

CHAPTER 3

Water Quality Monitoring And Assessment

Background

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

The estimates for Georgia are 44,056 miles of perennial streams, 23,906 miles of intermittent streams, and 603 miles of ditches and canals for a total of 70,150 geological stream miles. The estimates for the number of lakes in Georgia are 11,813 with a total acreage of 425,382. This information is summarized in Table 3-1.

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

Water Use Classifications and Water Quality Standards. The Board of Natural Resources is authorized through the Rules and Regulations for Water Quality Control to

establish water use classifications and water quality standards for the waters of the State.

For each water use classification, water quality standards or criteria have been developed, which establish the framework used by the Environmental Protection Division to make water use regulatory decisions. All of Georgia's waters are currently classified as fishing, recreation, drinking water, wild river, scenic river, or coastal fishing. Table 3-2 provides a summary of water use classifications and criteria for each use. Georgia's rules and regulations protect all waters for the use of primary contact recreation by having a fecal coliform bacteria standard of a geometric mean of 200 per 100 ml for all waters with the use designations of fishing or drinking water to apply during the months of May - October (the recreational season).

TABLE 3-1. WATER RESOURCES ATLAS

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

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

Georgia has six large publicly owned lakes that have specific water quality standards. These lakes are West Point, Jackson, Walter F. George, Lanier, Allatoona, and Carter's. Standards were

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

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

¹Standards for Trout Streams for dissolved oxygen are an average of 6.0 mg/l and a minimum of 5.0 mg/l. No temperature alteration is allowed in Primary Trout Streams and a temperature change of 2°F is allowed in Secondary Trout Streams.

²Geometric means should be "based on at least four samples collected from a given sampling site over a 30-day period at Intervals not less than 24 hours." The geometric mean of a series of N terms is the Nth root of their product. Example: the geometric mean of 2 and 18 is the square root of 36.

³Standards are same as fishing with the exception of dissolved oxygen, which is site specific.

adopted for chlorophyll-a, pH, total nitrogen, phosphorus, fecal coliform bacteria, dissolved oxygen, and temperature. Standards for major tributary phosphorus loading were also established. The standards for the six lakes are summarized in Table 3-4.

Water Quality Monitoring

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

Long-Term Ambient and Lake Tributary Monitoring.

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

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

Today the GAEPD contracts with the United States Geological Survey (USGS) for the statewide trend sampling work, and with the Columbus Water Works for sample collection on the Chattahoochee River below Columbus. Figure 1 shows the monitoring network stations for the sample collection period 2008-2009.

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

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

- (i) Instream concentrations of the following chemical constituents which are considered to be other toxic pollutants of concern in the State of Georgia shall not exceed the criteria indicated below under 7-day, 10-year minimum flow (7Q10) or higher stream flow conditions except within established mixing zones:
1. 2,4-Dichlorophenoxyacetic acid (2,4-D) 70 µg/l
 2. Methoxychlor 0.03 µg/l*
 3. 2,4,5-Trichlorophenoxy propionic acid (TP Silvex) 50 µg/l

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

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

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

² The in-stream criterion is lower than the EPD laboratory detection limits (A **** indicates that the criterion may be higher than or lower than EPD laboratory detection limits depending upon the hardness of the water).

³ The aquatic life criteria for these metals are expressed as a function of total hardness (mg/l) in a water body. Values in the table above assume a hardness of 50 mg/l CaCO₃. For other hardness values, the following equations from the EPA document – National Recommended Water Quality Criteria – EPA 2006 should be used. The minimum hardness allowed for use in these equations shall not be less than 25 mg/l, as calcium carbonate and the maximum shall not be greater than 400 mg/l as calcium carbonate.

Cadmium

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

Chromium III

acute criteria = $(e^{(0.8190[\ln(\text{hardness})] + 3.7256)}) (0.316) \mu\text{g/l}$
 chronic criteria = $(e^{(0.8190[\ln(\text{hardness})] + 0.6848)}) (0.860) \mu\text{g/l}$

Copper

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

Lead

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

Nickel

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

Zinc

acute criteria = $(e^{(0.8473[\ln(\text{hardness})] + 0.884)}) (0.978) \mu\text{g/l}$
 chronic criteria = $(e^{(0.8473[\ln(\text{hardness})] + 0.884)}) (0.986) \mu\text{g/l}$

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

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

1.	Chlordane	
	(a) Freshwater	0.0043 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	0.004 $\mu\text{g/l}^*$
2.	Cyanide	
	(a) Freshwater	5.2 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	1.0 $\mu\text{g/l}^*$
3.	Dieldrin	
	(a) Freshwater	0.056 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	0.0019 $\mu\text{g/l}^*$
4.	4,4'-DDT	0.001 $\mu\text{g/l}^*$
5.	a-Endosulfan	
	(a) Freshwater	0.056 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	0.0087 $\mu\text{g/l}^*$
6.	b-Endosulfan	
	(a) Freshwater	0.056 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	0.0087 $\mu\text{g/l}^*$
7.	Endrin	
	(a) Freshwater	0.036 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	0.0023 $\mu\text{g/l}^*$
8.	Heptachlor	
	(a) Freshwater	0.0038 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	0.0036 $\mu\text{g/l}^*$
9.	Heptachlor Epoxide	
	(a) Freshwater	0.0038 $\mu\text{g/l}^*$
	(b) Coastal and Marine Estuarine Waters	0.0036 $\mu\text{g/l}^*$
10.	Pentachlorophenol	
	(a) Freshwater	15 $\mu\text{g/l}^{*1}$
	(b) Coastal and Marine Estuarine Waters	7.9 $\mu\text{g/l}^*$

11.	PCBs	
	(a) Freshwater	0.014 µg/l*
	(b) Coastal and Marine Estuarine Waters	0.03 µg/l*
12.	Phenol	300 µg/l
13.	Toxaphene	0.0002 µg/l*

¹The instream freshwater criterion for pentachlorophenol is a function of pH, determined by the formula ($e^{(1.005(\text{pH}-5.134))}$). At a pH equal to 7.8 standard units the criterion is 15 µg/l.

*The in-stream criterion is lower than the EPD laboratory detection limits.

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

1.	Acenaphthene	990µg/l
2.	Acenaphthylene	**
3.	Acrolein	9.3µg/l
4.	Acrylonitrile	0.25µg/l
5.	Aldrin	0.000050 µg/l
6.	Anthracene	40000µg/l
7.	Antimony	640µg/l
8.	Arsenic (Total)	
	(a) Drinking Water Supplies	10 µg/l
	(b) All Other Classifications	50 µg/l
9.	Benzidine	0.0002 µg/l
10.	Benzo(a)Anthracene	0.018µg/l
11.	Benzo(a)Pyrene	0.018µg/l
12.	3,4-Benzofluoranthene	0.018µg/l
13.	Benzene	51µg/l
14.	Benzo(ghi)Perylene	**
15.	Benzo(k)Fluoranthene	0.018µg/l
16.	Beryllium	**
17.	a-BHC-Alpha	0.0049µg/l
18.	b-BHC-Beta	0.017µg/l
19.	Bis(2-Chloroethyl)Ether	0.53µg/l
20.	Bis(2-Chloroisopropyl)Ether	65000µg/l
21.	Bis(2-Ethylhexyl)Phthalate	2.2 µg/l
22.	Bromoform (Tribromomethane)	140µg/l
23.	Butylbenzyl Phthalate	1900 µg/l
24.	Carbon Tetrachloride	1.6µg/l
25.	Chlorobenzene	1600µg/l
26.	Chlorodibromomethane	13µg/l
27.	2-Chloroethylvinyl Ether	**
28.	Chlordane	0.00081µg/l
29.	Chloroform (Trichloromethane)	470 µg/l
30.	2-Chloronaphthalene	1600µg/l
31.	2-Chlorophenol	150µg/l
32.	Chrysene	0.018µg/l
33.	Dibenzo(a,h)Anthracene	0.018µg/l
34.	Dichlorobromomethane	17µg/l
35.	1,2-Dichloroethane	37µg/l
36.	1,1-Dichloroethylene	7100 µg/l
37.	1,2 – Dichloropropane	15µg/l
38.	1,3-Dichloropropylene	21 µg/l
39.	2,4-Dichlorophenol	290 µg/l
40.	1,2-Dichlorobenzene	1300 µg/l
41.	1,3-Dichlorobenzene	960 µg/l
42.	1,4-Dichlorobenzene	190 µg/l
43.	3,3'-Dichlorobenzidine	0.028 µg/l
44.	4,4'-DDT	0.00022 µg/l
45.	4,4'-DDD	0.00031 µg/l
46.	4,4'-DDE	0.00022 µg/l
47.	Dieldrin	0.000054 µg/l
48.	Diethyl Phthalate	44000 µg/l
49.	Dimethyl Phthalate	1100000 µg/l

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

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

- (v) Site specific criteria for the following chemical constituents will be developed on an as-needed basis through toxic pollutant monitoring efforts at new or existing discharges that are suspected to be a source of the pollutant at levels sufficient to interfere with designated uses:
1. Asbestos
- (vi) instream concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) must not exceed 0.0000012 µg/l under long-term average stream flow conditions.
- (vii) Mercury: For the protection of human health, total mercury concentrations bioaccumulating in a waterbody, in a representative population of fish, shellfish and/or other seafood representing different trophic levels, shall not exceed a total mercury concentration in edible tissues of 0.3 mg/kg wet weight. This standard is in accord with the USEPA *Water Quality Criterion for the Protection of Human Health: Methylmercury*, (January 2001, EPA-823-R-01-001), and because nearly 100% of the mercury in fish tissue is methylmercury, adoption of the standard as total mercury is an additional conservative measure. The representative fish tissue total mercury concentration for a waterbody is determined by calculating a Trophic-Weighted Residue Value, as described by

the Georgia EPD Protocol (October 19, 2001).

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

TABLE 3-4. WATER QUALITY STANDARDS FOR MAJOR LAKES

- (17) **Specific Criteria for Lakes and Major Lake Tributaries.** In addition to the general criteria, the following lake specific criteria are deemed necessary and shall be required for the specific water usage as shown:
- (a) West Point Lake:** Those waters impounded by West Point Dam and downstream of U.S. 27 at Franklin.
- (i) Chlorophyll a: For the months of April through October, the average of monthly photic zone composite samples shall not exceed 27 µg/l at the LaGrange Water Intake more than once in a five-year period.
 - (ii) pH: Within the range of 6.0 - 9.5.
 - (iii) Total Nitrogen: Not to exceed 4.0 mg/l as Nitrogen in the photic zone.
 - (iv) Phosphorus: Total lake loading shall not exceed 2.4 pounds per acre-foot of lake volume per year.
 - (v) Fecal Coliform Bacteria:
 - 1.U.S. 27 at Franklin to New River: Fecal coliform bacteria shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(c).
 - 2.New River to West Point Dam: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b).
 - (vi) Dissolved Oxygen: A daily average of 5.0 mg/l and no less than 4.0 mg/l at all times at the depth specified in 391-3-6-.03(5)(f).
 - (vii) Temperature: Not to exceed 90°F. At no time is the temperature of the receiving waters to be increased more than 5°F above intake temperature.
 - (viii) Major Lake Tributaries: For the following tributaries, the annual total phosphorus loading to West Point Lake shall not exceed the following:
 - 1. Yellow Jacket Creek at Hammet Road: 11,000 pounds.
 - 2. New River at Hwy 100: 14,000 pounds.
 - 3. Chattahoochee River at U.S. 27: 1,400,000 pounds.
- (b) Lake Walter F. George:** Those waters impounded by Walter F. George Dam and upstream to Georgia Highway 39 near Omaha.
- (i) Chlorophyll a: For the months of April through October, the average of monthly photic zone composite samples shall not exceed 18 ug/l at mid-river at U.S. Highway 82 or 15 ug/l at mid-river in the dam forebay more than once in a five-year period.
 - (ii) pH: Within the range of 6.0-9.5 standard units.
 - (iii) Total Nitrogen: Not to exceed 3.0 mg/l as nitrogen in the photic zone.
 - (iv) Phosphorus: Total lake loading shall not exceed 2.4 pounds per acre-foot of lake volume per year.
 - (v) Fecal Coliform:
 - 1. Georgia Highway 39 to Cowikee Creek: Fecal coliform bacteria shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(c)(iii).
 - 2. Cowikee Creek to Walter F. George Dam: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(l).
 - (vi) Dissolved Oxygen: A daily average of no less than 5.0 mg/l and no less than 4.0 mg/l at all times at the depth specified in 391-3-6-.03(5)(f).
 - (vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).
 - (viii) Major Lake Tributary: The annual total phosphorous loading to Lake Walter F. George, monitored at the Chattahoochee River at Georgia Highway 39, shall not exceed 2,000,000 pounds.
- (c) Lake Jackson:** Those waters impounded by Lloyd Shoals Dam and upstream to Georgia Highway 36 on the South and Yellow Rivers, upstream to Newton Factory Bridge Road on the Alcovy River and upstream to Georgia Highway 36 on Tussahaw Creek.
- (i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed 20 ug/l at a location approximately 2 miles downstream of the confluence of the South and Yellow Rivers at the junction of Butts, Newton and Jasper Counties more than once in a five-year period.
 - (ii) pH: Within the range of 6.0-9.5 standard units.
 - (iii) Total Nitrogen: Not to exceed 4.0 mg/l as nitrogen in the photic zone.
 - (iv) Phosphorus: Total lake loading shall not exceed 5.5 pounds per acre-foot of lake volume per year.
 - (v) Fecal Coliform: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(l).
 - (vi) Dissolved Oxygen: A daily average of 5.0 mg/l and no less than 4.0 mg/l at all times at the depth specified in 391-3-6-.03(5)(f).
 - (vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).
 - (viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading to Lake Jackson shall not exceed the following:
 - 1.South River at Island Shoals: 179,000 pounds
 - 2.Yellow River at Georgia Highway 212: 116,000 pounds
 - 3.Alcovy River at Newton Factory Bridge Road: 55,000 pounds
 - 4.Tussahaw Creek at Fincherville Road: 7,000 pounds

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- (d) Lake Allatoona:** Those waters impounded by Allatoona Dam and upstream to State Highway 5 on the Etowah River, State Highway 5 on Little River, the Lake Acworth dam, and the confluence of Little Allatoona Creek and Allatoona Creek. Other impounded tributaries to an elevation of 840 feet mean sea level corresponding to the normal pool elevation of Lake Allatoona.
- (i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:
- | | |
|--|---------|
| 1. Upstream from the Dam | 10 ug/l |
| 2. Allatoona creek upstream form I-75 | 10 ug/l |
| 3. Mid-Lake downstream from Kellogg Creek | 10 ug/l |
| 4. Little River upstream from Highway 205 | 15 ug/l |
| 5. Etowah River upstream from Sweetwater Creek | 12 ug/l |
- (ii) pH: within the range of 6.0-9.5 standard units
- (iii) Total Nitrogen: Not to exceed 4 mg/l as nitrogen in the photic zone.
- (iv) Phosphorous: Total lake loading shall not exceed 1.3 pounds per acre-foot of lake volume per year.
- (v) Fecal Coliform:
1. Etowah River, State Highway 5 to State Highway 20: Fecal coliform bacteria shall not exceed the Fishing Criterion as presented in 391-3-6-.03(6)(c)(iii).
 2. Etowah River, State Highway 20 to Allatoona Dam; Fecal coliform bacteria shall not exceed the Recreation criteria as presented in 391-3-6-.03(6)(b)(i).
- (vi) Dissolved Oxygen: A daily average of 5.0 mg/l and no less than 4.0 mg/l at all times at the depth specified in 391-3-6-.03(5)(g).
- (vii) Temperature:
1. Etowah River, State Highway 5 to State Highway 20: Water temperature shall not exceed the Fishing criterion as presented in 391-3-6-.03(6)(b)(iv).
 2. Etowah River State Highway 20 to Allatoona Dam: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).
- (viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading to Lake Allatoona shall not exceed the following:
- | | |
|---|----------------|
| 1. Etowah River at State Highway 5 spur and 140, at the USGS gage | 340,000 lbs/yr |
| 2. Little River at State Highway 5 (Highway 754) | 42,000 lbs/yr |
| 3. Noonday Creek at North Rope Mill Road | 38,000 lbs/yr |
| 4. Shoal Creek at State Highway 108 (Fincher Road) | 9,200 lbs/yr |
- (e) Lake Sidney Lanier:** Those waters impounded by Buford Dam and upstream to Belton Bridge Road on the Chattahoochee River, 0.6 miles downstream from State Road 400 on the Chestatee River, as well as other impounded tributaries to an elevation of 1070 feet mean sea level corresponding to the normal pool elevation of Lake Sidney Lanier.
- (i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:
- | | |
|--|---------|
| 1. Upstream from the Buford Dam forebay | 5 ug/l |
| 2. Upstream from the Flowery Branch confluence | 5 ug/l |
| 3. At Browns Bridge Road (State Road 369) | 5 ug/l |
| 4. At Bolling Bridge (State Road 53) on Chestatee River | 10 ug/l |
| 5. At Lanier Bridge (State Road 53) on Chattahoochee River | 10 ug/l |
- (ii) pH: Within the range of 6.0-9.5 standard units.
- (iii) Total Nitrogen: Not to exceed 4 mg/l as nitrogen in the photic zone.
- (iv) Phosphorous: Total lake loading shall not exceed 0.25 pounds per acre-foot of lake volume per year.
- (v) Fecal Coliform: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).
- (vi) Dissolved Oxygen: A daily average of 5.0 mg/l and no less than 4.0 mg/l at all times at the depth specified in 391-3-6-.03(5)(g).
- (vii) Temperature: Water temperature shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(iv).
- (viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading to Lake Sidney Lanier shall not exceed the following:
- | | |
|--|----------------|
| 1. Chattahoochee River at Belton Bridge Road | 178,000 pounds |
| 2. Chestatee River at Georgia Highway 400 | 118,000 pounds |
| 3. Flat Creek at McEver Road | 14,400 pounds |
- (f) Carters Lake:** Those waters impounded by Carters Dam and upstream on the Coosawattee River as well as other impounded tributaries to an elevation of 1072 feet mean sea level corresponding to the normal pool elevation of Carters Lake.
- (i) Chlorophyll a: For the months of April through October, the average of monthly mid-channel photic zone composite samples shall not exceed the chlorophyll a concentrations at the locations listed below more than once in a five-year period:
- | | |
|--|---------|
| 1. Carters Lake upstream from Woodring Branch | 5 ug/l |
| 2. Carters Lake at Coosawattee River embayment mouth | 10 ug/l |
- (ii) pH: within the range of 6.0 – 9.5 standard units.
- (iii) Total Nitrogen: Not to exceed 4.0 mg/l as nitrogen in the photic zone.
- (iv) Phosphorous: Total lake loading shall not exceed 172,500 pounds or 0.46 pounds per acre-foot of lake volume per year.
- (v) Fecal Coliform: Fecal coliform bacteria shall not exceed the Recreation criterion as presented in 391-3-6-.03(6)(b)(i).
-

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

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

(viii) Major Lake Tributaries: For the following major tributaries, the annual total phosphorous loading at the compliance monitoring location shall not exceed the following:

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

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

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

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

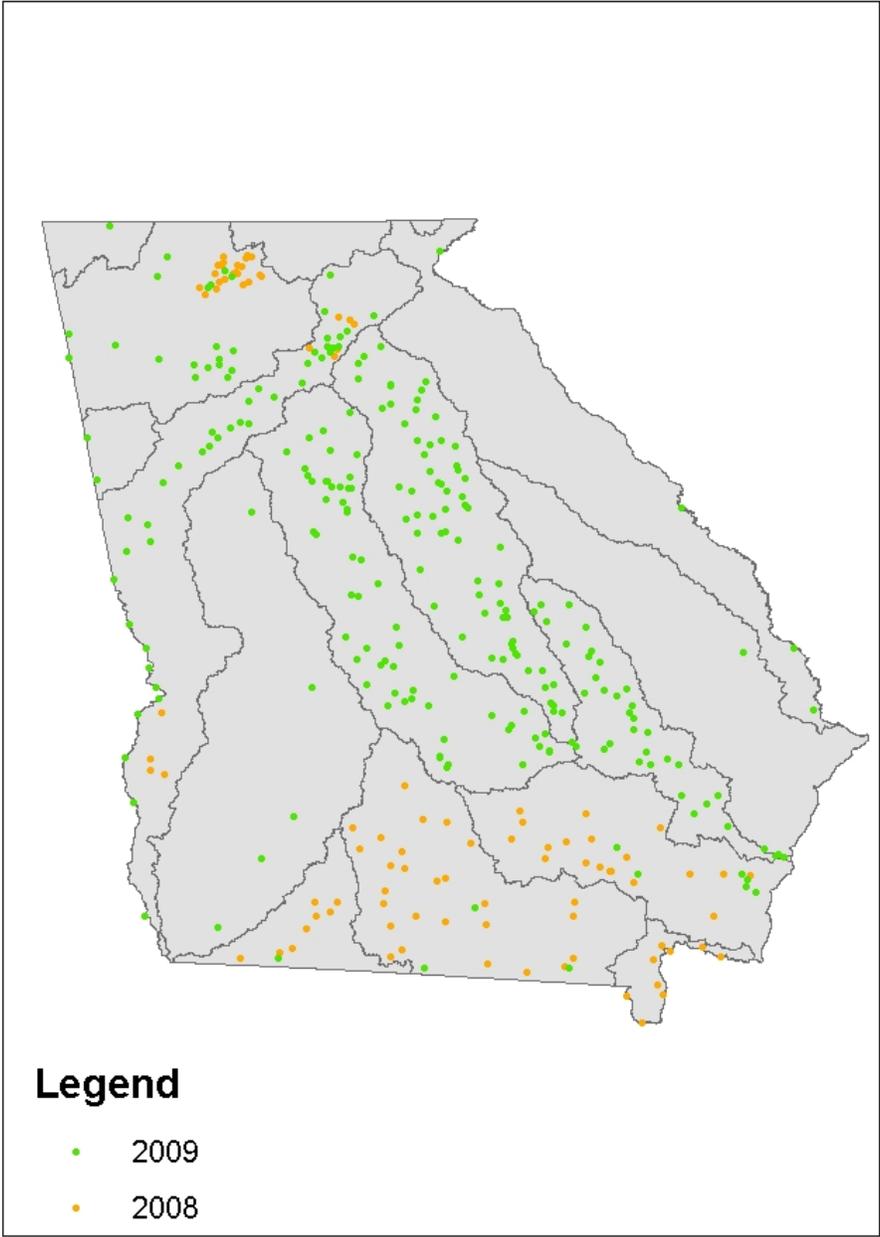
Figure 1 shows the monitoring network stations for the sample collection period 2008-2009. A list of the Statewide trend monitoring network stations, which consists of the “core” stations that are sampled every year, is presented in Table 3-6. Tables 3-7 and 3-8 provide a list of stations and parameters for the 2008 and 2009 rotating basin networks.

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

TABLE 3-5. MAJOR RIVER BASIN MONITORING GROUPS

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

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



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

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

Station Number	Location	River Basin	Parameters¹
01001001	Chattooga River - U.S. Highway 76 near Clayton, GA	Savannah	Standard
01011001	Savannah River - 0.5 Mile Downstream from Spirit Creek	Savannah	Standard
01014001	Savannah River - Seaboard Coast Line Railway, North of Clio	Savannah	Standard
02023001	Ogeechee River - GA Highway 24 nr Oliver, GA	Ogeechee	Standard
03035001	Oconee River at Barnett Shoals Road near Athens, GA	Oconee	Standard
03051001	Oconee River at Interstate Highway 16 near Dublin, GA	Oconee	Standard
04220111	Lake Jackson at confluence of Alcovy River and Yellow/South River Branch	Ocmulgee	Standard
04500001	Lake Jackson - Dam Forebay	Ocmulgee	Standard
05009901	Ocmulgee River - New Macon Water Intake	Ocmulgee	Standard
05015001	Ocmulgee River - 6.0 Miles Downstream from Tobesofkee Creek	Ocmulgee	Standard
05025001	Ocmulgee River - U.S. Highway 341 at Lumber City	Ocmulgee	Standard
06016001	Altamaha River - 6.0 Miles Downstream From Doctortown	Altamaha	Standard
07021001	Satilla River - GA Highways 15 and 121	Satilla	Standard
09001001	Suwannee River - U.S. Highway 441 near Fargo, GA	Suwannee	Standard
09044501	Withlacoochee River at Clyattsville-Nankin Rd nr Clyattsville, GA	Suwannee	Standard
10017001	Ochlockonee River @ Hadley Ferry Rd. nr Calvary, GA	Ochlockonee	Standard
11018001	Flint River at State Road 92 near Griffin, GA	Flint	Standard
11060011	Flint River at SR 26 near Montezuma	Flint	Standard
11090401	Flint River at State Road 234 near Albany, GA	Flint	Standard
11102001	Flint River at State Road 37 at Newton, GA	Flint	Standard
11109001	Flint River at U.S. Highway 27-B near Bainbridge, GA	Flint	Standard
12030141	West Fork Little River at Jess Helton Road near Clermont, GA	Chattahoochee	Standard
12030151	East Fork Little River at Honeysuckle Road near Clermont, GA	Chattahoochee	Standard
12030161	Lake Sidney Lanier - Little River Embayment, Betw M1WC & 3LR	Chattahoochee	Standard
12030171	Wahoo Creek at Ben Parks Road near Murrayville, GA	Chattahoochee	Standard
12030201	Lake Sidney Lanier at Lanier Bridge (State Road 53) on Chattahoochee River	Chattahoochee	Standard
12033201	Dicks Creek at Forest Service Road 144-1 near Neels Gap, GA	Chattahoochee	Standard
12037001	Lake Sidney Lanier at Boling Bridge (State Road 53) on Chestatee River	Chattahoochee	Standard
12038001	Lake Sidney Lanier at Browns Bridge Road (State Road 369)	Chattahoochee	Standard
12038610	Balus Creek at McEver Road near Oakwood, GA	Chattahoochee	Standard
12038651	Lake Sidney Lanier - Flat Creek Embayment, 100' U/S M7FC	Chattahoochee	Standard
12038681	Lake Sidney Lanier - Balus Creek Embayment, 0.34m SE M6FC	Chattahoochee	Standard
12038781	Mud Creek at McEver Road near Flowery Branch, GA	Chattahoochee	Standard
12039601	Sixmile Creek at Burrus Mill Road near Coal Mountain, GA	Chattahoochee	Standard
12038801	Lake Sidney Lanier - Mud Crk Embayment, Betw Marina & Ramp	Chattahoochee	Standard
12039401	Lake Lanier upstream from Flowery Branch Confluence (Midlake)	Chattahoochee	Standard
12039621	Lake Sidney Lanier - Six Mile Creek Embayment, 300' E	Chattahoochee	Standard

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

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

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

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

TABLE 3-7. GEORGIA BASIN MONITORING NETWORK 2008

Rivers and stream stations are sampled monthly for field and chemical parameters for one calendar year every five years. Four fecal coliform bacterial samples are collected each calendar quarter during the focused monitoring year. Basin lakes and reservoirs are sampled on a five-year rotational schedule. Samples are collected quarterly for non-standard basin lakes and reservoirs within the river basin of focus for the calendar year.

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

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

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

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

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

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

Station Number	Sampling Site	Sampling Organization¹	Water Body Type	Latitude	Longitude
1402040403	Harris Creek at East Harris Branch Road	Atlanta WP	Stream	-84.5947	34.59796
1402050802	Reregulation Reservoir (for Carters Lake) upstream Dam	Atlanta WP	Lake	-84.6928	34.60269
1402050803	Talking Rock Creek at Talking Rock Resort Community	Atlanta WP	Stream	-84.6606	34.56184
1404080902	Lake Allatoona at Little River upstream from Highway 205	Atlanta WP	Lake	-84.5772	34.15861
1404090401	Lake Allatoona Upstream from Dam	Atlanta WP	Lake	-84.7258	34.16083
1404090404	Lake Allatoona at Allatoona Creek Upstream from Interstate 75	Atlanta WP	Lake	-84.7114	34.08583
1404100104	Lake Allatoona at Etowah River upstream from Sweetwater Creek (Marker 44E/45E)	Atlanta WP	Lake	-84.5778	34.19
1404100409	Lake Allatoona downstream from Kellogg Creek (Markers 18/19E)	Atlanta WP	Lake	-84.6392	34.13861
0701020301	Satilla River at SR 135 near	Brunswick WP	Stream	-82.8889	31.42529
0701030102	Satilla River at CR 247 Minchew Road near	Brunswick WP	Stream	-82.7011	31.30792
0701040101	Broxton Creek at County Road 358 (Broxton Road) near Douglas, Ga.	Brunswick WP	Stream	-82.8431	31.58194
0701050101	Seventeen Mile River at SR32 / U.S. Hwy 121 near Douglas, GA	Brunswick WP	Stream	-82.8239	31.51958
0701060102	Seventeen Mile River - Georgia Highway 64 near Pearson, Ga.	Brunswick WP	Stream	-82.6788	31.37333
0701060401	Hog Creek at County Road 467 (Telmore-Dixie Union Road) at Bickley, Ga.	Brunswick WP	Stream	-82.5731	31.40472
0701070201	Cox Creek at Pineview Church Road near Waycross, GA	Brunswick WP	Stream	-82.4618	31.28698
0701070302	Kettle Creek at Hwy 1 near Waycross, GA	Brunswick WP	Stream	-82.3782	31.25705
0701070402	Satilla River - U.S. Highway 82 near Waycross, Ga.	Brunswick WP	Stream	-82.3247	31.23806
0701070403	Waycross Drainage Canal, 100ft u/s of Mouth, Waycross, Ga	Brunswick WP	Stream	-82.3198	31.23283
0701070501	Big Creek at SR 520 / U.S. Hwy 82 near Hoboken, Ga.	Brunswick WP	Stream	-82.1881	31.17444
0701090401	Little Hurricane Creek at Hwy 1 near Waycross, GA	Brunswick WP	Stream	-82.4328	31.42348
0701100101	Hurricane Creek - U.S. Highway 1 Near Alma	Brunswick WP	Stream	-82.4639	31.56667
0701100401	Alabaha River at US Hwy 84 near Blackshear, Ga.	Brunswick WP	Stream	-82.2257	31.31625
0701110202	Satilla River - U.S. Highway 82 nr Atkinson, Ga. (formerly identified as Hwy 84)	Brunswick WP	Stream	-81.8675	31.22111
0701120101	Satilla River at U.S. Highway 17 at Woodbine, Ga.	Brunswick WP	Stream	-81.7258	30.97444
0702040402	Little Satilla Creek at County Road 390 (Nine Run Road) near Screven, Ga.	Brunswick WP	Stream	-82.0325	31.49028
0703010201	Turtle River at SR 99 near	Brunswick WP	Stream	-81.6687	31.21588

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

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

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

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

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

TABLE 3-8. GEORGIA BASIN MONITORING NETWORK 2009

Rivers and streams stations are sampled monthly for field and chemical parameters for one calendar year every five years. Four fecal coliform bacterial samples are collected each calendar quarter during the focused monitoring year. Basin lakes and reservoirs are sampled on a five-year rotational schedule. Samples are collected quarterly for non-standard basin lakes and reservoirs within the river basin of focus for the calendar year.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

began utilizing macroinvertebrate biological data in addition to fish data for assessing the biotic integrity of wadeable streams in Georgia.

Lake Monitoring. The GAEPD has maintained monitoring programs for Georgia's public lakes since the late 1960's. Currently, Georgia has six major lakes that have standard criteria approved by legislature, which include: Sydney Lanier, Allatoona, West Point, Walter F. George, Jackson and Carters. These lakes are sampled every year from April to October when primary productivity is highest. All other major lakes are sampled according to a basin rotation schedule. Prior to 2008, lakes in the basin rotation schedule are sampled once per quarter in accordance with which basin is targeted that year. Beginning in 2008, major basin lakes were sampled each month from April to October. In 2008, the basins of focus were the Suwannee, St. Mary's, Satilla, and Ocklocknee. Banks Lake is the only major lake in this basin group. In 2009, lakes in the Oconee, Ocmulgee, and Altamaha basins were targeted. These lakes included Oconee, Sinclair, High Falls, Juliette, and Tobesofkee. Banks Lake was also sampled again in 2009. The data collected included depth profiles for dissolved oxygen, temperature, pH, and specific conductance, Secchi disk transparency, and chemical analyses for chlorophyll *a*, total phosphorus, nitrogen compounds, and turbidity.

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

In 2009, Georgia participated in a USEPA's National Rivers and Streams Assessment. Sampling sites were randomly selected nationally and each state was given the

opportunity to participate in sampling sites selected within their respective states. GAEPD participated in the wadeable portion only. Eighteen randomly selected sites were identified in Georgia and were sampled by the GAEPD using the USEPA's national wadeable stream protocol from July through November 2009. Data obtained from the survey will be assessed by the USEPA and conclusions will be published in a report on the quality of the Nation's rivers and streams.

Fish Tissue Monitoring. This general contaminants assessment project is focused on fish tissue sampling and analyses, risk-based data assessment, and annual publication of consumption guidance in Georgia's Freshwater & Saltwater Sport Fishing Regulations and in Guidelines for Eating Fish from Georgia Waters. Fish tissue samples are typically collected in the fall from Georgia lakes and rivers, and analyzed in the winter and spring. Site-specific sampling in Georgia estuaries occurs between the spring and fall on a case specific basis. The sampling is conducted by either the GADNR Wildlife Resources Division (WRD), or the Coastal Resources Division (CRD), depending on whether the site is freshwater (WRD), or estuarine/marine waters (CRD). Samples are catalogued and transported to GAEPD or University of Georgia laboratories and results are reported to the GAEPD the following late summer or early fall. The data from the annual collections are utilized in reassessments that are incorporated annually into the *Guidelines for Eating Fish from Georgia Waters* and *Georgia's Freshwater and Saltwater Sport Fishing Regulations*. The first risk-based consumption guidance was published in 1995. As part of the implementation of the Federal Clean Air Mercury Rule (CAMR), it was recognized that a more rigorous monitoring program of mercury in fish tissue would be required to support trend analysis and the efficacy of future reductions in air mercury emissions. A subproject was designed and implemented in 2006 consisting of 22 fish mercury trend stations, which will be monitored annually. Nineteen stations are fresh water and 3 are estuarine. As no new resources were provided in support of the mercury in fish trend monitoring, the general contaminants program has been reduced. The mercury in

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

Toxic Substance Stream Monitoring. The GAEPD has focused resources on the management and control of toxic substances in the State's waters for many years. Toxic substance analyses have been conducted on samples from selected trend monitoring stations since 1973. Wherever discharges were found to have toxic impacts or to include

toxic pollutants, the GAEPD has incorporated specific limitations on toxic pollutants in NPDES discharge permits. In 1983 the GAEPD intensified toxic substance stream monitoring efforts. This expanded toxic substance stream monitoring project included facility effluent, stream, sediment, and fish sampling at specific sites downstream of selected industrial and municipal discharges. From 1983 through 1991, ten to twenty sites per year were sampled as part of this project.

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

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

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

TABLE 3-10. MERCURY IN FISH TREND MONITORING STATIONS

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

Continued work is performed on a site-specific basis and as part of the rotating river basin monitoring program.

Aquatic Toxicity Testing. Biomonitoring requirements are currently addressed in all municipal and industrial NPDES permits. In January 1995, the GAEPD issued approved NPDES Reasonable Potential Procedures that

further delineate required conditions for conducting whole effluent toxicity (WET) testing for municipal and industrial discharges. The Reasonable Potential Procedures were updated in 2001 and the GAEPD additionally developed a WET Strategy that provided more detail as to how the State would determine which facilities needed a WET limit in their permit. This strategy outlined minimum data

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

Coastal Monitoring. The Coastal Resources Division (CRD) conducts the majority of coastal monitoring. This work includes the national coastal assessment program, beach water quality monitoring, estuarine nutrient monitoring, shellfish sanitation monitoring and monitoring for harmful algae including *Pfiesteria*. This work is discussed in Chapter 5.

Facility Compliance Sampling. In addition to surface water quality monitoring, the GAEPD conducts evaluations and compliance sampling inspections of municipal and industrial water pollution control plants and State-permitted industrial pretreatment facilities. Compliance sampling inspections include collection of 24-hour composite samples, evaluation of the permittee's sampling and flow monitoring provisions and sampling documentation. In excess of 300 sampling inspections were conducted by the GAEPD in Fiscal Year 2008-2009. The results were used to confirm validity of permittee self-monitoring data and as supporting evidence in enforcement actions.

Probabilistic Monitoring. In order to determine the quality of all the waters in the State, the GAEPD would either have to sample

and assess each individual waterbody (which is not possible due to the resources that would be needed) or would have to develop a scientific survey that would be representative of all the State's waters. Probabilistic monitoring provides a scientifically defensible way to sample a subset of all waters and then to use the results of this sampling to provide an estimate of the quality of all waters of the State. GAEPD has participated in various probabilistic monitoring in the past including USEPA's 2007 National Lakes Assessment Survey and USEPA's National Rivers and Streams Assessment in 2009. In addition, GAEPD's future monitoring plan calls for the State to choose a percentage of the sites that we are sampling in a given year randomly from a list of existing sites. The results of the probabilistic sampling are not adequate at this time to make an assessment of all the State's waters, but GAEPD should be able to do so in the future as the dataset grows.

Surface Water Quality Summary

Data Assessment. Water quality data are assessed to determine if standards are met and if the water body supports its designated or classified water use. If monitoring data show that standards are not achieved, the water body is said to be "not supporting" the designated use. The data reviewed included GAEPD monitoring data, and data from other State, Federal, local governments, and data from groups with approved QA/QC programs. Table 3-11 provides a list of agencies that

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

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

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

contributed data for use in assessing water quality in this and in past reports.

Appendix A includes an integrated list of waters for which data have been assessed. This list includes waters that have been assessed as “supporting” their designated uses and those assessed as “not supporting” their designated uses. In addition, some waters were placed in a third category called “assessment pending”. Waters were placed in the “assessment pending” group when the data available for a water were insufficient to make an assessment as to whether the water was supporting its designated uses or not. Appendix A also includes Georgia’s 2010 Listing Assessment Methodology which provides a description of how Georgia compares different types of water quality data with Georgia’s water quality criteria in making assessment decisions.

Evaluation of Use Support. Table 3-12 provides summary information from Appendix A on the total number of stream miles, lake acres, or square miles of sounds/harbors that fall in each assessment category. Many additional streams, particularly in urban areas

may not meet all standards, but monitoring resources are not adequate to sample all streams.

Assessment of Causes of Nonsupport of Designated Uses. There are many potential pollutants that may interfere with the designated use of rivers, streams, lakes, estuarine, and coastal waters. These can be termed the causes of use nonsupport. Based on information presented in Appendix A, Table 3-13 summarizes the parameters of concern or the causes which contributed to nonsupport of water quality standards or designated uses of a particular water body type.

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

pollution primarily associated with run off from the land following a rainfall event. Table 3-14 summarizes information presented in Appendix A concerning the sources of pollutants that prevent achievement of water

quality standards and use support in various water bodies in Georgia.

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

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

Priorities for Action. The list of waters in Appendix A includes all waters for which available data was assessed against applicable water quality standards and designated uses were determined to be supported, not fully supported, or it was determined that more data was needed before an assessment was made “assessment pending”. This list of waters has become a comprehensive list of waters for Georgia incorporating the information requested by Sections 305(b), 303(d), 314, and 319 of the Federal CWA. Waters listed in Appendix A are active 305(b) waters. Lakes or reservoirs

within these categories provide information requested in Section 314 of the CWA. Waters with nonpoint sources identified as a potential cause of a standards violation are considered to provide the information requested in the CWA Section 319 nonpoint assessment. The 303(d) list is made up of all waters within category 5 in Appendix A. The proposed date for development of a TMDL for 303(d) waters is indicated within the priority column on the list of waters.

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

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

Carbon Tetrachloride	1
Tetrachloroethylene	7
Trichloroethylene	1
PCB in Fish Tissue	357
Metals	1,039
Copper	34
Lead	5
Mercury	2
Zinc	2
Mercury in Fish Tissue (TWR)	991
pH/Acidity/Caustic Conditions	190
pH	190
Other	218
Commercial Fishing Ban (CFB)	218
Cause Category	Lakes/Reservoirs (acres) Contributions to Impairment¹
Pathogens	194
Fecal Coliform	194
Thermal Impacts	650
Temperature	650
Nutrients (Macronutrients/Growth Factors)	2,752
Phosphorus	2,752
Toxic Organics	92,555
PCB in Fish Tissue	92,555
Metals	4,067
Mercury in Fish Tissue (TWR)	4,067
Pesticides	20
DDD	20
DDE	20
Observed Effects	6,932
Chlorophyll a	6,932
Other	4,067
Mercury in Fish Tissue	4,067
Cause Category	Coastal Streams (miles) Contributions to Impairment¹
Pathogens	27
Fecal Coliform	27
Oxygen Depletion	40
Dissolved Oxygen	40
Toxic Organics	26
Polychlorinated biphenyls	4
PCB in Fish Tissue	26
Metals/Toxic Inorganics	4
Cadmium	2
Mercury	4
Pesticides	8
Dieldrin in Fish Tissue	3
Toxaphene in Fish Tissue	5
Other	30
Commercial Fishing Ban (CFB) & Shellfish Ban (SB)	30
Cause Category	Coastal Beaches (miles) Contributions to Impairment¹
Pathogens	4.34
Enterococcus	4.34
Cause Category	Sounds/Harbors (sq. miles) Contributions to Impairment¹
Oxygen Depletion	14
Dissolved Oxygen	14

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

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

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

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

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

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

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

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

CHAPTER 4

Wetland Programs

Introduction

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

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

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

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

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

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

Extent of Wetland Resources

Assessments of wetland resources in Georgia have been carried out with varying degrees of success by the USDA Natural Resources Conservation Service, the USFWS National Wetland Inventory, and the state Department of Natural Resources. The extent and location of specific tidal marsh types have been reported in numerous scientific papers and reports. Estimates of other specific wetlands types, such as bottomland hardwood swamps, are also reported in studies on a regional scale.

Hydric soils as mapped in county soil surveys are useful indicators of the location and extent of wetlands for the majority of Georgia counties with complete surveys. The dates of photography from which the survey maps are derived vary widely across the state. There is an ongoing effort by NRCS to develop digital databases at the soil mapping unit level, but most of these data sets are not yet available. However, soil surveys have proven useful in wetland delineation in the field and in the development of wetland inventories. County acreage summaries provide useful information on the distribution of wetlands across the state.

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

A complementary database was completed by Georgia DNR in 1991 and is based on classification of Landsat TM satellite imagery. Due to the limitations of remote sensing technology, the classification scheme is simplified in comparison to the Cowardin system used with NWI. Integration of this digital information with Geographic Information System technology is straight-forward. The inclusion of other upland landcover classes adds to the utility of this database in environmental analysis and landuse planning.

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

considerable acreage. The targeted accuracy level for the overall landcover assessment using Landsat imagery was 85%. However, the classification error was not necessarily distributed equally throughout all classes.

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

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

Wetland Trends In Georgia

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

The most precise measure of Georgia's wetland acreage (1991) has been developed by the U.S. Fish and Wildlife Service's National Wetland Inventory efforts. This statistically sound study was based upon 206 sample plots of four (4) square miles each that were delineated and measured from 1975 and 1982

aerial photography. The total acreage of wetlands for Georgia was estimated at 7,714,285 acres in 1982 as compared to earlier estimates of 5.2 million acres. This estimate is considerably higher than the total shown in a 1984 trend study and is due in part to better quality photography.

Georgia's total wetland area covers an estimated 20 percent of the State's landscape. This total (7.7 mil. ac.) includes approximately 367,000 acres of estuarine wetlands and 7.3 million acres of palustrine wetlands (forested wetlands, scrub-shrub, and emergents). A net wetland loss due to conversion of approximately 78,000 acres was estimated for the seven (7) year period, while 455,000 acres were altered by timber harvesting. These latter estimates are less reliable than the total acreage and are slightly higher than the 1984 study. Regardless of the method used to measure total acreage or wetland losses, Georgia still retains the highest percentage of pre-colonial wetland acreage of any southeastern state. The state lacks the resources to conduct an independent monitoring program on the frequency of wetland alterations by class or type.

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

Integrity of Wetland Resources

Wetland Use Support. In Georgia, wetland uses are tied to both the state water quality standards through the definition of "water" or "waters of the state", and to established criteria for wetlands protection (Chap. 391-3-16-03)

associated with the Comprehensive Planning Act of 1989 (O.C.G.A. 12-2-8).

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

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

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

The categories of freshwater wetlands and aquatic habitats to be identified, defined and mapped by the State and included in landuse planning are open water, non-forested emergent, scrub/shrub, forested and altered

wetlands. Landuse plans must address at least the following considerations with regard to wetland classes identified in the database:

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

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

The acceptable uses of wetlands without long term impairment of function were identified in wetland protection criteria as the following:

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

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

Water Quality Protection. Wetlands help to maintain water quality and improve degraded water by removing, transforming, or retaining nutrients; processing chemical and organic wastes and pollutants; and reducing sediment loads. Wetlands function as sediment, toxic substance, and nutrient traps, performing functions similar to a waste treatment plant. Wetland vegetation filters and retains sediments which otherwise enter lakes, streams, and reservoirs, often necessitating costly maintenance dredging activities. Wetlands may also perform similar purification functions with respect to ground water. Those wetlands hydrologically connected to ground water could also be a source of recharge for underground water supplies, in which case the natural settling and filtering of pollutants would

increase the purity of the water resource. As with any filter, wetlands can be damaged, overloaded, or made nonfunctional. Wetlands conservation and careful management of point and non-point pollutants can provide good wetland filtration of materials.

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

Natural water quality treatment or purification. (See wastewater treatment above).

Maintaining the biological and ecological integrity of wetlands is essential to the capitalization of these natural systems for the improvement of water quality and quantity. The polluting, filling, silting, channelizing, draining, dredging, and converting to other uses of wetlands are destructive to the ecological functions of wetlands.

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

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

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

Wetland Monitoring

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

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

Additional Wetlands Protection Activities

Georgia is protecting its wetlands through aggressive land acquisition, public education, land use planning, regulatory programs, and wetland restoration. Since 1987, the state has acquired more than 200,000 acres through program expansion and the Preservation 2000 and RiverCare 2000 acquisition efforts. Additional protection to wetlands is provided either directly or indirectly by several statutes listed below, but described elsewhere in this report. These state laws are as follows:

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

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

Conasauga River Natural Area in northwest Georgia.

Education And Public Outreach. WRD has one full-time person involved in aquatic education, providing training for educators in wetland values and acting as a resource person for developing and coordinating teaching materials. The Aquatic Education Program consists of three key components: Youth Education, Adult Education, and Kids Fishing. Youth Education involves training educators to use Aquatic Project Wild (APW), which consists of instructional workshops and supplementary conservation curriculum materials for teachers of K-12 grade age children. About 1,000 educators are trained annually to use APW in the classroom. Adult Education consists primarily of producing educational materials such as the annual Freshwater and Saltwater Sport Fishing Regulations, Reservoir and Southeast Rivers Fishing Predictions, Small Georgia Lakes Open to Public Fishing, Introduction to Trout Fishing, news releases, brochures, radio Public Service Announcements, videos, and staff presentations to sportsmen and civic organizations, as well as large events. The purpose of Kids Fishing Events (KFEs) is to introduce youth and their families to the joys of recreational fishing. The Aquatic Education Program touches tens of thousands of youths and adults each year, bringing these people closer to the environment, and teaching them conservation principles that are important to sustaining wetlands and healthy fish populations.

State Protected Species in Wetlands. With assistance from the USFWS, Section 6 Federal Aid Program, and USDA-FS Stewardship Program, WRD developed and published a descriptive handbook of Georgia's 103 protected plant species that include endangered, threatened, unusual, and rare plant species found in the state. Forty percent of the protected species are dependent on wetland or aquatic habitats in the vast majority known occurrences. The "Protected Plants of Georgia" book includes illustrations, descriptions, threats to species or their habitats, range in adjoining states, historical

notes, and recommendations for management of protected species habitats. The protected plant book has been distributed to all DNR personnel and wildlife biologists involved in the management of state properties. It has been distributed to the Georgia Forestry Commission, USDA-Natural Resource Conservation Service, Forest Service, USFWS, Corps of Engineers, US EPA, major utility companies, forest products corporations, consulting biologists, educators, and private citizens. The book calls the public's attention to the need to protect wetlands on private property as well as public property in the state. In addition, the following species are subjects of continuing research funded through Section 6 USFWS grant-in-aid programs:

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

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

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

Managing Wetlands on State WMAs, PFAs, Parks, Heritage Preserves, and Natural Areas. M.A.R.S.H. Project. Georgia DNR-WRD has a cooperative agreement with Ducks Unlimited (DU) for the purpose of acquiring, developing, restoring, or enhancing waterfowl habitat. A major aspect of this agreement is the M.A.R.S.H. program (Matching Aid to Restore States Habitat). Under the MARSH program, 7.5% of the money raised by DU in Georgia is made available as matching funds for work to develop, improve, or restore waterfowl habitat. Since 1985, more than 1.2 million dollars have been spent on habitat projects in the state of Georgia involving thousands of acres of wetlands. Completed projects include:

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

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

as having potentials for restoration or enhancement of wetland functions and values.

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

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

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

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

CHAPTER 5

Estuary and Coastal Programs

Background

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

Georgia Coastal Management Program

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

The Coastal Management Program has provided guidance and technical assistance to improve coastal water quality in general, and in the development of a Coastal Non-Point Source Control Program in particular. Under the Coastal Zone Management Act Reauthorization Amendments of 1990, Congress added a section entitled "Protecting Coastal Waters." That section directs states with federally approved coastal management programs to develop a Coastal Non-Point Source Program. To that end, the GAEPD is assisting the GCMP in 1) identifying land uses which may cause or contribute to the degradation of coastal waters, 2) identifying critical coastal areas adjacent to affected coastal waters, 3) identification of appropriate measures related to land use impacts to achieve and maintain water quality standards and designated uses, and 4) identifying management boundaries to more effectively manage land use impacts and water uses to protect coastal waters.

Public Health Water Quality Monitoring Program

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

Shellfish Sanitation Program

CRD's Shellfish Sanitation Program monitors the quality of Georgia's shellfish harvest waters for harmful bacteria that might affect the safety of shellfish for human consumption. Seven (7) harvest areas are designated for recreational picking of oysters and clams by the general public. An additional sixteen (16) harvest areas are designated for the commercial harvest of oysters and clams.

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

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

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

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

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

Beach Monitoring Program

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

Georgia's recreational beaches have been identified and prioritized into three (3) tiers

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

Nutrient Sampling Program

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

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

Coastal Streams, Harbors, and Sounds

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

Coastal Beaches

This report contains information on twenty-seven (27) coastal beaches. Of these, twenty-one (21) are considered to be supporting their designated use of coastal recreation. Six (6) beaches are considered as not supporting their designated use: two (2) are located on Jekyll Island at the St. Andrews picnic area and at Clam Creek; and one (1) beach is on St. Simons Island near Gould's inlet. All three (3) of these beaches are Tier 1 and are sampled weekly year-round. The other three (3) "not supporting" beaches are Tier 2 beaches, which are sampled less frequently. The Kings Ferry beach is located at a small municipal park on the Ogeechee River in Chatham County. Reimold's Pasture is a small island in Buttermilk sound at the mouth of the Altamaha River. The Blythe Island sandbar is located in the South Brunswick River in Glynn County.

Data Not Included in Assessment

Much of the data used to generate the 305(b)/303(d) list for coastal streams, harbors, and sounds were collected by CRD for the programs as described earlier in this chapter. Other data are used by CRD to address fisheries management or recreational use in specific areas along the coast, but much of

these data do not meet the minimum spatial or temporal (frequency) criteria of the GAEPD 2010 listing methodology guidance document and cannot be used to assess the ability of a water body to support its designated use(s). Data from the Georgia National Coastal Assessment (NCA) Program (2000-2006) were not included for this listing period. NCA data are based on a probabilistic, random sampling design with only one sample per year at each location. For the purposes of 305(b)/303(d), these data may be used in the future to augment existing data sets.

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

Commercial and Recreational Fisheries

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

The Fisheries Dependent Work Unit collects catch and effort information from the recreational and commercial fisheries in cooperation with the National Marine Fisheries Service. Total annual commercial landings in Georgia ranged from 6.98 to 9.78 million pounds of product during the period from 1999 to 2008, with an annual average of 7.87 million pounds. Penaeid shrimps are the most valuable catch in Georgia commercial landings, typically totaling nearly 11 million dollars (2.99 million pounds of tails) in unadjusted, ex-vessel value during recent years. Catches are composed primarily of white shrimp (*Litopenaeus setiferus*) during the fall, winter and spring, and brown shrimp (*Farfantepenaeus aztecus*) during the summer. These shrimp spawn in oceanic waters, but depend on the salt marsh wetlands to foster their juvenile and sub-adult stages. White shrimp landings have varied over the last 50 years with a recent downward trend due to declining fishing effort. Research has shown that densities of spawning stock, and to a lesser extent fall harvest, respond strongly to cold air outbreaks during the early winter that can produce wide scale kills of white shrimp, and to a suite of environmental variables impacting the salt marsh ecosystem that produce a range of growing conditions. Cold weather kills have been associated with abnormally cold winters in 1984, 1989, and 2000.

Blue crabs live longer than penaeid shrimps (3-4 years versus 1-2 years), and also exhibit less extreme fluctuations in annual abundance from one year to the next. Reported annual blue crab (*Callinectes sapidus*) landings in 2008 were above the most recent 10-year average of 3.38 million pounds (2008 = 4.18 million pounds). A severe drought from 1998 to 2002 reduced annual harvest 80% of the long-term average of 7.99 million pounds. The drought resulted in a reduction in the quantity of oligohaline and mesohaline areas within Georgia's estuaries. This effect was more pronounced in estuaries that did not receive direct freshwater inflow from rivers. It is believed this altered salinity profile resulted in (1) higher blue crab predation, (2) increased prevalence of the fatal disease caused by the

organism, *Hematodinium* sp, (3) reduction in the quantity of oligohaline nursery habitat, and (4) recruitment failure.

Commercial finfish landings fluctuate annually depending on market conditions and the impacts of management. American shad populations in the Altamaha River have fluctuated over the past 30 years. Anecdotal evidence indicates that participation in the American shad fishery continues to decline. Apparently, as older fishermen leave, there are few new entrants into the fishery. Since 2001, effort estimates have been collected using a trip ticket system with effort being recorded as the number of trips for both the set and drift gill net fisheries. Effort generally declined from a high of 887 trips in 2003 to a low of 700 trips in 2008. However, in 2006 effort increased to 1073 trips and was likely related to the relatively strong shad run that occurred that spring. Regulations have remained fairly constant over the past 15 years. The only modifications were a 15-day season extension in 1983, change in commercial fishing regulations in 1984 to clarify open and closed areas on the Altamaha River, and 15-day season extensions on the Savannah River from 2003-2007. No changes have been made to shad sportfishing regulations.

Total landings of bivalve mollusks have fluctuated greatly over the last 30 years. During the 1970's landings were totally dominated by oysters (*Crassostrea* sp.), generally over 50,000 pounds of raw meats per annum. During the early 1980's fishermen increasingly focused on hard clams (*Mercenaria* sp.) due to stock declines in other areas along the east coast and their market value. This combined with increasing acreages available for harvest activities due to water quality certifications, allowed the replacement of oysters by clams as the premier species from 1986-1988. From 1988-1992 clam landings again declined and oyster landings grew. Since 1990, the clam landings have shown a general increase in contrast to the oyster fishery that, after large catches from 1989-92, have shown a steady decline since. In 2009, clam harvest was approximately 73,254 lbs of meat, while oyster harvest was

only approximately 9,676 lbs of meat. Labor costs have effected this change in combination with temporary inaccessibility to some grounds because of conflicts over harvest rights. No acreage has been lost due to deteriorating water quality. Current research is focusing on improvements in stock genetics (growth and appearance enhancements), cultch substrate comparisons, and establishing new populations.