MEMORANDUM

TO: Governing Board

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

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

DATE: November 6, 2012

RE: October 2012 Hydrologic Conditions Report for the District

RAINFALL

- Average rainfall was 2.03", which is 68% of the long-term October average of 2.99". Madison and Jefferson counties had the lowest accumulations, with totals 34% and 17% of normal, respectively (Table 1, Figure 1). All counties were below normal, with the exception of Gilchrist which received average rainfall due to locally heavy storms near Trenton (Figure 2). The highest gaged monthly total was 4.36" in Baker County near Sanderson, and the lowest was 0.67" at Wacissa in Jefferson County. The highest gaged 1-day total was 2.36" in Sanderson, the result of an intense storm system that swept through the upper Santa Fe basin on the 8th and dropped up to 4" in localized areas. Watersheds in South Georgia that contribute to the Suwannee River had less than half of normal rainfall (Figure 3).
- Average SRWMD rainfall for the 12 months ending September 30 was 4.85" higher than the long-term average of 54.65". This average 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). Figure 5 shows the history of rainfall deficits beginning in 1998. The last three months' precipitation was 95% of the long-term average, based on records beginning in 1932.

SURFACEWATER

- **Rivers:** Dry, warm weather caused all rivers to fall, but conditions by the end of the month were largely in a range considered normal for the time of year. The Santa Fe River near Fort White, on the lower Santa Fe, returned to below-normal conditions after remaining near normal for three months (based on statistics beginning in 1928). Prior to the increased levels caused by the June flood, the river had been below normal or extremely low since spring of 2010. Statistics for a number of rivers are presented graphically in Figure 6 and conditions relative to historic conditions for the time of year in Figure 7.
- **Lakes**: Levels fell at all monitored lakes. Eight of 15 lakes' levels were below their long-term average. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for lakes where the gages were accessible.

SPRINGS

Ichetucknee River flows fell slowly throughout the month to near the average annual flow (based on records beginning in 1917). The highest flow in 7 years (38.5 cfs) was recorded at Suwannee Springs. The Suwannee River stopped flowing into White Sulphur Springs, allowing

the spring to flow out with a mix of river and groundwater before stopping at the end of the month. Statistics for a representative sample of springs are shown in Figures 9a and 9b.

GROUNDWATER

After responding well to the tropical storms and heavy rainfall earlier this summer, levels in almost all upper Floridan monitor wells in confined areas peaked in October and began to fall. Before peaking, these levels in the east and southeast District rose to conditions last seen before the drought beginning in late 2010. Levels in unconfined areas continued a second month of decline following their peaking in September. More than two-thirds of all the wells were in a range considered normal. Twenty percent were in a range considered high (Figure 10). The remaining 10% of wells, located in northwest Madison/northern Jefferson counties, lagged behind the rest of the District in recovery, appear to have peaked in a range considered low to extremely low. The 12-month rainfall deficit in this area was the highest in the District, approaching 15" below normal. Groundwater levels district-wide dropped from the 65th percentile to the 50th percentile (based on records beginning no earlier than 1978). 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 November 3 indicated slightly wet conditions in north Florida and mild drought in south central Georgia. The conditions in south Georgia became drier since last month.
- The National Weather Service Climate Prediction Center (CPC) issued an El Niño watch after models indicated El Niño conditions could develop in the coming months, but the most recent analysis suggests that the El Niño will be weak or borderline neutral. El Niño conditions often bring cooler and wetter weather to North Florida in the fall and winter. The CPC predicted that precipitation will be higher than normal in North Florida and the Panhandle through January based on the El Niño forecast.
- Figure 13 shows overhead irrigation application at a number of farms in the District during October. The average daily application rate was 0.03", unchanged from September.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to once a 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), agricultural water use (106 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	Oct 2012	October Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	2.56	3.05	84%	56.49	111%
Baker	1.98	3.31	60%	59.65	120%
Bradford	2.47	2.76	90%	57.47	113%
Columbia	1.71	3.06	56%	64.15	125%
Dixie	2.97	3.07	97%	57.28	97%
Gilchrist	3.02	2.98	101%	57.21	100%
Hamilton	1.37	3.01	45%	55.12	105%
Jefferson	0.52	3.07	17%	50.25	83%
Lafayette	2.24	3.09	72%	72.42	128%
Levy	2.08	3.14	66%	53.73	90%
Madison	1.09	3.24	34%	56.54	101%
Suwannee	2.07	3.22	64%	70.48	133%
Taylor	2.32	3.17	73%	62.10	104%
Union	2.08	3.27	64%	57.58	107%

October 2012 Average:	2.03
October Average (1932-2011):	2.99
Historical 12-month Average (1932-2011	54.56
Past 12-Month Total:	59.41
12-month Rainfall Surplus:	4.85

Figure 1: Comparison of District Monthly Rainfall

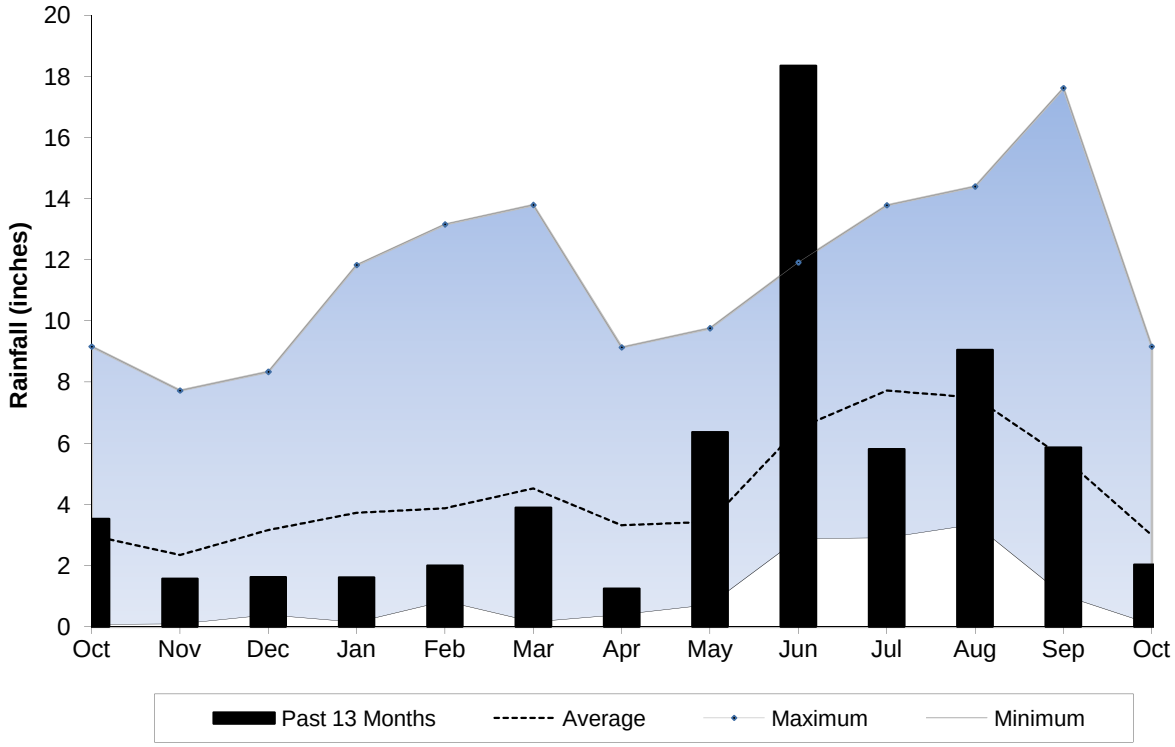


Figure 2: October 2012 Rainfall Estimate

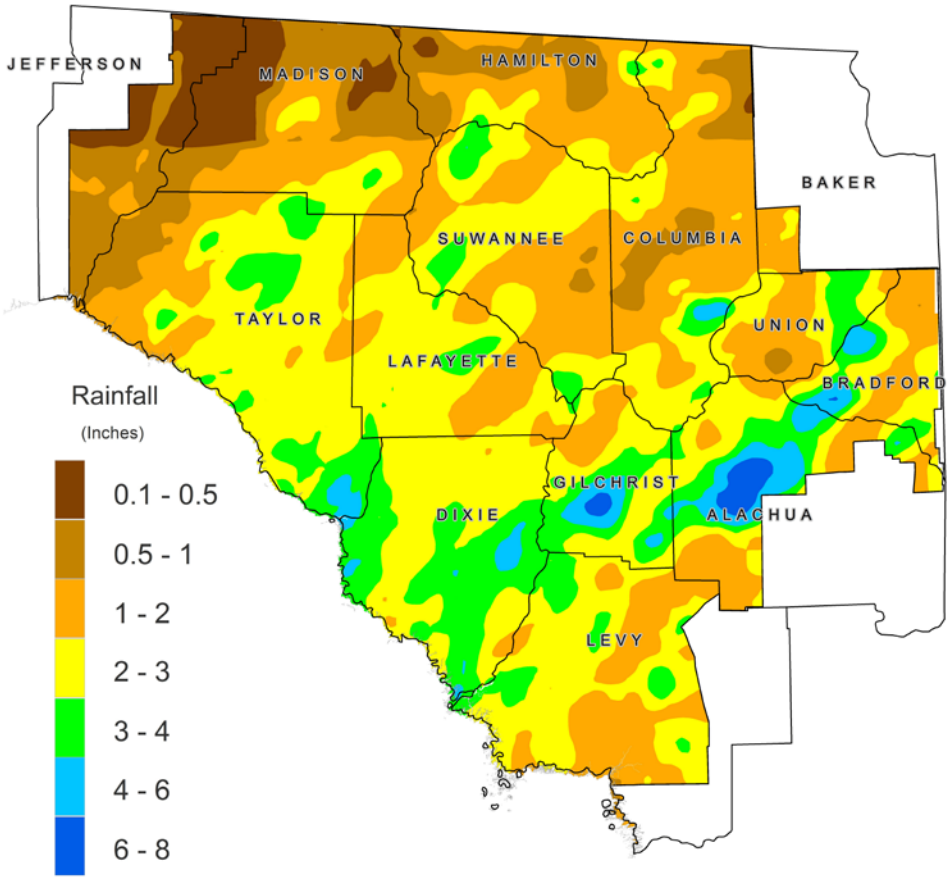


Figure 3: October 2012 Percent of Normal Rainfall

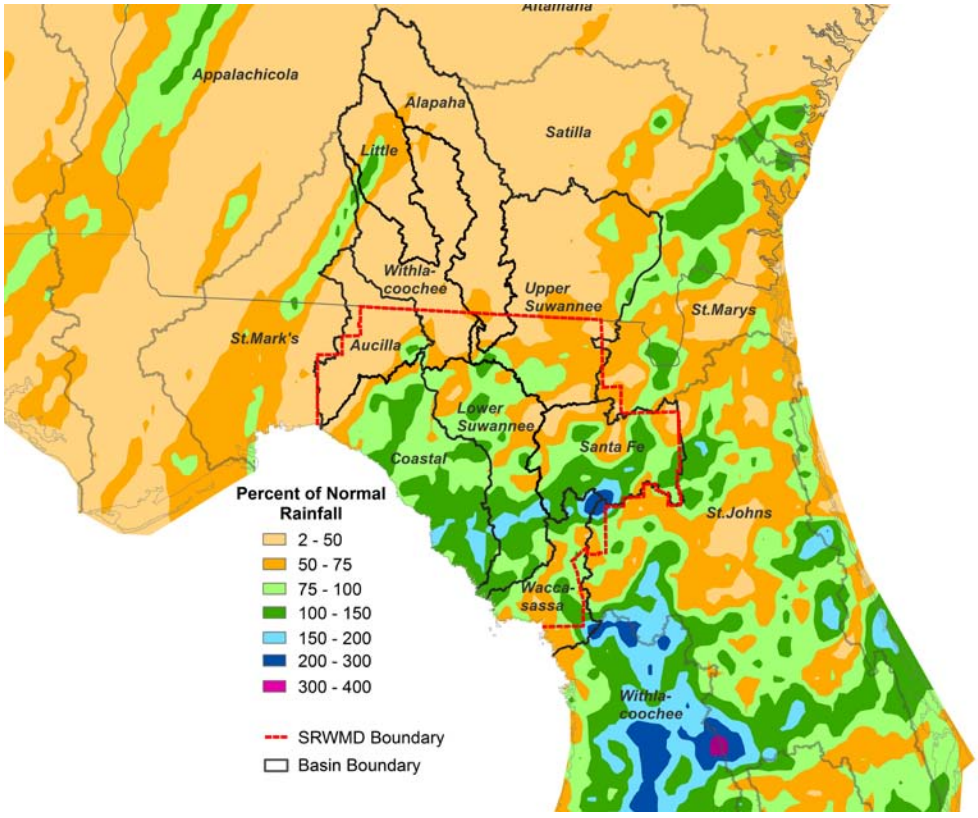


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Ending October 31, 2012

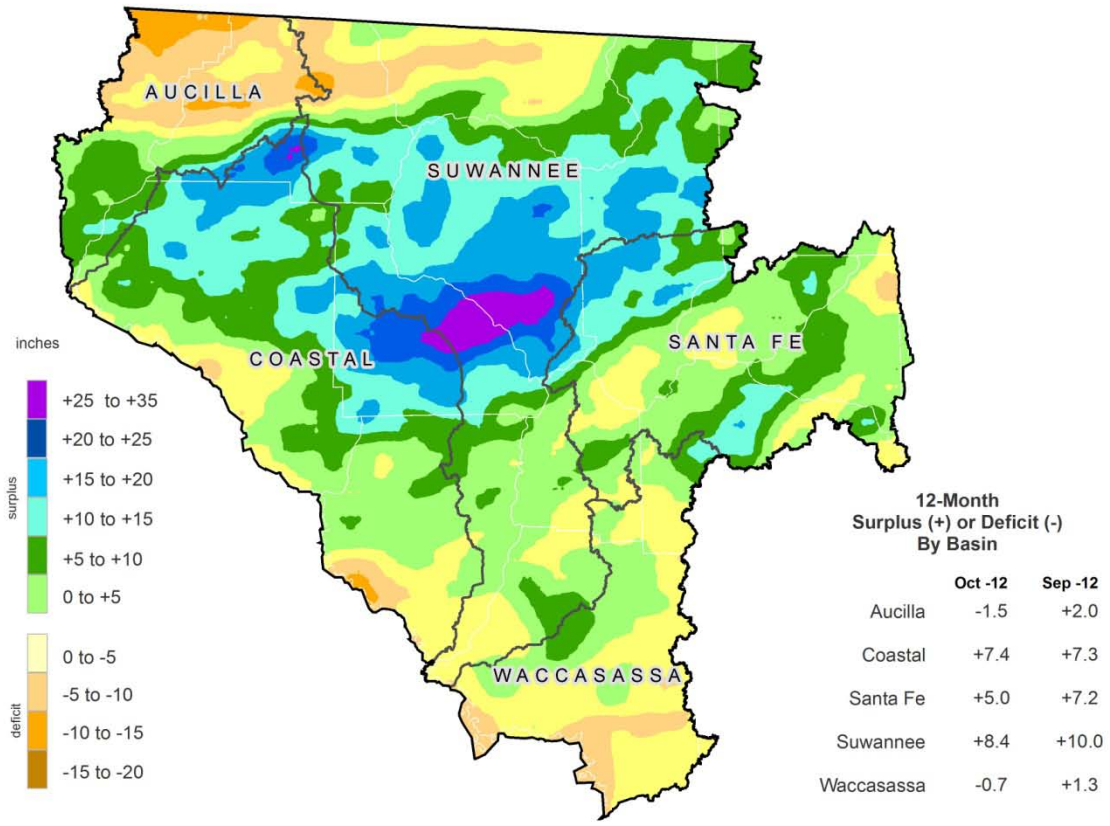


Figure 5: 12-Month Rolling Rainfall Deficit Since 1998
Difference between observed 12-month average SRWMD rainfall and the long-term average

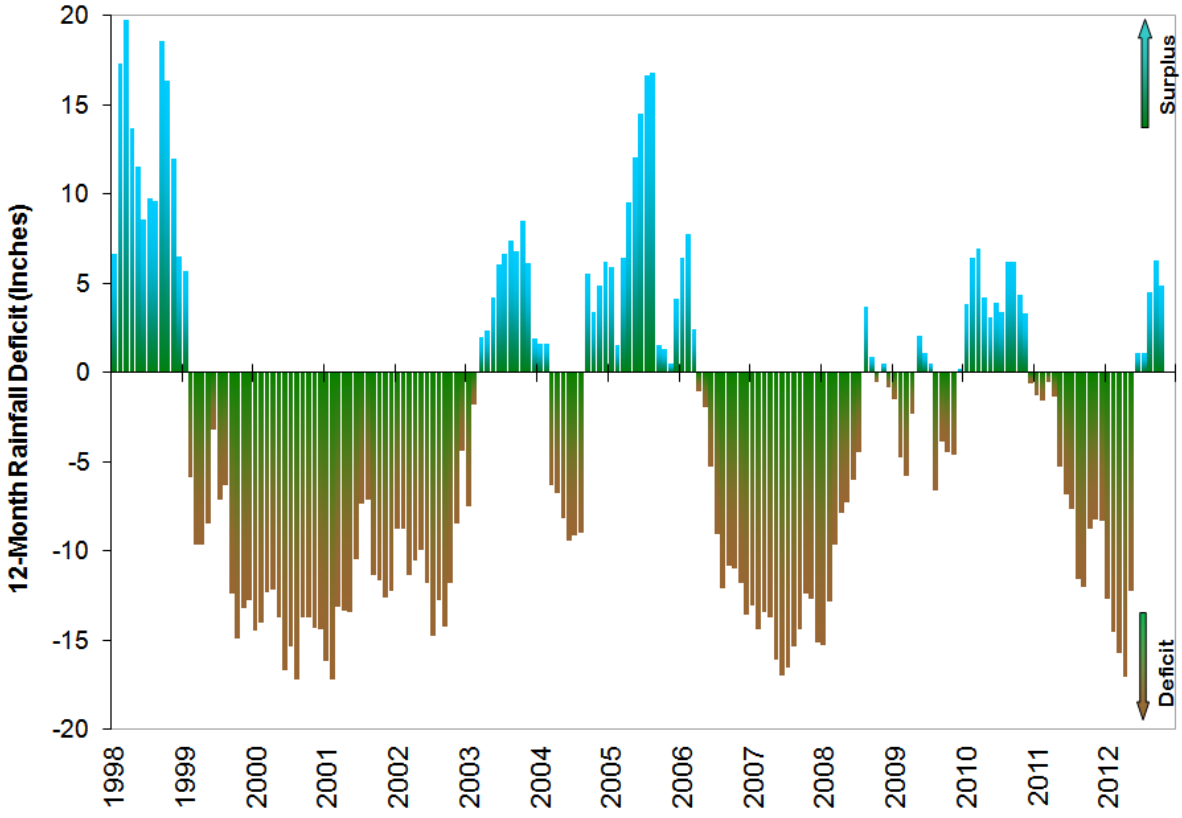


Figure 6: Daily River Flow Statistics
November 1, 2011 through October 31, 2012

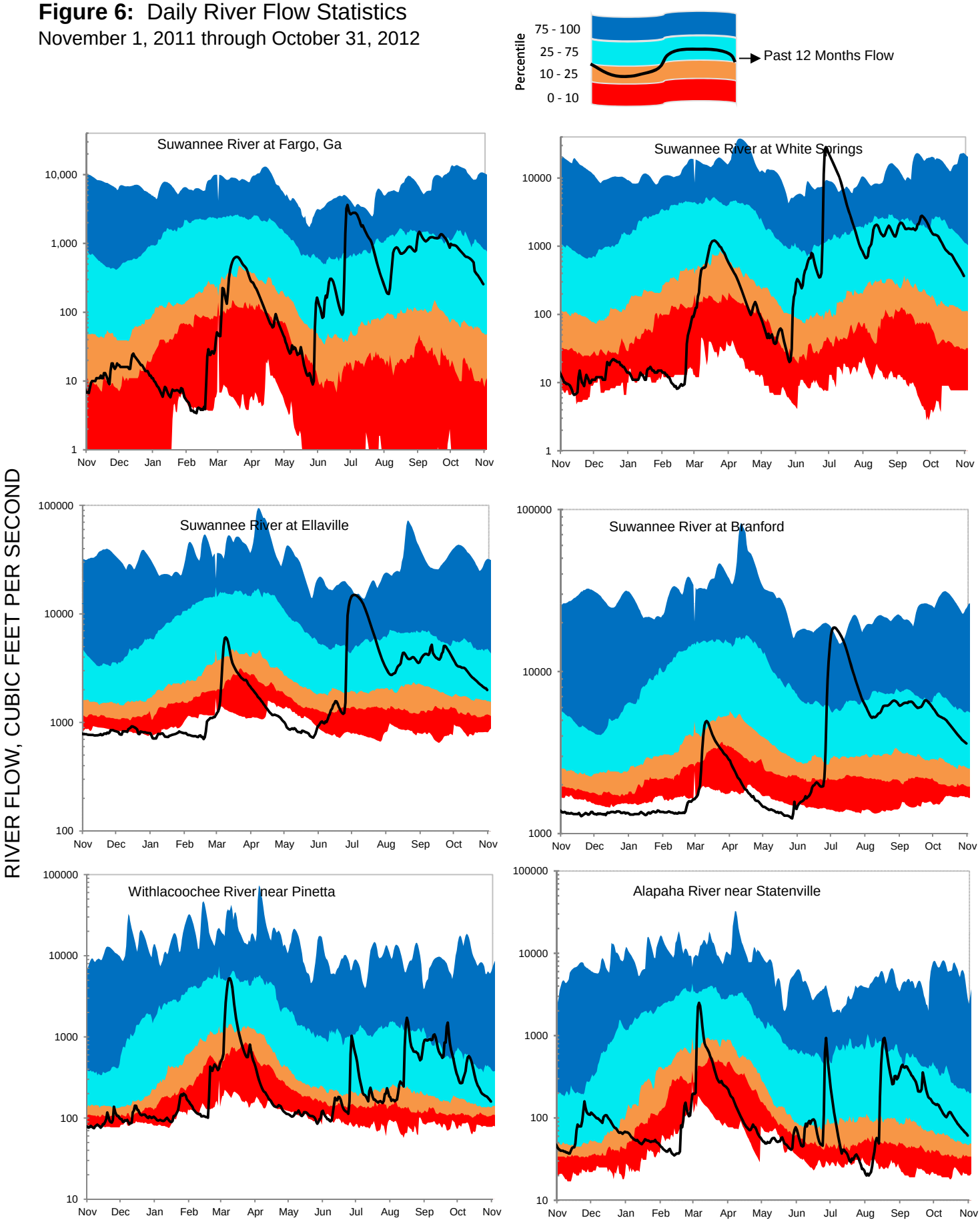
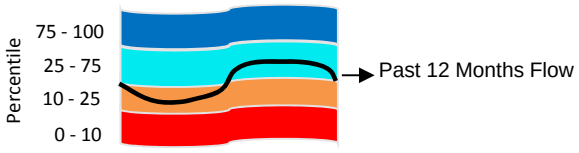
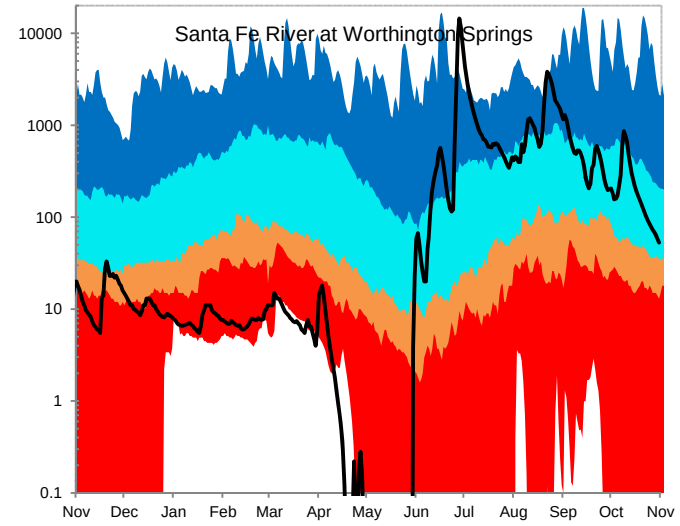
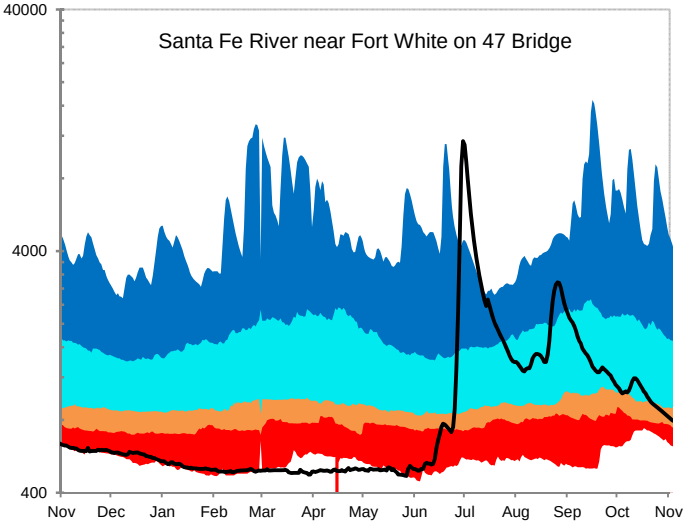


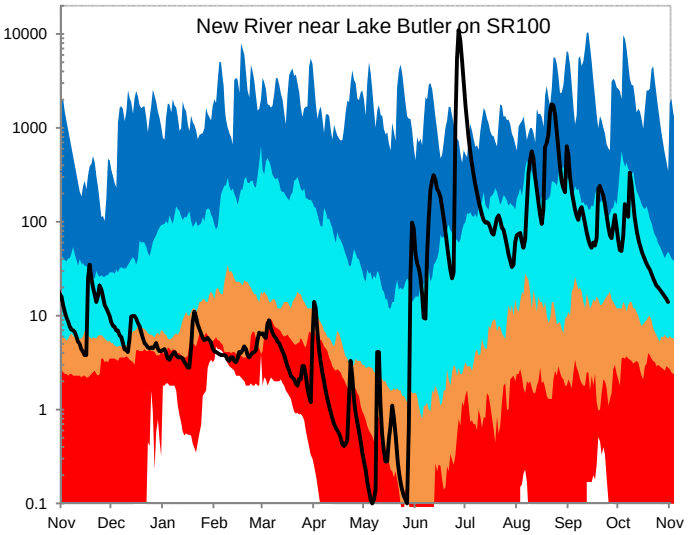
Figure 6, cont: Daily River Flow Statistics
November 1, 2011 through October 31, 2012

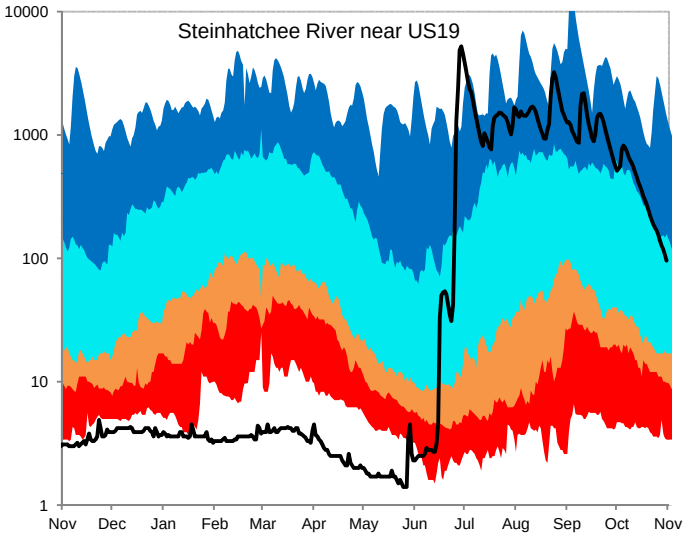


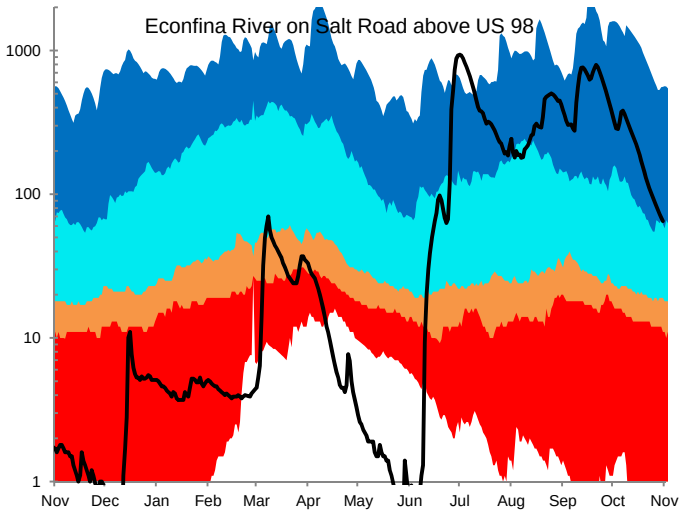
RIVER FLOW, CUBIC FEET PER SECOND

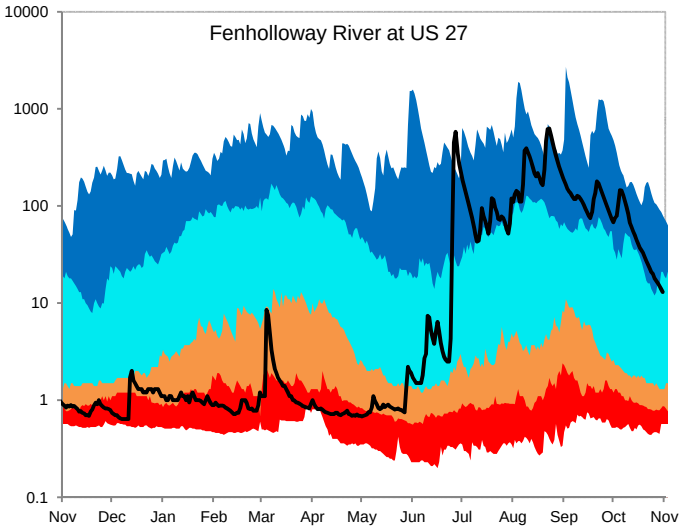












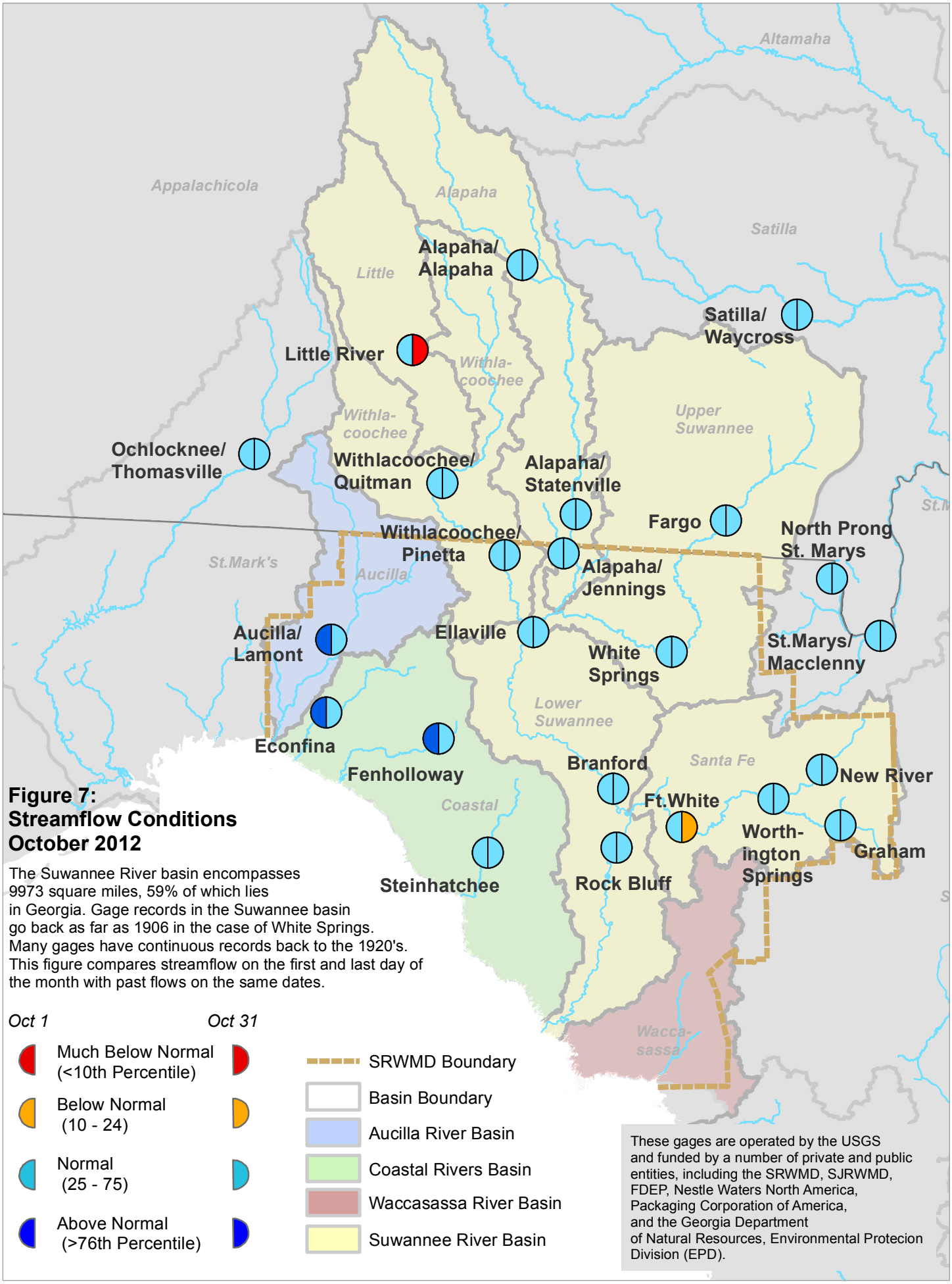


Figure 7:
Streamflow Conditions
October 2012

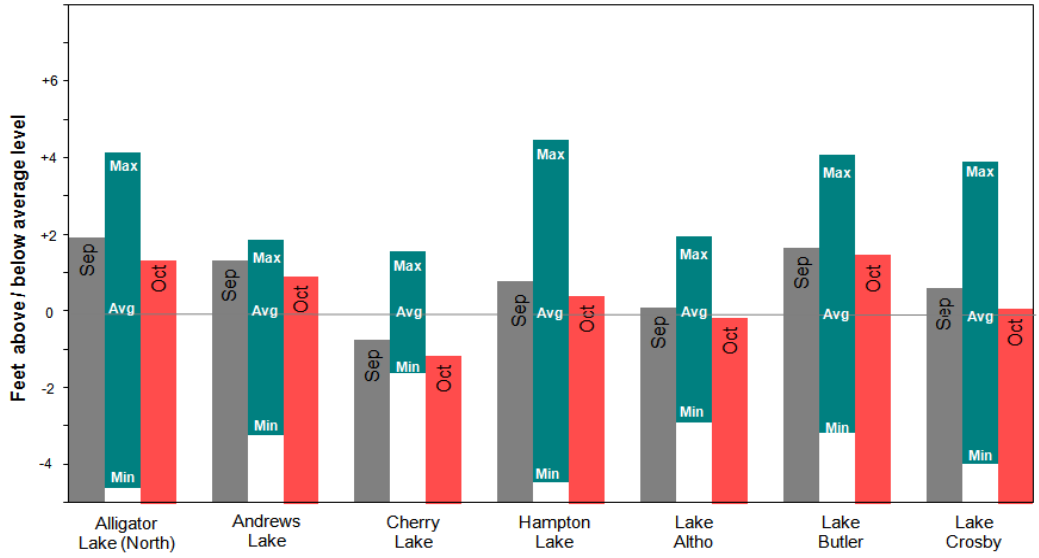
The Suwannee River basin encompasses 9973 square miles, 59% of which lies in Georgia. Gage records in the Suwannee basin go back as far as 1906 in the case of White Springs. Many gages have continuous records back to the 1920's. This figure compares streamflow on the first and last day of the month with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

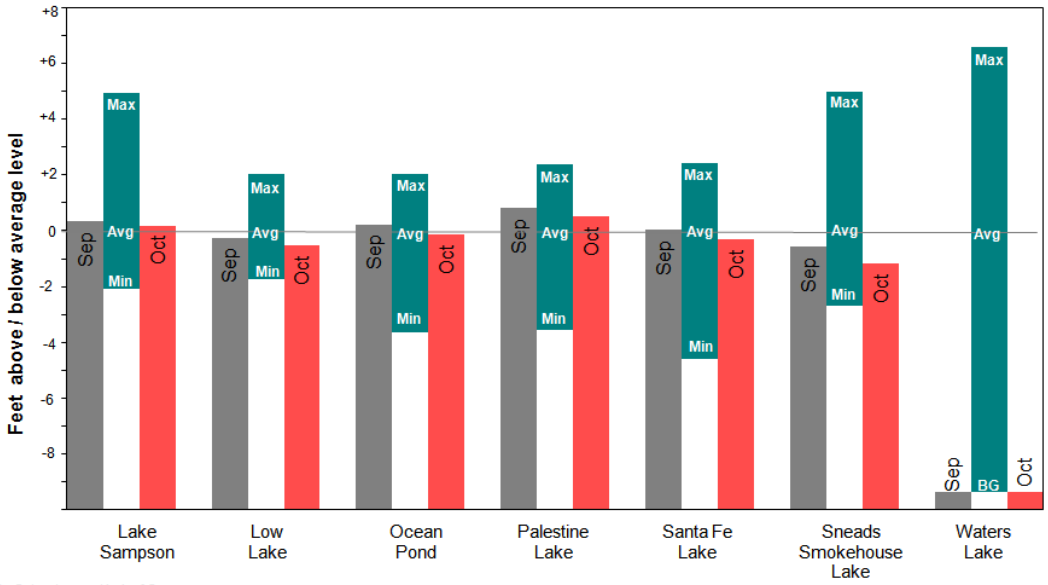
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

Figure 8: October 2012 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 full. If aquifer levels are low, these lakes go dry even if rainfall is normal.

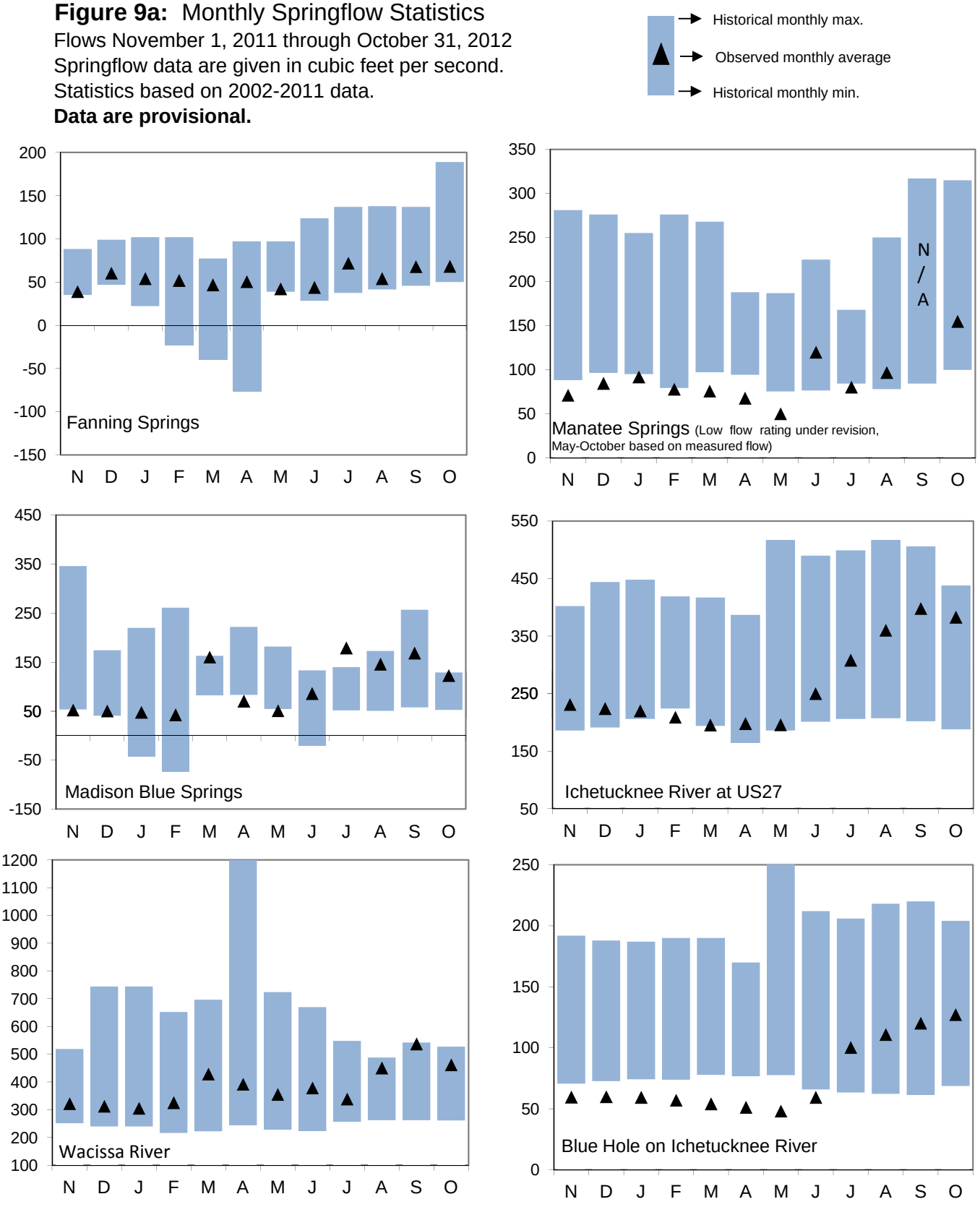
The District monitors 15 lakes with much of the data provided by volunteer observers. Most records go back to the 1970s, although the Sampson Lake record starts in 1957.





BG = Below Lowest Limit of Gage

Figure 9a: Monthly Springflow Statistics
Flows November 1, 2011 through October 31, 2012
Springflow data are given in cubic feet per second.
Statistics based on 2002-2011 data.
Data are provisional.

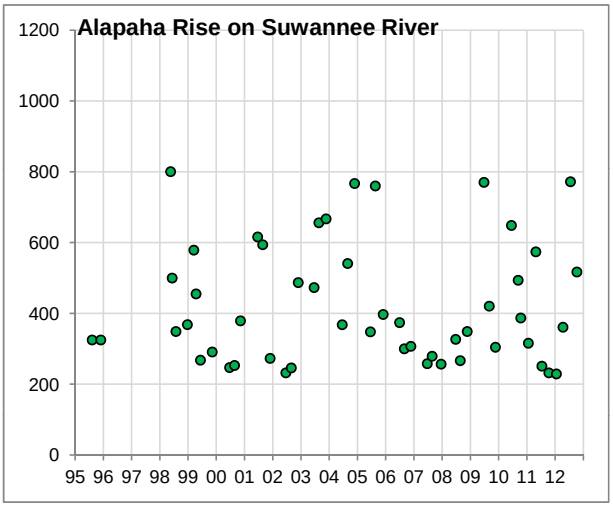


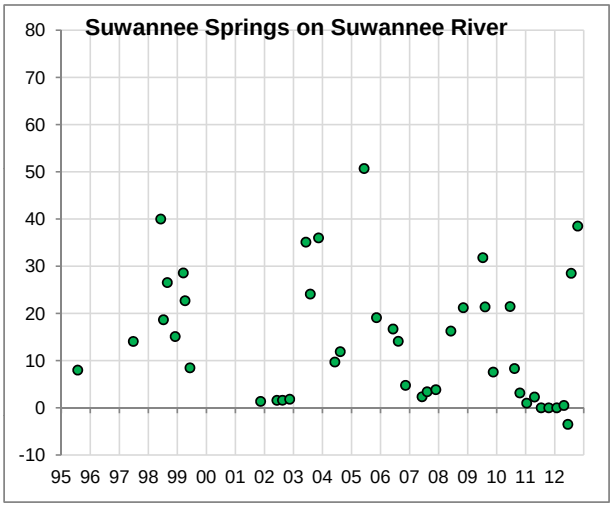
Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse.
Springflow for months marked by an asterisk (*) was strongly affected by river conditions.
Data will be revised once approved and published by the U.S. Geological Survey.

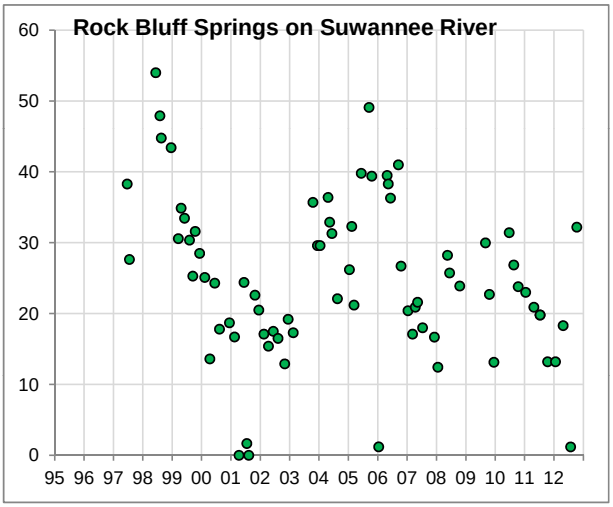
Figure 9b: Quarterly Springflow Measurements

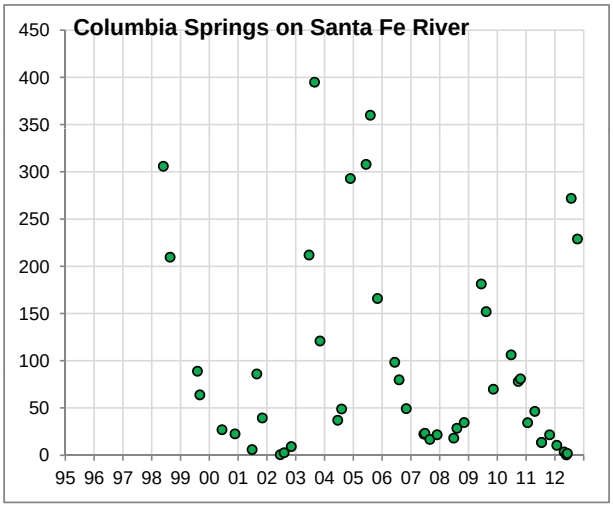
The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were sampled in October 2012. Flow is given in cubic feet per second.

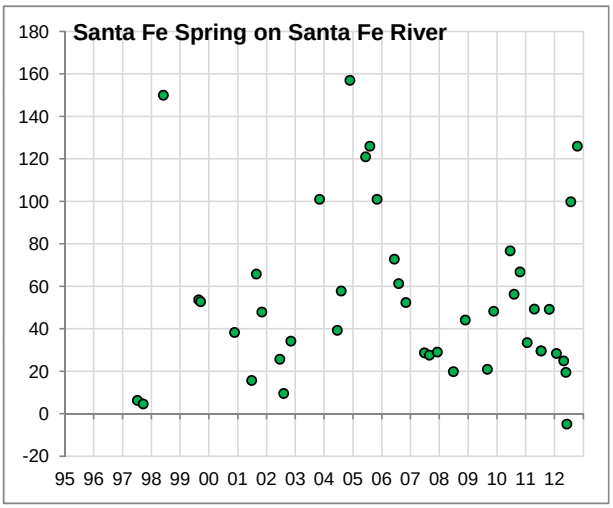
Spring flow is greatly affected by river levels. Rising river levels or high tides can slow spring flow or even reverse it. Some low flows in this data may not be representative of drought conditions.

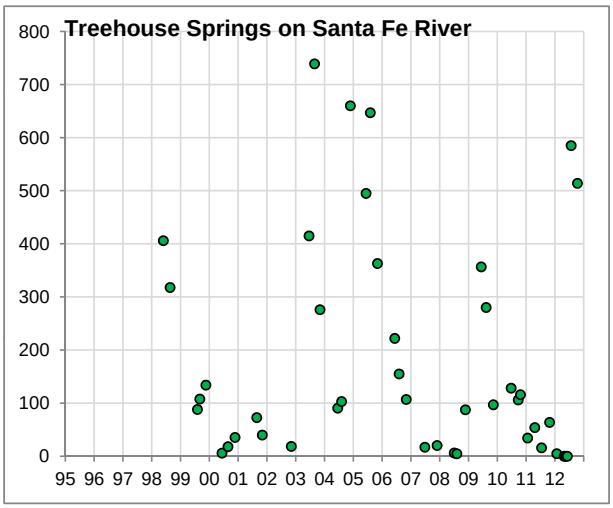












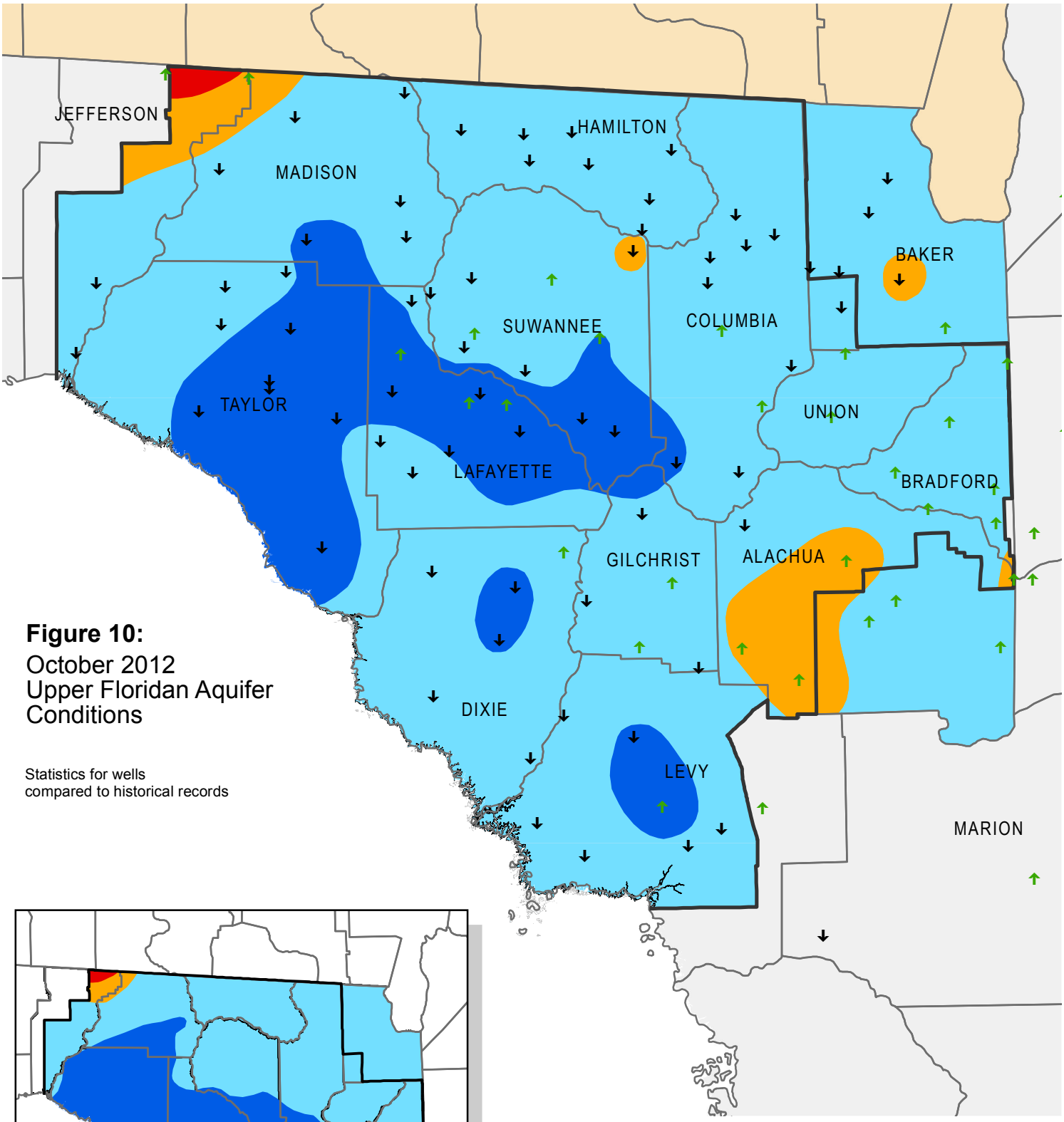
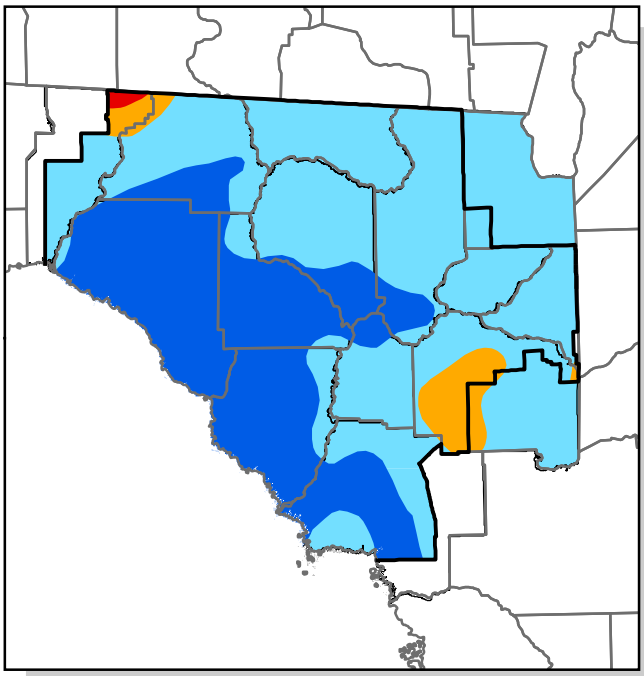


Figure 10:
October 2012
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: September 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

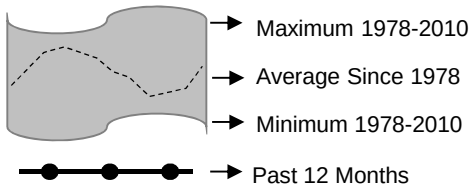
District Boundary

Figure 11: Monthly Groundwater Level Statistics

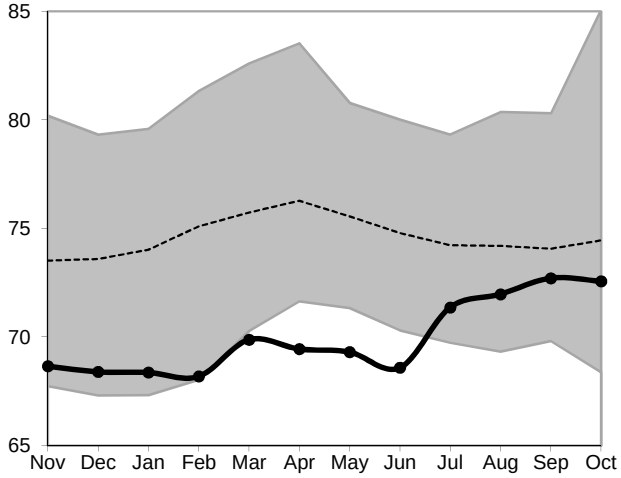
Levels November 1, 2011 through October 31, 2012

Period of Record Beginning 1978

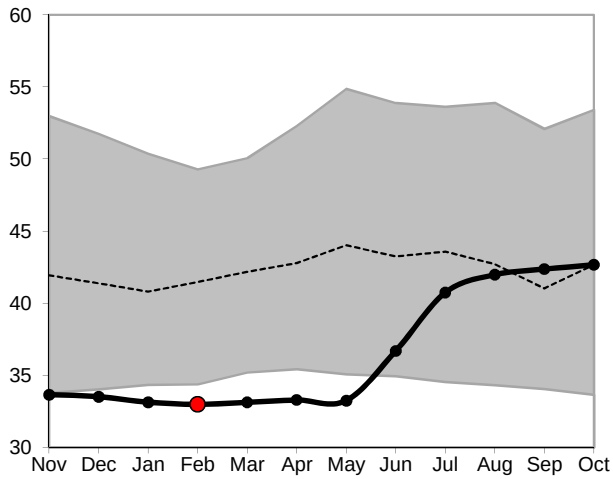
Datum is NGVD 1929



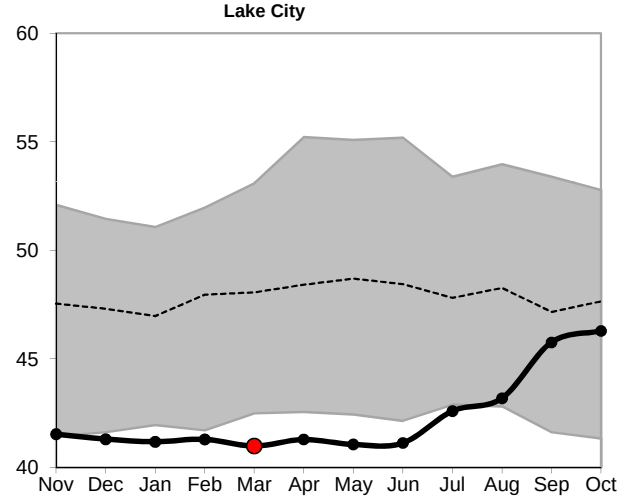
Madison County N010719001
near Greenville



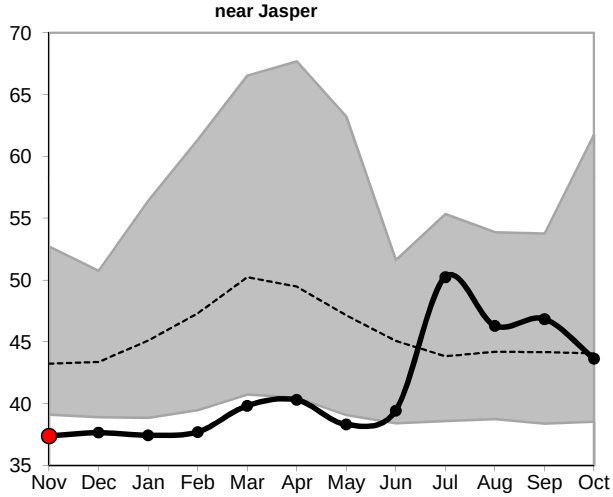
Suwannee County S021335001
near Live Oak



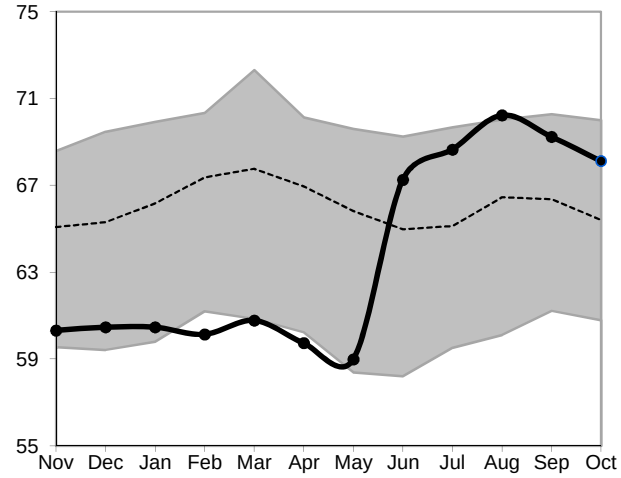
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

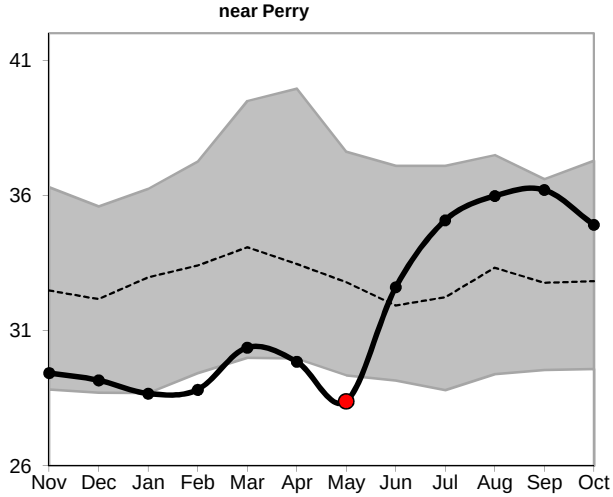
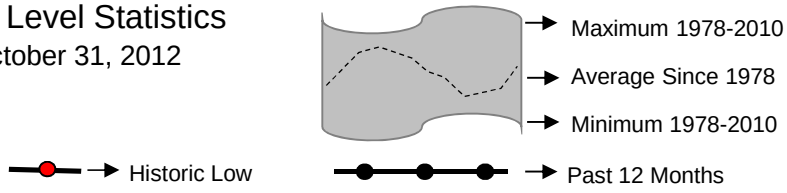
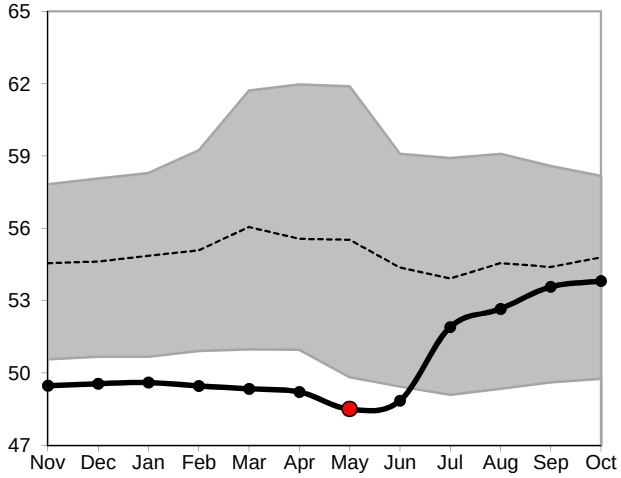


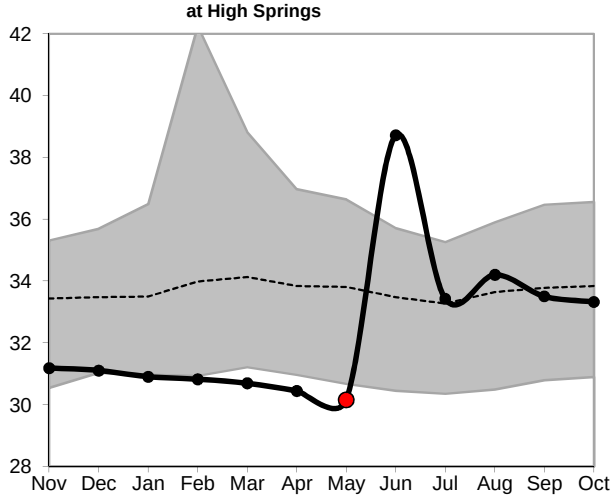
Figure 11, cont.: Groundwater Level Statistics
Levels November 1, 2011 through October 31, 2012
Period of Record Beginning 1978
Datum is NGVD 1929



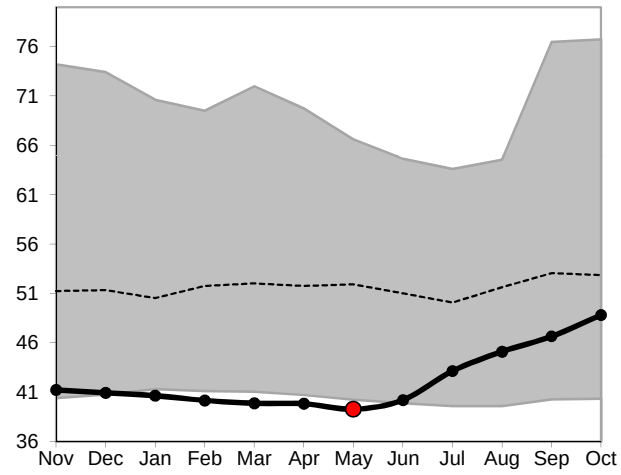
Union County S051933001
near Lake Butler



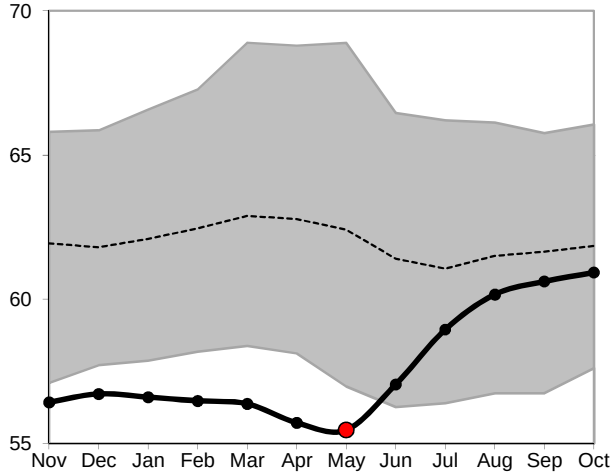
Alachua County S081703001
at High Springs



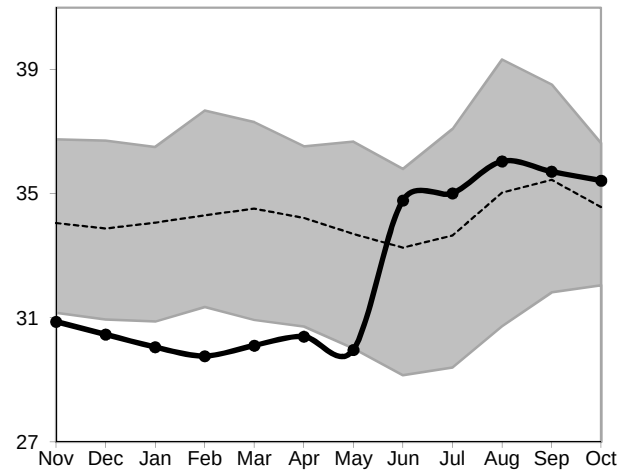
Gilchrist County S091607001
near Trenton



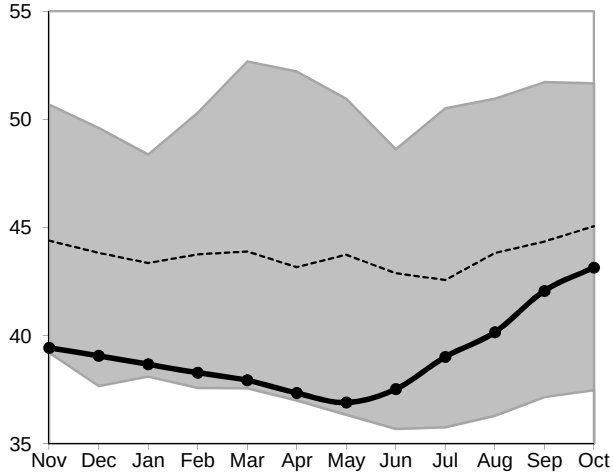
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



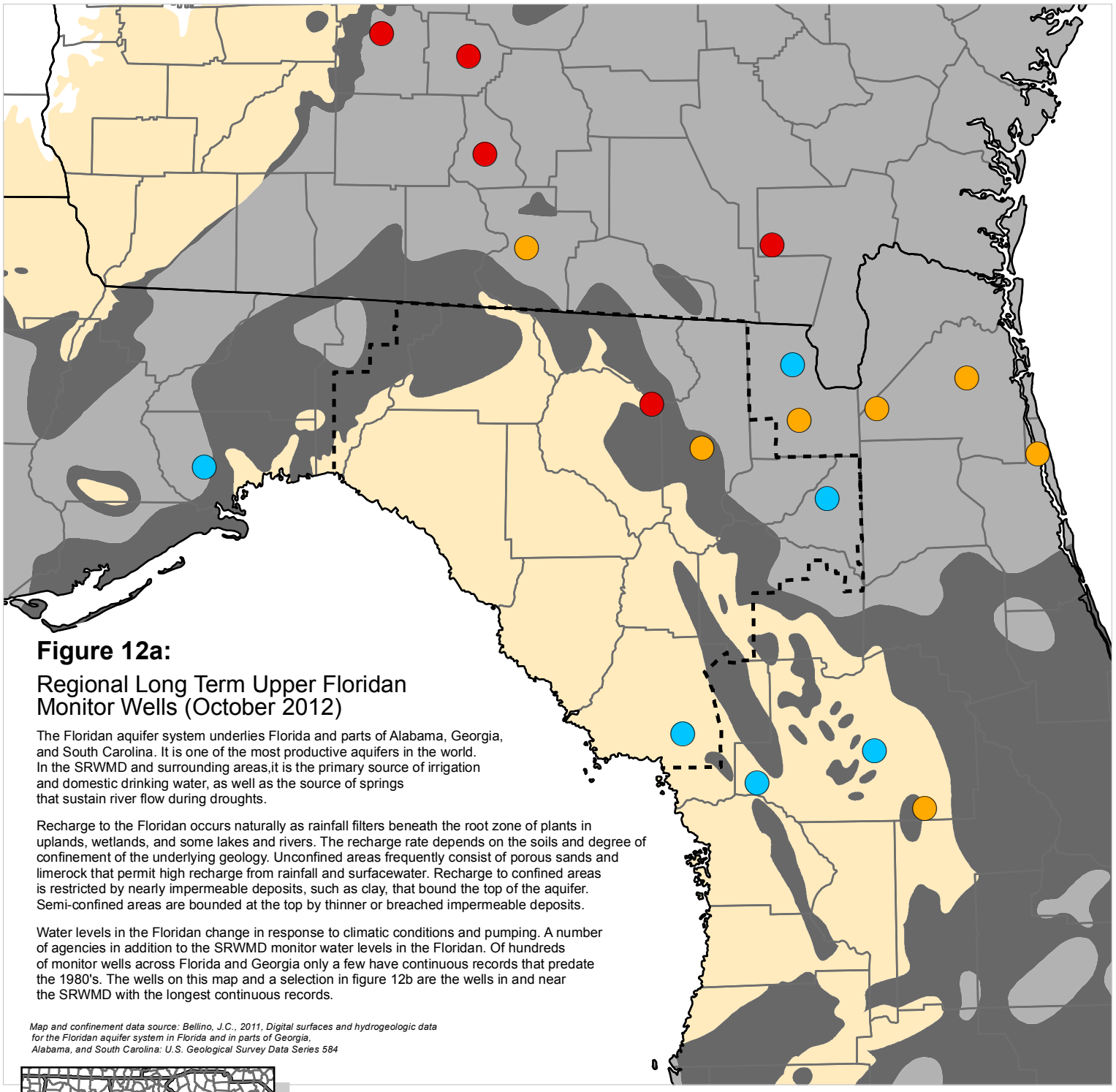


Figure 12a:

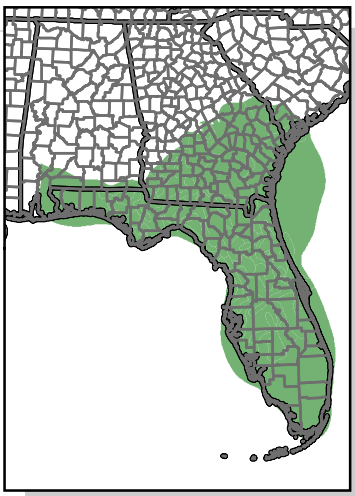
Regional Long Term Upper Floridan Monitor Wells (October 2012)

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

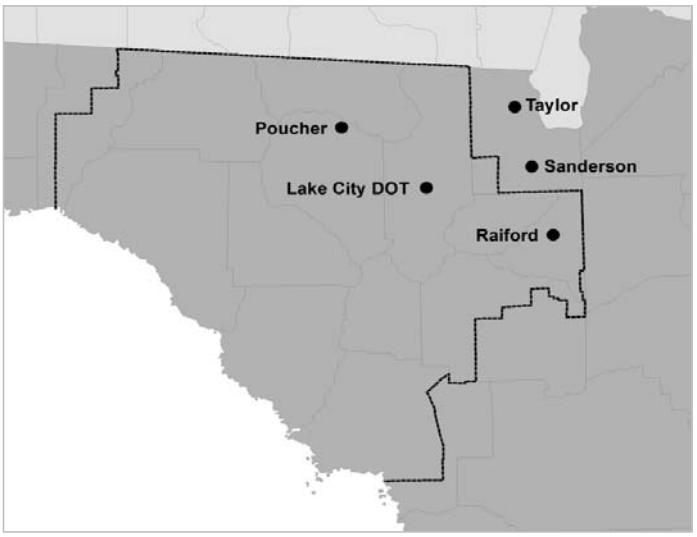
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

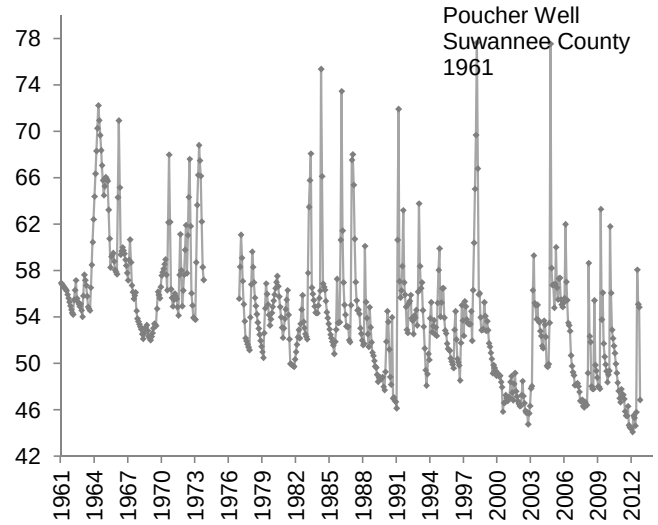
Figure 12b: Regional Long Term Upper Floridan Levels

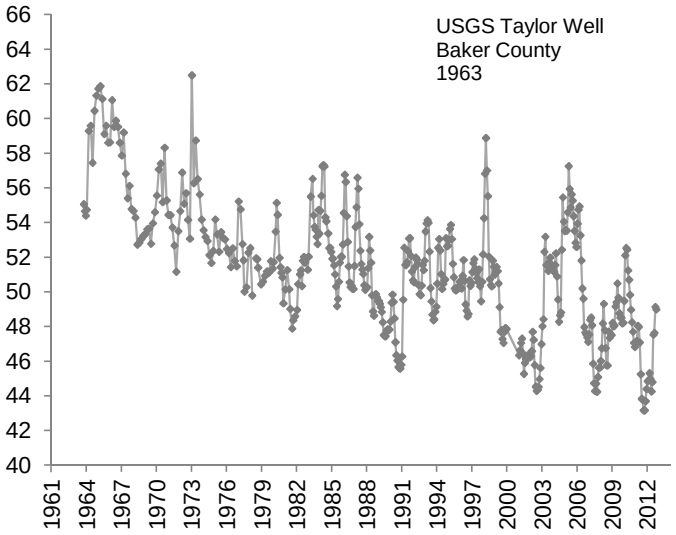
October 2012

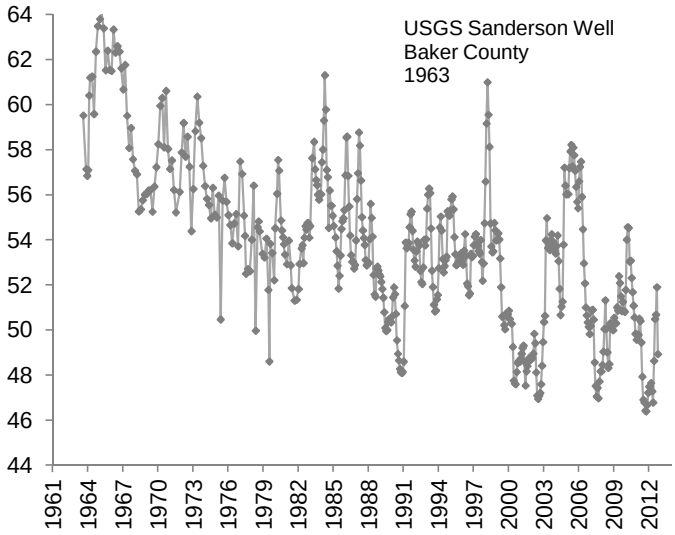
Upper Floridan Aquifer levels in feet above mean sea level

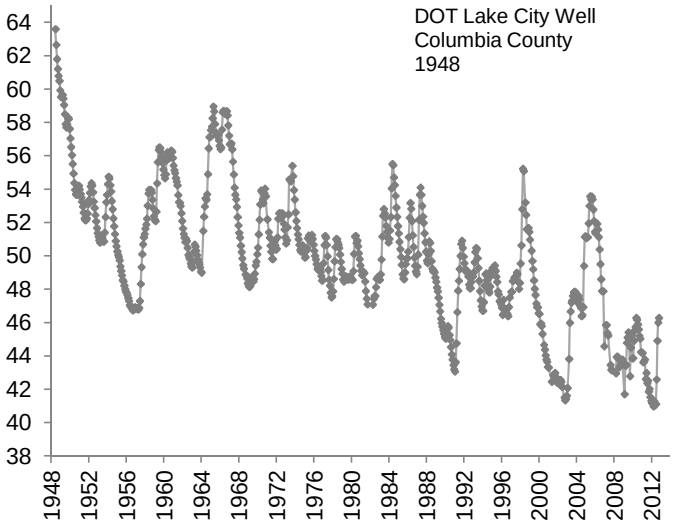
Taylor and Sanderson wells courtesy of SJRWMD











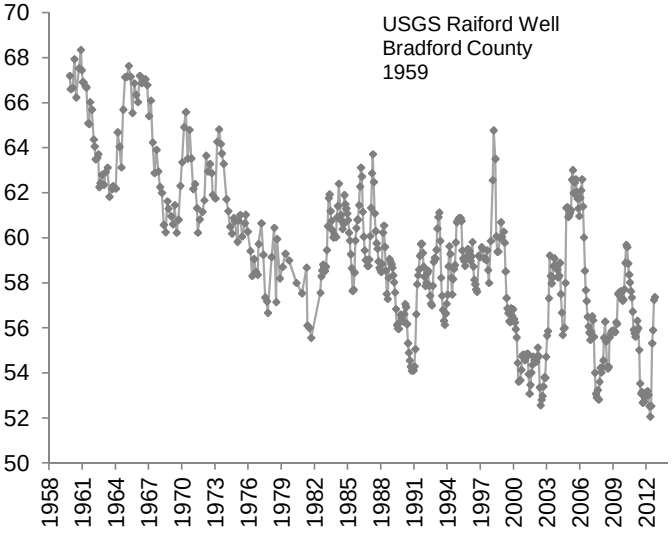


Figure 13: Agricultural Water Use

Daily evapotranspiration (loss of water by evaporation and plant transpiration) and irrigation based on usage reported by up to 106 overhead irrigation systems (12,250 acres total) on a variety of crops throughout the District. These units are part of a network of 164 units installed at 48 agricultural operations by permission of the owners. Evapotranspiration data courtesy of University of Florida IFAS Extension.