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: June 6, 2013

RE: May 2013 Hydrologic Conditions Report for the District

RAINFALL

- Average rainfall in the District was 2.67", which is 77% of the long-term May average of 3.47". Bradford County saw the highest totals with more than 300% of typical May rainfall (Table 1, Figure 1). The western half of the District was drier, with parts of Hamilton and Madison counties receiving less than one inch (Figure 2). The highest gaged monthly total was 7.64" at Santa Fe Lake (the headwaters of the Santa Fe River), which also had the highest 24-hour total of 4.77". The lowest gaged monthly total was 0.79" at Sneads Smokehouse Lake in Jefferson County. With the exception of the upper Santa Fe Basin, rainfall in most of the District and Georgia tributary basins was below normal (Figure 3).
- Average rainfall for the 12 months ending May 31 was 5.19" higher than the long-term average of 54.61" (Figure 4). The average 3-month deficit was 1.76". Figure 5 shows the history of rainfall deficits beginning in 1932.

SURFACEWATER

- **Rivers:** Alapaha, Withlacoochee, and Suwannee flows fell steadily but remained in a range considered normal for the time of year. Coastal rivers also had flows typical of May. Storms early in the month caused the upper Santa Fe River to rise to its highest levels since August. By the end of the month conditions were still above normal. Levels subsequently rose in the lower Santa Fe, but drier weather set in and levels dropped during the last half of the month. Statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions are in Figure 7.

- **Lakes**: Most monitored lakes kept levels near their long-term average. Sneads Smokehouse Lake, near the headwaters of the Aucilla River, fell by one foot. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.

SPRINGS

After receiving Suwannee River flow for three months, White Sulphur Springs reversed flow and returned tannic water to the river. The flow on May 31 was 6.5 cubic feet per second (about 4 million gallons per day). Telford Springs near Luraville was measured with its highest flow since 2005 (52 cubic feet per second or 33 million gallons per day). Statistics for a representative sample of springs are shown in Figure 9.

GROUNDWATER

Levels in three-quarters of monitored upper Floridan wells dropped in May, falling by an average of nearly one foot. Despite the declines, most levels stayed in a range considered normal based on records starting in the mid-1970s. Sixteen percent of monitored wells were below normal, mostly in parts of Dixie, Levy, and Alachua counties after six months of below-normal rainfall. Levels District-wide fell from the 65th to the 55th percentile. Wells in the vicinity of northern and western Alachua County remained near the 18th percentile. Two wells in southern Levy County, including one at Rosewood Tower near Cedar Key, fell below the 10th percentile. Statistics for a representative sample of wells are shown in Figure 11. Statistics for a number of regional long-term wells are shown in Figure 12 along with a description of aquifer characteristics.

HYDROLOGICAL/METEOROLOGICAL/WATER USE INFORMATION

- The Palmer Drought Severity Index (PDSI), a climatological tool produced by the National Climatic Data Center, evaluates the severity and frequency of abnormally dry or wet weather using precipitation, temperature, and soil moisture data. The PDSI value for the week ending June 1 indicated normal conditions in north Florida and south central Georgia.
- The National Weather Service Climate Prediction Center (CPC) three-month outlook showed equal chances of above-normal or below-normal precipitation through August. Neutral El Niño/Southern Oscillation conditions are at a greater than 60% probability throughout the summer, but there is some potential for the development of weak La Niña conditions which can mean drier weather for North Florida.
- The U.S. Drought Monitor showed abnormally dry conditions in parts of Gilchrist, Dixie, and Alachua counties, and moderate drought in southern Levy County.

CONSERVATION

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

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

Table 1: Estimated Rainfall Totals

County	May 2013	May Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	4.04	2.27	178%	56.14	110%
Baker	5.14	1.89	273%	61.53	123%
Bradford	7.09	2.22	319%	61.32	121%
Columbia	3.37	3.21	105%	63.92	124%
Dixie	2.35	3.43	68%	56.44	96%
Gilchrist	2.27	3.36	68%	54.99	96%
Hamilton	1.74	3.16	55%	57.59	110%
Jefferson	1.02	5.88	17%	55.83	92%
Lafayette	1.96	3.33	59%	67.94	120%
Levy	2.22	2.67	83%	54.13	91%
Madison	1.26	4.73	27%	58.71	104%
Suwannee	1.72	3.24	53%	67.71	128%
Taylor	1.80	4.16	43%	63.70	107%
Union	5.21	2.21	236%	58.46	108%

May 2013 Average:	2.67
May Average (1932-2012):	3.47
Historical 12-month Average (1932-2012):	54.61
Past 12-Month Total:	59.80
12-Month Rainfall Surplus:	5.19

Figure 1: Comparison of District Monthly Rainfall

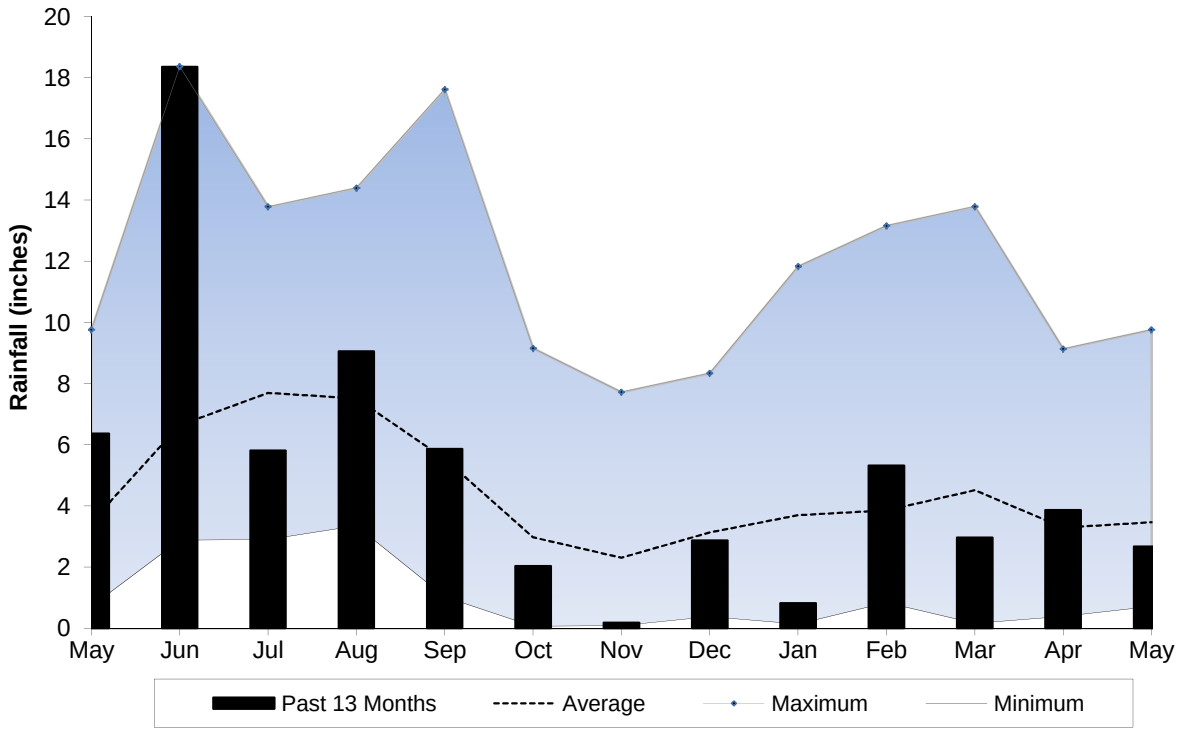


Figure 2: May 2013 Rainfall Estimate

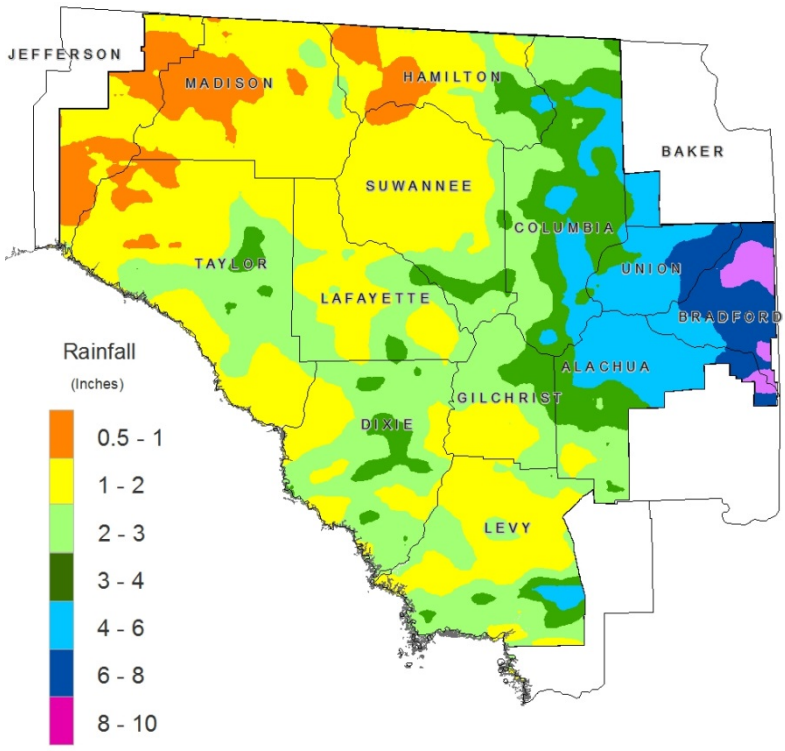


Figure 3: May 2013 Percent of Normal Rainfall

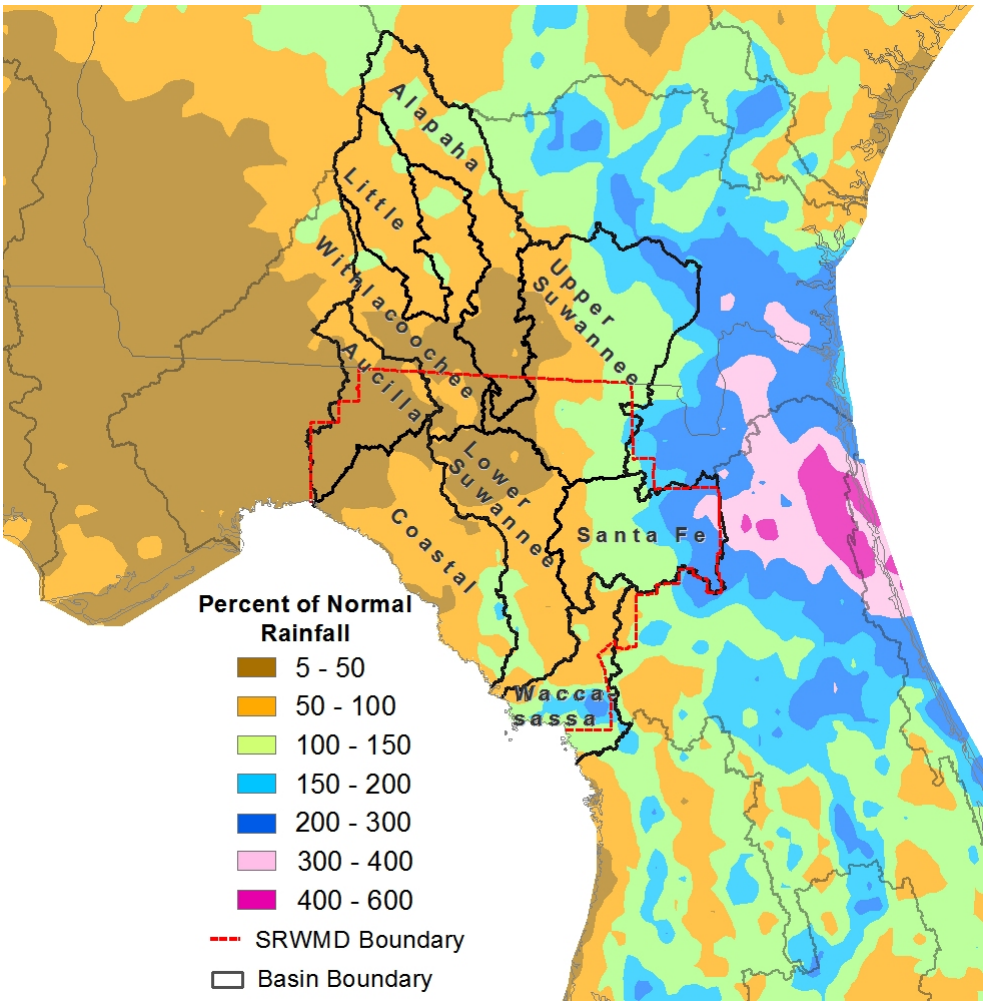


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through May 31, 2013

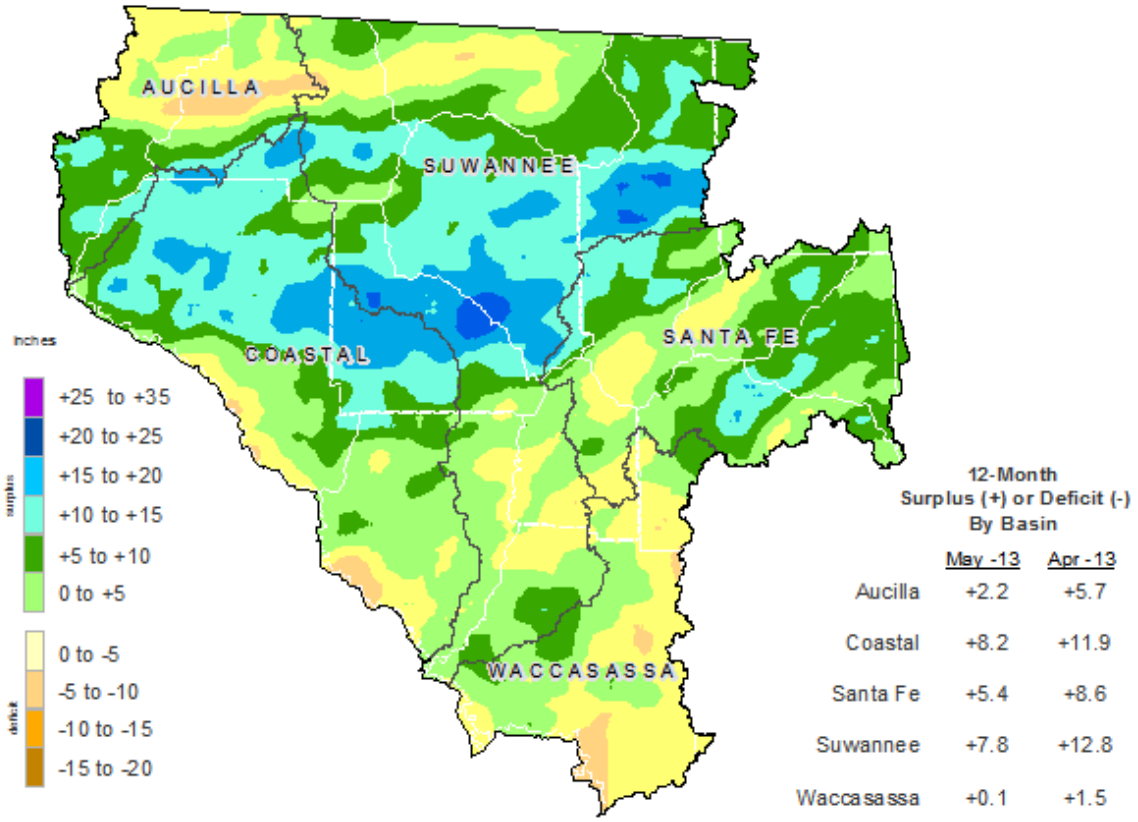


Figure 5: 12-Month Rolling Rainfall Deficit Since 1932

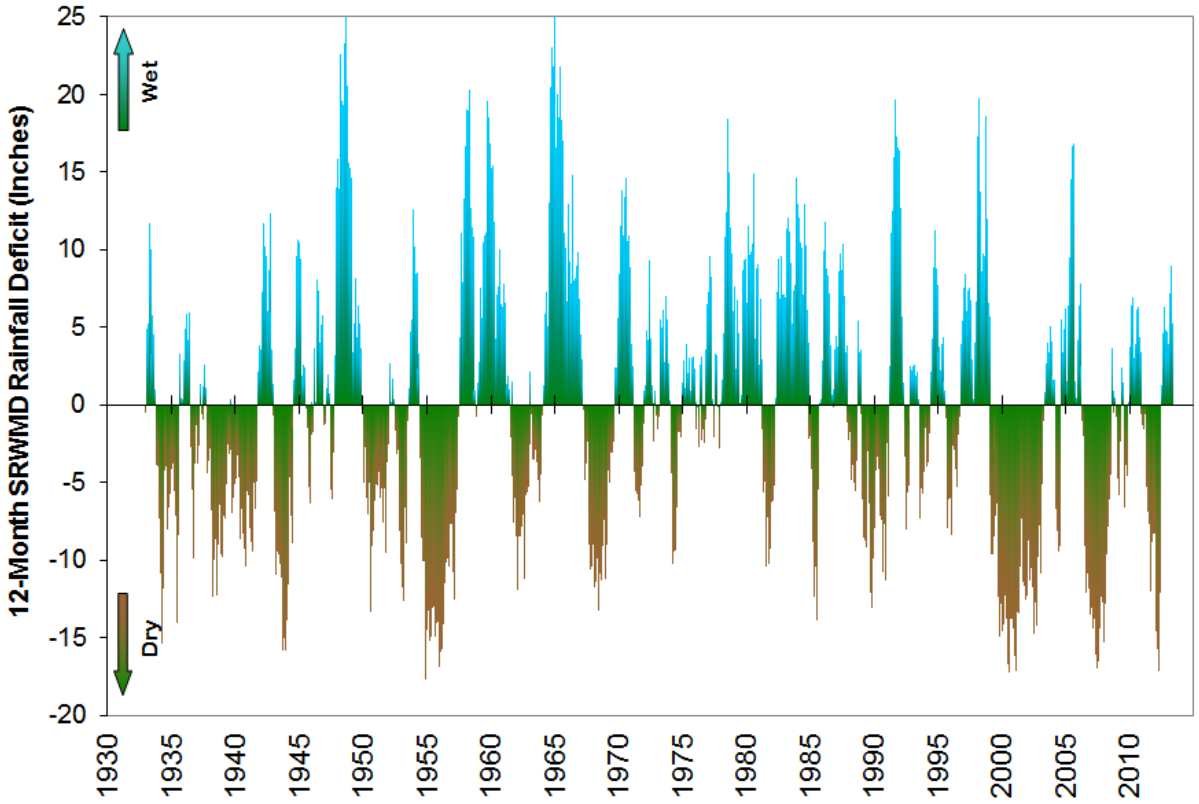


Figure 6: Daily River Flow Statistics
June 1, 2012 through May 31, 2013

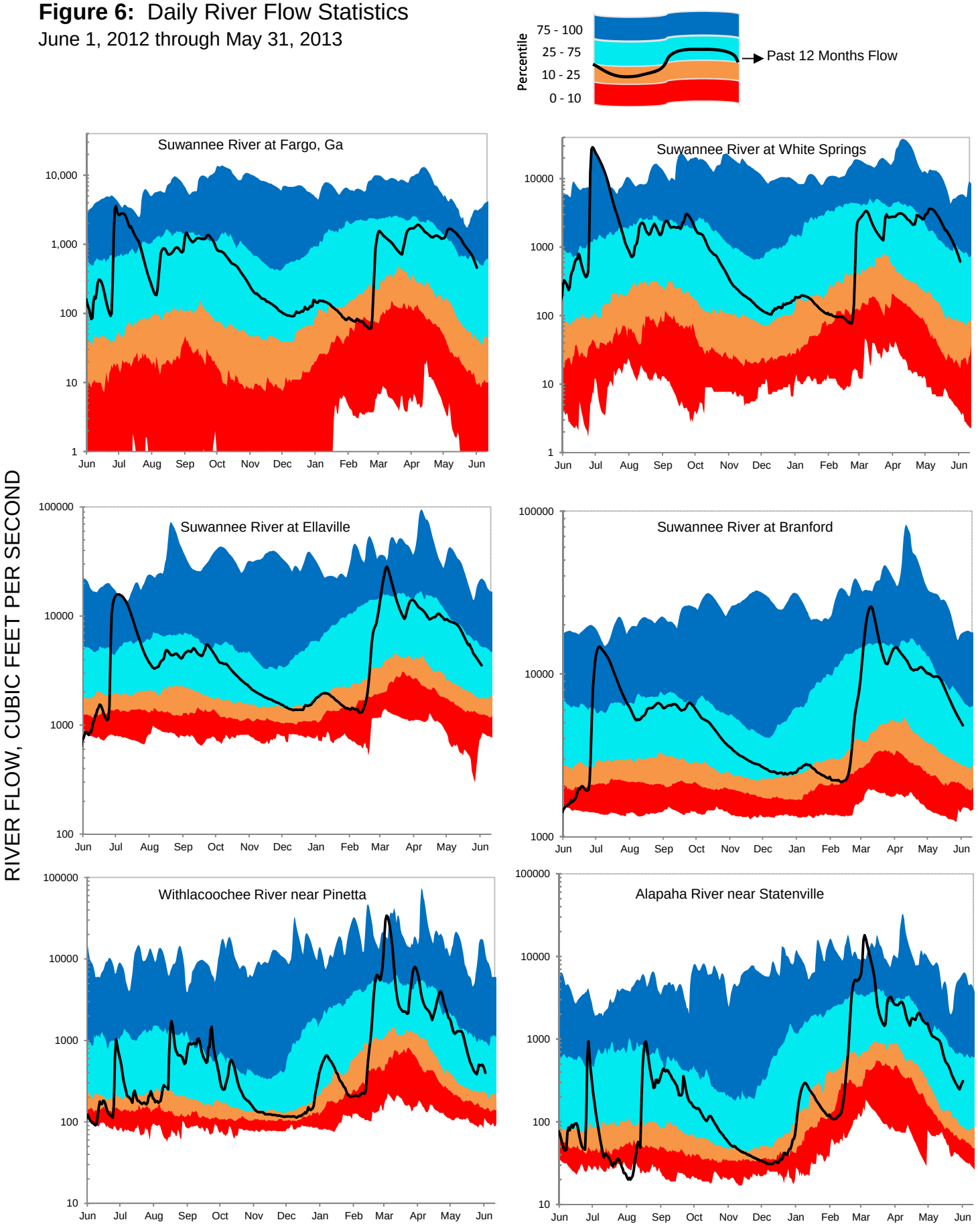
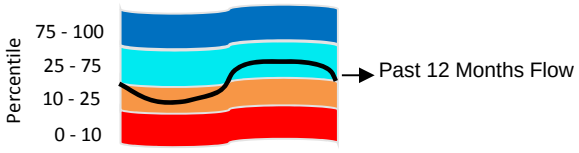
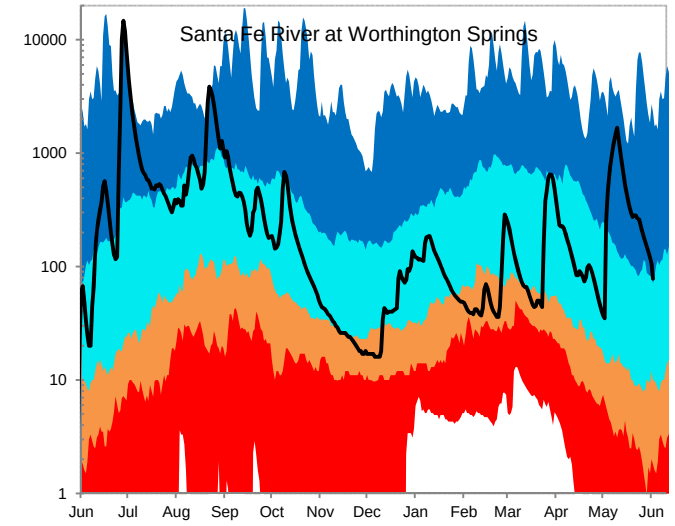
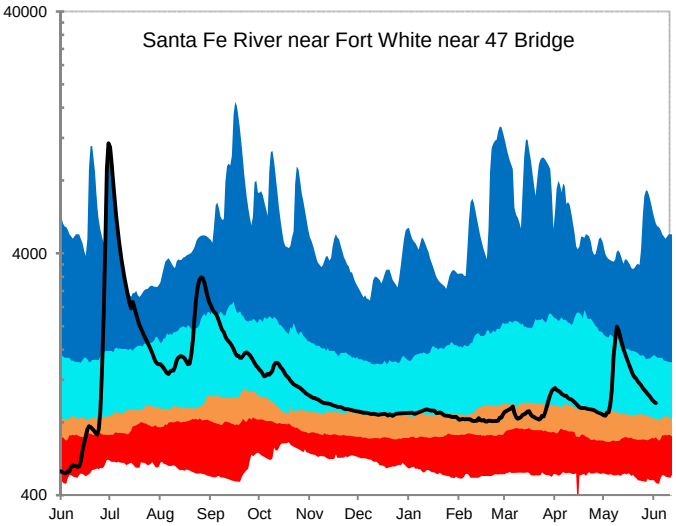


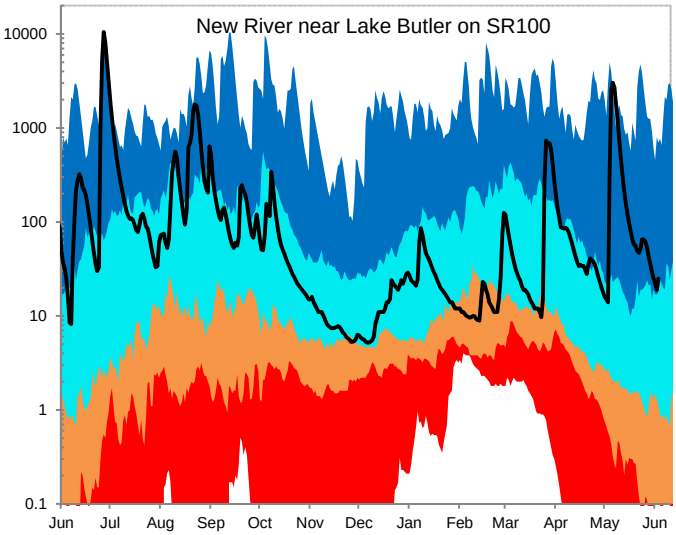
Figure 6, cont: Daily River Flow Statistics
June 1, 2012 through May 31, 2013

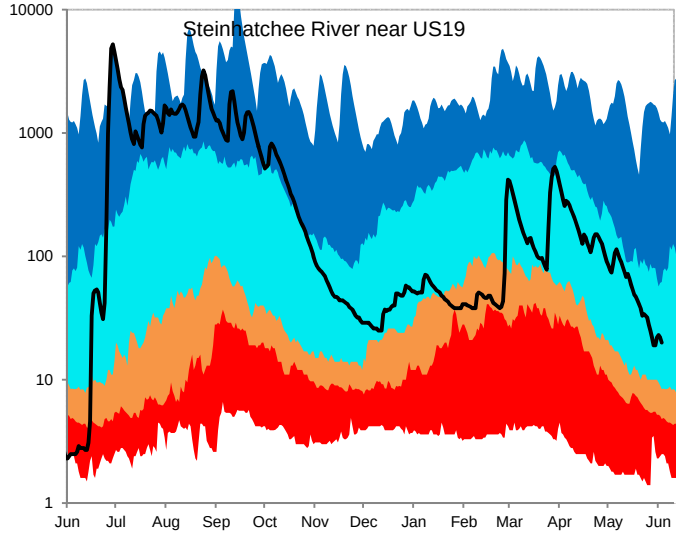


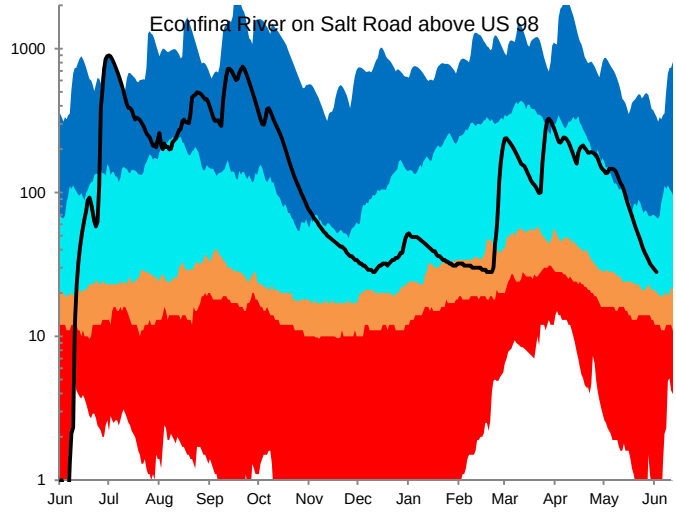
RIVER FLOW, CUBIC FEET PER SECOND

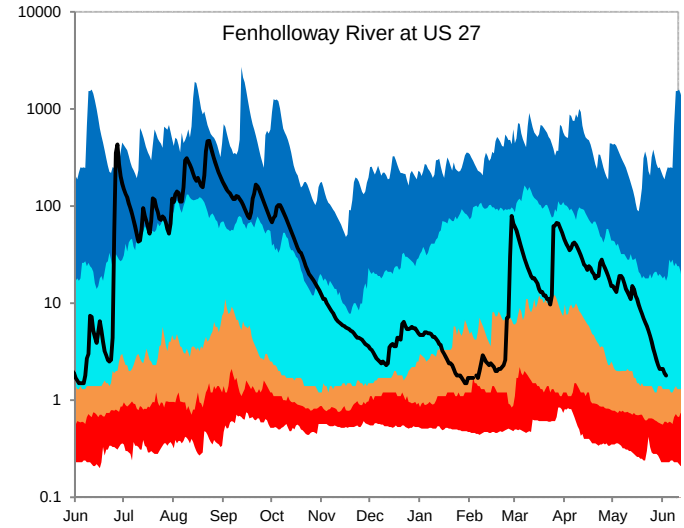












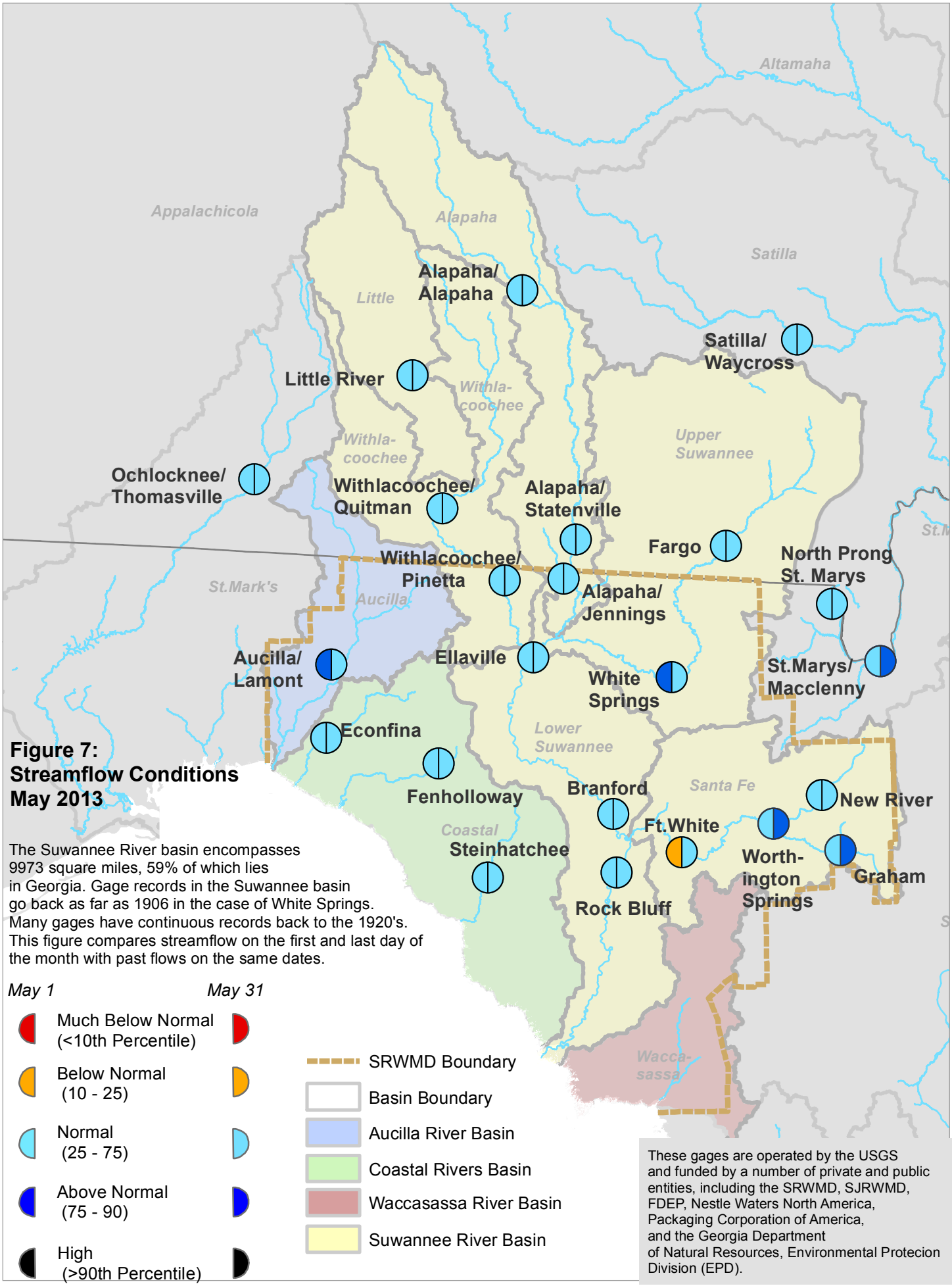


Figure 7:
Streamflow Conditions
May 2013

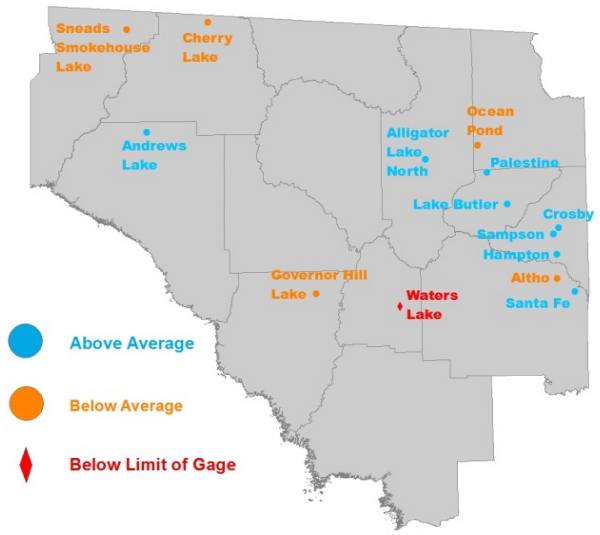
The Suwannee River basin encompasses 9973 square miles, 59% of which lies in Georgia. Gage records in the Suwannee basin go back as far as 1906 in the case of White Springs. Many gages have continuous records back to the 1920's. This figure compares streamflow on the first and last day of the month with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

May 1 *May 31*

- Much Below Normal (<10th Percentile)
- Below Normal (10 - 25)
- Normal (25 - 75)
- Above Normal (75 - 90)
- High (>90th Percentile)

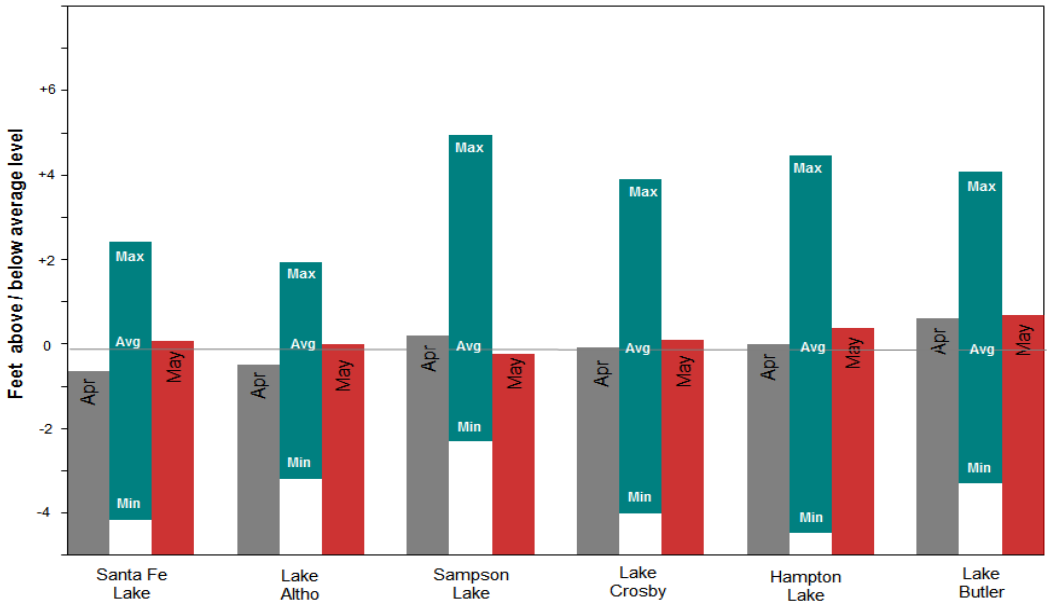
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

Figure 8: May 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.



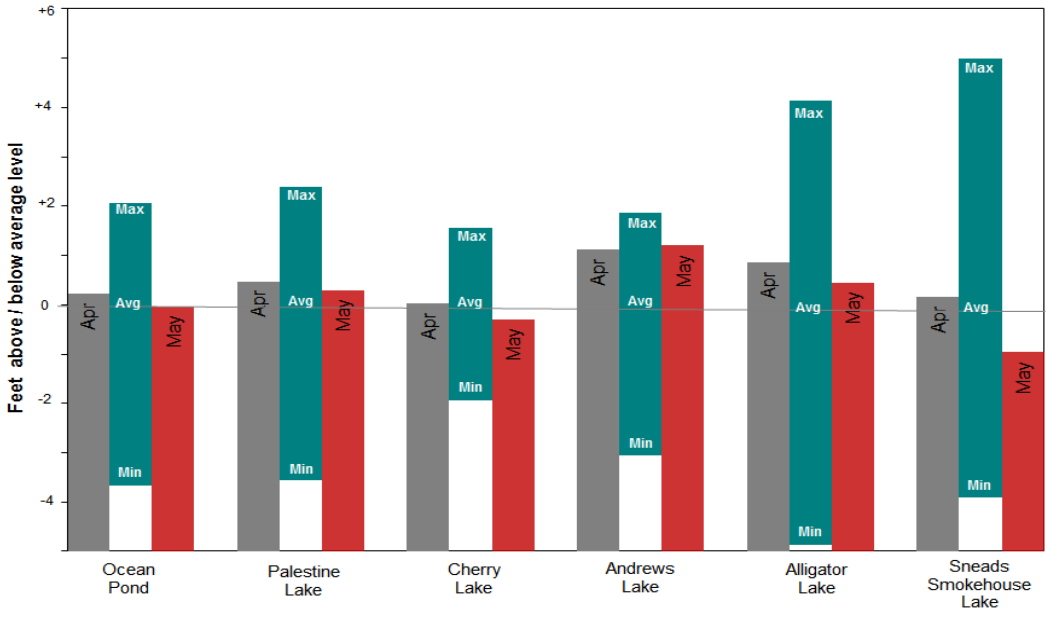


Figure 9: Quarterly Springflow Measurements

The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were measured in May 2013. 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.

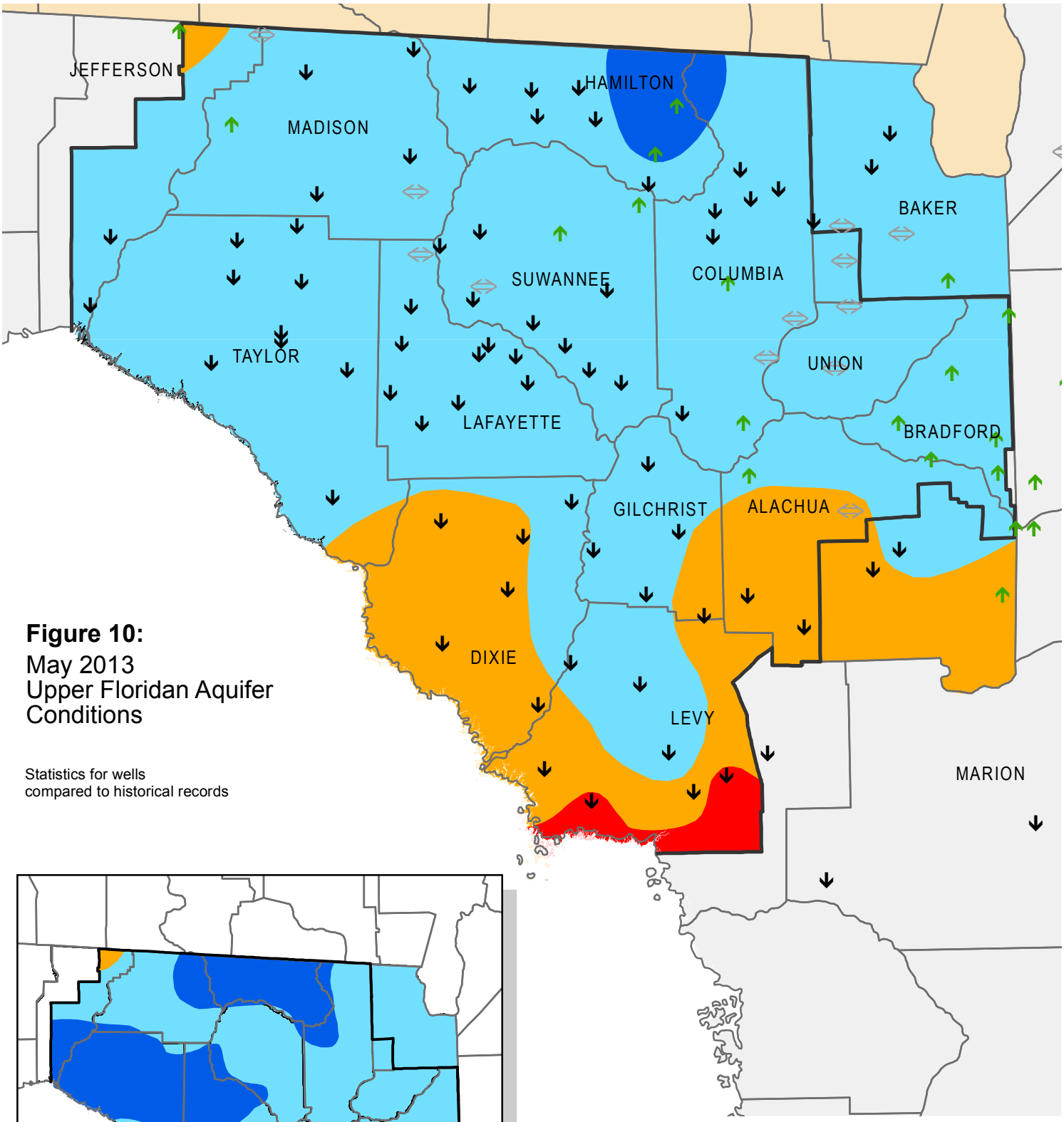
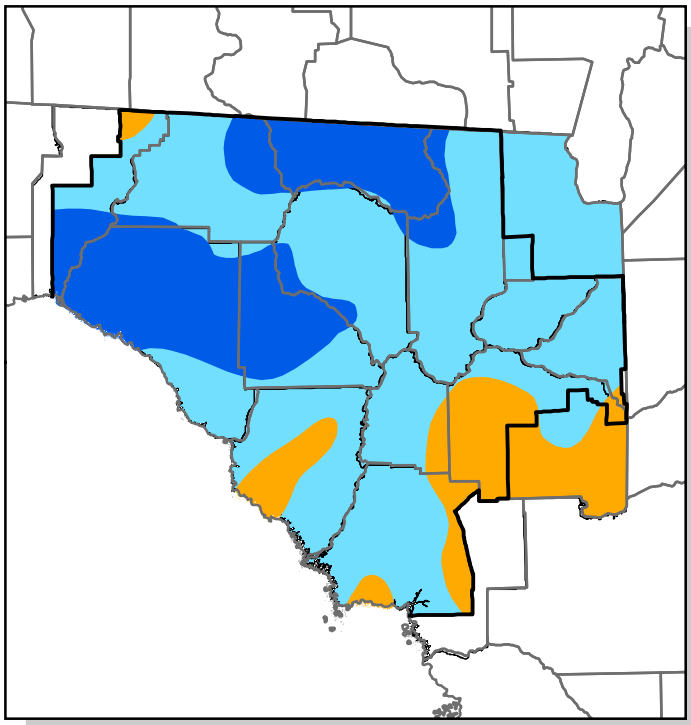


Figure 10:
May 2013
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: April 2013 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

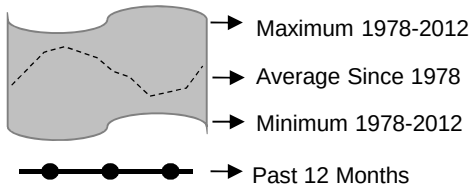
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

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

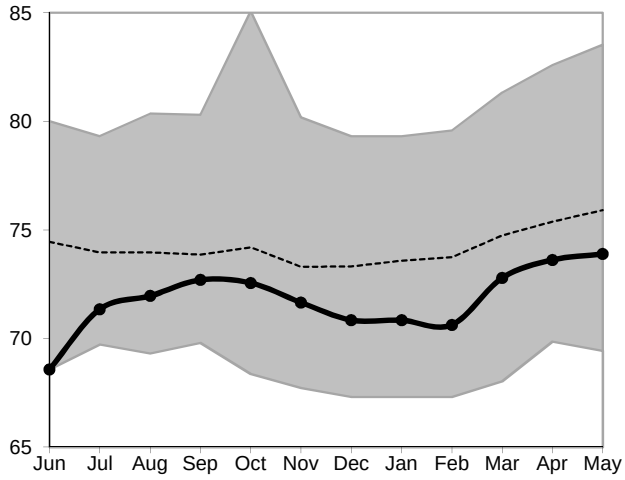
District Boundary

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

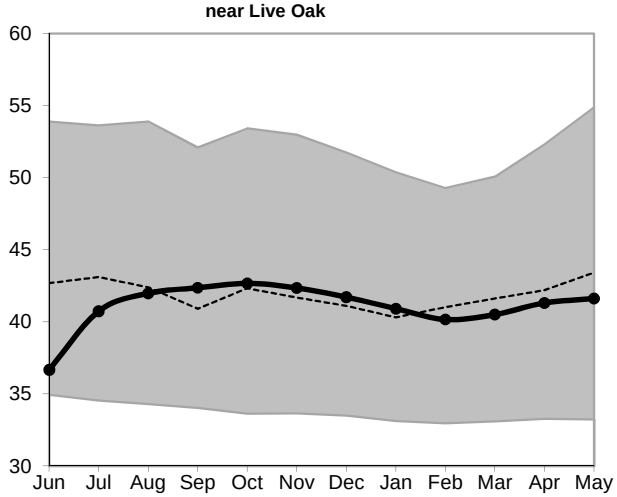


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

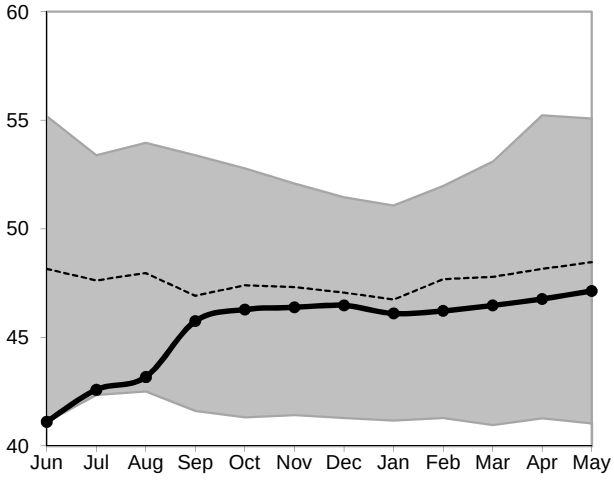
Madison County N010719001
near Greenville



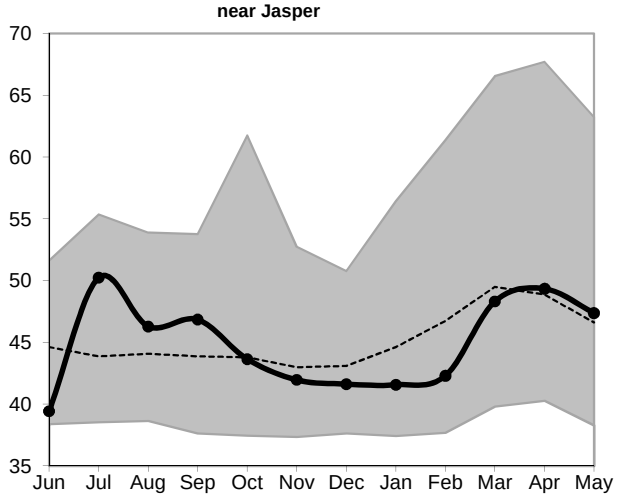
Suwannee County S021335001
near Live Oak



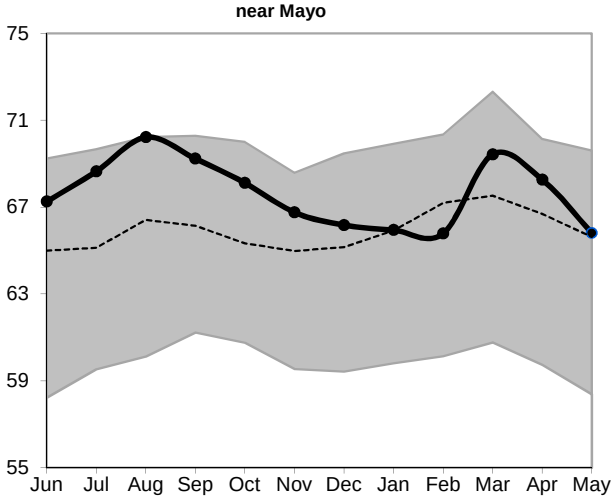
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

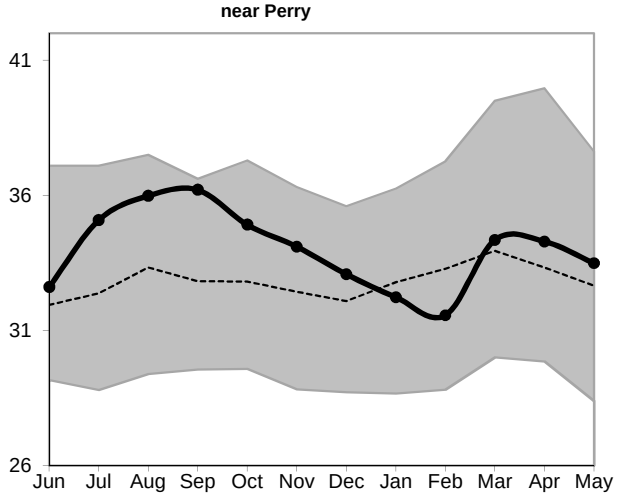
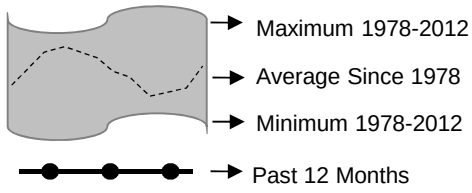
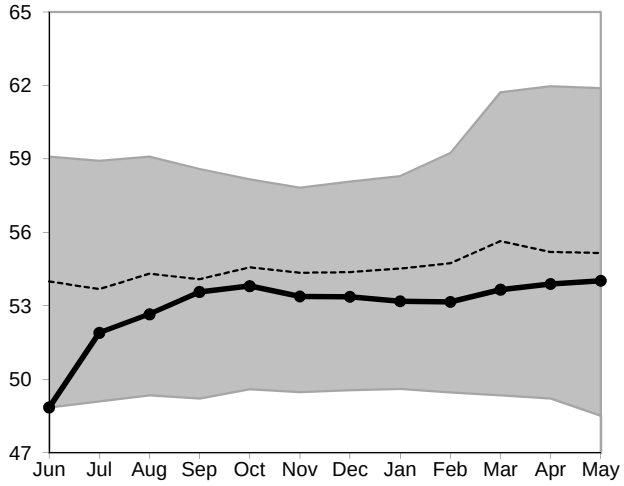


Figure 11, cont.: Groundwater Level Statistics
Levels June 1, 2012 through May 31, 2013
Period of Record Beginning 1978

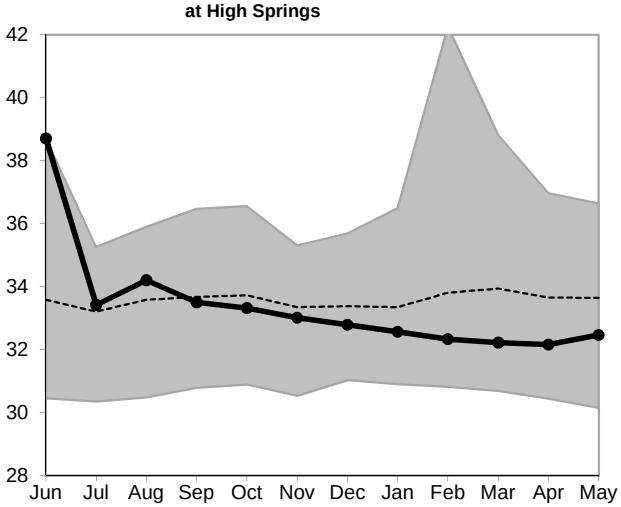


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

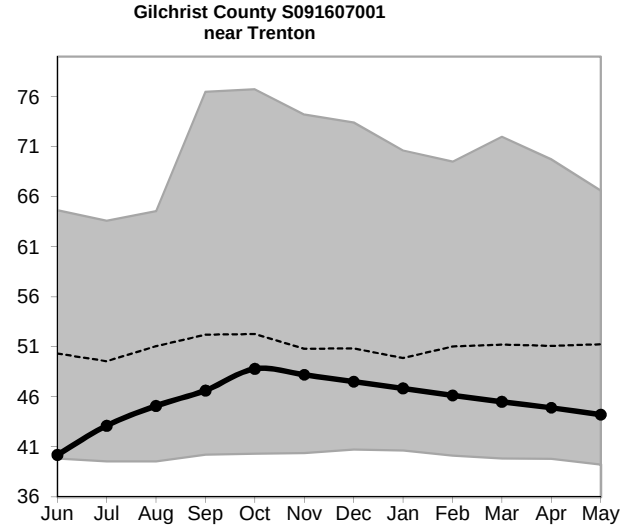
Union County S051933001
near Lake Butler



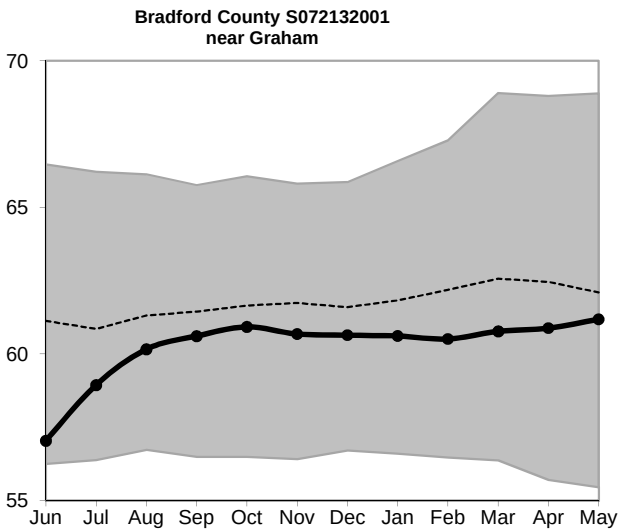
Alachua County S081703001
at High Springs



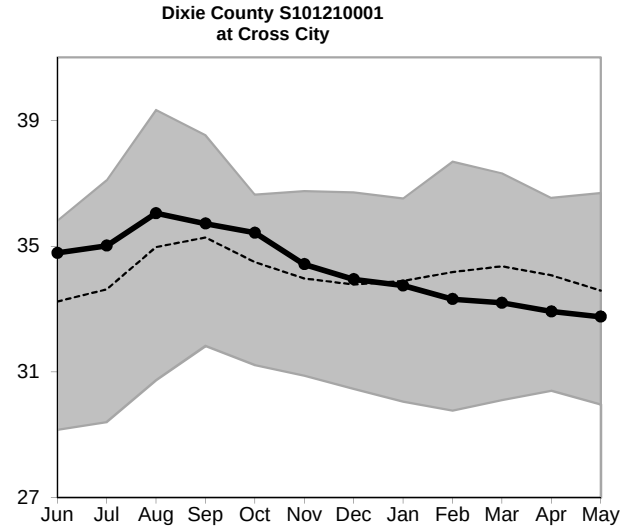
Gilchrist County S091607001
near Trenton



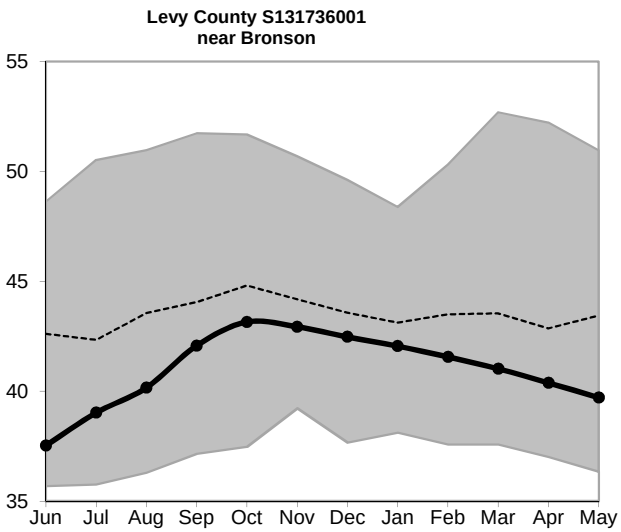
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



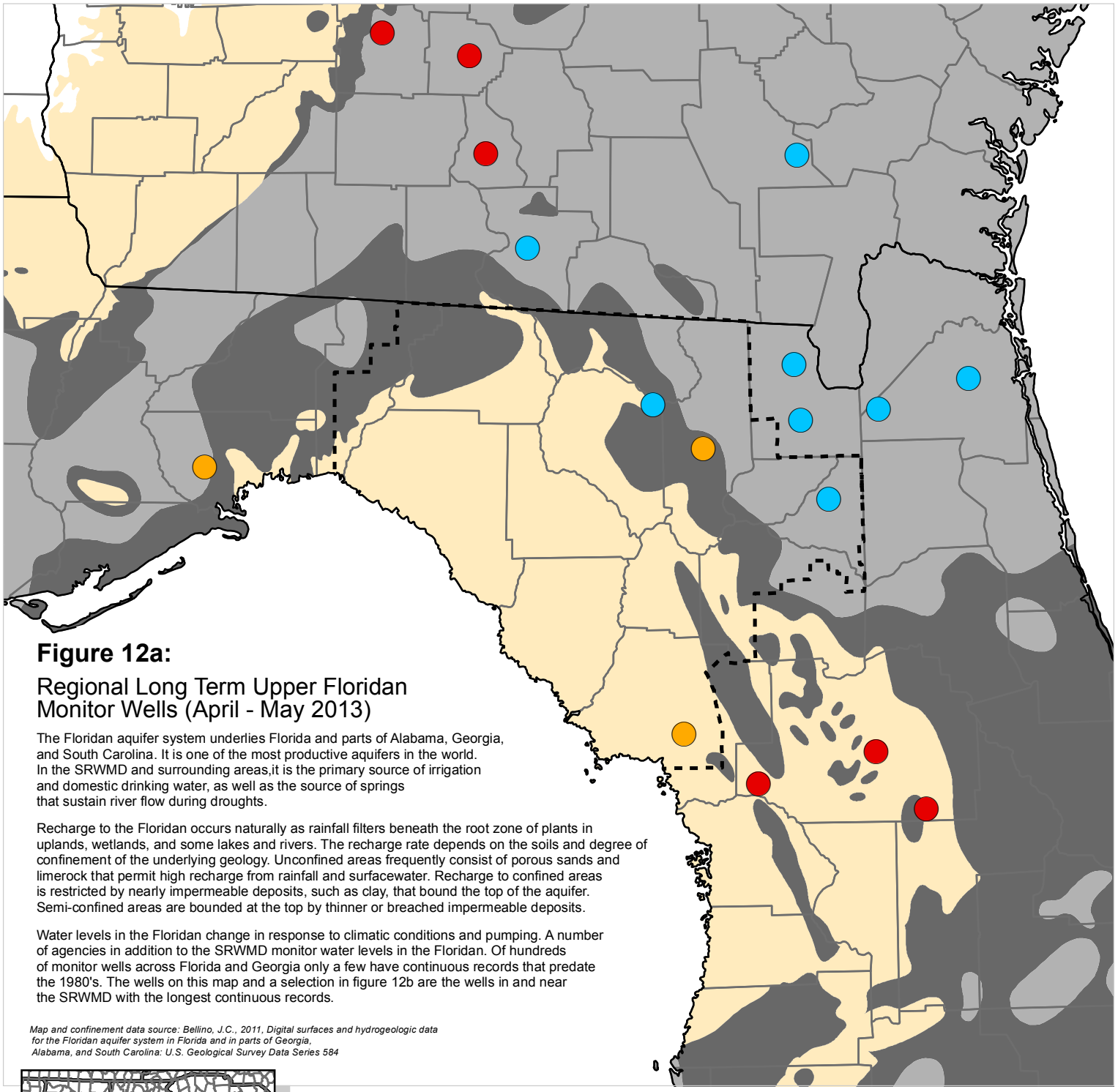


Figure 12a:

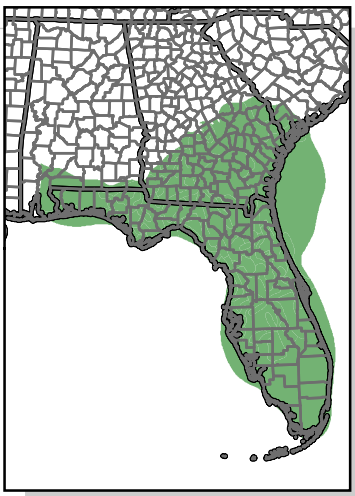
Regional Long Term Upper Floridan Monitor Wells (April - May 2013)

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

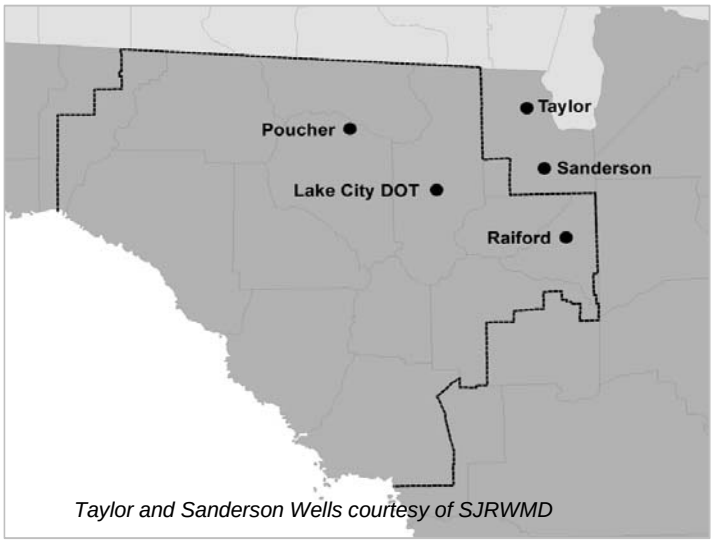
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

Percentile of Most Recent Water Level Relative to Entire Record

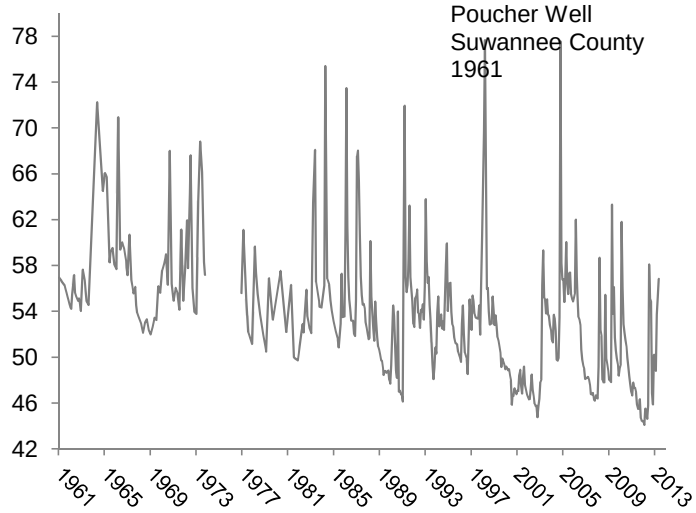
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

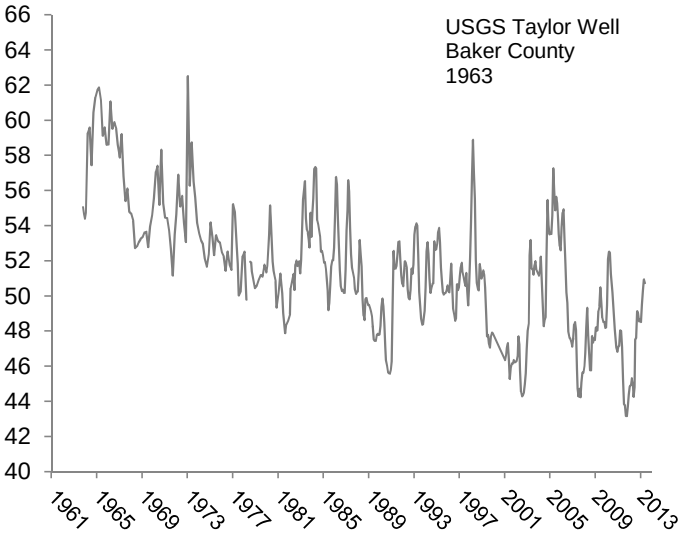
Figure 12b: Regional Long Term Upper Floridan Levels

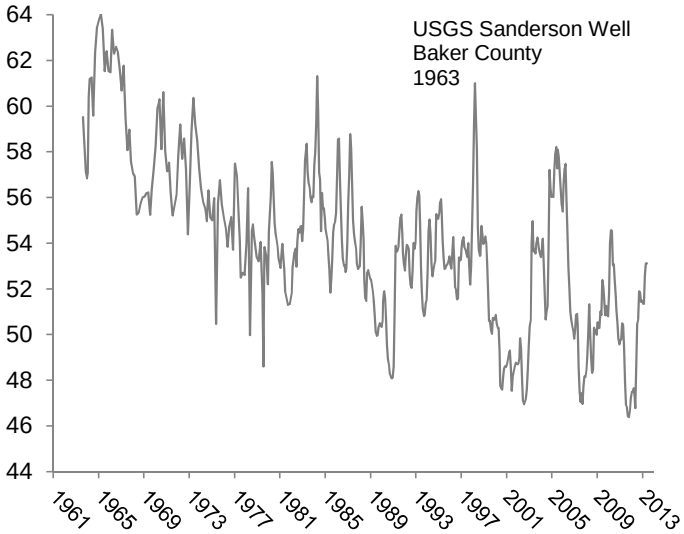
May 2013

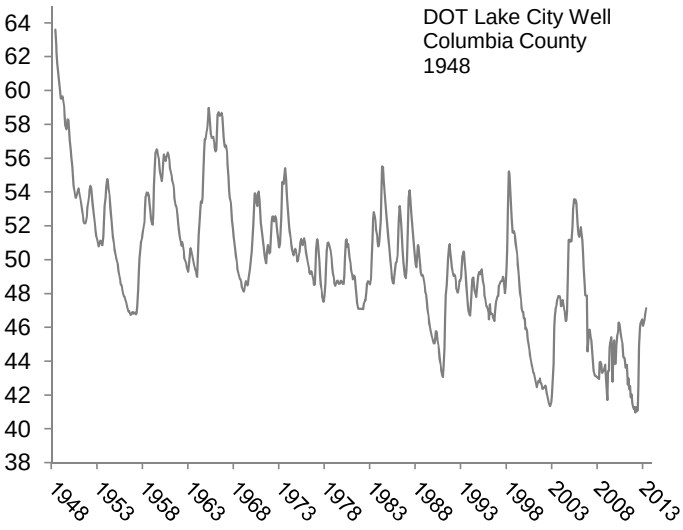


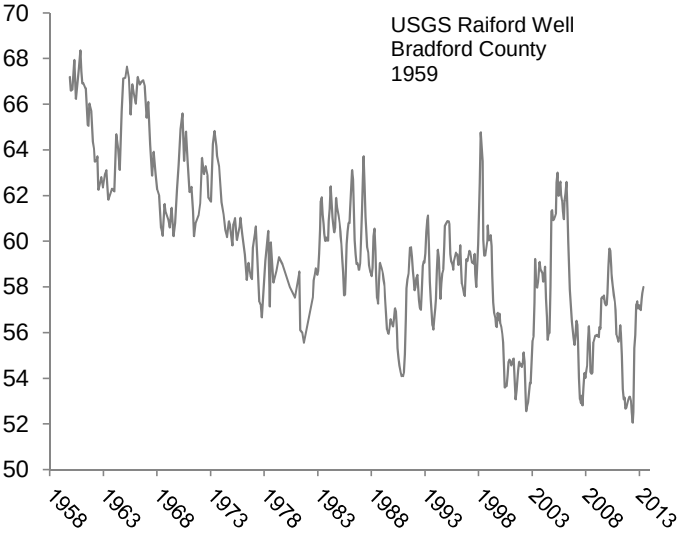
Taylor and Sanderson Wells courtesy of SJRWMD











Upper Floridan Aquifer Elevation above NGVD 1929, Feet