *E. coli* 30-day STV | 2050 counts/100mL of *E. coli*	X		X				
	Estuarine; May - Oct.: 30-day geometric mean | 200 count/100 mL of fecal coliform Non-human, lakes/reservoirs | 300 counts/100 mL fecal coliform Non-human, rivers/streams |500 counts/100 mL fecal coliform			X			X	
	Estuarine; Nov. - April: 30-day geometric mean | 1000 counts/100 mL of fecal coliform Max | 4000 counts/100 mL of fecal coliform			X			X	
	Estuarine[2]: 30-day geometric mean | 35 counts/100 mL of enterococci 30-day STV | 130 counts/100mL of enterococci Non-human, lakes/reservoirs | 53 counts/100 mL of enterococci Non-human, rivers/streams |88 counts/100 mL of enterococci			X			X	
	Estuarine[2]; Nov. - April: 30-day geometric mean | 175 counts/100 mL of enterococci 30-day STV | 650 counts/100mL of enterococci			X			X	

[1] Specific Lake Criteria can be found in GA Rule 391-3-6-.03, paragraph 17.
[2] Criteria do not apply until approved by USEPA. The most recent approved version of Georgia's water quality standards can be found on the GAEPD water quality standards webpage.

Water Quality Monitoring
Watershed Protection Branch's goal is to effectively manage, regulate, and allocate the water resources of Georgia. To achieve this goal, the State's resources are monitored 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 existing facilities, develop TMDLs, verify water pollution control plant compliance, collect data for criteria development, and document water use impairments and reasons for problems causing less than full support of designated water uses.

Data collected at all sites includes dissolved oxygen, temperature, pH, and specific conductance; and chemical analyses for turbidity, 5-day BOD, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, total Kjeldahl nitrogen, total phosphorus, and total organic carbon. At some river sites additional parameters analyzed include bacteria (fecal coliform, *E. coli*, or enterococci depending on designated use), metals, anions (Total Dissolved Solids), and ortho phosphate. In Georgia's lakes and estuaries, bacteria (fecal coliform, *E. coli*, or enterococci depending on designated use), chlorophyll *a*, secchi disk transparency, and photic zone depth are also collected.

Some of the monitoring tools used by EPD include:

Trend Monitoring
Since the late 1960s, Georgia has conducted long term water quality monitoring of streams at strategic locations throughout Georgia. This monitoring is conducted by EPD associates and through cooperative agreements with federal, state, and local agencies at specific, fixed locations throughout the year.

EPD funds three continuous water quality monitors operated by the USGS. These monitors are located in the Coosa River at the Georgia/Alabama Stateline, in the Chattahoochee River at Hwy 92, and in the Savannah Harbor at the Corps Dock.

In 2010, EPD added 41 flow gages to its monitoring network as part of the State Water Plan. Table 3-3 provides a list of the 72 USGS stream gages funded by GAEPD in 2019.

Targeted Monitoring
EPD associates collect monthly samples from 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.

Probabilistic Monitoring
To determine the quality of all the waters in the State, EPD monitors a subset of randomly selected monitoring sites. These sites provide a sufficiently large sample size to make a statistically valid inference about Georgia's water quality.

Between 2015 and 2019 approximately 100 streams were sampled as part of the probabilistic monitoring study. The results of this monitoring predict that approximately 59% of Georgia's streams are supporting their designated uses; 3% of streams are impaired due to low dissolved oxygen; approximately 1% are impaired for temperature or metals, and 62% are impaired for fecal coliform bacteria. Approximately 11% of the waters sampled between 2015 and 2019 did not meet the pH criteria due to low pH. EPD believes that during 2017 and 2018, the pH probes may have been providing false low pH levels. Therefore, these waters were placed in Category 3 while EPD determines whether the observed low pH is due to issues with the pH probes, may be natural due to low alkalinity, or is the result of a water quality impairment. Since the accuracy of the pH data is being evaluated, EPD cannot estimate the percentage of waters impaired for pH, but it is likely less than 11%.

The accuracy of EPD's predictions is highly dependent upon the sample size. The more sites that are sampled under the

Table 3-3. USGS Stream Gages Funded By GAEPD

USGS Number	Station Name and Location
Savannah River Basin	
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
02197830	Brier Creek near Waynesboro, GA
02198000	Brier Creek at Millhaven, GA
02198100	Beaverdam Creek nr Sardis, GA
02198375	Savannah River near Estill, GA
Ogeechee River Basin	
02200120	Ogeechee River GA 88, near Grange GA
02201000	Williamson Swamp Creek at Davisboro, GA*
02202190	Ogeechee River at GA 24, near Oliver, GA
02202600	Black Creek near Blitchton, GA
02202680	Ogeechee River at GA 204, near Ellabell, GA
02203000	Canoochee River nr Claxton, GA
02203518	Canoochee River at Bridge 38, at Fort Stewart
02203536	Ogeechee River at US 17, near Richmond Hill, GA*
Altamaha River Basin	
02204520	South River at GA 81, at Snapping Shoal, GA
02208000	Yellow River at Rocky Plains Road, near Rocky Plains, GA
02211800	Towaliga River at GA 83, near Juliette, GA
02212735	Ocmulgee River at GA 18, at Dames Ferry, GA
02214075	Chaconne Creek at Houston Road, near Byron, GA
02214590	Big Indian Creek at US 341, near Clinchfield, GA
02215000	Ocmulgee River at US 341, near Hawkinsville, GA
02215100	Tucsawhatchee Creek near Hawkinsville, GA
02215500	Ocmulgee River at Lumber City, GA
02215900	Little Ocmulgee River at GA 149, at Scotland, GA
02216180	Turnpike Creek near McRae, GA
02223110	Buffalo Creek at GA 272, near Oconee, GA
02223190	Commissioner Creek at US 441, at McIntyre, GA
02223360	Big Sandy Creek at US 441, near Irwinton, GA
02225270	Ohoopee River at GA 297, near Swainsboro, GA
02225500	Ohoopee River nr Reidsville, GA
Suwannee River Basin	
02315920	Alapaha River at GA 125/32, near Irwinville, GA
02317797	Little River Near Ty Ty Road near Tifton, GA
02318000	Little River near Adel, GA*
Satilla River Basin	
02226180	Brunswick River at St. Simons Island, GA
02226362	Satilla River at GA 158, near Waycross, GA
02226500	Satilla River near Waycross, GA
02227270	Alabaha River at GA 203, near Blackshear, GA
02227500	Little Satilla River near Offerman, 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	
23312495	Soquee River at GA 197 near Clarkesville, GA*

USGS Number	Station Name and Location
02343940	Sawhatchee Creek at Cedar Springs, GA
02342850	Hanahatchee Creek at Union Road, near Union GA
02343225	Pataula Creek at US 82, near Georgetown, GA
02337500	Snake Creek near Whitesburg, GA
02338660	New River near Corinth, 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*

* Partially funded by another cooperator

probabilistic monitoring study, the more likely it is that the results will reflect the status of all the State's streams. Thirty to 50 sites should be a sufficient sample size. While approximately 100 sites were sampled as part of the probabilistic monitoring study, not all the parameters reported above were measured at each site. Dissolved oxygen, pH, and temperature data were collected at all sites, metals were collected at 66 sites and fecal coliform bacteria data was only collected at 58 sites.

EPD also 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 (2008-2009, 2013-2014; & 2018-2019), the National Wetlands Condition Assessments (2011 & 2016), and in cooperation with the DNR Coastal Resources Division, the National Coastal Condition Assessment (2015).

Lake Monitoring

Since the late 1960's EPD has maintained a monitoring program for Georgia's 28 public lakes. Currently, these lakes are sampled every year from April to October when primary productivity is highest. The data collected in the lake 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, alkalinity, hardness, suspended solids, ammonia, nitrate-nitrite, total Kjeldahl nitrogen, total phosphorus, total organic carbon, bacteria (fecal coliform or *E. coli* depending on designated use), and chlorophyll *a*.

Three measurements (secchi depth, chlorophyll *a* and total phosphorus) are used

to calculate Carlson's Trophic State Index (TSI) for each lake's dampool location each month using the equations below.

TSI_{secchi} = 60 – (14.41) (ln Secchi disk (meters))

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

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

Results are combined into a total trophic state index (TTSI) and the growing-season average TTSI is used to assess each of the various lakes. The historic growing-season average TTSI for each of the 28 major lakes are graphed in Figure 3-1.

Estuary Monitoring
In addition to the lakes, EPD monitors eight estuaries annually during the growing season from April through October.

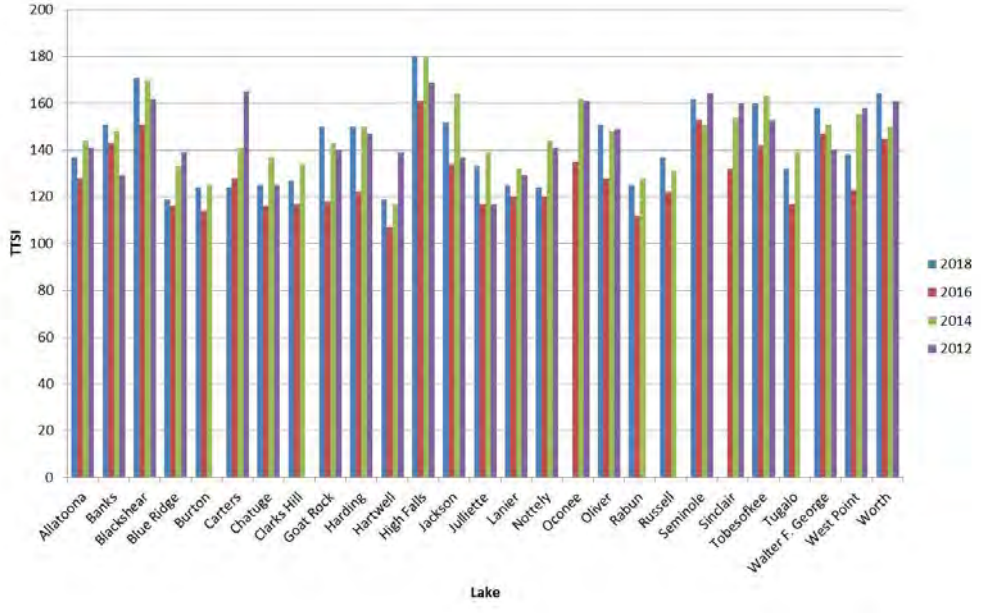
Coastal Monitoring
CRD conducts the majority of coastal monitoring in the State. CRD conducts water quality monitoring in estuarine and near-shore coastal waters through its Public Health Water Quality Monitoring Program. This program includes the Shellfish Sanitation and Beach Water Quality Monitoring Programs that are concerned with public health. See Chapter 5 for more details.

Biological Monitoring
Biological monitoring is performed to assess the biological integrity of the State's waters. WRD has been conducting fish bioassessments since the early 1990s. Since 2007, EPD has been utilizing macroinvertebrate data to assess the biotic integrity of wadeable streams.

Intensive Surveys
These studies focus intensive monitoring on a particular issue or problem over a short time period. EPD conducts several basic types of intensive surveys, including model calibration surveys for wasteload allocation and/or TMDL modeling and impact studies to determine the cause and effect relationships between pollutant sources and receiving waters.

EPD is currently reevaluating the State's instream criteria for dissolved oxygen and pH. Some areas of the State, particularly in South Georgia, have dissolved oxygen concentrations and pH levels that are often naturally lower than the State's current criteria, especially in blackwaters. The percentage of streams assessed as impaired for dissolved oxygen may change once the new criteria are adopted.

Figure 3-1.
Historic Growing-Season Average Total Trophic State Index for Georgia's Major Lakes



Toxic Substance Stream Monitoring
EPD has focused on the management and control of toxic substances in the State's waters for many years. During 2018-2019, metals were monitored at 160 sites. Wherever discharges were found to have toxic impacts or to include toxic pollutants, EPD incorporated specific limitations on toxic pollutants in NPDES discharge permits. Toxic substance analyses are conducted on samples from selected trend monitoring stations.

Aquatic Toxicity Testing
Biomonitoring requirements are addressed in all municipal and industrial NPDES permits. EPD has Reasonable Potential Procedures that outline conditions for conducting whole effluent toxicity (WET) testing for municipal and industrial discharges.

Facility Compliance Sampling
EPD 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 Each year over 86 inspections are performed. The results are used to confirm validity of permittee self-monitoring data and as supporting evidence in enforcement actions

Figure 3-2 shows the monitoring network stations for 2018-2019. This figure includes the State-wide trend monitoring network stations, the targeted monitoring stations, probabilistic stations and stations sampled by CRD. A list of these stations and the parameters sampled is presented in Table 3-5.

Fish Tissue Monitoring
Each year fish tissue samples are collected from Georgia lakes and rivers, and estuaries by either WRD, or CRD, depending on whether the site is freshwater (WRD), or estuarine/marine waters (CRD) and analyzed for general contaminants. Sampling sites, fish species, and fish size are selected based on fishing pressure and/or where more information is required for a particular species. The data assessments are incorporated annually into the Guidelines for Eating Fish for Georgia Waters and Georgia's Freshwater and Saltwater Sport Fishing Regulations. See Chapter 6 for more details.

As part of the implementation of the Federal Clean Air Mercury Rule (CAMR), a rigorous monitoring program of mercury in fish tissue was developed for trend analysis and to determine the efficacy of reductions in air mercury emissions. A project was designed and implemented in 2006 consisting of 22 fish mercury trend stations, which are monitored annually. Nineteen stations are fresh water and three are estuarine. The mercury in fish trend monitoring sites are provided in Table 3-4.
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Table 3-4.
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

Figure 3-2.
Georgia Monitoring Network Station Locations 2018-2019

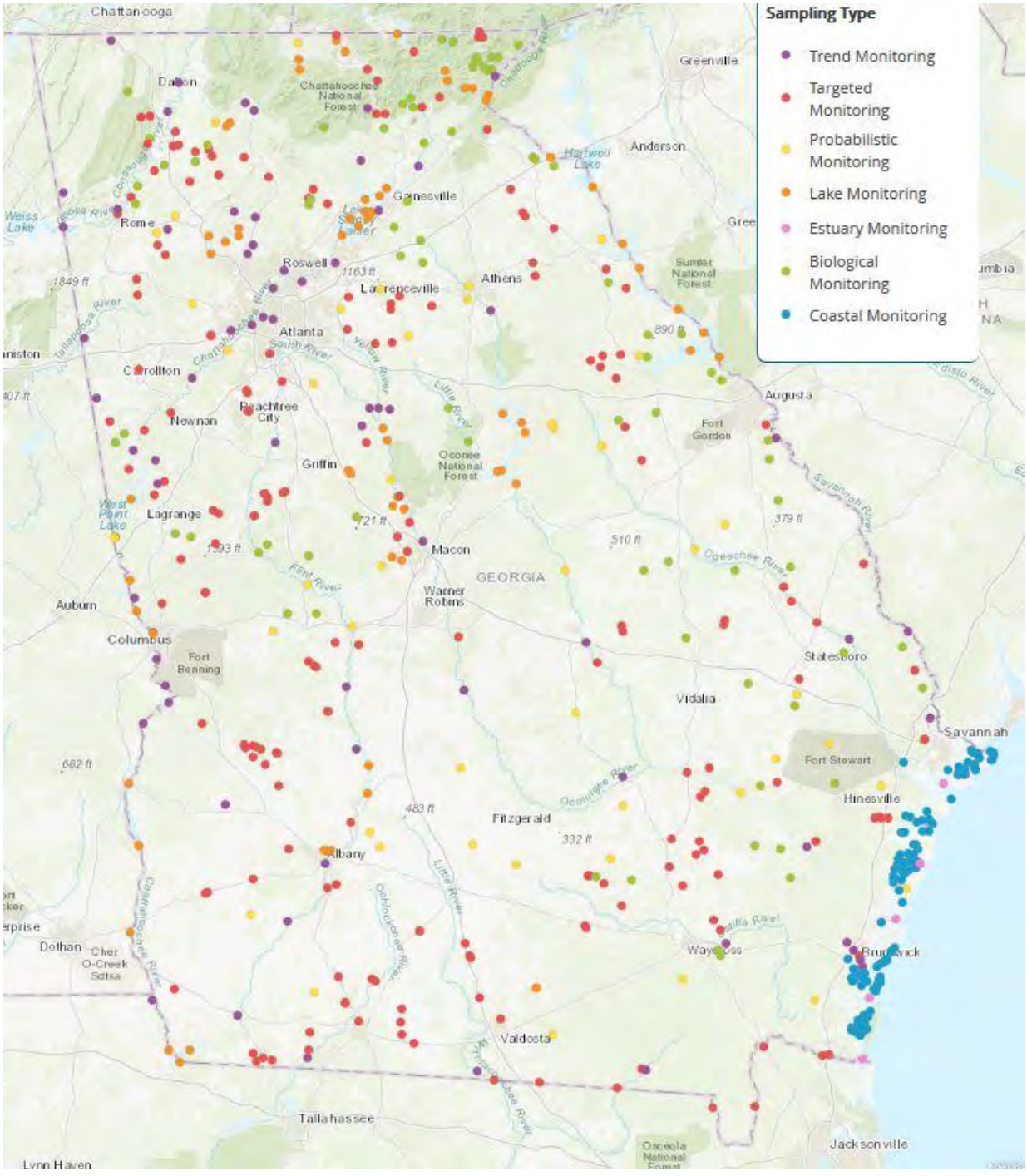

Table 3-5. Statewide Monitoring Network for 2018-2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
RV_06_2846	Altamaha River 6.0 miles downstream from Doctortown, GA	Altamaha	USGS	Trend Monitoring	31.6233	-81.7653	X	X			X					X		2018/2019
RV_12_4280	Big Creek at Roswell Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	Trend Monitoring	34.017851	-84.352492	X	X	X		X		X	X	X			2018/2019
RV_12_3891	Chattahoochee River - Atlanta Water Intake	Chattahoochee	Atlanta WP	Trend Monitoring	33.8278	-84.455	X	X	X				X					2018/2019
RV_12_3859	Chattahoochee River - DeKalb County Water Intake	Chattahoochee	Atlanta WP	Trend Monitoring	33.9731	-84.2631	X	X	X									2018/2019
RV_12_3934	Chattahoochee River at Bankhead Highway	Chattahoochee	Atlanta WP	Trend Monitoring	33.795278	-84.507778	X	X	X				X					2018/2019
RV_12_3960	Chattahoochee River at Capps Ferry Road near Rico, GA	Chattahoochee	Atlanta WP	Trend Monitoring	33.5778	-84.808611	X	X	X				X					2018/2019
RV_12_3870	Chattahoochee River at Cobb County Water Intake near Roswell, GA	Chattahoochee	Atlanta WP	Trend Monitoring	33.9443	-84.405	X	X	X									2018/2019
RV_12_3841	Chattahoochee River at McGinnis Ferry Road	Chattahoochee	Atlanta WP	Trend Monitoring	34.050556	-84.097701	X	X	X				X					2018/2019
RV_12_4316	Peachtree Creek at Northside Drive in Atlanta, GA	Chattahoochee	Atlanta WP	Trend Monitoring	33.8194	-84.407778	X	X	X		X		X	X	X			2018/2019
RV_12_4329	Sweetwater Creek at Interstate Highway 20	Chattahoochee	Atlanta WP	Trend Monitoring	33.7728	-84.614722	X	X	X		X		X	X	X			2018/2019
LK_12_4074	Lake Harding - Dam Forebay (aka Chatt. River US Bartletts Ferry Dam)	Chattahoochee	CWW/Atlanta WP	Trend Monitoring	32.6633	-85.090278	X		X								X	2018/2019
LK_12_4079	Lake Oliver - Chattahoochee River at Columbus Water Intake near Columbus, GA	Chattahoochee	CWW	Trend Monitoring	32.5214	-84.9983	X	X										2018/2019
RV_12_4084	Chattahoochee River downstream from Columbus Water Treatment Facility	Chattahoochee	CWW	Trend Monitoring	32.4089	-84.9803	X	X										2018/2019
RV_12_4091	Chattahoochee River downstream Oswichee Creek	Chattahoochee	CWW	Trend Monitoring	32.3	-84.9369	X	X										2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
RV_12_4093	Chattahoochee River at Hichitee Creek (River Mile 127.6)	Chattahoochee	CWW	Trend Monitoring	32.2308	-84.9232	X	X										2018/2019
RV_12_3902	Chattahoochee River at Belton Bridge Road near Lula, GA	Chattahoochee	USGS	Trend Monitoring	34.4451	-83.6842	X	X			X					X		2018/2019
RV_12_4094	Chattahoochee River at Spur 39 near Omaha, GA (Seaboard Railroad)	Chattahoochee	USGS	Trend Monitoring	32.1436	-85.0453	X	X					X					2018/2019
RV_12_4110	Chattahoochee River at SR 91 near Steam Mill, GA	Chattahoochee	USGS	Trend Monitoring	30.9775	-85.0053	X	X					X					2018/2019
RV_12_4041	Chattahoochee River at US Hwy. 27 near Franklin, GA	Chattahoochee	USGS	Trend Monitoring	33.2792	-85.1	X	X			X					X		2018/2019
RV_12_3925	Chestatee River at SR 400 near Dahlonega, GA	Chattahoochee	USGS	Trend Monitoring	34.4667	-83.9689	X	X			X					X		2018/2019
RV_12_4292	Dicks Creek at Forest Service Road 144-1 near Neels Gap, GA	Chattahoochee	USGS	Trend Monitoring	34.6797	-83.9372	X	X			X					X		2018/2019
RV_12_4003	Flat Creek at McEver Road near Gainesville, GA	Chattahoochee	USGS	Trend Monitoring	34.2658	-83.885	X	X			X					X		2018/2019
RV_12_4039	New River at SR 100 near Corinth, GA	Chattahoochee	USGS	Trend Monitoring	33.2353	-84.9878	X	X			X					X		2018/2019
RV_12_4049	Yellow Jacket Creek at Hammet Road near Hogansville, GA	Chattahoochee	USGS	Trend Monitoring	33.1392	-84.9753	X	X			X					X		2018/2019
RV_14_4640	Chattooga River at Holland-Chattoogaville Road (FAS1363) near Lyerly, GA	Coosa	USGS	Trend Monitoring	34.3356	-85.4453	X	X					X					2018/2019
RV_14_4460	Conasauga River at Tilton Bridge near Tilton, GA	Coosa	USGS	Trend Monitoring	34.6667	-84.9283	X	X					X					2018/2019
RV_14_4438	Conasauga River at US Hwy. 76 near Dalton, GA	Coosa	USGS	Trend Monitoring	34.783	-84.873	X	X					X					2018/2019
RV_14_4622	Coosa River - GA/Alabama State Line Monitor near Cave Springs	Coosa	USGS	Trend Monitoring	34.1983	-85.4439	X	X					X					2018/2019
RV_14_4520	Coosawattee River at Georgia Hwy. 5 near Ellijay, GA	Coosa	USGS	Trend Monitoring	34.6717	-84.5002	X	X					X					2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
RV_14_4586	Etowah River at Hardin Bridge (FAS 829) near Euharlee, GA	Coosa	USGS	Trend Monitoring	34.18886	-84.9251	X	X					X					2018/2019
RV_14_4549	Etowah River at SR 5 spur near Canton, GA	Coosa	USGS	Trend Monitoring	34.2397	-84.4944	X	X					X					2018/2019
RV_14_4555	Little River at Georgia Hwy. 5 near Woodstock, GA	Coosa	USGS	Trend Monitoring	34.1222	-84.5043	X	X					X					2018/2019
RV_14_4518	Mountaintown Creek at SR 282 (US Hwy. 76) near Ellijay, GA	Coosa	USGS	Trend Monitoring	34.7034	-84.5398	X	X					X					2018/2019
RV_14_4851	Noonday Creek at Georgia Hwy. 92 near Woodstock, GA	Coosa	USGS	Trend Monitoring	34.0861	-84.5306	X	X					X					2018/2019
RV_14_4534	Oostanaula River at Rome Water Intake near Rome, GA	Coosa	USGS	Trend Monitoring	34.2703	-85.1733	X	X					X					2018/2019
RV_14_4550	Shoal Creek at SR 108 (Fincher Road) near Waleska, GA	Coosa	USGS	Trend Monitoring	34.2608	-84.5956	X	X					X					2018/2019
RV_15_4918	West Chickamauga Creek - Georgia Highway 146 near Ringgold, GA	Tennessee	USGS	Trend Monitoring	34.9572	-85.2056	X	X					X					2018/2019
RV_11_3553	Flint River at SR 234 near Albany, GA	Flint	USGS	Trend Monitoring	31.5524	-84.1463	X	X			X					X		2018/2019
RV_11_3507	Flint River at SR 26 near Montezuma	Flint	USGS	Trend Monitoring	32.2929	-84.044	X	X			X					X		2018/2019
RV_11_3558	Flint River at SR 37 at Newton, GA	Flint	USGS	Trend Monitoring	31.3094	-84.335	X	X			X					X		2018/2019
RV_11_3487	Flint River at SR 92 near Griffin, GA	Flint	USGS	Trend Monitoring	33.3089	-84.3931	X	X			X					X		2018/2019
RV_11_3563	Flint River at US Hwy. 27-B near Bainbridge, GA	Flint	USGS	Trend Monitoring	30.9109	-84.5805	X	X			X					X		2018/2019
RV_11_3804	Lime Creek at Springhill Church Rd	Flint	Tifton WP	Trend Monitoring	32.035	-83.9925	X	X			X		X	X	X	X		2018/2019
RV_11_3807	Little Ichawaynochaway Creek at CR3	Flint	Tifton WP	Trend Monitoring	31.803532	-84.640013	X	X			X		X	X	X	X		2018/2019
RV_10_3386	Ochlockonee River at Hadley Ferry Road near Calvary, GA	Ochlockonee	USGS/Tifton WP	Trend Monitoring	30.7317	-84.2355	X	X			X					X		2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
RV_04_888	Alcovy River at Newton Factory Bridge Road near Stewart, GA	Ocmulgee	USGS	Trend Monitoring	33.4494	-83.8283	X	X			X					X		2018/2019
RV_05_2203	Ocmulgee River at Hawkinsville, GA	Ocmulgee	USGS/Tifton WP	Trend Monitoring	32.2818	-83.4628	X	X			X		X			X		2018/2019
RV_05_2165	Ocmulgee River at New Macon Water Intake	Ocmulgee	USGS	Trend Monitoring	32.8992	-83.6641	X	X			X					X		2018/2019
RV_05_2223	Ocmulgee River at US Hwy. 341 at Lumber City, GA	Ocmulgee	USGS	Trend Monitoring	31.9199	-82.6743	X	X			X					X		2018/2019
RV_04_853	South River at Island Shoals Road near Snapping Shoals, GA	Ocmulgee	USGS	Trend Monitoring	33.4527	-83.9271	X	X			X					X		2018/2019
RV_04_892	Tussahaw Creek at Fincherville Road near Jackson, GA	Ocmulgee	USGS	Trend Monitoring	33.3789	-83.9634	X	X			X					X		2018/2019
RV_04_876	Yellow River at Georgia Hwy. 212 near Stewart, GA	Ocmulgee	USGS	Trend Monitoring	33.4543	-83.8813	X	X			X					X		2018/2019
RV_03_502	Oconee River at Barnett Shoals Road near Athens, GA	Oconee	USGS	Trend Monitoring	33.8562	-83.3265	X	X			X					X		2018/2019
RV_03_640	Oconee River at Interstate Hwy. 16 near Dublin, GA	Oconee	USGS	Trend Monitoring	32.4804	-82.8582	X	X			X					X		2018/2019
RV_02_298	Ogeechee River at Georgia Hwy. 24 near Oliver, GA	Ogeechee	USGS	Trend Monitoring	32.4948	-81.5558	X	X			X					X		2018/2019
RV_07_2986	Satilla River at Georgia Hwy.15 and Hwy.121	Satilla	USGS	Trend Monitoring	31.2167	-82.1625	X	X			X					X		2018/2019
SH_07_3035	Brunswick Harbor (off East River) - 0.83 miles SW of Brunswick	Satilla	Brunswick WP	Trend Monitoring	31.14361	-81.4975	X										X	2018/2019
SH_07_3036	Brunswick River - U.S. Highway 17	Satilla	Brunswick WP	Trend Monitoring	31.1164	-81.4858	X						X				X	2018/2019
SH_07_3032	Turtle River - Georgia Highway 303	Satilla	Brunswick WP	Trend Monitoring	31.18694	-81.53139	X										X	2018/2019
SH_07_3029	Turtle River off Hermitage Island	Satilla	Brunswick WP	Trend Monitoring	31.22028	-81.56417	X										X	2018/2019
RV_01_66	Chattooga River at US Hwy. 76 near Clayton, GA	Savannah	USGS	Trend Monitoring	34.814	-83.3064	X	X			X					X		2018/2019

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RV_01_87	Savannah River at 0.5 mile downstream from Spirit Creek	Savannah	USGS	Trend Monitoring	33.3306	-81.9153	X	X			X					X		2018/2019
RV_01_109	Savannah River at Seaboard Coast Line Railway, north of Clyo, GA	Savannah	USGS	Trend Monitoring	32.525	-81.264	X	X			X					X		2018/2019
RV_01_120	Savannah River at US Hwy. 17 (Houlihan Bridge)	Savannah	USGS	Trend Monitoring	32.1658	-81.1539	X	X			X					X		2018/2019
RV_09_3181	Suwannee River at US Hwy. 441 near Fargo, GA	Suwannee	USGS/Tifton WP	Trend Monitoring	30.6806	-82.5606	X	X			X					X		2018/2019
RV_09_3236	Withlacoochee River at Clyattsville-Nankin Road near Clyattsville, GA	Suwannee	USGS	Trend Monitoring	30.6747	-83.3947	X	X			X					X		2018/2019
RV_13_4349	Little Tallapoosa River at Georgia Hwy. 100 near Bowden, GA	Tallapoosa	USGS	Trend Monitoring	33.4928	-85.2792	X	X					X					2018/2019
RV_13_4353	Tallapoosa River at Georgia Hwy. 8 near Tallapoosa, GA	Tallapoosa	USGS	Trend Monitoring	33.7408	-85.3364	X	X					X					2018/2019
RV_06_2850	Fountain Branch at Logging Road near Ludowici, GA	Altamaha	Brunswick WP	Targeted Sampling	31.646461	-81.720465	X				X					X		2018
RV_12_4225	Brush Creek at Bevis Rd near Franklin, GA	Chattahoochee	Atlanta WP	Targeted Sampling	33.201865	-85.116664	X	X			X		X	X	X			2018
RV_12_4297	Hannahatchee Creek at Moores Store Rd	Chattahoochee	Tifton WP	Targeted Sampling	32.14205	-84.756105	X				X							2018
RV_12_4146	Standing Boy Creek at Fortson Rd near Cataula, GA	Chattahoochee	Atlanta WP	Targeted Sampling	32.641702	-84.953146	X	X			X							2018
RV_12_16773	Tributary to Mountain Creek at Callaway Gardens near Pine Mountain, GA	Chattahoochee	Atlanta WP	Targeted Sampling	32.828	-84.861	X	X			X							2018
RV_12_17283	Sautee Creek at Lynch Mountain Rd near Helen, GA	Chattahoochee	Cartersville WP	Targeted Sampling	34.68497	-83.66906	X						X					2018
RV_12_17286	Soquee R. at Watts Mill Rd.	Chattahoochee	Cartersville WP	Targeted Sampling	34.72868	-83.58385	X				X		X					2018
RV_12_17282	Town Creek at U.S. 19 near Cleveland	Chattahoochee	Cartersville WP	Targeted Sampling	34.65933	-83.84945	X				X							2018

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RV_12_17281	Tributary to Chestatee near Cleveland	Chattahoochee	Cartersville WP	Targeted Sampling	34.66088	-83.89351	X				X		X					2018
RV_14_4480	Bow Creek at Old Rome-Dalton Road	Coosa	Cartersville WP	Targeted Sampling	34.53859	-85.0267	X	X					X					2018
RV_14_4823	Crane Eater Creek at Pine Chappel Road	Coosa	Cartersville WP	Targeted Sampling	34.53111	-84.8722	X	X					X					2018
RV_14_4825	Dozier Creek at Bells Ferry Road	Coosa	Cartersville WP	Targeted Sampling	34.32083	-85.1103	X	X										2018
RV_14_16687	Etowah River at South Broad Street Rome	Coosa	Cartersville WP	Targeted Sampling	34.2515	-85.1763	X	X			X		X					2018
RV_14_17277	Fuller Branch at Riddle Mill Rd near	Coosa	Cartersville WP	Targeted Sampling	34.411026	-84.671791	X	X										2018
RV_14_17274	Lick Creek at Liberty Church Rd near Ranger, GA	Coosa	Cartersville WP	Targeted Sampling	34.514598	-84.724472	X											2018
RV_14_17276	Marlow Branch at Hwy 61 near Ranger, GA	Coosa	Cartersville WP	Targeted Sampling	34.485759	-84.706371	X						X					2018
RV_14_17272	Robins Creek at W. Kinman Rd near Calhoun	Coosa	Cartersville WP	Targeted Sampling	34.430119	-84.994258	X											2018
RV_14_16799	Town Creek at Newton Creek Loop near Calhoun, GA	Coosa	Cartersville WP	Targeted Sampling	34.528	-84.899	X	X										2018
RV_11_17310	Horse Creek at Butler Mill Rd near Marshallville, GA	Flint	Atlanta WP	Targeted Sampling	32.478577	-84.099924	X	X								X		2018
RV_11_3589	Fish Pond Drain at Town and Country Rd	Flint	Tifton WP	Targeted Sampling	31.02469	-84.893255	X				X							2018
RV_11_5111	Bryants Swamp at Bryant Hill Rd	Flint	Tifton WP	Targeted Sampling	32.472617	-83.979535	X				X							2018
RV_11_16756	Kell Creek at SR 62	Flint	Tifton WP	Targeted Sampling	31.48577	-84.50654	X				X							2018
RV_11_5103	Kiokee Creek at Old Dawson Rd	Flint	Tifton WP	Targeted Sampling	31.61222	-84.326491	X				X							2018
RV_11_16330	Mossy Creek at Pleasant Hill Rd	Flint	Tifton WP	Targeted Sampling	31.87844	-84.375904	X				X							2018

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RV_10_3369	Bridge Creek at CR 222	Ochlockonee	Tifton WP	Targeted Sampling	31.066944	-83.918056	X				X							2018
RV_10_3366	Ochlockonee River at Zion Grove Church Rd	Ochlockonee	Tifton WP	Targeted Sampling	31.0565	-83.899467	X				X							2018
RV_10_3384	Tired Creek at CR 151	Ochlockonee	Tifton WP	Targeted Sampling	30.76361	-84.2294	X				X							2018/2019
RV_10_3389	Attapulgus at US Hwy 27	Ochlockonee	Tifton WP	Targeted Sampling	30.73278	-84.4536	X				X							2018/2019
RV_10_3390	Swamp Creek at US Hwy 27	Ochlockonee	Tifton WP	Targeted Sampling	30.71944	-84.4114	X				X							2018/2019
RV_10_3423	Little Attapulgus at SR 241	Ochlocknee	Tifton WP	Targeted Sampling	30.71806	-84.49	X				X							2018/2019
RV_10_3415	Oquina Creek at Old Cassidy Rd	Ochlockonee	Tifton WP	Targeted Sampling	30.884714	-83.98171	X				X							2018
RV_10_3425	Parkers Mill Creek at CR 324	Ochlockonee	Tifton WP	Targeted Sampling	30.838056	-84.22611	X				X							2018
RV_05_2817	Crooked Creek at West Lake Rd	Ocmulgee	Tifton WP	Targeted Sampling	32.501896	-83.487386	X				X							2018
RV_05_2147	Calaparchee Creek at Sanders Rd (CR 49) near Bolin	Ocmulgee	Atlanta WP	Targeted Sampling	32.922014	-83.79499	X						X	X	X			2018
RV_05_2149	Rocky Creek at Tucker Road (CR 742) near Macon, GA	Ocmulgee	Atlanta WP	Targeted Sampling	32.86102	-83.744632	X						X					2018
RV_05_2124	Scoggins Creek at River Road (County Road 60) near East Juliette	Ocmulgee	Atlanta WP	Targeted Sampling	33.091252	-83.775112	X						X					2018
RV_05_2163	Tobler Creek at U.S. Highway 23 near Forsyth, GA	Ocmulgee	Atlanta WP	Targeted Sampling	32.977333	-83.730169	X						X	X	X			2018
RV_05_17304	Tributary to Yellow Water Creek at Moore Rd near Jackson, GA	Ocmulgee	Atlanta WP	Targeted Sampling	33.308996	-83.942332	X				X							2018
RV_03_510	Apalachee River at SR 81 near Bethlehem, GA	Oconee	Atlanta WP	Targeted Sampling	33.915825	-83.78141	X				X							2018
RV_03_17303	Shoal Creek at Bradley Gin Rd near Bethlehem, GA	Oconee	Atlanta WP	Targeted Sampling	33.87249	-83.61928	X				X							2018

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RV_02_17287	Goldens Creek at W. Quarter Rd near Warrenton, GA	Ogeechee	Atlanta WP	Targeted Sampling	33.376756	-82.663196	X				X		X			X		2018
RV_02_17288	Rocky Comfort Creek at SR 102 near Gibson, GA	Ogeechee	Atlanta WP	Targeted Sampling	33.23498	-82.583042	X											2018
RV_02_16390	Cay Creek	Ogeechee	Brunswick WP	Targeted Sampling	31.7437	-81.39733	X											2018
RV_02_17327	N. Newport River 1.6 miles DS of I-95	Ogeechee	Brunswick WP	Targeted Sampling	31.74627	-81.36208	X											2018
RV_02_17326	Peacock Creek near Riceboro, GA	Ogeechee	Brunswick WP	Targeted Sampling	31.74979	-81.40732	X											2018
RV_02_368	Riceboro Creek at Seaboard Coast Line Railroad in Riceboro, GA	Ogeechee	Brunswick WP	Targeted Sampling	31.74611	-81.42809	X											2018
RV_07_2976	Seventeen Mile River at Hwy 64 near Pearson, GA	Satilla	Brunswick WP	Targeted Sampling	31.373333	-82.678817	X											2018
RV_07_2973	Seventeen Mile River at SR 158 near Douglas, GA	Satilla	Brunswick WP	Targeted Sampling	31.46862	-82.76685	X											2018
RV_07_16398	Tributary to Tributary to Seventeen Mile River at Gaskin Avenue near Douglas, GA	Satilla	Brunswick WP	Targeted Sampling	31.502071	-82.845428	X				X							2018
RV_01_82	Butler Creek - 0.5 Mile Downstream from Phinizy Ditch	Savannah	Atlanta WP	Targeted Sampling	33.384444	-81.965556	X											2018
RV_01_17299	Big Clouds Creek at Hwy 22 near Comer, GA	Savannah	Atlanta WP	Targeted Sampling	33.997497	-83.109412	X				X		X					2018
RV_01_17297	Fork Creek at Bennett Rd near Bowman, GA	Savannah	Atlanta WP	Targeted Sampling	34.19196	-83.01754	X				X							2018
RV_01_17300	Hannah Creek at Hannah Creek Church Rd near Franklin Springs, GA	Savannah	Atlanta WP	Targeted Sampling	34.240447	-83.156347	X				X		X					2018
RV_01_176	Hayes Creek at Dove Hill Rd near Franklin Springs, GA	Savannah	Atlanta WP	Targeted Sampling	34.255102	-83.167656	X				X							2018
RV_01_41	Pistol Creek at Wilkes Co Rd 128 (Oscar Walton Rd) near Tignall	Savannah	Atlanta WP	Targeted Sampling	33.947416	-82.656777	X				X		X					2018

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RV_01_17295	Stephens Creek at Hubbard Rd near Carnesville, GA	Savannah	Atlanta WP	Targeted Sampling	34.348995	-83.229664	X				X		X			X		2018
RV_01_17301	Toccoa Creek at Falls Rd near Toccoa, GA	Savannah	Atlanta WP	Targeted Sampling	34.593285	-83.345081	X				X							2018
RV_01_17298	Tributary to South Fork Broad River at Hill Street near Comer, GA	Savannah	Atlanta WP	Targeted Sampling	34.050214	-83.11731	X				X		X					2018
RV_01_17293	Wahachee Creek at Dr. George Ward Rd near Elberton, GA	Savannah	Atlanta WP	Targeted Sampling	34.022763	-82.759673	X				X		X					2018
RV_01_17325	Brier Creek at Brannens Bridge Road	Savannah	Brunswick WP	Targeted Sampling	32.8105	-81.4844	X				X							2018
RV_01_115	Ebenezer Creek at Long Bridge Road (CR 307) near Stillwell, GA	Savannah	Brunswick WP	Targeted Sampling	32.364583	-81.23075	X				X							2018
RV_09_3203	Alapahoochee River at SR 135	Suwannee	Tifton WP	Targeted Sampling	30.628333	-83.087778	X											2018
RV_09_16765	Piscola Creek at Coffee Rd	Suwannee	Tifton WP	Targeted Sampling	30.881135	-83.771941	X	X										2018
RV_09_16764	Piscola Creek at Hwy 122	Suwannee	Tifton WP	Targeted Sampling	30.939235	-83.768289	X	X										2018
RV_09_16763	Piscola Creek at SR 33	Suwannee	Tifton WP	Targeted Sampling	30.830549	-83.769923	X	X										2018
RV_09_3230	Piscola Creek at US Hwy 84	Suwannee	Tifton WP	Targeted Sampling	30.793056	-83.706389	X	X										2018
RV_09_3153	Suwannoochee Creek at Hwy 441	Suwannee	Tifton WP	Targeted Sampling	30.683056	-82.583056	X											2018
RV_09_3155	Toms Creek at CR 36	Suwannee	Tifton WP	Targeted Sampling	30.605278	-82.70444	X											2018
RV_09_16800	Tributary to Cherry Creek DS Oak St. Subdivision WPCP	Suwannee	Tifton WP	Targeted Sampling	30.89499	-83.27701	X				X							2018
RV_09_3237	Withlacoochee River at Hwy 31	Suwannee	Tifton WP	Targeted Sampling	30.635667	-83.3115	X											2018
RV_15_4945	Betty Creek at RCNS footbridge	Tennessee	Cartersville WP	Targeted Sampling	34.968314	-83.390897	X				X		X					2018

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RV_15_17279	Kelly Creek at Hugh Kelly Lane	Tennessee	Cartersville WP	Targeted Sampling	34.970215	-83.367419	X				X		X					2018
RV_15_4927	Little Tennessee River - 0.2 Mile Upstream from State Line	Tennessee	Cartersville WP	Targeted Sampling	34.993056	-83.381389	X											2018
RV_04_2057	Alcovy River at State Road 81 near Loganville, GA	Upper Ocmulgee	Atlanta WP	Targeted Sampling	33.881667	-83.824167	X				X		X					2018
RV_04_880	Bay Creek at Piney Grove Road near Loganville, GA	Upper Ocmulgee	Atlanta WP	Targeted Sampling	33.862	-83.824483	X				X					X		2018
RV_06_2838	Altamaha River at US Hwy 1	Altamaha	Brunswick WP	Targeted Sampling	31.938889	-82.356944	X											2019
RV_06_17536	Bells Mill Creek at Providence Church Rd near Toombs Central, GA	Altamaha	Brunswick WP	Targeted Sampling	31.95489	-82.2442	X											2019
RV_06_17537	Little Tenmile Creek at Tenmile Rd near Baxley, GA	Altamaha	Brunswick WP	Targeted Sampling	31.855	-82.26736	X											2019
RV_06_2915	Spring Branch at CR 349 near Glennville, GA	Altamaha	Brunswick WP	Targeted Sampling	31.896325	-81.910975	X				X					X		2019
RV_06_17538	Tenmile Creek at Tenmile Rd near Baxley, GA	Altamaha	Brunswick WP	Targeted Sampling	31.83558	-82.28934	X	X										2019
RV_06_17555	Pendleton Creek at Hwy 80 near Adrian, GA	Altamaha	Tifton WP	Targeted Sampling	32.55116	-82.68018	X				X							2019
RV_06_17556	Pendleton Creek at Hwy 86 near Ardian, GA	Altamaha	Tifton WP	Targeted Sampling	32.52442	-82.67524	X				X							2019
RV_12_4050	Beech Creek at Hammett Road near LaGrange, GA	Chattahoochee	Atlanta WP	Targeted Sampling	33.09541	-84.994157	X	X										2019
RV_12_17499	Denny Creek at Denny Creek Rd near Ephesus, GA	Chattahoochee	Atlanta WP	Targeted Sampling	33.398065	-85.212585	X	X			X		X					2019
RV_12_17253	Flat Creek at Hightower Road	Chattahoochee	Atlanta WP	Targeted Sampling	33.15155	-84.94428	X	X			X		X					2019
RV_12_4033	Hilly Mill Creek at Enon Grove Road	Chattahoochee	Atlanta WP	Targeted Sampling	33.360278	-85.042222	X	X			X		X					2019
RV_12_17489	Little Anneewakee Creek at Somer Mill Rd near Douglasville, GA	Chattahoochee	Atlanta WP	Targeted Sampling	33.755104	-84.713607	X				X							2019

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RV_12_17490	Little Anneewakee Creek at Vansant Rd near Douglasville, GA	Chattahoochee	Atlanta WP	Targeted Sampling	33.751162	-84.711971	X				X							2019
RV_12_17519	Trib to Mulberry Creek at Oakview Street near Waverly Hall, GA	Chattahoochee	Atlanta WP	Targeted Sampling	32.688794	-84.741871	X	X			X							2019
RV_12_17518	Trib to Mulberry Creek at Pond Street near Waverly Hall, GA	Chattahoochee	Atlanta WP	Targeted Sampling	32.68843	-84.738485	X	X			X							2019
RV_12_3971	Wahoo Creek at Wagers Mill Road	Chattahoochee	Atlanta WP	Targeted Sampling	33.436667	-84.911667	X	X										2019
RV_14_17575	Ballard Creek at Folsom Glade Rd near Adairsville, GA	Coosa	Cartersville WP	Targeted Sampling	34.384583	-84.816989	X											2019
RV_14_5142	Dead Man's Branch at Corinth Rd	Coosa	Cartersville WP	Targeted Sampling	34.587072	-84.889544	X	X										2019
RV_14_4650	Dry Creek at Pine Bow Rd	Coosa	Cartersville WP	Targeted Sampling	34.083	-84.939	X											2019
RV_14_17574	Etowah River at Eagles Beak Park near Hightower, GA	Coosa	Cartersville WP	Targeted Sampling	34.313127	-84.230672	X	X			X		X					2019
RV_14_16423	Etowah River at Kelly Bridge Rd	Coosa	Cartersville WP	Targeted Sampling	34.352667	-84.20625	X	X			X		X					2019
RV_14_4579	Euharlee Creek at Government Farm Rd	Coosa	Cartersville WP	Targeted Sampling	33.985	-85.082	X											2019
RV_14_4836	Jones Branch at Taylorsville Macedonia Rd	Coosa	Cartersville WP	Targeted Sampling	34.122871	-84.9788	X											2019
RV_14_4844	Little Scarecorn	Coosa	Cartersville WP	Targeted Sampling	34.48389	-84.547513	X									X		2019
RV_14_5140	Salacoa Creek at King Bottom Rd	Coosa	Cartersville WP	Targeted Sampling	34.505	-84.789	X											2019
RV_14_4691	Settingdown Creek at Matt Hwy	Coosa	Cartersville WP	Targeted Sampling	34.29347	-84.138231	X											2019
RV_14_4867	Sharp Mountain at SR143(108)	Coosa	Cartersville WP	Targeted Sampling	34.402438	-84.429762	X											2019
RV_14_4871	Snake Creek at SR136 nr LaFayette, GA	Coosa	Cartersville WP	Targeted Sampling	34.646556	-85.061447	X	X										2019

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RV_14_4876	Swamp Creek at Redwine Cove Rd SW near Dalton	Coosa	Cartersville WP	Targeted Sampling	34.649601	-85.013416	X											2019
RV_11_17564	Cedar Creek at CR 73 near Ideal, GA	Flint	Tifton WP	Targeted Sampling	32.40052	-84.22755	X				X							2019
RV_11_16802	Cedar Creek at Hwy 90	Flint	Tifton WP	Targeted Sampling	32.37803	-84.18865	X				X							2019
RV_11_17568	Choctahatchee Creek at US Hwy 280 near Plains, GA	Flint	Tifton WP	Targeted Sampling	32.03432	-84.46729	X	X	X									2019
RV_11_17562	Dry Creek at Nelms Rd near Baconton, GA	Flint	Tifton WP	Targeted Sampling	31.46499	-84.09016	X				X							2019
RV_11_17561	Dry Creek at Radium Springs Rd near Baconton, GA	Flint	Tifton WP	Targeted Sampling	31.45143	-84.13503	X				X							2019
RV_11_3531	Flint River at Hwy 32	Flint	Tifton WP	Targeted Sampling	31.725254	-84.018237	X	X	X				X					2019
RV_11_17570	Harrel Mill Creek at Macedonia Church Rd near Preston, GA	Flint	Tifton WP	Targeted Sampling	32.03878	-84.54044	X	X	X									2019
RV_11_17569	Hog Branch at US Hwy 280 near Plains, GA	Flint	Tifton WP	Targeted Sampling	32.04261	-84.48602	X	X	X									2019
RV_11_3718	Jesters Creek nr Nottingham Rd	Flint	Atlanta WP	Targeted Sampling	33.564666	-84.362502	X	X										2019
RV_11_17520	Kennel Creek at SR 18 near Greenville, GA	Flint	Atlanta WP	Targeted Sampling	33.029549	-84.701843	X	X			X							2019
RV_11_17458	Kinchafoonee Creek at Hwy 45	Flint	Tifton WP	Targeted Sampling	31.967923	-84.445895	X	X	X									2019
RV_11_3538	Kinchafoonee Creek at SR 41	Flint	Tifton WP	Targeted Sampling	32.05269	-84.54834	X	X	X									2019
RV_11_3798	Lanahassee Creek at US Hwy 280	Flint	Tifton WP	Targeted Sampling	32.048351	-84.506708	X	X	X									2019
RV_11_17503	Pelham Creek at D/S of Marnelle MHP near Fayetteville, GA	Flint	Atlanta WP	Targeted Sampling	33.43913	-84.525662	X	X										2019
RV_11_17502	Pelham Creek at SR 54 (W. Lanier Ave) near Fayetteville, GA	Flint	Atlanta WP	Targeted Sampling	33.443413	-84.529444	X	X										2019

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RV_11_17567	Pessell Creek at Loop Rd near Plains, GA	Flint	Tifton WP	Targeted Sampling	32.02207	-84.389919	X				X							2019
RV_11_16755	Pessell Creek at Thrasher Rd	Flint	Tifton WP	Targeted Sampling	32.014497	-84.384629	X				X							2019
RV_11_16804	Prison Branch at Hwy 49	Flint	Tifton WP	Targeted Sampling	32.19455	-84.13317	X				X							2019
RV_11_17566	Prison Branch U/S Andersonville WPCP near Andersonville, GA	Flint	Tifton WP	Targeted Sampling	32.19402	-84.1364	X				X							2019
RV_11_17565	Sand Creek at CR 69 near Ideal, GA	Flint	Tifton WP	Targeted Sampling	32.38202	-84.1992	X				X							2019
RV_11_17501	Tar Creek at D/S of Four Seasons MHP near Fayetteville, GA	Flint	Atlanta WP	Targeted Sampling	33.515235	-84.533108	X	X										2019
RV_11_17527	Tar Creek at Rivers Rd near Fayetteville, GA	Flint	Atlanta WP	Targeted Sampling	33.524247	-84.53561	X	X										2019
RV_11_3690	Town Branch at Hwy 19 (Main St) nr Williamson Rd	Flint	Atlanta WP	Targeted Sampling	33.10881	-84.342303	X				X							2019
RV_11_3691	Town Branch at SR 18	Flint	Atlanta WP	Targeted Sampling	33.101824	-84.355752	X				X							2019
RV_11_17505	Trib to Birch Creek at Concord Rd near Concord, GA	Flint	Atlanta WP	Targeted Sampling	33.097367	-84.444546	X				X							2019
RV_11_17506	Trib to Birch Creek D/S of Concord Pond (N) near Concord, GA	Flint	Atlanta WP	Targeted Sampling	33.097761	-84.449294	X				X							2019
RV_11_17313	Trib to Elkins Creek at W. Fossett Rd near Concord, GA	Flint	Atlanta WP	Targeted Sampling	33.06864	-84.43267	X				X							2019
RV_11_17509	Trib to Elkins Creek D/S of Molena Extended Care near Molena, GA	Flint	Atlanta WP	Targeted Sampling	33.006977	-84.495856	X				X							2019
RV_11_17507	Trib to Elkins Creek U/S of Concord South (N) near Concord, GA	Flint	Atlanta WP	Targeted Sampling	33.083219	-84.432674	X				X							2019
RV_11_17508	Trib to Elkins Creek U/S of Molena Extended Care near Molena, GA	Flint	Atlanta WP	Targeted Sampling	33.007642	-84.499209	X				X							2019
RV_11_3831	Trib to Kinchafoonee at Millard Kennedy Rd CR 10	Flint	Tifton WP	Targeted Sampling	32.00174	-84.50556	X	X	X									2019

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RV_11_17560	Trib to Perry Creek at Azalea St near Arlington, GA	Flint	Tifton WP	Targeted Sampling	31.433889	-84.727689	X				X							2019
RV_11_17559	Trib to Perry Creek at Hwy 62 near Arlington, GA	Flint	Tifton WP	Targeted Sampling	31.42638	-84.74006	X				X							2019
RV_11_17521	Walnut Creek at Woodbury Road/Sr 18/SR109	Flint	Atlanta WP	Targeted Sampling	33.015041	-84.672206	X	X			X					?		2019
RV_11_17522	Warm Springs Branch at Juke Line Rd near Warms Springs, GA	Flint	Atlanta WP	Targeted Sampling	32.893557	-84.68953	X	X			X		X			X		2019
RV_10_3422	Little Attapulgus Creek at Faceville-Attapulgus Rd	Ochlockonee	Tifton WP	Targeted Sampling	30.750046	-84.501333	X				X							2019
RV_10_16316	Pine Creek at SR 3	Ochlockonee	Tifton WP	Targeted Sampling	30.963491	-84.045693	X				X							2019
RV_10_17558	Pine Creek US Ochlockonee WPCP near Ochlockonee, GA	Ochlockonee	Tifton WP	Targeted Sampling	30.964723	-84.048281	X				X							2019
RV_10_5099	Trib to Oaky Woods at SR 3	Ochlockonee	Tifton WP	Targeted Sampling	31.076989	-84.080288	X											2019
RV_04_17516	Cornish Creek at Jersey Walnut Grove Rd near Jersey, GA	Ocmulgee	Atlanta WP	Targeted Sampling	33.723666	-83.816026	X	X			X							2019
RV_04_936	Gum Creek at Hightower Trail	Ocmulgee	Atlanta WP	Targeted Sampling	33.716563	-83.898492	X	X			X							2019
RV_04_867	No Business Creek at Lee Road near Snellville, GA	Ocmulgee	Atlanta WP	Targeted Sampling	33.778056	-84.038056	X	X			X							2019
RV_04_2070	Pughs Creek (Trib to Yellow River) at Five Forks Trickum Rd, Lawrenceville, GA	Ocmulgee	Atlanta WP	Targeted Sampling	33.909982	-84.033464	X	X			X		X					2019
RV_04_17504	South River at Blount Street near East Point, GA	Ocmulgee	Atlanta WP	Targeted Sampling	33.678433	-84.423414	X	X			X		X					2019
RV_03_650	Oconee River at Shady Field Boat Ramp/Riverbend WMA	Oconee	Tifton WP	Targeted Sampling	32.39533	-82.7985	X											2019
RV_02_457	Little Lotts Creek at SR 46 near Statesboro, GA	Ogeechee	Brunswick WP	Targeted Sampling	32.32603	-81.8024	X											2019

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RV_02_293	Ogeechee River at Rocky Ford Road nr Rocky Ford, Ga.	Ogeechee	Brunswick WP	Targeted Sampling	32.64942	-81.8409	X	X										2019
RV_02_292	Ogeechee River at Scarboro Rd nr Rocky Ford, Ga	Ogeechee	Brunswick WP	Targeted Sampling	32.71074	-81.87958	X	X										2019
RV_02_446	Ogeechee River at US 301 near Statesboro, GA	Ogeechee	Brunswick WP	Targeted Sampling	32.565	-81.715	X	X										2019
RV_02_17543	Salt Creek U/S of Nassau Woods and Savannah Pines WPCP's near Garden City, GA	Ogeechee	Brunswick WP	Targeted Sampling	32.07649	-81.17952	X				X							2019
RV_02_17548	Thick Creek at Durden Rd near Twin City, GA	Ogeechee	Brunswick WP	Targeted Sampling	32.572177	-82.168029	X				X							2019
RV_02_17547	Thick Creek at Tern Rd. near Twin City, GA	Ogeechee	Brunswick WP	Targeted Sampling	32.55537	-82.17546	X				X							2019
RV_07_3034	Academy Creek - Upstream Dam At Ditch To East River; Brunswick	Satilla	Brunswick WP	Targeted Sampling	31.16194	-81.5025	X				X							2019
RV_07_2999	Alabaha River at CR 160 near Blackshear, Ga	Satilla	Brunswick WP	Targeted Sampling	31.27444	-82.19056	X	X			X							2019
RV_07_2998	Alabaha River at US Hwy 84 near Blackshear, Ga	Satilla	Brunswick WP	Targeted Sampling	31.31625	-82.22567	X	X			X							2019
RV_07_3016	Big Satilla Creek at SR 121 near Blackshear, Ga	Satilla	Brunswick WP	Targeted Sampling	31.506483	-82.1997	X	X										2019
RV_07_3013	Big Satilla Creek at SR 203 near Baxley, Ga	Satilla	Brunswick WP	Targeted Sampling	31.59083	-82.31167	X	X										2019
RV_07_3012	Big Satilla Creek at US Hwy 1 near Baxley, Ga	Satilla	Brunswick WP	Targeted Sampling	31.65832	-82.43222	X	X										2019
RV_07_2996	Hurricane Creek at CR 331 (Ten Mile Church Rd) nr Alma, GA	Satilla	Brunswick WP	Targeted Sampling	31.46	-82.37667	X				X					X		2019
RV_07_17539	Hurricane Creek at Hwy 32 near Alma, GA	Satilla	Brunswick WP	Targeted Sampling	31.53902	-82.44621	X				X							2019
RV_07_17540	Sweetwater Creek at Bowen Rd near Baxley, GA	Satilla	Brunswick WP	Targeted Sampling	31.64629	-82.29446	X				X							2019

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RV_07_17541	Sweetwater Creek at Reese Rd near Baxley, GA	Satilla	Brunswick WP	Targeted Sampling	31.61061	-82.27393	X				X							2019
RV_07_17554	Trib to Trib to Seventeen Mile River 100 m downstream of McDonald Rd near Douglas, GA	Satilla	Brunswick WP	Targeted Sampling	31.501623	-82.842639	X				X							2019
RV_07_16397	Trib to Trib to Seventeen Mile River at 10th Street near Douglas, GA	Satilla	Brunswick WP	Targeted Sampling	31.501813	-82.841701	X				X							2019
RV_07_17533	Unnamed Trib to Little Red Bluff Creek at CR 243 (Old 64 Rd) near Pearson, GA	Satilla	Brunswick WP	Targeted Sampling	31.293037	-82.861914	X				X							2019
RV_07_17534	Unnamed Trib to Little Red Bluff Creek at US 441 (S Main St) near Pearson, GA	Satilla	Brunswick WP	Targeted Sampling	31.27966	-82.857697	X				X							2019
RV_01_17513	Beaverdam Creek at Happy Hollow Rd near Washington, GA	Savannah	Atlanta WP	Targeted Sampling	33.666	-82.774	X				X		X					2019
RV_01_17514	Harden Creek at Washington Rd near Crawfordville, GA	Savannah	Atlanta WP	Targeted Sampling	33.62035	-82.783949	X				X		X					2019
RV_01_59	Little River at Wilkes Co Rd 192 near Washington, GA	Savannah	Atlanta WP	Targeted Sampling	33.651694	-82.83325	X											2019
RV_01_272	Rocky Creek at SR80 Wrightsboro Rd, Washington, GA	Savannah	Atlanta WP	Targeted Sampling	33.673119	-82.685085	X											2019
RV_01_17512	Williams Creek at Wrightsboro Rd near Sharon GA	Savannah	Atlanta WP	Targeted Sampling	33.576306	-82.707732	X				X		X					2019
RV_08_3125	North Prong St Marys at SR 94 near Moniac, Ga	St Marys	Brunswick WP	Targeted Sampling	30.5175	-82.230556	X											2019
RV_08_3128	North Prong St Marys at SR 94 near St. George, Ga	St Marys	Brunswick WP	Targeted Sampling	30.524444	-82.018611	X											2019
RV_08_3134	Saint Marys River at I-95 near Gross, Florida	St Marys	Brunswick WP	Targeted Sampling	30.74466	-81.65418	X											2019
RV_08_3135	Saint Marys River at U.S. Highway 17 near Gross, Florida	St Marys	Brunswick WP	Targeted Sampling	30.74151	-81.68799	X											2019
RV_08_3133	St Mary's River at US Hwy 301 near Folkston, Ga	St Marys	Brunswick WP	Targeted Sampling	30.7768	-81.97889	X									X		2019

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RV_09_16325	Bear Creek at Kent Drive	Suwannee	Tifton WP	Targeted Sampling	31.154876	-83.426943	X											2019
RV_09_16326	Bear Creek at Patterson St.	Suwannee	Tifton WP	Targeted Sampling	31.165996	-83.433297	X											2019
RV_09_16400	Big Branch at Graves Lane	Suwannee	Tifton WP	Targeted Sampling	31.217054	-83.456261	X											2019
RV_09_5070	Reedy Creek at East Broad St	Suwannee	Tifton WP	Targeted Sampling	31.268065	-83.680011	X				X							2019
RV_09_16337	Reedy Creek at Serena Drive	Suwannee	Tifton WP	Targeted Sampling	31.269788	-83.681287	X				X							2019
RV_09_16324	Trib to Franks Creek at Union Rd	Suwannee	Tifton WP	Targeted Sampling	30.983256	-83.38127	X											2019
RV_13_17500	Little Tallapoosa River at Little Tallapoosa River at Northside Dr.	Tallapoosa	Atlanta WP	Targeted Sampling	33.615	-85.07	X	X			X		X					2019
RV_13_4406	Swinney Branch at Maner Rd nr Rockmart	Tallapoosa	Cartersville WP	Targeted Sampling	33.919736	-85.076221	X											2019
RV_15_4931	Hiawassee River at Streak Hill Rd	Tennessee	Cartersville WP	Targeted Sampling	34.911925	-83.708927	X	X	X							X		2019
RV_15_4971	Nottely River at Lower Owltown Rd	Tennessee	Cartersville WP	Targeted Sampling	34.8411	-83.936111	X	X	X									2019
RV_15_4898	Nottely River at SR 180	Tennessee	Cartersville WP	Targeted Sampling	34.794583	-83.890661	X	X	X									2019
RV_15_4902	Nottely River at Tate Rd	Tennessee	Cartersville WP	Targeted Sampling	34.980643	-84.089305	X	X	X									2019
RV_06_2840	Altamaha River at State Road 121 near Surrency, GA	Altamaha	Brunswick WP	Probabilistic Sampling	31.853889	-82.094167	X	X					X					2018
RV_12_3944	Chattahoochee River at SR 166	Chattahoochee	Atlanta WP	Probabilistic Sampling	33.692778	-84.630278	X	X	X				X					2018
RV_14_17278	Tributary to Wilbanks Branch at Old Hwy 441	Coosa	Cartersville WP	Probabilistic Sampling	34.62213	-84.68831	X	X			X		X					2018
RV_14_4587	Two Run Creek at SR293 near Kingston, GA	Coosa	Cartersville WP	Probabilistic Sampling	34.242778	-84.889722	X	X					X					2018

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RV_11_17321	Ichawaynochaway Creek at Rentz Bridge Rd/ CR69	Flint	Tifton WP	Probabilistic Sampling	31.339179	-84.517164	X	X					X					2018
RV_11_17307	Whitewater Creek at Morton Rd near Maulk, GA	Flint	Atlanta WP	Probabilistic Sampling	32.526488	-84.407114	X	X					X					2018
RV_10_17320	West Branch Barnetts Creek at SR 93	Ochlockonee	Tifton WP	Probabilistic Sampling	31.010515	-84.204306	X	X					X					2018
RV_05_17317	Alligator Creek at SR 31	Ocmulgee	Tifton WP	Probabilistic Sampling	32.190286	-82.904754	X						X					2018
RV_05_17305	Echeconee Creek at Eisenhower Pkwy near Macon, GA	Ocmulgee	Atlanta WP	Probabilistic Sampling	32.79969	-83.865161	X						X					2018
RV_05_2240	Ocmulgee River at Hwy 83 near Juliette, GA	Ocmulgee	Atlanta WP	Probabilistic Sampling	33.1591	-83.8241	X						X					2018
RV_03_782	Barber Creek at Daniels Bridge Road near Athens, GA	Oconee	Atlanta WP	Probabilistic Sampling	33.89935	-83.443383	X						X					2018
RV_03_17291	Neel Creek at SR 15 near Sparta, GA	Oconee	Atlanta WP	Probabilistic Sampling	33.369815	-83.013903	X						X	X	X			2018
RV_03_17292	Whitten Creek at SR 15 near White Plains, GA	Oconee	Atlanta WP	Probabilistic Sampling	33.386886	-83.025148	X						X	X	X			2018
RV_02_355	Canoochee River at SR119 near Pembroke, GA	Ogeechee	Brunswick WP	Probabilistic Sampling	32.05817	-81.65183	X	X					X					2018
RV_02_16389	Mount Hope Creek at SR25 near Hinesville, GA	Ogeechee	Brunswick WP	Probabilistic Sampling	31.882254	-81.393176	X	X			X		X		X			2018
RV_02_17289	Ogeechee River at Hwy 16 near Jewell, GA	Ogeechee	Atlanta WP	Probabilistic Sampling	33.295482	-82.781301	X				X		X					2018
RV_07_17323	Hurricane Creek at Hwy 221 near Denton, GA	Satilla	Brunswick WP	Probabilistic Sampling	31.797311	-82.673556	X	X					X					2018
RV_07_17322	Otter Creek at New Forest Hwy near West Green, GA	Satilla	Brunswick WP	Probabilistic Sampling	31.570049	-82.736435	X	X					X					2018
RV_07_3004	Satilla River at U.S. Highway 17 at Woodbine, GA	Satilla	Brunswick WP	Probabilistic Sampling	30.97444	-81.72583	X	X					X					2018
RV_01_17294	Tributary to Van Creek at John Rucker Rd near Elberton, GA	Savannah	Atlanta WP	Probabilistic Sampling	34.146885	-82.780163	X				X		X					2018

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RV_09_17319	Alapaha River at Howell Rd	Suwannee	Tifton WP	Probabilistic Sampling	30.828236	-83.018769	X	X					X					2018
RV_09_3161	Alapaha River at SR32	Suwannee	Tifton WP	Probabilistic Sampling	31.631279	-83.417777	X						X					2018
RV_09_17318	Willacoochee Creek at Frank Rd	Suwannee	Tifton WP	Probabilistic Sampling	31.622711	-83.216326	X						X					2018
RV_04_17302	Tributary to Palm Creek at Brookes Rd near Dacula, GA	Upper Ocmulgee	Atlanta WP	Probabilistic Sampling	33.943066	-83.873189	X						X					2018
RV_06_17535	Beards Creek at Hwy 301 near Glennville, GA	Altamaha	Brunswick WP	Probabilistic Sampling	31.993162	-81.918042	X	X					X					2019
RV_12_4063	Chattahoochee River DS West Point Dam	Chattahoochee	Atlanta WP	Probabilistic Sampling	32.913384	-85.191372	X	X					X					2019
RV_12_4175	Mill Creek at Cochran Ridge Rd	Chattahoochee	Cartersville WP	Probabilistic Sampling	33.883624	-84.806793	X	X					X					2019
RV_14_17573	Macedonia Slough at Euharlee Rd near Euharlee, GA	Coosa	Cartersville WP	Probabilistic Sampling	34.174017	-84.981362	X	X					X					2019
RV_11_17571	Abrams Creek at Cowford Bridge Rd near Leesburg, GA	Flint	Tifton WP	Probabilistic Sampling	31.684299	-83.927094	X											2019
RV_11_17563	Flint River at SR 96 near Reynolds, GA	Flint	Tifton WP	Probabilistic Sampling	32.543309	-84.014343	X						X					2019
RV_11_3444	Flint River at US Hwy 19	Flint	Atlanta WP	Probabilistic Sampling	32.7214	-84.2325	X	X					X					2019
RV_11_17572	Trib to Mill Creek at Jewel Crowe Rd near Leesburg, GA	Flint	Tifton WP	Probabilistic Sampling	31.623937	-83.879562	X											2019
RV_04_974	Brush Creek at Pinehurst Dr	Ocmulgee	Atlanta WP	Probabilistic Sampling	33.552816	-84.207933	X	X										2019
RV_04_17517	Mountain Creek at Monroe Jersey Rd	Ocmulgee	Atlanta WP	Probabilistic Sampling	33.749684	-83.736188	X	X			X							2019
RV_04_17515	Watson Creek at Rivermist Drive	Ocmulgee	Atlanta WP	Probabilistic Sampling	33.861039	-84.072113	X	X			X							2019
RV_03_593	Middle Oconee River at Mitchell Bridge Rd	Oconee	Atlanta WP	Probabilistic Sampling	33.956603	-83.43759	X						X					2019

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RV_03_635	Oconee River at Hwy 57	Oconee	Tifton WP	Probabilistic Sampling	32.781667	-82.958217	X						X					2019
RV_02_286	Ogeechee River at Hwy 78 near Wadley, GA	Ogeechee	Brunswick WP	Probabilistic Sampling	32.86972	-82.31972	X	X					X			X		2019
RV_02_17550	Trib to Eightmile Creek at Rosier Rd near Rosier, GA	Ogeechee	Brunswick WP	Probabilistic Sampling	32.96858	-82.16917	X	X					X					2019
RV_02_17546	Trib to Lotts Creek at Nevills Daisy Rd near Nevills, GA	Ogeechee	Brunswick WP	Probabilistic Sampling	32.26454	-81.81187	X	X					X					2019
SH_02_17553	Barn Creek near Sapelo Island, GA	Ogeechee	Brunswick WP	Probabilistic Sampling	31.447002	-81.272816	X	X					X				X	2019
RV_01_17511	Trib to Upton Creek at Smith Mill Rd	Savannah	Atlanta WP	Probabilistic Sampling	33.667224	-82.591145	X						X					2019
RV_09_17532	Black River at Swamp Rd near Waycross, GA	Suwannee	Brunswick WP	Probabilistic Sampling	31.065642	-82.378981	X	X					X					2019
RV_09_17557	Little Brushy Creek at SR 90 near Ocilla, GA	Suwannee	Tifton WP	Probabilistic Sampling	31.54908	-83.20444	X											2019
RV_09_16319	Trib to Mill Creek at Amoco Rd	Suwannee	Tifton WP	Probabilistic Sampling	31.955212	-83.477801	X											2019
RV_15_17576	Trib to Dickey Mill Creek at Piney Rd near Pleasant Hill, GA	Tennessee	Cartersville WP	Probabilistic Sampling	34.946195	-84.286469	X	X			X		X					2019
LK_01_40	Clarks Hill Lake - Dam Forebay	Savannah	Atlanta WP	Lake Monitoring	33.662694	-82.198528	X		X								X	2018/2019
LK_01_71	Clarks Hill Lake - Little River at Highway 47	Savannah	Atlanta WP	Lake Monitoring	33.692722	-82.338805	X		X								X	2018/2019
LK_01_39	Clarks Hill Lake- Savannah River at Dordon Creek.	Savannah	Atlanta WP	Lake Monitoring	33.765861	-82.271778	X		X								X	2018/2019
LK_01_38	Clarks Hill Lake- Savannah River at U.S. Highway 378	Savannah	Atlanta WP	Lake Monitoring	33.857861	-82.399583	X		X								X	2018/2019
LK_01_7	Lake Burton - 1/4-mile South of Burton Island (aka Tallulah River)	Savannah	Cartersville WP	Lake Monitoring	34.835233	-83.553817	X		X								X	2018/2019
LK_01_8	Lake Burton - Dampool (aka Tallulah River u/s Lake Burton Dam)	Savannah	Cartersville WP	Lake Monitoring	34.795317	-83.5401	X		X								X	2018/2019

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LK_01_22	Lake Hartwell - Dam Forebay	Savannah	Atlanta WP	Lake Monitoring	34.358733	-82.824417	X		X								X	2018/2019
LK_01_11	Lake Hartwell at Interstate 85	Savannah	Atlanta WP	Lake Monitoring	34.484167	-83.029833	X		X								X	2018/2019
LK_01_9	Lake Rabun - Approx. 4.5 mi u/s Dam (Mid Lake)	Savannah	Cartersville WP	Lake Monitoring	34.763533	-83.455817	X		X								X	2018/2019
LK_01_10	Lake Rabun - Dampool (aka Tallulah River - Upstream from Mathis Dam)	Savannah	Cartersville WP	Lake Monitoring	34.764722	-83.417778	X		X								X	2018/2019
LK_01_29	Lake Richard B. Russell - Dam Forebay	Savannah	Atlanta WP	Lake Monitoring	34.026333	-82.594167	X		X								X	2018/2019
LK_01_27	Lake Russell Between Markers 42 and 44 (Mid Lake)	Savannah	Atlanta WP	Lake Monitoring	34.127778	-82.673611	X		X								X	2018/2019
LK_01_67	Lake Tugalo - u/s Tugalo Lake Rd (aka Bull Sluice Rd.)	Savannah	Atlanta WP	Lake Monitoring	34.737805	-83.340555	X		X								X	2018/2019
LK_01_68	Lake Tugalo - Upstream from Tugaloo Dam	Savannah	Atlanta WP	Lake Monitoring	34.715	-83.351694	X		X								X	2018/2019
LK_03_545	Lake Oconee - Richland Creek Arm	Oconee	Atlanta WP	Lake Monitoring	33.3947	-83.1767	X		X								X	2018/2019
LK_03_538	Lake Oconee 300 Meters Upstream Wallace Dam (Dam Forebay)	Oconee	Atlanta WP	Lake Monitoring	33.351667	-83.160833	X		X								X	2018/2019
LK_03_520	Lake Oconee At Highway 44, Oconee River Arm	Oconee	Atlanta WP	Lake Monitoring	33.431394	-83.265734	X		X								X	2018/2019
LK_03_526	Lake Sinclair - 300 Meters Upstream Dam (Dam Forebay)	Oconee	Atlanta WP	Lake Monitoring	33.142817	-83.202617	X		X								X	2018/2019
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	X		X								X	2018/2019
LK_03_530	Lake Sinclair - Midlake, Oconee River Arm	Oconee	Atlanta WP	Lake Monitoring	33.1968	-83.2742	X		X								X	2018/2019
LK_04_897	Lake Jackson - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.322	-83.8409	X		X								X	2018/2019
LK_04_893	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Ocmulgee	Atlanta WP	Lake Monitoring	33.368229	-83.863339	X		X								X	2018/2019

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LK_05_2078	High Falls Lake - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.1799	-84.0209	X		X								X	2018/2019
LK_05_2076	High Falls Lake - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	33.1973	-84.031	X		X								X	2018/2019
LK_05_2132	Lake Juliette - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	33.0338	-83.7572	X	X									X	2018/2019
LK_05_2131	Lake Juliette - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	33.0464	-83.8106	X		X								X	2018/2019
LK_05_2146	Lake Tobesofkee - Dam Forebay	Ocmulgee	Atlanta WP	Lake Monitoring	32.8215	-83.7706	X		X								X	2018/2019
LK_05_2144	Lake Tobesofkee - Midlake	Ocmulgee	Atlanta WP	Lake Monitoring	32.8346	-83.8161	X		X								X	2018/2019
LK_09_3199	Banks Lake - Near Lakeland, Ga.	Suwanee	Tifton WP	Lake Monitoring	31.026667	-83.105555	X	X									X	2018/2019
LK_11_3535	Flint River Reservoir (Lake Worth) at Dam Forebay	Flint	Tifton WP	Lake Monitoring	31.6033	-84.1365	X		X								X	2018/2019
LK_11_3534	Flint River Reservoir at Midlake, Flint River Arm	Flint	Tifton WP	Lake Monitoring	31.6085	-84.119	X		X								X	2018/2019
LK_11_3520	Lake Blackshear at Dam Forebay	Flint	Tifton WP	Lake Monitoring	31.8479	-83.9394	X		X								X	2018/2019
LK_11_3467	Lake Blackshear at Midlake	Flint	Tifton WP	Lake Monitoring	31.9665	-83.9342	X		X								X	2018/2019
LK_11_3569	Lake Seminole - Flint River Arm at Spring Creek	Flint	Tifton WP	Lake Monitoring	30.7627	-84.8171	X		X								X	2018/2019
LK_11_3551	Lake Worth (original) - Above Hwy 91 Bridge	Flint	Tifton WP	Lake Monitoring	31.6109	-84.15	X		X								X	2018/2019
LK_12_4078	Goat Rock Lake - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.6112	-85.0794	X		X								X	2018/2019
LK_12_4107	Lake Andrews at Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	31.2632	-85.113	X	X									X	2018/2019
LK_12_4072	Lake Harding - Midlake, Main Body	Chattahoochee	Atlanta WP	Lake Monitoring	32.7379	-85.1125	X		X								X	2018/2019

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LK_12_4012	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Chattahoochee	Atlanta WP	Lake Monitoring	34.200278	-83.982869	X		X								X	2018/2019
LK_12_4080	Lake Oliver - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.516	-85.0009	X		X								X	2018/2019
LK_12_4113	Lake Seminole at Chattahoochee Arm, Lower	Chattahoochee	Tifton WP	Lake Monitoring	30.7662	-84.9201	X		X								X	2018/2019
LK_12_4115	Lake Seminole at Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	30.7115	-84.8647	X		X								X	2018/2019
LK_12_4007	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2504	-83.9244	X		X								X	2018/2019
LK_12_4005	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Chattahoochee	Atlanta WP	Lake Monitoring	34.2587	-83.9198	X		X								X	2018/2019
LK_12_3913	Lake Sidney Lanier - Little River Embayment, b/w M1WC & 3LR	Chattahoochee	Atlanta WP	Lake Monitoring	34.355	-83.8427	X		X								X	2018/2019
LK_12_4010	Lake Sidney Lanier - Mud Creek Embayment, b/w Marina & Ramp	Chattahoochee	Atlanta WP	Lake Monitoring	34.2333	-83.9373	X		X								X	2018/2019
LK_12_4019	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E M9SM	Chattahoochee	Atlanta WP	Lake Monitoring	34.2335	-84.0287	X		X								X	2018/2019
LK_12_3995	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.31235	-83.950103	X		X								X	2018/2019
LK_12_4001	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Chattahoochee	Atlanta WP	Lake Monitoring	34.261666	-83.950662	X		X								X	2018/2019
LK_12_3998	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Chattahoochee	Atlanta WP	Lake Monitoring	34.32195	-83.880171	X		X								X	2018/2019
LK_12_4028	Lake Sidney Lanier upstream of Buford Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	34.162778	-84.067108	X		X								X	2018/2019
LK_12_4103	Lake Walter F. George at Dam Forebay	Chattahoochee	Tifton WP	Lake Monitoring	31.629167	-85.0725	X		X								X	2018/2019
LK_12_4097	Lake Walter F. George at U.S. Highway 82	Chattahoochee	Tifton WP	Lake Monitoring	31.891944	-85.120833	X		X								X	2018/2019

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LK_12_4060	West Point Lake - Dam Forebay	Chattahoochee	Atlanta WP	Lake Monitoring	32.9208	-85.1834	X		X								X	2018/2019
LK_12_4048	West Point Lake at LaGrange Water Intake near LaGrange, GA	Chattahoochee	Atlanta WP	Lake Monitoring	33.0783	-85.110833	X		X								X	2018/2019
LK_14_4524	Carters Lake - Midlake (upstream from Woodring Branch)	Coosa	Cartersville WP	Lake Monitoring	34.6076	-84.638	X		X								X	2018/2019
LK_14_4523	Carters Lake (CR1) - Upper Lake, Coosawattee Arm	Coosa	Cartersville WP	Lake Monitoring	34.62087	-84.6212	X		X								X	2018/2019
LK_14_4497	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Coosa	Cartersville WP	Lake Monitoring	34.085833	-84.711389	X		X								X	2018/2019
LK_14_4502	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Coosa	Cartersville WP	Lake Monitoring	34.19	-84.577778	X		X								X	2018/2019
LK_14_4553	Lake Allatoona at Little River upstream from Highway 205	Coosa	Cartersville WP	Lake Monitoring	34.158611	-84.577222	X		X								X	2018/2019
LK_14_4556	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Coosa	Cartersville WP	Lake Monitoring	34.138611	-84.639167	X		X								X	2018/2019
LK_14_4494	Lake Allatoona Upstream from Dam	Coosa	Cartersville WP	Lake Monitoring	34.160833	-84.725845	X		X								X	2018/2019
LK_15_4907	Lake Blue Ridge (LMP18) - 300 Meter Upstream of Dam	Tennessee	Cartersville WP	Lake Monitoring	34.881667	-84.28	X		X								X	2018/2019
LK_15_4908	Lake Blue Ridge (LMP18A) - 4 miles upstream Dam	Tennessee	Cartersville WP	Lake Monitoring	34.84017	-84.2731	X		X								X	2018/2019
LK_15_4895	Lake Chatuge LMP 12 at State Line (aka Hiawassee River)	Tennessee	Cartersville WP	Lake Monitoring	34.983333	-83.788611	X		X								X	2018/2019
LK_15_4900	Lake Nottely - Dam Forebay (aka Nottely River - Upstream from Nottely Dam)	Tennessee	Cartersville WP	Lake Monitoring	34.957778	-84.092222	X		X								X	2018/2019
LK_15_4899	Lake Nottely (LMP15A) at Reece Creek	Tennessee	Cartersville WP	Lake Monitoring	34.91152	-84.0506	X		X								X	2018/2019
SH_02_56	Mouth of Wilmington River - Marker #19 Wassaw Sound	Ogeechee	Brunswick WP	Estuary Monitoring	31.932416	-80.977111	X	X									X	2019

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SH_02_374	Sapelo River - Mouth of Broro River - 1.4 miles South of Shellman's Bluff	Ogeechee	Brunswick WP	Estuary Monitoring	31.544861	-81.316027	X	X									X	2019
SH_02_372	Sapelo Sound at South Newport River near Barbour Island	Ogeechee	Brunswick WP	Estuary Monitoring	31.554108	-81.200361	X	X									X	2019
SH_06_2857	Altamaha River - channel marker #201 off Wolf Island	Altamaha	Brunswick WP	Estuary Monitoring	31.319166	-81.325	X	X									X	2018/2019
SH_07_3049	Cumberland Sound at St. Marys Riv nr St Marys, GA	Satilla	Brunswick WP	Estuary Monitoring	30.728073	-81.489794	X	X									X	2018/2019
SH_07_3008	St. Andrews Sound at Satilla Riv near	Satilla	Brunswick WP	Estuary Monitoring	30.983162	-81.453238	X	X									X	2018/2019
SH_02_317	Little Ogeechee River at Green Island	Ogeechee	Brunswick WP	Estuary Monitoring	31.88823	-81.08798	X	X									X	2018/2019
SH_02_364	St Catherines Sound at Medway River near Midway, GA	Ogeechee	Brunswick WP	Estuary Monitoring	31.715469	-81.156798	X	X									X	2018/2019
RV_06_2942	Little Creek near Gardi Rd near Jesup, GA	Altamaha	Brunswick WP	Biological Monitoring	31.491437	-81.846891	X				X				X			2018
RV_06_2884	Yam Grandy Creek at Levilligar Pond Road (County Road 198) near Nunez, GA	Altamaha	Brunswick WP	Biological Monitoring	32.49889	-82.36361	X				X				X			2018
RV_12_3984	Chattahoochee River at State Roads 17/75 near Nacooche, GA	Chattahoochee	Cartersville WP	Biological Monitoring	34.6872	-83.710278	X				X		X	X	X			2018
RV_12_17315	Crawford Creek at Perry Mill Rd near Lagrange, GA	Chattahoochee	Atlanta WP	Biological Monitoring	32.935218	-84.889328	X	X			X		X	X	X			2018
RV_12_17316	Deer Creek at Spradlin Rd near Centralhatchee, GA	Chattahoochee	Atlanta WP	Biological Monitoring	33.348444	-85.139148	X	X			X		X	X	X			2018
RV_12_17280	Glade Branch at Town Creek Road	Chattahoochee	Cartersville WP	Biological Monitoring	34.5997	-83.85579	X				X		X	X	X	X		2018
RV_12_17284	Horton Creek at Sims Road	Chattahoochee	Cartersville WP	Biological Monitoring	34.69962	-83.76059	X				X		X	X	X			2018
RV_12_17285	Smith Ck. at Unicoi Bottoms Rd at State Park	Chattahoochee	Cartersville WP	Biological Monitoring	34.7224	-83.72574	X				X		X	X	X			2018

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RV_12_17314	White Sulfur Creek at Hubert Russell Rd near Greenville, GA	Chattahoochee	Atlanta WP	Biological Monitoring	32.920338	-84.813178	X	X			X		X	X	X			2018
RV_14_17275	Redbud Creek at Red Bud Rd near Ranger, GA	Coosa	Cartersville WP	Biological Monitoring	34.533641	-84.728596	X	X						X	X			2018
RV_14_4425	Snake Creek at Pocket Road in Sugar Valley	Coosa	Cartersville WP	Biological Monitoring	34.55722	-85.0164	X	X					X	X	X			2018
RV_14_17273	Woodward Creek at Gaines Loop near Rome, GA	Coosa	Cartersville WP	Biological Monitoring	34.364356	-85.07319	X	X			X		X	X	X			2018
RV_11_17309	Beaver Creek at Hwy 137 near Butler, GA	Flint	Atlanta WP	Biological Monitoring	32.600562	-84.188731	X	X			X			X	X			2018
RV_11_17312	Patsiliga Creek at N Culverhouse Rd near Butler, GA	Flint	Atlanta WP	Biological Monitoring	32.602066	-84.333266	X	X			X		X	X	X			2018
RV_11_17311	Tobler Creek at Waymanville Rd near Thomaston, GA	Flint	Atlanta WP	Biological Monitoring	32.841667	-84.231781	X	X			X			X	X			2018
RV_11_17308	Womble Creek at Old Alabama Rd near Thomaston, GA	Flint	Atlanta WP	Biological Monitoring	32.886393	-84.432866	X	X			X			X	X			2018
RV_05_17306	Berry Creek at Hwy 23 near Forsyth, GA	Ocmulgee	Atlanta WP	Biological Monitoring	33.084299	-83.789011	X				X		X	X	X			2018
RV_02_462	Mill Creek at Bulloch County Road 386 Old River Road near Brooklet, GA	Ogeechee	Brunswick WP	Biological Monitoring	32.440012	-81.579074	X	X			X		X	X	X	X		2018
RV_02_17290	Whetstone Creek at Mayfield Rd near Warrenton, GA	Ogeechee	Atlanta WP	Biological Monitoring	33.400434	-82.695976	X				X		X	X	X			2018
RV_02_342	Wolfe Creek at SR129 near Metter, GA	Ogeechee	Brunswick WP	Biological Monitoring	32.30867	-82.05243	X				X				X			2018
RV_07_2977	Dry Creek at CR 552 (Flying Hawk Rd.) near Nichols, GA	Satilla	Brunswick WP	Biological Monitoring	31.48423	-82.6314	X				X				X			2018
RV_07_3019	Little Satilla Creek at Tillman Anderson Rd near Odum, GA	Satilla	Brunswick WP	Biological Monitoring	31.630317	-82.0194	X				X				X			2018
RV_01_245	Cherokee Creek at SR220 near Lincolnton, GA	Savannah	Atlanta WP	Biological Monitoring	33.757914	-82.383579	X				X			X	X			2018
RV_01_246	Chickasaw Creek at Henry Hill Rd near Tignall, GA	Savannah	Atlanta WP	Biological Monitoring	33.97074	-82.745674	X				X			X	X	X		2018

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RV_01_255	Florence Creek near Ce Norman Rd, SW of Lincolnton, GA	Savannah	Atlanta WP	Biological Monitoring	33.753558	-82.548276	X				X			X	X			2018
RV_01_257	Kemp Creek at Holliday Park Rd near Washington, GA	Savannah	Atlanta WP	Biological Monitoring	33.664353	-82.553398	X				X			X	X			2018
RV_01_73	Kiokee Creek at SR 104 near Evans	Savannah	Atlanta WP	Biological Monitoring	33.600583	-82.232666	X				X		X	X	X			2018
RV_01_91	McBean Creek at State Road 56 at McBean, GA	Savannah	Atlanta WP	Biological Monitoring	33.241388	-81.947416	X				X			X	X			2018
RV_01_112	Runs Branch at Effingham Co Rd 63 (Sisters Ferry Rd) near Clyo	Savannah	Brunswick WP	Biological Monitoring	32.459972	-81.291888	X				X				X			2018
RV_01_92	Spirit Creek at State Road 56 near McBean, GA	Savannah	Atlanta WP	Biological Monitoring	33.318361	-81.955111	X				X			X	X			2018
RV_01_205	Stekoa Creek Clayton u/s of Clayton WPCP bridge	Savannah	Cartersville WP	Biological Monitoring	34.871609	-83.401745	X				X		X	X	X			2018
RV_01_208	Stekoa Creek SW at Bethel Rd	Savannah	Cartersville WP	Biological Monitoring	34.846852	-83.414173	X				X		X	X	X	X		2018
RV_01_74	Uchee Creek at State Road 104 near Evans, GA	Savannah	Atlanta WP	Biological Monitoring	33.566944	-82.183388	X				X		X	X	X			2018
RV_01_137	Whites Creek at Wire Rd near Thompson, GA	Savannah	Atlanta WP	Biological Monitoring	33.436	-82.509	X				X		X	X	X			2018
RV_06_17552	Hurricane Branch at Jack Scott Rd near Wrightsville, GA	Altamaha	Brunswick WP	Biological Monitoring	32.78171	-82.57229	X						X	X				2019
RV_06_2841	Watermelon Creek at SR 196 near Glenville, GA	Altamaha	Brunswick WP	Biological Monitoring	31.881506	-81.995472	X						X	X				2019
RV_12_17524	Hazel Creek at Double Bridge Rd.	Chattahoochee	Atlanta WP	Biological Monitoring	34.585	-83.518	X						X	X				2019
RV_12_3898	White Creek at New Bridge Rd.	Chattahoochee	Atlanta WP	Biological Monitoring	34.543	-83.66	X						X	X				2019
RV_14_5132	Bannister Creek at Nichols Rd. near Cumming, GA	Coosa	Cartersville WP	Biological Monitoring	34.309757	-84.22011	X						X	X				2019
RV_14_4433	Oothkalooga Creek at Salem Rd	Coosa	Cartersville WP	Biological Monitoring	34.452	-84.944	X	X					X	X				2019

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RV_14_4487	Pine Log Creek at Hwy 53	Coosa	Cartersville WP	Biological Monitoring	34.463	-84.791	X	X					X	X				2019
RV_14_4693	Settingdown Creek at Wallace Tatum Rd	Coosa	Cartersville WP	Biological Monitoring	34.289318	-84.230376	X						X	X				2019
RV_05_17526	Tobesofkee Creek at SR 83 near Forsyth, GA	Ocmulgee	Atlanta WP	Biological Monitoring	33.003	-83.994	X						X	X				2019
RV_03_533	Little River at Hwy 213	Oconee	Atlanta WP	Biological Monitoring	33.451167	-83.536633	X						X	X				2019
RV_03_557	Little River at SR 16	Oconee	Atlanta WP	Biological Monitoring	33.314	-83.437	X						X	X				2019
RV_03_799	Mulberry River at Covered Bridge Rd near Braselton, GA	Oconee	Atlanta WP	Biological Monitoring	34.079	-83.776	X						X	X				2019
RV_03_580	Mulberry River at Georgia Highway 11 near Winder, GA	Oconee	Atlanta WP	Biological Monitoring	34.052222	-83.663611	X						X	X				2019
RV_03_17510	North Oconee River at Broome Rd near Gainesville, GA	Oconee	Atlanta WP	Biological Monitoring	34.299	-83.742	X						X	X				2019
RV_03_575	Walnut Creek a SR 332 near Talmo, GA	Oconee	Atlanta WP	Biological Monitoring	34.144	-83.677	X						X	X				2019
RV_03_5116	Walnut Creek at Poplar Springs Rd near Talmo, GA	Oconee	Atlanta WP	Biological Monitoring	34.197	-83.806	X						X	X				2019
RV_02_17544	Billy Branch at Hwy 21 near Millen, GA	Ogeechee	Brunswick WP	Biological Monitoring	32.79654	-81.84326	X						X	X				2019
RV_02_17549	Deep Creek at Mt Olive Rd near Herndon, GA	Ogeechee	Brunswick WP	Biological Monitoring	32.78006	-82.11862	X						X	X				2019
RV_02_17542	Salt Creek at Village Dr near Garden City, GA	Ogeechee	Brunswick WP	Biological Monitoring	32.07093	-81.18814	X				X							2019
RV_02_17551	Spring Creek at CR 334 near Wadley, GA	Ogeechee	Brunswick WP	Biological Monitoring	32.82004	-82.44883	X						X	X				2019
RV_01_204	Chechero Creek at New Hope Church Rd	Savannah	Atlanta WP	Biological Monitoring	34.850288	-83.359956	X				X		X	X				2019
RV_01_19	Crawford Creek at County Road 118 near Lavonia, GA	Savannah	Atlanta WP	Biological Monitoring	34.480322	-83.122422	X						X	X				2019

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RV_01_17545	Fitz Branch at Bates Rd near Waynesboro, GA	Savannah	Brunswick WP	Biological Monitoring	33.0726	-81.90363	X						X	X				2019
RV_01_17523	Law Ground Creek at Warwoman Rd. Crossing	Savannah	Atlanta WP	Biological Monitoring	34.94	-83.192	X						X	X				2019
RV_01_5120	Little Crawford Creek at New Town Rd. near Lavonia, GA	Savannah	Atlanta WP	Biological Monitoring	34.474	-83.109	X						X	X				2019
RV_01_17525	Little Shoal Creek at Griffin Rd. Crossing	Savannah	Atlanta WP	Biological Monitoring	34.445	-83.014	X						X	X				2019
RV_01_17492	Pool Creek at Underwood Lane near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.838967	-83.324491	X				X		X	X				2019
RV_01_17498	Roach Mill Creek at Warwoman Rd. Crossing	Savannah	Atlanta WP	Biological Monitoring	34.887	-83.325	X				X		X	X				2019
RV_01_17496	Saddle Gap Branch at Dugan Hill Rd near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.877878	-83.39358	X				X		X	X				2019
RV_01_17495	Scott Creek at Shadyside Drive near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.877127	-83.405712	X				X		X	X				2019
RV_01_17491	She Creek at Woods Rd near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.839377	-83.337022	X				X		X	X				2019
RV_01_17494	Stekoa Creek at US Hwy 441/23 near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.888594	-83.393537	X				X		X	X				2019
RV_01_17493	Stekoa Creek D/S of She Creek near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.833573	-83.345079	X				X		X	X				2019
RV_01_17497	Warwoman Creek at Black Diamond Rd near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.888	-83.292	X				X		X	X				2019
RV_06_2905	Milliken Bay (Unnamed Tributary to Little McMillen Creek) at 341 in Jesup, GA	Altamaha	Brunswick WP	Biological Monitoring	31.6129	-81.892	X				X				X			2018/2019
RV_12_4123	Hillabahatchee Creek at CR 210 near Frolona, GA	Chattahoochee	Atlanta WP	Biological Monitoring	33.311218	-85.187675	X	X			X		X	X	X	X		2018/2019
RV_14_4829	Dykes Creek at Dykes Creek Crossing	Coosa	Cartersville WP	Biological Monitoring	34.29357	-85.0855	X	X			X		X	X	X	X		2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
RV_14_4837	Jones Creek near Jones Creek Rd, Dahlonega, GA	Coosa	Atlanta WP	Biological Monitoring	34.602401	-84.150559	X				X	X	X	X	X	X		2018/2019
RV_11_3789	Flint River at Sprewell Bluff Sprewell Bluff State Park	Flint	Atlanta WP	Biological Monitoring	32.855988	-84.476812	X	X			X		X	X	X			2018/2019
RV_02_351	Thick Creek at Daisy Nevills Rd	Ogeechee	Brunswick WP	Biological Monitoring	32.2167	-81.82518	X				X				X	X		2018/2019
RV_02_389	Tributary of Taylor's Creek at SR 144	Ogeechee	Brunswick WP	Biological Monitoring	31.89098	-81.62311	X				X				X			2018/2019
RV_07_3060	Big Creek at High Bluff Rd WSW of Hoboken, GA	Satilla	Brunswick WP	Biological Monitoring	31.163172	-82.189464	X				X				X			2018/2019
RV_07_3099	Mill Creek near High Bluff Rock Rd near Waycross, GA	Satilla	Brunswick WP	Biological Monitoring	31.189994	-82.202803	X	X			X		X	X	X	X		2018/2019
RV_01_244	Charlies Creek at Charlies Creek Rd East of Hiawassee, GA	Savannah	Atlanta WP	Biological Monitoring	34.95895	-83.57158	X				X	X	X	X	X	X		2018/2019
RV_01_248	Coleman River at Coleman River Rd near Clayton, GA	Savannah	Atlanta WP	Biological Monitoring	34.952033	-83.516599	X				X	X	X	X	X	X		2018/2019
RV_01_135	Sweigoffer Creek at Lake Cherie Rd near Rincon, GA	Savannah	Brunswick WP	Biological Monitoring	32.288	-81.191	X				X				X			2018/2019
RV_15_4961	E. Chickamauga Creek at Lower Gordon Springs Rd	Tennessee	Cartersville WP	Biological Monitoring	34.74717	-85.1243	X	X			X		X	X	X	X		2018/2019
RV_07_5094	Unnamed Tributary to Seventeenmile River at Wendell Sears Road near Douglas, GA	Satilla	Brunswick WP	Biological Monitoring	31.498861	-82.807956	X				X				X			2018/2019
SOSS	Ossabaw Island South Beach	Ogeechee	CRD	Coastal Monitoring	31.721783	-81.140733				X								2018/2019
JIWY	Jekyll Island - Captain Wylly Road Crossover Beach	Satilla	CRD	Coastal Monitoring	31.063161	-81.404438				X								2018/2019
SIN	Saint Simons Island - North Beach at Goulds Inlet	Satilla	CRD	Coastal Monitoring	31.152005	-81.365855				X								2018/2019
JISD	Jekyll Island - South Dunes Picnic Area Beach	Satilla	CRD	Coastal Monitoring	31.031801	-81.41495				X								2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
JISA	Jekyll Island - St. Andrews Beach	Satilla	CRD	Coastal Monitoring	31.021002	-81.434903				X								2018/2019
JIM	Jekyll Island - Middle Beach at Convention Center	Satilla	CRD	Coastal Monitoring	31.048649	-81.408999				X								2018/2019
SIF	Saint Simons Island - 5th Street Crossover Beach	Satilla	CRD	Coastal Monitoring	31.135723	-81.384978				X								2018/2019
SIM	Saint Simons Island - Middle Beach (aka East Beach Old Coast Guard Station)	Satilla	CRD	Coastal Monitoring	31.143995	-81.370008				X								2018/2019
JIN	Jekyll Island - North Beach at Dexter Lane	Satilla	CRD	Coastal Monitoring	31.077175	-81.401756				X								2018/2019
SIMA	Saint Simons Island - Massengale Park Beach	Satilla	CRD	Coastal Monitoring	31.140415	-81.376669				X								2018/2019
SIS	Saint Simons Island - South Beach at Lighthouse	Satilla	CRD	Coastal Monitoring	31.133474	-81.393706				X								2018/2019
JIS	Jekyll Island - South Beach at 4-H Camp	Satilla	CRD	Coastal Monitoring	31.0142	-81.424002				X								2018/2019
SES	Sea Island - South Beach	Satilla	CRD	Coastal Monitoring	31.181139	-81.344992				X								2018/2019
SEN	Sea Island - North Beach	Altamaha	CRD	Coastal Monitoring	31.19763	-81.329772				X								2018/2019
BIRP	Blythe Island Sandbar Beach	Satilla	CRD	Coastal Monitoring	31.152417	-81.561267				X								2018/2019
REIM	Reimolds Pasture Beach	Altamaha	CRD	Coastal Monitoring	31.303567	-81.3943				X								2018/2019
TYST	Tybee Island - Strand Beach at Pier	Savannah	CRD	Coastal Monitoring	31.992987	-80.845794				X								2018/2019
TYN	Tybee Island - North Beach at Gulick Street	Savannah	CRD	Coastal Monitoring	32.020688	-80.841481				X								2018/2019
TYM	Tybee Island - Middle Beach at Center Terrace	Savannah	CRD	Coastal Monitoring	32.007311	-80.841002				X								2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
TYS	Tybee Island - South Beach at Chatham Street	Savannah	CRD	Coastal Monitoring	31.986827	-80.851302				X								2018/2019
SKID	Skidaway Narrows County Park Beach (aka Butterbean Beach)	Ogeechee	CRD	Coastal Monitoring	31.946671	-81.06779				X								2018/2019
DALL	Dallas Bluff Sandbar Beach	Ogeechee	CRD	Coastal Monitoring	31.591	-81.299067				X								2018/2019
KING	Kings Ferry County Park Beach	Ogeechee	CRD	Coastal Monitoring	31.97804	-81.287606				X								2018/2019
BOSS	Ossabaw Island Bradley Beach	Ogeechee	CRD	Coastal Monitoring	31.825	-81.0491				X								2018/2019
CNBF	Contentment Bluff Sandbar Beach	Ogeechee	CRD	Coastal Monitoring	31.57307	-81.31293				X								2018/2019
JICC	Jekyll Island - Clam Creek Beach	Satilla	CRD	Coastal Monitoring	31.118236	-81.41691				X								2018/2019
New	Jekyll Driftwood	Satilla	CRD	Coastal Monitoring	31.05	-81.403				X								2018/2019
1049	Southernmost tributary off Romerly Marsh Creek	Savannah	CRD	Coastal Monitoring	31.92866	-81.01839		X										2018/2019
TYP	Tybee Island - Polk Street Beach	Savannah	CRD	Coastal Monitoring	32.026133	-80.854733		X										2018/2019
6216	Crooked River, Camden	Satilla	CRD	Coastal Monitoring	30.849	-81.542		X										2018/2019
6217	Crooked River South, Camden	Satilla	CRD	Coastal Monitoring	30.841	-81.521		X										2018/2019
6218	South Crooked River Mouth, Camden	Satilla	CRD	Coastal Monitoring	30.823	-81.498		X										2018/2019
6300	Cumberland River-Marker #39, Camden	Satilla	CRD	Coastal Monitoring	30.927	-81.452		X										2018/2019
6317	Cumberland River East Shellbine, Camden	Satilla	CRD	Coastal Monitoring	30.911	-81.485		X										2018/2019
6318	Delaroche Creek Headwaters, Camden	Satilla	CRD	Coastal Monitoring	30.861	-81.508		X										2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
6323	Brickhill River Upstream 6214, Camden	Satilla	CRD	Coastal Monitoring	30.855	-81.467		X										2018/2019
6343	Brickhill River West Bend, Camden	Satilla	CRD	Coastal Monitoring	30.868	-81.485		X										2018/2019
6344	Mumford Creek at Brickhill River, Camden	Satilla	CRD	Coastal Monitoring	30.883	-81.479		X										2018/2019
6360	Maiden Creek	Satilla	CRD	Coastal Monitoring	31.0693	-81.545		X										2018/2019
6361	Honey Creek	Satilla	CRD	Coastal Monitoring	31.0547	-81.539		X										2018/2019
6411	Downstream from Cabin Bluff @ marker 51A, Camden	Satilla	CRD	Coastal Monitoring	30.881	-81.511		X										2018/2019
6412	Upstream from Delaroche ck @ marker 55, Camden	Satilla	CRD	Coastal Monitoring	30.87	-81.499		X										2018/2019
1050	Northern mouth of Habersham Creek	Ogeechee	CRD	Coastal Monitoring	31.92503	-81.0086		X										2018/2019
1052	Northernmost tributary off Romerly Marsh Creek	Ogeechee	CRD	Coastal Monitoring	31.94317	-81.00914		X										2018/2019
1152	Old Romerly Marsh Creek	Ogeechee	CRD	Coastal Monitoring	31.92557	-80.9852		X										2018/2019
1153	Romerly Marsh Creek Chatham	Ogeechee	CRD	Coastal Monitoring	31.92993	-80.98919		X										2018/2019
1154	Halfmoon River at Beard Creek	Ogeechee	CRD	Coastal Monitoring	31.97741	-80.96789		X										2018/2019
1155	Tybee Cut South	Ogeechee	CRD	Coastal Monitoring	31.95172	-80.98532		X										2018/2019
1159	Pa Cooper Creek	Ogeechee	CRD	Coastal Monitoring	31.96792	-80.936		X										2018/2019
1200	Mouth of House Creek Chatham	Ogeechee	CRD	Coastal Monitoring	31.946	-80.93		X										2018/2019
1201	North of House Creek/Wassaw Sound Chatham	Ogeechee	CRD	Coastal Monitoring	31.955	-80.933		X										2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
1222	Cut Oyster Creek to Bull River Chatham	Ogeechee	CRD	Coastal Monitoring	32.015	-80.924		X										2018/2019
1223	North Fork Oyster Creek Chatham	Ogeechee	CRD	Coastal Monitoring	32.014	-80.916		X										2018/2019
1224	North Junction Lazaretto & Oyster Creeks Chatham	Ogeechee	CRD	Coastal Monitoring	31.998	-80.912		X										2018/2019
1225	South Junction Lazaretto & Oyster Creeks Chatham	Ogeechee	CRD	Coastal Monitoring	31.995	-80.91		X										2018/2019
1337	Bull River upstream of Betz Creek	Ogeechee	CRD	Coastal Monitoring	32.02829	-80.94725		X										2018/2019
1338	Betz Creek	Ogeechee	CRD	Coastal Monitoring	32.02005	-80.94529		X										2018/2019
1352	Priest Landing Chatham	Ogeechee	CRD	Coastal Monitoring	31.96058	-81.01186		X										2018/2019
3242	Medway River Near Sunbury	Ogeechee	CRD	Coastal Monitoring	31.685	-81.296		X										2018/2019
3249	Halfmoon East	Ogeechee	CRD	Coastal Monitoring	31.686	-81.277		X										2018/2019
3255	Mouth of Jones Hammock Creek	Ogeechee	CRD	Coastal Monitoring	31.734	-81.194		X										2018/2019
3273	Bear River across from Newell Creek	Ogeechee	CRD	Coastal Monitoring	31.741	-81.161		X										2018/2019
3275	Bear River across from Kilkenny	Ogeechee	CRD	Coastal Monitoring	31.771	-81.16998		X										2018/2019
3285	Dickinson Creek Mouth	Ogeechee	CRD	Coastal Monitoring	31.7568	-81.2724		X										2018/2019
3286	Jones Creek Mouth	Ogeechee	CRD	Coastal Monitoring	31.74765	-81.2541		X										2018/2019
3288	Medway River East of Sunbury Creek	Ogeechee	CRD	Coastal Monitoring	31.728	-81.22028		X										2018/2019
3291	Van Dyke Creek Mouth	Ogeechee	CRD	Coastal Monitoring	31.6894	-81.194		X										2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
3319	Walburg Northwest	Ogeechee	CRD	Coastal Monitoring	31.68713	-81.15633		X										2018/2019
4092	Eagle Creek, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.51	-81.278		X										2018/2019
4100	Back River at July Cut	Ogeechee	CRD	Coastal Monitoring	31.53	-81.33		X										2018/2019
4120	Mud River at Dog Hammock	Ogeechee	CRD	Coastal Monitoring	31.52777	-81.25732		X										2018/2019
4122	Little Mud River at Barbour Island River	Ogeechee	CRD	Coastal Monitoring	31.59343	-81.26117		X										2018/2019
4123	Sapelo Sound at Highpoint	Ogeechee	CRD	Coastal Monitoring	31.53432	-81.22433		X										2018/2019
4175	Old Teakettle Creek, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.442	-81.306		X										2018/2019
4177	Shellbluff Creek, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.476	-81.332		X										2018/2019
4178	Creighton Narrows, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.488	-81.323		X										2018/2019
4179	New Teakettle Creek, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.485	-81.295		X										2018/2019
4180	Front River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.523	-81.291		X										2018/2019
4184	Juliention River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.554	-81.314		X										2018/2019
4185	Little Mud River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.5636	-81.25778		X										2018/2019
4186	South Mouth Barbour Island River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.55775	-81.23293		X										2018/2019
4187	Middle Barbour Island River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.593	-81.236		X										2018/2019
4188	Middle Wahoo River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.615	-81.214		X										2018/2019
4190	South Swain River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.632	-81.224		X										2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
4191	North Swain River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.634	-81.237		X										2018/2019
4195	Todd River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.56232	-81.21815		X										2018/2019
4196	Crescent River, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.503	-81.335		X										2018/2019
4197	Crescent River, South-end of Creighton, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.491	-81.332		X										2018/2019
4304	Julienton River mouth, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.559	-81.274		X										2018/2019
4305	Julienton River middle, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.548	-81.308		X										2018/2019
4306	Four Mile Island southwest, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.539	-81.302		X										2018/2019
4330	Jolly Creek	Ogeechee	CRD	Coastal Monitoring	31.555	-81.29		X										2018/2019
4333	South end of Sapelo Island	Ogeechee	CRD	Coastal Monitoring	31.38741	-81.28912		X										2018/2019
4400	Julienton River, middle, McIntosh	Ogeechee	CRD	Coastal Monitoring	31.557	-81.294		X										2018/2019
5069	Jointer River Mouth, Glynn	Satilla	CRD	Coastal Monitoring	31.055	-81.469		X										2018/2019
5105	Jointer River - Mac's Basin	Satilla	CRD	Coastal Monitoring	31.1	-81.516		X										2018/2019
5198	Mouth Cedar Creek, Glynn	Satilla	CRD	Coastal Monitoring	31.089	-81.479		X										2018/2019
5199	Jointer River, Glynn	Satilla	CRD	Coastal Monitoring	31.08	-81.506		X										2018/2019
5200	Cobb Creek, Glynn	Satilla	CRD	Coastal Monitoring	31.071	-81.483		X										2018/2019
5322	Jointer Island West, Glynn	Satilla	CRD	Coastal Monitoring	31.091	-81.515		X										2018/2019
5357	Jointer Creek at Sage Dock, Glynn	Satilla	CRD	Coastal Monitoring	31.102	-81.527		X										2018/2019
5358	Jointer Creek upstream of Sage Dock, Glynn	Satilla	CRD	Coastal Monitoring	31.106	-81.533		X										2018/2019

Georgia Station Number	Sampling Site	River Basin	Sampling Organization[1]	Waterbody Type/Project	Latitude	Longitude	Routine[2]	Fecal coliform	E. coli	Enterococci	Ortho Phosphorus	Anions/TDS	Metals	Macroinvertebrates	Diatoms[3]	Discharge	Chlorophyll *a*	Year
5359	Little Satilla River at Honey Creek, Glynn	Satilla	CRD	Coastal Monitoring	31.064	-81.526		X										2018/2019
6201	Little Satilla River, Camden	Satilla	CRD	Coastal Monitoring	31.039	-81.491		X										2018/2019
6210	Cabin Bluff, Camden	Satilla	CRD	Coastal Monitoring	30.892	-81.512		X										2018/2019
6212	North Brickhill River, Camden	Satilla	CRD	Coastal Monitoring	30.904	-81.461		X										2018/2019
6213	Delaroche Creek Mouth, Camden	Satilla	CRD	Coastal Monitoring	30.863	-81.497		X										2018/2019
6214	South Brickhill River, Camden	Satilla	CRD	Coastal Monitoring	30.85	-81.477		X										2018/2019
6215	Mouth Black Point Creek, Camden	Satilla	CRD	Coastal Monitoring	30.858	-81.541		X										2018/2019

Rivers and streams stations are sampled monthly for field and chemical parameters. 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.

Coastal Monitoring stations: Numeric stations are sampled for fecal coliform, dissolved oxygen, temperature, pH, and specific conductance monitoring, Letter stations are sampled for enterococci and pH

[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, CRD = Coastal Resource Division, USGS = United States Geological Survey, CWW = Columbus Water Works.

[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

Lake 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.

Surface Water Quality Summary

For the 2020 list, new data were assessed for 634 Waters that included newly assessed waters and existing waters. 132 waters were assessed for the first time. Of these, 49 were found to be Supporting their uses, 55 were found to Not be Supporting their uses and 28 were Categorized as Assessment Pending, which means at this time we could not determine if they were supporting or not supporting their uses. For those assessed as Not Supporting, the impairments were for fish community (BioF), fecal coliform, ammonia toxicity, dissolved oxygen, pH, lead, and selenium. Based on the monitoring data collected in 2018-2019, 30 impairments were removed and 145 impairments were added. The majority of impairments were added for fecal coliform (64) and BioF (40).

The most significant changes in the 2020 list include:

- Changes in the chlorophyll *a* listing for many of the lakes
- Ammonia toxicity was added as a cause of impairment
- Updates were made to waters previously assessed for Bio F based on recalibration of data by WRD
- A number of waters were placed in Category 3 due to pH
- Specific causes have been assigned to specific designated uses for water with multiple uses
- Changes have been made to cause names to make them easier to understand

Two lake sections in Lake Walter F. George and Carters Lake moved from Supporting to Assessment Pending, two lake sections in Lake Lanier moved from Supporting to Not Supporting, and six lake sections in Walter F. George, Lanier, and Allatoona moved from Assessment Pending for chlorophyll *a* to Not Supporting. Ammonia toxicity was added for 15 waters. 1,403 sites assessed for BioF were rescored and the assessment changed for 8% of the sites. 43 sites changed from Supporting to Not Supporting for Bio F and 67 sites changed from Not Supporting to Supporting for Bio F. Approximately 50 waters were evaluated having low pHs. However, there were questions regarding the probe accuracy and if the low pH was due to natural conditions. Therefore, these waters were listed as Assessment Pending until additional data could be collected to answer these questions. Supplemental material providing more detail about these changes can be found in the documents Highlights of the 2020 List and Summary of 2020 Listing Decisions.

The total number of assessed waters in the 2020 list is 2,777. Of these, 1,153 (42%) are Supporting, 1,373 (49%) are Not Supporting, and 251 (95) are Assessment Pending. The percentage of supporting waters is down slightly from the previous lists as shown in Table 3-6.

305(b)/303(d) List

Appendix A includes an integrated list of waters for which data have been assessed. Appendix A also includes Georgia's 2020 Listing Assessment Methodology, which provides a description of how Georgia makes assessment decisions.

Assessed waters are 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.

Table 3-6.
Summary of the 305(b)/303(d) Lists

	2020 List	2018 List	2016 List	2014 List
Waters Assessed	2,777	2,616	2,399	2,297
Supporting	1,153 (42%)	1,142 (44%)	1,052 (44%)	1,019 (44%)
Not Supporting	1,373 (49%)	1,301 (50%)	1,226 (51%)	1,175 (51%)
Assessment Pending	251 (9%)	173 (6%)	121 (5%)	103 (5%)

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.

Data Assessed
Water quality data are assessed to determine if standards are met and if the water body supports its designated use. If monitoring data show that standards are not met, the water body is said to be "not supporting" the designated use. The data reviewed included EPD monitoring data, data from other State, Federal, local governments, and data from groups with EPD approved QA/QC programs. Table 3-7 provides a list of agencies that contributed data used to develop the 2020 report. The data may have been submitted specifically for the 2020 list or for previous listing cycles.

Evaluation of Use Support
Table 3-8 and Figure 3-3 provide 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
Many potential pollutants may interfere with the designated use of rivers, streams, lakes, beaches, and coastal waters. These can be termed the causes of use nonsupport. Based on information presented in Appendix A, Figure 3-4 summarizes the parameters of concern or the causes that 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, note that EPD removed Commercial Fishing Ban (CFB) as a cause of impairment in the 2018 305b/303d list of waters in response to USEPA's removal of CFB from their National Database (ATTAINS) list. These impairments were replaced by the cause FCG(PCBs). Georgia's 2016 305(b)/303(d) list 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 GA Rule 391-4-3-.04. The commercial fishing ban is in place due to historical PCB contamination. 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". Therefore, if you compare the 2016 and 2018 Integrated reports, it looks like here has been a large increase in the number of waters assessed as impaired for FCG(PCBs) when really the increase is a function of CFB listings being changed to FCG(PCBs).

Table 3-7.
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 County	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 Sandy Springs	Athens Clarke County
City of Suwanee	City of Dacula

Table 3-8.
Evaluation of Use Support by Water Body Type and Assessment Category 2018-2019

Degree of Use Support	Streams/ Rivers (miles)	Lakes/ Reservoirs (acres)	Freshwater Beaches (miles)	Coastal Streams/ Rivers (miles)	Sounds/ Harbors (sq. miles)	Coastal Beaches (miles)
Support	5,421	192,211	1.97	265	52	29.61
Not Support	9,076	159,858	0.16	77	11	4.84
Assessment Pending	1,227	39,576	0.09	151	26	0
Total	15,724	391,645	2.22	493	89	34.45

Assessment of Sources of Nonsupport of Designated Uses

Pollutants may come from point or nonpoint sources. Point sources are discharges into waterways through discrete conveyances, such as pipes or channels. Nonpoint sources are diffuse sources of pollution primarily associated with stormwater runoff.

The sources of pollution in Georgia water bodies 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. Now, nonpoint source pollution is the major contributor to impairment.

Figure 3-5 summarizes the sources of pollutants that prevent achievement of water quality standards and use support in Georgia's waters.

Priorities for Action

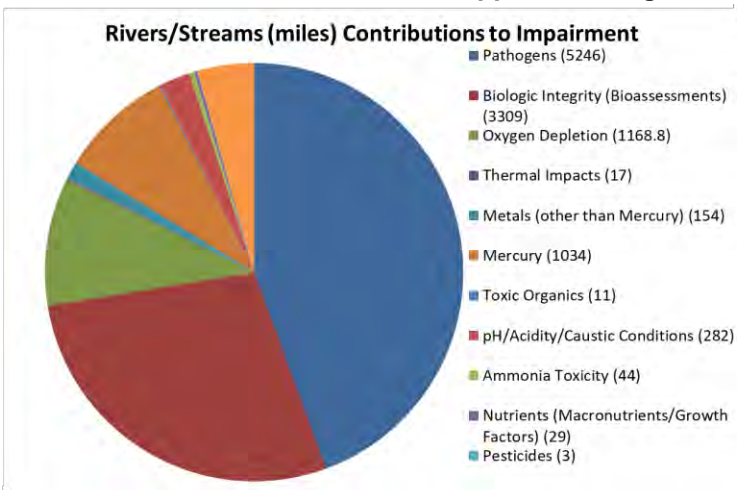
The list of waters in Appendix A has become a comprehensive list of waters for Georgia incorporating the information requested by Sections 305(b), 303(d), 314, and 319 of the Federal CWA. Waters listed in Appendix A are active 305(b) waters. Lakes or reservoirs within these categories provide information 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.

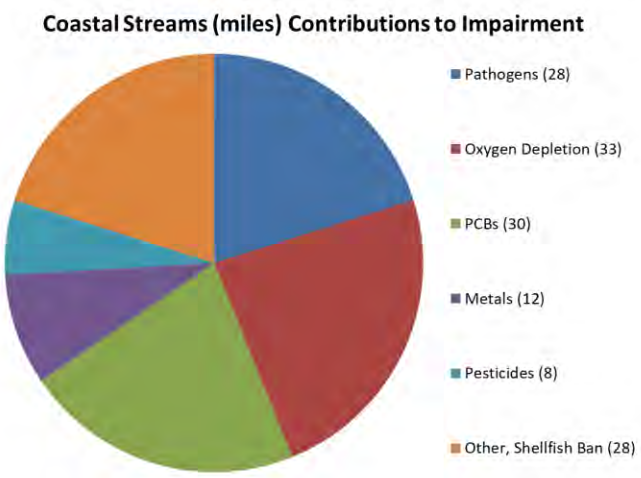
Georgia's Priority Waters Under U.S. EPA's Long-Term Vision

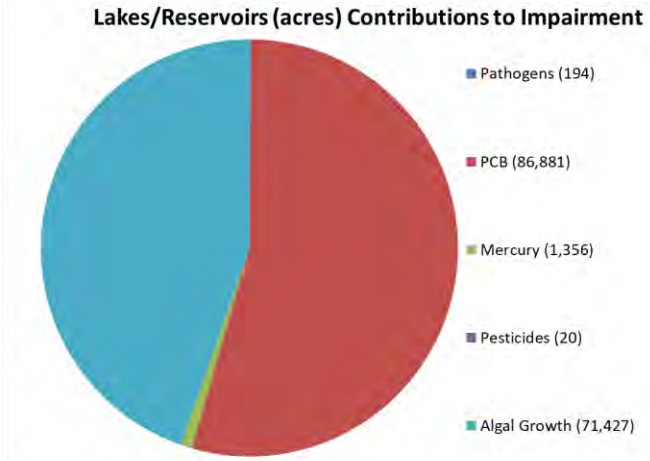
In December 2013, USEPA released a new Long-Term Vision for Assessment, Restoration, and Protection of waters under the Clean Water Act Section 303(d) Program. The document goes through 2022 and focuses on six elements:1) Prioritization, 2) Assessment, 3) Protection, 4) Alternatives, 5) Engagement, and 6) Integration. According to USEPA, as part of the Prioritization element, states are to review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate strategic planning and maximize limited resources. Each state was to develop a Priority Framework and a list of priority waters for which the states would have a TMDL, TMDL alternative, or protection plan written for by 2022. EPD developed a Priority Framework in February 2015 and posted it on EPD's website.

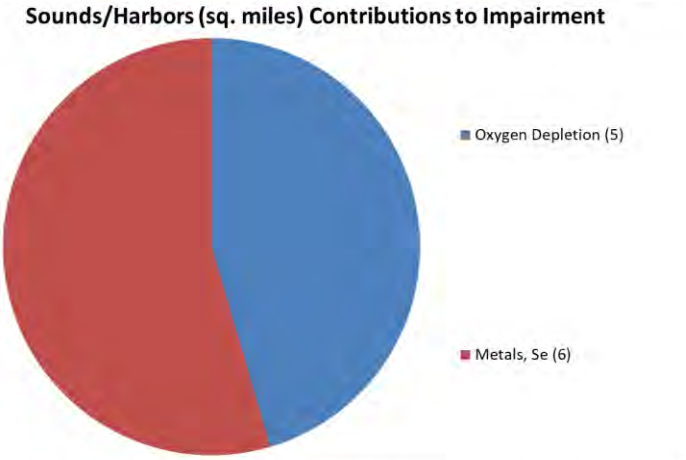
Figure 3-3. Evaluation of Use Support by Water Body Type and Assessment Category

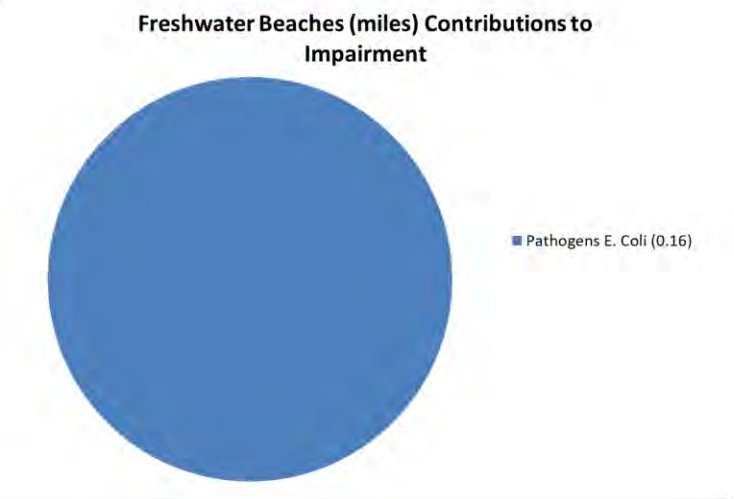
Figure 3-4.
Causes of Nonsupport of Designated Uses by Water Body Type 2018-2019

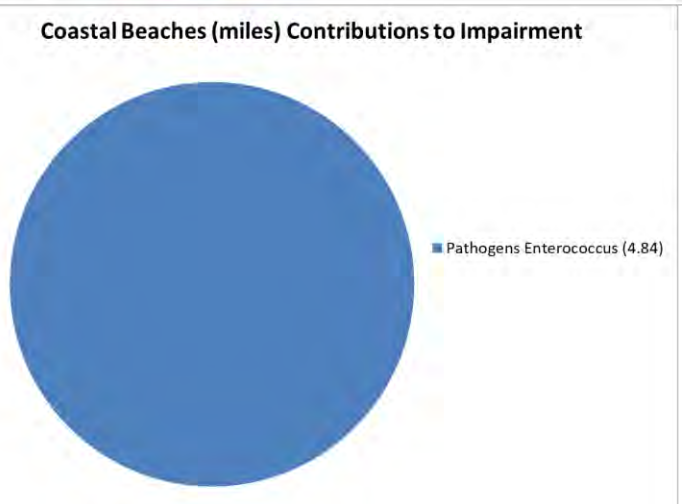






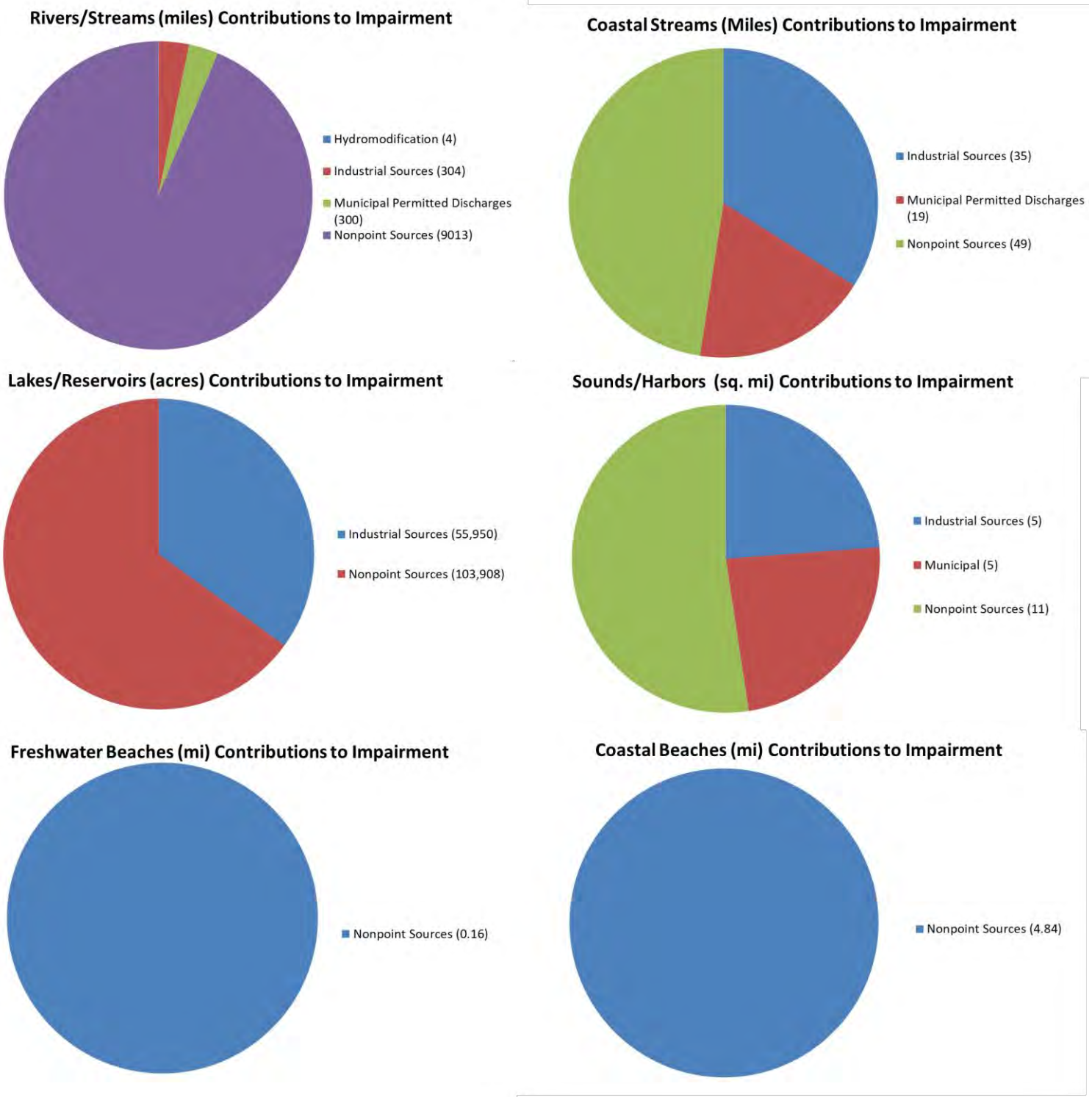






The total mileage/acreage provided for each impairment category (e.g. Pathogens, Toxic Organics, Metals, etc.) is a summation of the mileage/acreage of all the waters impaired by one or more of the pollutants in the category.

Figure 3-5.
Potential Sources of Nonsupport of Designated Uses by Water Body Types 2018-2019



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.

EPD has consistently written TMDLs for impaired waters in a timely manner. EPD writes TMDLs on a five-year rotating river basin schedule. Because all river basins are reviewed in a 5-year period, a water is typically on the impaired list for no more than 5 years before a TMDL is written. Since Georgia did not need to prioritize waters based on what TMDLs could be developed by 2022, EPD instead chose priority waters based on anticipated resource allocation. In particular, EPD assessed the following factors in selecting priority waters: impacts to public health, recreational use, interstate issues, national or regional EPA priorities (like reduction of nutrients), and stakeholder involvement in the area. Georgia identified the waters in Table 3-9 as priority waters. The waters on the priority list can be organized into six groups.

1) Lake Lanier – Lake Lanier is composed of five segments. Only one of these segments (Lanier Lake – Browns Bridge Road (SR 369)) was on the 2012 303(d) list for chlorophyll *a*. However, the other four segments were added to the priority list and a TMDL for chlorophyll *a* was written for the entire lake. EPA approved the Lake Lanier TMDL in 2017. The TMDL addresses nutrients, which are a National priority.

2) Carters Lake – Carters Lake is composed of two segments. Both were on the 2012 303(d) list for chlorophyll *a* and total phosphorus. Georgia put both segments of the lake on the priority list for each parameter and developed a TMDL to address them. EPA approved the Carters Lake TMDL in 2016. This TMDL addresses nutrients, which are a National priority

3) Savannah Harbor – This segment is impaired for DO. EPD is working with South Carolina DHEC and the Savannah River/Harbor Discharger Group to restore this water and has completed a TMDL alternative plan (5R). The Savannah Harbor Restoration Plan was developed in 2015.

4) 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 2019.

5) Four coastal beaches listed on the 2012 303(d) 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. EPA approved these TMDLs in 2016 and 2017.

6) Ochlockonee River Basin – Georgia placed the Upper and Lower Ochlockonee Watersheds on the priority list due to chlorophyll *a* and DO impairments in Lake Talquin, a downstream lake located in Florida, even though USEPA did not include these watersheds as priorities in ATTAINS . A TMDL is being developed by FL DEP 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 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 EPD's priorities under the new Vision, EPD plans to continue developing TMDLs using the rotating basin approach as in the past. Therefore, Georgia will develop more TMDLs by 2022 than what is accounted for in the priority list

Table 3-9.
List of Priority Waters

Group	Water ID	Name/Location	Parameter of Concern	Approach to Address Parameter of Concern	Completed
Lake Lanier	GAR031300010819	Lanier Lake (Browns Bridge Road (SR 369))	Chlorophyll *a*	TMDL	2018
	GAR031300010705	Lanier Lake (Bolling Bridge)	Chlorophyll *a*	Protection via TMDL	2018
	GAR031300010818	Lanier Lake (Lanier Bridge Road (SR53))	Chlorophyll *a*	Protection via TMDL	2018
	GAR031300010820	Lanier Lake (Flowery Branch)	Chlorophyll a	Protection via TMDL	2018
	GAR031300010821	Lanier Lake (Dam Pool)	Chlorophyll *a*	Protection via TMDL	2018
Carters Lake	GAR031501020406	Carters Lake (US Woodring Branch/Midlake)	Chlorophyll *a* & Phosphorus	TMDL	2016
	GAR031501020408	Carters Lake (Coosawattee River Embayment)	Chlorophyll *a* & Phosphorus	TMDL	2016
Savannah Harbor	GAR030601090318	Savannah Harbor (SR 25 (old US Hwy 17) to Elba Island Cut)	Dissolved Oxygen	TMDL Alternative (5R)	2016
Coosa River	GAR031501050209	Coosa River (Beach Creek to Stateline)	Temperature	Direct to Implementation	Permit issued 2019
Beaches	GAR030602040306	Kings Ferry County Park Beach (US Hwy 17 Kingsferry Bridge on Ogeechee River - Entire Beach)	Enterococci	TMDL	2016
	GAR030701060506	Reimolds Pasture Beach (Eastern Shore of Buttermilk Sound)	Enterococci	TMDL	2017
	GAR030702030230	Jekyll Island Clam Creek Beach (Clam Creek to Old North Picnic Area)	Enterococci	TMDL	2017
	GAR030702030415	Jekyll Island – St. Andrews Beach (Macy Lane to St. Andrews Picnic Area)	Enterococci	TMDL	2017
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.

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.

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 considered to be 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.

Some significant wetlands are associated with blackwater streams originating in the Coastal Plain, lime sinkholes, 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 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.

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

Extent of Wetland Resources

The USDA Natural Resources Conservation Service, the U.S. Fish and Wildlife Service (USFWS), and the Georgia Department of Natural Resources have assessed Georgia's wetland resources. The NRCS is developing 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). Although not intended for use in jurisdictional determinations of wetlands, these products are invaluable for site surveys, trends analysis, and land use planning.

A complementary database, completed by Georgia DNR in 1991, was based on classification of Landsat TM satellite imagery. Due to the limitations of remote sensing technology, the classification scheme was simplified compared to the Cowardin system. 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. WRD botanists mapped the Nature Serve Classification of habitats for the 11 county coastal area in 2010

NWI for Georgia's six coastal counties was updated by CRD using 2006 base imagery. A summary of wetland acreages derived from this database is as follows:

Wetland System: Class	Acreage
Marine Unconsolidated Shore	3,084
Estuarine: Emergent	351,236
Estuarine: Unconsolidated Shore	10,700
Estuarine: Scrub-Shrub	4,495
Estuarine: Forested	2,053
Lacustrine: Aquatic Bed	108
Lacustrine: Emergent	10
Lacustrine: Unconsolidated Shore	32
Palustrine: Forested	339,743
Palustrine: Emergent	52,511
Palustrine: Scrub-Shrub	30,899
Palustrine: Unconsolidated Bottom	8,242
Palustrine: Aquatic Bed	832
Palustrine: Unconsolidated Shore	193
Riverine: Unconsolidated Shore	90

The full report can be found on CRD's website and the data from NWI can be found at www.fws.gov.

CRD also produced an NWI Plus database, which adds additional descriptors to the updated NWI dataset and provides a functional component to wetlands in the six coastal counties. CRD rated wetlands as either a High Potential, Moderate Potential, or Low to No Potential for 11 functions. In addition, CRD completed an Impacted Wetland Inventory that identified, assessed, and inventoried impacted wetlands in the six coastal counties. The project area included all estuarine, marine and tidal fresh wetlands, as delineated by the NWI updates completed in 2009, based on 2006 base imagery.

Any of the wetland related data can be viewed at CRD's wetland restoration portal. For more information about the dataset, contact CRD.

Wetland Trends in Georgia

The loss of wetlands is of increasing concern because of associated adverse impacts to flood control, water quality, aquatic wildlife habitat, rare and endangered species habitat, aesthetics, and recreation. Historically, wetlands were 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, Georgia lacks accurate assessments for historic losses in wetland acreages.

Wetlands cover an estimated 20 percent of Georgia. This total includes approximately 367,000 acres of estuarine wetlands and 7.3 million acres of palustrine wetlands (forested wetlands, scrub-shrub, and emergents). Georgia has lost wetlands through conversion, as well as timber harvesting. Despite these losses, Georgia still retains the highest percentage of pre-colonial wetland acreage of any southeastern state.

Acceptable uses of wetlands include:

- Timber production and harvesting
- Wildlife and fisheries management
- Wastewater treatment
- Recreation

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.

Each year, CRD along with other project partners monitors marsh dieback sites along the coast. CRD also monitors shorelines along Georgia tidal creeks to quantify habitat use and restoration of shorelines. Every five years, CRD monitors sea level rise impacts to coastal marshlands and associated upland habitats. CRD partnered with WRD in 2014 to initiate this monitoring at 8 locations distributed throughout the coastal counties. These sites will continue to be monitored every 5 years as long-term monitoring stations. CRD also participates in periodic National Wetlands Condition Assessment (NWCA) efforts coordinated by the USEPA.

In 2011, EPD initiated a wetland monitoring and assessment program that uses an ecoregion-level approach. The goal of the program is to develop appropriate wetland assessment protocols. To date, 90 wetland sites within five ecoregions have been selected and monitored using various protocols, including National Wetlands Condition Assessment (NWCA) protocols. In 2018 and 2019, wetland monitoring focused on assessment of wetland hydric soil characteristics correlated to groundwater hydrology conditions occurring in terrain gradients extending from central wetland areas through transitional border zones toward adjacent uplands. This monitoring was established at reference quality wetland habitats situated within DNR Wildlife Management Areas selected from statewide candidate sites. Additionally, assessment of hydrology, soils and vegetation was performed at various statewide wetland restoration and creation sites which the Georgia Department of Transportation established approximately 20 to 30 years ago under terms of Corps of Engineers 404 permit wetland mitigation requirements. Wetland monitoring in Georgia, to the extent possible, is being coordinated with work being conducted by other Region 4 states within the same ecoregions.

Wetland Permitting

In 2011, EPD formed a Wetlands Unit to review and issue 401 Water Quality Certifications for Section 404 permits, oversee compensatory mitigation program, and advance EPD's wetlands program. During 2018-2019, EPD issued seventy-three 401 WQCs.

All dredge and fill activities in freshwater wetlands are regulated in Georgia by the U.S. Army Corps of Engineers (USACE). Joint permit procedures between the USACE and DNR, including public notices, are carried out in Georgia. Separate permits for alterations to salt marsh and the State's water bottoms are issued by the Coastal Marshlands Protection Committee, a State permitting authority. Enforcement is carried out by the State, USACE and USEPA in tidal waters, and by USACE and USEPA in freshwater systems.

Throughout Georgia, wetlands are granted special consideration in local planning processes under the Georgia Planning Act and the Department of Community Affair's Standards and Procedures for Regional Planning. Specifically, landuse plans must address the following wetlands considerations:

1) Whether the area is unique or significant in the conservation of flora and fauna including threatened, rare or endangered species.
2) 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.
3) Whether impacts or modification by a project would adversely affect fishing or recreational use of wetlands.
4) Whether an alteration or impact would be temporary in nature.
5) Whether alteration of wetlands would have measurable adverse impacts on adjacent sensitive natural areas.
6) Where wetlands have been created for mitigation purposes under Section 404 of the Clean Water Act, such wetlands shall be considered for protection.

Wetland Protection

Georgia protects its wetlands through land acquisition, public education, land use planning, regulatory programs, and wetland restoration. Additional wetlands protection is provided either directly or indirectly by the following statutes:

- 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
- Georgia Planning Act

Education and Public Outreach

The Georgia EPD Adopt-A-Stream program has contracted with UGA Marine Extension and to coordinate the Coastal Georgia Adopt-A-Wetland Program from Skidaway Island, just outside of Savannah. Funding is through an EPA Wetland Program Development Grant. The goals of the program are to educate the public on the importance of wetlands, increase public awareness of water quality issues, train citizens to monitor and protect wetlands and collect baseline wetland health data.

CRD 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

Georgia's State Wildlife Action Plan is a statewide strategy to conserve populations of native wildlife species and their habitats before these species become more challenging to conserve. The Plan identifies high priority species and habitats in Georgia, describes problems affecting these species and habitats, and outlines specific research, conservation, and monitoring needs to maintain the state's wildlife diversity. The plan identifies the protection of wetland and aquatic habitats as a critical wildlife conservation need.

CHAPTER 5

Estuary and Coastal Programs

Background

Georgia DNR CRD manages Georgia's coastal resources. 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.

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. WRD and 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 NonPoint Source (NPS) Program. The Coastal NPS Program is the summary of the full set of regulatory and non-regulatory approaches the State of Georgia uses to control runoff from nonpoint sources, such as agriculture, forestry, and development, into the State's coastal marshlands, wetlands, and beaches. The Coastal NPS Program is required by NOAA and EPA for all coastal states that participate in the Coastal Zone Management Program. In Georgia, the Coastal NPS Program is limited to the 11 coastal counties. The Coastal NPS Program is part of the Georgia's Statewide NPS Program, and GAEPD and CRD partner to implement the program.

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. Both are 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 harvest areas are designated for recreational picking of oysters and clams by the general public. An additional 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.

Table 5-1.
Location and Size of Areas Approved for Shellfish Harvest

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

Water quality sampling occurs monthly at 82 stations in five counties on the coast: 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 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.

Twenty-eight coastal beaches are monitored and 25 beaches support their designated uses. Three beaches are under permanent swimming advisory and do not support their designated uses for enterococci; 2 of these beaches are located on Jekyll Island at St Andrews picnic area and at Clam Creek and 1 beach is the Kings Ferry beach located on the Ogeechee River in Chatham County.

Coastal Streams, Harbors, and Sounds

Several water bodies have been shown to have low DO readings over discrete periods of time during an annual cycle. EPD has categorized these streams as needing further assessment. There are six coastal streams or sound/harbors listed for low DO. There are 34 streams in Category 3 for DO. These low DO readings typically occurred in the late summer and early fall and may be natural. To more accurately represent and report on natural DO 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.

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, and 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 Marine Sportfish Population Health Survey (MSPHS) uses gill and trammel nets to capture recreational finfish in the Wassaw, St. Andrew Altamaha River Sounds 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 19.04 million pounds of product during the period from 2010 to 2019, with an annual average of 11.25 million pounds.

Penaeid shrimps are the most valuable catch in Georgia commercial landings, averaging 9.24 million dollars (2.2 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, 2000,and 2018.

Blue crabs live longer than penaeid shrimps (3-4 years versus 1-2 years), and exhibit fewer extreme fluctuations in annual abundance from one year to the next. The 10-year average (2010 – 2019) of commercial blue crab harvest was 3.44 million pounds with an ex-vessel value of 4.03 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 (2010 - 2019) of shad trips is 287 with a high of 344and a low of 243. 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 less than 10 reported trips, landings averaging less than 500 lbs, and participation averaging less than 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 most 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 (2010-2019) for clams was 249 thousand pounds of meats while oyster harvest was 26.7 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 conservatively developed using available scientific information regarding likely intake rates of fish and toxicity values for the detected contaminants. Under the guidelines, each species receives one of four, recommendations for each location: No Restriction, Limit Consumption to One Meal Per Week, Limit Consumption to One Meal Per Month, or Do Not Eat. In 2019, 52.9% of recommendations for fish tested in Georgia waters were No Restriction, 31.4% were Limit Consumption to One Meal Per Week, 11.8% were Limit Consumption to One Meal Per Month, and 3.9% were Do Not Eat.

This information is also provided annually in Georgia's Freshwater and Saltwater Fishing Regulations, which is available from DNR and supplied with each fishing license purchased. This information is also updated annually in the DNR publication *Guidelines for Eating Fish from Georgia Waters*. **Th**ese 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, but to help fishermen choose safe fish for eating.

Of the 46 constituents tested, only Arsenic, DDD/DDE, Mercury, PCBs, and Toxaphene have been found in fish at concentration above what may be safely consumed at an unlimited amount or frequency.

Fish Consumption Guidelines

Georgia has more than 44,000 miles of perennial streams and more than 421,000 acres of lakes. Georgia DNR cannot sample every waterbody in the State. However, the 26 major reservoirs, which make up more than 90% of the total lake acreage, are high priority. These lakes are monitored to track any trends in fish contaminant levels. DNR has also prioritized sampling fish in rivers and streams downstream of urban and/or industrial areas. In addition, DNR focuses on public areas that are frequented by a large number of anglers.

The general contaminants program includes testing tissue samples from edible fish and shellfish for the substances listed in Table 6-1.

Table 6-1.
Parameters for Fish Tissue Testing

Antimony	a-BHC	HCB
Arsenic	b-BHC	Heptachlor
Beryllium	d-BHC	Heptachlor Epoxide
Cadmium	g-BHC (Lindane)	Methoxychlor
Chromium, Total	g-Chlordane	Mirex
Copper	Chlordane, Total	PCB-1016
Lead	Chlorpyrifos	PCB-1221
Mercury	4,4-DDD	PCB-1232
Nickel	4,4-DDE	PCB-1242
Selenium	4,4-DDT	PCB-1248
Silver	Dieldrin	PCB-1254
Thallium	Endosulfan I	PCB-1260
Zinc	Endosulfan II	PCB-1268
Aldrin	Endosulfan Sulfate	Pentachloroanisole
a-Chlordene	Endrin	Toxaphene
	Endrin Aldehyde	

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 consumption restriction recommended for one species due to dieldrin residues, and one pond has restrictions recommended due to DDT/DDD/DDE residues.

In 1995, USEPA updated guidance on mercury in response to documented increased risks of consuming fish with mercury. The DNR reassessed all mercury data and added consumption guidelines in 1996 for several waterbodies, which had no restrictions in 1995. Georgia's 2019 guidance 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. A water is not supporting its designated use if consumption is limited or not recommended. This risk-based assessment methodology is used for all fish contaminants except mercury. For mercury, if the trophic-weighted fish community tissue mercury is in excess of the water quality criteria of 0.3 µg/g wet weight total mercury, then the water is listed as impaired.

General Guidelines to Reduce Health Risks

The following suggestions may help to reduce the risks of fish consumption:

Keep smaller fish for eating. Generally, larger, older fish may be more contaminated than younger, smaller fish. You can minimize your health risk by eating smaller fish (within legal size limits) and releasing the larger fish.

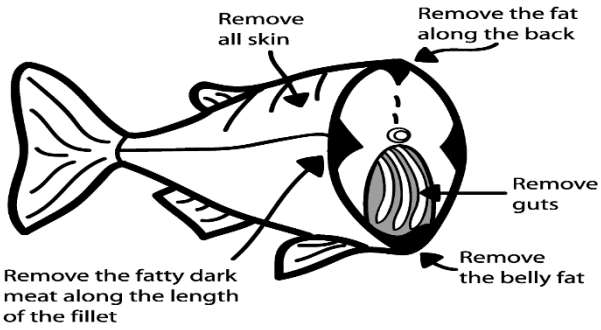
Vary the kinds of fish you eat. Contaminants build up in large predators and bottom-feeding fish, like bass and catfish, more rapidly than in other species. By substituting a few meals of panfish, such as perch, sunfish, and Crappie, you can reduce your risk.

Eat smaller meals when you eat big fish and eat them less often. If you catch a big fish, freeze part of the catch and space the meals from this fish over a longer period of time.

Clean and cook your fish properly. How you clean and cook your fish can reduce the level of contaminants by as much as half in some fish. Some chemicals have a tendency to concentrate in the fatty tissues. Remove the fish's skin and trimming fillets properly according to the diagram below, can reduce the level of contaminants substantially. Mercury, however, is bound to the meat of the fish, so these precautions will not help reduce mercury contamination.

Remove the skin from fillets or steaks. The skin is often high in fat and contaminants.

Trim off the fatty areas. 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%. Internal organs (intestines, liver, roe, and so forth) are also high in fat and contaminants.

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 not reuse the oil for cooking. Pan frying removes few, if any, contaminants.

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

The College of Family and Consumer Sciences, Cooperative Extension Services, University of Georgia and the Chemical Hazards Program, Georgia Department of Public Health collaborated with DNR to develop *A Woman's Guide to Eating Fish*. These simple brochures provide specific information targeted to women of child-bearing age and children for four areas of Georgia: Coastal Georgia; Coosa, Etowah, and Oostanaula Rivers; North Georgia; and Central and South Georgia. These brochures are available in both English and Spanish and can be found on the DNR website. The information will be updated as needed.

Mercury in Fish Trend Project

Mercury is a naturally occurring metal that cycles between the land, water, and air. As mercury cycles through the environment, plants and

animals absorb and ingest it. States across the southeast and the nation have detected mercury in fish at levels that have resulted in limits on fish consumption. The source of mercury in Georgia's fish is most likely due to atmospheric deposition.

Mercury may be naturally occurring, such as in South Georgia swamps, or from anthropogenic sources, such as municipal or industrial sources or fossil fuels. Mercury contamination is related to global atmospheric transport. USEPA 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.

In response to regulatory actions requiring reductions in air emissions of mercury, DNR recognized the need to establish a mercury in fish trend network to provide data that could be used to evaluate potential changes that may result in fish body burdens. In 2006, 22 stations were established based on proximity to major air-emission sources (coal-fired electric generating units and a chlor-alkali plant), waters with TMDLs for mercury in fish, and State boundaries for out-of-state sources. A designated predator species is monitored annually, and the fish tissue is analyzed for mercury.

Recreational Public Beach Monitoring

USACE conducts *E. coli* monitoring at its reservoir bathing beaches in Georgia. DNR Parks conducts *E. coli* monitoring at 27 State Park Lake swimming beaches listed in Table 6-2 weekly during the summertime recreational season.

Tennessee Valley Authority (TVA), Georgia Power, the U.S. Forest Service, the National Park Service, and counties and cities throughout the state also conduct some sampling at the public beaches they operate.

The USGS, along with the National Park Service, Cobb County Water System, City of Roswell, Chattahoochee RiverKeeper and the Chattahoochee Parks Conservancy, operate the BacteriALERT website. The website provides users of the Chattahoochee River and citizens of Atlanta with real-time predictions of *E. coli* bacteria concentrations for three sites on the Chattahoochee River using turbidity as an indicator. Estimating bacteria concentrations from turbidity is a new and inexact analysis, and the statistical model that ties the two together is not a simple linear correlation.

Table 6-2. DNR State Park Lakes

A.H. Stephens State Park Group Camp Beach
Don Carter State Park
Elijah Clark State Park
F.D. Roosevelt State Park: Large Group Camp Beach
F.D. Roosevelt State Park: Small Group Camp Beach
Fort Mountain State Park
Fort Yargo State Park: Day Use Beach
Fort Yargo State Park: Group Camp Area
George T. Bagby State Park and Lodge
Georgia Veterans State Park
Hard Labor Creek. State Park: Camp Daniel Morgan Beach
Hard Labor Creek State Park: Camp Rutledge Beach
Hard Labor Creek State Park: Day Use Camp Beach
High Falls State Park
Kolomoki Mounds State Historic Park
Laura Walker State Park
Little Ocmulgee State Lodge Park
Mistletoe State Park
Red Top Mountain State Park and Lodge
Reed Bingham State Park
Richard B. Russell State Park
Rocky Mountain Public Fishing Area
Seminole State Park
Tallulah Gorge State Park
Tugaloo State Park
Unicoi State Park Day Use Beach
Vogel State Park

CRD 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 Departments 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 grow in the narrow intertidal zone and are exposed between high water and low water tide periods. Only a limited portion of that area 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.

CRD currently monitors and maintains five shellfish growing areas comprising 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 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 thoughsome 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

Cyanobateria blooms are an increasing concern for Georgia. Cyanobacteria occur naturally in low abundance in Georgia’s lakes and reservoirs. However, cyanobacteria blooms can cause a variety of water quality issues, including the potential to produce toxins and taste-and-odor compounds. EPD is developing a means to better detect blooms, assess whether toxins are present, and better inform the public on this issue.

CHAPTER 7

Watershed Protection Programs

Program Perspective

The first major legislation to deal with water pollution control in Georgia was passed in 1957. This legislation 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, cleaning up targeted pollution problems, establishing water use classifications and water quality standards, initiating trend monitoring, and implementing a state construction grants program.

In 1972, the Federal Water Pollution Control Act of 1972, also known as the Clean Water Act (CWA) was enacted by Congress. The CWA launched the national objective to provide "for the protection and propagation of fish, shellfish, and wildlife and provide for recreation in and on the water". The CWA established the NPDES permit system for regulation of municipal (domestic) 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 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 CWA. The federal Water Quality Act of 1987 placed increased emphasis on toxic substances, control of nonpoint source pollution, and clean lakes, wetlands and estuaries. The Act required all states to evaluate their water quality standards and adopt numeric criteria for toxic substances to protect aquatic life and public health, which EPD initiated and completed 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. Georgia's initial *Nonpoint Source Assessment Report* was completed in compliance with the CWA and approved by USEPA in January 1990. This report, *Water Quality in Georgia*, serves as the process to update the *Nonpoint Source Assessment Report*. EPD then completed the first nonpoint source management plan in the late 1990s.

In the late 1980s and early 1990s, the Georgia General Assembly passed a number of laws that set the agenda for EPD in the early 1990s, such as the Growth Strategies Act, which protects sensitive watersheds, wetlands, and groundwater recharge areas and the ban on high phosphate detergents to reduce nutrient loading to rivers and lakes. Legislation passed in 1990 required EPD 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 the Georgia Environmental Policy Act requiring an environmental effects report be developed for major State funded projects, accorded major river corridors additional protections, and 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. In 1992, the General Assembly passed the River Basin Management Planning Act that required EPD develop and implement plans for water

protection for each major river basin in Georgia.

Building on those planning activities, in 2004, the General Assembly passed the Comprehensive State-wide Water Management Planning Act. 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.

EPD, with the help of numerous stakeholders, produced and submitted an initial draft of the statewide water plan on June 28, 2007. Following several rounds of public input, the Georgia Water Council approved the "Georgia Comprehensive State-wide Water Management Plan" on January 8, 2008. The water plan was 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 and updated them in 2017. This work is discussed in Chapter 2.

Watershed Projects
In 2018-2019 high priority was placed on the following Watershed Projects:

Savannah Harbor Restoration
The Savannah Harbor was first listed as impaired for dissolved oxygen (DO) on the 2002 303(d) list. USEPA issued a DO Total Maximum Daily Load (TMDL) in 2006. EPD subsequently revised its DO criteria for the Harbor and the revised criteria were approved by USEPA in 2010. EPD, South Carolina Department of Health and Environmental Control (SCDHEC), and USEPA, along with Savannah River/Harbor Discharge Group, developed an alternative restoration plan to meet the new DO criteria. On October 9, 2015, EPD 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." USEPA approved the revised list November 13, 2016, and withdrew the November 2006 EPA Savannah Harbor TMDL, which was based on the previous Georgia DO criteria.

The wasteload allocations listed in the 5R Restoration Plan have been incorporated into reissued NPDES wastewater permits with compliance schedules as long as seven years. Once all compliance schedules have been completed and permit limits have been met, EPD believes the applicable water quality standards will be met and intends to remove the Savannah Harbor from subcategory 5R and move the Harbor to Category 1.

Coosa River Nutrient and DO Levels
EPD 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.

EPD's RIV-1 model 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 and may be used to revise the Coosa River DO TMDL and wasteload allocations for permitted discharges.

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 NPDES permit with temperature

limits to GA Power Company's Plant Hammond facility.

Alabama Department of Environmental Management (ADEM), EPD, 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. These models were used to develop the 2008 Nutrient TMDL for Lake Weiss. EPD has implemented the total phosphorus reductions in the Coosa River Basin needed to meet downstream water quality standards in Alabama.

Ochlockonee River Basin and Lake Talquin Nutrients Reductions

In 2009, Lake Talquin, was listed as impaired by Florida Department of Environmental Protection (FLDEP). About 75 percent of the lake's watershed is in Georgia. BASF Catalysts, a chemical company in Attapulgus, Georgia, is the largest point source contributor and agriculture is the largest non-point source of the pollution.

EPD has been working with USEPA, FLDEP, as well as industry, county, and area municipal officials to develop a nutrient TMDL for Lake Talquin. USEPA developed a series of complex water quality models that cover the entire watershed using Loading Simulation Program in C++ (LSPC) to estimate the nutrient loads within and discharged from each sub-basin, EFDC to simulate three-dimensional movement of water mass in the rivers and lake, and WASP 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.

FLDEP issued a TMDL in May 2017 that was successfully challenged by BASF. The models have been revised and the calibration period extended. Stakeholders' meetings have been held to review the revised model calibrations. The Lake Talquin TMDL will be reissued in 2020.

Numeric Nutrient Criteria

USEPA requested each State develop a strategy for adopting nutrient water quality criteria to protect waters from the adverse effects of nutrient enrichment. EPD first developed Georgia's Plan for the Adoption of Water Quality Standards for Nutrients in 2005, which was subsequently revised in October 2008 and August 2013.

In 2015, USEPA, EPD, and SCDHEC collaborated on a technical report "An Approach to Develop Numeric Nutrient Criteria for Georgia and South Carolina Estuaries" supporting the development and establishment of numeric water quality criteria under the CWA to protect the applicable designated uses in Georgia and South Carolina estuaries from the effects of excess nitrogen and phosphorus. 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 via measures that are surrogates for designated use endpoints.

Water Quality Monitoring

EPD seeks to effectively manage, regulate, and allocate the water resources of Georgia. Monitoring the State's water resources is necessary to achieve this goal and allows the establishment of baseline and trend data, documentation of existing conditions, development of protective and scientifically defensible water quality standards, study of impacts of specific discharges, determination of improvements resulting from upgraded water pollution control plants, initiation or escalation of enforcement actions, establishment of wasteload allocations for new and existing facilities, development of TMDLs, verification of water pollution control plant compliance, and documentation of water use impairment. EPD uses long term trend monitoring, targeted and probabilistic

monitoring, biological monitoring, intensive surveys, toxic substances monitoring, aquatic toxicity testing, and facility compliance sampling, among other monitoring tools. Details regarding Georgia's monitoring programs are discussed in Chapter 3.

Water Quality Modeling, Wasteload Allocations and TMDL Development

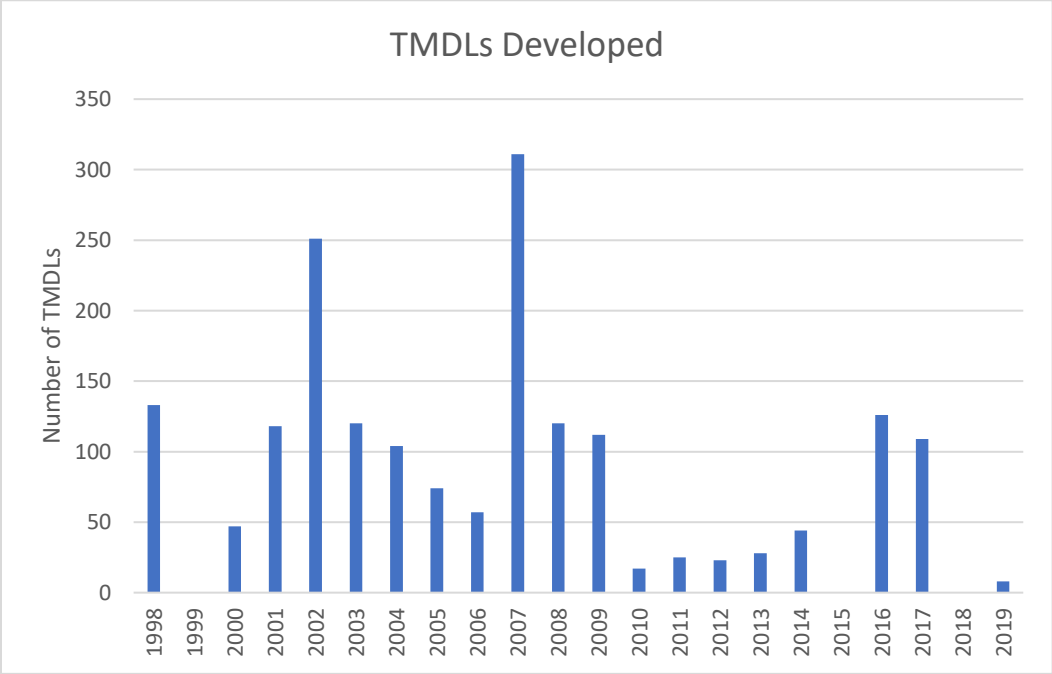
EPD uses water quality models to develop TMDLs for waterbodies not meeting their water quality standards. These models are also used to develop wasteload allocations to determine appropriate water quality-based permit limits for discharges into the State's waters.

In 2013, USEPA released "A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program to coordinate and focus efforts to advance the effectiveness of the TMDL Program. To accomplish this, the Vision focused on six elements: 1) Prioritization, 2) Assessment, 3) Protection, 4) Alternatives, 5) Engagement, and 6) Integration.

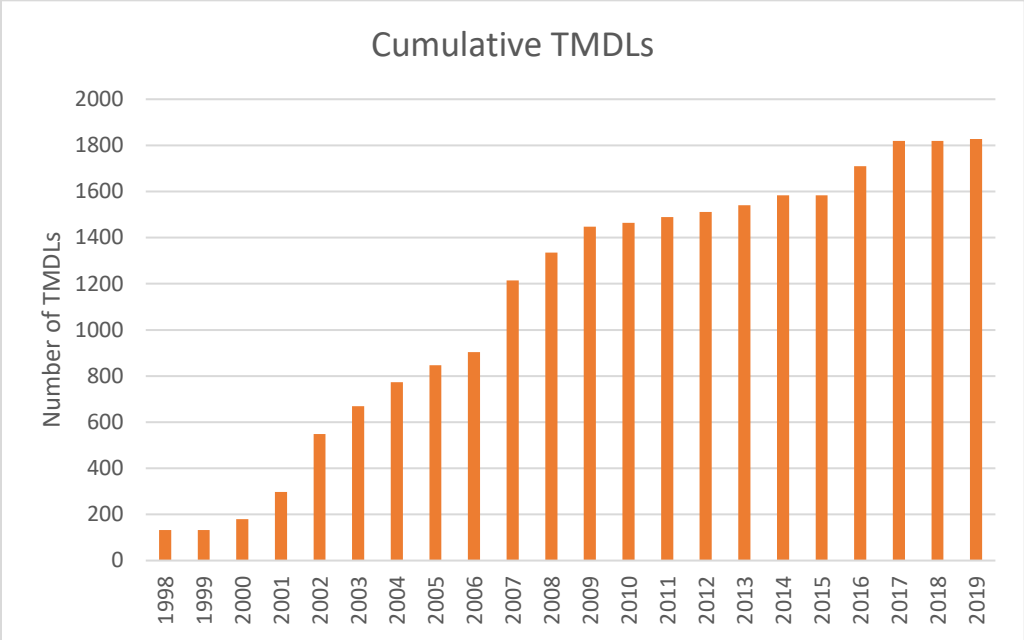
EPD prioritized the following list of waters for protection, "direct to implementation", TMDL development, and/or TMDL alternative development: Lake Lanier, Carters Lake, Savannah Harbor, Coosa River, Coastal beaches listed for enterococci, and the Ochlockonee River Basin.

Meanwhile, EPD continues to develop TMDLs using the rotating basin approach. Of the fourteen river basins, the four basins with the most of TMDLs are the Chattahoochee (15.1%), Coosa (14.4%), Ocmulgee (17.5%), and Oconee (10.1%). To date, more than 1800 TMDLs have been developed for 20 parameters. The majority of TMDLs are for Fecal coliform (46.8%), sediment (29.9%), and low DO (11.7%). Figures 7-1 and 7-2 show the number of TMDLs developed each year since 1998 and the cumulative sum of TMDLs EPD has prepared.

Figure 7-1.
Number of TMDLs Developed Each Year



7-2. Cumulatie Number ot TMDLs Georgia EPD has Developed



TMDL Implementation

TMDLs are implemented through changes in NPDES permits to address needed point source reductions and watershed management plans to address needed nonpoint source reductions. Changes in NPDES permits are made by EPD in coordination with permittees. Watershed management plans, which outline specific nonpoint source best management practices, are developed and implemented through partnerships and grants.

Metropolitan North Georgia Water Planning District

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, a 15 county area that includes Bartow, Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Fulton, Forsyth, Gwinnett, Hall, Henry, Paulding, and Rockdale Counties. 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 2017.

EPD conducts audits to determine whether local governments are in compliance with the District Plans. State law prohibits the EPD 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 stormwater permit), unless such local government is in compliance with the applicable provisions of the District Plan, or the Director certifies that such local government is making good faith efforts to come into compliance.

Wastewater Regulatory Program

National Pollutant Discharge Elimination System (NPDES) Permit Program

The CWA requires NPDES permits for point source wastewater and stormwater dischargers, compliance monitoring for those

permits and appropriate enforcement action for violations of the permits.

In addition to NPDES permits, EPD continues to implement a permit system for land application and disposal systems (LAS). LAS are used as alternatives to surface water discharges, when appropriate.

From January 2018 to December 2019, NPDES and LAS permits were issued, modified or reissued for 220 municipal and private discharges and for 225 industrial discharges.

Concentrated Animal Feeding Operations (CAFOs)
The Georgia rules require animal feeding operations to obtain a NPDES or LAS permit through EPD's Concentrated Animal Feeding Operations (CAFO) permitting program.

Georgia has permitted 94 farms that have been issued a LAS or NPDES permit, including 32 large farms with liquid manure handling systems. Of these, 3 have NPDES CAFO permits and 29 have LAS permits. In the interest of efficiency, EPD redirected, through a contract, some inspections and compliance activities related to these farms to the Georgia Department of Agriculture Livestock/Poultry Section (GDA).

Combined Sewer Systems (CSS)
A Combined Sewer System (CSS) is a sewer system that is designed to collect rainwater runoff, domestic sewage and industrial wastewater in the same pipe. EPD has issued NPDES permits to the three municipalities (Albany, Atlanta, and Columbus) that have CSS. The permits require that the CSS must not cause or contribute to instream violations of Georgia Water Quality Standards.

Stormwater Permitting Program
The CWA Amendments of 1987 require NPDES permits to be issued for stormwater discharges associated with construction activity, industrial activity, and municipal separate storm sewer systems (MS4). EPD designated all municipalities and counties in the metropolitan Atlanta area (Clayton, Cobb, DeKalb, Fulton, and Gwinnett Counties) as of 1994 as large MS4s and issued forty-five individual stormwater permits to the Atlanta area municipalities on June 15, 1994. These permits were reissued in 1999, 2004, 2009, 2014, and 2019.

Augusta, Macon, Savannah, Columbus, the counties surrounding these cities and any other incorporated cities within these counties were identified as medium MS4s.

Thirteen individual stormwater permits were issued to these MS4s April and May 1995.These permits were reissued in 2000, 2005, 2010, 2012, and 2017. In 2014, the number of medium MS4s was reduced to twelve when the City of Macon and Bibb County became consolidated as Macon-Bibb County Consolidated Government.

The 1999 Phase II regulations for MS4s required permit coverage for municipalities with a population less than 100,000 and located within an urbanized area, as defined by the latest decennial census. In addition, EPD was required to develop criteria to designate any additional MS4s with the potential to contribute to adverse water quality impacts, such as the Georgia Department of Transportation and military installations. In December 2002, EPD issued a NPDES general permit for small MS4s, which covered 86 cities and counties. This Permit was most recently reissued in December 2017 and currently covers 109 municipalities, including 20 MS4s designated as a result of the 2010 census. In 2009, EPD issued a NPDES general permit to seven Department of Defense installations. EPD reissued the NPDES general permit for Department of Defense installations in 2014 and 2019, and the permit currently covers 6 facilities. In 2011, EPD issued a NPDES general permit to the Georgia Department of Transportation (GDOT). EPD reissued this permit in 2017.

None of the NPDES MS4 permits contain effluent limits. Instead, each MS4 permittee is required to institute Storm Water

Management Plan (SWMP) components or best management practices that will control stormwater pollution. The stormwater permits for industrial facilities and MS4s require the submittal of Annual Reports to EPD. Each year, EPD reviews these Annual Reports and provides comments to permittees.

In 1993, EPD issued a NPDES general permit for industrial stormwater. This permit was reissued in 1998, 2006, 2012, and 2017. This permit covers the stormwater discharge from 2,923 industrial facilities. An additional 691 facilities have submitted a No Exposure Exclusion Form.

EPD issued a NPDES general permit for construction stormwater associated with land disturbances of five acres or more, which was subsequently appealed in 1992, 1994, 1995, 1996 and 1999. The permit was issued in 2000. In 2003, the NPDES general permit for construction stormwater was reissued by EPD as three general permits: one for stand-alone projects, one for infrastructure projects, and one for common development projects. In accordance with the Phase II stormwater rules, these general permits required coverage for projects disturbing one acre or more. EPD reissued these permits in 2013, modified them in 2016, and then reissued them in 2018. During 2018-2019, 33,308 primary, secondary and tertiary permittees submitted Notices of Intent for coverage under the construction general permits. As of September 30, 2019, there were 20,184 construction sites with NPDES coverage.

Compliance and Enforcement Program

Ensuring compliance with permit conditions is an important part of protecting water quality. Staff review discharge and groundwater monitoring reports, inspect facilities, sample effluents, investigate citizen complaints, provide on-site technical assistance and, when necessary, initiate enforcement action.

Inspections are also an important compliance tool. In Federal Fiscal Year 2019 (FFY19), EPD staff conducted inspections at 668 construction sites, 125 industrial facilities, 9 large MS4s, 2, medium MS4s, and 23 small MS4s. EPD conducted inspections at 300 municipal and industrial wastewater treatment plants that discharge to state waters and at 79 significant industrial users that discharge to municipal wastewater systems.

EPD utilizes all reasonable means to obtain compliance, including technical assistance, noncompliance notification letters, conferences, consent orders, administrative orders, and civil penalties. The EPD Director has the authority to negotiate consent orders and issue administrative orders. In 2018 and 2019, EPD issued 150 orders addressing permit issues and collected $836,503 in negotiated settlements.

As of December 31, 2019, 151 of the 165 (91.5%) major municipal discharges facilities were in compliance with their permit conditions. The remaining facilities are under compliance schedules to resolve the noncompliance or implementing infiltration/ inflow strategies. As of December 31, 2019, 32 out of 33 (97%) major industrial facilities were in compliance with their permit conditions.

The vast majority of stormwater enforcement orders are used in connection with the three construction permits. Between 2018-2019, EPD issued a total of 27 construction stormwater enforcement orders and collected $121,481 in negotiated settlements.

During 2018-2019, increased emphasis was placed on the industrial pretreatment programs delegated to municipalities to ensure that the cities comply with applicable requirements for pretreatment program implementation.

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 were 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.

Nonpoint Source Management Program

EPD is the lead agency for implementing the State's *Nonpoint Source Management Program*. This program combines regulatory and non-regulatory approaches, in cooperation with State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, non-governmental organizations and individual citizens.

States are required to update their Nonpoint Source Management Programs at least once every five years. In 2014 and again in 2019, EPD completed the process of revising the State's *Nonpoint Source Management Program*. The 2019 Statewide Nonpoint Source Management Plan (Plan) focuses on the nonpoint source pollution categories identified in Section 319(b): Agriculture, Silviculture, Construction, Urban Runoff, Hydrologic/Habitat Modification, Land Disposal, Resource Extraction and Other Nonpoint Sources. The 2019 Plan is organized by land use to support the nonpoint source implementation recommendations in the TMDLs, and includes a section discussing statewide programmatic approach, such as education and outreach and grants. The revised plan was developed through a public process, incorporating input from a wide range of stakeholders involved in nonpoint source management activities throughout the State.

Agriculture

Georgia addresses agricultural nonpoint sources through both regulatory (CAFO, LAS permits, for example) and non-regulatory (grant support) approaches. The statewide non-regulatory approach uses cooperative partnerships with various agencies and a variety of activities and programs. Key activities and programs are included as specific goals in the Agriculture Chapter of the Statewide Nonpoint Source Management Plan. In October 2018-September 2019, approximately $2.6 million in new Section 319(h) Grant projects were implemented to achieve those goals.

Under an ongoing FFY16 Section 319(h) grant contract, Georgia Soil and Water Conservation Commission (GSWCC) established six cost-share agreements to install agricultural BMPs in the Scull Shoal Creek sub-watershed (Savannah Basin) for $83,574 federal funds and $55,716 match.

A statewide desktop mapping exercise to locate areas with high potential NPS agricultural contributions identified Wahoo Creek-Little River (Chattahoochee Basin) and North Fork Broad River-Middle Fork Broad River (Savannah Basin) for development and implementation of watershed management plans under a FFY18 Section 319(h) grant contract for $400,000. This grant will also fund agricultural BMPs in Big Generostee Creek-Upper Coldwater Creek and Little Coldwater Creek (Savannah Basin) selected in the mapping exercise. In addition, GSWCC received a FFY19 competitive grant award of $400,000 to install BMPs recommended in the Watershed Management Plans for the Big Indian Creek, Rooty Creek, and Brier Creek. And the Soil and Water Conservation

District was awarded $212,595, in a competitive FFY19 Section 319(h) grant, to implement the Brushy Creek Watershed Management Plan completed under a contracted funded by the FFY17 Section 106 grant.

In FFY19, 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. Outreach and education activities to promote the nonpoint source program included seven public meetings and two booth presentations.

Silviculture

The Georgia Forestry Commission (GFC) has been an integral partner with the EPD since 1977, committed to protecting and maintaining the integrity and quality of the State's waters. EPD designated GFC as the lead agency for the silviculture portion of the State's *Nonpoint Source Management Program*. This program is managed by a Statewide Water Quality Coordinator and 12 foresters serving as District Water Quality Coordinators. GFC Coordinators receive specialized training in erosion and sediment control, forest road layout and construction, stream habitat assessment and wetland delineation.

GFC Coordinators provide local and statewide training to the forestry community through workshops, field demonstrations, presentations, management advice to landowners and distribution of *Georgia's Best Management Practices for Forestry* manual and brochures. GFC also investigates and mediates complaints involving forestry operations. However, the GFC is not a regulatory authority; therefore, in situations where GFC cannot get satisfactory compliance, the case is turned over to the EPD for enforcement as provided under the Georgia Water Quality Control Act. During FFY19, GFC gave 199 BMP educational talks or presentations to 10,926 individuals. In addition, GFC addressed and resolved 69 forestry complaints, requiring 144 site visits. GFC conducted 212 one-to-one conferences with silviculture workers and professionals on-site or in the field.

In 2019, 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, GFC evaluated 254 sites totaling 40,950 acres. Of the 8,074 individual BMPs evaluated, the statewide percentage of correct implementation was 94.40%. Out of the 131 miles of streams evaluated, 96.92% were found to have no impacts or impairments from forestry practices.

Urban Runoff

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

Consistent with the multiple sources of urban runoff, strategies to manage urban runoff have multiple focuses. Specifically, the Statewide Nonpoint Source Management Plan focuses on stormwater management through green infrastructure, onsite sewage disposal systems, dirt roads, land disturbing activities, floodplain management, and hydromodification, particularly dams.

To further statewide coordination and implementation of urban runoff best management practices, the Atlanta Regional Commission (ARC) and EPD 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 EPD, 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.

Erosion and Sedimentation Control

The Georgia Erosion and Sedimentation Act (GESA) was signed into law in April 1975. GESA established a statewide comprehensive program for erosion and sedimentation control to conserve and protect the State's natural resources. GESA allows municipalities and counties to adopt local ordinances and become delegated "Issuing Authorities". EPD delegates local "Issuing Authority" (LIA) status, administers EPD rules where no LIA exists, and oversees LIA implementation. Currently 322 cities and counties have been certified as LIAs. During October 2018 – September 2019, EPD didn't decertify any LIAs or certify any new LIAs.

Future amendments to GESA created additional protections for the State's natural resources. GESA sets up 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 stormwater permits. GESA also holds Georgia's first NPDES permit fee system for construction stormwater, and established training and education requirements for individuals involved in design, review, permitting, construction, monitoring or inspection of any land disturbing activity. The Georgia Soil and Water Conservation Commission administers the training and certification program.

GESA also specifies stream buffer protections and variances to those protections and required the Georgia Board of Natural Resources to adopt amendments to its Rules to implement a warm water, trout stream, and coastal marshland buffer variance program. EPD administers the stream buffer variance program. In FFY19, 182 stream buffer variances were reviewed, of which 142 were approved and none were denied.

Grants

Under Section 319(h) of the CWA, USEPA awards a Nonpoint Source Implementation Grant to EPD to fund projects that implement the State's Plan. Priorities for funding include implementation of TMDL implementation plans and watershed management plans, addressing listed streams, and protecting healthy watersheds. Projects with a BMP monitoring components, those located on the coast, and those addressing a priority watershed are also prioritized.

Section 319(h) Grant funds are made available annually to public agencies in Georgia. 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 FFY19, Georgia's Section 319(h) grants funded eight new projects for over $1.96 million. Project activities include septic system repairs, stream restoration and implementation of green infrastructure. In FFY19, EPD administered 46 Section 319(h) projects, totaling more than $9.5 million in federal funds and $7.6 million in matching funds or in-kind services. Projects activities included implementation of agricultural BMPs, stormwater BMPs, septic repair and pump-outs and monitoring.

Outreach
EPD's Outreach consists of four primary programs that support the education and involvement of Georgia citizens in activities to protect our waterways from nonpoint source pollution. The four programs, highlighted below, include Georgia Project WET, River of Words, Georgia Adopt-A-Stream and Rivers Alive.

Water Education for Teachers 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. Since 1997, over 11,500 Georgia teachers have been certified as Project WET educators, and over 1,100 have volunteered to be facilitators and train other adults in their communities.

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.

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. It is the first curriculum of its kind, focusing on the Chattahoochee River watershed and the unique issues that face an urban watershed. Since its first printing in August of 2005, over 2,900 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 River of Words, an international poetry and art contest for K-12 students. This contest encourages students to explore their watersheds through poetry and art. Georgia students have been selected as National Grand Prize Winners and Finalists. In addition to the students that are recognized nationally, Georgia Project WET honors approximately 50 students as State winners annually.

In partnership with the Georgia Center for the Book, Georgia Project WET coordinates a 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 view the River of Words exhibit at the Education floor of the Georgia Aquarium.

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

Currently, 1,902 volunteers participate in the over 290 community sponsored AAS Programs. Volunteers conduct clean ups, stabilize streambanks, monitor waterbodies using physical, chemical and biological methods, and evaluate habitats and watersheds at over 730 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.

AAS 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 3 months a newsletter is published and distributed to over 11,300 volunteers statewide with program updates and information about available resources.

Starting in 2010, Georgia AAS brought back their annual conference, Confluence, which has grown from 150 participants to more 250 participants annually. The conference provides volunteers with an opportunity to further their knowledge of water related issues, such as visual monitoring, green infrastructure, and stream stabilization. Confluence also includes an award ceremony for recognizing the outstanding achievements of volunteers and local trainers.

AAS has an online database that houses volunteer water quality monitoring data and programmatic information. The website provides visitors with real time stats and graphs automatically generated by the information volunteers submit. As of December 31, 2019, 221 groups actively monitor 736 sites.

Georgia Adopt-A-Stream partners with the Georgia River Network to lead the monitoring team for Paddle Georgia, a weeklong paddle down major Georgia waterways. In 2018, 69 sites were tested on the Yellow and Ocmulgee Rivers and in 2019, 60 sites were tested on the Suwannee and Withlacoochee Rivers. These events connect citizens with activities that protect and improve Georgia waters.

Rivers Alive EPD coordinates an 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. Rivers Alive provides t-shirts and other materials, such as posters and public service announcements, to support local organizers.

Rivers Alive maintains an online database for registering cleanups and submitting cleanup data. 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 EPD website. During 2018-2019, 49,059 volunteers cleaned 2,474 miles of waterways, and removed 1,030,000 pounds of trash.

Land Protection Programs

Georgia Outdoor Stewardship Program (GOSP)

During the 2018 legislative session, the Georgia General Assembly passed House Bill 332 and House Resolution 238, establishing the Georgia Outdoor Stewardship Act. On November 6, 2018, Georgia voters passed the amendment with 83% support. The Georgia Outdoor Stewardship Act dedicates 40% of existing sales and use taxes on outdoor sporting goods to fund stewardship projects for existing state and local parks, acquire and develop new state and local parks, and acquire and protect new lands critical to the protection of our wildlife and clean water supplies.

For the inaugural 2019-2020 grant cycle, eligible applicants, which include local governments, recreation authorities, state agencies, and certain non-profit organizations, cumulatively submitted 58 applications requesting a total of $78 million dollars in grant funding. For more information about the Georgia Outdoor Stewardship Program and these grants, visit www.gadnr.org/gosp.

Land Conservation Program

To date, Georgia DNR has protected over 544,300 acres of conservation land and another 36,361 acres through permanent conservation easements. Between 2018 and January 2020, Georgia DNR acquired 84,300 acres of conservation land. Notable acquisitions protecting stream and wetland habitat included the Canoochee Sandhills WMA, Lanahassee Creek WMA, and

additions to the Ohopee Dunes WMA and Chattahoochee Fall Line WMA.

Private Lands Program
Georgia DNR provides technical assistance to private landowners to encourage protection and restoration of natural habitats such as wetlands. Working with other state and federal agencies, as well as non-governmental organizations, Georgia 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 on the WRD website.

Georgia Emergency Response Team
EPD 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 EPD. 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.

EPD 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 team members interact at the command level with local, state, and federal agency personnel to ensure the protection of human health and the environment during emergency and post emergency situations. The 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 EPD with responsibility for monitoring of radiation and radioactive materials in the environment. EPD takes the 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. EPD also 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

Groundwater Protection and Water Withdrawal Permitting

In 2019, groundwater supplied 2,139 of Georgia's 2,376 public water systems, which are permitted by EPD's Drinking Water Program. About 66% of the groundwater withdrawal permits are for municipal systems, which are permitted for 434 million gallons per day on an annual average (MGD-ADD). About two-thirds of industrial and commercial water withdrawal permits use groundwater, which are permitted for 374 MGD-AAD. About 14,620 of the 27,403 farm 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.

Georgia's Groundwater Resources

Ground-water is extremely important to the life, health, and economy of Georgia. 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).

The State of Georgia possesses a groundwater supply that is both abundant and of high quality. The aquifers are ultimately recharged by precipitation and the Georgia Geologic Survey identified the most significant recharge areas for the main aquifer systems in the State (Figure 8-2). The economy of Georgia and the health of millions of persons could be compromised if Georgia's groundwater were to be significantly polluted. 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.

Georgia's Groundwater Monitoring Network

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. One of the purposes of the network is to allow the EPD to identify groundwater quality trends before they become problems. Figure 8-3 shows locations of stations for the groundwater monitoring network during calendar years 2018 through 2019.

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 Volatile Organic Compounds (VOC) contamination issues found within a well located in Atlanta. The 2018 ambient monitoring program had 77 sampling events with iron, manganese, or aluminum exceedances of the secondary Maximum Contaminant Levels (MCLs) and two wells with uranium levels in excess of the primary MCL. In addition, the 2018 program uncovered two wells with VOC contamination, one potentially due to a neighboring underground petroleum storage tank and the other possibly due to using too much disinfectant. The 2019 ambient monitoring program continued quarterly monitoring of the well with petroleum by-products. The 2019 ambient monitoring program had 81 sampling events with iron, manganese, or aluminum in excess of secondary MCLs and two wells with sample waters having uranium levels above the primary MCL. 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. Major sources of groundwater contamination are provided in Table 8-1. Results of aquifer monitoring data for calendar years 2018 and 2019 are provided in Table 8-2

Groundwater Issues

Sustainable Yields

The Regional Water Plans (discussed in Chapter 2) are informed by assessments of the quantity and quality of surface waters in major streams and rivers, and the estimated ranges of sustainable yields of prioritized aquifers in Georgia.

Most of the aquifers prioritized for assessment were aquifers within the Coastal Plain physiographic province of Georgia where most groundwater use within the State occurs. Estimated ranges of sustainable yields of Coastal Plain aquifers were determined using finite

Figure 8-1.
Hydrologic Provinces of Georgia

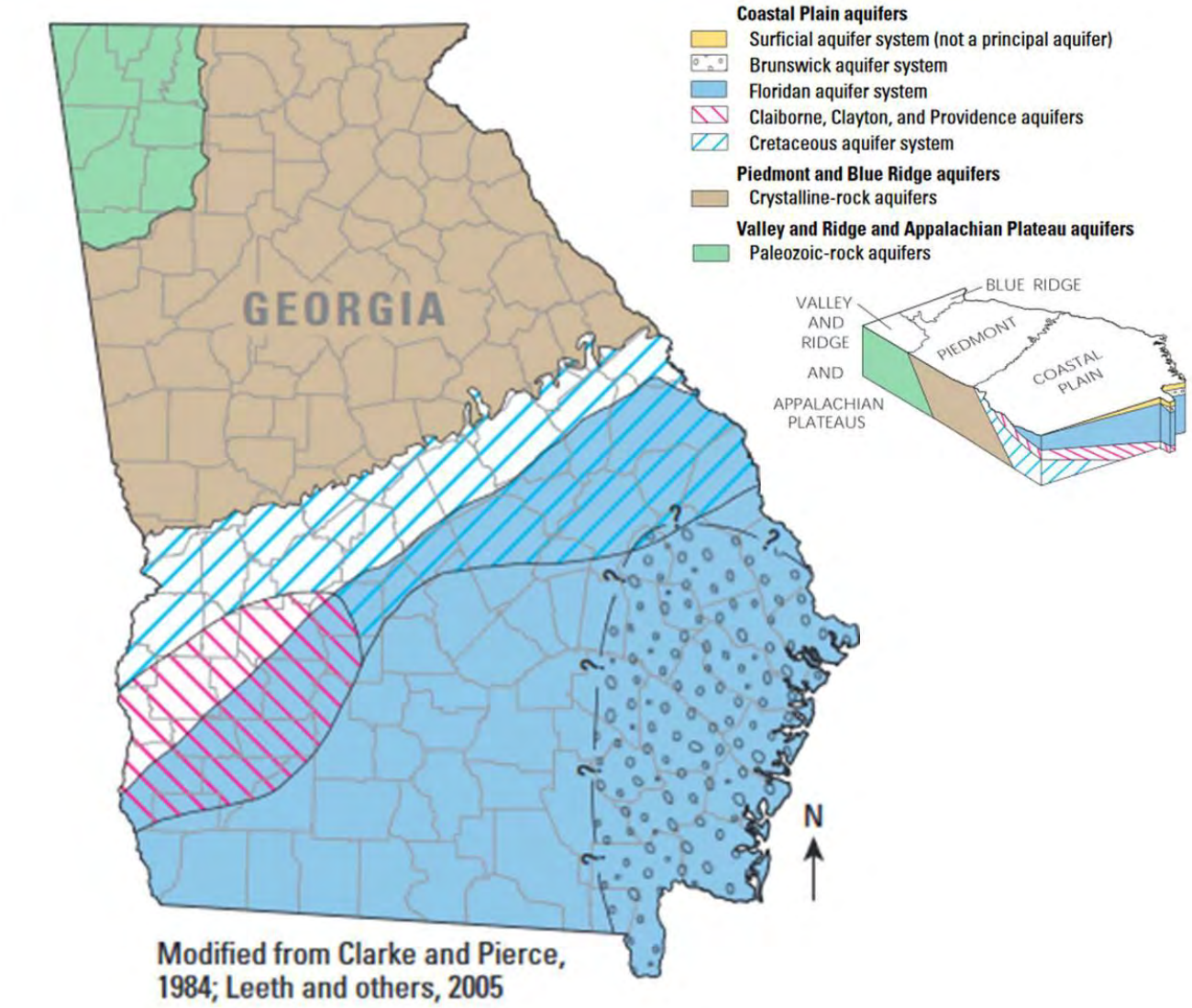


Figure 8-2.
Generalized Map of Significant Groundwater Recharge Areas of Georgia

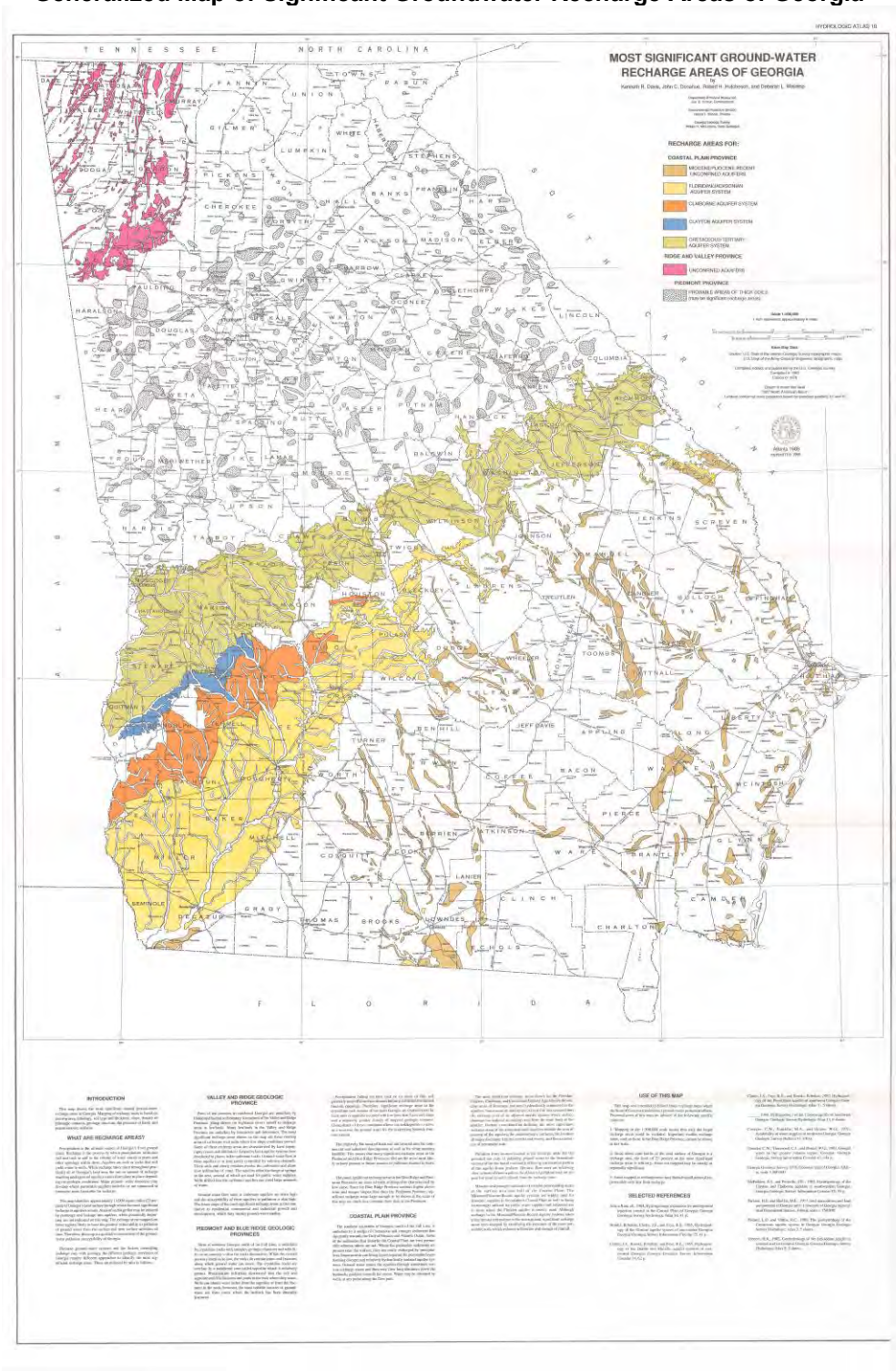


Figure 8-3.
Groundwater Monitoring Network, 2018-2019

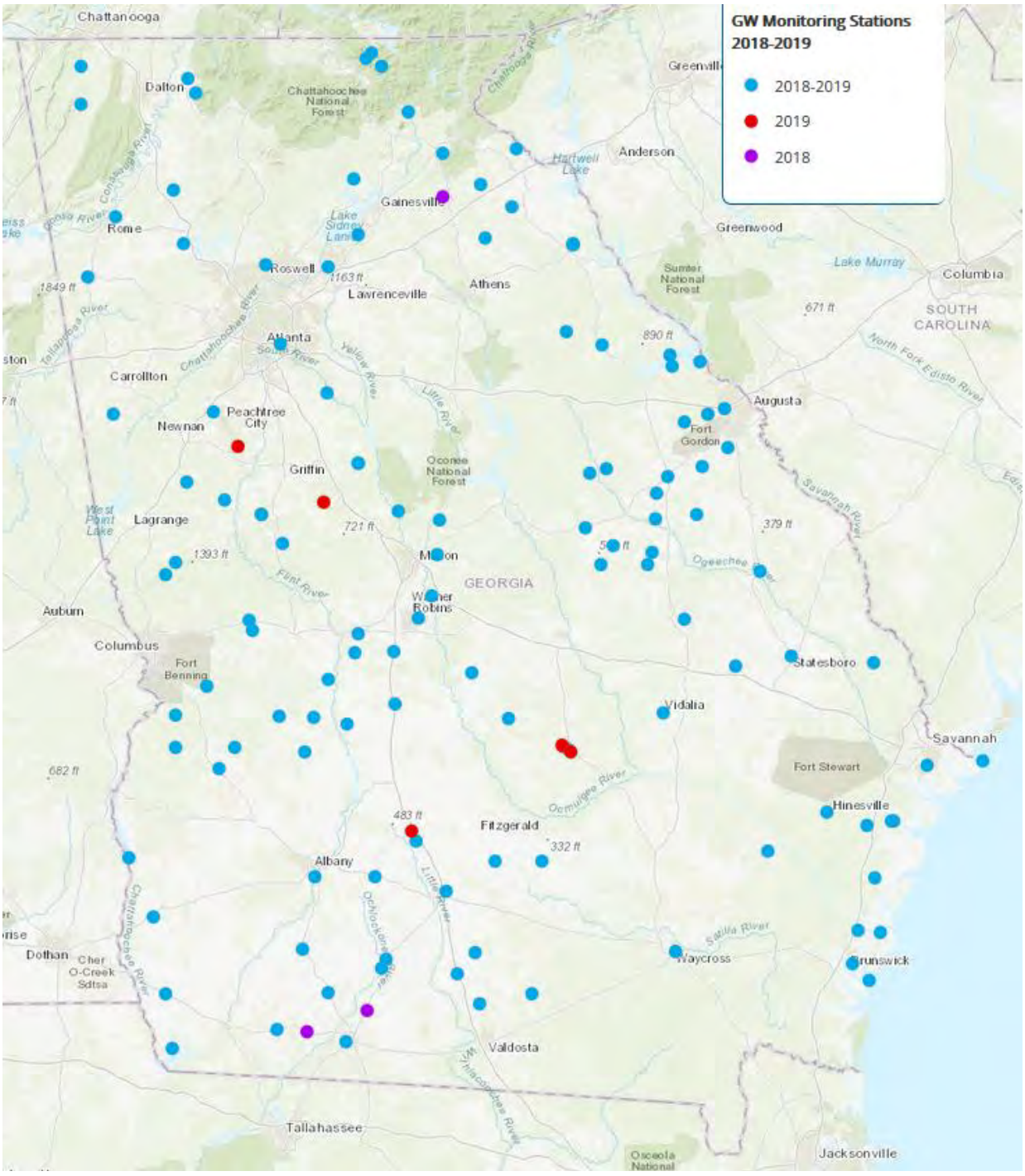


Table 8-1.
Major Sources of Groundwater Contamination

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*	F	H, I
Natural radioactivity		

*10 highest-priority sources

Factors used to select each of the contaminant sources.

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

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

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

Table 8-2.
Summary of Groundwater Monitoring Results for 2018-2019

Year	Aquifer		Nitrate/ Nitrite	VOCs	Arsenic	Uranium	Copper or Lead	Fe, Mn, or Al
2018	Cretaceous/ Providence	Detections	12	0	0	0	8	22
		Exceedances	0	0	0	0	0	9
	Clayton	Detections	3	0	0	0	5	5
		Exceedances	0	0	0	0	0	3
	Claiborne	Detections	1	0	0	0	0	4
		Exceedances	0	0	0	0	0	4
	Jacksonian	Detections	6	1	0	0	1	6
		Exceedances	0	0	0	0	0	3
	Floridan	Detections	22	7	4	0	5	55
		Exceedances	0	0	0	0	0	13
	Miocene	Detections	1	1	0	0	2	7
		Exceedances	0	0	0	0	0	4
	Piedmont/ Blue Ridge	Detections	56	8	0	10	17	93
		Exceedances	0	2	0	2	0	39
	Valley and Ridge	Detections	9	1	0	0	0	6
		Exceedances	0	0	0	0	0	2
	Total	Detections	110	18	4	10	38	198
		Exceedances	0	2	0	2	0	77
2019	Cretaceous/ Providence	Detections	12	1	0	0	11	28
		Exceedances	0	0	0	0	0	12
	Clayton	Detections	3	0	0	0	6	9
		Exceedances	0	0	0	0	0	5
	Claiborne	Detections	1	0	0	0	0	4
		Exceedances	0	0	0	0	0	3
	Jacksonian	Detections	7	1	0	0	1	11
		Exceedances	0	0	0	0	0	4
	Floridan	Detections	21	4	0	0	3	53
		Exceedances	0	0	0	0	0	14
	Miocene	Detections	1	1	0	0	2	6
		Exceedances	0	0	0	0	0	4
	Piedmont/ Blue Ridge	Detections	59	8	0	8	30	99
		Exceedances	0	0	0	2	0	39
	Valley and Ridge	Detections	10	1	0	0	0	2
		Exceedances	0	0	0	0	0	0
	Total	Detections	114	16	0	8	53	212
		Exceedances	0	0	0	2	0	81

difference and finite element numerical modeling methods. The estimated 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 estimated 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.

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.

Several factors are considered for risk of GWUDI, including location, historical sampling data, microbiological quality, chemical quality, physical parameters, well/spring construction, hydrogeology, 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 southcentral parts of the state contain areas of karst topography.

EPD evaluates public groundwater sources (wells and springs) to determine if they are likely to have direct surface water influence. 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.

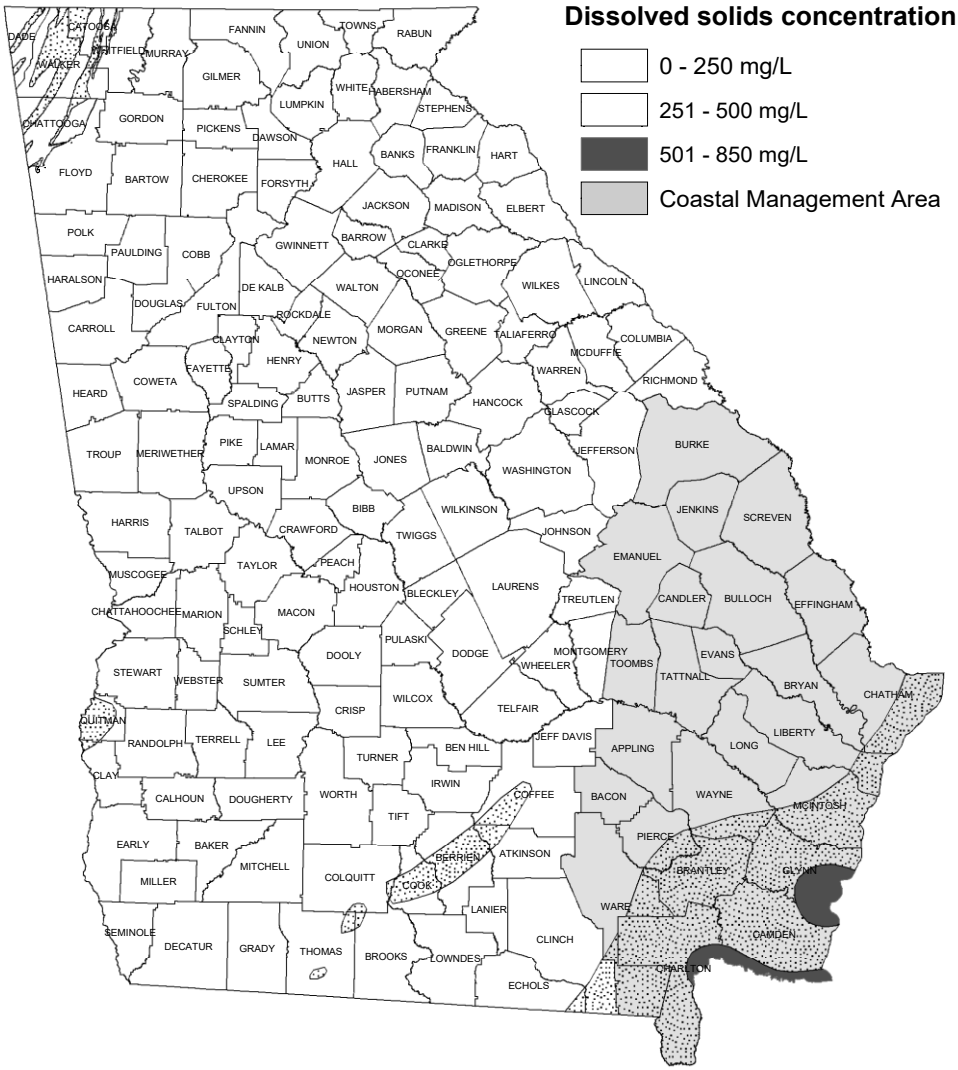
Salt Water Intrusion

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. 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.

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 below as red and yellow zones). EPD

Figure 8-4.
Areas Susceptible to Natural High Dissolved Solids and 24 County Area Covered by the Interim Coastal Management Strategy



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 systems with existing withdrawal permits in the red and yellow zones were issued new permits. The new permits have reduced limits that become effective in 2020 and 2025.

Pesticides
Agricultural chemicals are commonly used in the agricultural regions of the State (Figure 8-5). 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

Radiation
A natural source of contamination is from radioactive minerals that are a minor rock constituent in some Georgia aquifers, including areas where fractured granite is the source of well water. While natural radioactivity may occur anywhere in Georgia (Figure 8-6), 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).

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.

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 Site where nuclear weapons were produced.

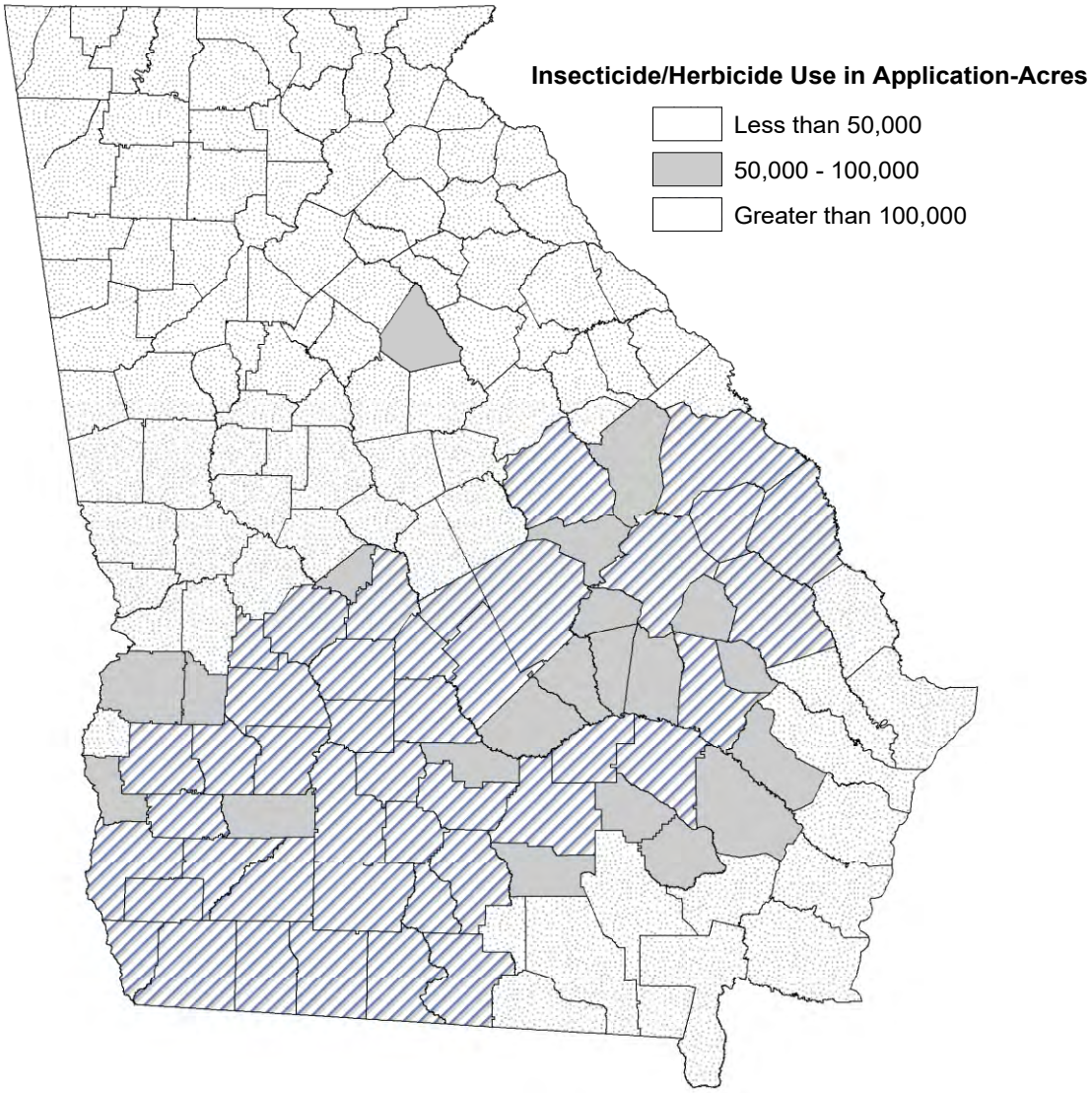
Permitted Withdrawals
The Water Supply Program of the Watershed Protection Branch currently has three major water withdrawal permitting responsibilities: (a) permitting of municipal and industrial groundwater withdrawal facilities; (b) permitting of municipal and industrial surface water withdrawal facilities; and (c) permitting of both surface and groundwater for farm uses.

Groundwater Use Permit
Management of groundwater quantity involves allocating the State’s groundwater, through a permitting system, to ensure that the resource is sustainably used and continues to be productively available to present and future generations. 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 Groundwater 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.

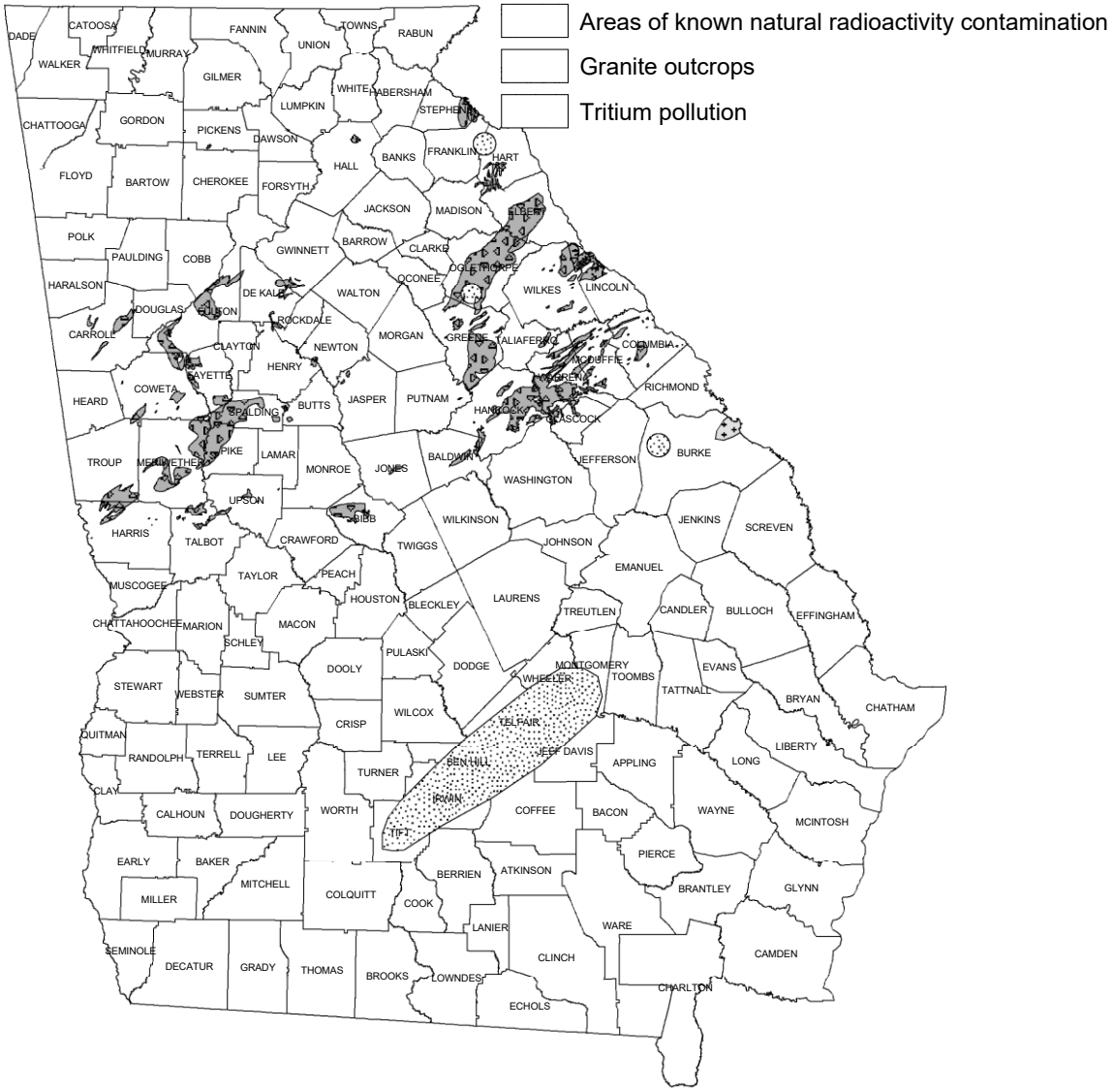
There are 502 active groundwater withdrawal permits: 329 municipal/public supply permits and 173 industrial permits.

Figure 8-5.
Insecticide/Herbicide Use in Georgia, 1980



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

Figure 8-6.
Areas Susceptible to Natural and Human Induced Radiation



Surface Water Withdrawal Permit
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 considered waters of the State) to obtain a Surface Water Withdrawal Permit. 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.

There are 286 active surface water withdrawal permits: 195 municipal permits, 76 industrial permits, and 15 golf course permits.

Farm Water Use Permit
The 1988 Amendments to both the Ground-Water Use Act and the Water Quality Control Act require all farm groundwater and surface water users of more than 100,000 gpd on a monthly average to obtain a Farm Water Use Permit (70 gpm pump or larger).

“Farm Use" is specifically defined as “irrigation of any land used for general farming, forage, aquaculture, pasture, turf production, orchards, or tree and ornamental nurseries; provisions of water supply for farm animals, poultry farming, or any other activity conducted in the course of a farming operation.” Farm uses “shall also include” 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 Farm 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.

Farm Water Use Permit identifies among other things the source, the purpose of withdrawal, total design pumping capacity, installation date, acres irrigated, 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.

There are 27,403 agricultural water use permits (both ground and surface water), of which 14,620 are for groundwater withdrawals, 1,731 are for well to pond permits that has an associated groundwater withdrawal, and 403 are for golf courses and athletic fields.

Groundwater Protection
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. Table 8-3 is a summary of Georgia groundwater protection programs. The prevention of groundwater pollution includes:

- Proper siting, construction and operation of environmental facilities and activities through a permitting system
- Implementation of environmental planning criteria by incorporation of land-use planning by local governments,
- Implementation of a Wellhead Protection Program for municipal drinking water wells,
- Detection and mitigation of existing problems,
-

Table 8-3.
Summary of State Groundwater Protection Programs

Programs or Activities	Check (X)	Implementation Status	Responsible Georgia Agency
Active SARA Title III Program	X	Fully Established	Environ. Protection
Ambient groundwater 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
Groundwater discharge		Prohibited	
Groundwater Best Management Practices	X	Pending	Environ. Protection
Groundwater legislation	X	Fully Established	Environ. Protection
Groundwater classification		Not applicable	
Groundwater quality standards	X	Ongoing	Environ. Protection
Interagency coordination for groundwater 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

- Development of other protective standards, as appropriate, where permits are not required, and
- Education of the public to the consequences of groundwater contamination and the need for groundwater protection.
-

Other programs EPD uses to protect groundwater included:

Hazardous Site Response Act
requires the notification and control of releases of hazardous materials to soil and groundwater. As of December 31, 2019, there are 504 sites listed on the Georgia Hazardous Site Inventory (HSI). A trust fund has been established raised from fees paid by hazardous waste generators for the purpose of cleaning abandoned hazardous waste sites.

Recharge Area Protection Program
EPD has detailed maps showing the relative susceptibility of shallow groundwater to pollution by man's activities at the land surface. EPD has developed environmental criteria to protect groundwater in significant recharge areas. 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.

Underground Injection Control (UIC) Program
During 2018-2019, EPD issued 70 UIC permits and as of December 31, 2019, EPD has 177 active UIC permits covering 6,319 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.

Underground Storage Tank Act
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 31, 2019, there are a total of 29,210 underground storage tanks (USTs) at a total of 9,803 UST facilities.

Water Well Standards Act
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, 2019, Georgia had 230 active licensed water well contractors, 36 active bonded drillers, and 80 active certified pump installers that are required to follow strict well construction and repair standards.

Wellhead Protection
Where recharge to individual wells using the surficial or unconfined aquifers is taking place, 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. Currently there are 1727 active municipal groundwater wells with Wellhead Protection Plans.

Monitoring of Unregulated Drinking Water Contaminants
The Unregulated Contaminant Monitoring Rule (UCMR) is used to collect data on contaminants that are suspected to be present in drinking water, and therefore the source water, and do not have health-based standards set under the Safe Drinking Water Act (SDWA).

Beginning in 2000, and approximately once every five year, EPA has issued a list of no more than 30 contaminants for monitoring by public water systems. The chemicals tested are not regulated, are known or anticipated to occur in public water systems, and may warrant future regulations under the SWDA.

Thus far, water samples have been tested for 109 chemicals and 2 viruses by UCMR1-UCMR4. UCMR5 will begin in 2022.

CHAPTER 9

Major Issues and Challenges

Georgia's major issues and challenges include increased population placing considerable demands on Georgia's water resources; controlling nonpoint source pollution, protecting human health and aquatic life from toxic substances in rivers, lakes, sediment, and fish tissue; excessive levels of nutrients that have detrimental effects on human health and the environment; and protecting recreational and drinking water uses from harmful algae blooms.

Comprehensive State and Regional Water Planning

Georgia is one of the fastest growing states in the nation. The increasing population places considerable demands on Georgia's ground and surface water resources in terms of water supply, water quality, and assimilative capacity.

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 plans present solutions identified by a cross-section of regional leaders, drawing on regional knowledge and priorities to ensure that Georgia's waters can be 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 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. 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 reduction of toxic substances in rivers, lakes, sediment, and fish tissue is extremely important in protecting both human health and aquatic life. The most effective method is to reduce the release of toxic substances into the environment. Although, it is expensive 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.

PFAS

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that have strong carbon-fluorine bonds, which cause them to be highly persistent in the environment and in animals, including fish and human beings. These chemicals don't break down and they can accumulate over time.

There is evidence that exposure to PFAS can lead to adverse human health effects. These chemicals can cause reproductive and developmental problems to fetuses during pregnancy or to breastfed infants (e.g., low birth weight), liver and kidney damage, and immunological effects in laboratory animals. Both chemicals have caused tumors in animals.

Health advisories provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. EPA established health advisory levels at 70 parts per trillion.

EPA and EPD conducted joint sampling of the streams in the Coosa River Basin and have found elevated levels above the health advisory in both surface water and drinking water sources. Cities with elevated PFAS levels have identified alternative water sources.

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. Four of these lakes, Allatoona, Carters Lanier, and Walter F George, have been listed as impaired for chlorophyll a, which is the primary biological indicator in lakes for nutrient overenrichment. TMDLs, based on watershed modeling, have been completed to address the nutrient issues for Allatoona, Carters and Lanier. These TMDLs require both point and nonpoint source reductions. The wasteload allocations outlined in these TMDLs are currently being implemented in NPDES permits.

Harmful Algal Blooms

Cyanobacteria are commonly referred to as blue-green algae and they occur naturally in waters. Under certain circumstances, these algae may grow rapidly to form dense accumulations known as blooms. When blooms are formed by toxin-producing bacteria like blue-green algae, it is generally referred as a Harmful Algal Bloom (HAB). These blooms are considered harmful because they can produce irritants and/or toxins, called cyanotoxins, which can pose health risks to humans and animals. Cyanobacteria are also associated with taste and odor problems.

Cyanotoxins can cause human and animal illness through direct contact, ingestion, or inhalation. Depending on the species of cyanobacteria, the toxins affect the nervous system, liver, skin, or stomach. No human deaths due to cyanotoxins have occurred in the United States, though animal deaths have been widely reported. Pets, livestock, and wildlife may be exposed to cyanotoxins if they drink water from toxin-contaminated waterbodies, lick their fur after swimming in such waters, or consume toxin-containing algal scum or mats.

Table 9-1 provides the human and animal health effects from HABs.

Table 9-1.
Health Effects from Cyanotoxin Exposure

Humans	Animals
Rash, irritation, swelling, sores	Vomiting
Gastrointestinal problems	Diarrhea
Respiratory problems	Seizures
Fever	Death
Headache	
Neurologic symptoms	
Ear symptoms	

Microscopic identification should be performed to determine the type algal species causing the bloom and if it is present in a large enough amount to trigger toxin production. Cyanotoxins may be present both before and after cyanobacteria are observed. Cyanotoxin levels should be confirmed through laboratory testing. The toxins typically tested for include microcystins/nodularins, cylindrospermospin, saxitoxin and anatoxin-a.

The World Health Organization (WHO) considers toxin levels under 10 micrograms/liter to represent a low-level risk for adverse health outcomes from short-term recreational exposure. The Environmental Protection Agency (EPA) recommends microcystin cyanotoxins not exceed 8 micrograms/liter and cylindrospermopsin cyanotoxins not exceed 15 micrograms/liter in recreational waters

APPENDIX A

WATERS ASSESSED FOR COMPLIANCE WITH DESIGNATED USES

The attached tables present Georgia's 2020 Integrated 305(b)/303(d) List of Waters. EPD issued a public notice on February 21, 2019 soliciting data from any outside sources to be included in the assessment of water quality data for the 2020 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 2020 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, coastal beaches, and freshwater 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 water 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 2020 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 2020 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 21, 2019, a notice soliciting water quality data for use in the development of the 2020 305(b)/303(d) list of Waters was placed on the Georgia Environmental Protection Divison's website. The notice was placed on the webpage for the State's 305(b)/303(d) list (https://epd.georgia.gov/water-quality-georgia) and on the webpage that contains public announcements for the Watershed Protection Branch (https://epd.georgia.gov/watershed-protection-branch-public-announcements). The notice stated that the EPD was gathering water quality data and information to be used in the development of Georgia's draft 2020 305(b)/303(d) List of Waters. Any comments, data, or other information were requested to be submitted to EPD by July 1, 2019. The notice 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. This notice was also sent to entities that had current Sampling and Quality Assurance Plans that had been approved by EPD.

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 regard 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, Georgia's Parks, Recreation and Historic Sites 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 2017-2019 were considered in development of Georgia's 2020 305(b)/303(d) List of Waters. For data collected in 2019, typically only data from January thru June are available for assessment. Currently, Georgia has around 2,700 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 2017 and 2019, EPD continues to use the older available data for the waterbodies to make their assessments. In addition, data from 2014 through 2016 are considered along with the 2017 through 2019 data, when assessing a waterbody, if the data set is continuous. For instance, if data were collected every year from 2014-2019, then the data from all these years are used in the assessment. On the other hand, if data were collected in 2014, but not again until 2018, then only the 2018 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 2020 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, Georgia's Parks, Recreation and Historic Sites 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 2020 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.

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 90th 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.

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 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.

M. Ammonia Toxicity:
EPD implemented U.S. EPA's 2013 Ammonia Criteria using our narrative criteria "All waters shall be free from toxic, corrosive, acidic, and caustic substances discharged from municipalities, industries, or other sources, such as nonpoint sources, in amounts, concentrations, or combinations which are harmful to humans, animals, or aquatic life", along with our 2017 NPDES Permitting Strategy for Addressing Ammonia Toxicity. As part of this permitting strategy, EPD has been collecting ammonia data upstream and

downstream of NPDES facilities to determine if discharges are causing waters to exceed the U.S. EPA's chronic ammonia criteria.

1. Listing – Ammonia concentration are compared against the criteria in the *U.S. EPA Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater 2013.* Waterbodies are determined not to be supporting their use designation if any of the following occurs:

    a. Ammonia concentrations exceed the chronic criteria more than once a year.

    b. Ammonia concentrations exceed (2.5 x the chronic criteria) more than once in a 3-year period.

    c. Ammonia concentrations exceed the acute criteria more than once in a 3-year period.

2. Delisting – A waterbody is eligible for delisting when the following conditions occur:

    a. Ammonia concentrations exceed the chronic criteria less than once a year.

    b. Ammonia concentrations exceed (2.5 x the chronic criteria) no more than once in a 3-year period.

    c. Ammonia concentrations exceed the acute criteria no more than once in a 3-year period.

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

1 = DNR-EPD, Watershed Planning & Monitoring Program	43 = City of Atlanta
2 = DNR-EPD, Wastewater Regulatory Program (Municipal)	44 = City of Cartersville
3 = DNR-EPD, Wastewater Regulatory Program (Industrial)	45 = Georgia Ports Authority
4 = DNR, Wildlife Resources Division	46 = Chattahoochee/Flint RDC
5 = DNR, Coastal Resources Division	47 = Upper Etowah Adopt-A-Stream
6 = State University of West Georgia	48 = Middle Flint RDC
7 = Gainesville College	49 = Central Savannah RDC
8 = Georgia Institute of Technology	50 = Chatham County
9 = U.S. Environmental Protection Agency	51 = City of Savannah
10 = U.S. Geological Survey	52 = Heart of Georgia RDC
11 = U.S. Army Corps of Engineers	53 = City of Augusta
12 = U.S. Forest Service	54 = Southwire Company
13 = Tennessee Valley Authority	55 = DNR-EPD, Brunswick Coastal District
14 = Cobb County	56 = DNR-EPD, Hazardous Waste Mgmt. Branch
15 = Dekalb County	57 = Ellijay High School
16 = Douglas County Water & Sewer Authority	58 = DNR, Georgia Parks Recreation & Historic Sites Division
17 = Fulton County	59 = DNR-EPD, Ambient Monitoring Unit (Macroinvertebrate Team)
18 = Gwinnett County	60 = Forsyth County
19 = City of Clayton	61 = Tyson Foods, Inc.
20 = City of Gainesville	62 = South Georgia RDC
21 = City of LaGrange	63 = Northeast GA RDC
22 = Georgia Mountains R.D.C.	64 = Ogeechee Canoochee Riverkeeper
23 = City of Conyers	65 = Screven County
24 = Lake Allatoona (Kennesaw State University)	66 = Coastal GA RDC
25 = Lake Blackshear (Lake Blackshear Watershed Association)	67 = City of Roswell
26 = Lake Lanier (University of Georgia)	68 = City of Alpharetta
27 = West Point (LaGrange College/ Auburn University)	69 = Columbia County
28 = Georgia Power Company	70 = Southwest GA RDC
29 = Oglethorpe Power Company	71 = Southeast GA RDC
30 = South Carolina Electric & Gas Company	72 = Coweta County
31 = South Carolina DHEC	73 = Middle GA RDC
32 = Jones Ecological Research Center	74 = Bartow County
33 = Alabama DEM	75 = Atlanta Regional Commission
34 = City of College Park	76 = Soquee River Watershed Partnership
35 = Kennesaw State University	77 = Upper Chattahoochee Riverkeeper
36 = University of Georgia	78 = Henry County
37 = Columbus Water Works	79 = City of Suwanee
38 = Columbus Unified Government	80 = City of Dacula
39 = St. Johns River Water Mgmt. District	81 = City of Sandy Springs
40 = Town of Trion	82 = Athens Clarke County
41 = Cherokee County Water & Sewerage Authority	83 = LandTec Southeast, Inc
42 = Clayton County Water Authority	

Note: The above is a list of all historical data sources. All sources were not necessarily used in compilation of the 2020 list.

Cause Code	Cause Name		Source Code	Source Name
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 Discharge
Cd	Cadmium		NP	Nonpoint Source
Cu	Copper		UR	Urban Runoff
1,1-DCE	1,1-Dichloroethylene			
DO	Dissolved Oxygen			
FC	Fecal Coliform Bacteria			
Hg	Mercury			
P	Phosphorus			
Pb	Lead			
Se	Selenium			
Trichloroethane	1,1,2-Trichloroethane			
Tox	Toxicity Indicated			
Zn	Zinc			