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: November 7, 2013

RE: October 2013 Hydrologic Conditions Report for the District

RAINFALL

- October rainfall was 0.61", which is only 20% of the long-term average of 2.98" (Figure 1, Table 1). This was the 12th driest October in 80 years of record-keeping. With only 1.13", Dixie County had the highest average with localized areas receiving up to 2" (Figure 2). The lowest gaged monthly total was 0.11" near Forest Grove Tower in western Alachua County, and the highest was 2.09" at Goethe State Forest in Levy County.
- Both Mayo and Jasper reported 0.23" for the month, the fourth-lowest October total for those stations since records began in 1950.
- Dry conditions were also prevalent in the Suwannee River's tributary watersheds in south Georgia, with most of the area seeing less than 50% of typical rainfall for the second month in a row (Figure 3).
- Average rainfall for the 12 months ending October 31 was 2.8" lower than the long-term average of 54.61" (Figure 4). Average rainfall for the 3 months ending October 31 was 3.7" lower than the long-term average of 16.0" (Figure 5). After nearly record-breaking high rainfall in the middle Suwannee basin this summer, the three-month surplus along the middle-Suwannee corridor fell from almost 20" to less than 3". Three-month deficits in the upper Suwannee and upper Santa Fe basins approached 12".

SURFACEWATER

- **Rivers:** Levels across the District continued to fall after two months of below-normal rainfall. Gages on the Santa Fe River fell below the 25th percentile (considered low) but Suwannee River flows remained in a normal range for the time of year. Coastal river flows were also typical of the season. Statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions are in Figure 7.

- **Lakes**: Lake levels fell for the second month in a row. Most lakes dropped below their long-term average levels. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.

- **Springs**: Springflow along the middle Suwannee River remained high after the summer's record rains. Lafayette Blue Springs was measured at 98 MGD (million gallons per day), its highest flow since 2005. Suwannee Blue Springs was measured at 23 MGD, the fourth highest flow in the record and near the high of 25 MGD recorded in 1998. Falling river levels helped Fanning and Manatee Springs have their highest flows since last year, with 58 and 121 MGD respectively. White Sulphur Springs continued to discharge for the second straight month, but the water flowing out of the spring remained tannic (brown) from months of inflow from the Suwannee River. The flow on October 18 was 12 MGD, almost 6% of the total flow of the Suwannee River at White Springs on that day. Statistics for these springs and others are shown in Figure 9.

GROUNDWATER

Almost 90% of monitored upper Floridan aquifer levels fell in October. Exceptions were in northern Lafayette County and along the southeastern District boundary in Alachua County, although these levels appeared to be at their peak. Levels in the middle Suwannee River corridor remained above the 75th percentile. Overall, levels remained above normal but fell to the 65th percentile from the 85th percentile in September. Only 13 wells had levels lower than their long-term median. Statistics for a representative sample of wells are shown in Figure 11, and 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 November 2 indicated incipient dry spell conditions in north Florida.
- The National Weather Service Climate Prediction Center (CPC) three-month outlook showed a potential for below-normal precipitation through January. Neutral El Niño/Southern Oscillation conditions are expected into spring 2014, with no tendency toward either El Niño (cooler and wetter) or La Niña (warmer and drier) conditions caused by Pacific Ocean temperatures.
- The U.S. Drought Monitor indicated abnormally dry conditions in southeast Georgia and northeast Florida, including Hamilton, Columbia, Union, and Bradford counties.

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 (inches)

County	Oct 2013	October Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	0.53	3.05	17%	50.67	99%
Baker	0.50	3.31	15%	47.51	95%
Bradford	0.30	2.76	11%	48.59	96%
Columbia	0.29	3.06	9%	49.66	97%
Dixie	1.13	3.07	37%	56.22	95%
Gilchrist	0.85	2.98	28%	55.40	97%
Hamilton	0.36	3.01	12%	48.99	94%
Jefferson	0.66	3.07	22%	50.80	84%
Lafayette	0.46	3.09	15%	58.36	103%
Levy	1.13	3.14	36%	54.35	91%
Madison	0.50	3.24	16%	54.55	97%
Suwannee	0.30	3.22	9%	55.76	105%
Taylor	0.59	3.17	19%	58.49	98%
Union	0.43	3.27	13%	48.23	89%

October 2013 Average:	0.61
October Average (1932-2012):	2.98
Historical 12-month Average (1932-2012):	54.61
Past 12-Month Total:	51.80
12-Month Rainfall Deficit:	-2.81

Figure 1: Comparison of District Monthly Rainfall

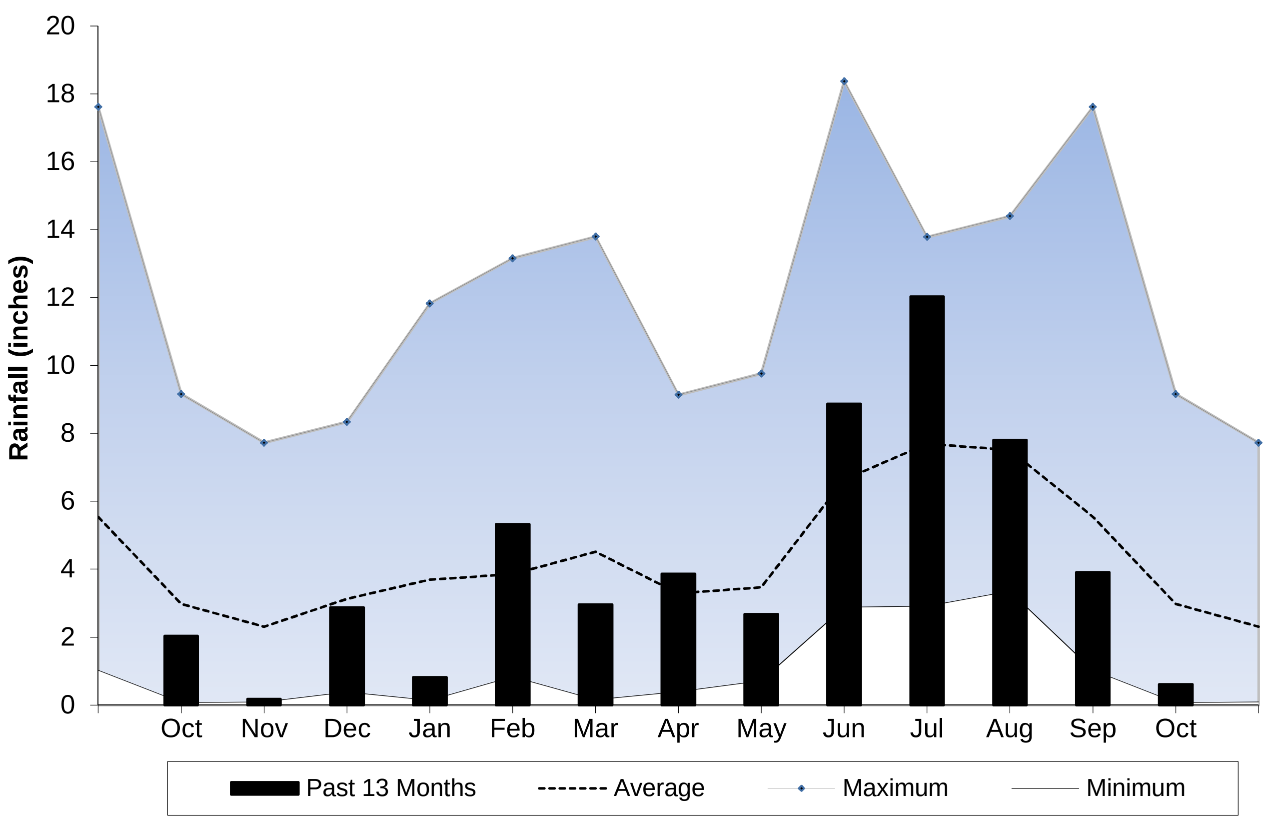


Figure 2: October 2013 Rainfall Estimate

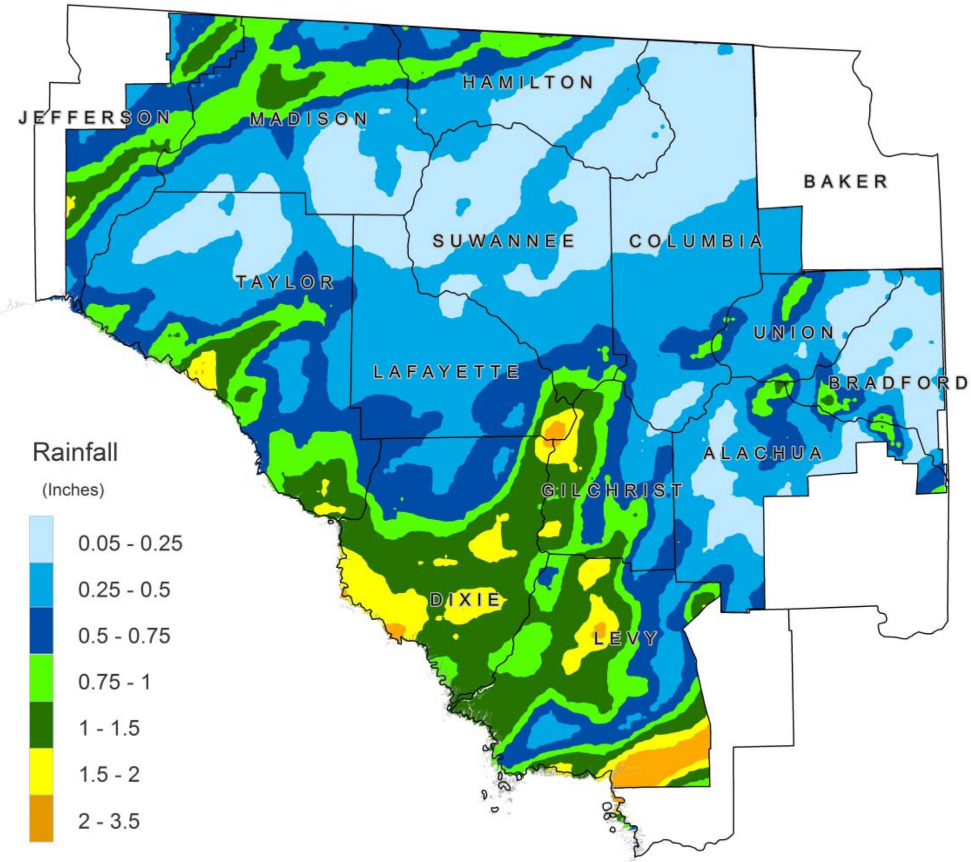


Figure 3: October 2013 Percent of Normal Rainfall

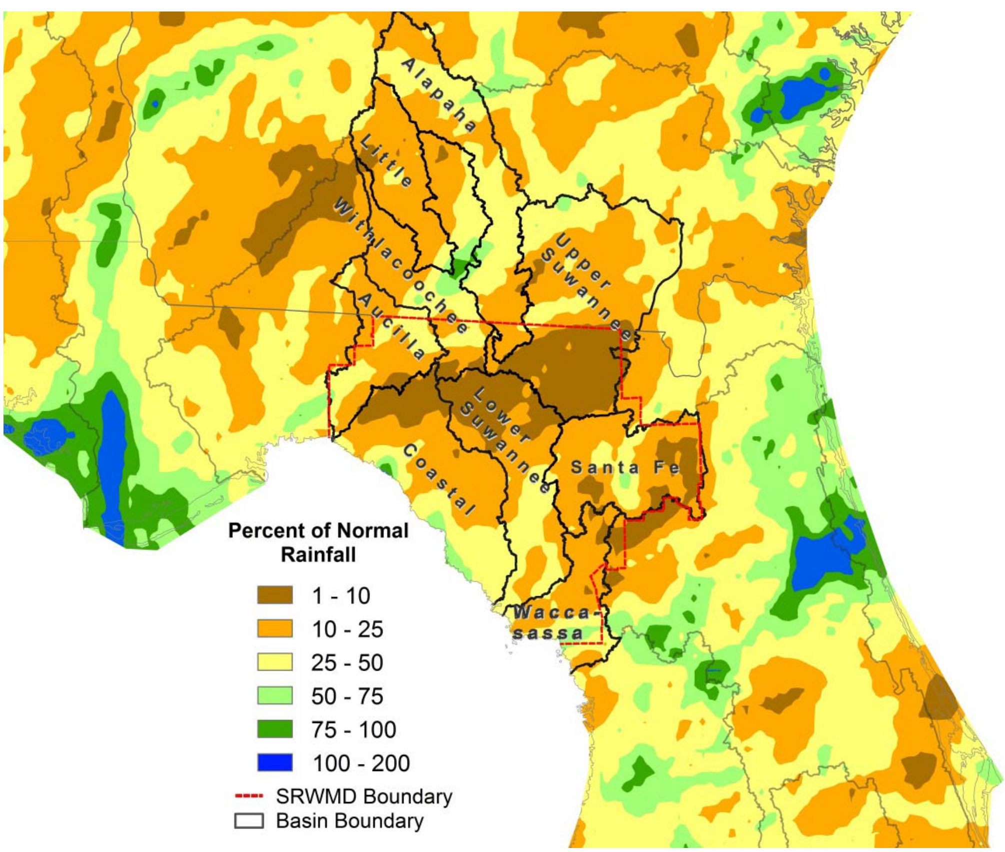
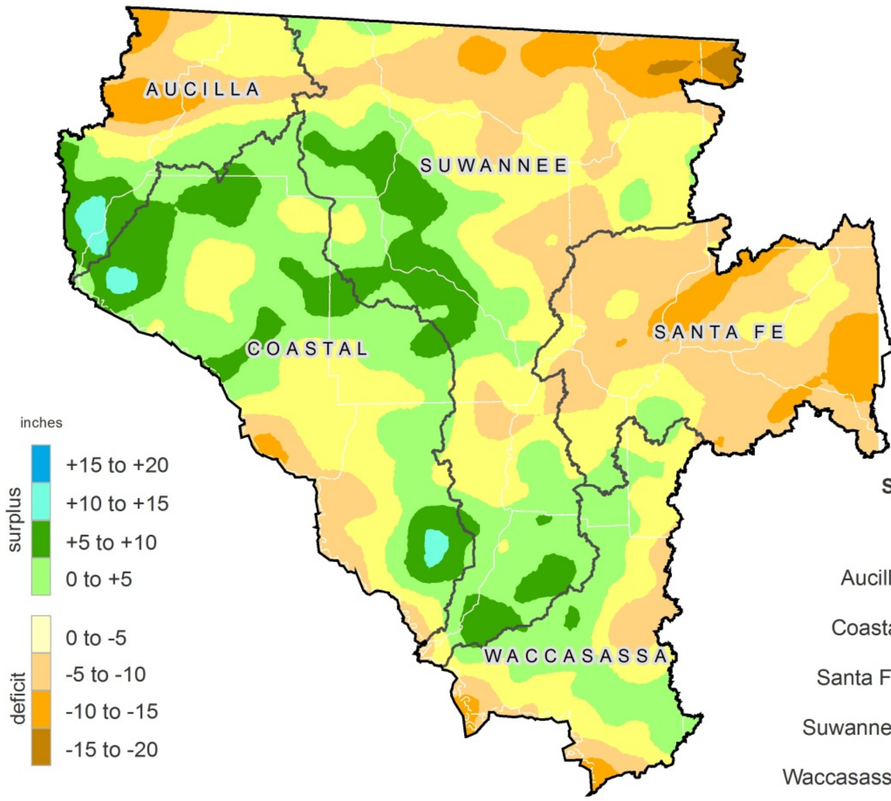


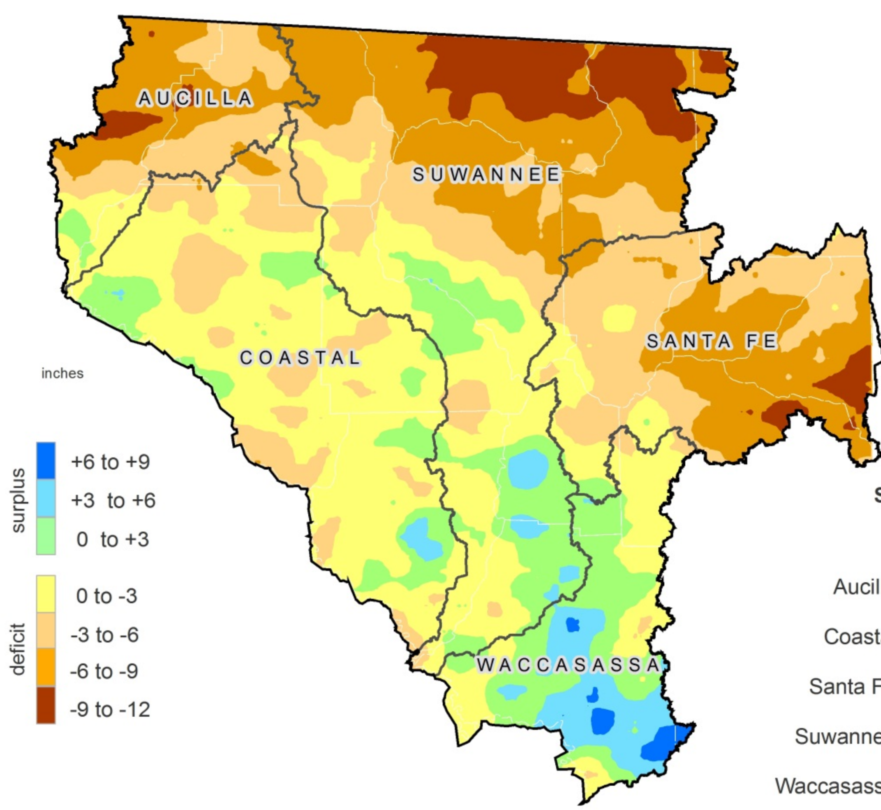
Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through October 31, 2013



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

	Oct -13	Sep -13
Aucilla	-2.6	-2.2
Coastal	+1.4	+3.3
Santa Fe	-6.9	-4.9
Suwannee	-1.9	+0.3
Waccasassa	-0.7	+0.7

Figure 5: 3-Month Rainfall Surplus/Deficit by River Basin
Through October 31, 2013

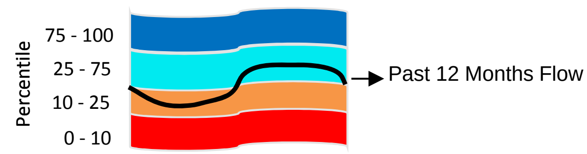


3-Month
Surplus (+) or Deficit (-)
By Basin

	Oct -13	Sep -13
Aucilla	-5.8	-0.1
Coastal	-1.8	+7.7
Santa Fe	-5.6	-1.1
Suwannee	-4.6	+2.1
Waccasassa	+1.6	+10.0

Figure 6: Daily River Flow Statistics

November 1, 2012 through October 31, 2013



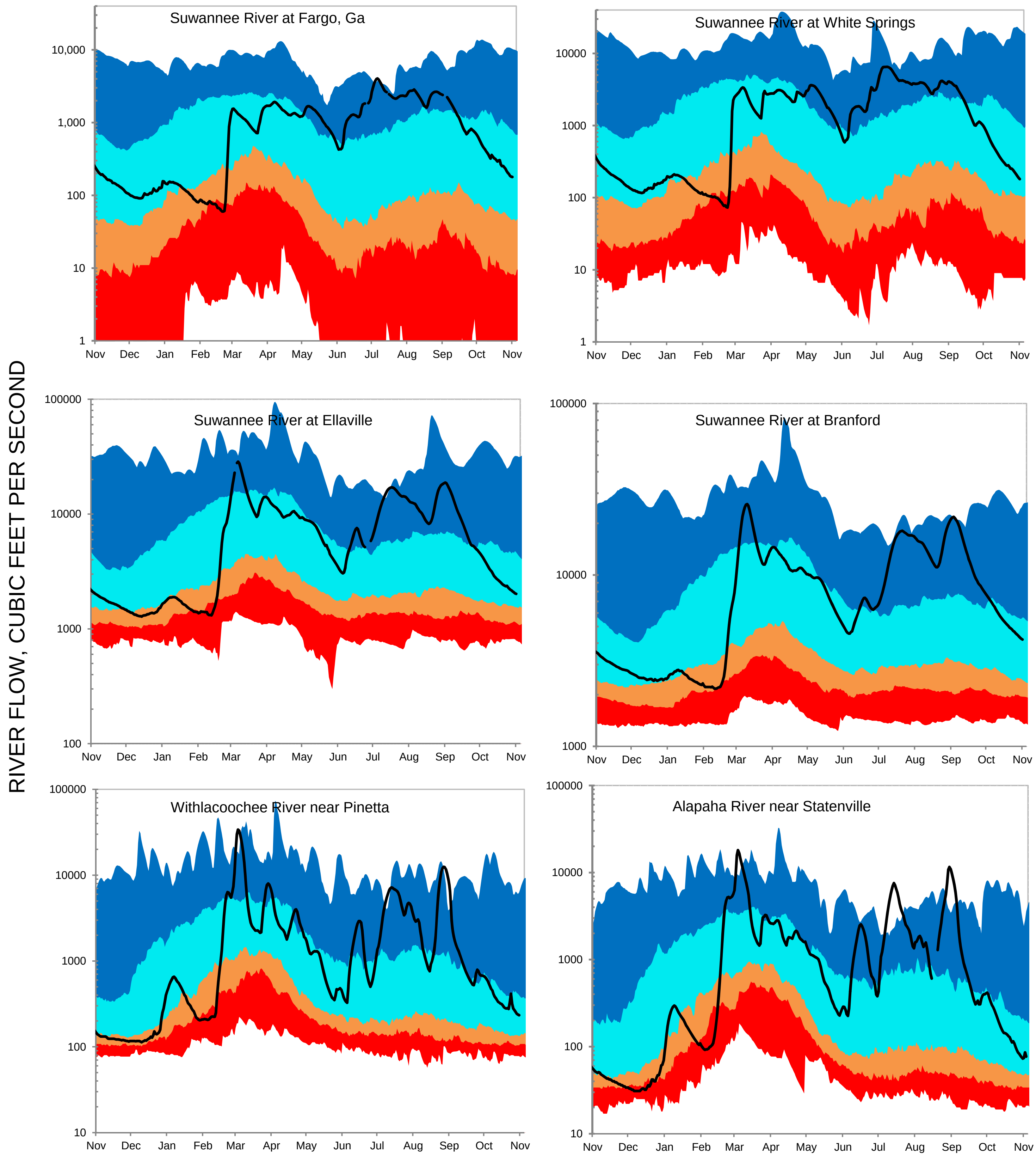
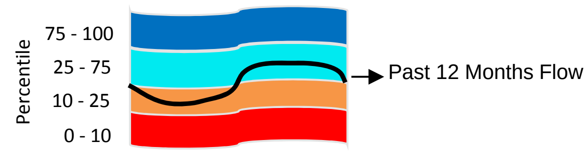
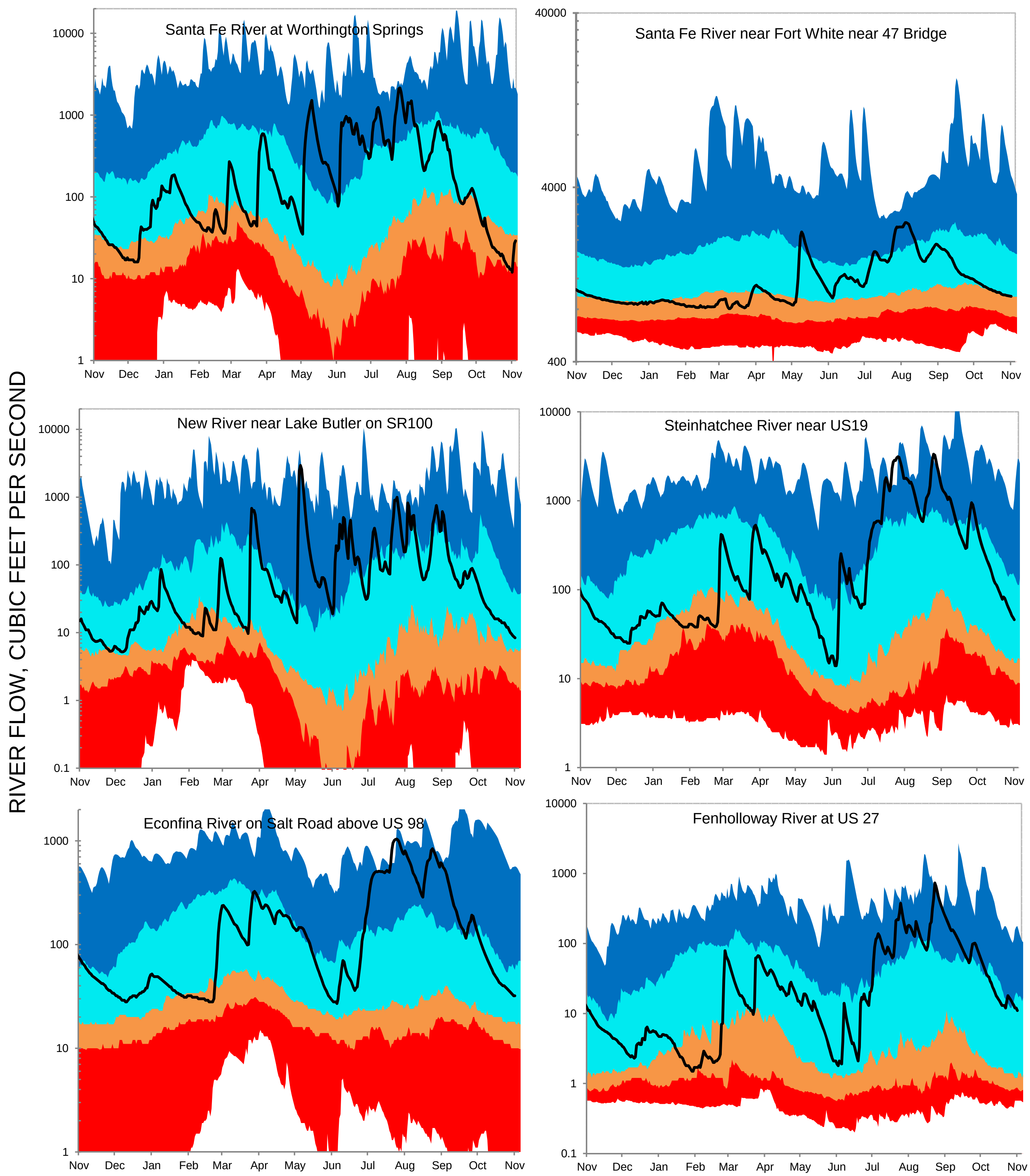


Figure 6, cont: Daily River Flow Statistics

November 1, 2012 through October 31, 2013





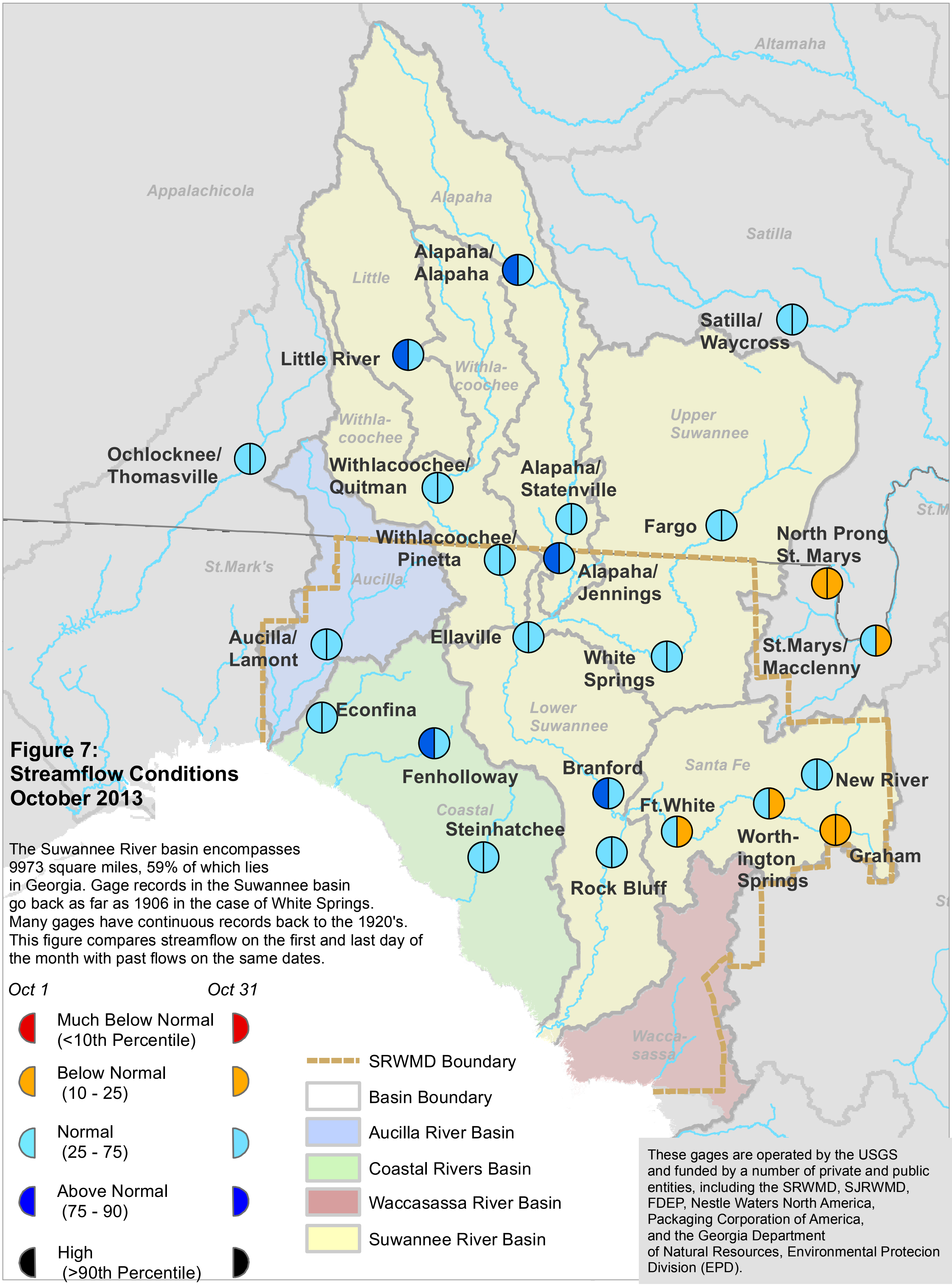


Figure 7:
Streamflow Conditions
October 2013

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.

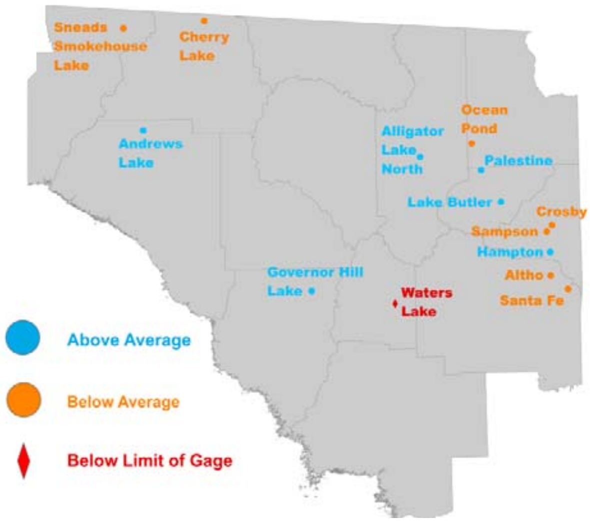
Oct 1 *Oct 31*

- 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

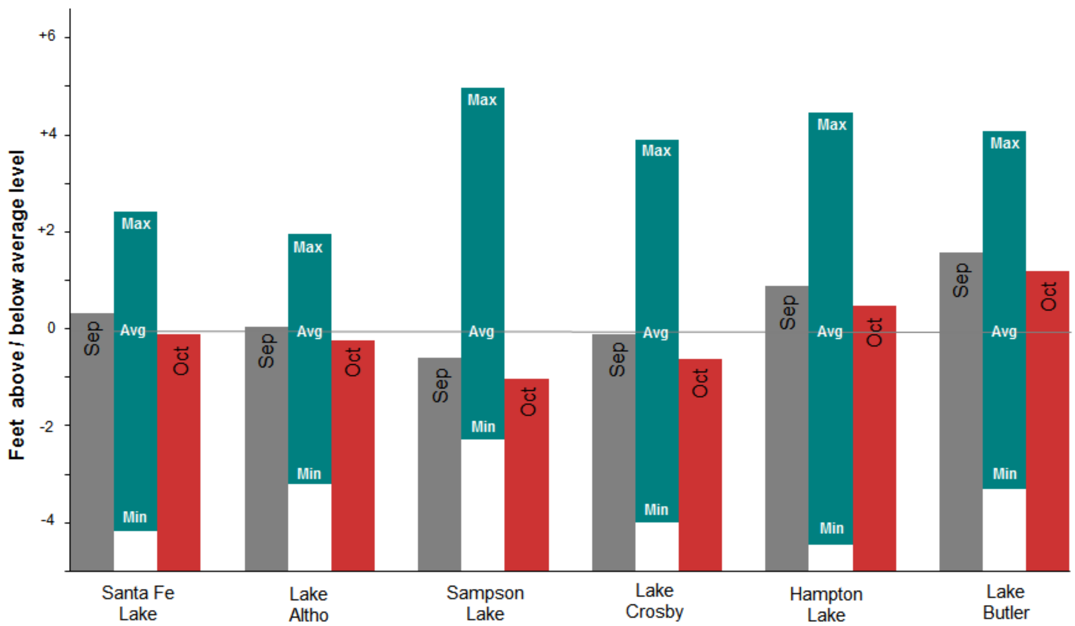
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

Figure 8: October 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.



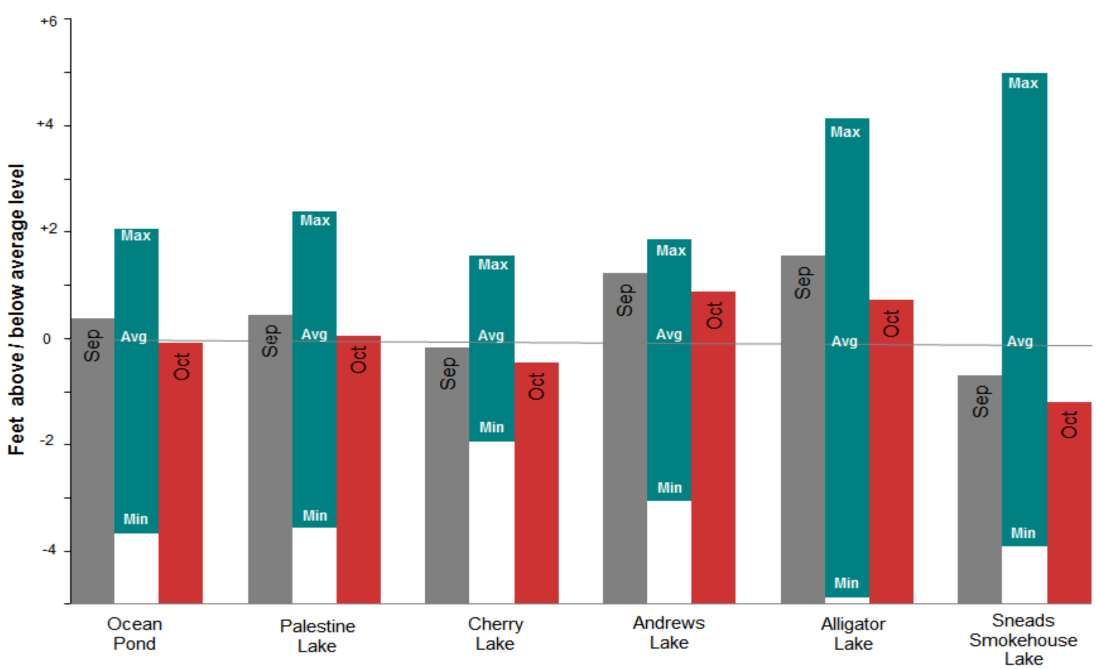


Figure 9: Quarterly Springflow Measurements

The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were measured in October 2013, with the last measurement marked in red. Flow is given in million gallons per day (MGD).

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

Figure 9: Quarterly Springflow Measurements, continued

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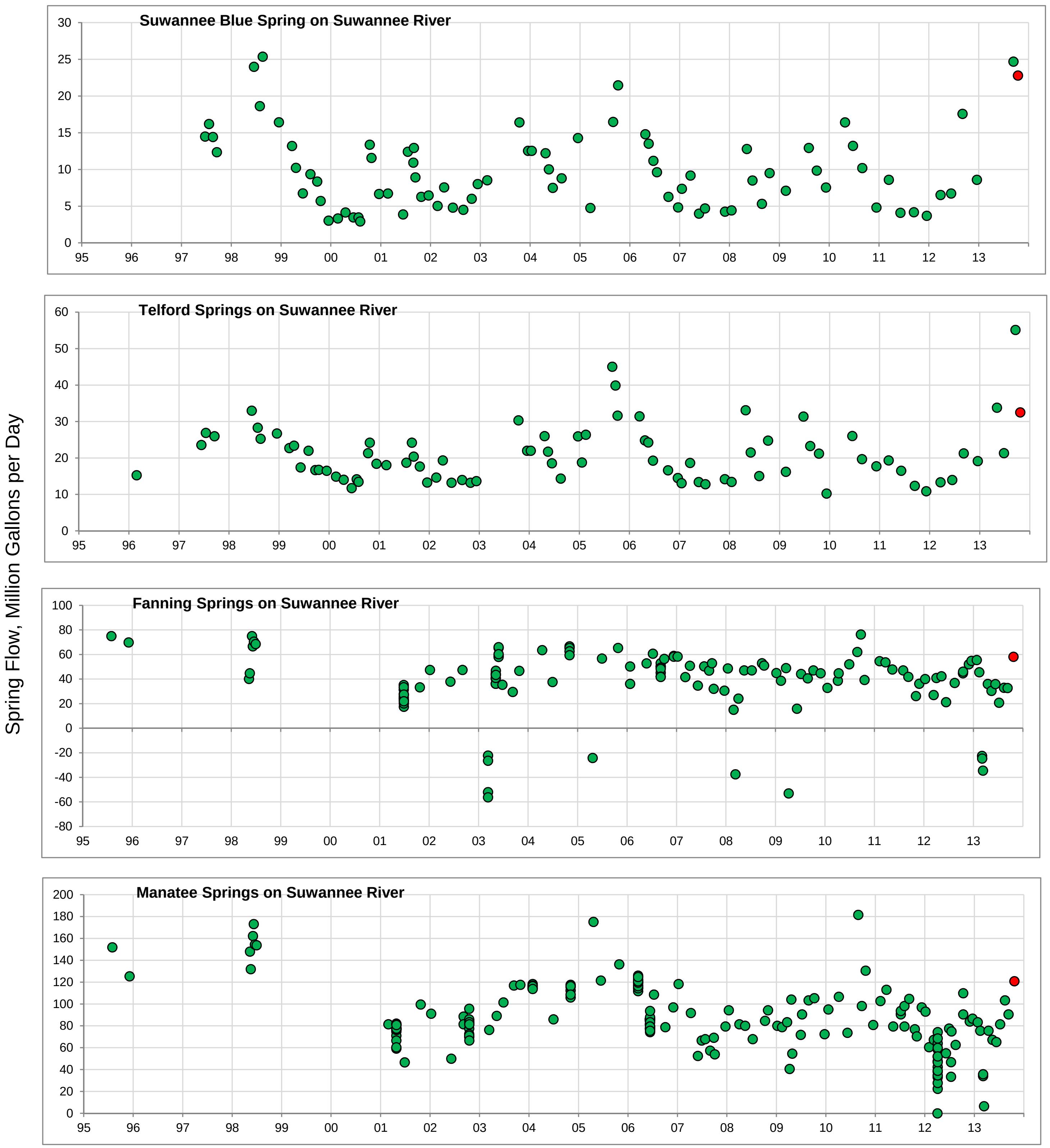


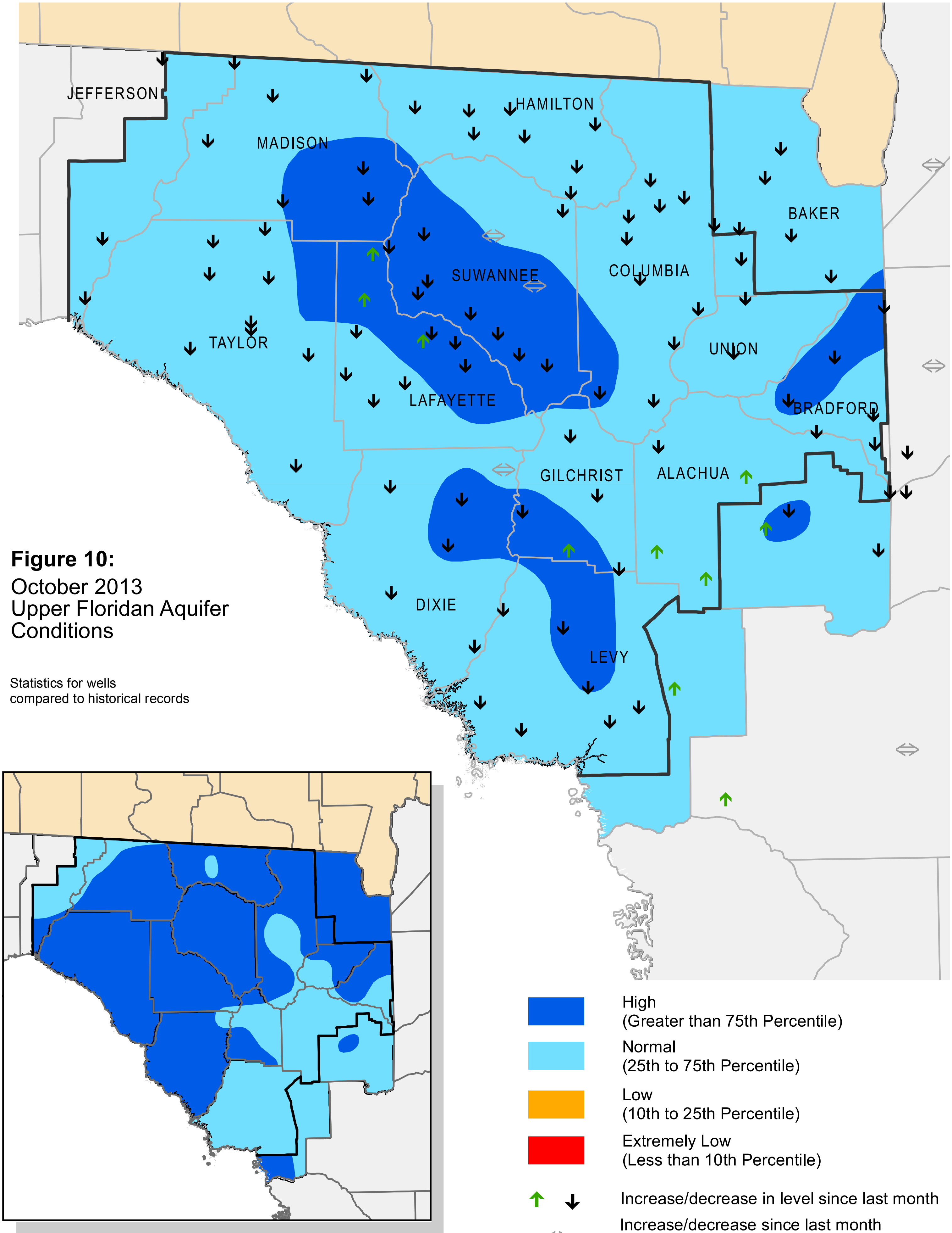
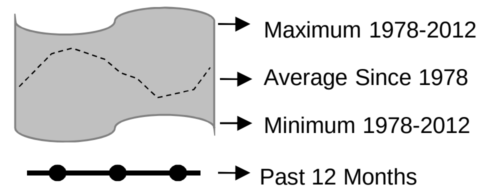


Figure 10:
October 2013
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records

Inset: September 2013 Groundwater Levels

Figure 11: Monthly Groundwater Level Statistics
Levels November 1, 2012 through October 31, 2013
Period of Record Beginning 1978



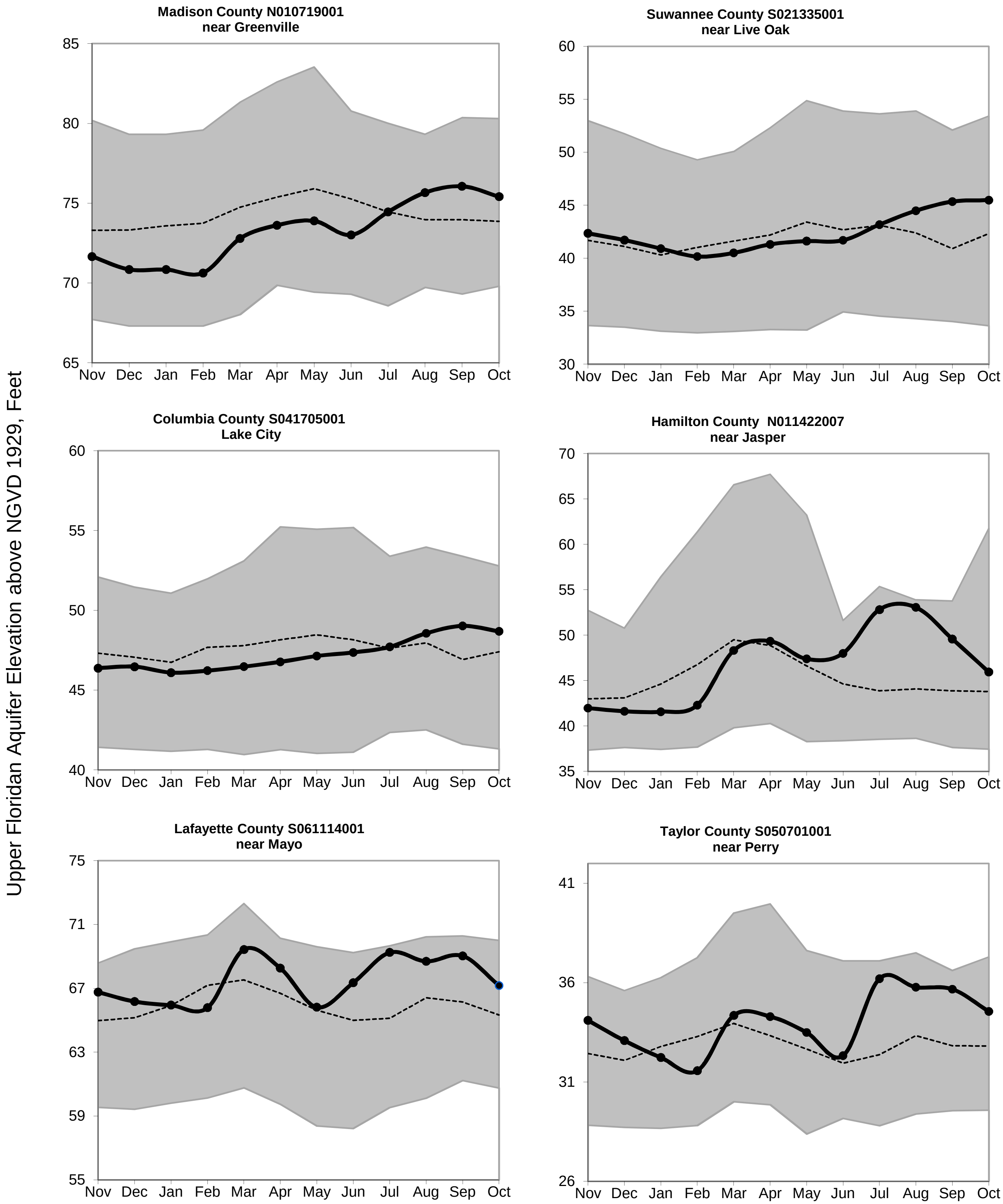
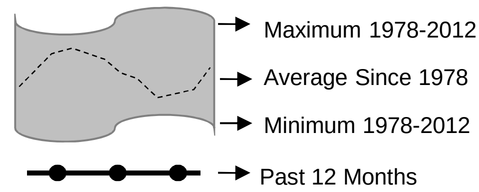
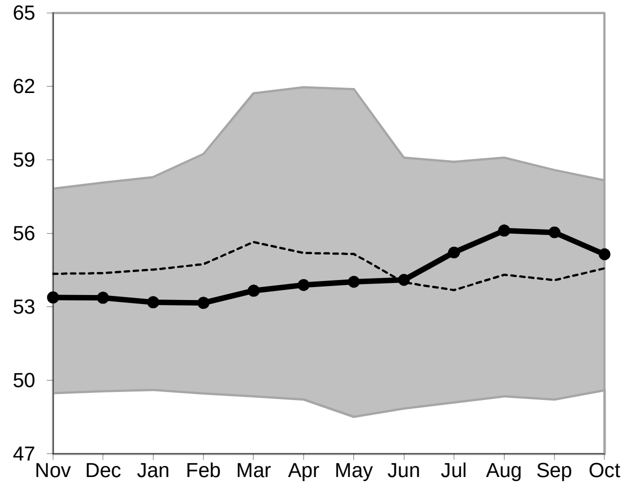


Figure 11, cont.: Groundwater Level Statistics
Levels November 1, 2012 through October 31, 2013
Period of Record Beginning 1978

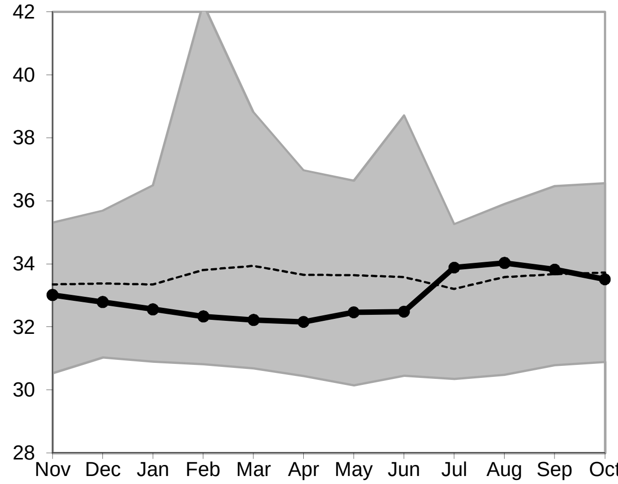


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

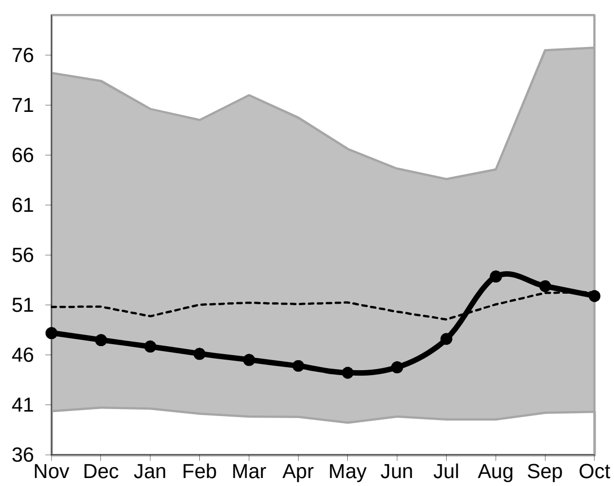
**Union County S051933001
near Lake Butler**



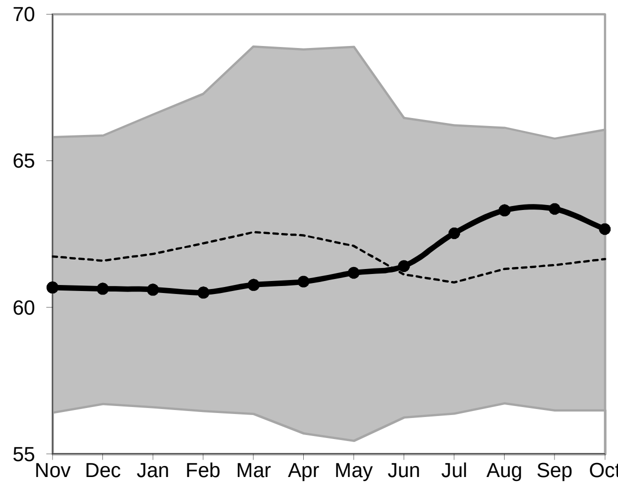
**Alachua County S081703001
at High Springs**



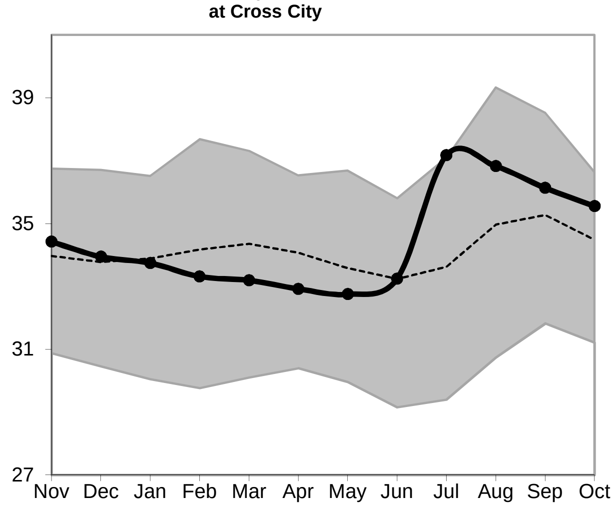
**Gilchrist County S091607001
near Trenton**



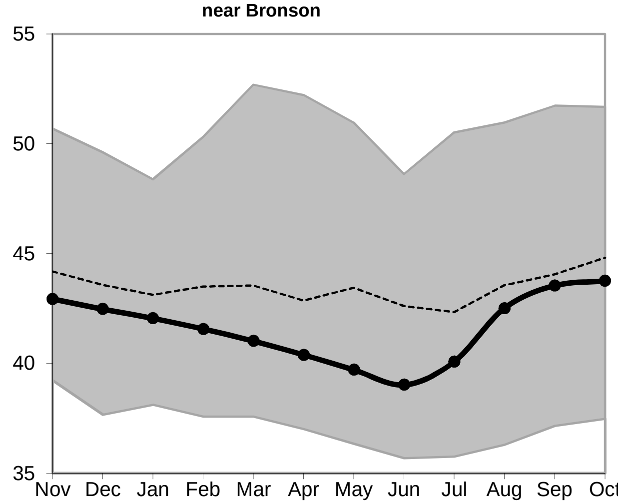
**Bradford County S072132001
near Graham**



**Dixie County S101210001
at Cross City**



**Levy County S131736001
near Bronson**



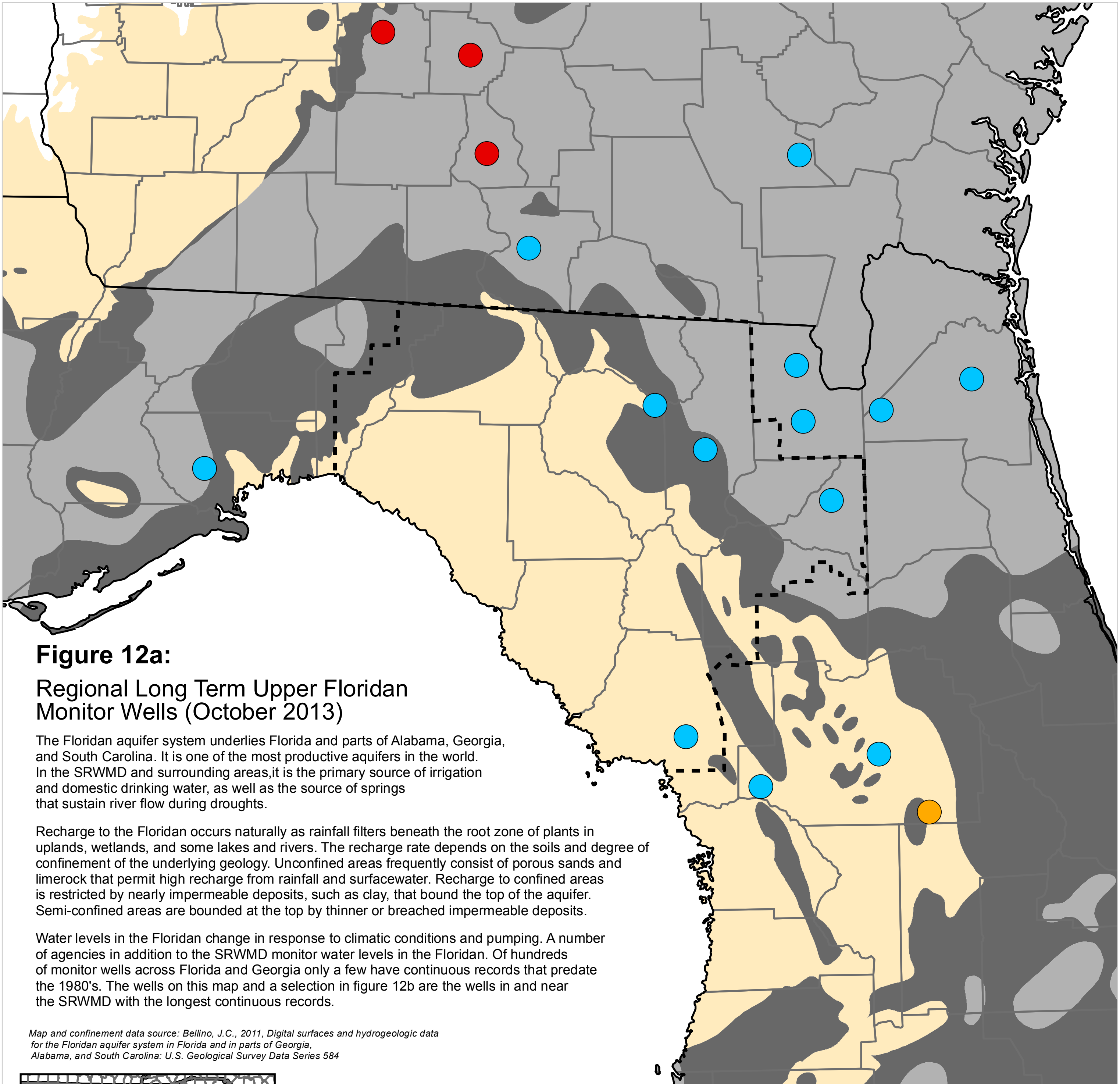


Figure 12a:

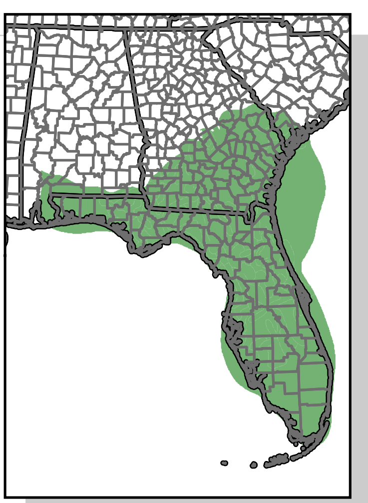
Regional Long Term Upper Floridan Monitor Wells (October 2013)

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

October 2013