MEMORANDUM

TO: Governing Board

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

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

DATE: October 7, 2012

RE: September 2012 Hydrologic Conditions Report for the District

RAINFALL

- Average rainfall in the District was 5.86", which is near the long-term average of 5.54". Most counties averaged near-normal rainfall, with the exception of Bradford which was 50% of normal (Table 1, Figure 1). Parts of interior Levy County saw as much as 12" (Figure 2). The highest gaged total was 8.08" in Newberry, and the lowest was 2.73" in Lake City. The highest gaged 1-day total was 3.86", also at Newberry. Watersheds in south Georgia that contribute to the Suwannee River were generally less than normal (Figure 3).
- Average SRWMD rainfall for the 12 months ending September 30 was 6.35" 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). The surplus was the highest since March 2010. Figure 5 shows the history of rainfall deficits beginning in 1998. The last three months' precipitation was the same as the long-term average, based on records beginning in 1932.

SURFACEWATER

- **Rivers:** Coastal rivers in Taylor, Dixie, and Levy counties remained significantly higher than normal throughout September, but drier conditions in the last half of the month allowed levels to slowly decline. The Steinhatchee River fell below the 80th percentile of daily flows for the first time in over 3 months. Its headwaters received a year's worth of rain since late May. Suwannee River conditions remained stable, staying above the 50th percentile throughout the month. Upper Santa Fe gages also remained above median, but the Santa Fe near Fort White in the lower Santa Fe basin dropped to just above the 25th percentile by the end of the month. The Withlacoochee and Alapaha rivers, which were relatively unaffected by tropical systems in 2012, improved to consistently normal conditions. 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**: The Governor Hill Lake gage in northeast Dixie County reported levels for the first time in five years, with the lake reaching its highest level since 2006. Four of sixteen monitored lakes remained below but near their long-term average levels. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for lakes where the gages were accessible.

SPRINGS

The Ichetucknee River flowed at rates last seen in 2006, with rates near the average annual flow based on records beginning in 1917. Lafayette Blue Springs, Little River Springs, and Suwannee Blue Springs also had their highest flows in more than 6 years. Some springs were still affected by river levels and by tannic water returning from the aquifer. The Suwannee River flowed into White Sulphur Springs throughout the month. Statistics for a representative sample of springs are shown in Figures 9a and 9b.

GROUNDWATER

One-third of monitored Upper Floridan Aquifer wells were in the highest 25% of records and more than half were in a range considered normal. Only one well, in northern Jefferson County, remained below the 10th percentile. Levels remained high in Taylor, Dixie, and Lafayette counties (Figure 10). Levels in the confined aquifer in eastern counties continued to creep up, but conditions started to fall in most unconfined areas, especially in the lower Santa Fe basin. Median conditions across the District compared to all historic levels remained near the 65th percentile (based on records beginning no earlier than 1978) for the third month in a row. 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 September 29 indicated moderately wet conditions in north Florida and incipient dry spell conditions in south central Georgia.
- The National Weather Service Climate Prediction Center issued an El Niño watch after models indicated El Niño conditions could develop in the coming months, but the most recent analysis suggests the chance of an El Niño is diminishing. El Niño conditions often bring cooler and wetter weather to North Florida in the fall and winter.
- Figure 13 shows overhead irrigation application at a number of farms in the District. The average daily application rate was 0.03", slightly higher than the August rate of 0.02", but less than half of application rates reported in September 2010 and 2011.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to two days 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), 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	Sep 2012	September Average	Last 3 Months	Last 12 Months
Alachua	6.14	5.36	21.73	57.95
Baker	4.36	5.44	15.50	60.83
Bradford	3.06	6.13	19.01	59.86
Columbia	5.20	4.85	17.56	65.87
Dixie	5.60	6.58	25.45	57.22
Gilchrist	6.82	5.75	24.02	59.44
Hamilton	5.22	4.63	12.89	56.73
Jefferson	5.42	5.31	16.52	52.64
Lafayette	6.62	5.46	24.93	73.27
Levy	7.49	6.70	26.18	55.55
Madison	6.91	4.62	16.93	59.21
Suwannee	6.17	5.08	19.24	72.54
Taylor	5.57	5.61	23.95	62.33
Union	4.33	4.94	17.52	59.96

September 2012 Average:	5.86
Historical September Average (1932-2011):	5.54
Historical 12-month Average (1932-2011):	54.56
Past 12-Month Total:	60.91
12-month Rainfall Surplus:	6.35

(Rainfall reported in inches)

Figure 1: Comparison of District Monthly Rainfall

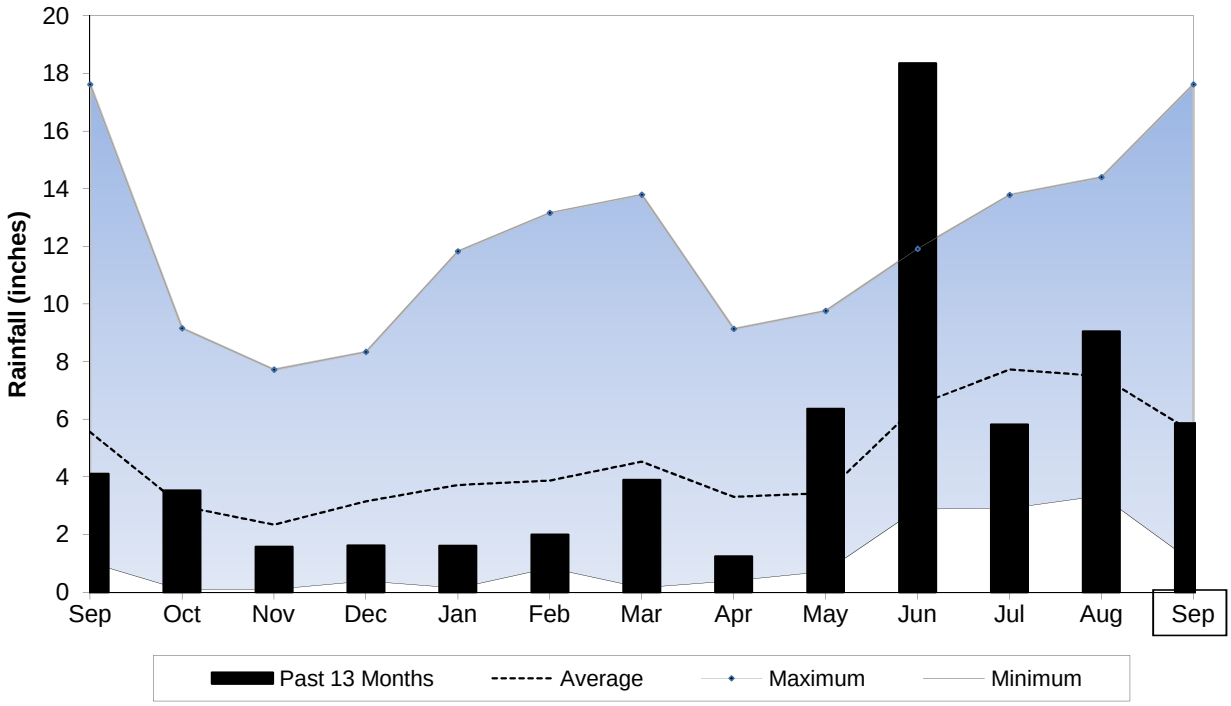


Figure 2: September 2012 Rainfall Estimate

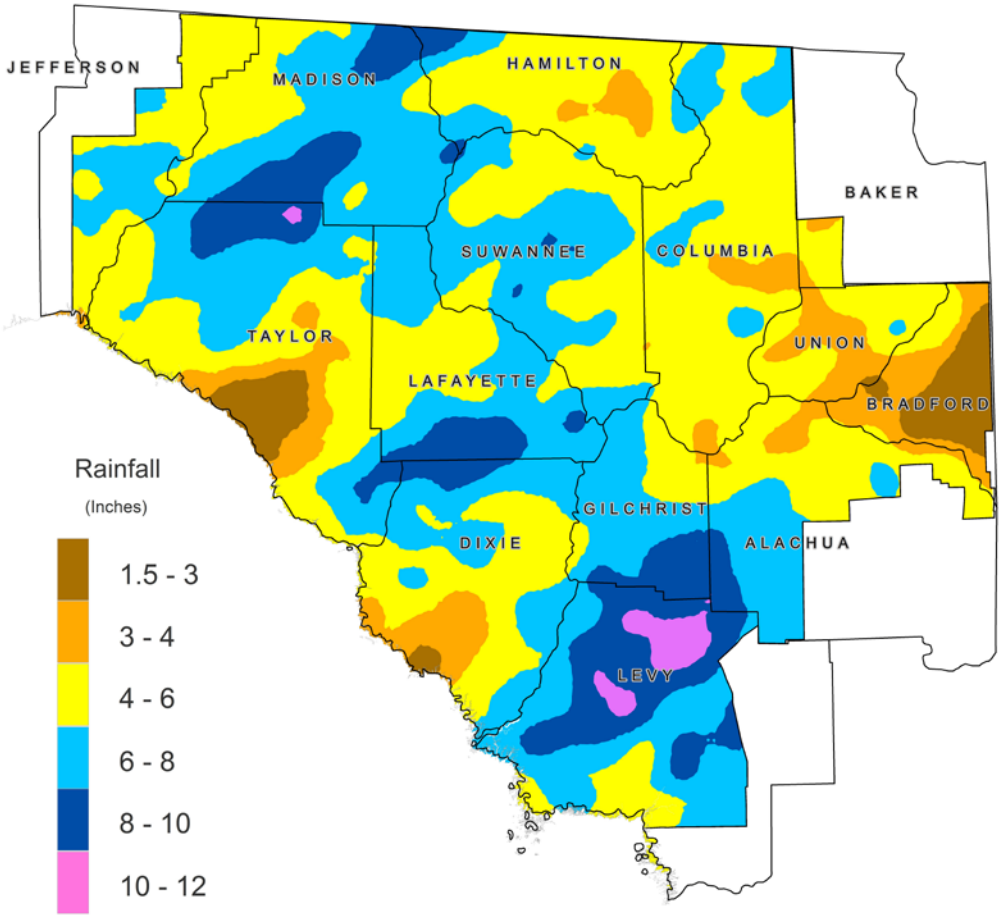


Figure 3: September 2012 Percent of Normal Rainfall

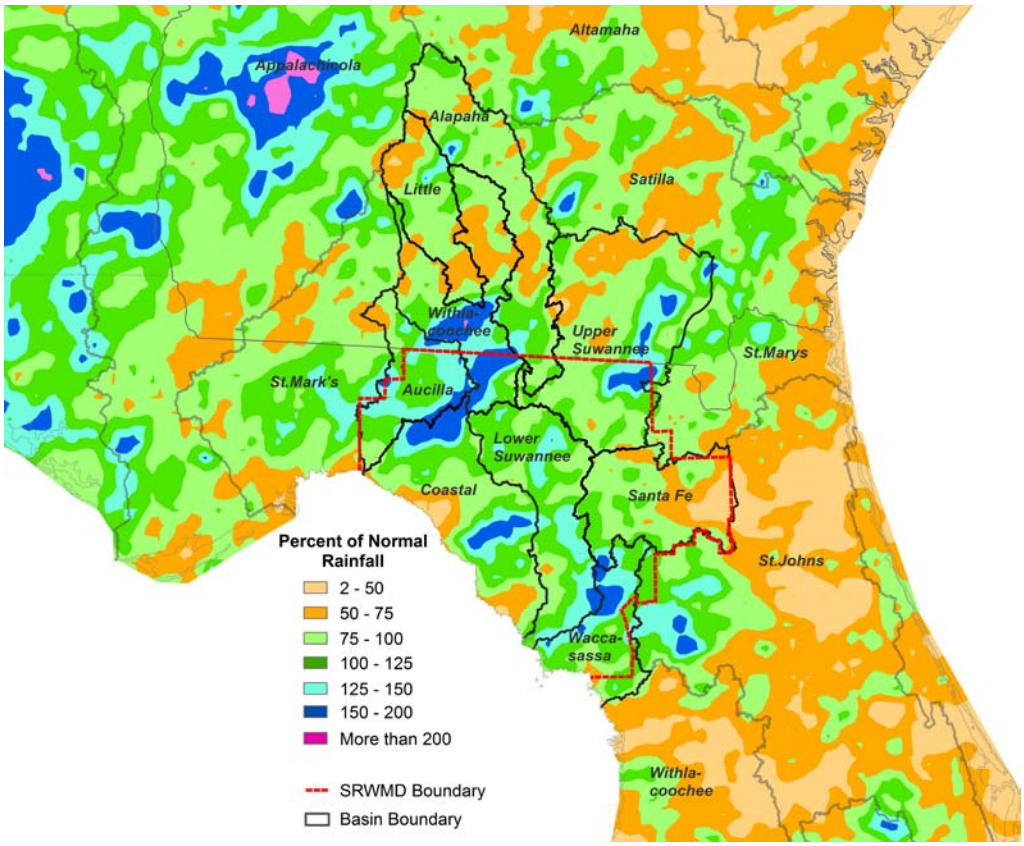


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Ending September 30, 2012

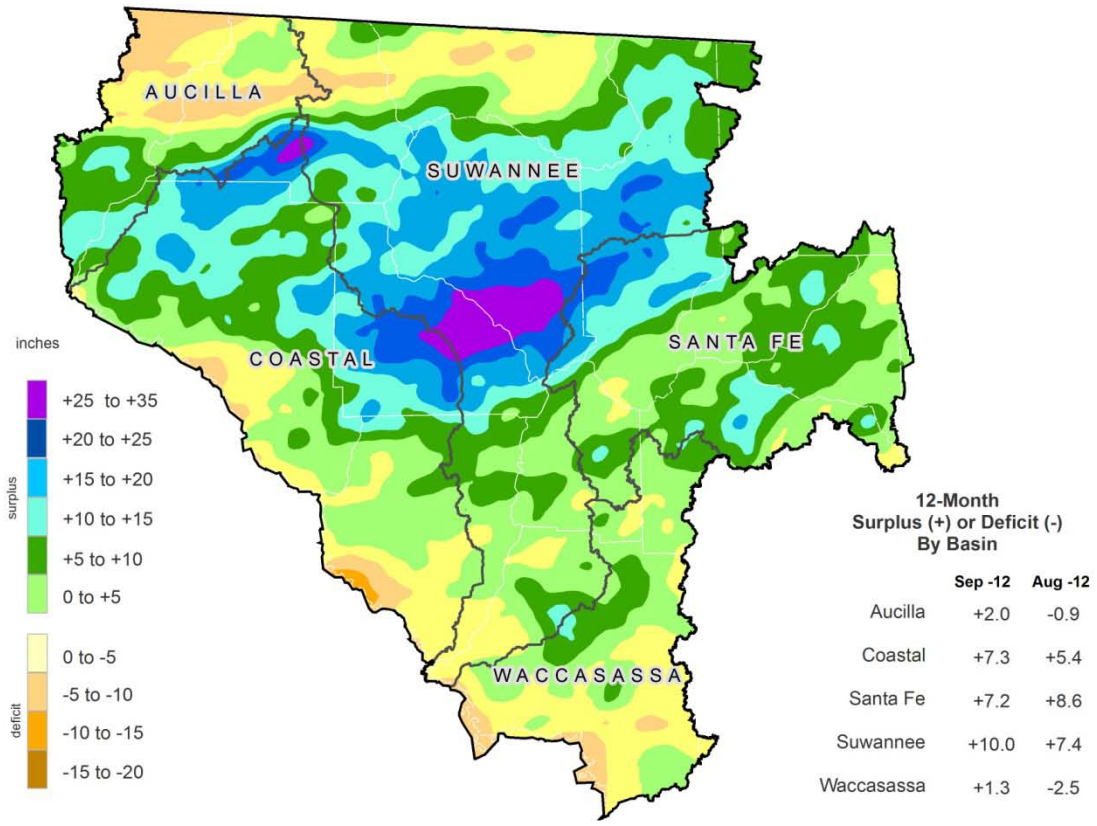


Figure 5: 12-Month Rolling Rainfall Deficit Since 1998
Difference between observed 12-month rainfall and the long-term average

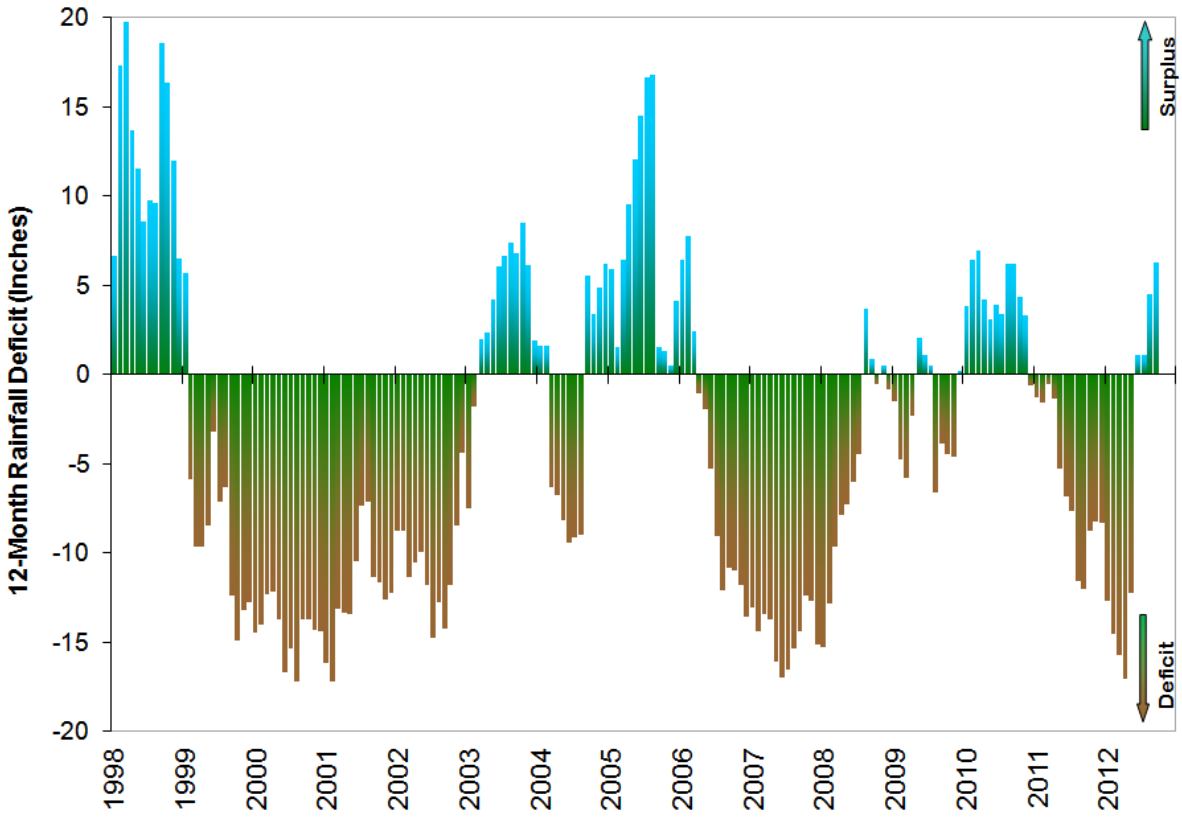
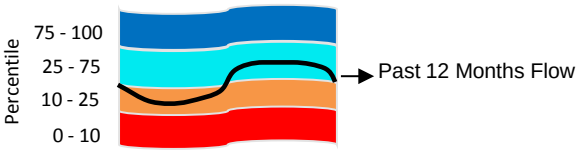
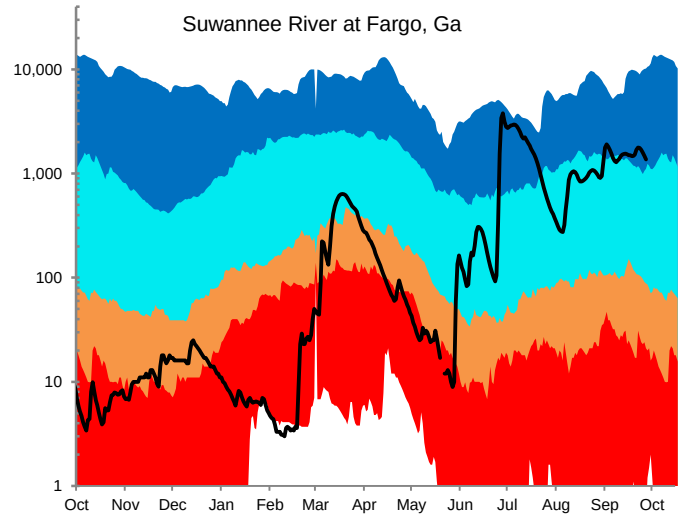
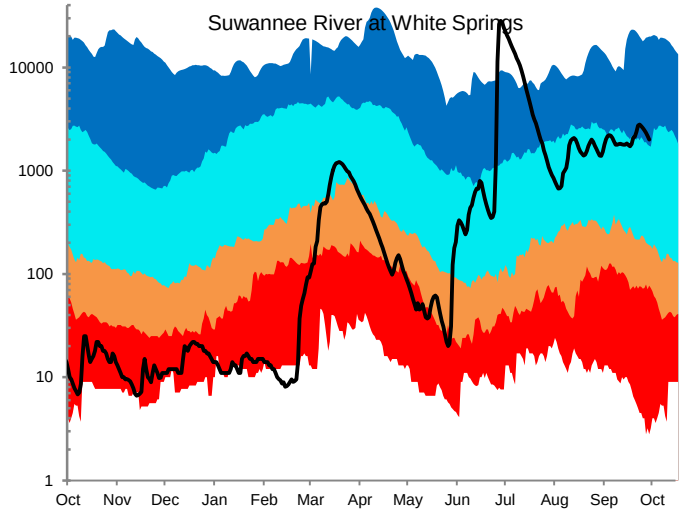


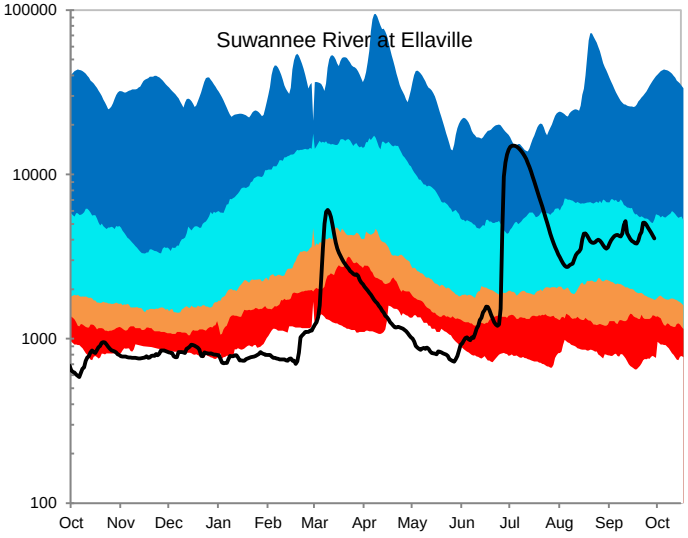
Figure 6: Daily River Flow Statistics
October 1, 2011 through September 30, 2012

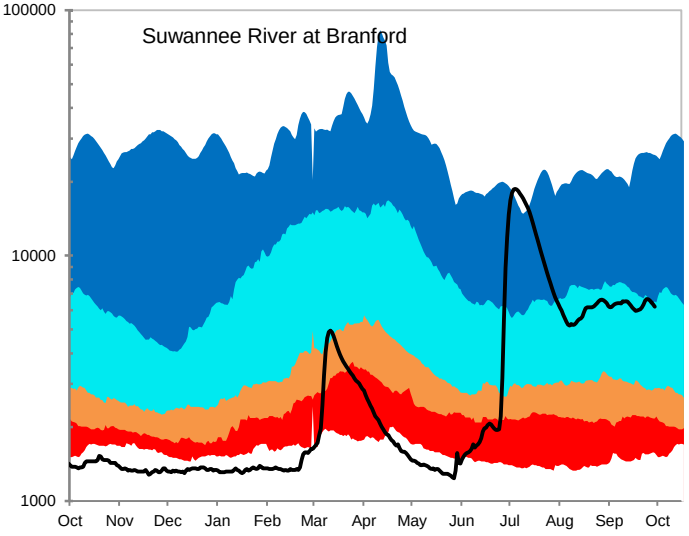


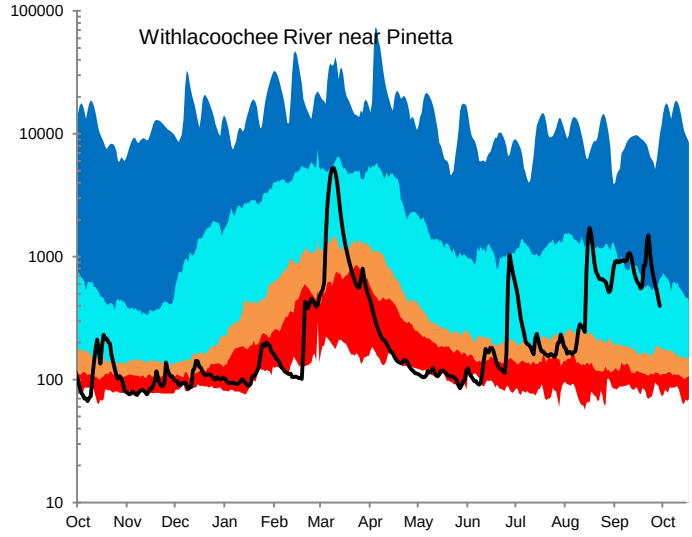
RIVER FLOW, CUBIC FEET PER SECOND











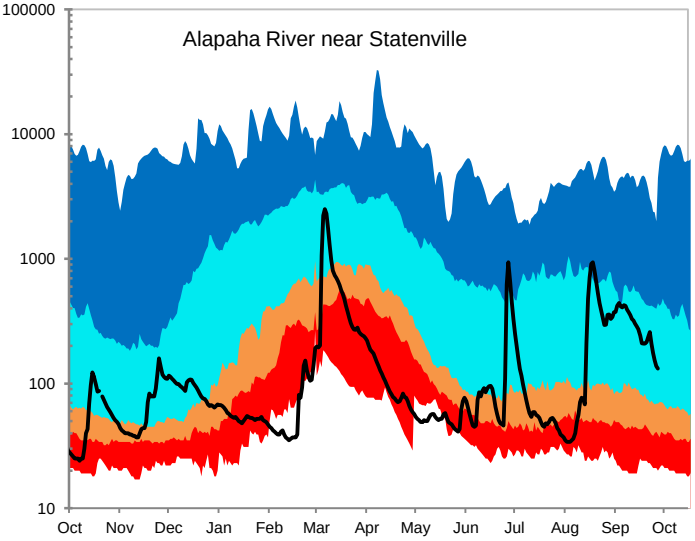
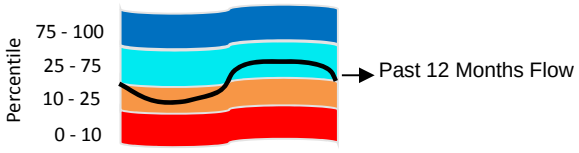
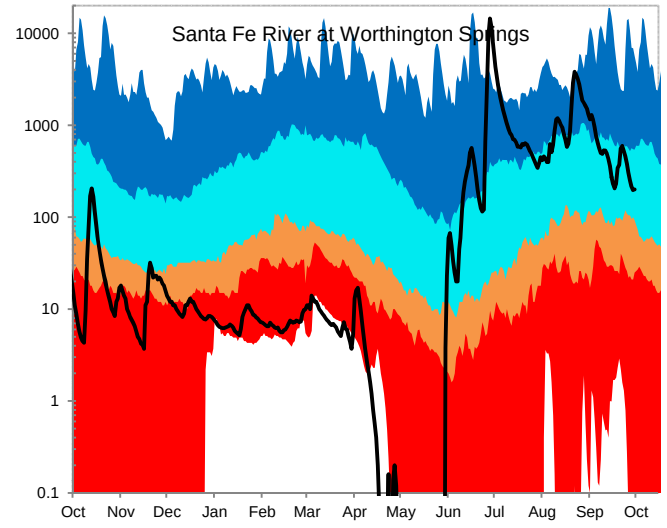
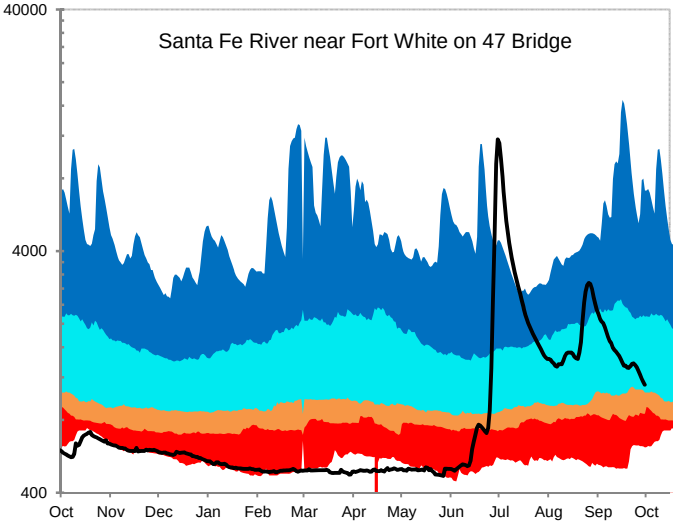


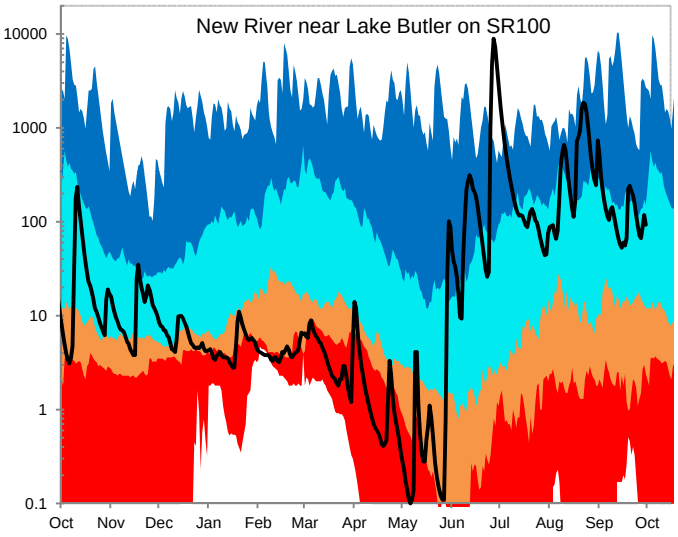
Figure 6, cont: Daily River Flow Statistics
October 1, 2011 through September 30, 2012

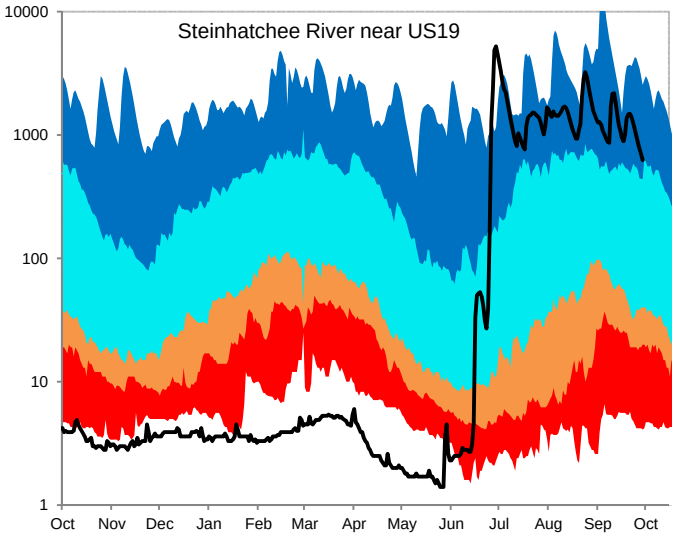


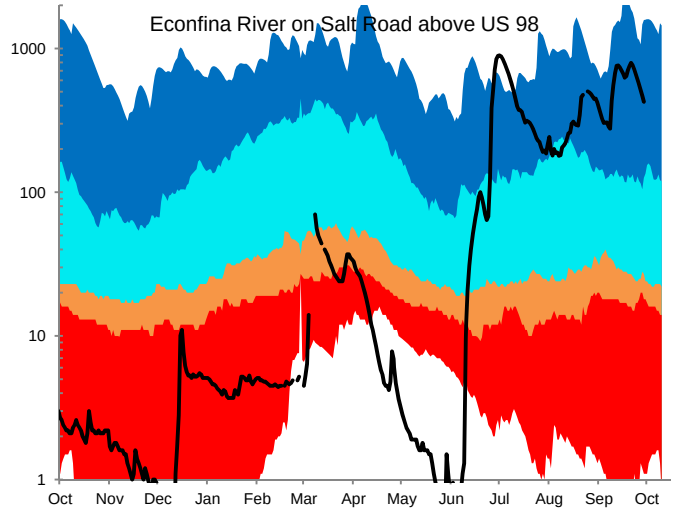
RIVER FLOW, CUBIC FEET PER SECOND

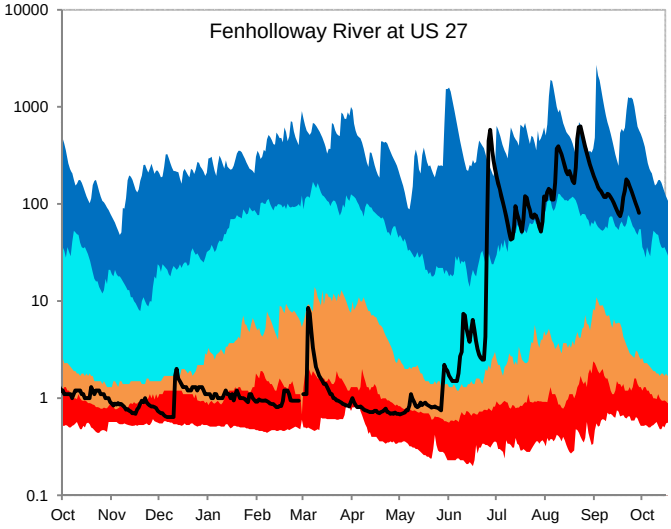












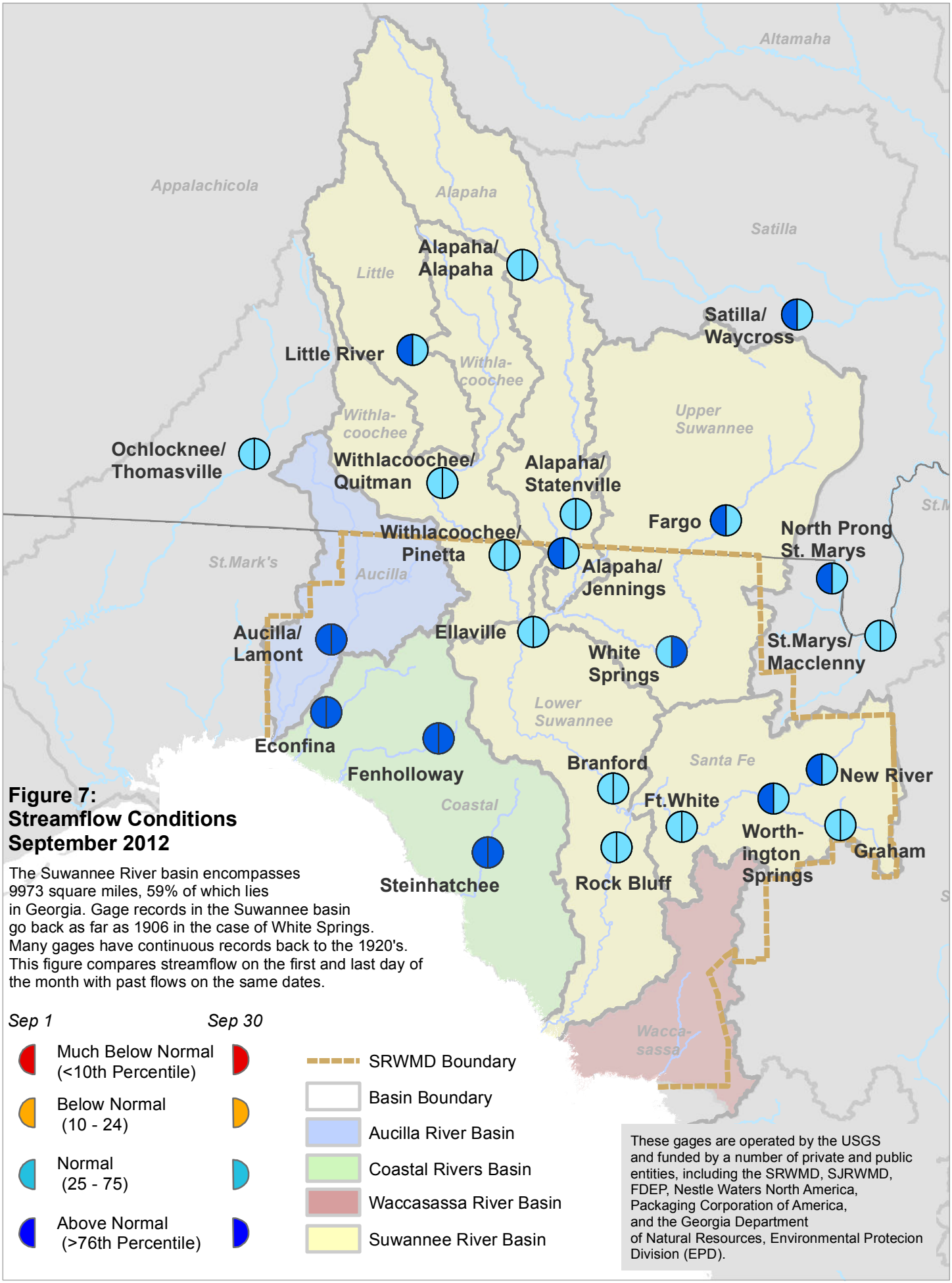
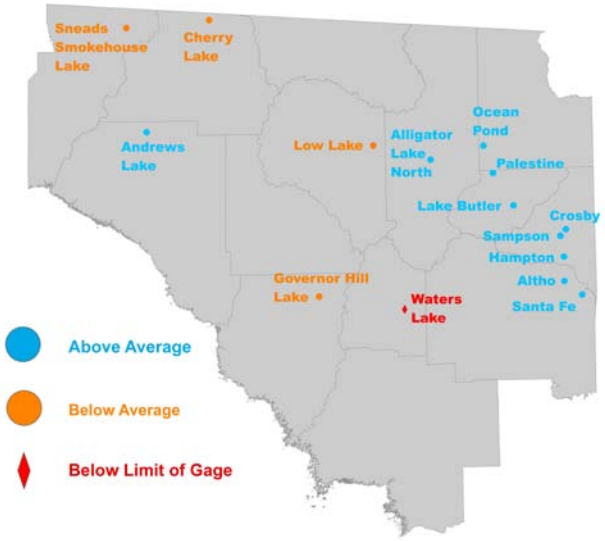


Figure 7:
Streamflow Conditions
September 2012

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.

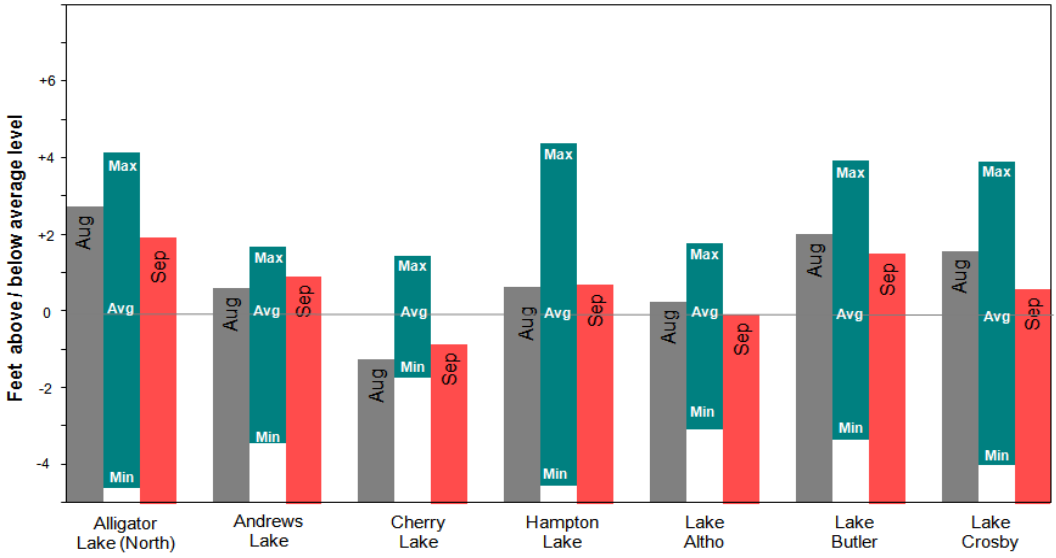
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

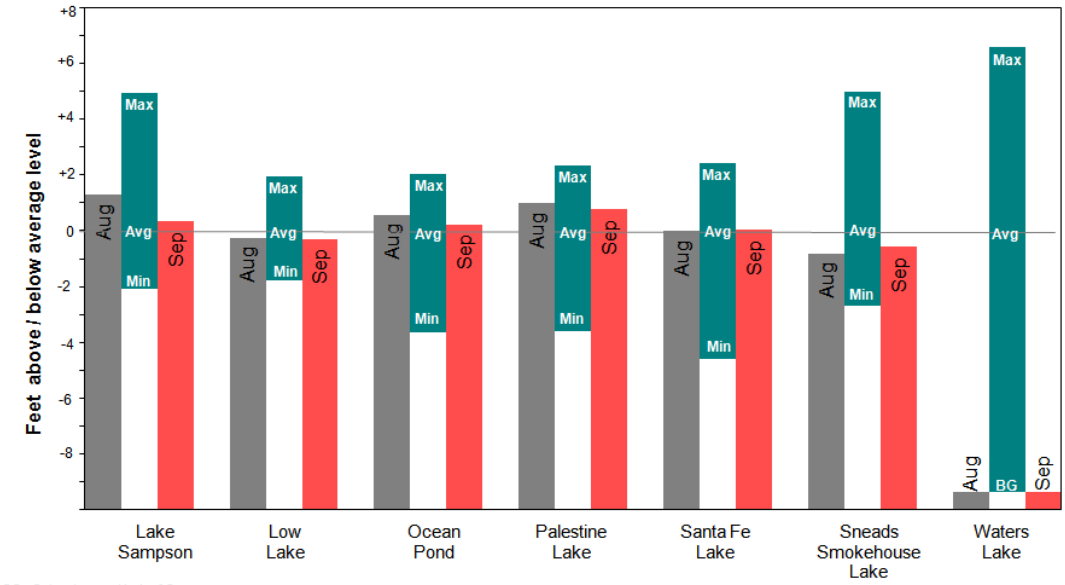
Figure 8: September 2012 Lake Levels



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 1970's, although the Sampson Lake record starts in 1957.





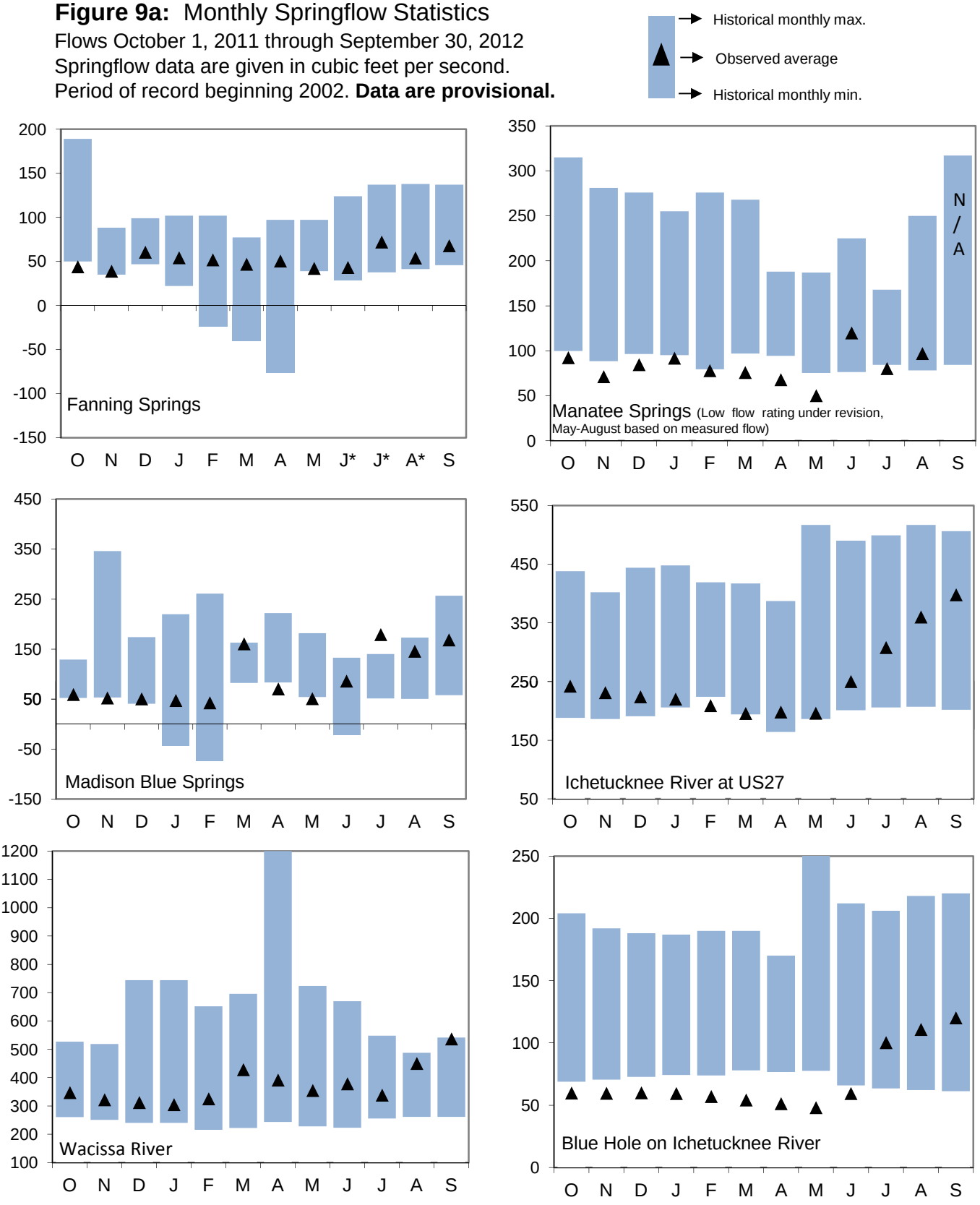
BG = Below Lowest Limit of Gage

Figure 9a: Monthly Springflow Statistics

Flows October 1, 2011 through September 30, 2012

Springflow data are given in cubic feet per second.

Period of record beginning 2002. **Data are provisional.**

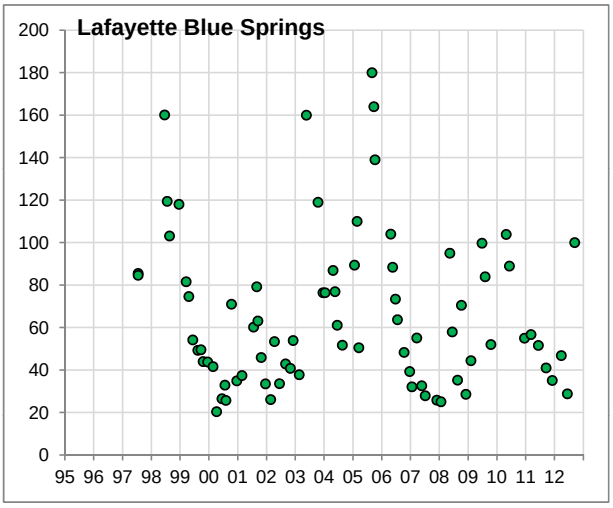


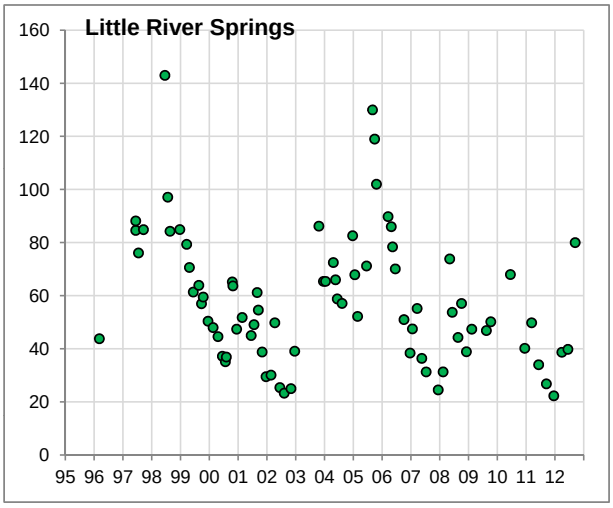
Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse.
Springflow for months marked by an asterisk (*) was strongly affected by river conditions.
Data will be revised once approved and published by the U.S. Geological Survey.

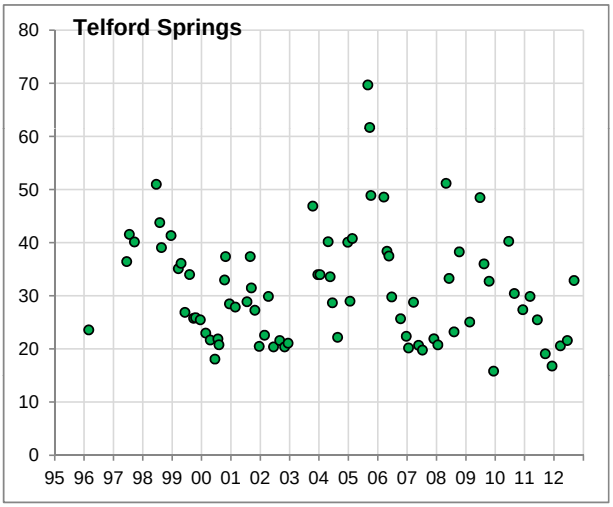
Figure 9b: Quarterly Springflow Measurements

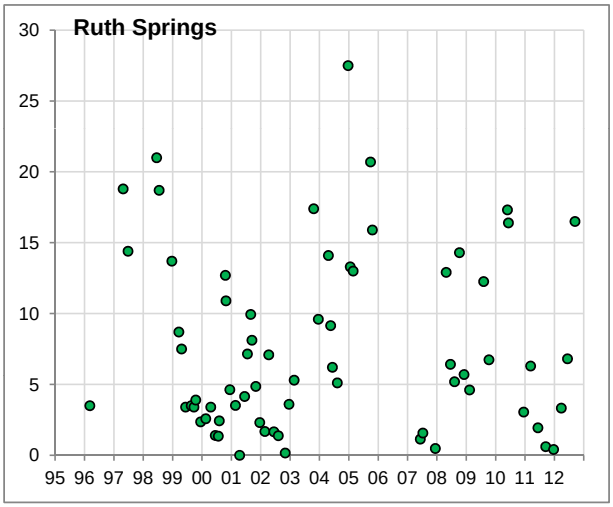
The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were sampled in September 2012. Flow is given in cubic feet per second.

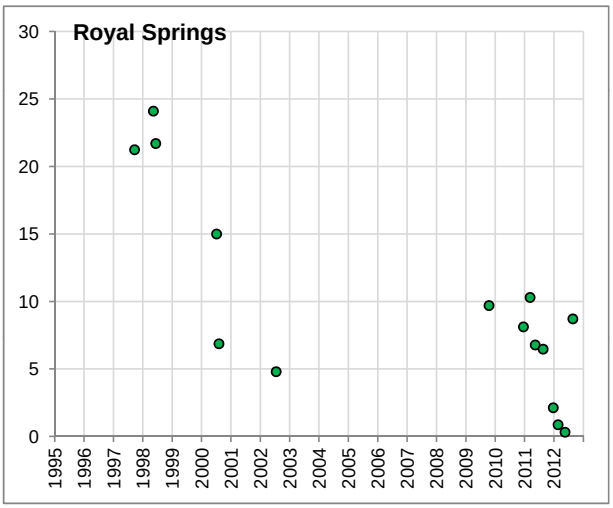
Spring flow is greatly affected by river levels. Rising river levels or high tides can slow spring flow or even reverse it. Some low flows in this data may not be representative of drought conditions.

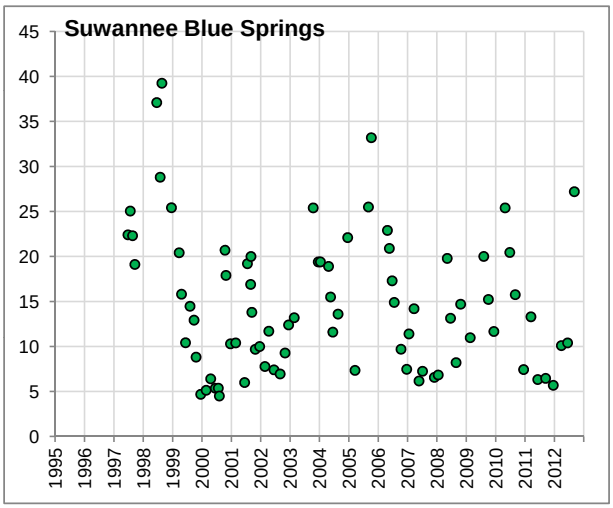












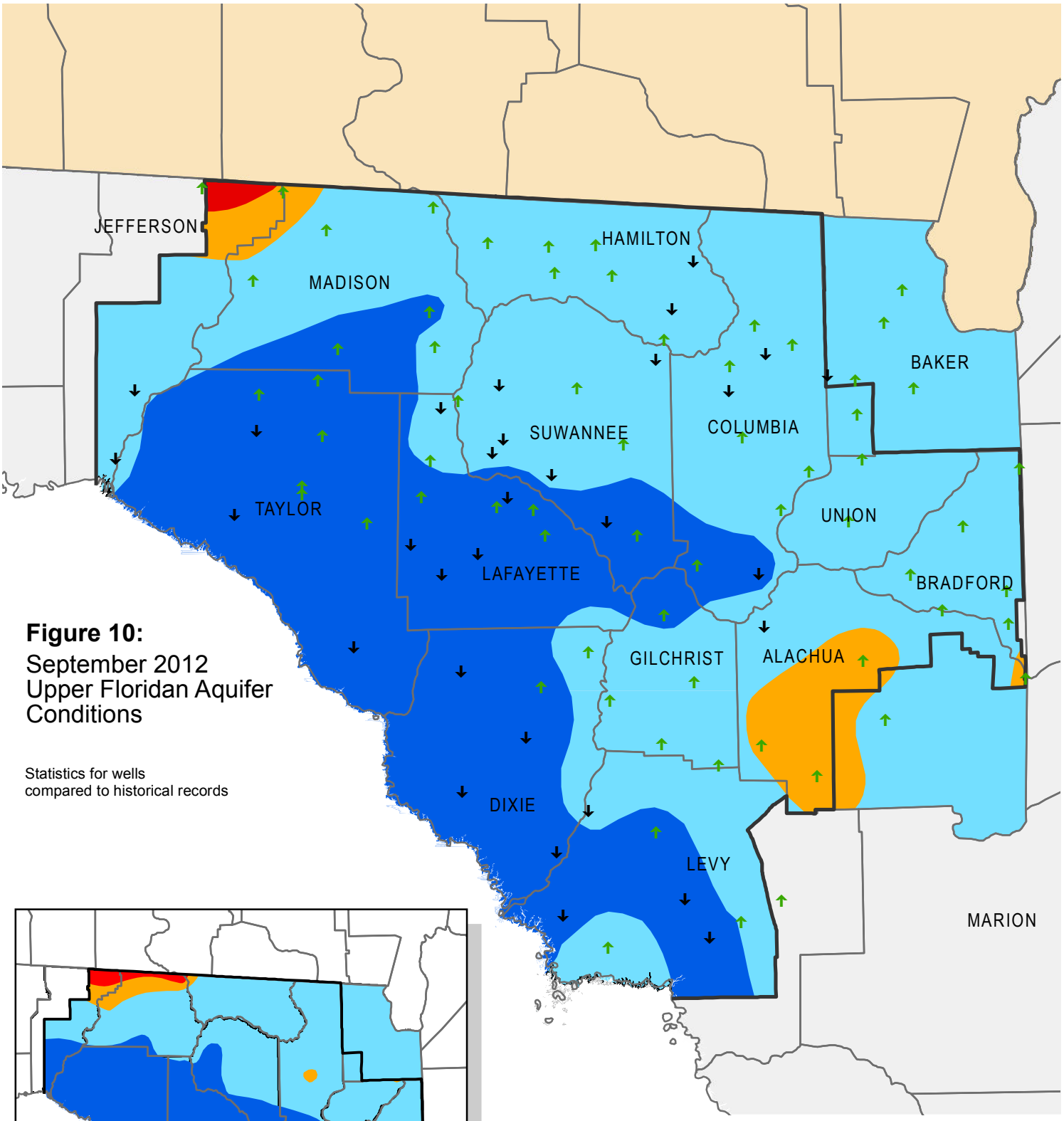
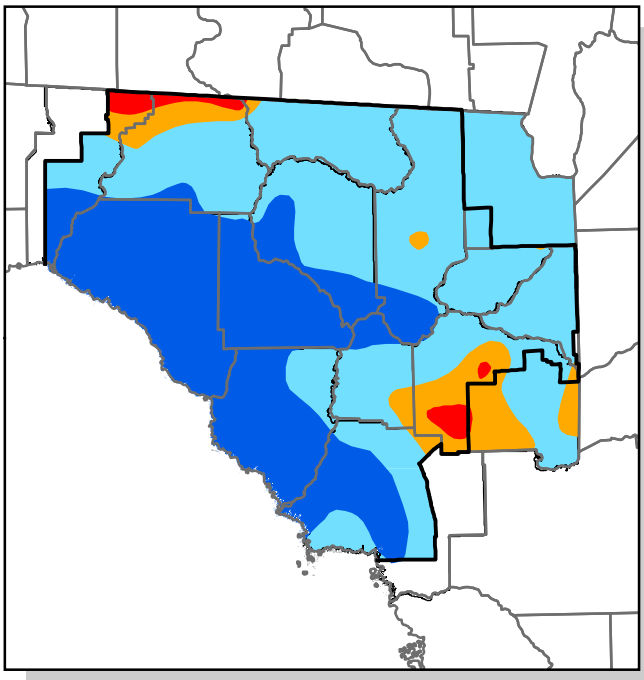


Figure 10:
September 2012
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: August 2012 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

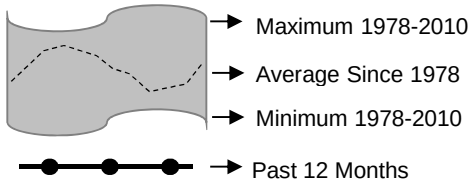
Extremely Low
(Less than 10th Percentile)

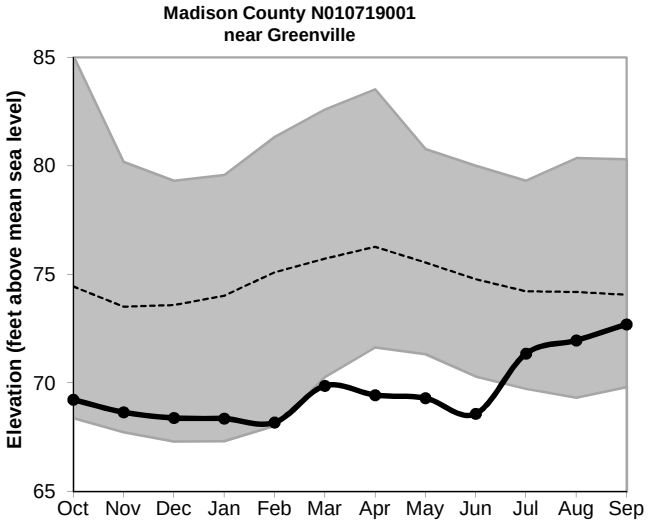
Increase/decrease in level since last month

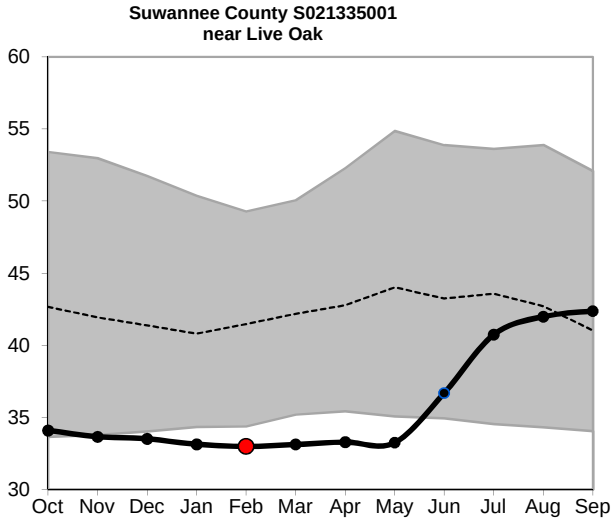
District Boundary

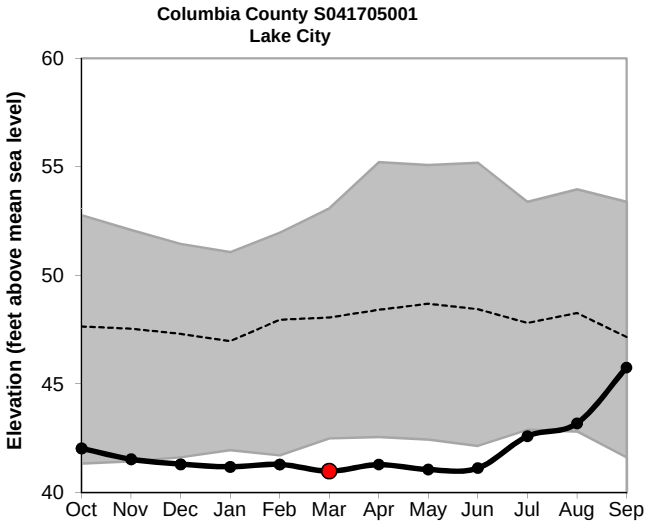
Figure 11: Monthly Groundwater Level Statistics

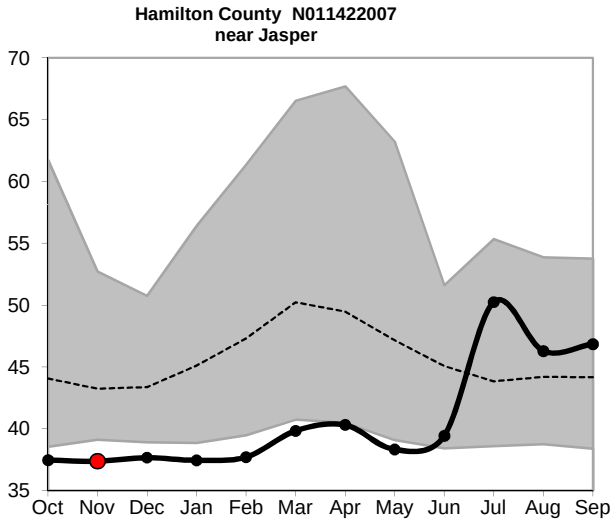
Levels October 1, 2011 through September 30, 2012
Period of Record Beginning 1978

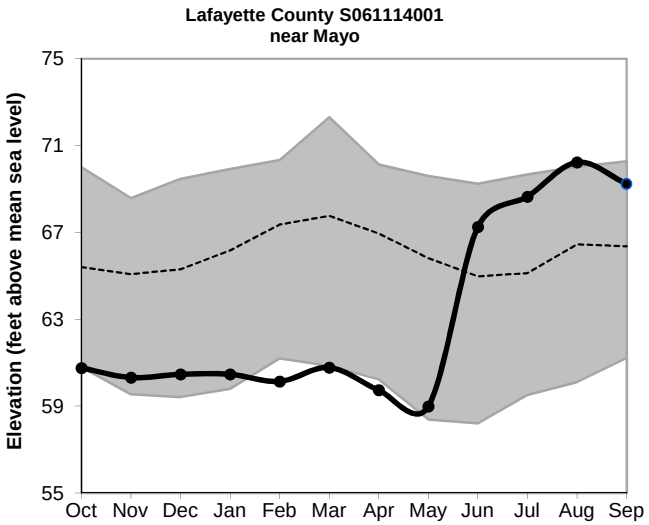












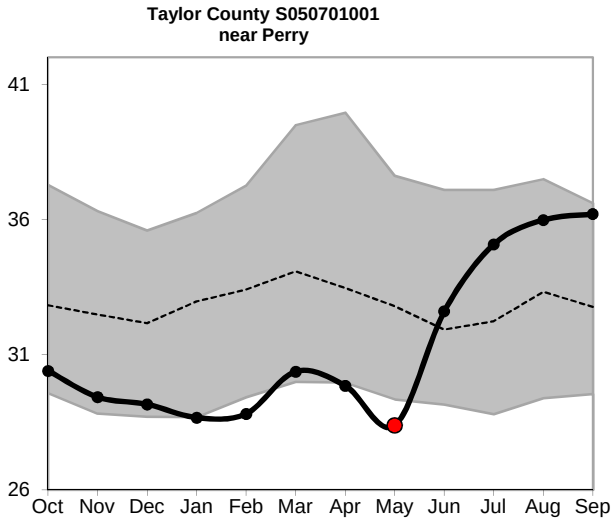
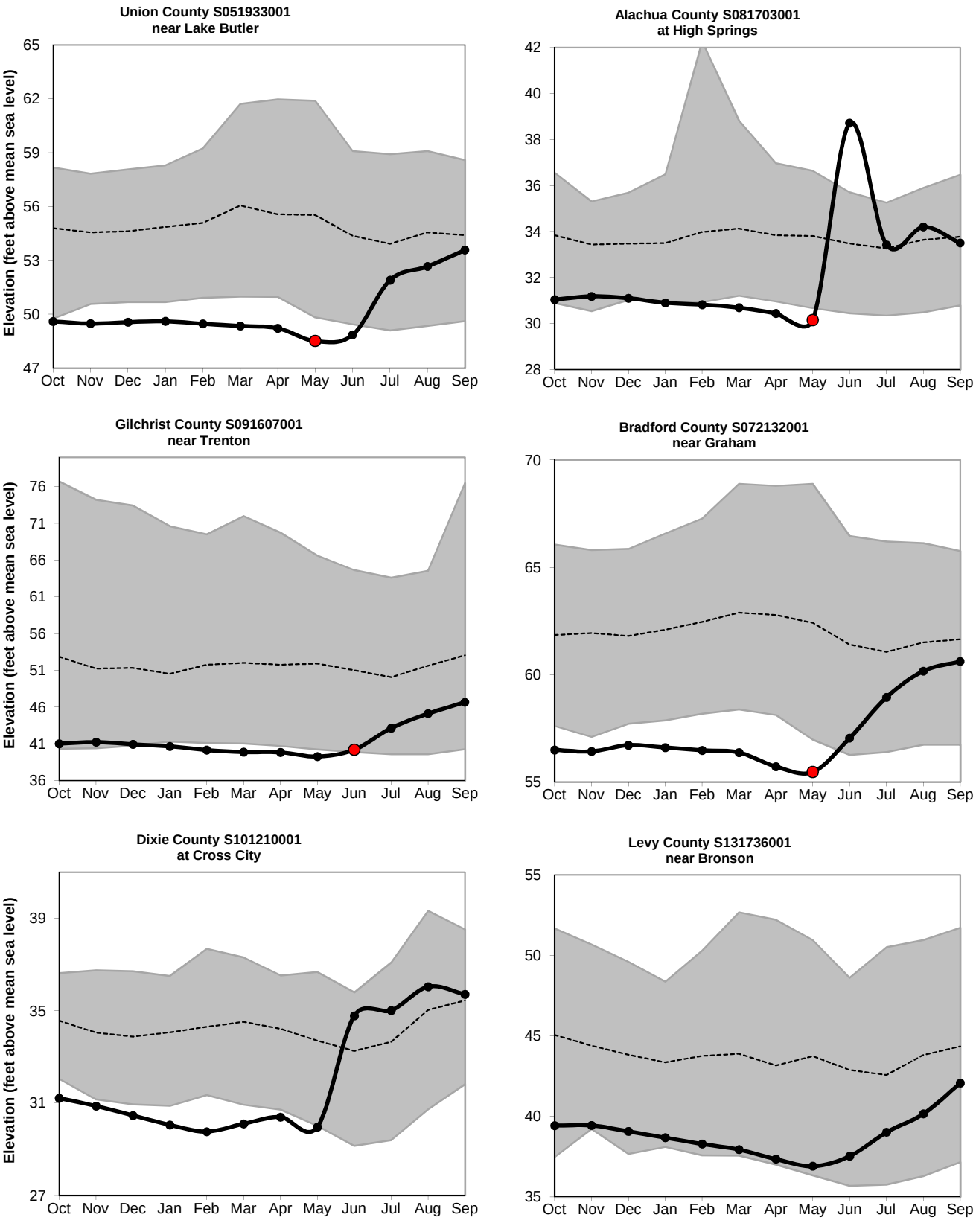


Figure 11, cont.: Groundwater Level Statistics

Levels October 1, 2011 through September 30, 2012
Period of Record Beginning 1978



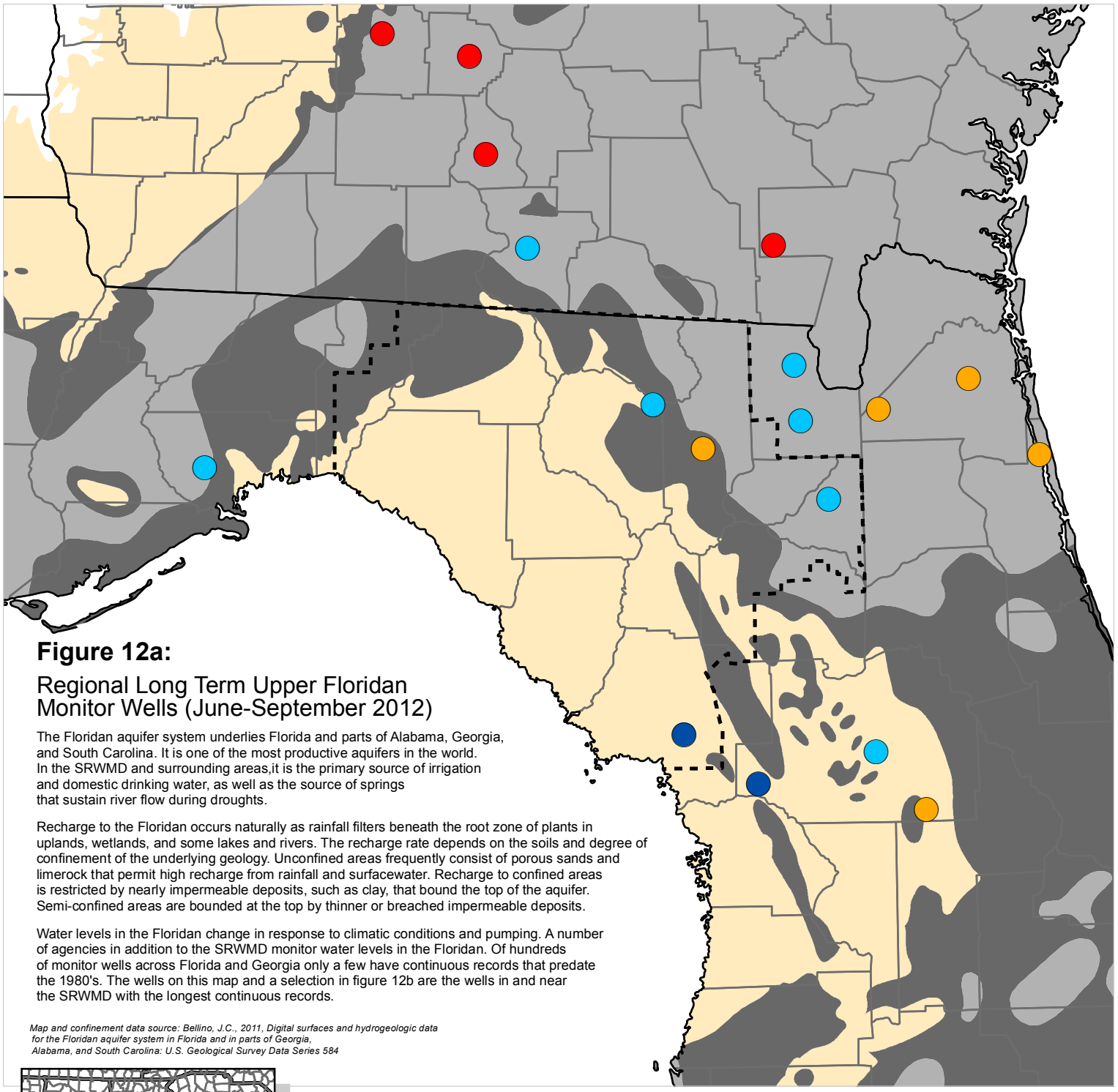


Figure 12a:

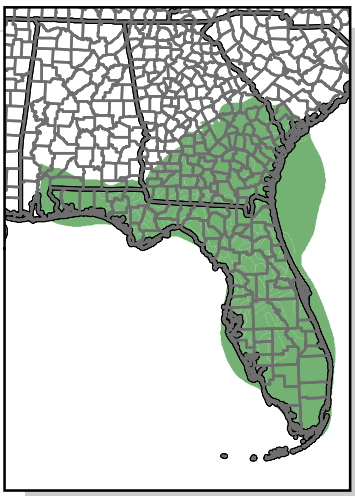
Regional Long Term Upper Floridan Monitor Wells (June-September 2012)

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

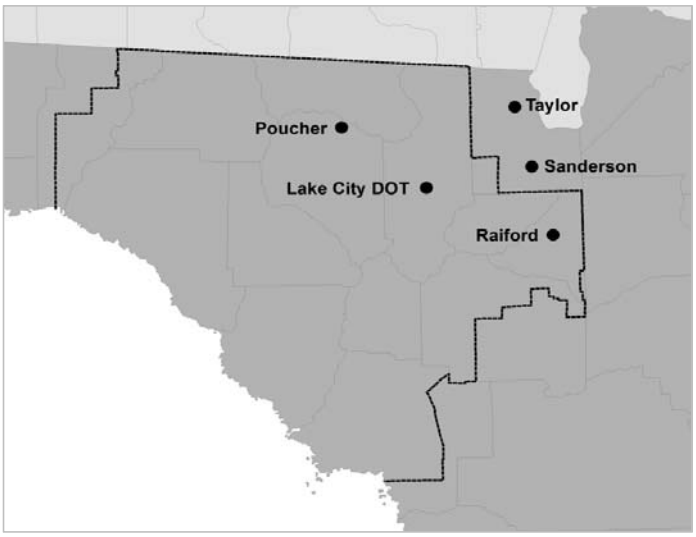
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

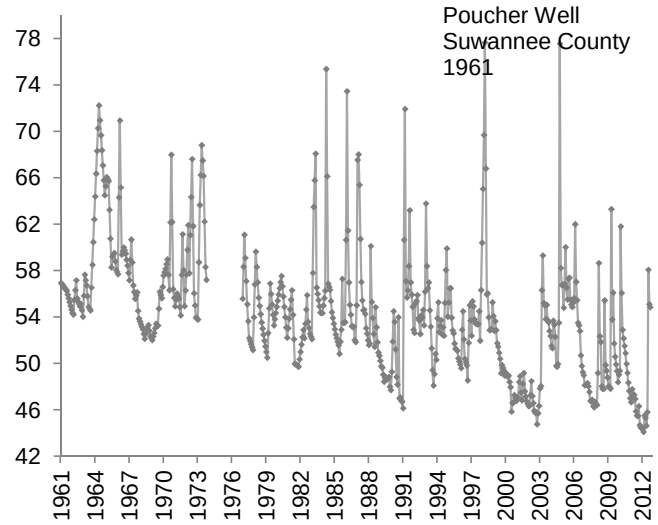
Figure 12b: Regional Long Term Upper Floridan Levels

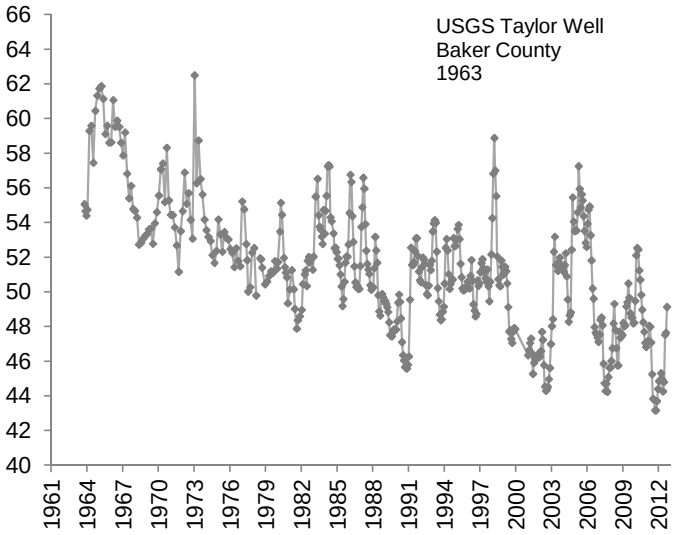
September 2012

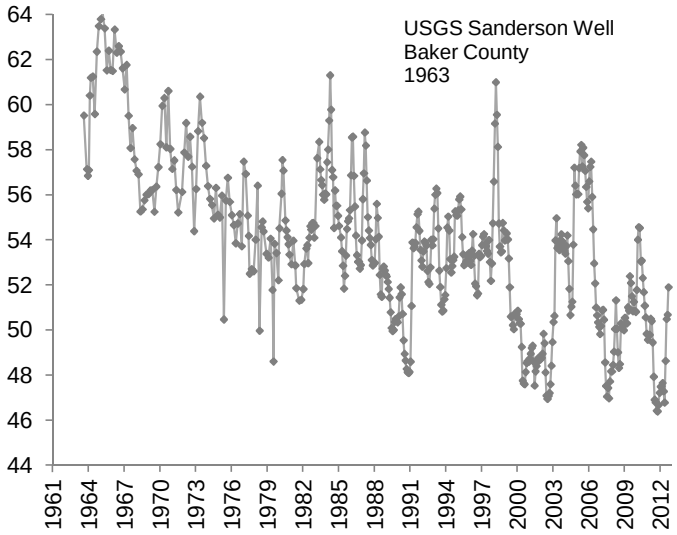
Upper Floridan Aquifer levels in feet above mean sea level

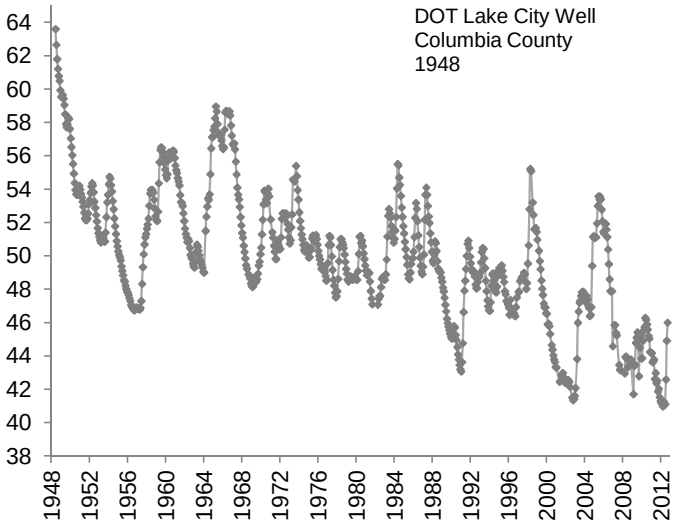
Taylor and Sanderson wells courtesy of SJRWMD











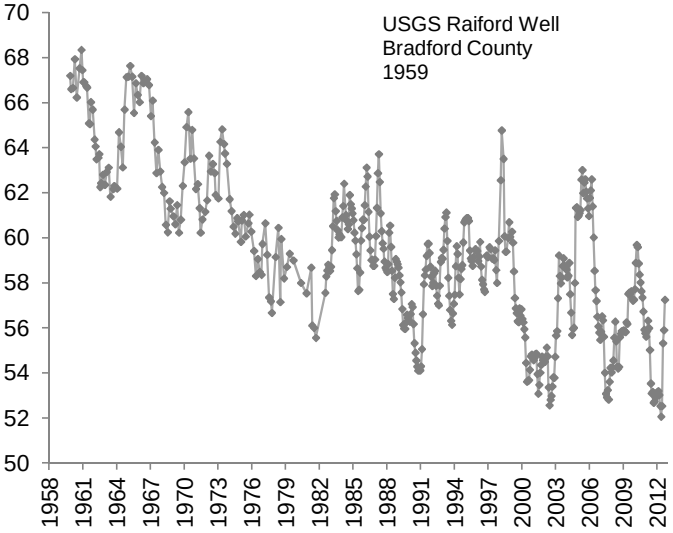


Figure 13: Agricultural Water Use

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.