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: March 10, 2013

RE: February 2013 Hydrologic Conditions Report for the District

RAINFALL

- Three fronts brought heavy rain to south Georgia in February, with totals up to 16" in a narrow band in the upper Alapaha and Withlacoochee basins. Gages in the upper Alapaha received nearly 14" over two weeks. The lower Withlacoochee basin in Georgia saw 8-9". Hardest hit was the Little River basin, a tributary of the Withlacoochee, where gages recorded around 15". The storms were one month shy of the 4th anniversary of similar fronts which caused record flooding on the Withlacoochee and Alapaha rivers and major flooding on the Suwannee River. While the highest February rainfall totals were similar in both amount and location to the 2009 event, the February storms were less widespread with lower accumulations toward the Florida border.
- Average rainfall in the District was 5.32", which is 138% of the long-term February average of 3.85" (Table 1, Figure 1). Distribution favored northern counties, with totals as high as 12" in northern Madison and Jefferson counties (Figure 2). Totals in the southern counties were generally less than 3". The highest gaged monthly total was 11.6" at Wacissa Tower in Jefferson County. The highest daily total was 4.44" at the Benton inspection station in northern Columbia County. Despite the high accumulations, the rainfall was of relatively low intensity. The average highest hourly total was 0.75". The highest hourly total was 1.66" at Suwannee Farms. The lowest gaged monthly total was 1.66" at Santa Fe Lake. Figure 3 shows the February rainfall as a percent of normal in the Suwannee basin.
- Average rainfall for the 12 months ending February 28 was 7.19" higher than the long-term average of 54.61". This surplus is the result of a wide range of accumulation, with areas in the central part of the District seeing 30"-40" more than the northern and southern areas in the last year (Figure 4). The deficit in northern Jefferson County improved from 20" in January to nearly 10". Figure 5 shows the history of rainfall deficits beginning in 1998.

SURFACEWATER

- **Rivers:** Prior to the Georgia rainfall, gages throughout the Suwannee basin were below normal or extremely low. Georgia gages crested mid-month after the first front, causing Suwannee gages downstream to rise to normal levels. The second series of fronts beginning February 22nd caused the Alapaha and Withlacoochee river gages to reach flows in the highest 10% by the end of the month. The upper Suwannee River was less affected by the storms, with gages near Fargo and White Springs reaching normal conditions by the end of the month. The lower Santa Fe River remained below normal. The Aucilla River at Lamont rose above flood stage on February 26. Coastal rivers, with the exception of the Waccasassa, ended the month with a normal range of flows.

- **Lakes**: Eight of 13 monitored lakes remained lower than average. Snead's Smokehouse Lake, part of the Aucilla River in northern Jefferson County, rose over 3 feet. Alligator Lake in Lake City rose almost a foot. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for monitored lakes.

SPRINGS

Flows at monitored springs generally fell in February, the result of both falling aquifer levels and rising rivers. Florida State Park staff reported a number of springs that browned-out with river water as the rivers rose, including Madison Blue Springs and Lafayette Blue Springs. The USGS recorded reverse flow at Madison Blue, and the Suwannee River flowed back into White Sulphur Springs. Hart Springs and Otter Springs also had reverse flow. Statistics for a representative sample of springs are shown in Figures 9a and 9b.

GROUNDWATER

Levels in 75% percent of monitored upper Floridan aquifer wells were in a range considered normal based on records beginning no earlier than 1976. Wells near the Withlacoochee and Alapaha Rivers rose significantly as those rivers began to flood. Levels in northwest Taylor County near the Jefferson border responded well to 6-10" of rainfall. Most wells in the northeastern part of the District remained stable, while 4 wells in western Alachua County fell below normal. Levels district-wide rose slightly from the 37th to the 38th percentile. Levels in two wells in northern Jefferson County that have been below the 10th percentile since summer of 2011 began to rise. 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 2 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 May in north Florida. Neutral El Niño/Southern Oscillation conditions are expected into the summer.
- The U.S. Seasonal Drought Outlook issued on March 7 showed persistence of drought in central and northeast Florida through at least May 31.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to once per week between November and March 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	Feb 2013	February Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	2.31	3.59	64%	59.45	117%
Baker	5.54	3.44	161%	62.84	126%
Bradford	3.01	3.64	83%	61.85	122%
Columbia	5.74	3.72	154%	67.16	131%
Dixie	3.38	3.98	85%	57.42	97%
Gilchrist	3.06	4.18	73%	58.50	102%
Hamilton	6.96	4.01	174%	57.61	110%
Jefferson	9.65	4.65	208%	55.68	92%
Lafayette	5.61	3.98	141%	73.39	130%
Levy	2.59	3.63	71%	55.54	93%
Madison	8.36	4.36	192%	59.29	105%
Suwannee	6.39	3.73	172%	72.32	137%
Taylor	7.43	3.94	188%	65.08	109%
Union	3.73	3.63	103%	59.69	111%

February 2013 Average:	5.32
February Average (1932-2012):	3.85
Historical 12-month Average (1932-2012):	54.61
Past 12-Month Total:	61.80
12-Month Rainfall Surplus:	7.19

Figure 1: Comparison of District Monthly Rainfall

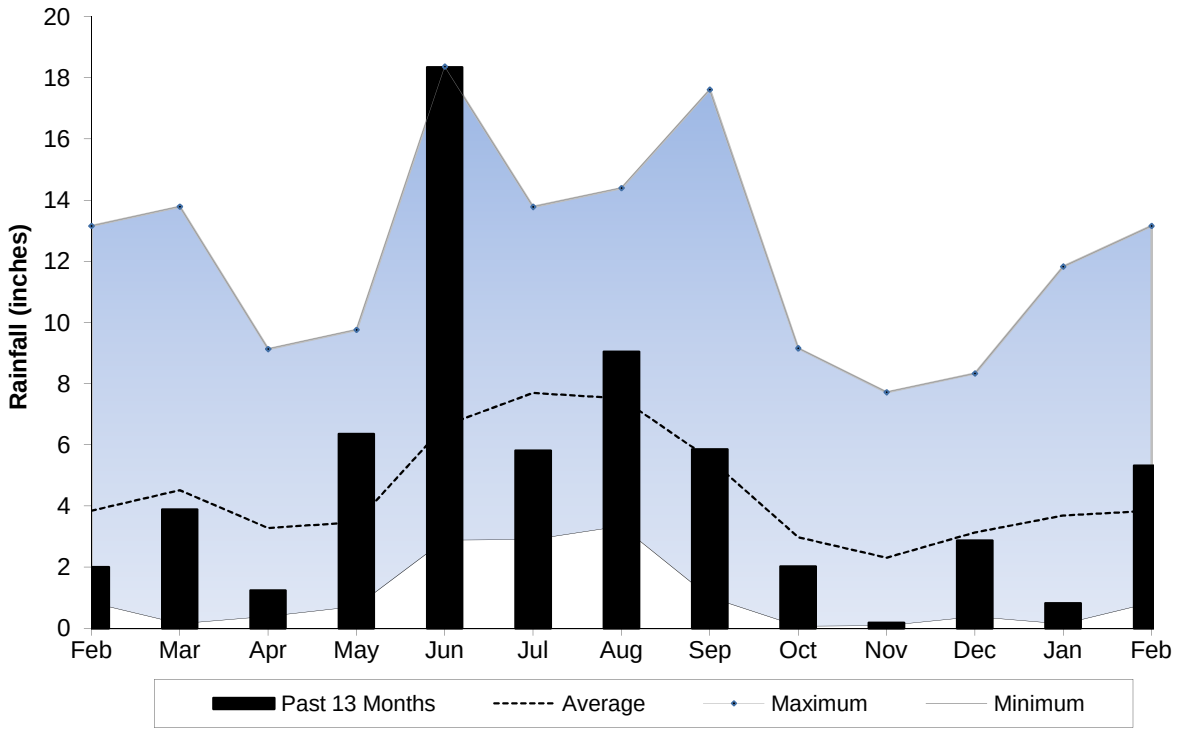


Figure 2: February 2013 Rainfall Estimate

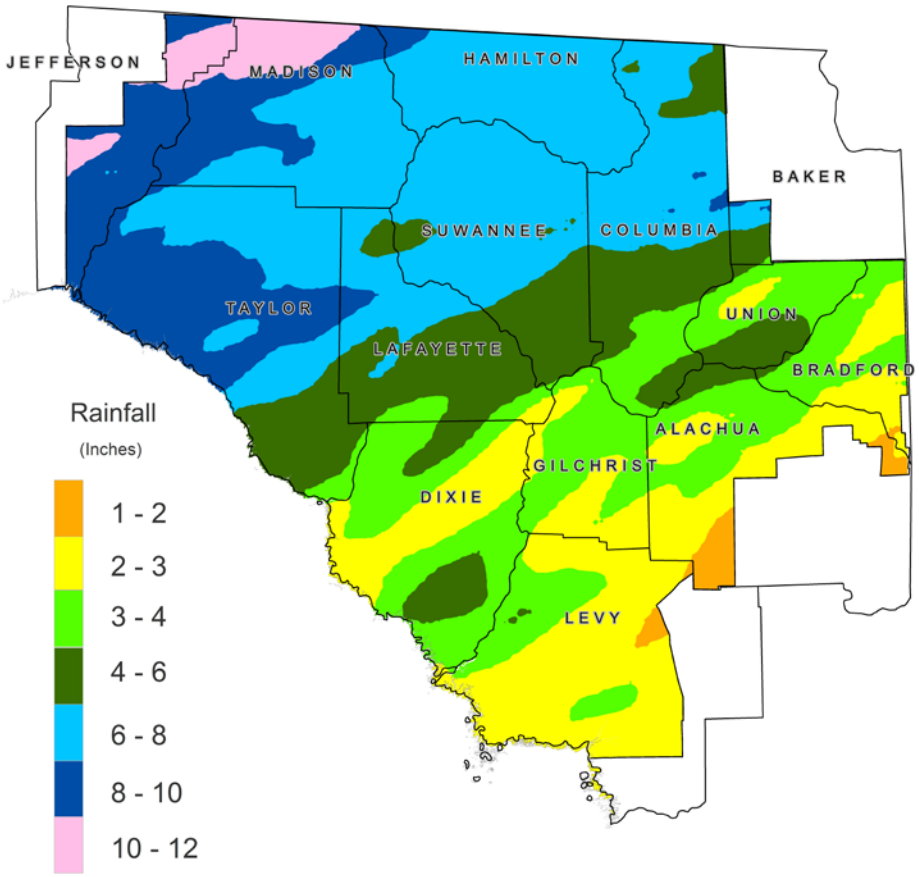


Figure 3: February 2013 Percent of Normal Rainfall

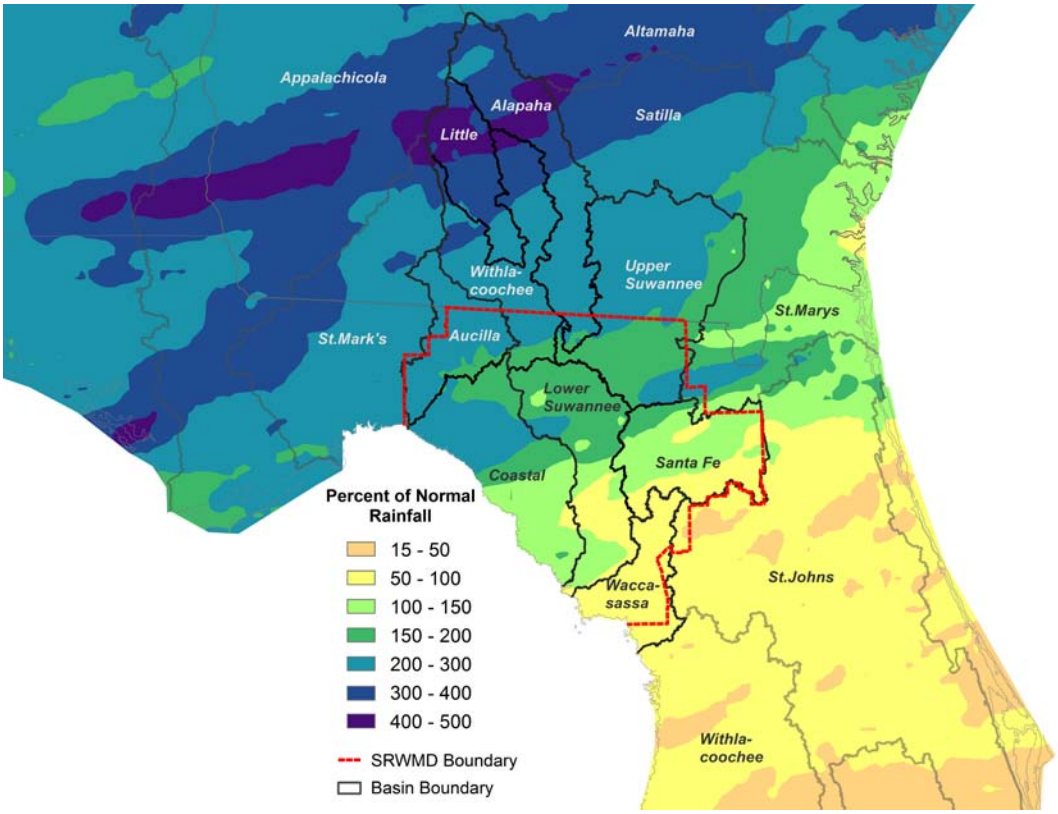


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through February 28, 2013

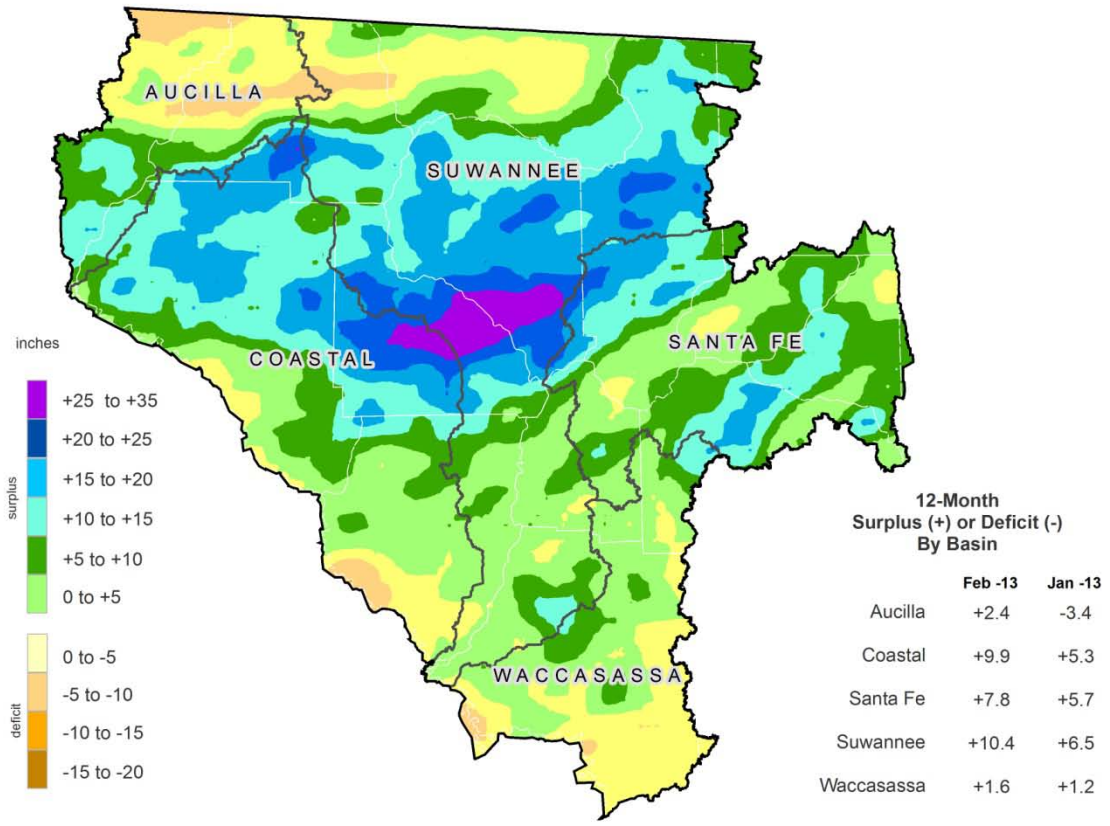


Figure 5: 12-Month Rolling Rainfall Deficit Since 1998

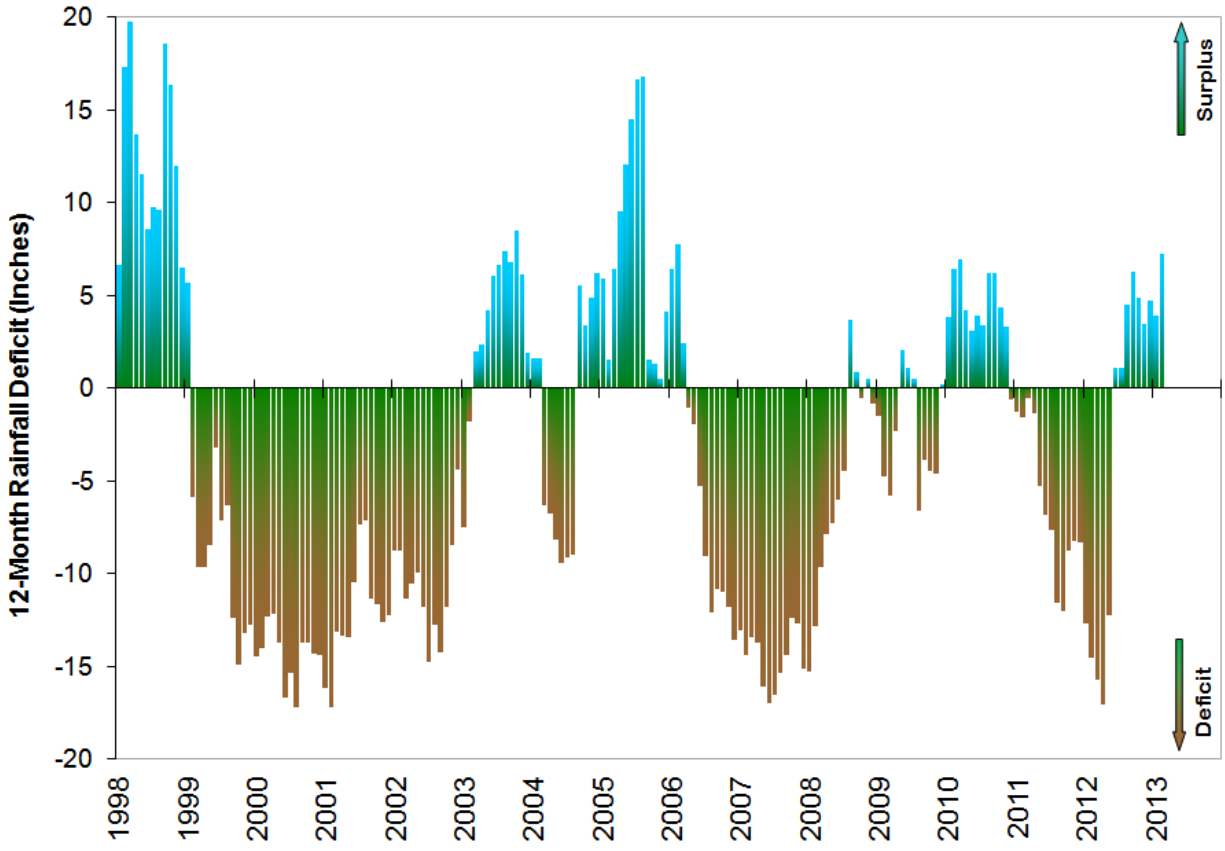


Figure 6: Daily River Flow Statistics
March 1, 2012 through March 1, 2013

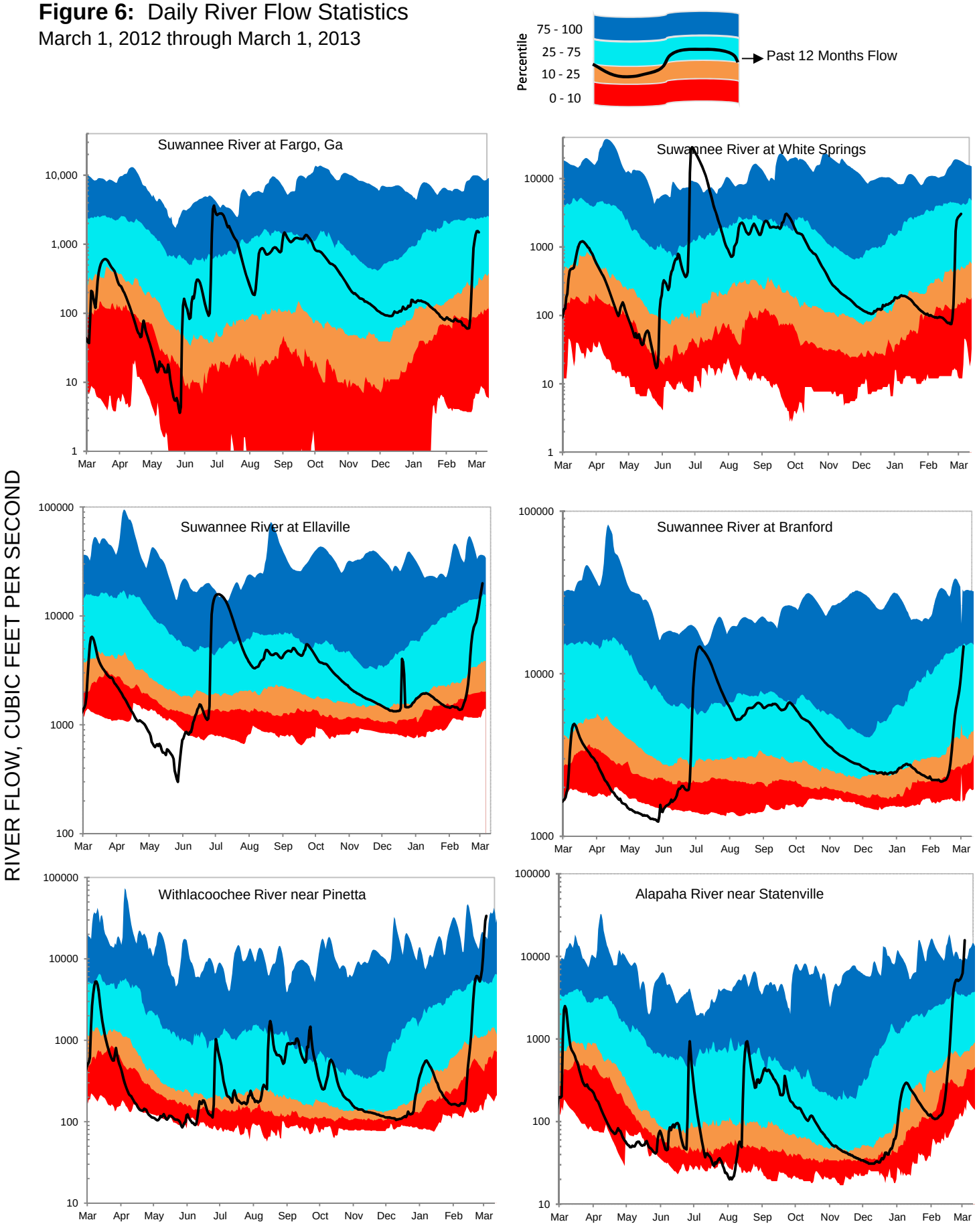
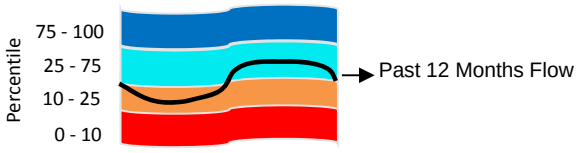
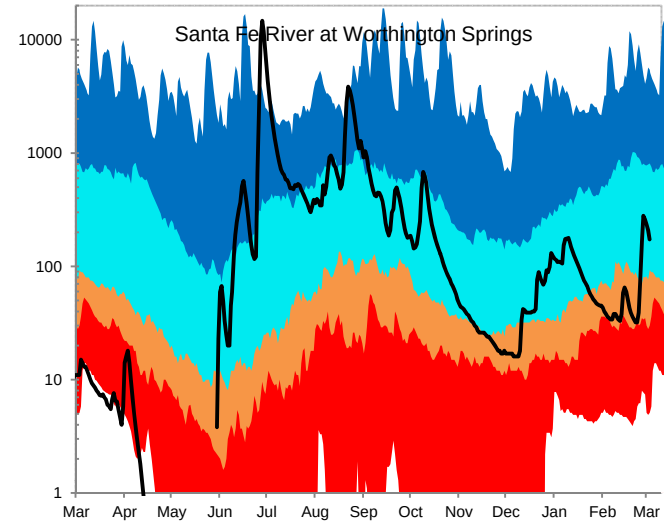


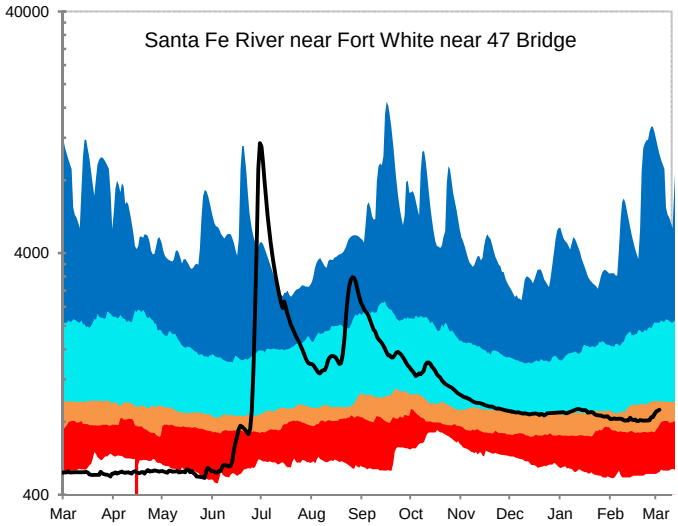
Figure 6, cont: Daily River Flow Statistics

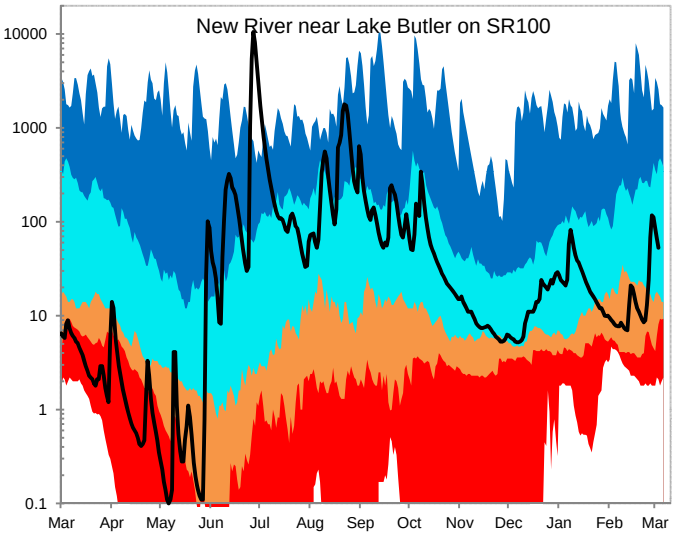
March 1, 2012 through March 1, 2013

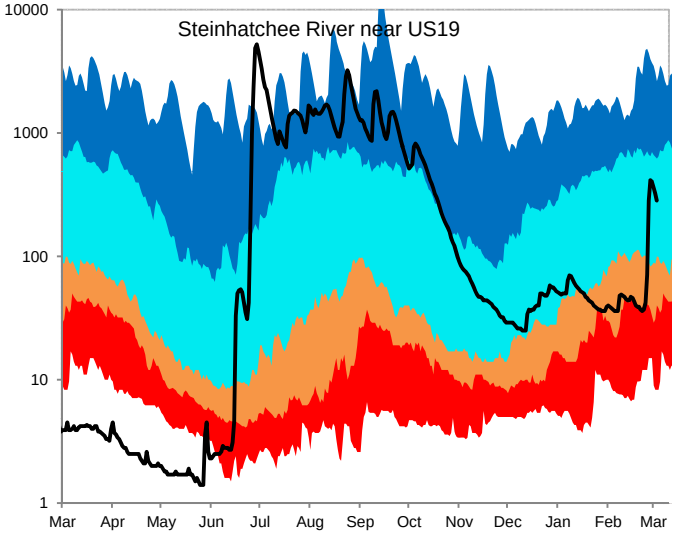


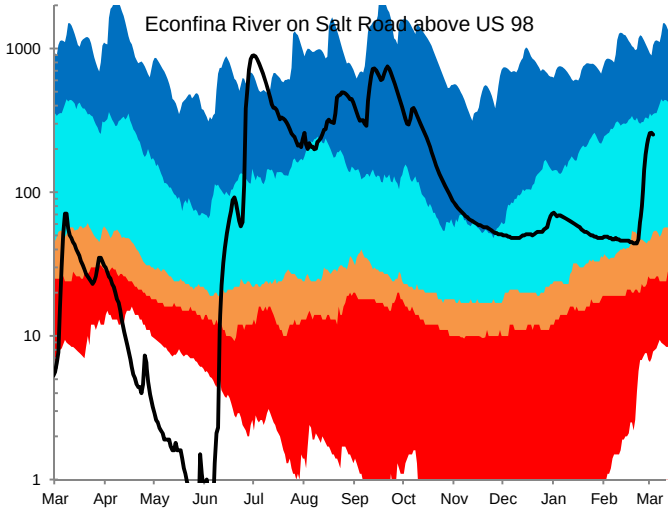
RIVER FLOW, CUBIC FEET PER SECOND

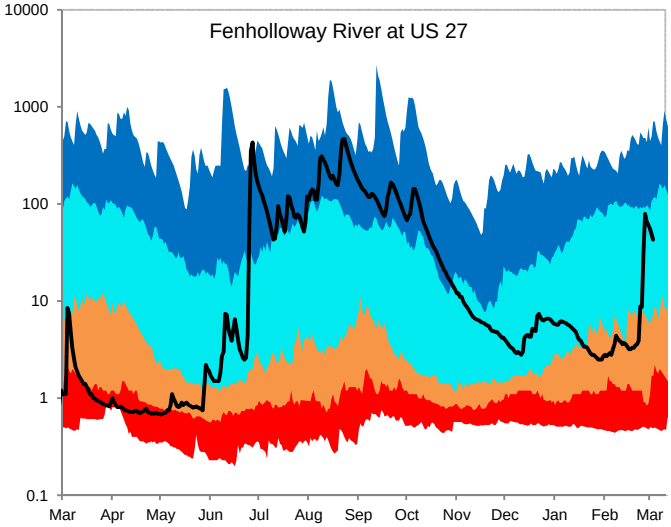












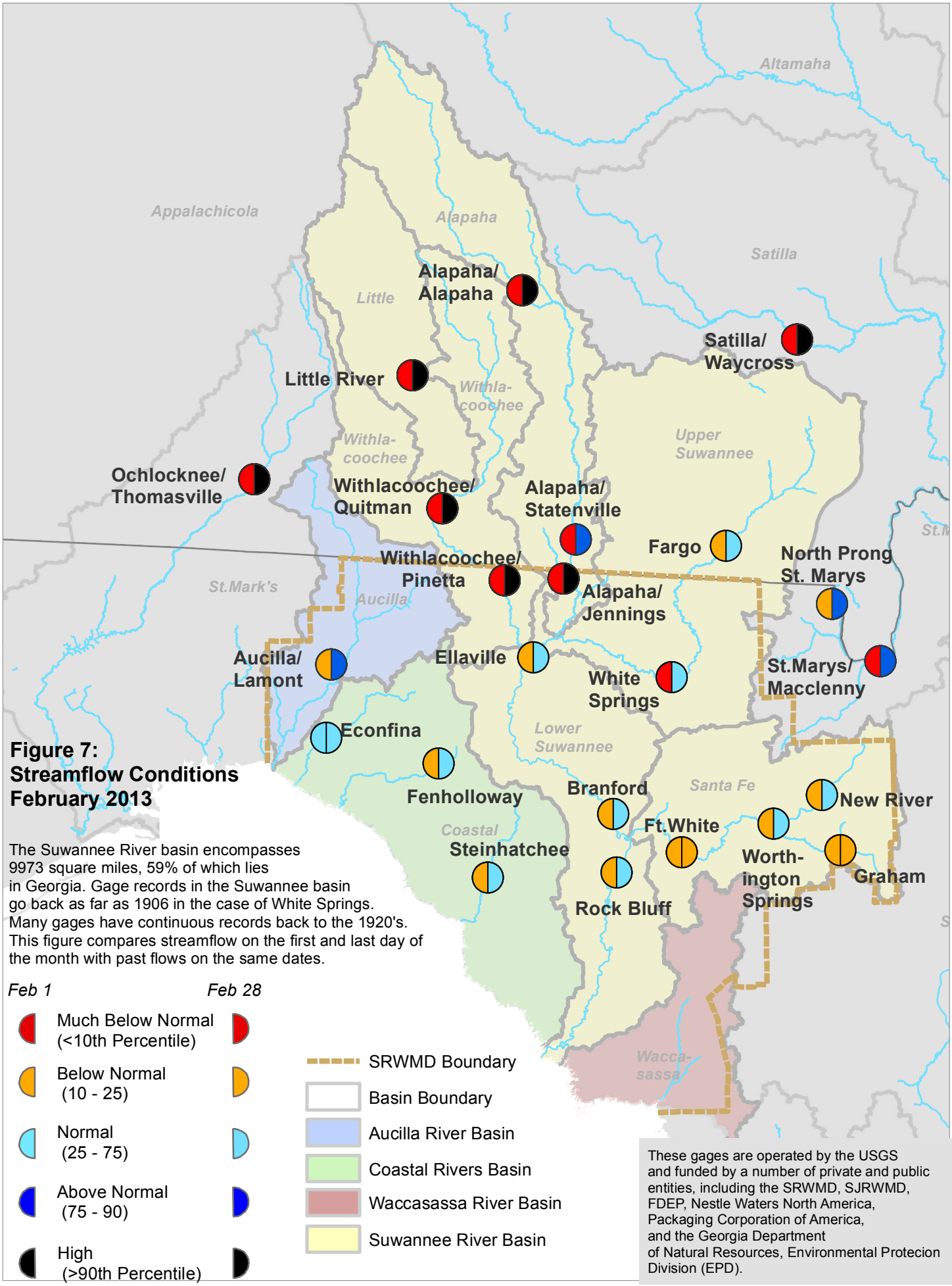
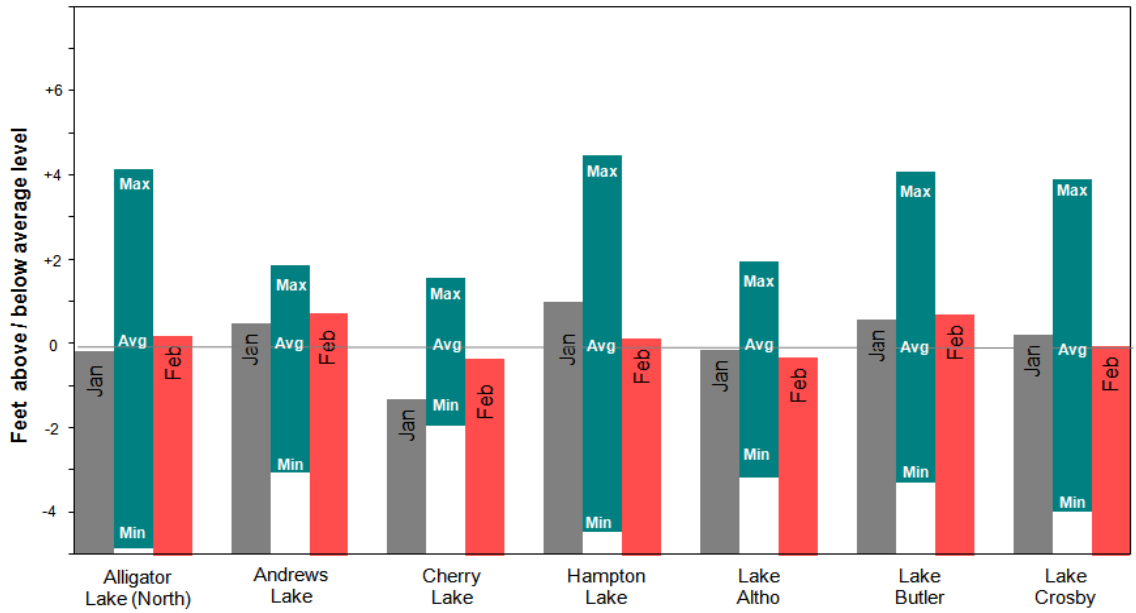
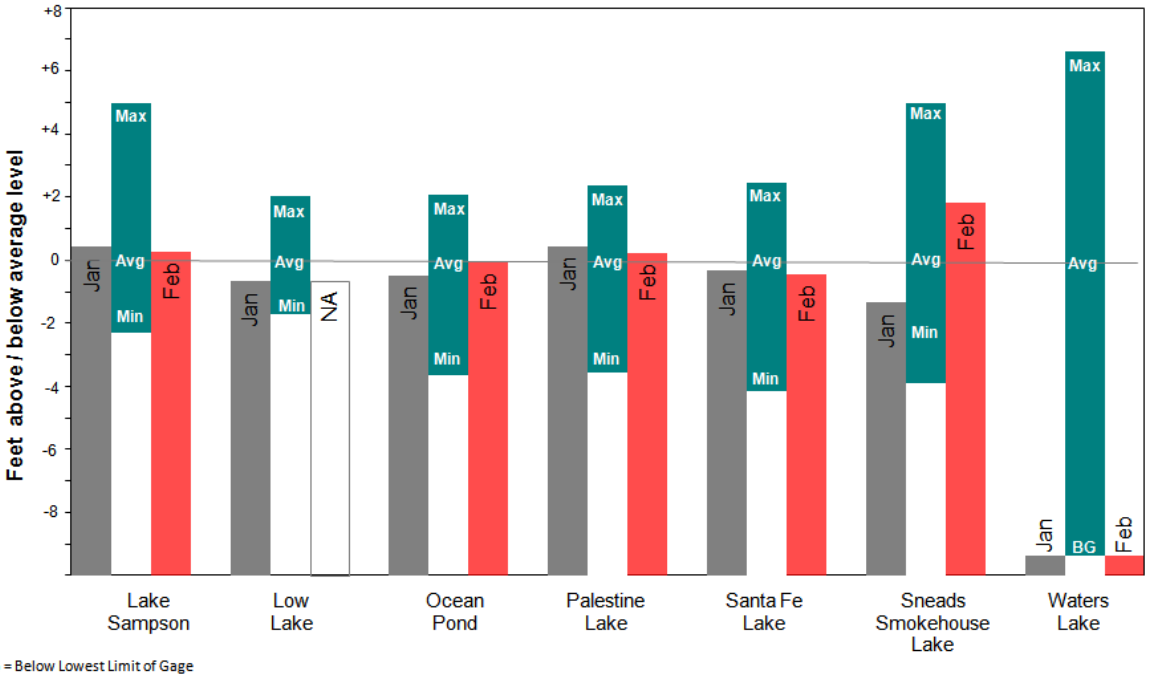

Altamaha
Appalachicola
Alapaha
Satilla
Little
Alapaha/
Alapaha
Satilla/
Waycross
Little River
Withla-
coochee
Withla-
coochee
Upper
Suwannee
Ochlocknee/
Thomasville
Withlacoochee/
Quitman
Alapaha/
Statenville
Fargo
North Prong
St. Marys
St.Mark's
Withlacoochee/
Pinetta
Aucilla
Alapaha/
Jennings
Aucilla/
Lamont
Ellaville
White
Springs
St.Marys/
Macclenny
Econfina
Lower
Suwannee
Fenholloway
Branford
Santa Fe
New River
Ft.White
Coastal
Steinhatchee
Worth-
ington
Springs
Graham
Rock Bluff
Wacca-
sassa
Figure 7:
Streamflow Conditions
February 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.
Feb 1
Feb 28
Much Below Normal (<10th Percentile)
Below Normal (10 - 25)
Normal (25 - 75)
Above Normal (75 - 90)
High (>90th Percentile)
SRWMD Boundary
Basin Boundary
Aucilla River Basin
Coastal Rivers Basin
Waccasassa River Basin
Suwannee River Basin
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: February 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.

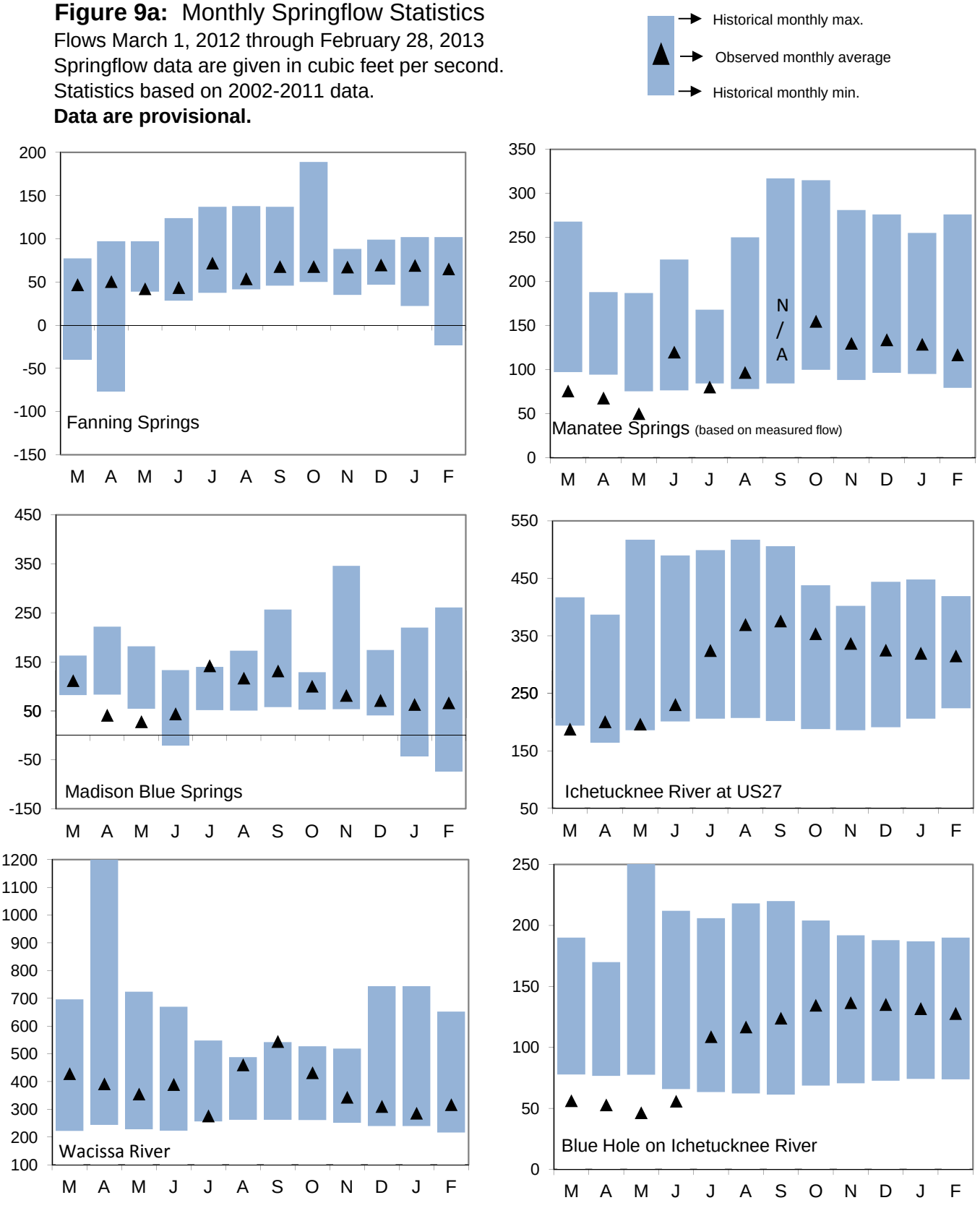
The District monitors 15 lakes with much of the data provided by volunteer observers. Most records go back to the 1970s, although the Sampson Lake record starts in 1957.





BG = Below Lowest Limit of Gage

Figure 9a: Monthly Springflow Statistics
Flows March 1, 2012 through February 28, 2013
Springflow data are given in cubic feet per second.
Statistics based on 2002-2011 data.
Data are provisional.

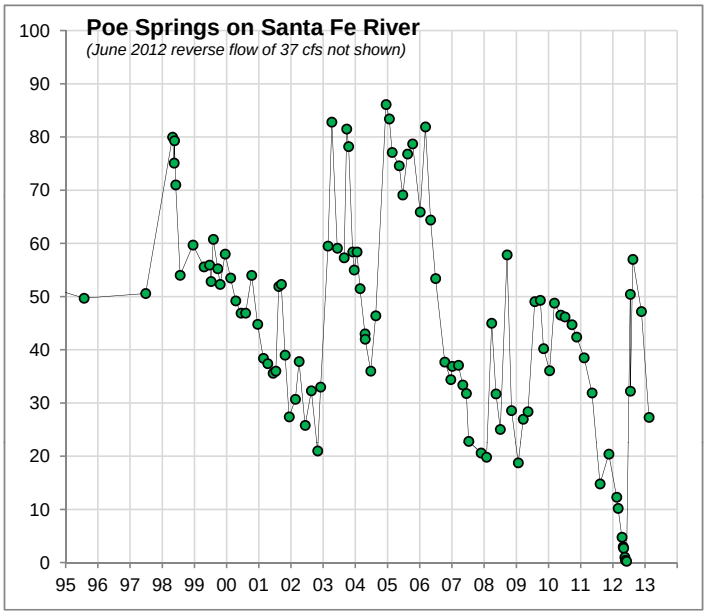


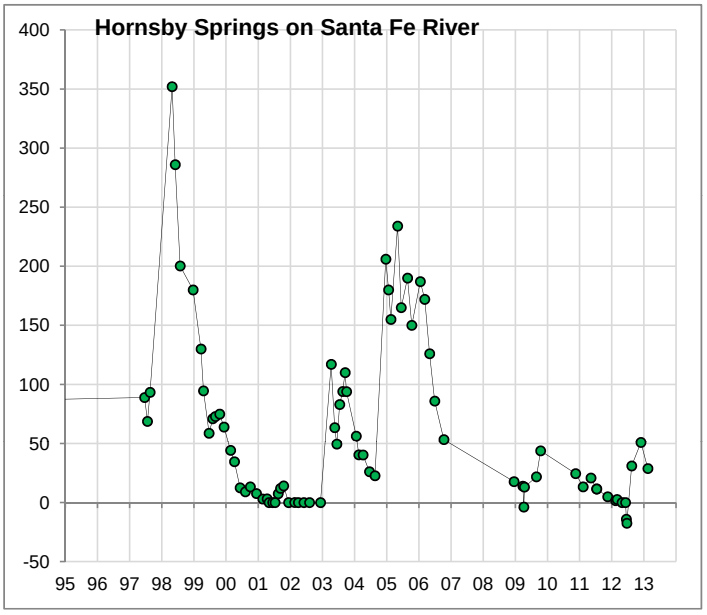
Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse.
Springflow for months marked by an asterisk (*) was strongly affected by river conditions.
Data will be revised once approved and published by the U.S. Geological Survey.

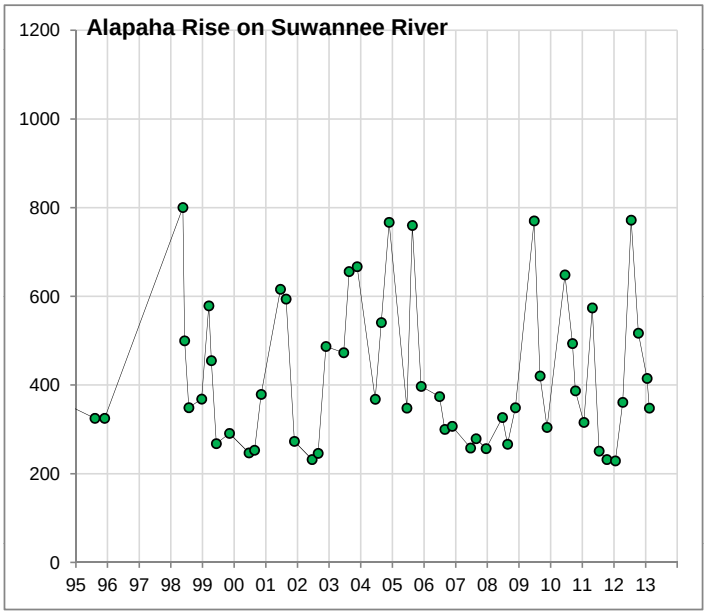
Figure 9b: Quarterly Springflow Measurements

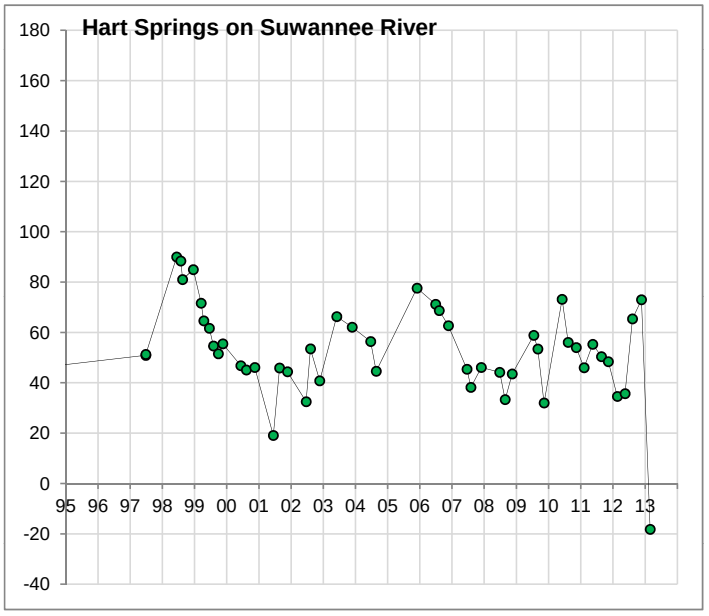
The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were measured in February 2013. Flow is given in cubic feet per second.

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.









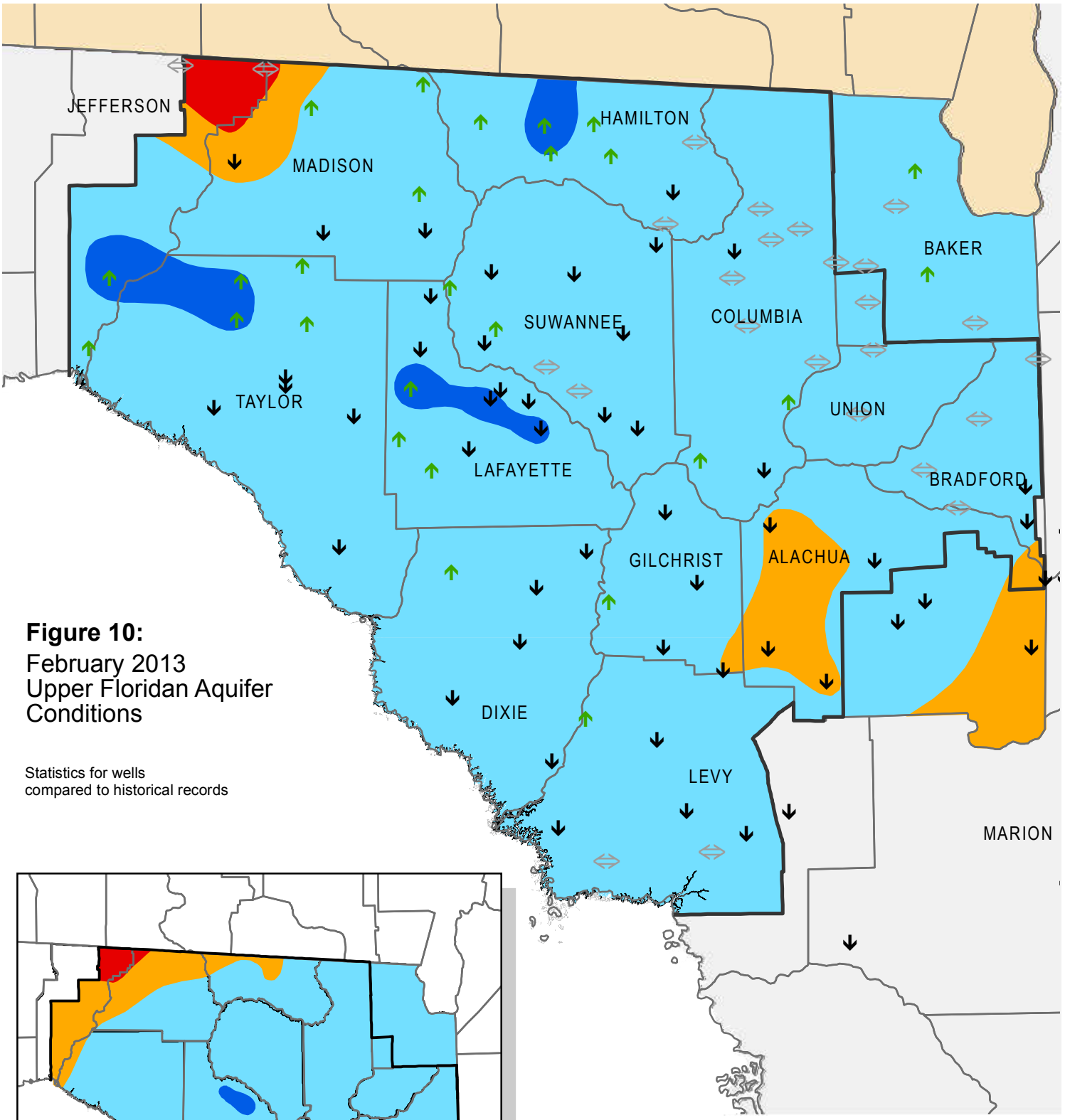
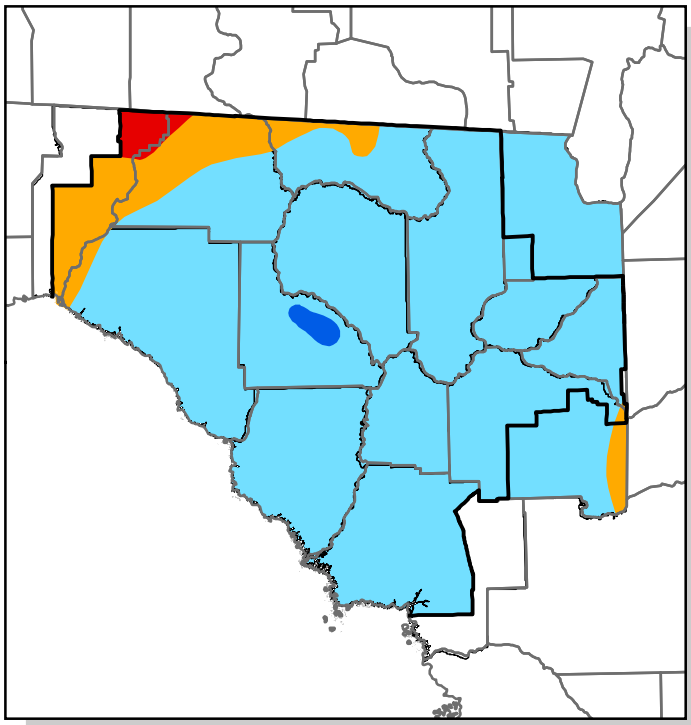


Figure 10:
February 2013
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: January 2012 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

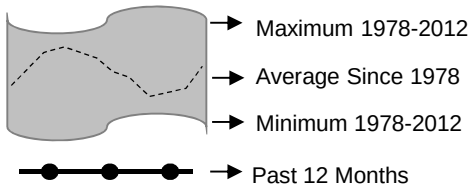
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

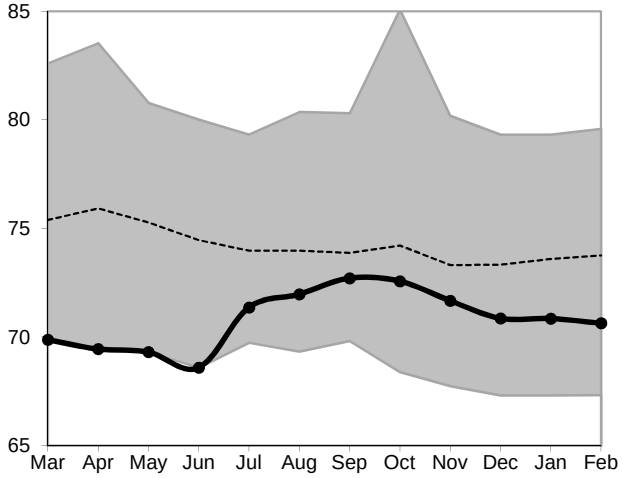
Increase/decrease since last month
less than one percent of historic range

District Boundary

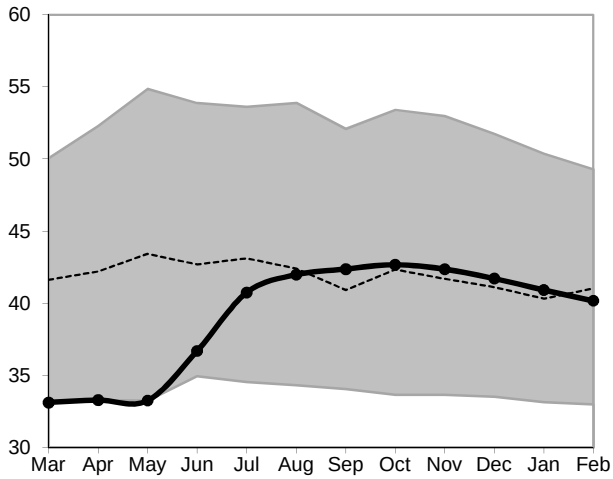
Figure 11: Monthly Groundwater Level Statistics
Levels March 1, 2012 through February 28, 2013
Period of Record Beginning 1978
Datum is NGVD 1929



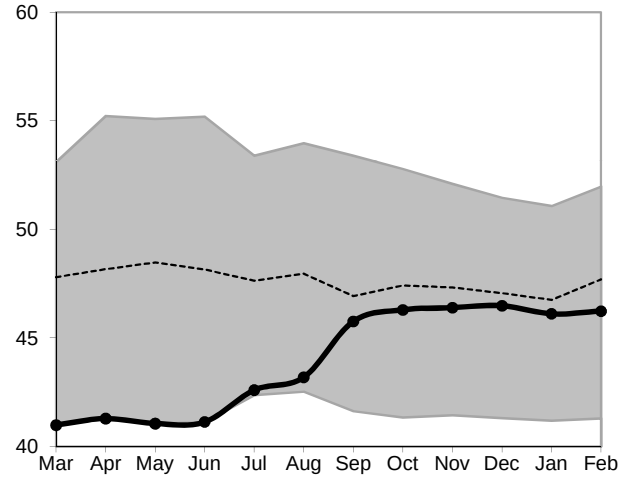
Madison County N010719001
near Greenville



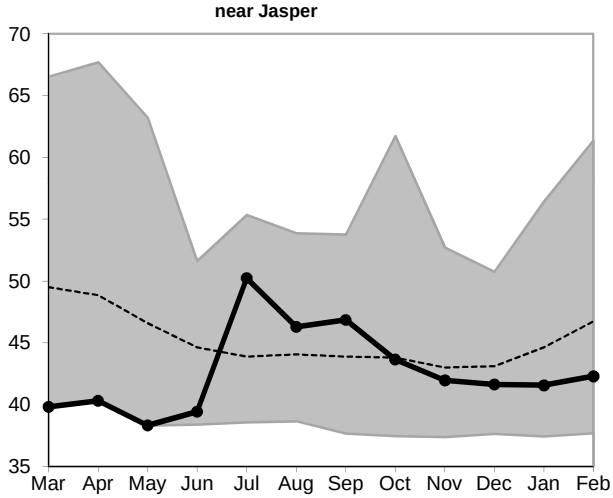
Suwannee County S021335001
near Live Oak



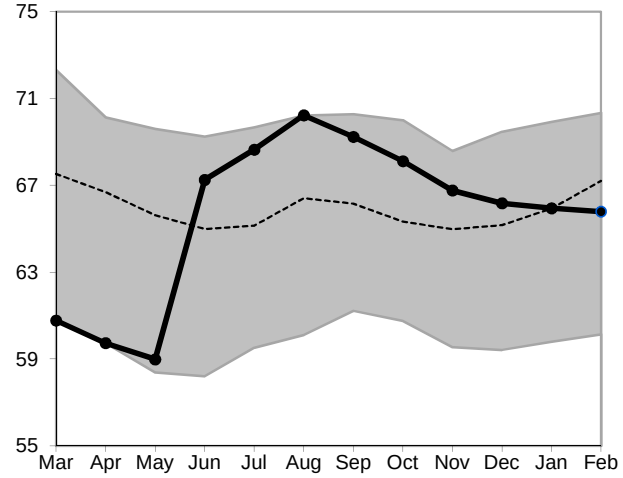
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

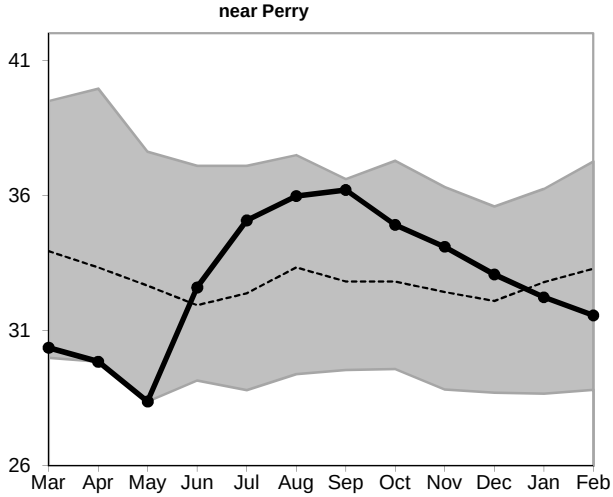
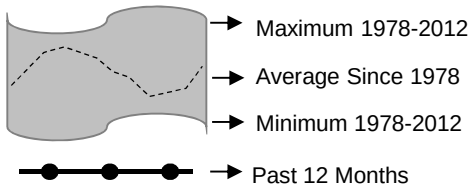
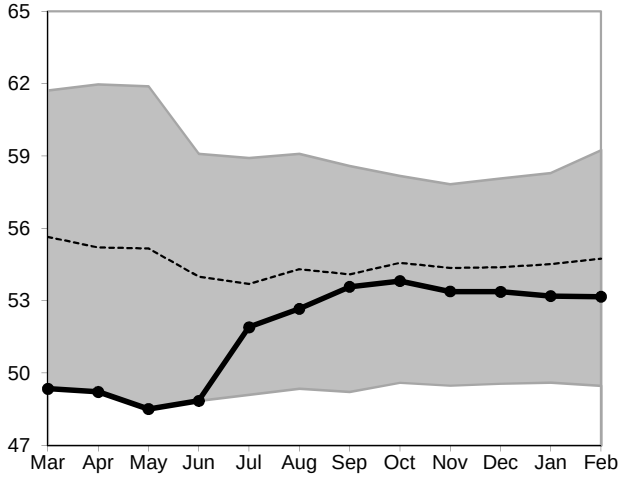


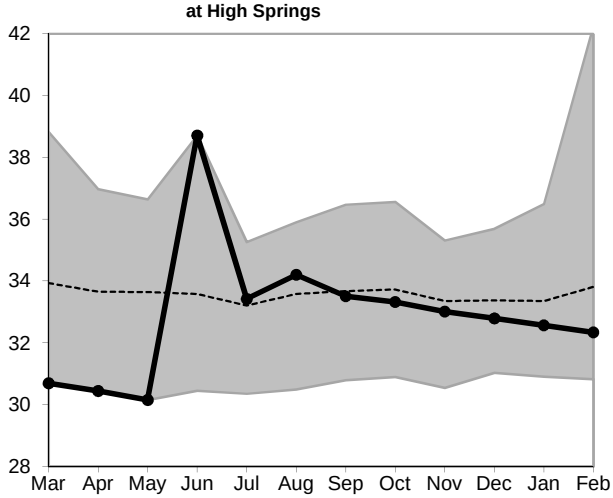
Figure 11, cont.: Groundwater Level Statistics
Levels March 1, 2012 through February 28, 2013
Period of Record Beginning 1978
Datum is NGVD 1929



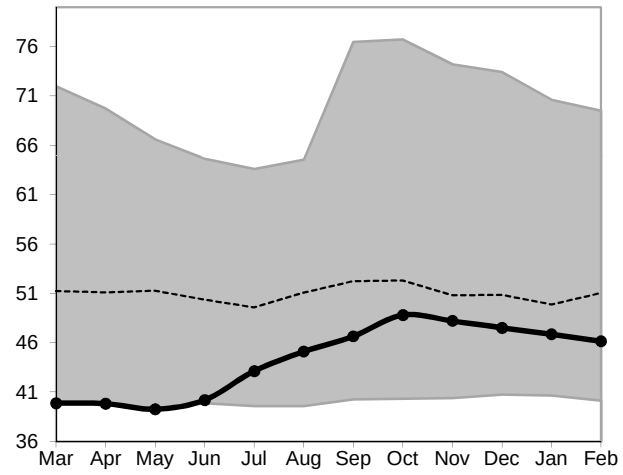
Union County S051933001
near Lake Butler



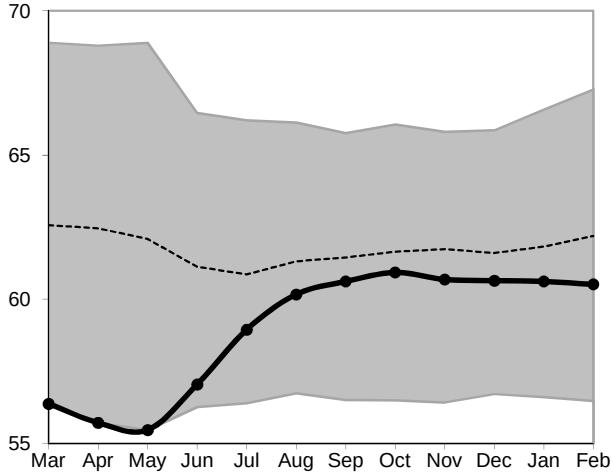
Alachua County S081703001
at High Springs



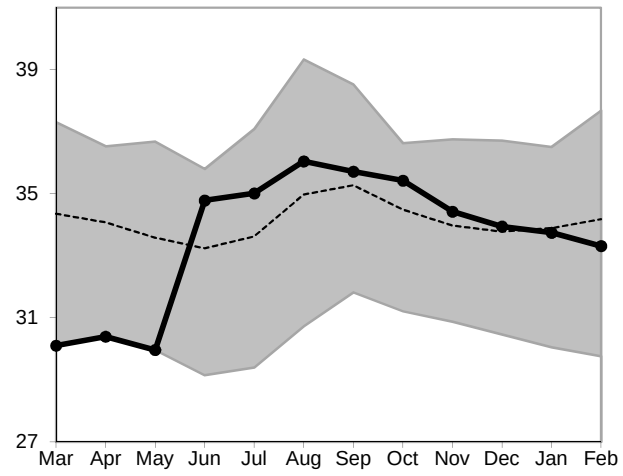
Gilchrist County S091607001
near Trenton



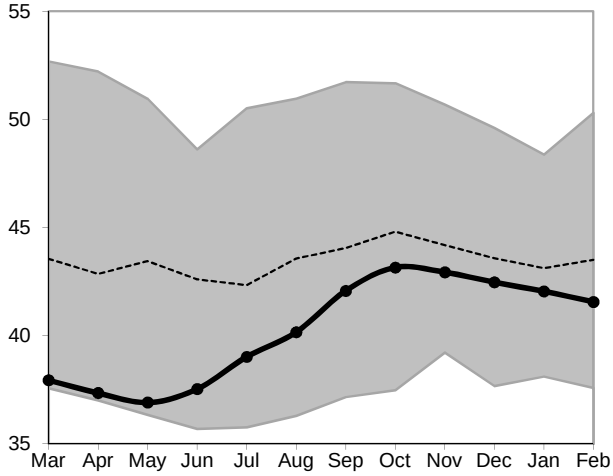
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



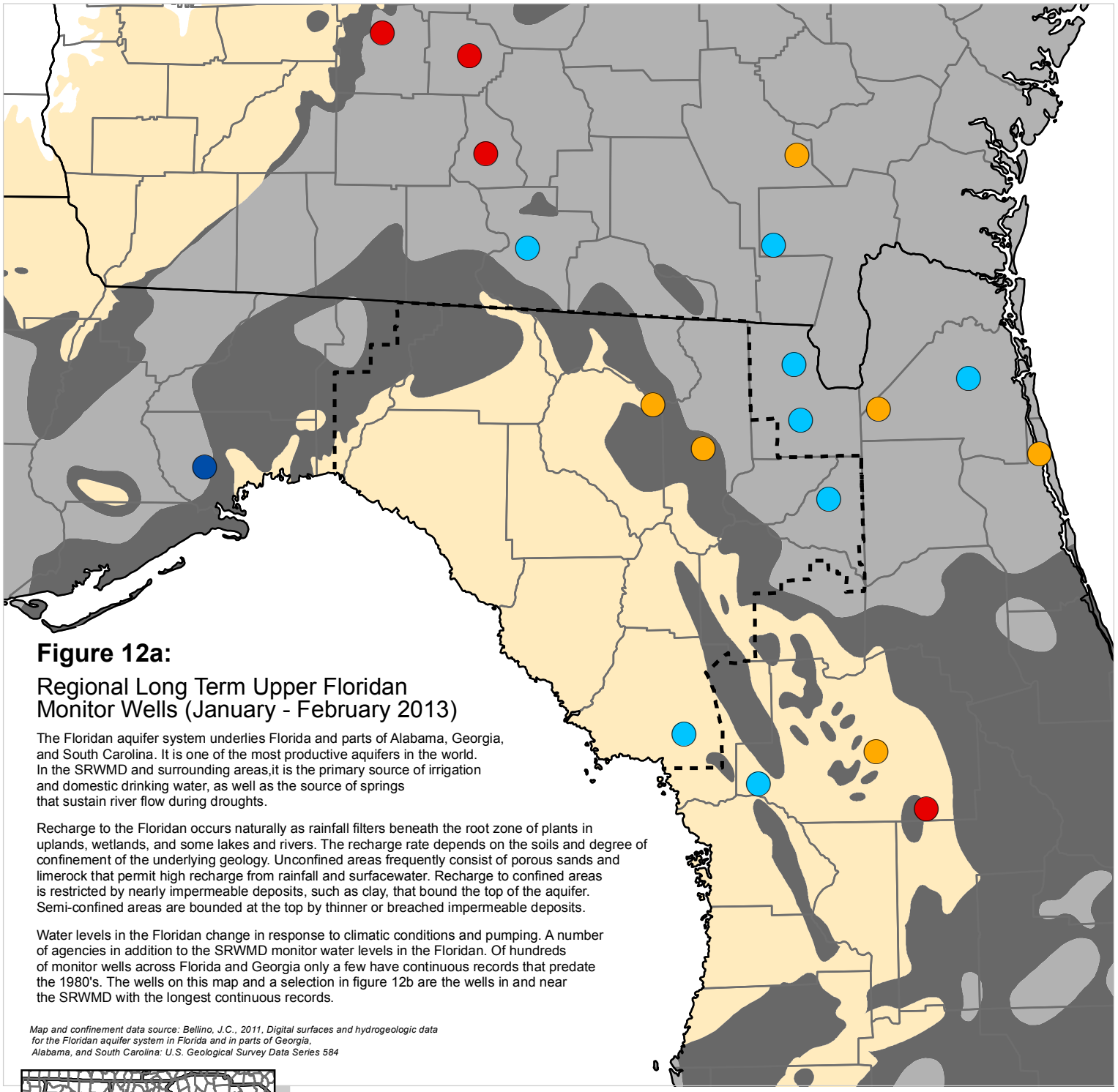


Figure 12a:

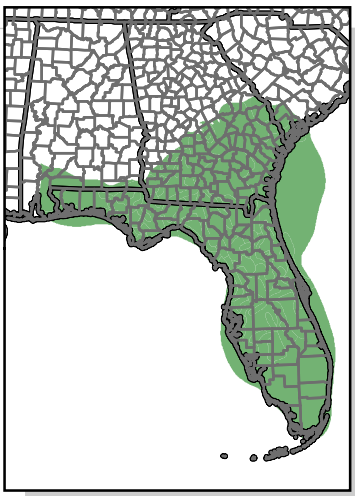
Regional Long Term Upper Floridan Monitor Wells (January - February 2013)

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

February 2013

Upper Floridan Aquifer levels in feet above mean sea level

Taylor and Sanderson wells courtesy of SJRWMD