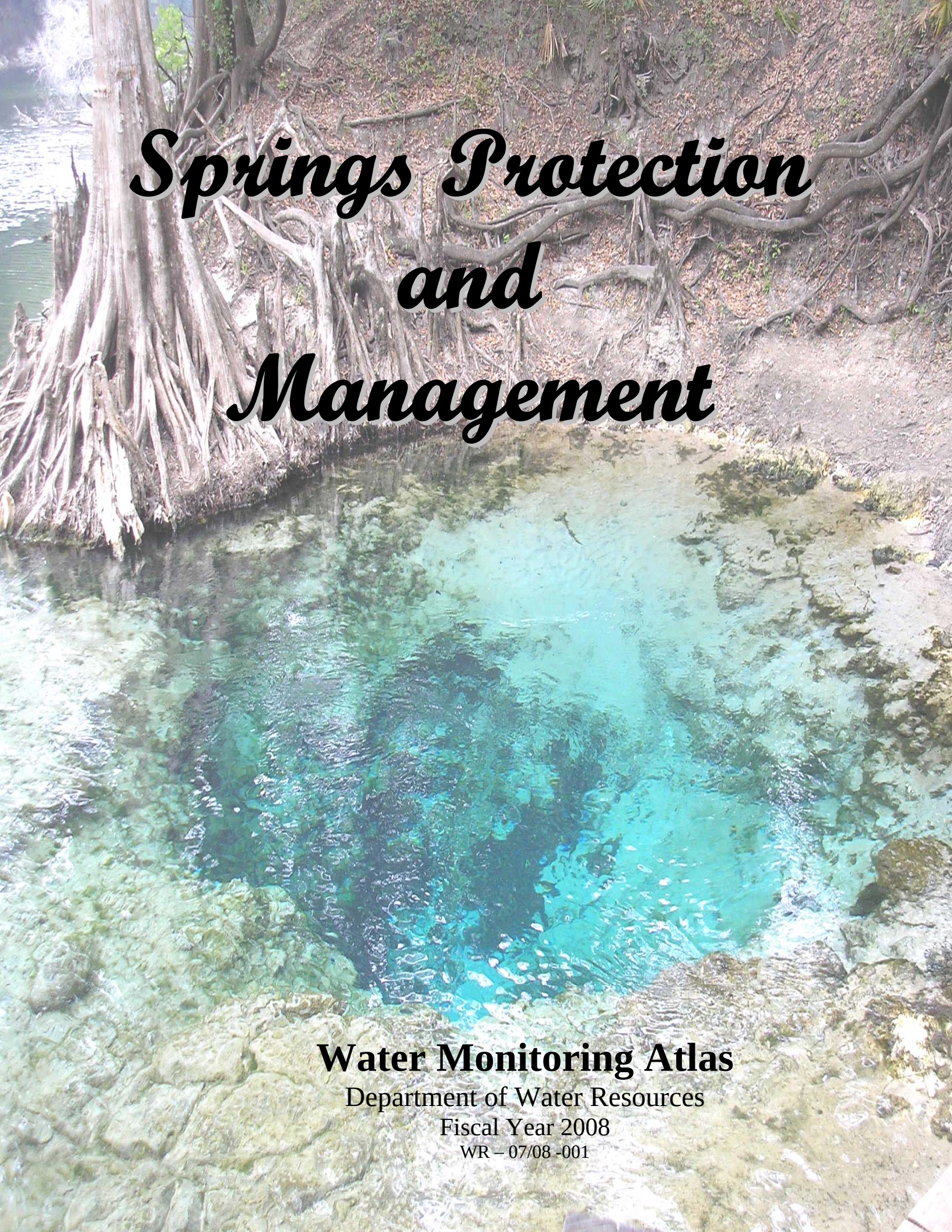




Springs Protection and Management

Water Monitoring Atlas

Department of Water Resources

Fiscal Year 2008

WR – 07/08 -001

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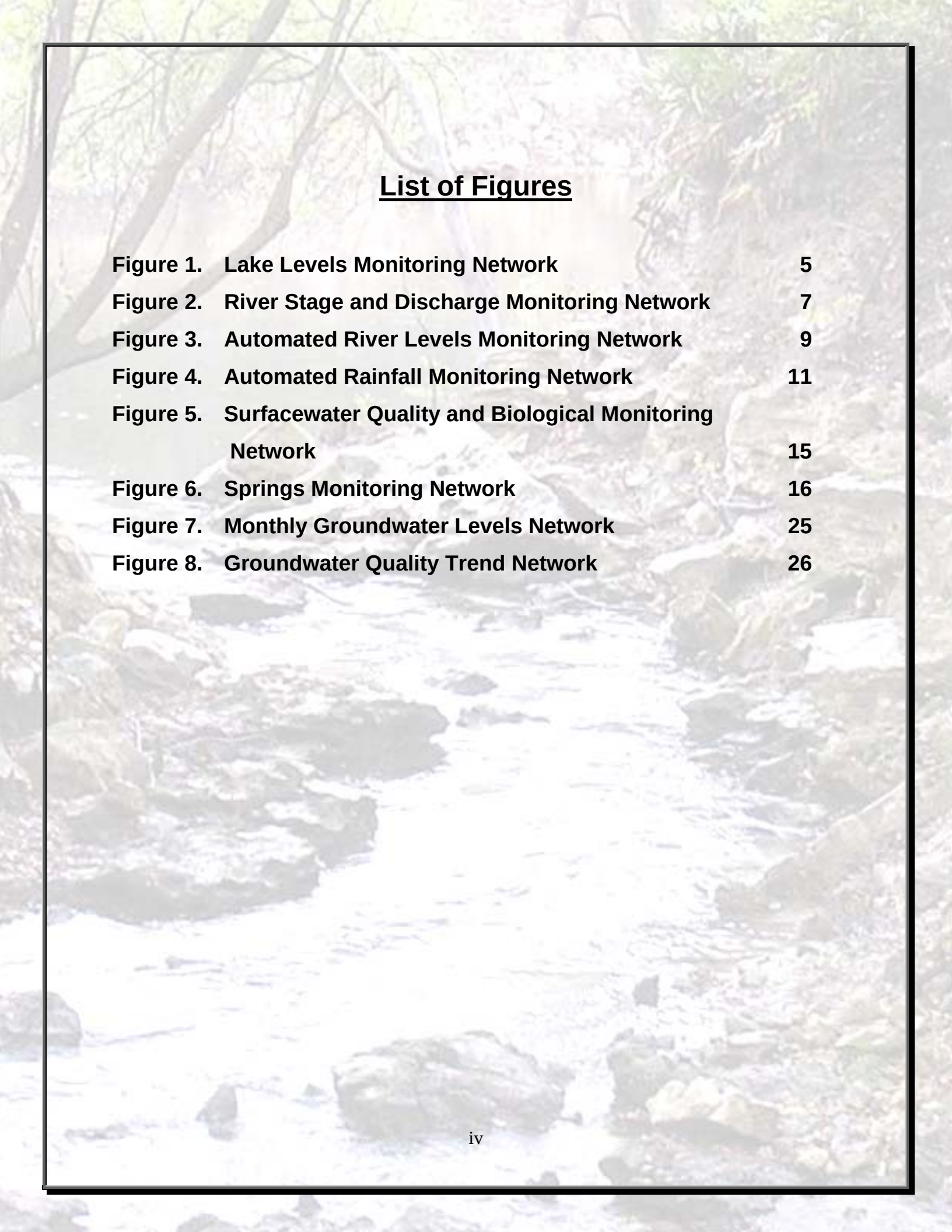
Kirk B. Webster

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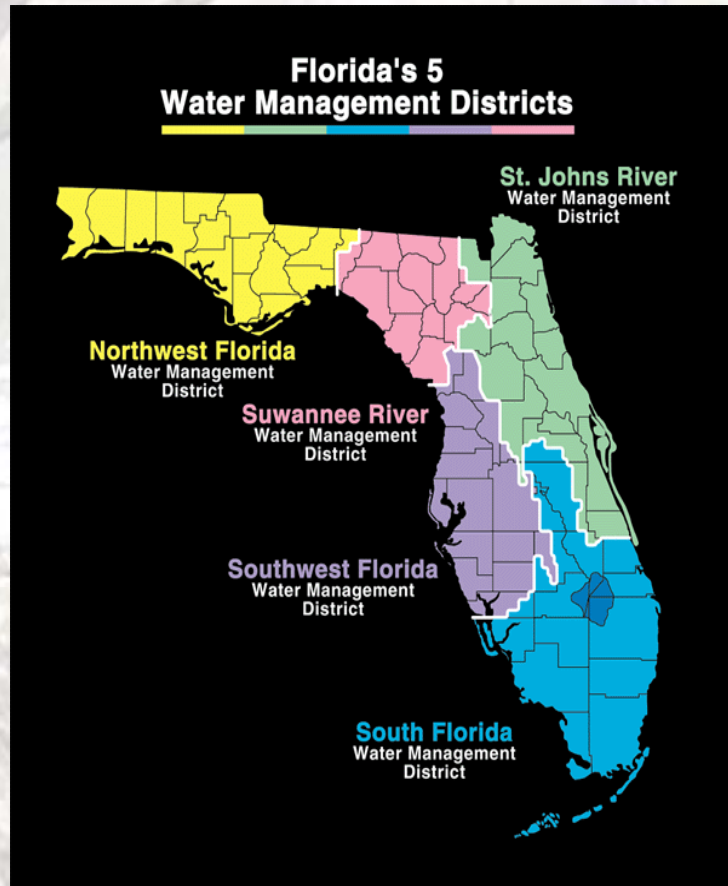


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Suwannee River Water Management District Background

The Suwannee River Water Management District (District) is one of five regional water management districts in Florida. All districts were created by the Florida Legislature through passage of the Water Resources Act of 1972. The District is the smallest of the state's water management districts in terms of geographic area, population, tax base, and agency staff.



The Suwannee River Water Management District manages water and related natural resources in north-central Florida by providing water quality and quantity monitoring, research, regulation, land acquisition and management, and flood protection.

The service area of the District covers approximately 7,640 square miles and all or part of 15 counties in north-central Florida. Those counties

include all or part of Alachua, Baker, Bradford, Columbia, Dixie, Gilchrist, Hamilton, Jefferson, Levy, Lafayette, Madison, Putnam, Suwannee, Taylor, and Union.

The District covers 13 river basins, which include the following major rivers: Suwannee, Santa Fe, Withlacoochee, Aucilla, Alapaha, Ichetucknee, Fenholloway, Steinhatchee, Econfina, Waccasassa, and Wacissa. Each of these is monitored by the District's Springs Protection and Management Network (SPMN).

Springs Protection and Management Introduction

This atlas describes the types and locations of monitoring conducted by the Suwannee River Water Management District and cooperating agencies.

To assess the quality and quantity of water in the District, the District maintains the Springs Protection and Management Network to monitor river, lake, and groundwater levels, river discharge, rainfall, and surface and groundwater quality conditions. The network monitors short and long-term trends, which can be used in forecasting future water quantity and quality conditions. Information from the network is used in support of a wide variety of applications, including:

- Consumptive use permitting
- Water supply projects
- Water shortage management
- Watershed planning and management projects
- Environmental restoration and protection
- Development of Minimum Flows and Levels
- Improved flood forecasts and warnings by the National Weather Service
- Improved public access to flood information
- Implementation of no-wake zones



In addition, data are provided to the public, universities, and local, state, and federal agencies via the District's webpage, or by request. Public inquiries include farmers requesting rainfall data, outdoor enthusiasts requesting river levels for recreational planning, and property owners requesting flood information. District staff processes between 50 and 75 data requests per month.

Surfacewater Monitoring Networks

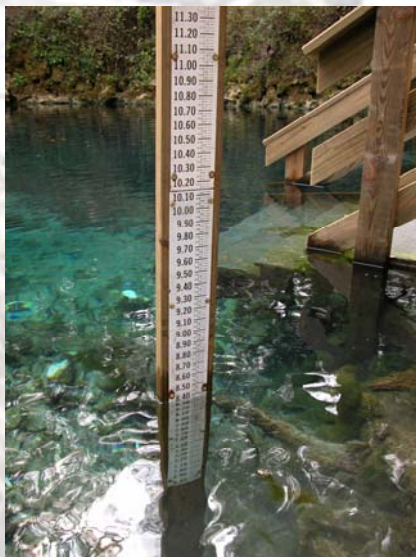
LAKE LEVELS

Water levels in 21 lakes (Figure 1 and Table 1) are monitored daily, weekly, or monthly, depending on the specific water body. Data collection is conducted by observers, who live near or on the water body or by District technicians. Measurement devices include continuous recorders and staff gages. Data are ultimately delivered to the LAKES data table in the Oracle database. Many of the sites have been monitored continuously for thirty years or more.

RIVER LEVELS

River Level Monitoring Network

River and stream levels are measured at varying frequencies at 46 sites (Figure 2 and Table 2). The U. S. Geological Survey (USGS) collects data at 18 stations in Florida and 3 stations in Georgia under a cooperative program with the District. The remaining stations are maintained by District staff and by volunteer observers. Measurement devices include continuous recorders, staff gages, and wire weight gages. Real-time data are provided for 27 sites via telephone modem for the District-run stations and satellite telemetry for the USGS stations.



Flood Warning Network

The District collects water levels from its own network and from stations operated by other agencies on a real time basis for the purpose of providing as much lead time as possible for emergency managers, flood warning agencies, and property owners to respond to potential flooding threats along the District's major streams. The District's flood monitoring network consists of 25 automated river gages (Figure 3). Levels from these sites are posted on the District's webpage, sent electronically to the National Weather Service, and made available by telephone through a 24-hour automated voice recording.

Database

The MANUAL and AUTOMATED data tables in the Oracle database contain river level monitoring data. Data from sites maintained by the USGS is stored in the USGS Automated Data Acquisition and Processing System (ADAPS) database. USGS data are also available to the public at www.usgs.gov.

RIVER DISCHARGES

The District has a cooperative agreement with the USGS to monitor 21 daily discharge stations (Figure 2 and Table 3) in Florida and Georgia. The District conducts measurements at an additional 22 stations (Table 6C). The District and USGS also measure discharges on springs on an as-needed basis and during periods of extreme flooding or drought.

Database

The data table STREAMQ in the Oracle database contains discharge measurements, while USGS measurements are available in the ADAPS database. A majority of USGS discharge measurements are available on CD-ROM. Data for the most recent 12 months must be requested directly from the USGS.



RAINFALL

Observer Network

Data is collected from 15 monthly rainfall stations (Table 4A). Three are at Florida Park Service (FPS) stations, and 12 are private stations.

Automated Network

The District has installed an automated rainfall-monitoring network to supplement the river level flood forecast network. The District maintains tipping bucket rain gages at various locations (Table 4B and Figure 4). Data from these gages can be accessed in near-real-time on the District's website and are provided to the National Weather Service for use in flood-forecasting.

Database

Monthly rainfall totals are stored in the data table MONTHLY_RAIN. MONTHLY_RAIN contains historic monthly rainfall, by year, for all rainfall stations.

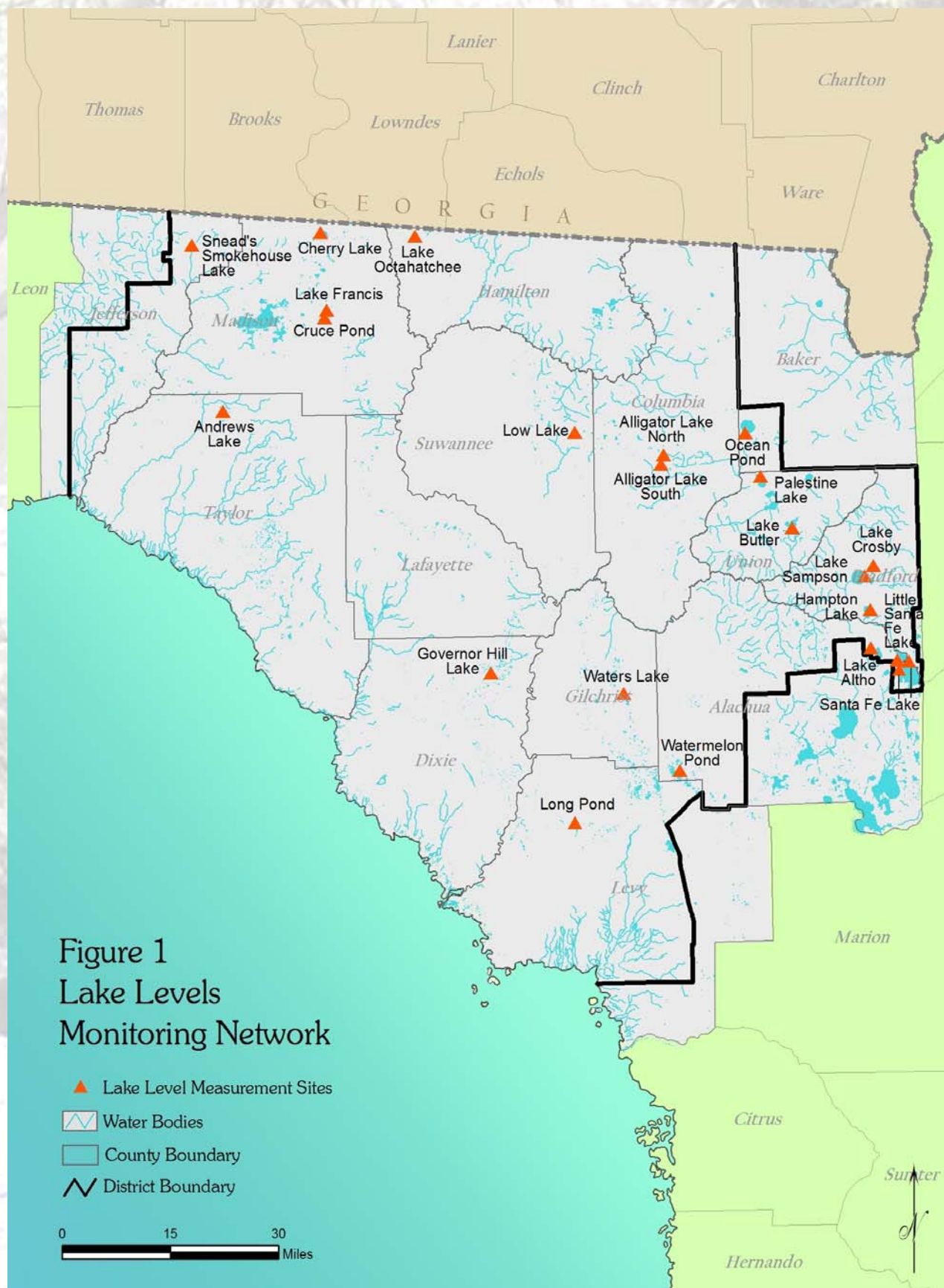


Table 1. Lake Level Stations.

Lake Name	County	Gage Type	Frequency
Alligator Lake (north)	Columbia	Recorder	Hourly
Alligator Lake (south)	Columbia	Recorder	Hourly
Andrews Lake	Taylor	Staff	Weekly
Cherry Lake	Madison	Staff	Weekly
Cruce Pond	Madison	Staff	Weekly
Governor Hill Lake	Dixie	Recorder	Hourly
Hampton Lake	Bradford	Staff	Weekly
Lake Altho	Alachua	Staff	Weekly
Lake Butler	Union	Staff	Monthly
Lake Crosby	Bradford	Staff	Weekly
Lake Francis	Madison	Staff	Weekly
Lake Octahatchee	Hamilton	Staff	Weekly
Lake Sampson	Bradford	Staff	Weekly
Low Lake	Suwannee	Staff	Monthly
Ocean Pond	Baker	Recorder	Hourly
Palestine Lake	Union	Staff	Weekly
Little Santa Fe Lake	Alachua	Staff	Weekly
Santa Fe Lake	Alachua	Staff	Hourly
Snead's Smokehouse Lake	Jefferson	Recorder	Hourly
Watermelon Pond	Alachua	Staff	Monthly
Waters Lake	Gilchrist	Staff	Monthly

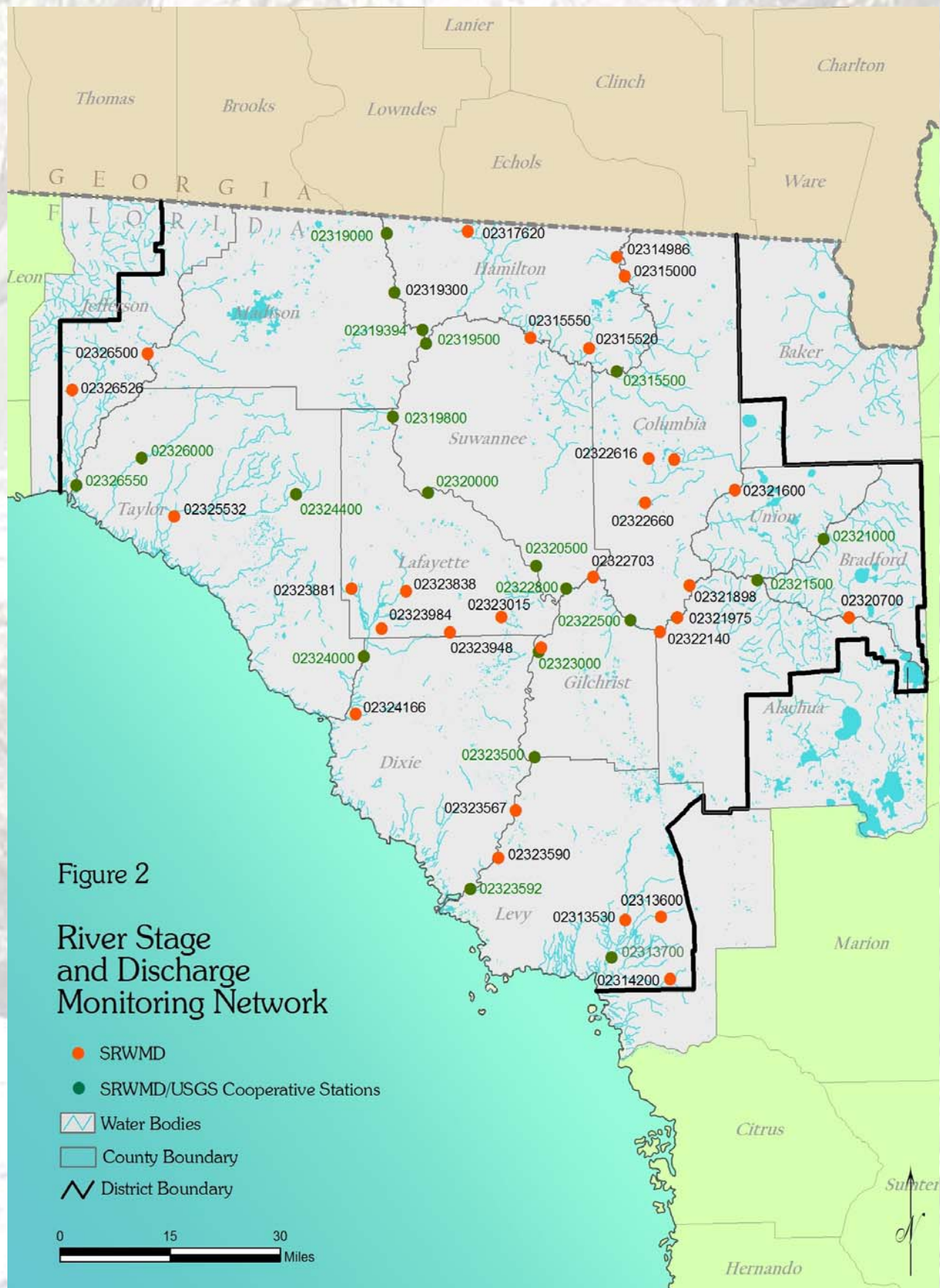


Table 2. Stream and River Level Stations.

Station ID	Station Name	Gage Type	Frequency
02316000	Alapaha River near Alapaha, GA (USGS)	Wire Weight, Recorder	Hourly
02317620	Alapaha River near Jennings (USGS)	Wire Weight, Recorder	Hourly
02311750	Alapaha River near Statenville (USGS)	Wire Weight, Recorder	Hourly
02326500	Aucilla River at Lamont	Wire Weight, Recorder	Hourly
02326550	Aucilla River near Nutall Rise (USGS)	Staff Gage, Recorder	15 minute
02319302	Blue Spring near Madison (USGS)	Staff Gage, Recorder	Hourly
02325532	Fenholloway River near Hampton Springs	Wire Weight, Recorder	Hourly
02318000	Little River near Adel (USGS)	Wire Weight, Recorder	Hourly
02321000	New River near Lake Butler (USGS)	Wire Weight, Recorder	Hourly
02323984	North Canal at Henry Land Bend	Staff Gage, Recorder	Hourly
02321600	Olustee Creek near Lulu	Staff Gage, Recorder	Hourly
02323838	Pocosin Canal near Clara	Staff Gage, Recorder	Hourly
02323881	Reedy Creek near Carbur Tower	Staff Gage, Recorder	Hourly
02314986	Rocky Creek near Belmont	Staff Gage, Recorder	Hourly
02324166	Sandhill Creek near Steinhathee	Staff Gage, Recorder	Hourly
02320800	Sampson River at Sampson	Staff Gage, Recorder	30 minute
02320700	Santa Fe River near Graham	Staff Gage, Recorder	Hourly
02321500	Santa Fe River at Worthington Springs (USGS)	Recorder, Wire Weight	Hourly
02321898	Santa Fe River at O'Leno State Park	Staff Gage	Daily
02321975	Santa Fe River at High Springs	Wire Weight, Recorder	Hourly
02322500	Santa Fe River near Fort White (USGS)	Staff Gage, Recorder	Hourly
02322703	Santa Fe River at Three Rivers Estates	Staff Gage, Recorder	Hourly
02322800	Santa Fe River near Hildreth (USGS)	Wire Weight, Recorder	Hourly
02324000	Steinhatchee River near Cross City (USGS)	Staff Gage, Recorder	Hourly
02315000	Suwannee River near Benton	Wire Weight, Recorder	Hourly
02315500	Suwannee River at White Springs (USGS)	Wire Weight, Recorder	Hourly
02315520	Suwannee River at Suwannee Springs	Wire Weight, Recorder	Hourly
02319500	Suwannee River at Ellaville	Staff Gage, Recorder	Hourly
02319800	Suwannee River at Dowling Park (USGS)	Wire Weight, Recorder	Hourly
02320000	Suwannee River at Luraville (USGS)	Wire Weight, Recorder	Hourly
02320500	Suwannee River at Branford (USGS)	Wire Weight, Recorder	Hourly
02323000	Suwannee River near Bell (Rock Bluff) (USGS)	Wire Weight, Recorder	Hourly
02323489	Suwannee River at Halefield	Staff Gage	Bi-weekly
02323500	Suwannee River near Wilcox	Staff Gage, Recorder	Hourly
02323567	Suwannee River at Manatee Springs	Staff Gage, Recorder	Hourly
02323590	Suwannee River at Fowler's Bluff	Staff Gage, Recorder	15 minute
02323592	Suwannee River above Gopher River (USGS)	Staff Gage, Recorder	15 minute
02315520	Swift Creek at Facil	Staff Gage, Recorder	30 minute
02314200	Tenmile Creek at Lebanon Station	Staff Gage, Recorder	Hourly
02313530	Waccasassa River at Gulf Hammock	Staff Gage, Recorder	Hourly
02313700	Waccasassa River near Gulf Hammock (USGS)	Staff Gage, Recorder	15 minute
02326526	Wacissa River near Wacissa	Staff Gage, Recorder	Hourly
02313600	Wekiva Springs near Gulf Hammock	Staff Gage	Weekly
02319000	Withlacoochee River near Pinetta	Staff Gage, Recorder, Wire Weight	Hourly
02319300	Withlacoochee River near Madison (USGS)	Wire Weight, Recorder	Hourly
02319394	Withlacoochee River near Lee (USGS)	Wire Weight, Recorder	Hourly

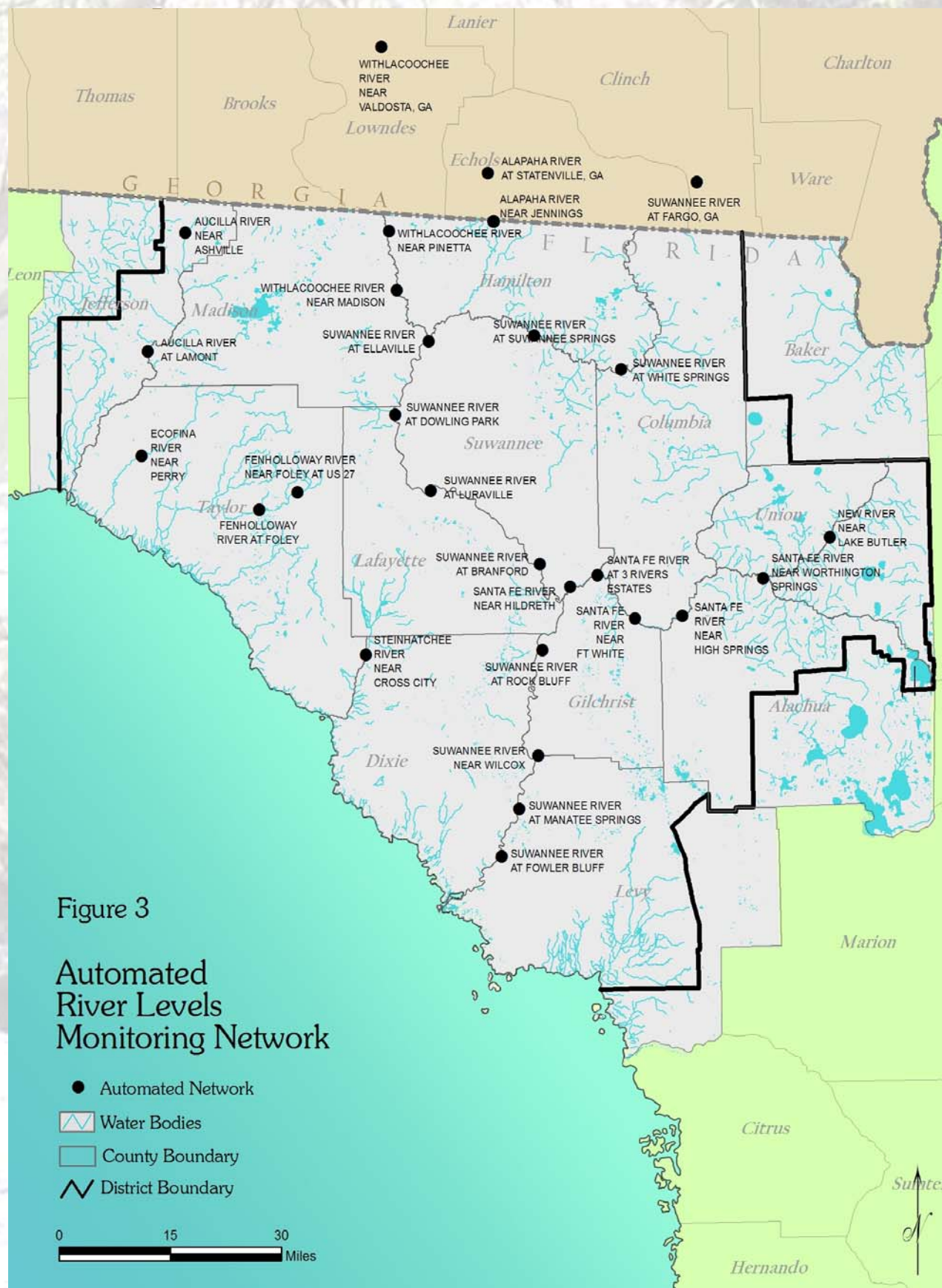


Table 3. Surfacewater Discharge Stations.

Station Number	Station Location	Agency
02316000	Alapaha River near Alapaha, GA	USGS/SRWMD
02317620	Alapaha River near Jennings	USGS
02311750	Alapaha River near Statenville	USGS/SRWMD
02326500	Aucilla River at Lamont	SRWMD
02326550	Aucilla River near Nuttall Rise	USGS/SRWMD
02319302	Madison Blue Spring	USGS/SRWMD
02325532	Fenholloway River near Hampton Springs	SRWMD
02318000	Little River near Adel, GA	USGS/SRWMD
02321000	New River near Lake Butler	USGS/SRWMD
02323838	North Canal at Henry Land Bend	SRWMD
02321600	Olustee Creek near Lulu	SRWMD
02323984	Pocosin Canal near Clara	SRWMD
02323881	Reedy Creek near Carbur Tower	SRWMD
02314986	Rocky Creek near Belmont	SRWMD
02322660	Rose Creek near Columbia City	SRWMD
02324166	Sandhill Creek near Steinhatchee	SRWMD
02320700	Santa Fe River at Graham	SRWMD
02321500	Santa Fe River at Worthington Springs	USGS/SRWMD
02321898	Santa Fe River at O'Leno State Park	SRWMD
02321975	Santa Fe River at High Springs	SRWMD
02322500	Santa Fe River near Fort White	USGS/SRWMD
02322800	Santa Fe River near Hildreth (US 129)	USGS/SRWMD
02324000	Steinhatchee River near Cross City	USGS/SRWMD
02315000	Suwannee River near Benton	SRWMD
02315500	Suwannee River at White Springs (US 41)	USGS
02315550	Suwannee River at Suwannee Springs	SRWMD
02319500	Suwannee River at Ellaville	USGS/SRWMD
02319800	Suwannee River at Dowling Park	USGS/SRWMD
02320000	Suwannee River at Luraville	USGS/SRWMD
02320500	Suwannee River at Branford	USGS/SRWMD
02323000	Suwannee River near Bell	USGS/SRWMD
02323500	Suwannee River near Wilcox	USGS/SRWMD
02323592	Suwannee River above Gopher River	USGS/SRWMD
02315520	Swift Creek at Facil	SRWMD
02313530	Waccasassa River at Gulf Hammock (US 19)	SRWMD
02313700	Waccasassa River near Gulf Hammock	USGS/SRWMD
02326526	Wacissa River near Wacissa	SRWMD
02313600	Wekiva Springs near Gulf Hammock	SRWMD
02319000	Withlacoochee River near Pinetta	USGS/SRWMD
02319300	Withlacoochee River near Madison	USGS/SRWMD
02319394	Withlacoochee River near Lee	USGS/SRWMD

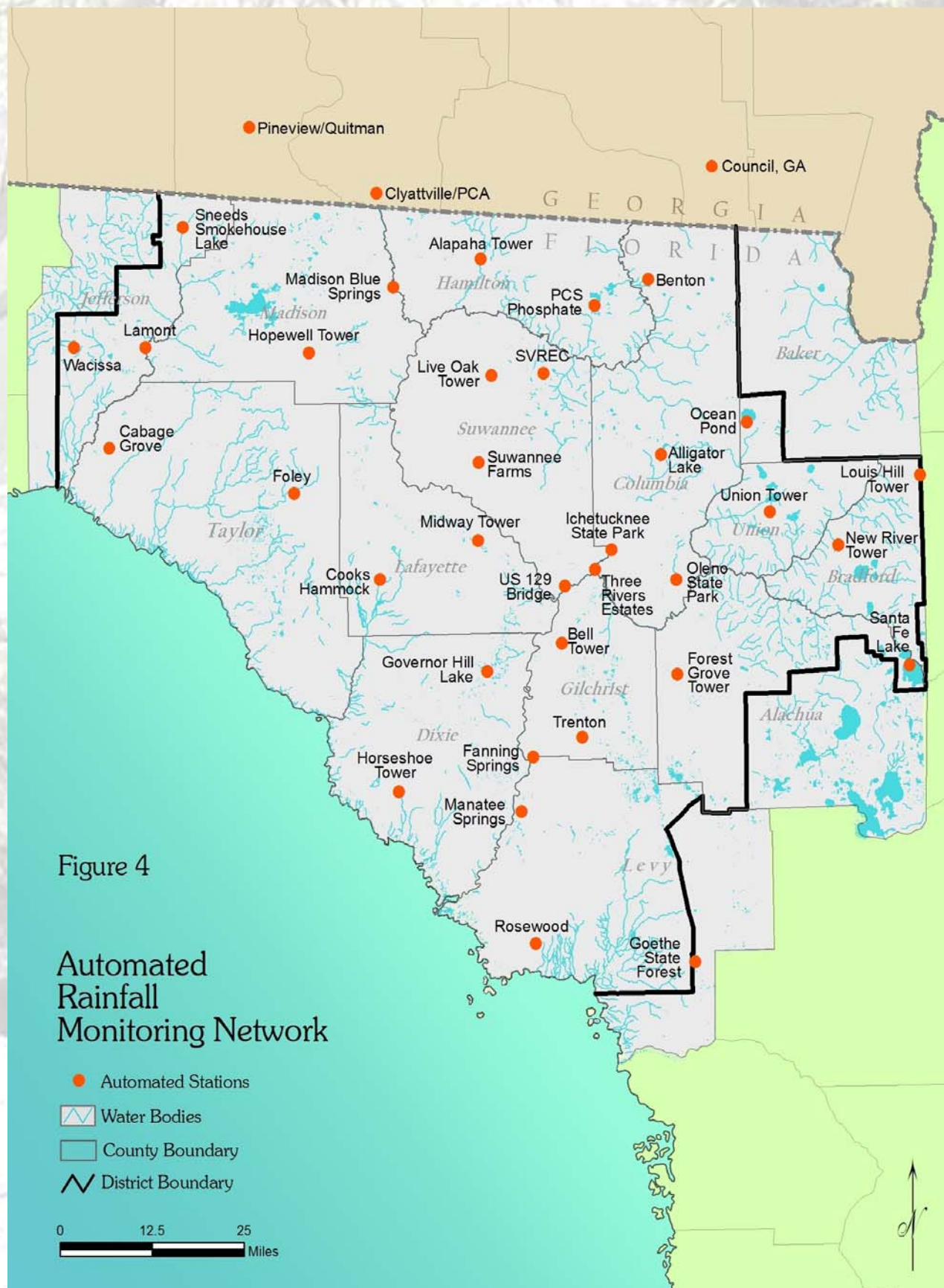


Table 4A. Observer Rainfall Stations.

Station Name	ID#	Agency	County
Suwannee Springs	8	SRWMD	Suwannee
Lake Sampson	14	SRWMD	Bradford
Starke	25	SRWMD	Bradford
Hampton Lake	33	SRWMD	Bradford
Ichetucknee River State Park	41	FPS	Columbia
Lake Octahatchee	42	SRWMD	Hamilton
Lake Butler	62	SRWMD	Union
Fanning Springs State Park	72	SRWMD	Levy
Heilbronn	81	SRWMD	Bradford
Jonesville	86	SRWMD	Alachua
SRWMD	88	SRWMD	Suwannee
Pine Mount	92	SRWMD	Suwannee
Manatee Springs State Park	93	FPS	Levy
Peacock Springs State Park	95	FPS	Suwannee
Newburn	97	SRWMD	Suwannee

SRWMD = Suwannee River Water Management District

FPS = Florida Park Service

Table 4B. Automated Rainfall Stations.

Station Name	ID#	County
Benton Tower	202	Columbia
Alligator Lake	204	Columbia
Suwannee Valley REC	210	Suwannee
Three Rivers Estates	212	Columbia
Forest Grove Tower	229	Alachua
US 129 Bridge	233	Gilchrist
Louis Hill Tower	234	Bradford
New River Tower	235	Bradford
O'Leno State Park	240	Columbia
Ichetucknee Springs State Park	241	Columbia
Governor Hill Lake	243	Dixie
Horseshoe Tower	244	Dixie
Alapaha Tower	246	Hamilton
Sneads Smokehouse Lake	248	Jefferson
Wacissa	250	Jefferson
Cooks Hammock	251	Lafayette
Midway Tower	252	Lafayette
Live Oak Tower	254	Suwannee
Suwannee Farms	256	Suwannee
Cabbage Grove	257	Taylor
Foley	259	Taylor
Union Tower	263	Union
Hopewell Tower	266	Madison
Madison Blue Springs	269	Madison
Bell Tower	270	Gilchrist
Trenton	271	Gilchrist
Fanning Springs	272	Levy
Rosewood	273	Levy
Goethe State Forest	274	Levy
Lamont	276	Jefferson
Santa Fe Lake	279	Alachua
PCS	287	Hamilton
Manatee Springs State Park	293	Levy
Ocean Pond	299	Baker
Council	311	Clinch GA
Clyattville	318	Lowndes GA
Pineview	321	Brooks GA

Surfacewater Quality Networks

WATER CHEMISTRY MONITORING

Network

Water chemistry samples within the District are taken at 75 surfacewater sites (Figures 5-6; Table 5). These samples are collected monthly, bi-monthly, every 6 weeks, or quarterly. Twenty-two of the 75 sites are springs. Fourteen of the 22 springs are monitored 12 times per year and 8 of the 22 springs are monitored 3 times per year (Tables 6A-C). Water chemistry analyses include field measurements, physical/biological samples, nutrients, and major ions (Table 7).



Database

Surfacewater chemistry data is stored in the Oracle database. Surfacewater quality data is input into the data table SWQ_SWN_SWIM. Data collected prior to the SWIM program (before 1989) is stored in the data table named SWQ_SWN_WATQ.

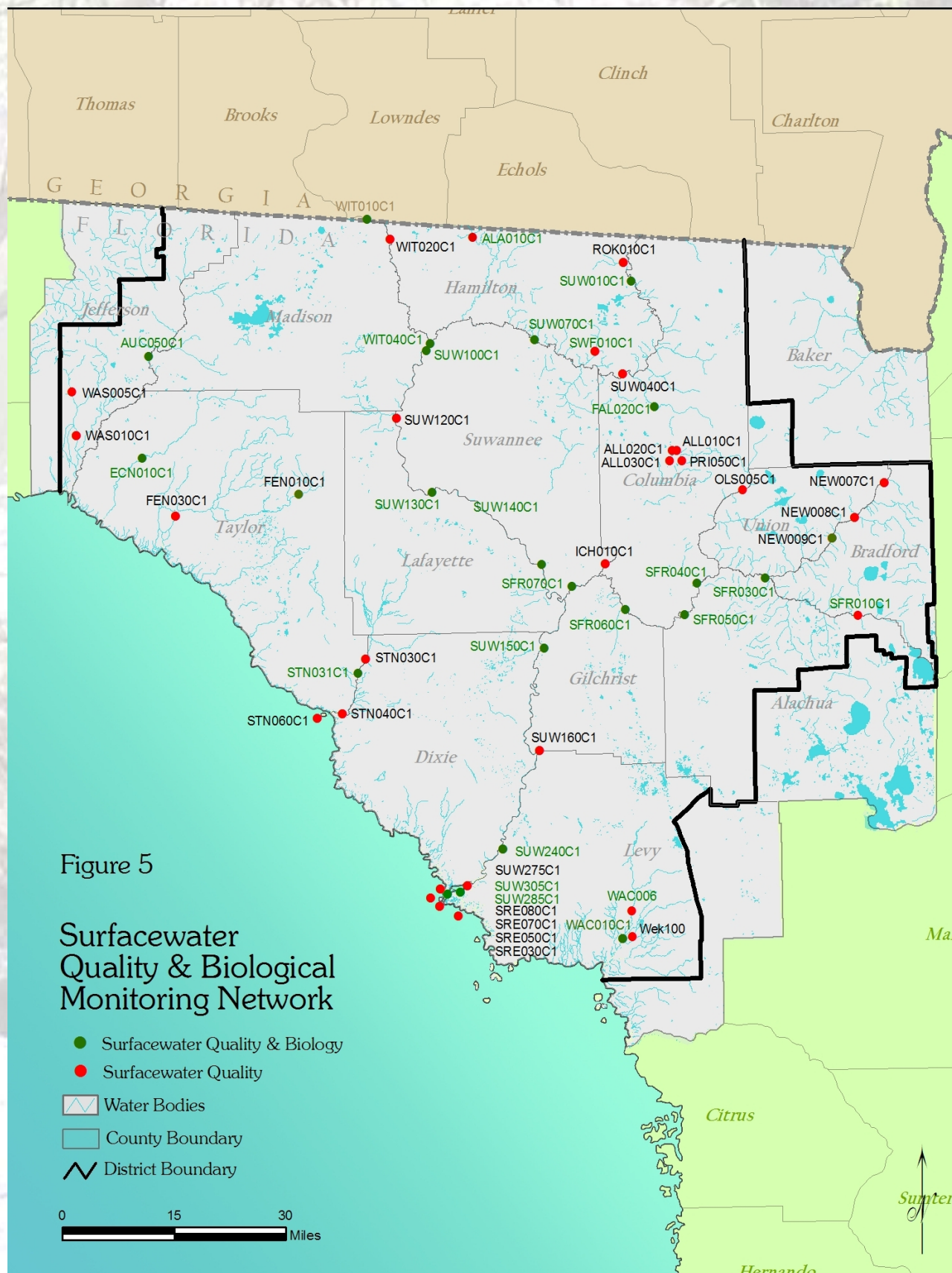
BIOLOGICAL MONITORING

Network

Biological sampling is conducted quarterly for benthic invertebrates, periphyton, and phytoplankton. All biological samples are collected concurrently with water chemistry samples. Tables 6A-C contain the list of sites along with the timetable and methods for macroinvertebrate, periphyton, and phytoplankton sampling.

Database

Biological data is stored in the database named AQUATICBIODATA. Benthic invertebrate data is stored in the data file WATRES_BENTHIC, phytoplankton data is stored in the table named WATRES_PHYTOPLNK, and periphyton data is contained in the WATRES_PERIPHYTON data table. Previously-collected coliform data is stored in the District's Oracle database in the data table SWQ_SWN_SWIM.



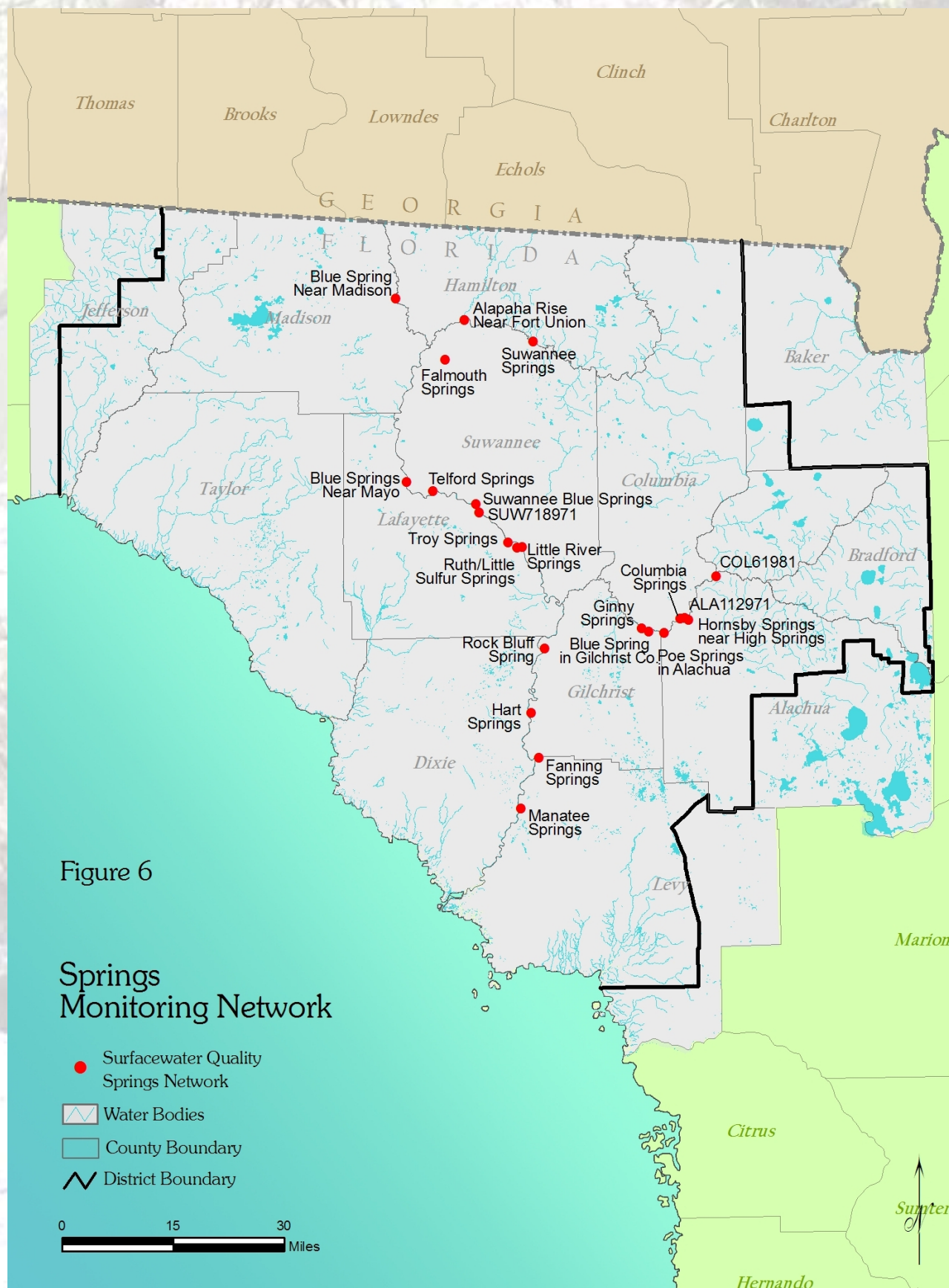


Table 5. Surfacewater Quality Monitoring Stations with Location

STATID	STATION	TYPE	LATITUDE	LONGITUDE	COUNTY
	ALLIGATOR LAKE				
ALL010C1	ALLIGATOR LAKE NORTH LOBE EAST CORNER MID LAKE	LAKE	301027	823710	COLUMBIA
ALL020C1	ALLIGATOR LAKE N LOBE NW CORNER MID LAKE	LAKE	301030	823749	COLUMBIA
ALL030C1	ALLIGATOR LAKE S LOBE SE OF RADIO TWR MID LAKE	LAKE	300916	823809	COLUMBIA
PRI050C1	PRICE CREEK NEAR LAKE CITY	CREEK	300914	823629	COLUMBIA
	AUCILLA RIVER				
AUC050C1	AUCILLA RIVER AT LAMONT	RIVER	302211	834825	JEFFERSON
WAS010C1	WACISSA RIVER NEAR WACISSA	RIVER	301257	835818	JEFFERSON
WAS005C1	WACISSA RIVER AT USGS GAGE	RIVER	301805	835849	JEFFERSON
	COASTAL RIVERS				
ECN010C1	ECONFINA RIVER NEAR PERRY	RIVER	301015	834925	TAYLOR
FEN010C1	FENHOLLOWAY NEAR FOLEY AT US 27	RIVER	300554	832819	TAYLOR
FEN030C1	FENHOLLOWAY BELOW SPRING CK OFF C-136	RIVER	300328	834458	TAYLOR
	SANTA FE RIVER				
ALA112971	TREEHOUSE SPRING	SPRING	295117	823611	ALACHUA
BLU010C1	BLUE SPRING NEAR HIGH SPRINGS	SPRING	294946	824100	GILCHRIST
COL010C1	COLUMBIA SPRINGS	SPRING	295114	823643	COLUMBIA
COL61981	SANTA FE SPRING	SPRING	295604	823150	COLUMBIA
GIN010C1	GINNIE SPRINGS	SPRING	295009	824200	GILCHRIST
HOR010C1	HORNSBY SPRING NEAR HIGH SPRINGS	SPRING	295100	823536	ALACHUA
ICH010C1	ICHETUCKNEE RIVER AT US 27	RIVER	295716	824703	COLUMBIA
OLS005C1	OLUSTEE CREEK AT STATE ROAD 100	CREEK	300544	822824	COLUMBIA
POE010C1	POE SPRINGS NEAR HIGH SPRINGS	SPRING	294933	823859	ALACHUA
SFR010C1	SANTA FE RIVER NEAR GRAHAM	RIVER	295046	821311	BRADFORD
SFR030C1	SANTA FE RIVER AT WORTHINGTON SPRINGS	RIVER	295518	822534	ALACHUA
SFR040C1	SANTA FE RIVER AT OLENO STATE PARK	RIVER	295451	823448	COLUMBIA
SFR050C1	SANTA FE RIVER NEAR HIGH SPRINGS (US 441)	RIVER	295110	823631	ALACHUA

Table 5. continued.

STATID	STATION	TYPE	LATITUDE	LONGITUDE	COUNTY
SFR060C1	SANTA FE RIVER AT STATE ROAD 47	RIVER	295153	824428	COLUMBIA
SFR070C1	SANTA FE RIVER NEAR HILDRETH AT US 129	RIVER	295441	825137	GILCHRIST
NEW007C1	NEW RIVER AT SR-125	RIVER	300614	820913	UNION
NEW008C1	NEW RIVER AT SR-229 NEAR RAIFORD	RIVER	300213	821319	UNION
NEW009C1	NEW RIVER AT SR-100 NEAR LAKE BUTLER	RIVER	295963	821627	UNION
	SUWANNEE RIVER				
ALA010C1	ALAPAHA RIVER NEAR JENNINGS	RIVER	303553	830424	HAMILTON
ALR010C1	ALAPAHA RISE NEAR FORT UNION	SPRING	302615	830524	HAMILTON
BLM010C1	BLUE SPRING NEAR MADISON	SPRING	302849	831440	MADISON
FAL020C1	FALLING CREEK AT CR-131	CREEK	301540	824007	COLUMBIA
FAM010C1	FALMOUTH SPRINGS	SPRING	302140	830806	SUWANNEE
FAN010C1	FANNING SPRINGS	SPRING	293514	825608	LEVY
HAR010C1	HART SPRINGS	SPRING	294029	825706	GILCHRIST
LBS010C1	BLUE SPRINGS NEAR MAYO	SPRING	300731	831332	LAFAYETTE
LRS010C1	LITTLE RIVER SPRINGS	SPRING	295948	825759	SUWANNEE
MAN010C1	MANATEE SPRINGS	SPRING	292921	825837	LEVY
RKB010C1	ROCK BLUFF SPRINGS	SPRING	294755	825507	GILCHRIST
RLS010C1	RUTH/LITTLE SULFUR SPRINGS	SPRING	295944	825837	LAFAYETTE
ROK010C1	ROCKY CREEK NEAR BELMONT	CREEK	303240	824402	HAMILTON
SBL010C1	SUWANNEE BLUE SPRINGS	SPRING	300452	830409	SUWANNEE
SUW010C1	SUWANNEE RIVER NEAR BENTON	RIVER	303028	824300	COLUMBIA
SUW040C1	SUWANNEE RIVER AT WHITE SPRINGS	RIVER	301933	824419	HAMILTON
SUW070C1	SUWANNEE RIVER AT SUWANNEE SPRINGS	RIVER	302342	825610	SUWANNEE
SUW100C1	SUWANNEE RIVER AT ELLAVILLE	RIVER	302237	831049	SUWANNEE
SUW120C1	SUWANNEE RIVER AT DOWLING PARK	RIVER	301441	831459	SUWANNEE
SUW130C1	SUWANNEE RIVER AT LURAVILLE	RIVER	300556	831019	LAFAYETTE

TABLE 5. continued.

STATID	STATION	TYPE	LATITUDE	LONGITUDE	COUNTY
SUW140C1	SUWANNEE RIVER AT BRANFORD	RIVER	295720	825540	SUWANNEE
SUW150C1	SUWANNEE RIVER AT ROCK BLUFF	RIVER	294728	825528	GILCHRIST
SUW160C1	SUWANNEE RIVER NEAR WILCOX	RIVER	293529	825614	LEVY
SUW240C1	SUWANNEE RIVER AT FOWLER BLUFF	RIVER	292357	830122	LEVY
SUW275C1	SUWANNEE RIVER AT GOPHER RIVER	RIVER	291941	830611	DIXIE
SUW285C1	SUWANNEE RIVER #2 EAST PASS	RIVER	291859	830710	DIXIE
SUW305C1	SUWANNEE RIVER IN WEST PASS	RIVER	291844	830850	DIXIE
SRE030C1	EAST PASS CHANNEL AT 4 TH MARKER	ESTUARY	291611	830726	LEVY
SRE050C1	ALLIGATOR PASS AT MARKER 21	ESTUARY	291720	830955	DIXIE
SRE070C1	WADLEY PASS AT MARKER 7	ESTUARY	291819	831108	DIXIE
SRE080C1	SALT CREEK AT MARKER 20	ESTUARY	291924	830947	DIXIE
SUW718971	UN-NAMED SPRING	SPRING	300350	830343	SUWANNEE
SSS010C1	SUWANNEE SPRINGS	SPRING	302338	825604	SUWANNEE
SWF010C1	SWIFT CREEK AT FACIL	CREEK	302214	824800	HAMILTON
TEL010C1	TELFORD SPRINGS	SPRING	300623	830956	SUWANNEE
TRY010C1	TROY SPRINGS	SPRING	300021	825951	LAFAYETTE
WIT010C1	WITHLACOOCHEE RIVER AT STATE LINE AT CR-145	RIVER	303806	831842	MADISON
WIT020C1	WITHLACOOCHEE RIVER NEAR PINETTA	RIVER	303545	831535	MADISON
WIT040C1	WITHLACOOCHEE RIVER NEAR LEE	RIVER	302324	831020	MADISON
	STEINHATCHEE RIVER				
STN030C1	STEINHATCHEE RIVER NEAR CROSS CITY	RIVER	294627	831927	LAFAYETTE
STN031C1	STEINHATCHEE RIVER ABOVE STEINHATCHEE FALLS	RIVER	294449	832032	DIXIE
STN040C1	STEINHATCHEE RIVER AT STEINHATCHEE	ESTUARY	294004	832240	TAYLOR
STN060C1	STEINHATCHEE RIVER SOUND	ESTUARY	293935	832604	DIXIE
	WACCASASSA RIVER				
WEK100C1	WEKIVA RIVER BELOW L. WEKIVA CK. CONFLUENCE	RIVER	291330	824408	LEVY
WAC010C1	WACCASASSA RIVER NEAR GULF HAMMOCK ON SR-326	RIVER	291315	824529	LEVY
WAC006C1	WACCASASSA RIVER NEAR GULF HAMMOCK ON US 19	RIVER	291629	82416	LEVY

Table 6A. Surfacewater Quality Monitoring Stations, Sample Types, and Sampling Events.

STATION	CHEM	DISCH	Chl-a	HD	Qual	Ponar	Periphyton	Phytop
ALA010C1	12				4			
ALL010C1	6		6					
ALL020C1	6		6			4		4
ALL030C1	6		6			4		4
AUC050C1	12				4			
ECN010C1	12				4			
FAL020C1	4				4			
FEN010C1	4				4			
FEN030C1	4							
ICH010C1	12							
NEW007C1	6							
NEW008C1	6							
NEW009C1	6				4			
OLS005C1	4							
PRI050C1	6							
ROK010C1	4							
SFR010C1	12							
SFR030C1	12			4				
SFR040C1	12				4		4	
SFR050C1	12		12	4	4			
SFR060C1	12		12				4	
SFR070C1	12		12	4			4	
STN030C1	12							
STN031C1	4				4			
STN040C1	6		6					
SUW010C1	12			4	4		4	
SUW040C1	12							
SUW070C1	12		12	4				
SUW100C1	12			4			4	
SUW120C1	12							
SUW130C1	12			4			4	
SUW140C1	12		12	4			4	

Table 6A. continued.

STATION	CHEM	DISCH	Chl-a	HD	Qual	Ponar	Periphyton	Phytop
SUW150C1	12		12	4			4	
SUW160C1	12		12					
SUW240C1	12		12	4			4	
SUW275C1	12							
SWF010C1	12							
WAC010C1	12							
WAC006C1	12							
WAS005C1	8						4	
WAS010C1	8							
WEK100C1	12							
WIT010C1	12			4				
WIT020C1	6							
WIT040C1	12			4				
TOTAL	430	0	120	48	40	8	40	8

Table 6B. Surfacewater Quality Monitoring Stations, Sample Types, and Sampling Events for the Suwannee River Estuary Sites.

STATION	CHEM	DISCH	Chl-a	HD	Qual	Ponar	Periphyton	Phytop
SUW305C1	12		12	4		4		
SRE030C1	6		6					
SRE050C1	6		6					
SRE070C1	6		6					
SRE080C1	6		6					
STN060C1	6		6					
TOTAL	42	0	42	4	0	4	0	0

Table 6C. Surfacewater Quality Monitoring Stations, Sample Types, and Sampling Events for Spring Sites.

STATION	CHEM	DISCH	Chl-a	HD	Qual	Ponar	Periphyton	Phytop
ALA112971	3	3						
ALR010C1	3	3						
BLM010C1	12	0						
BLU010C1	12	6						
COL010C1	3	3						
COL61981	3	3						
FAM010C1	3	0						
FAN010C1	12	0						
GIN010C1	3	3						
HAR010C1	3	3						
HOR010C1	12	0						
LBS010C1	12	6						
LRS010C1	12	6						
MAN010C1	12	0						
POE010C1	12	6						
RKB010C1	12	6						
RLS010C1	12	6						
SBL010C1	12	6						
SUW718971	12	6						
SSS010C1	3	3						
TEL010C1	12	6						
TRY010C1	12	0						
TOTAL	192	75	0	0	0	0	0	0
GRAND TOTAL	664	75	162	52	40	12	40	8

CHEM = Chemistry sample

DISCH = Discharge measurements

Chl-a = Chlorophyll-a measurements

Qual = Dip net sampling

Ponar = Petite ponar sampling

Periphyton = Periphytometer sampling

Phytop = Phytoplankton sampling

HD = Hester-Dendy

12 = Monthly sampling

8 = Sampled every 6 weeks

6 = Bimonthly sampling

4 = Quarterly sampling

3 = Sampled in November, June, and August

Table 7. Surfacewater Quality Network Parameters.

PARAMETERS	UNITS	METHOD
Field Measurements		
Sample Depth	meters	
Total Depth	meters	
Water Temperature	°C	170.1 EPA
pH	SU	150.1 EPA
Dissolved Oxygen--Probe	mg L ⁻¹	360.1 EPA
Conductivity Field	µmho cm ⁻¹	120.1 EPA
Conductivity at 25C	µmhos cm ⁻¹	120.1 EPA
River Stage	ft, NGVD	
Discharge	cfs	
Secchi Disk	meters	
Salinity	ppt	120.1 EPA
Physical/Biological Samples		
Color	PCU	110.2 EPA
Turbidity	NTU	180.1 EPA
TDS	mg L ⁻¹	160.1 EPA
Alkalinity	mg L ⁻¹	310.2 EPA
TOC	mg L ⁻¹	415.1 EPA
DOC	mg L ⁻¹	5310B SM
Chlorophyll a	µg L ⁻¹	10200H SM
Major Ions		
Potassium	mg L ⁻¹	6010EPA
Sodium	mg L ⁻¹	6010EPA
Magnesium	mg L ⁻¹	6010EPA
Calcium	mg L ⁻¹	6010EPA
Chloride	mg L ⁻¹	300EPA
Fluoride	mg L ⁻¹	300 EPA
Sulfate	mg L ⁻¹	300 EPA
Silica (Total Silicon)	mg L ⁻¹	200.7 EPA
Nutrients		
Nitrate+nitrite-nitrogen	mg L ⁻¹	353.2 EPA
TKN	mg L ⁻¹	351.2 EPA
Ammonia Nitrogen	mg L ⁻¹	350.1 EPA
Total Phosphorus	mg L ⁻¹	365.1 EPA
Orthophosphate	mg L ⁻¹	365.1 EPA

*MDL = Method Detection Limit

Groundwater Monitoring Networks

GROUNDWATER LEVELS NETWORK

Network

Groundwater level (GWL) records are available for 1,082 wells. The majority of these wells are only measured during record high or record low periods and 396 wells are inactive. One hundred and eighty-one (181) wells are measured monthly in the GWL network; of these, 77 have continuous recorders (Figure 7).

Database

Groundwater levels are stored in the District's GWL database.

GROUNDWATER QUALITY NETWORKS

Network

The District has two groundwater quality networks. The Trend Network allows the assessment of changes in groundwater quality over time (Figure 8). The Status Network generates statistically valid snapshots of the overall groundwater quality each year (Figure 10). These networks are funded and sampled by the District.

A). Trend Network

The trend network began in October 2000. It consists of 90 Floridan aquifer wells sampled quarterly. This network is more intensive in areas with water quality concerns. The network parameter list is shown in Table 8.

B). Status Network

The status network began in October 2000. The network consists of randomly selected wells, which are sampled once per year for a 5-year period. The wells are re-randomized, with new wells selected after 5 years of sampling. This provides for statistically based sampling and data analysis, and allows for the generation of annual water quality maps. The network parameter list is shown in Table 8.



Databases

Groundwater quality data is stored in the District's WATQ database. It contains records for over 1,700 wells sampled from 1975 to present.

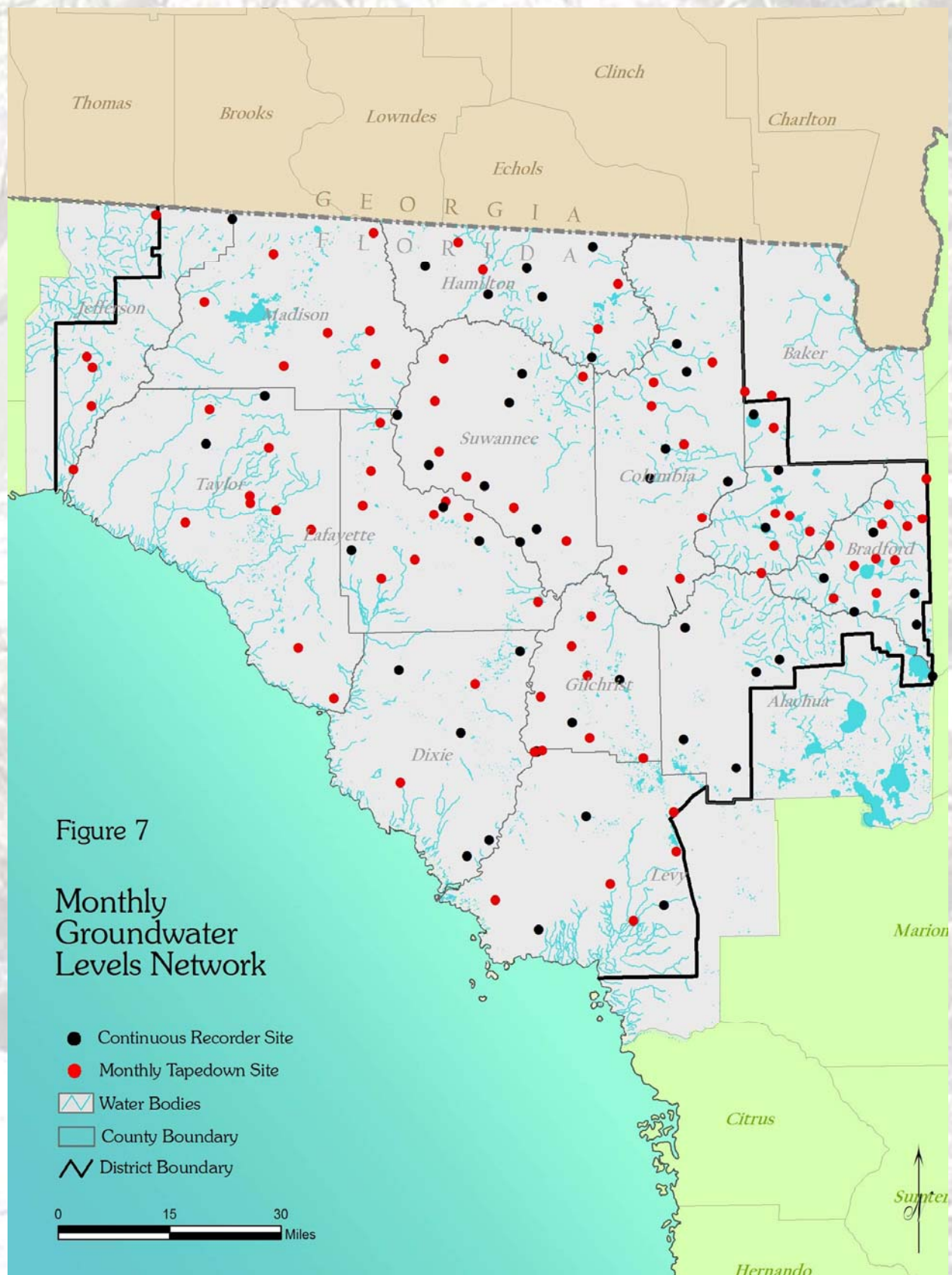


Figure 7

Monthly Groundwater Levels Network

- Continuous Recorder Site
- Monthly Tapdown Site
- ▨ Water Bodies
- ▭ County Boundary
- ▭ District Boundary

0 15 30
Miles

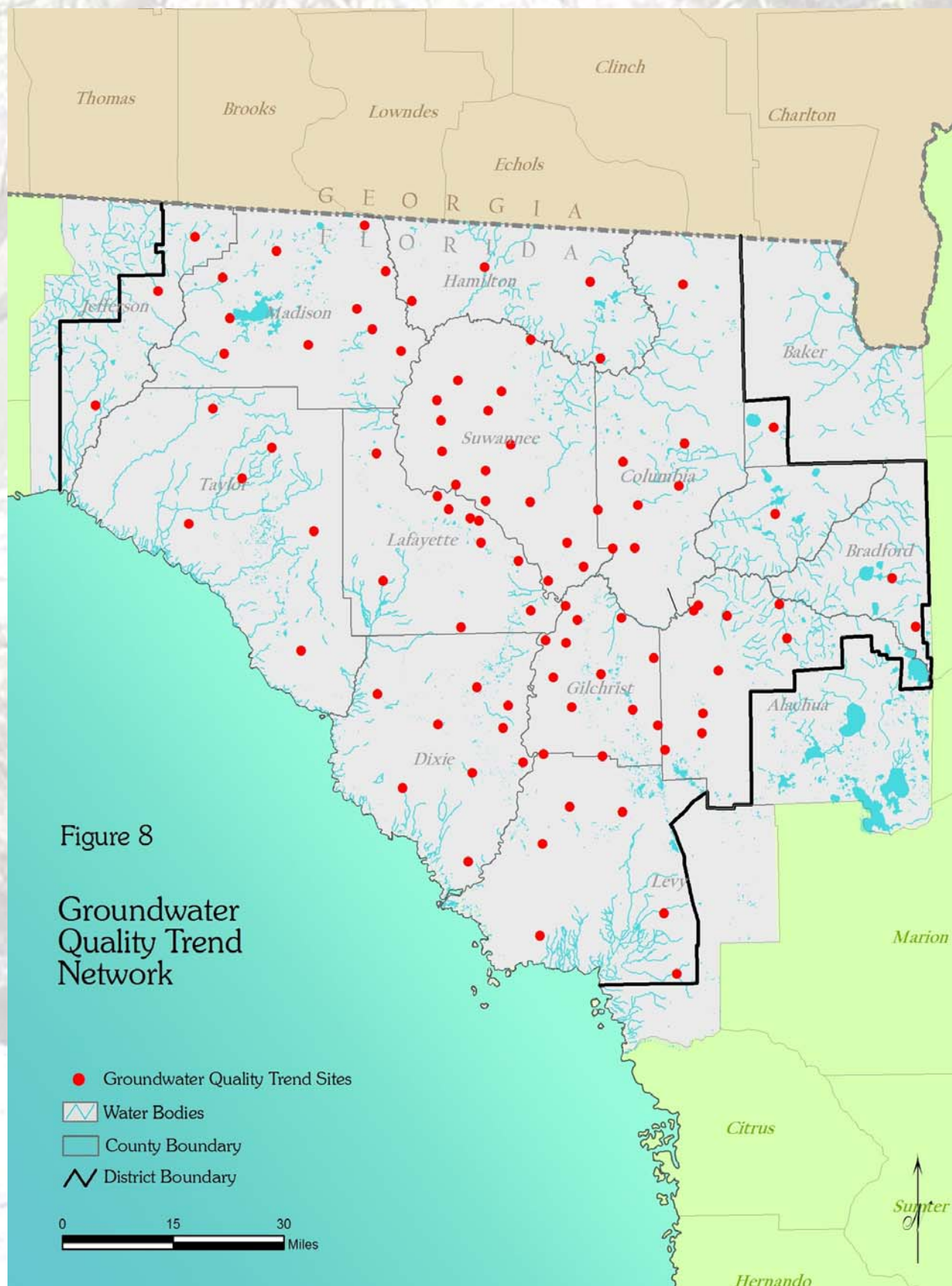


Figure 8

Groundwater Quality Trend Network

● Groundwater Quality Trend Sites

□ Water Bodies

□ County Boundary

▬ District Boundary

0 15 30
Miles

Table 8. Groundwater Quality Network Parameters.

PARAMETERS	UNITS	METHOD
Physical/Biological		
Turbidity	NTU	180.1 EPA
Total Dissolved Solids (TDS)	mg L ⁻¹	160.1 EPA
Alkalinity as CaCO ₃	mg L ⁻¹	310.2 EPA
Total organic carbon	mg L ⁻¹	415.1 EPA
Dissolved organic carbon	mg L ⁻¹	5310B SM
Major Ions		
Potassium	mg L ⁻¹	6010 EPA
Sodium	mg L ⁻¹	6010 EPA
Magnesium	mg L ⁻¹	6010 EPA
Calcium	mg L ⁻¹	6010 EPA
Chloride	mg L ⁻¹	300.0 EPA
Fluoride	mg L ⁻¹	300.0 EPA
Sulfate	mg L ⁻¹	300.0 EPA
Minor Ions		
Iron	mg L ⁻¹	6010 EPA
Lead	mg L ⁻¹	6010 EPA
Cadmium	mg L ⁻¹	6010 EPA
Arsenic	mg L ⁻¹	6010 EPA
Nutrients		
Nitrate plus nitrite	mg L ⁻¹	353.2 EPA
Total kjeldahl nitrogen	mg L ⁻¹	351.2 EPA
Ammonia nitrogen	mg L ⁻¹	350.1 EPA
Total phosphorus	mg L ⁻¹	365.2 EPA
Orthophosphate	mg L ⁻¹	365.1 EPA

EPA (1) Methods for Chemical Analysis of Water and Wastes. US EPA Office of Research and Development, Cincinnati, OH. March 1983.

SM Standard Methods for the Examination of Water and Wastewater, Eighteenth Edition. American Public Health Association. Washington, D.C. 1992.