MEMORANDUM

TO: Governing Board

FROM: Megan Wetherington, P.E., Senior Professional Engineer

THRU: Ann B. Shortelle, Ph.D., Executive Director
Erich Marzolf, Ph.D., Water Resources Division Director

DATE: April 5, 2013

RE: March 2013 Hydrologic Conditions Report for the District

RAINFALL

- Average rainfall in the District was 2.96", which is 64% of the long-term March average of 4.52". (Table 1, Figure 1). Dixie, Gilchrist, Alachua, and Levy counties were well below normal, while parts of Suwannee, Lafayette, and Columbia counties saw totals typical for the time of year (Figure 2). Usher Tower near Chiefland in Levy County reported its second-lowest March total since record-keeping began in 1956, with only 0.69" recorded. The 3-month total at that gage set a new record low. The highest gaged monthly total was 5.84" at Midway Tower in Lafayette County. The highest daily total was 4.7" near Sanderson in Baker County. Rainfall in South Georgia near the Florida border was typical of March, but the upper parts of the Withlacoochee and Alapaha basins were below normal (Figure 3).
- Average rainfall for the 12 months ending March 31 was 6.26" higher than the long-term average of 54.61" (Figure 4). Figure 5 shows the history of rainfall deficits beginning in 1998.

SURFACEWATER

- **Rivers:** The Alapaha, Withlacoochee, and Suwannee rivers continued to rise during the first half of the month after record-breaking February rains fell over parts of the Georgia basins. The Withlacoochee River near Pinetta crested at its fourth-highest stage since 1931, while the Alapaha River near Statenville rose to its fifth-highest crest. The upper Suwannee basin including the Okefenokee Swamp received much less rainfall than the other two tributaries, resulting in backwater above the Alapaha confluence and no flooding upstream at Suwannee Springs and White Springs. With the upper Suwannee not contributing, flooding downstream of Ellaville was minor. The river at Ellaville crested just above flood stage, and crests diminished in severity further downstream. The rising Suwannee caused a backwater flood on the lower Santa Fe River, resulting in minor flooding at the Santa Fe at Three Rivers estates. Rivers fell steadily after cresting, but another series of storms in south Georgia caused minor rises at the end of the month. The Aucilla River remained at or above flood stage throughout the month. Other coastal rivers had flows typical for the time of year. Statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions are in Figure 7.

  As a result of major flooding of the Withlacoochee River, on February 28 the Withlacoochee Wastewater Treatment Plant (WWTP) near Valdosta was taken offline as the river inundated critical buildings and structures. The plant was brought back online and returned to normal operations on March 3rd. During this event, the natural-occurring bacteria used in the treatment process were reserved so that the system could treat wastewater immediately when it was returned to operation. During major flooding in 2009, the bacteria were washed out of the plant as a result of the continuous pumping during the event. In the March event, the plant was fully operational in three days, unlike 2009 when the plant had a complete loss of function for nine days and was not fully operational for over a month.

Results from FDEP's sampling of the Withlacoochee River showed that bacteria levels were well below the established water quality standard. Based on these results, little to no environmental impact was anticipated, and FDEP ceased further testing. The results were shared with the Florida Department of Health to inform their determination of the need for health advisories.

- **Lakes**: Levels at most monitored lakes remained stable throughout the month. Sneads Smokehouse Lake, part of the Aucilla River, rose to its highest levels since Tropical Storm Fay in 2008. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for monitored lakes.

SPRINGS

Most springs along the Withlacoochee and Suwannee rivers were browned-out from river water throughout the month, with reverse flow recorded at Madison Blue, Hart, and Otter and observed at others. Flows slowed and rebounded at Madison Blue as the Withlacoochee River dropped. Ichetucknee River flow was slowed by 10% by the rising Santa Fe. USGS staff and District contractors made a number of measurements at the Alapaha Rise as the Suwannee rose and fell. The lowest flow in the record (65 cfs) was recorded during high water, followed by the highest flow since 1984 (1020 cfs) as the river dropped. Statistics for a representative sample of springs are shown in Figures 9a and 9b.

GROUNDWATER

Levels increased in 75% percent of monitored upper Floridan aquifer wells. Groundwater levels rose along the axis of heavier rainfall in the central part of the District from Taylor to Baker County and in wells along the Suwannee, Withlacoochee, and Alapaha rivers. Levels generally fell in areas of lower rainfall in the southern part of the District. Conditions District-wide rose from the 38th to the 58th percentile. Statistics for a representative sample of wells are shown in Figure 11. Statistics for a number of regional long-term wells are shown in Figure 12 along with a description of aquifer characteristics.

HYDROLOGICAL/METEOROLOGICAL/WATER USE INFORMATION

- The Palmer Drought Severity Index (PDSI), a climatological tool produced by the National Climatic Data Center, evaluates the severity and frequency of abnormally dry or wet weather using precipitation, temperature, and soil moisture data. The PDSI value for the week ending March 30 indicated normal conditions in north Florida and moderately wet conditions in south central Georgia.
- The National Weather Service Climate Prediction Center (CPC) three-month outlook indicated a probability of below-normal precipitation through June in north Florida. Neutral El Niño/Southern Oscillation conditions are expected into the summer.

- The U.S. Drought Monitor showed moderate drought in Dixie, Gilchrist, Alachua, and Levy counties.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to twice per week between March and November based on a water conservation rule that applies to residential landscaping, public or commercial recreation areas, and public and commercial businesses that aren't regulated by a District-issued permit.

This report is compiled in compliance with Chapter 40B-21.211, Florida Administrative Code, using rainfall (radar-derived estimate), groundwater (105 wells), surfacewater (35 stations), and general information such as drought indices and forecasts. Data are provisional and are updated as revised data become available. Data are available at www.mysuwanneeriver.com or by request.

Table 1: Estimated Rainfall Totals

County	Mar 2013	March Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	1.62	4.21	39%	57.39	112%
Baker	3.74	4.36	86%	62.64	125%
Bradford	3.04	4.29	71%	61.91	122%
Columbia	3.87	4.62	84%	66.56	129%
Dixie	1.61	4.79	34%	56.49	96%
Gilchrist	1.67	4.84	34%	56.71	99%
Hamilton	3.21	5.17	62%	55.49	106%
Jefferson	3.73	5.80	64%	55.52	92%
Lafayette	3.85	5.03	77%	73.16	129%
Levy	0.94	5.03	19%	54.35	91%
Madison	3.86	5.72	67%	57.39	102%
Suwannee	4.33	5.17	84%	71.55	135%
Taylor	3.86	5.34	72%	64.95	109%
Union	3.60	4.85	74%	59.51	110%

March 2013 Average:	2.96
March Average (1932-2012):	4.52
Historical 12-month Average (1932-2012):	54.61
Past 12-Month Total:	60.87
12-Month Rainfall Surplus:	6.26

Figure 1: Comparison of District Monthly Rainfall

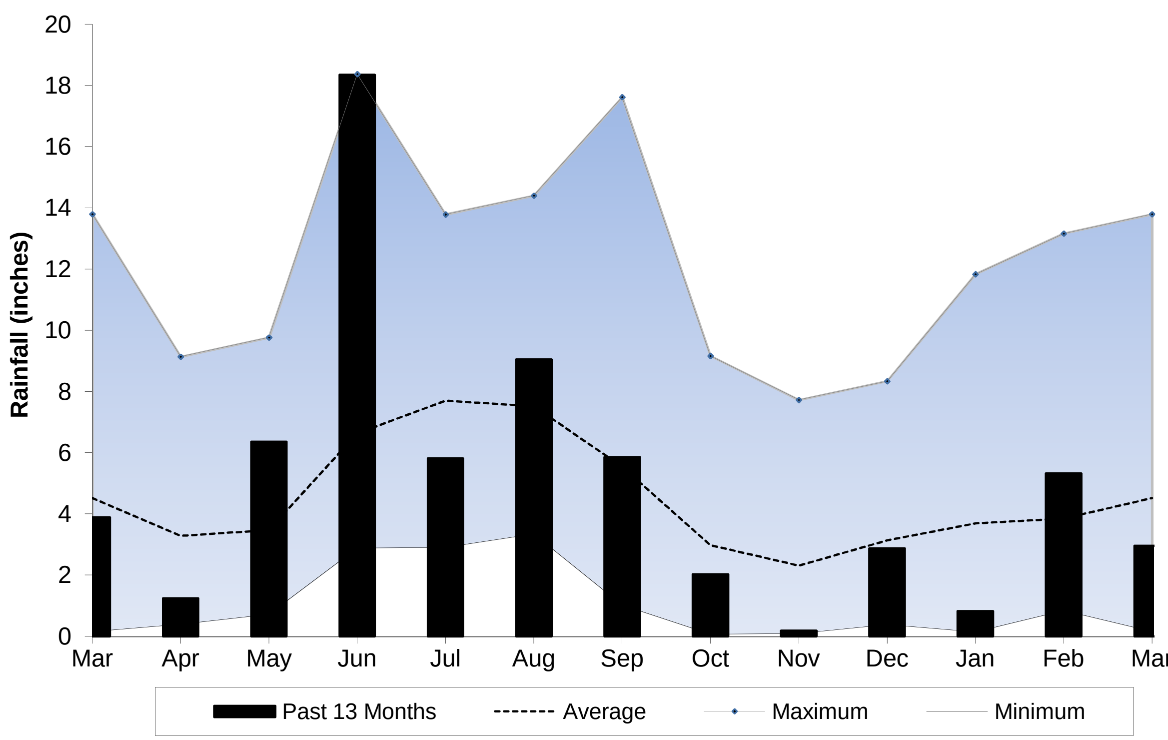


Figure 2: March 2013 Rainfall Estimate

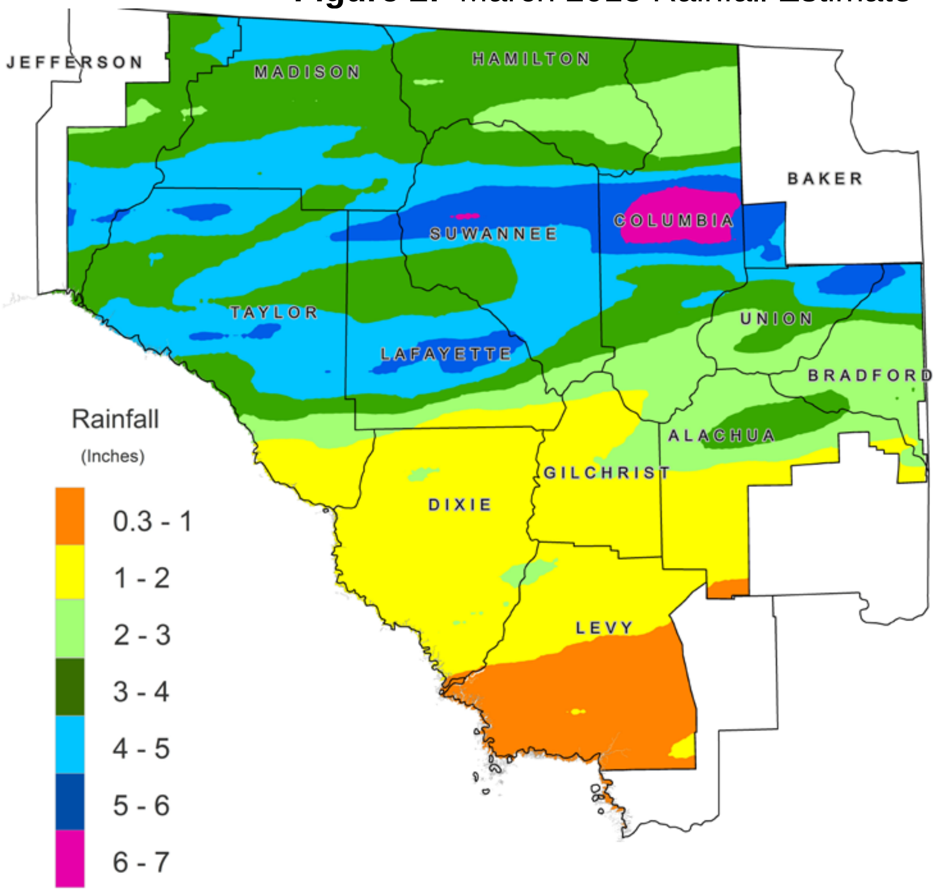


Figure 3: March 2013 Percent of Normal Rainfall

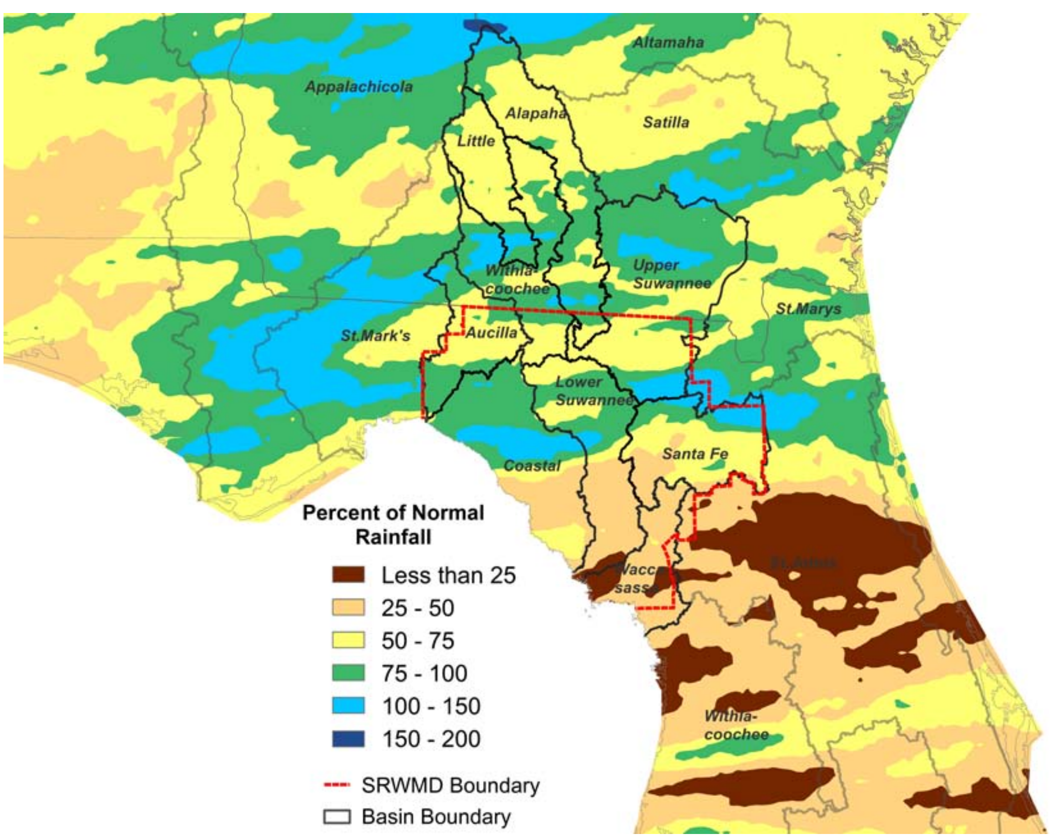
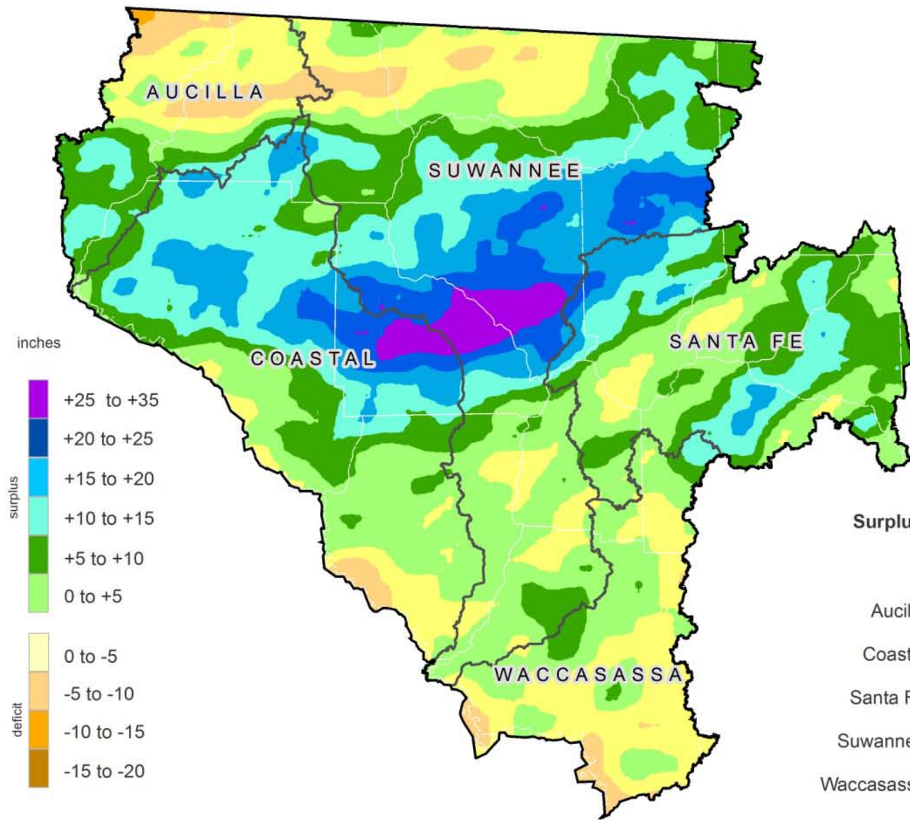


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin Through March 31, 2013



12-Month Surplus (+) or Deficit (-) By Basin

	Mar -13	Feb -13
Aucilla	+1.4	+2.4
Coastal	+9.7	+9.9
Santa Fe	+7.1	+7.8
Suwannee	+8.9	+10.4
Waccasassa	+0.3	+1.6

Figure 5: 12-Month Rolling Rainfall Deficit Since 1998

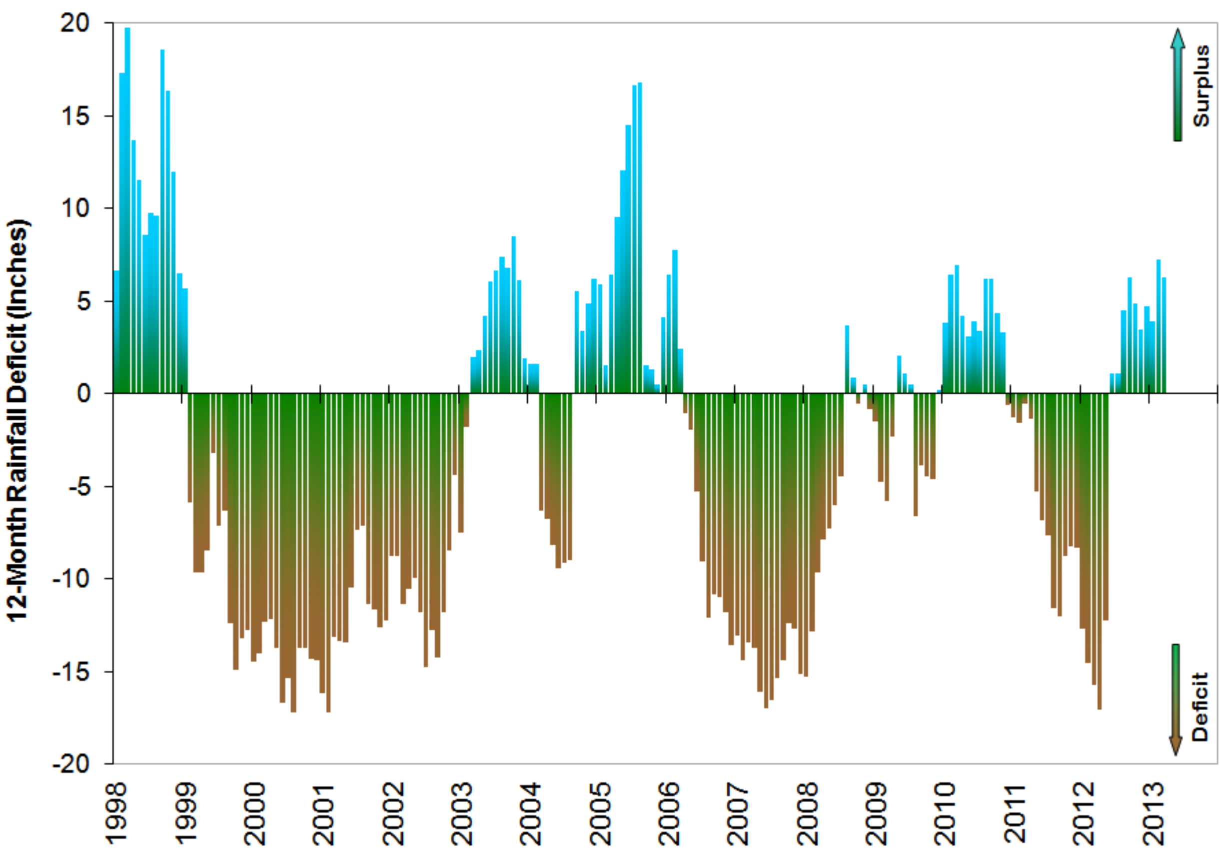
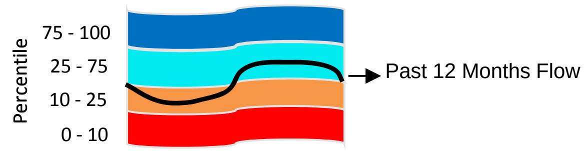


Figure 6: Daily River Flow Statistics

April 1, 2012 through March 31, 2013



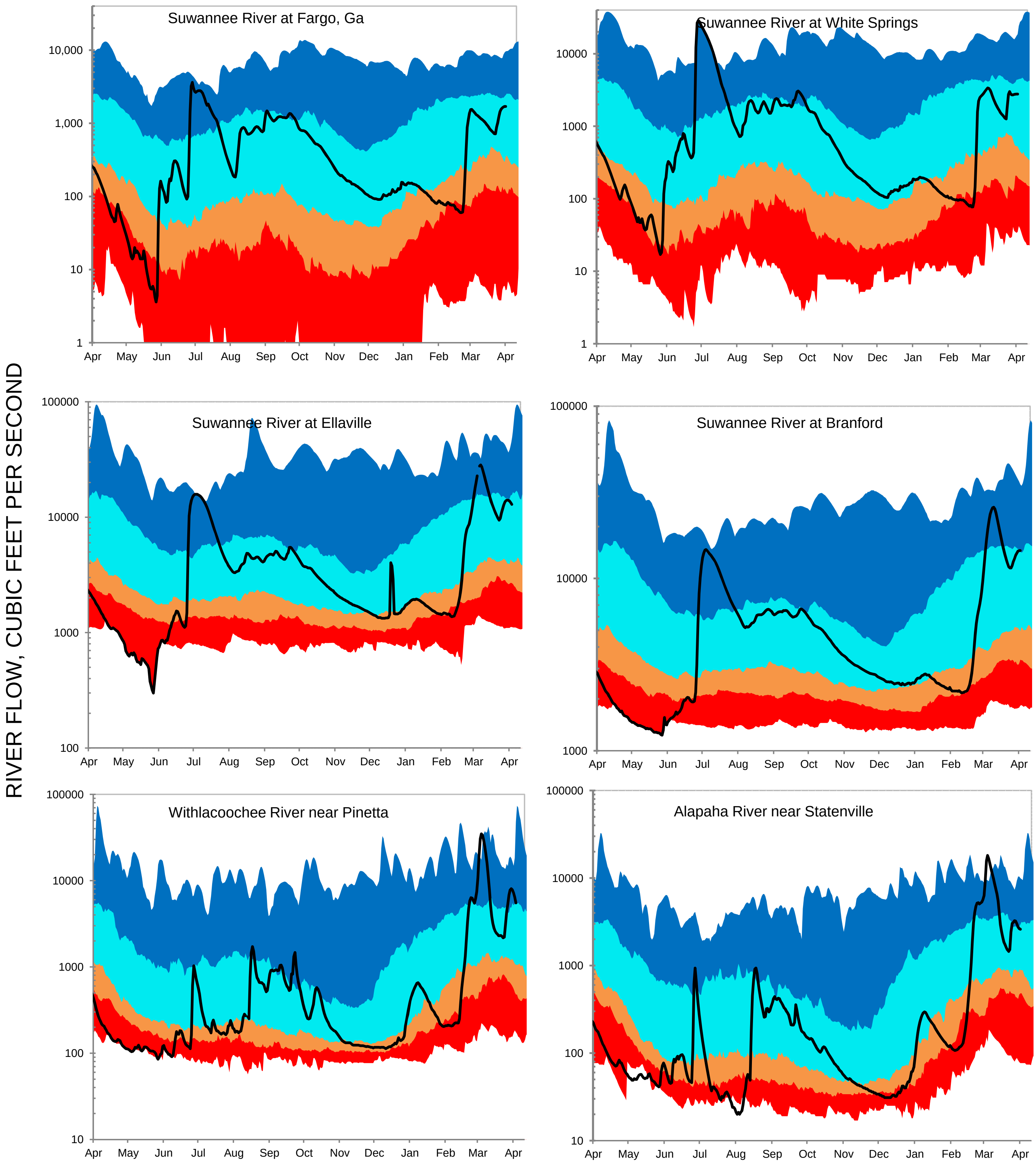
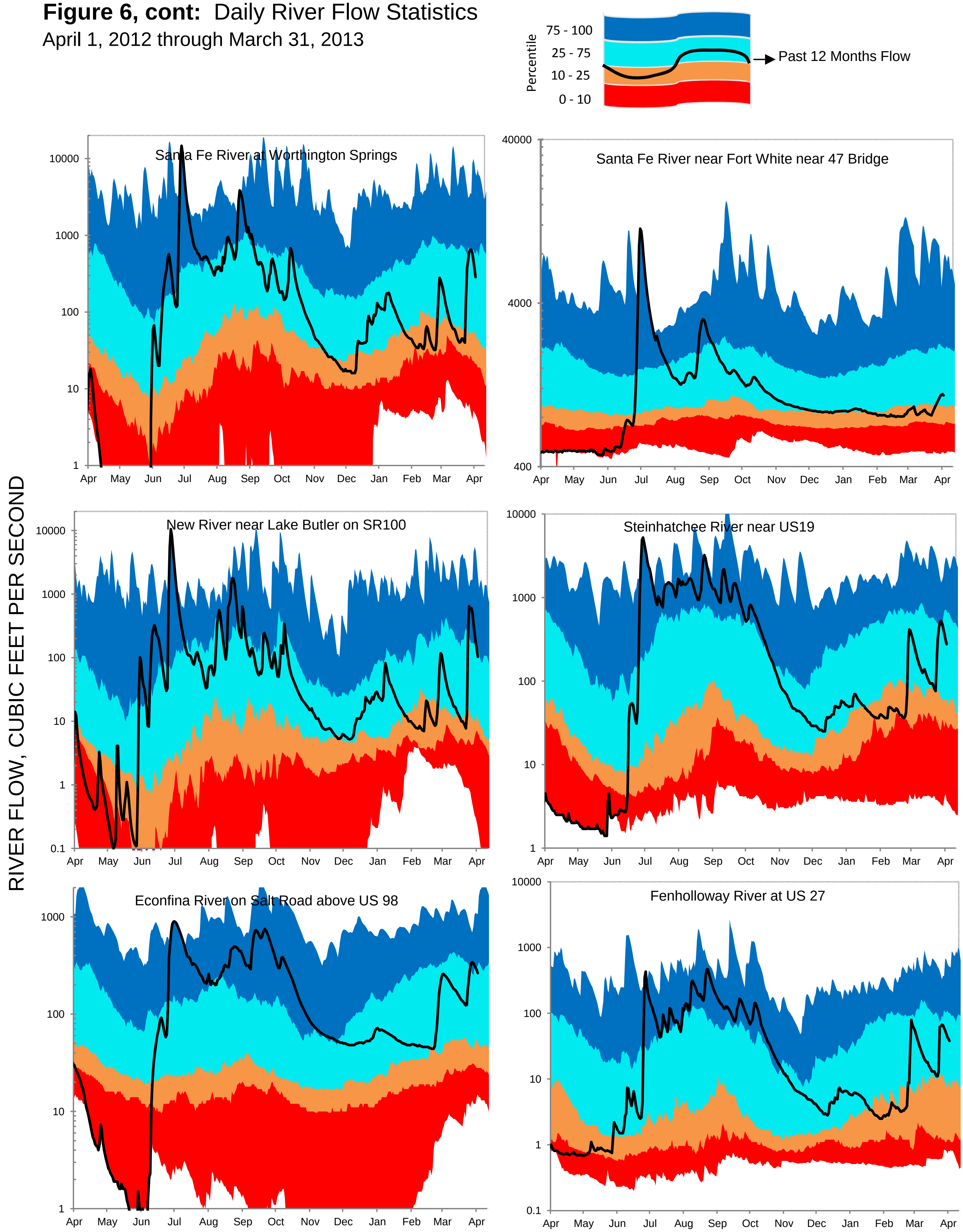


Figure 6, cont: Daily River Flow Statistics

April 1, 2012 through March 31, 2013



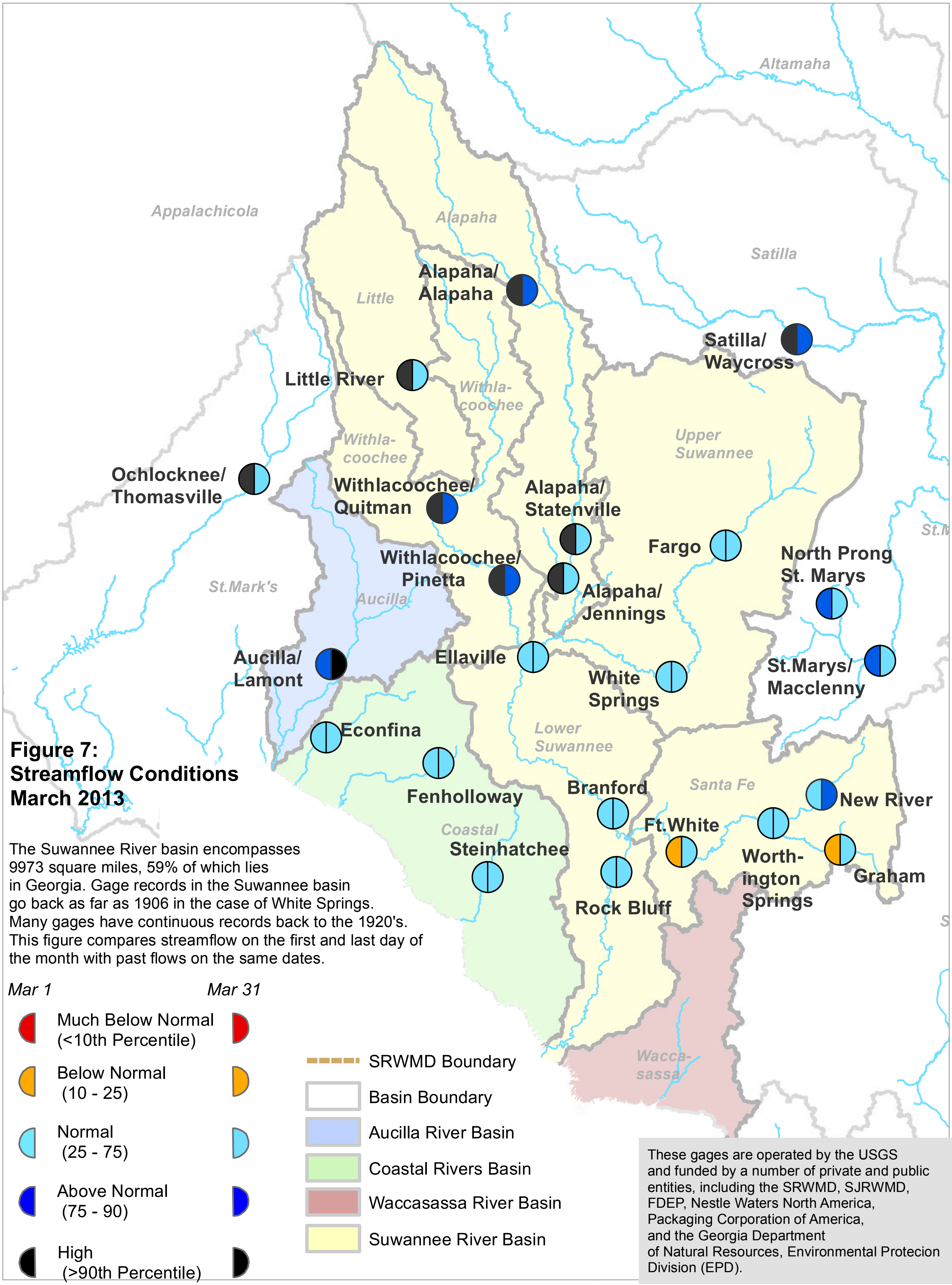
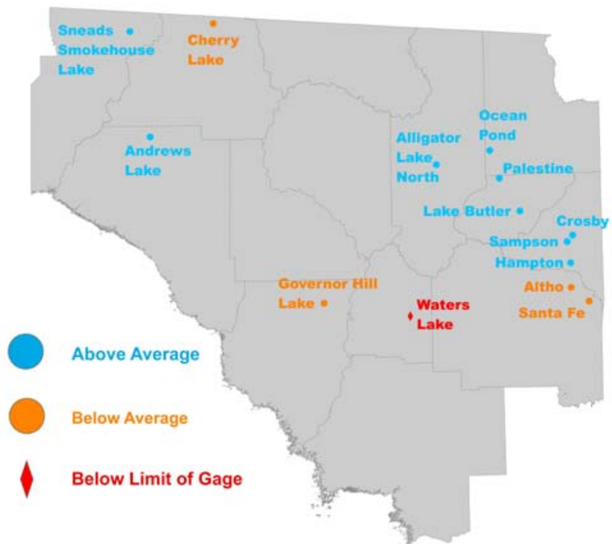


Figure 7: Streamflow Conditions March 2013

The Suwannee River basin encompasses 9973 square miles, 59% of which lies in Georgia. Gage records in the Suwannee basin go back as far as 1906 in the case of White Springs. Many gages have continuous records back to the 1920's. This figure compares streamflow on the first and last day of the month with past flows on the same dates.

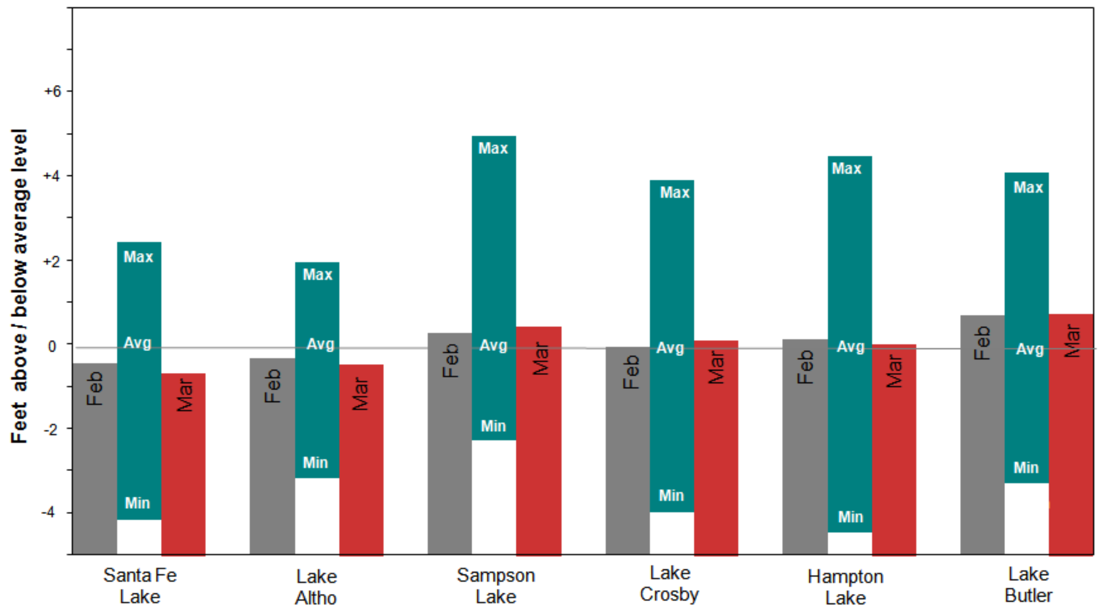
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

Figure 8: March 2013 Lake Levels



SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular ones in the eastern part of the District, are embedded in a surficial or intermediate aquifer over relatively impermeable clay deposits. These lakes rise and fall according to local rainfall and surface runoff. They retain water during severe droughts since most losses occur from evaporation. Other lakes, such as Governor Hill and Waters Lake, have porous or "leaky" bottoms that interact with the Floridan aquifer. These lakes depend on groundwater levels to stay high. If aquifer levels are low, these lakes go dry even if rainfall is normal.

The District monitors 14 lakes with much of the data provided by volunteer observers. Most records go back to the 1970s, although the Sampson Lake record starts in 1957.



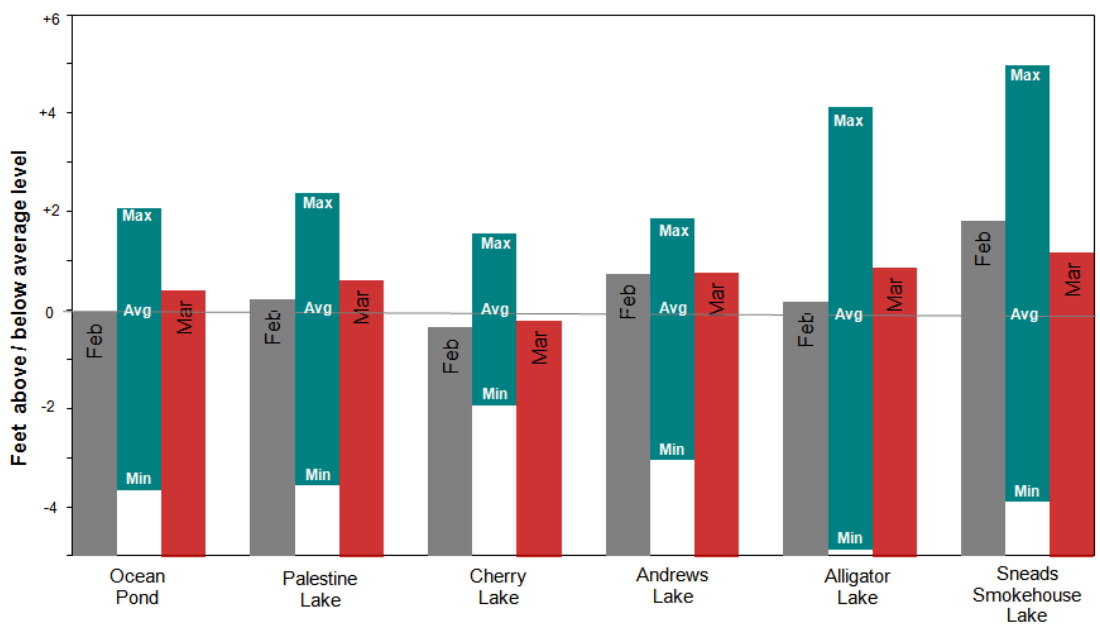
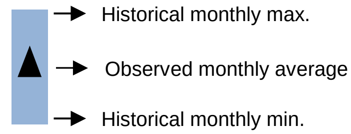
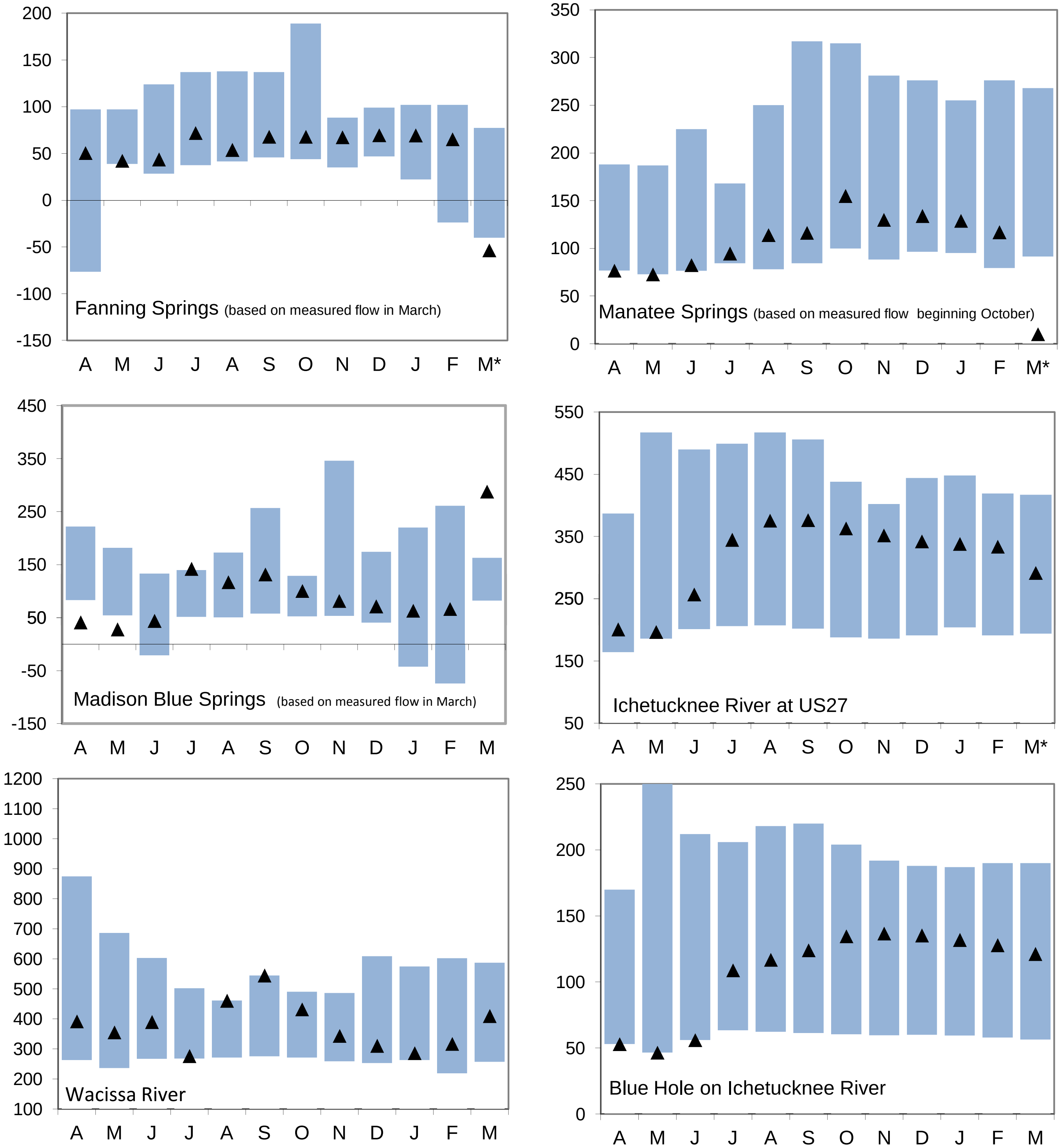


Figure 9a: Monthly Springflow Statistics
Flows April 1, 2012 through March 31, 2013
Springflow data are given in cubic feet per second.
Statistics based on 2002-2012[1] data.
Data are provisional.





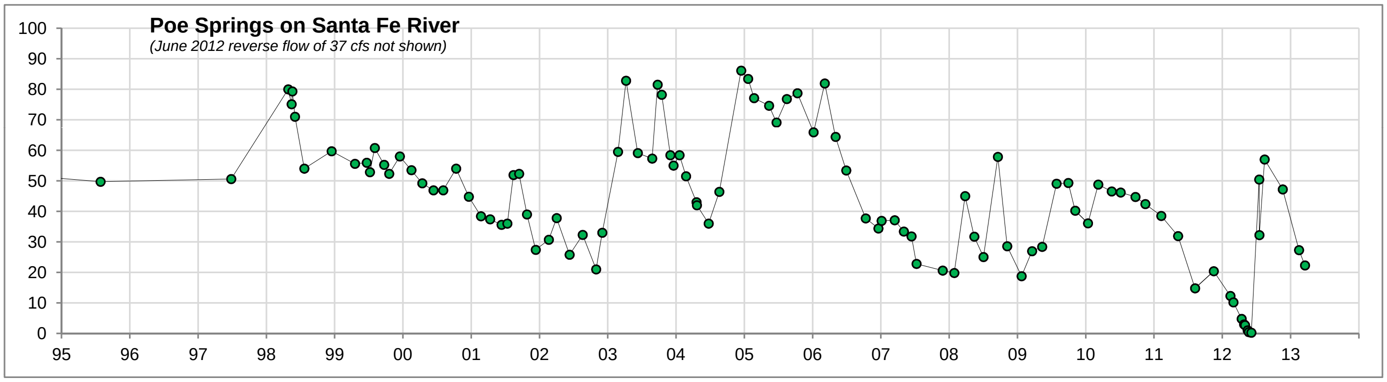
Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse.
Springflow for months marked by an asterisk (*) was strongly affected by river conditions.
Data will be revised once approved and published by the U.S. Geological Survey.

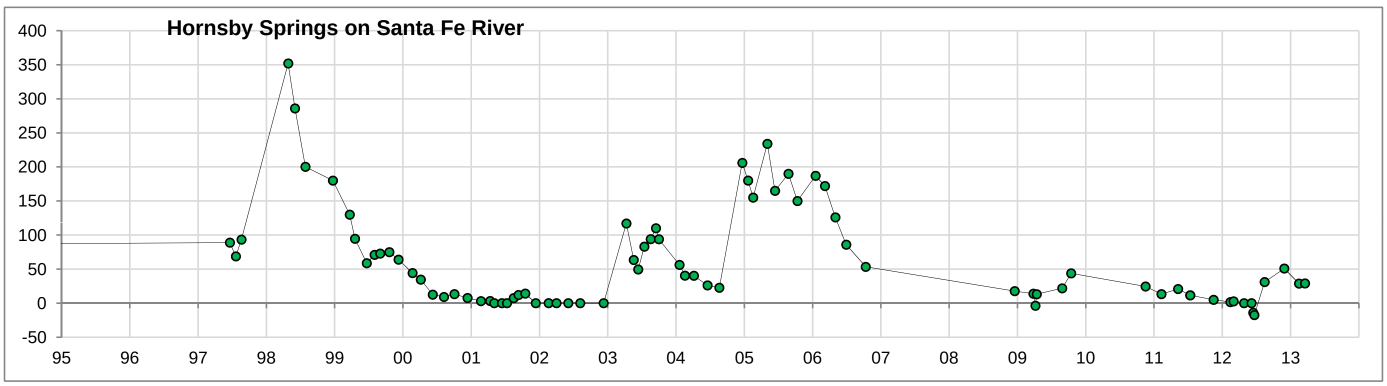
[1]Statistics for Madison Blue based on 2002 - 2011 data

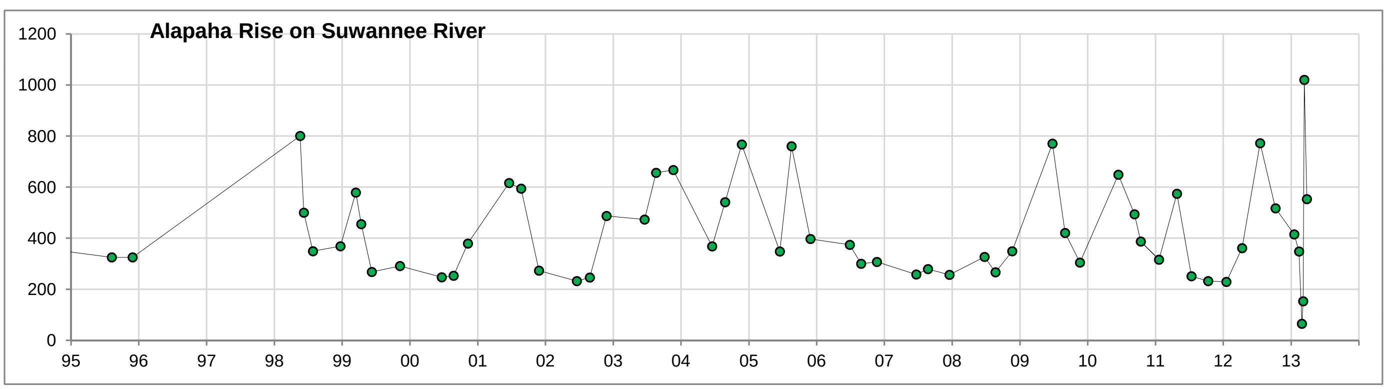
Figure 9b: Quarterly Springflow Measurements

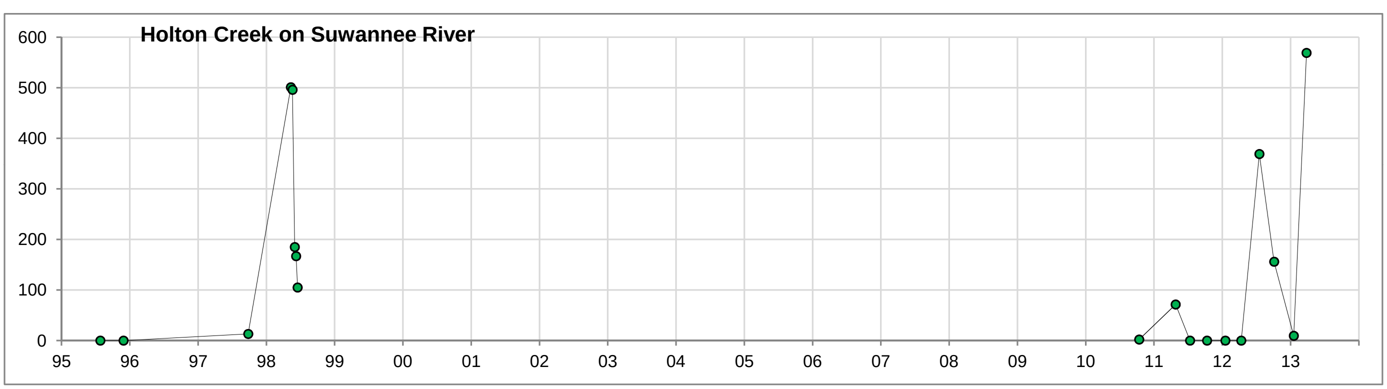
The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were measured in March 2013. Flow is given in cubic feet per second.

Spring flow is greatly affected by river levels. Rising river levels or high tides can slow spring flow or even reverse it. Some low flows in this data may not be representative of drought conditions.









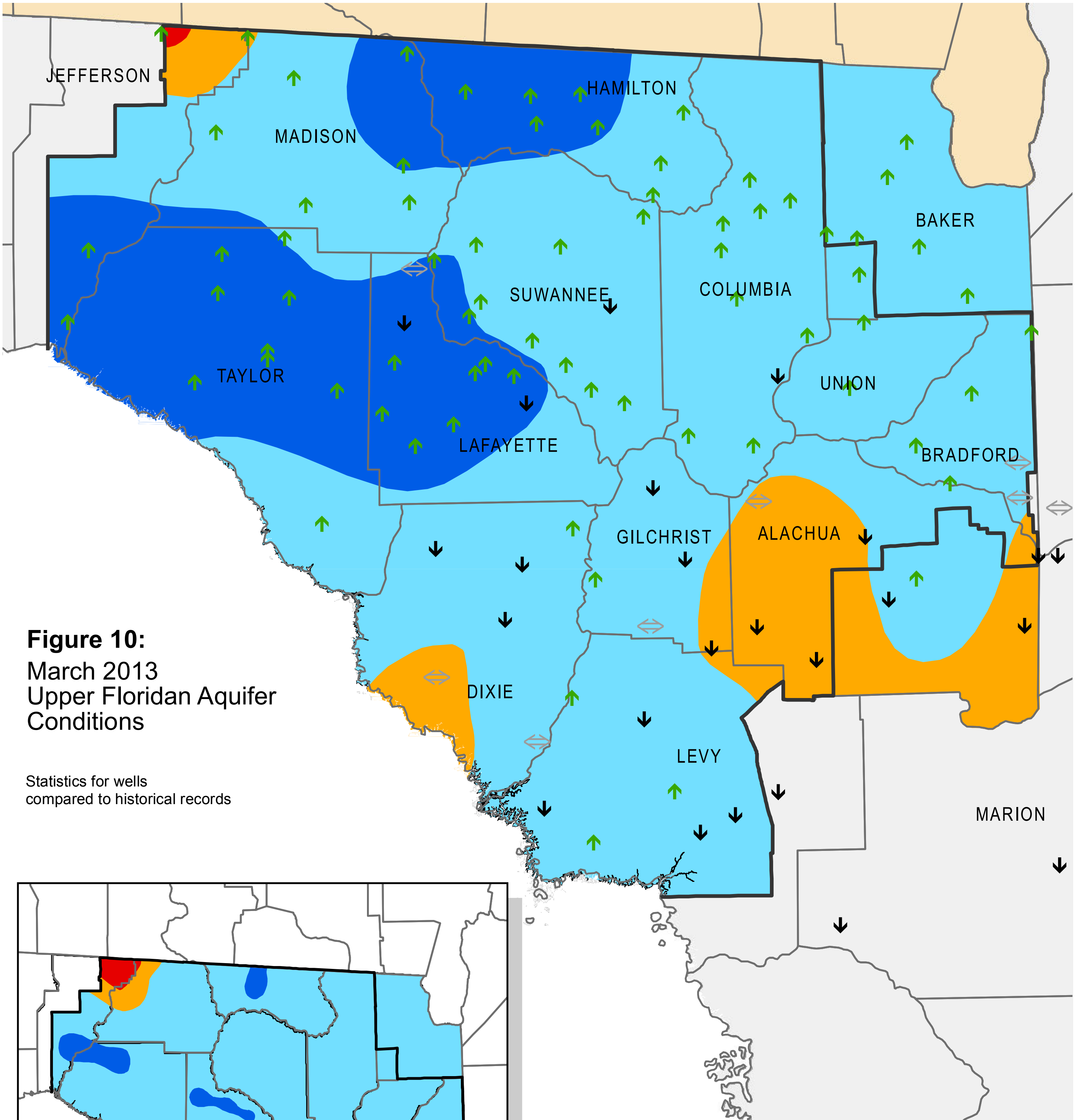
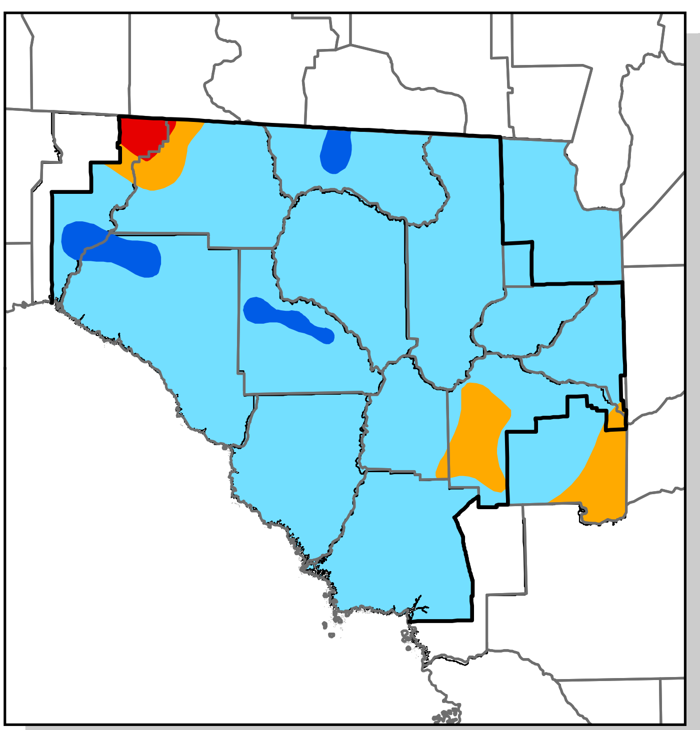


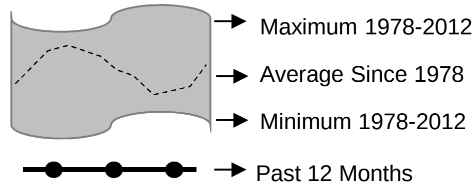
Figure 10:
March 2013
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: February 2013 Groundwater Levels

Figure 11: Monthly Groundwater Level Statistics
Levels April 1, 2012 through March 31, 2013
Period of Record Beginning 1978
Datum is NGVD 1929



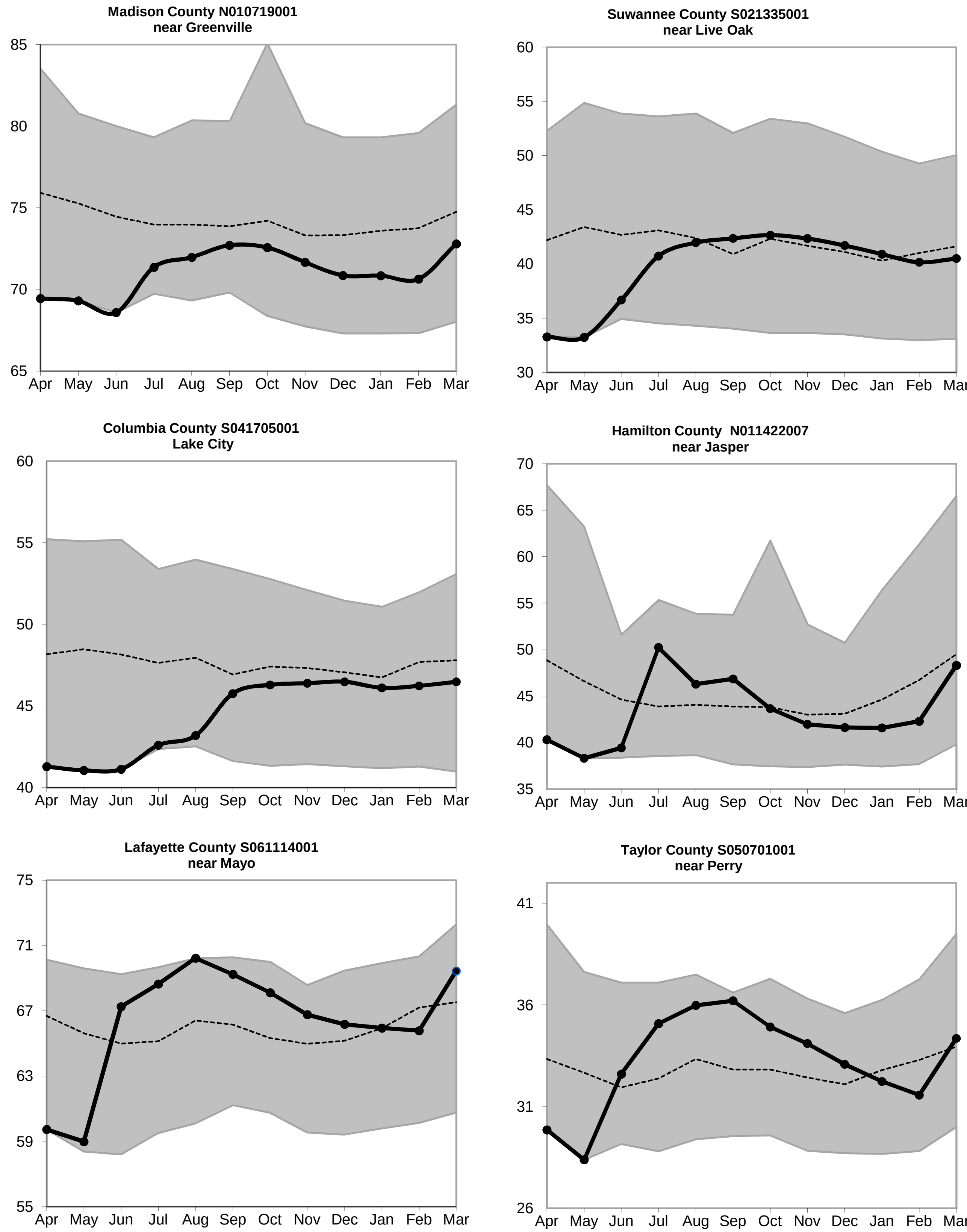
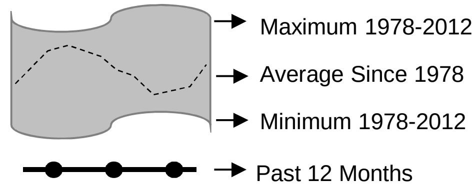
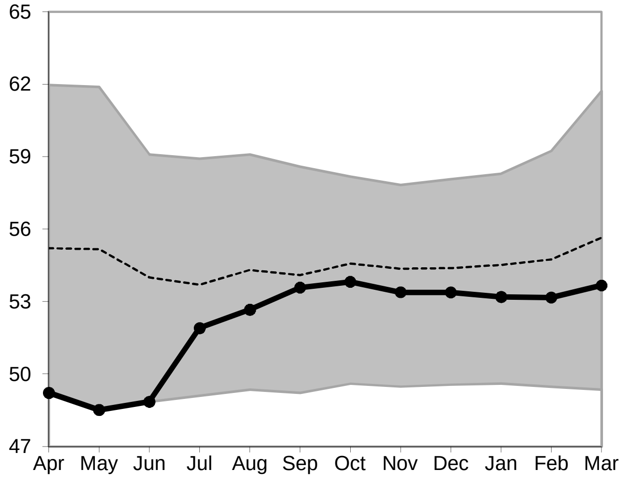


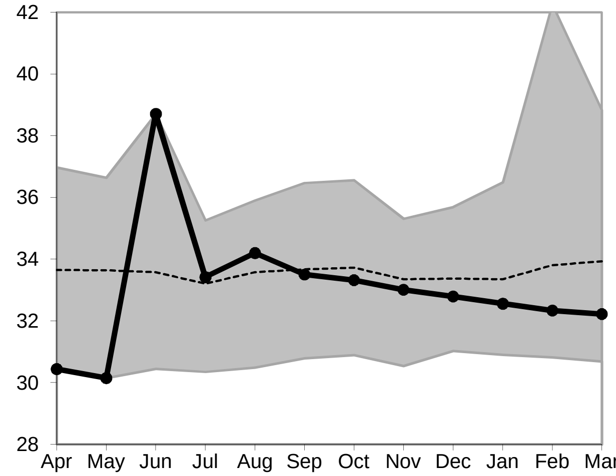
Figure 11, cont.: Groundwater Level Statistics
Levels April 1, 2012 through March 31, 2013
Period of Record Beginning 1978
Datum is NGVD 1929



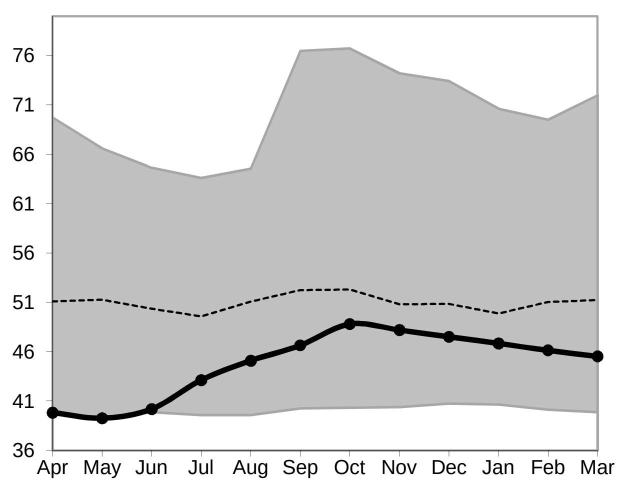
Union County S051933001
near Lake Butler



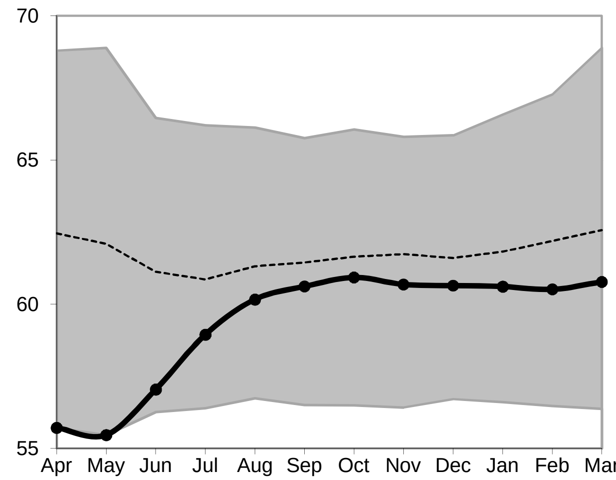
Alachua County S081703001
at High Springs



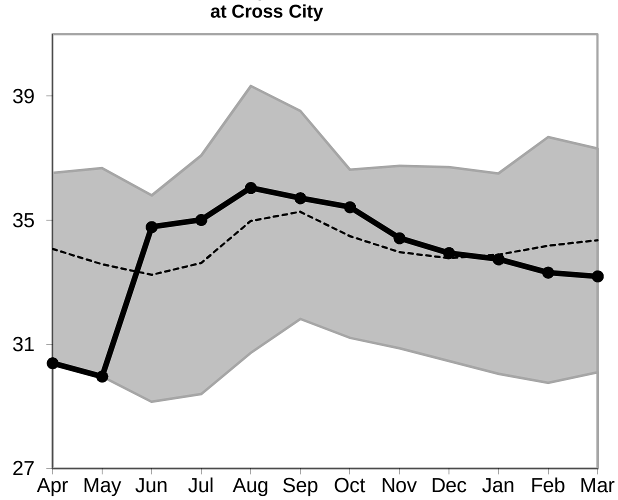
Gilchrist County S091607001
near Trenton



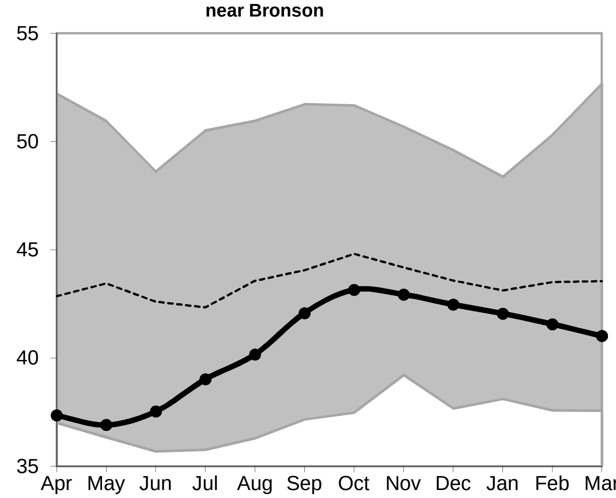
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



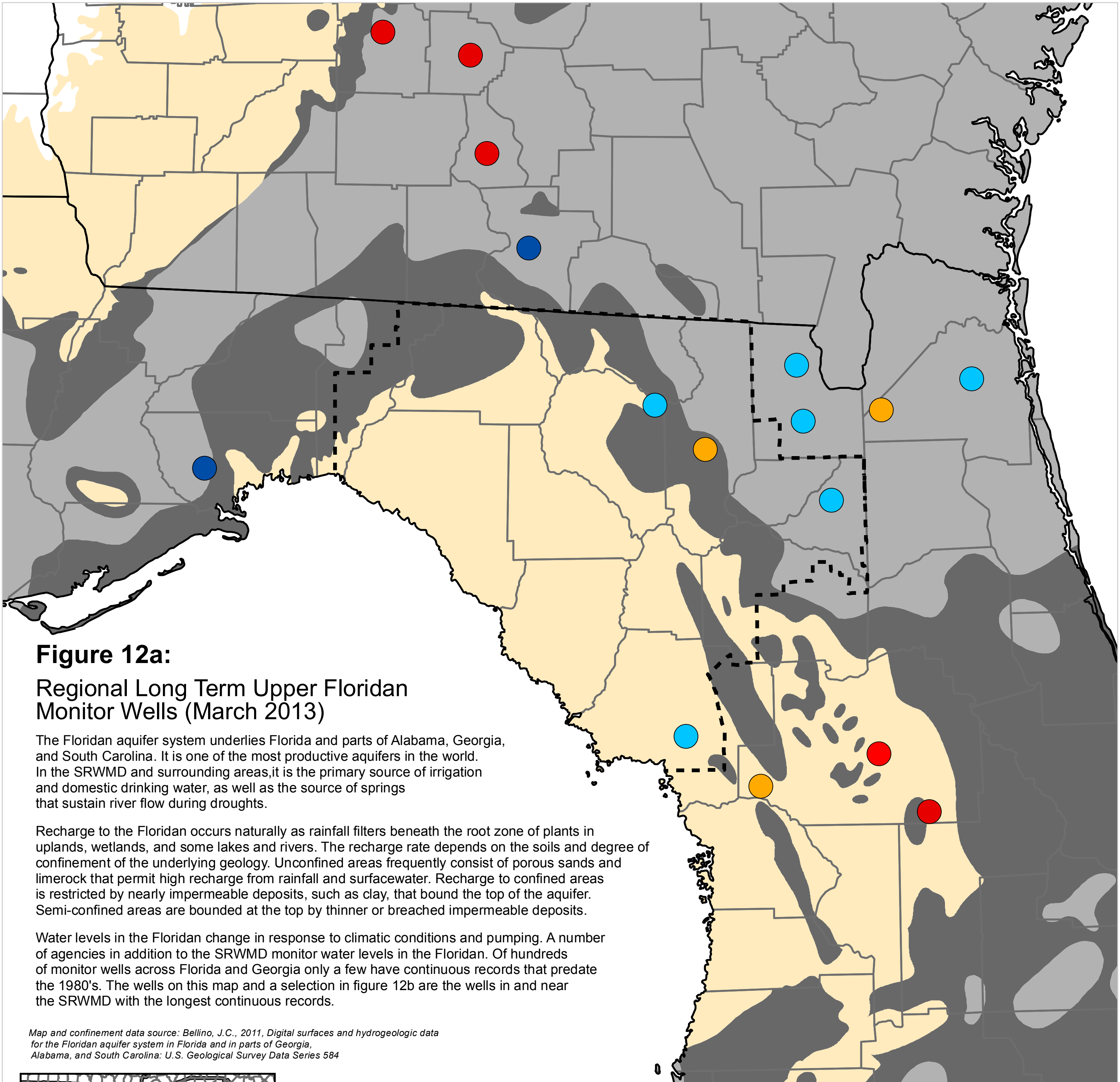


Figure 12a:

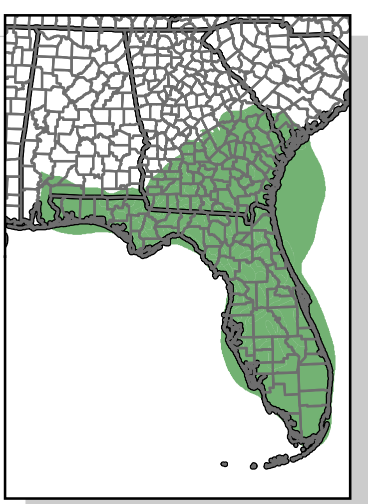
Regional Long Term Upper Floridan Monitor Wells (March 2013)

The Floridan aquifer system underlies Florida and parts of Alabama, Georgia, and South Carolina. It is one of the most productive aquifers in the world. In the SRWMD and surrounding areas,it is the primary source of irrigation and domestic drinking water, as well as the source of springs that sustain river flow during droughts.

Recharge to the Floridan occurs naturally as rainfall filters beneath the root zone of plants in uplands, wetlands, and some lakes and rivers. The recharge rate depends on the soils and degree of confinement of the underlying geology. Unconfined areas frequently consist of porous sands and limerock that permit high recharge from rainfall and surfacewater. Recharge to confined areas is restricted by nearly impermeable deposits, such as clay, that bound the top of the aquifer. Semi-confined areas are bounded at the top by thinner or breached impermeable deposits.

Water levels in the Floridan change in response to climatic conditions and pumping. A number of agencies in addition to the SRWMD monitor water levels in the Floridan. Of hundreds of monitor wells across Florida and Georgia only a few have continuous records that predate the 1980's. The wells on this map and a selection in figure 12b are the wells in and near the SRWMD with the longest continuous records.

Map and confinement data source: Bellino, J.C., 2011, Digital surfaces and hydrogeologic data for the Floridan aquifer system in Florida and in parts of Georgia, Alabama, and South Carolina: U.S. Geological Survey Data Series 584



Inset: Extent of Floridan Aquifer

Occurence of Confined and Unconfined Conditions in the Upper Floridan Aquifer

- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

Percentile of Most Recent Water Level Relative to Entire Record

- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

Figure 12b: Regional Long Term Upper Floridan Levels

March 2013
Upper Floridan Aquifer levels in feet above mean sea level
Taylor and Sanderson wells courtesy of SJRWMD