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: July 5, 2013

RE: June 2013 Hydrologic Conditions Report for the District

RAINFALL

- Average rainfall in the District was 8.77", which is 132% of the long-term June average of 6.63". This was the 14th wettest June since 1932. On June 6, Tropical Storm Andrea made landfall about 10 miles south of Steinhatchee on the Dixie County coast with maximum winds of 65 miles per hour. The storm moved northeast across the District and exited the state near Fargo, Georgia, the next day. Average rainfall from the storm was 1.8", with the highest District storm total of 3.8" near Live Oak. The speed of the storm helped keep rainfall totals relatively low; in most areas, Andrea brought less than 20% of the month's total rain.
- Every county in the District had above-normal rainfall (Table 1, Figure 1). Totals were well distributed across the District, with only a few localized areas seeing less than 6" (Figure 2). Rainfall in the Georgia tributary basins was also above normal (Figure 3). The highest gaged monthly total was 15.34" at PCS near White Springs, which also had the highest 24-hour total of 4.61" and the highest number of days with rainfall at 19. The lowest gaged monthly total was 4.86" at Rosewood Tower near Cedar Key.
- June marked the end of a 12-month rainfall surplus caused by Tropical Storm Debby in 2012. Average rainfall for the 12 months ending June 30 was 4.4" lower than the long-term average of 54.61" (Figure 4). Average rainfall for the 3 months ending June 30 was 2.1" higher than the long-term average of 13.4", with the highest accumulations in Hamilton and northern Columbia counties (Figure 5).

SURFACEWATER

- **Rivers:** After falling steadily throughout May, most river levels rose in response to widespread heavy rains before peaking in mid-June at levels much above typical June conditions. Upper Suwannee gages continued to rise in response to local rainfall and ended the month in the highest 10% of June flows since record-keeping began. The Santa Fe River near Fort White had flows near both the median of June flows and the median of all daily flows since 1928. 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 remained near their long-term average levels. Sampson Lake near Starke fell below average after the gates were opened in early June in anticipation of Tropical Storm Andrea. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.

SPRINGS

White Sulphur Springs flowed out for less than a week before the rising Suwannee River started to flow back into the spring. A number of middle Suwannee Springs were measured in late May and again in late June, and all showed reduced flow in June due to rising river levels. However, Lafayette Blue Springs near Mayo still had one of its highest flows since 2005 (68 million gallons per day (MGD)). It remained closed to swimming most of the month due to brown river water in the spring. Little River Springs near Branford was measured at 45 MGD on June 27, 25% higher than its median flow since 1997. Statistics for a representative sample of springs are shown in Figure 9.

GROUNDWATER

Most upper Floridan aquifer monitor wells did not immediately respond to rainfall, with less than 40% showing a significant increase in levels by the end of the month. Wells along the Suwannee River corridor lagged behind the rising river with levels slightly lower than in May. Two wells in southern Levy County, including one at Rosewood Tower near Cedar Key, remained below the 10th percentile for the second month in a row. Eleven percent of the wells were below the 25th percentile, considered below normal, while 80% were in a range considered normal. 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 29 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 showed a potential for above-normal rainfall through September. Neutral El Niño/Southern Oscillation conditions are expected into the fall, with no tendency toward either El Niño (cooler and wetter) or La Niña (warmer and drier) conditions.
- The U.S. Drought Monitor showed no drought in peninsular Florida or Georgia, the first drought-free report for both states since 2010.

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	June 2013	June Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	8.75	6.57	133%	50.03	98%
Baker	6.87	6.29	109%	45.46	91%
Bradford	7.66	6.11	125%	50.68	100%
Columbia	9.14	6.25	146%	49.23	96%
Dixie	8.22	6.42	128%	50.65	86%
Gilchrist	10.62	6.43	165%	51.66	90%
Hamilton	10.07	6.13	164%	46.76	89%
Jefferson	6.51	6.09	107%	46.40	77%
Lafayette	9.29	6.25	149%	54.19	96%
Levy	8.48	6.87	123%	50.01	84%
Madison	9.84	6.08	162%	50.26	89%
Suwannee	9.65	6.20	156%	51.10	96%
Taylor	9.24	6.93	133%	55.18	93%
Union	8.10	6.78	120%	46.77	87%

June 2013 Average:	8.77
June Average (1932-2012):	6.63
Historical 12-month Average (1932-2012):	54.61
Past 12-Month Total:	50.20
12-Month Rainfall Deficit:	-4.41

Figure 1: Comparison of District Monthly Rainfall

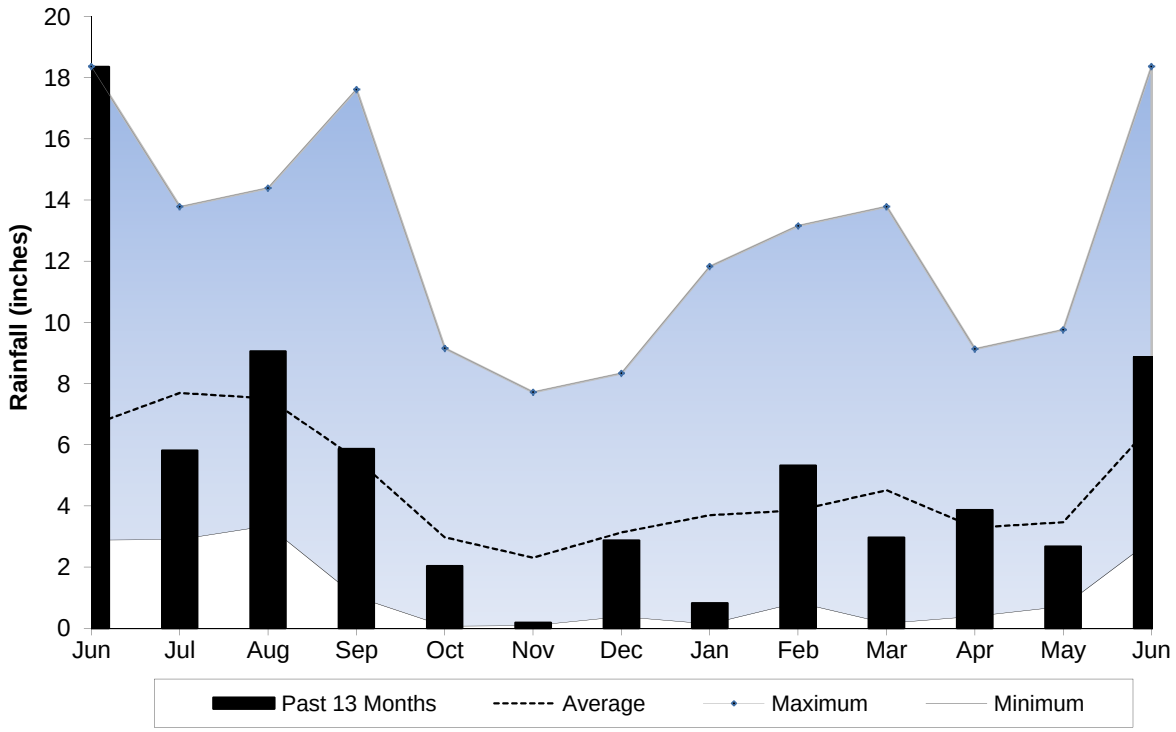


Figure 2: June 2013 Rainfall Estimate

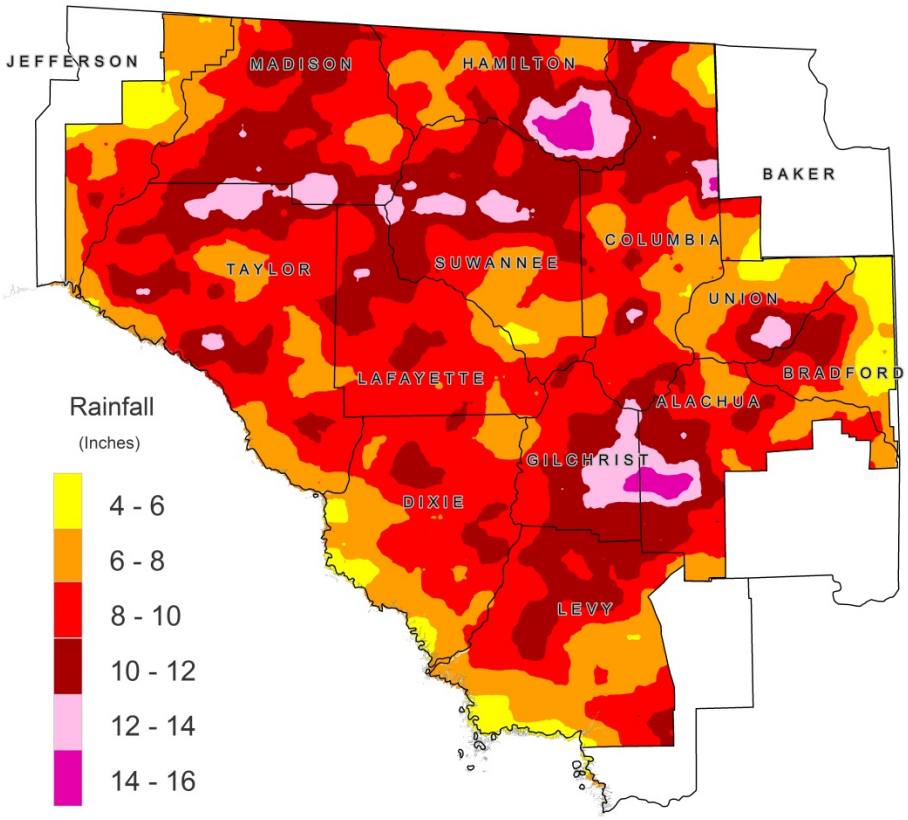


Figure 3: June 2013 Percent of Normal Rainfall

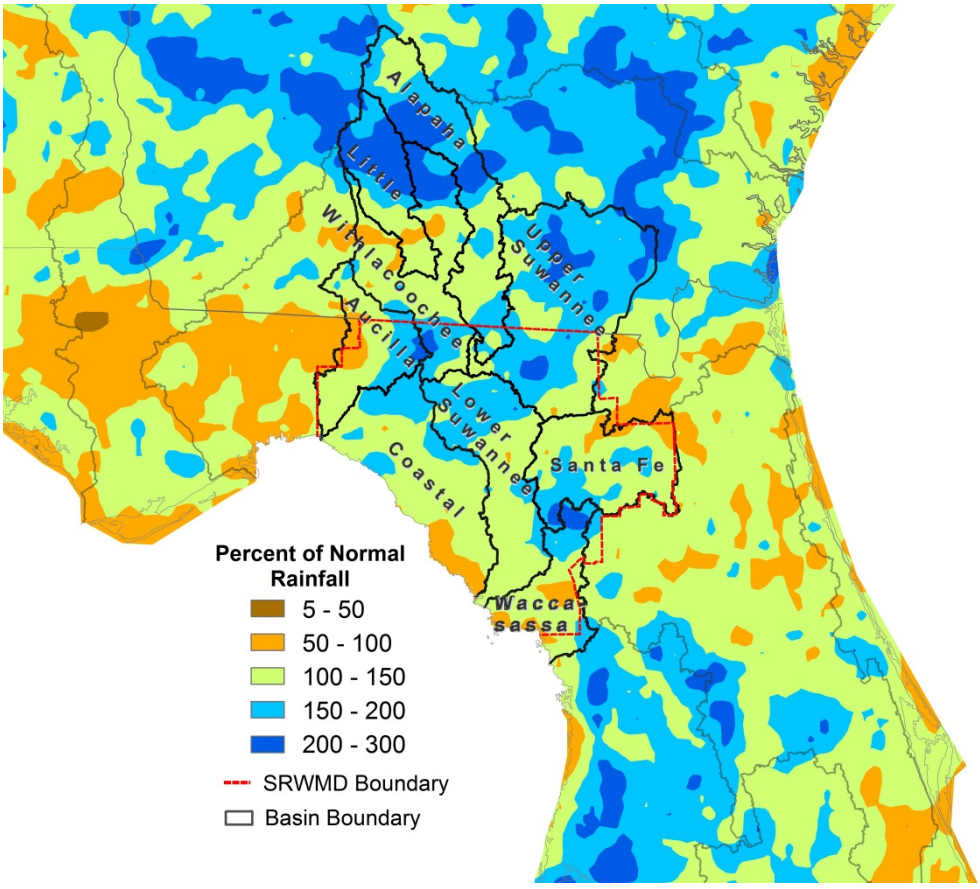


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through June 30, 2013

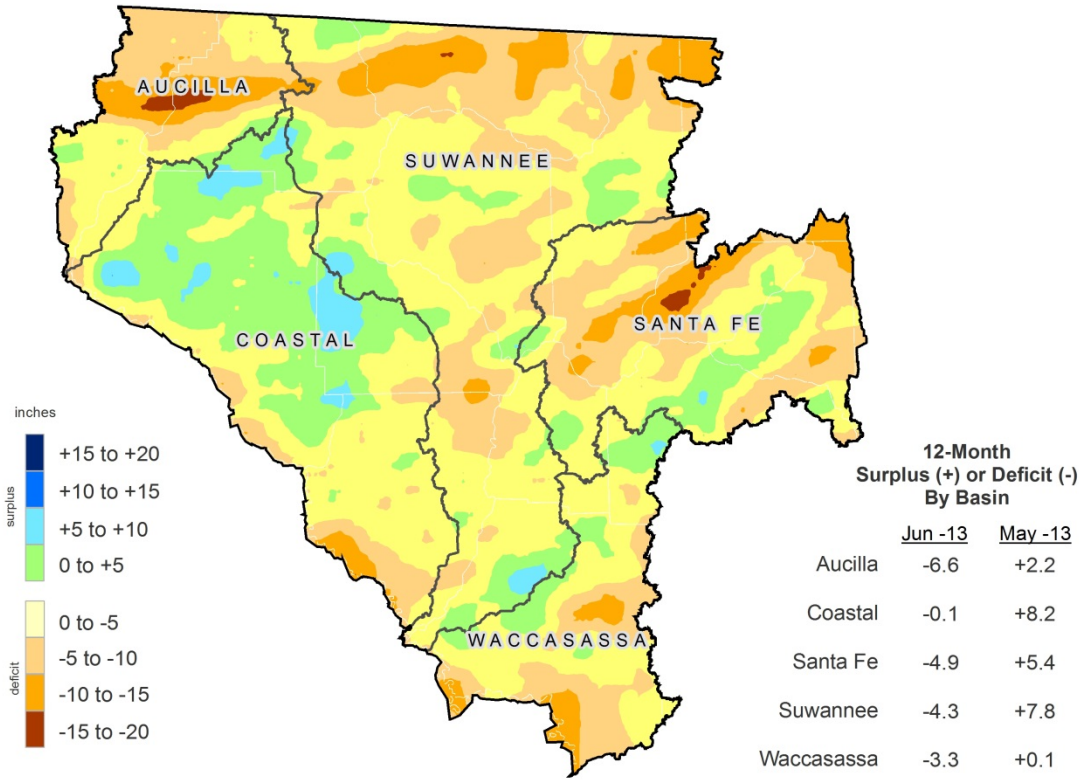


Figure 5: 3-Month Rainfall Surplus/Deficit by River Basin
Through June 30, 2013

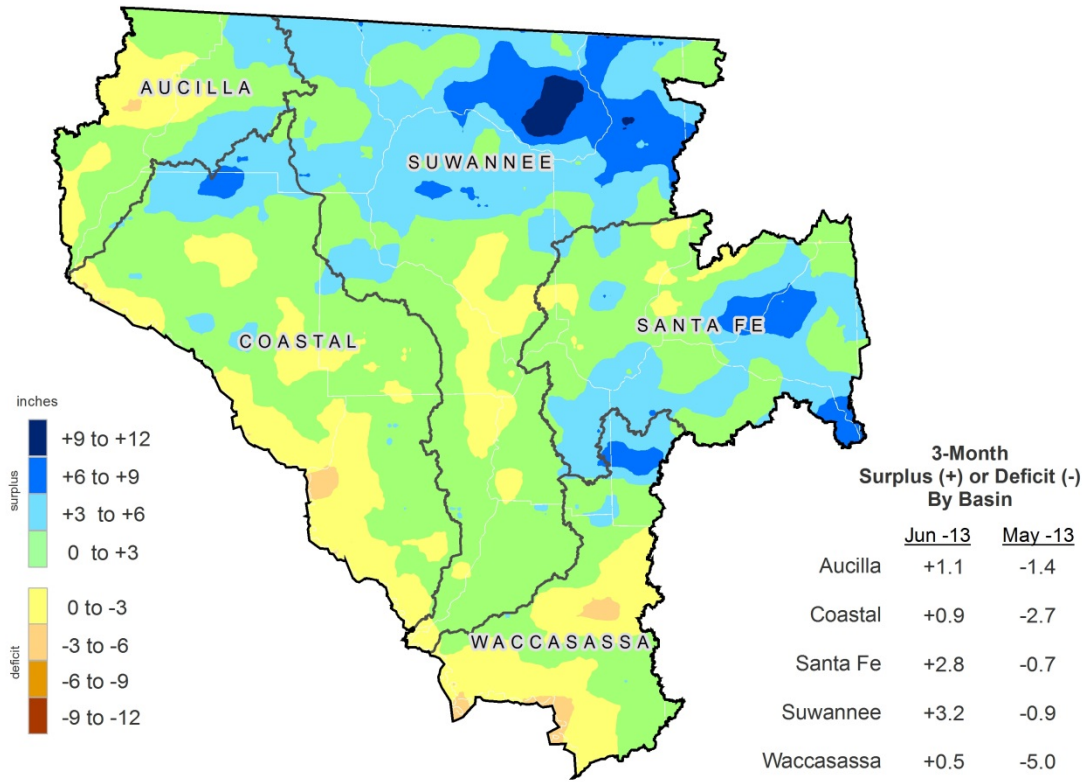


Figure 6: Daily River Flow Statistics
July 1, 2012 through July 1, 2013

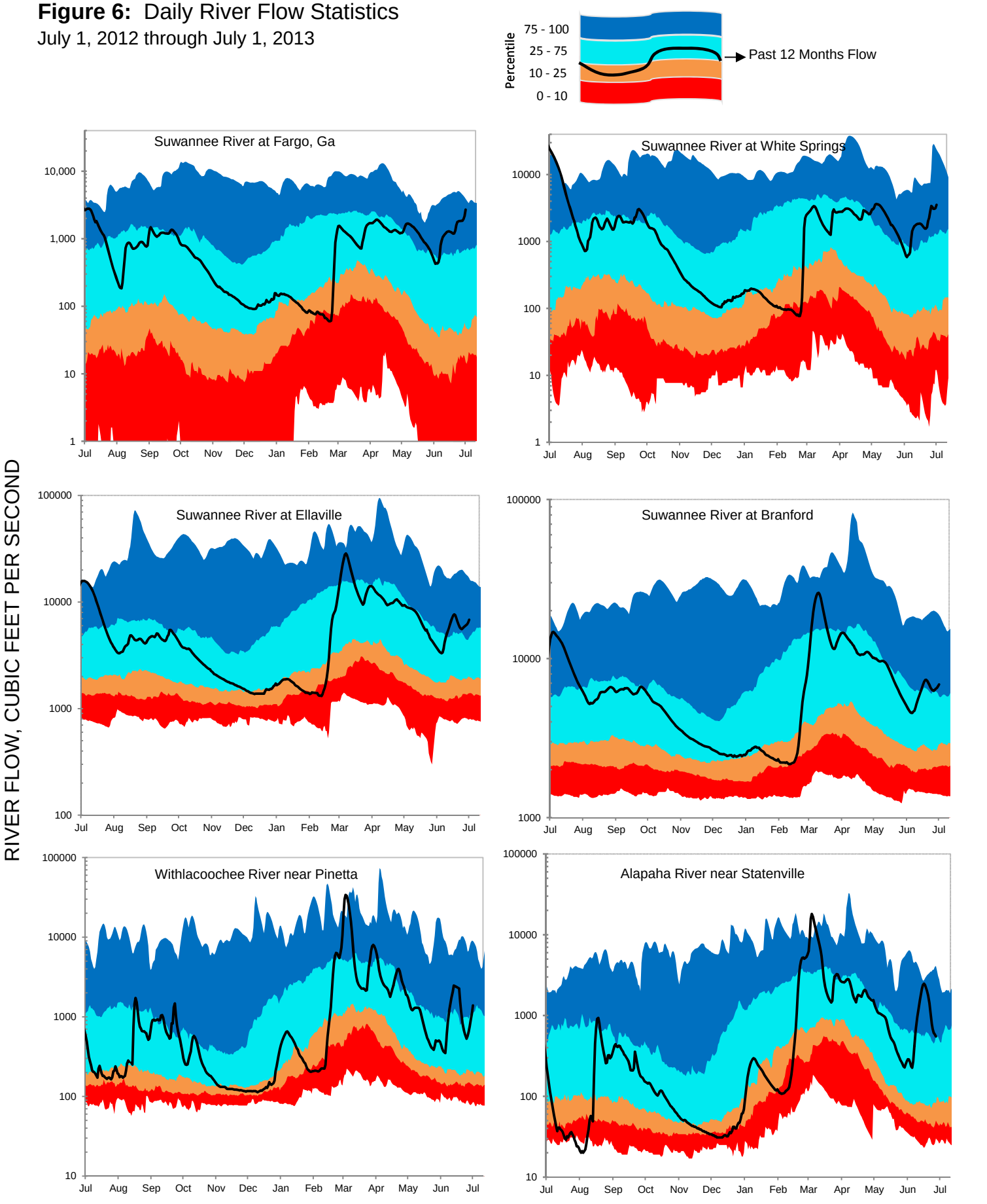
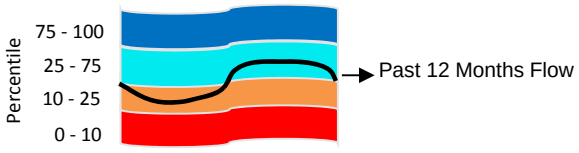
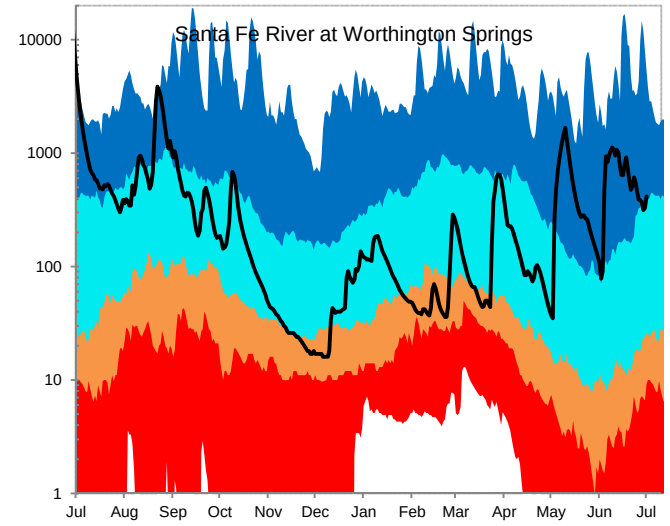
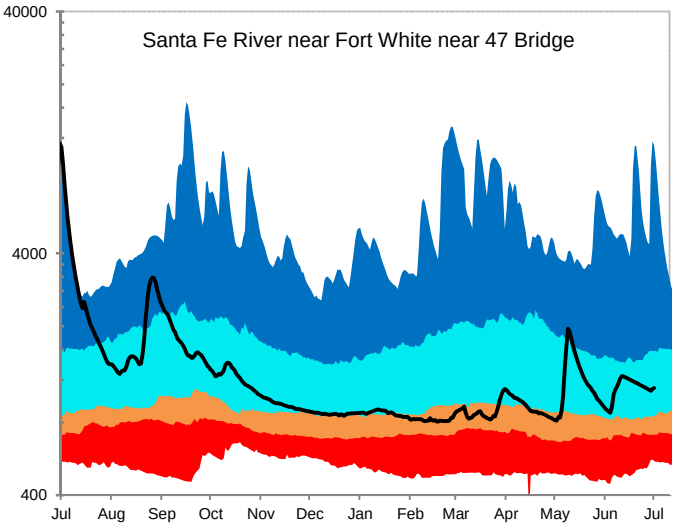


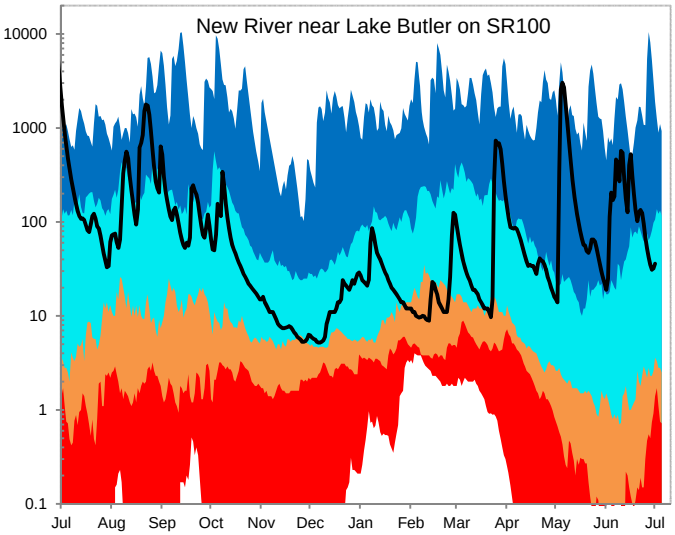
Figure 6, cont: Daily River Flow Statistics
July 1, 2012 through July 1, 2013

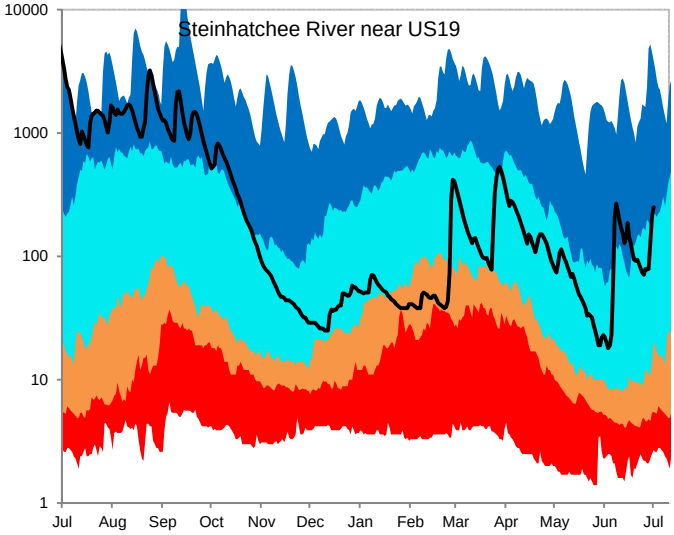


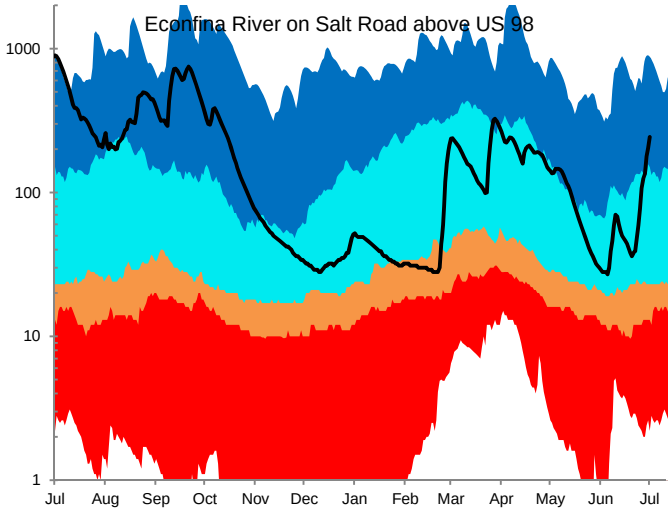
RIVER FLOW, CUBIC FEET PER SECOND

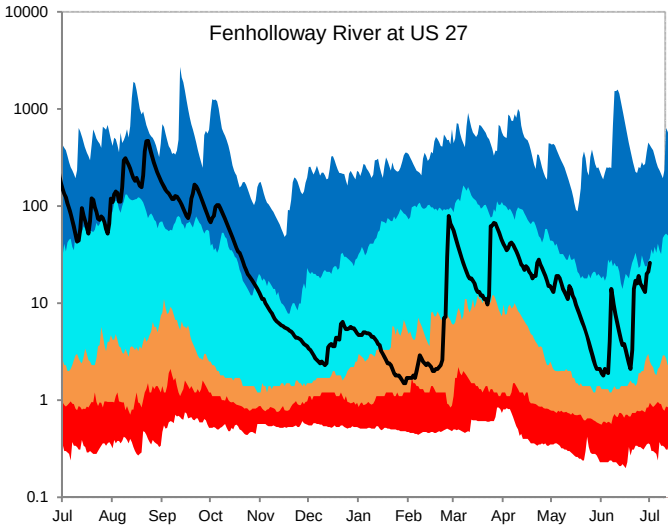












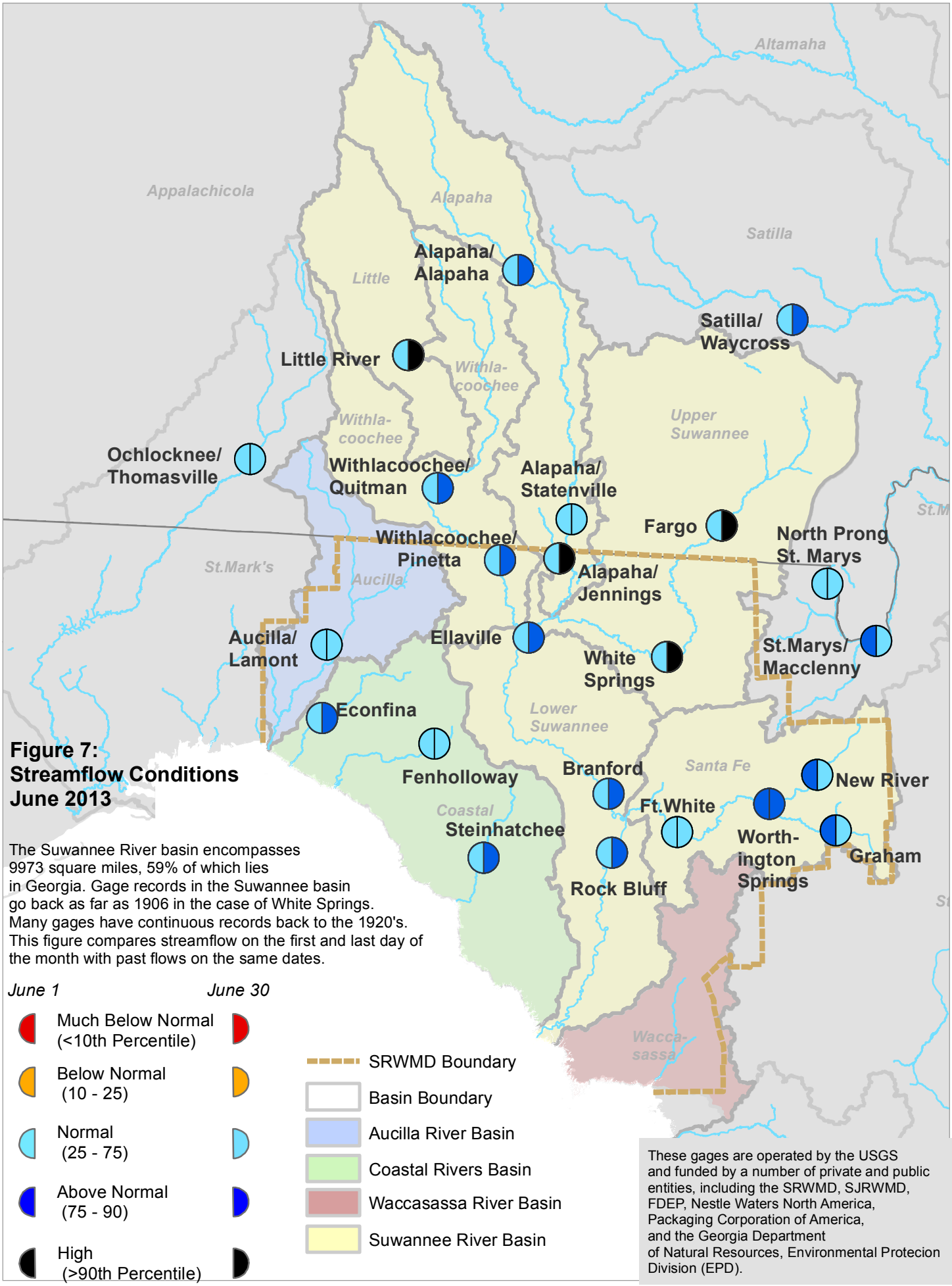
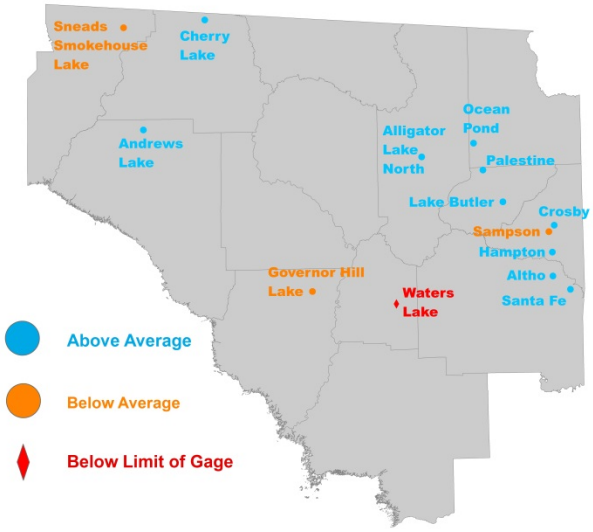
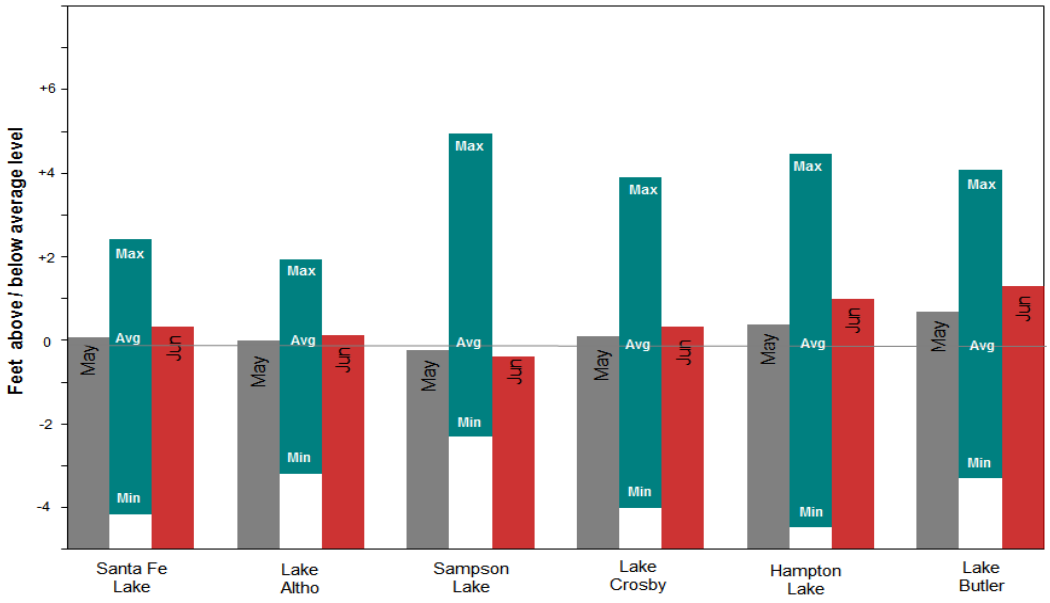

Altamaha
Appalachicola
Alapaha
Satilla
Little
Alapaha/
Alapaha
Satilla/
Waycross
Little River
Withla-
coochee
Withla-
coochee
Upper
Suwannee
Ochlocknee/
Thomasville
Withlacoochee/
Quitman
Alapaha/
Statenville
Fargo
North Prong
St. Marys
St.Mark's
Aucilla
Withlacoochee/
Pinetta
Alapaha/
Jennings
Aucilla/
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
June 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.
June 1
June 30
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: June 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.



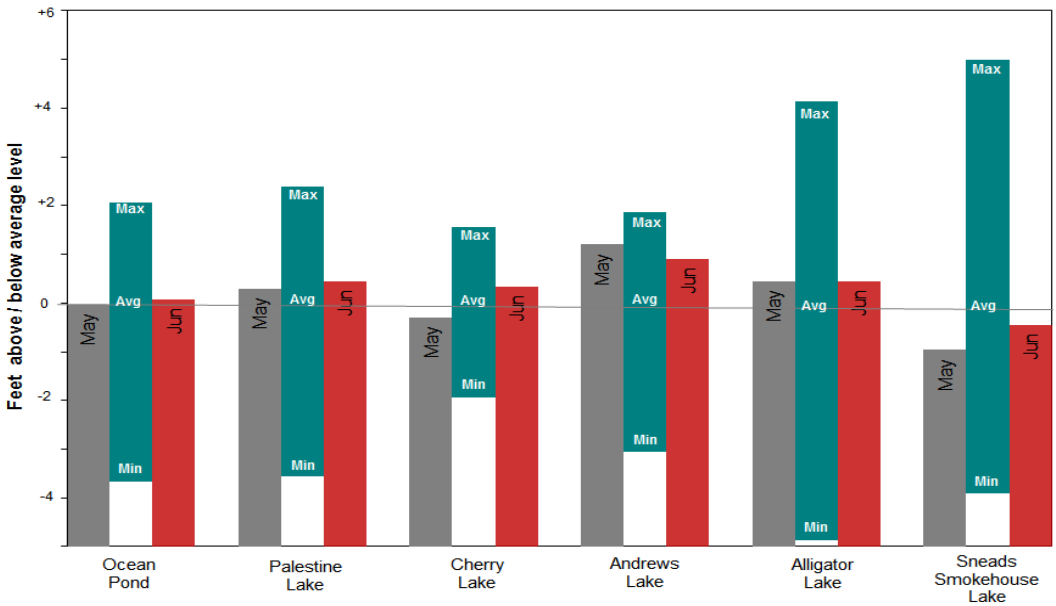
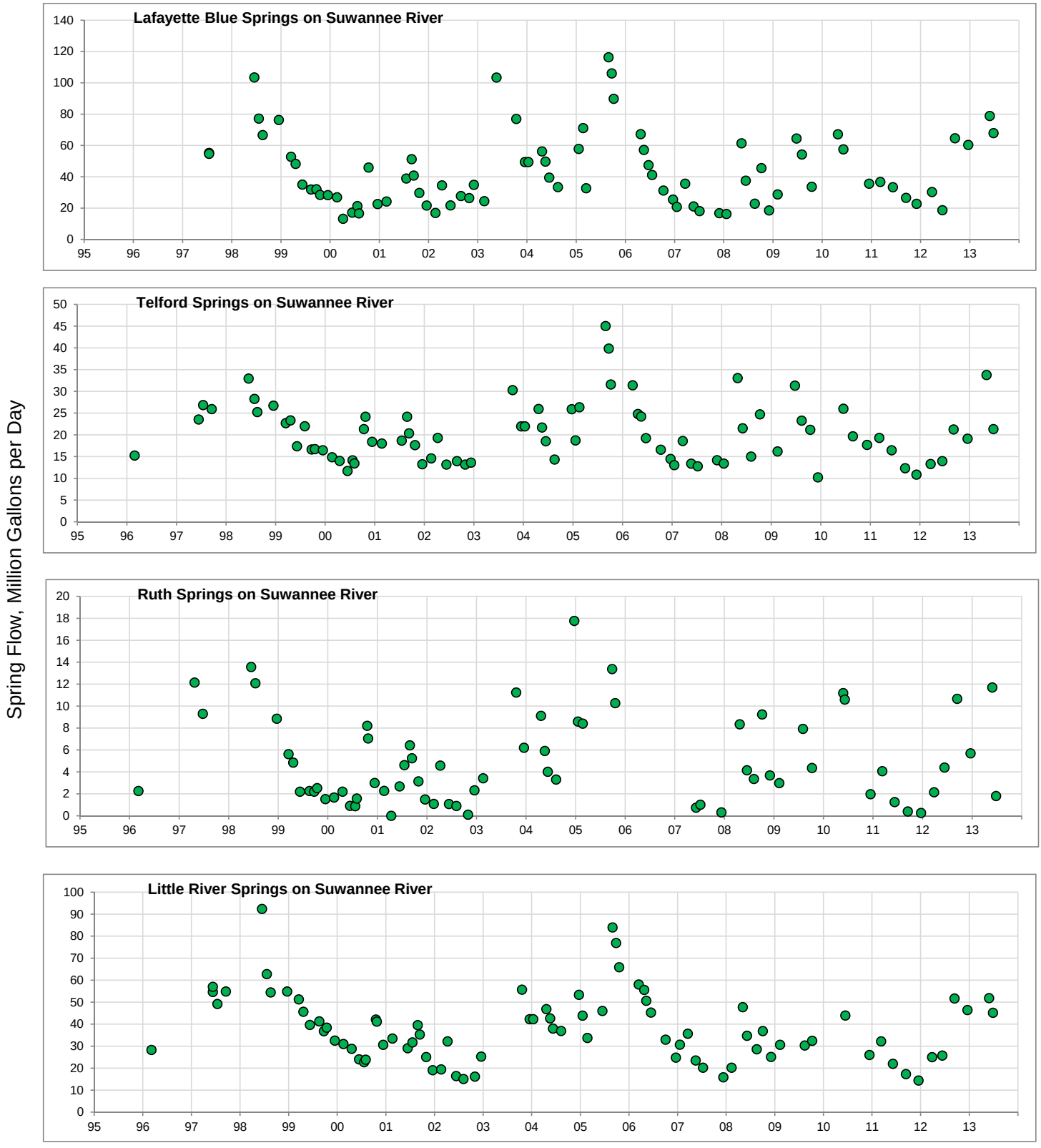


Figure 9: Quarterly Springflow Measurements

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



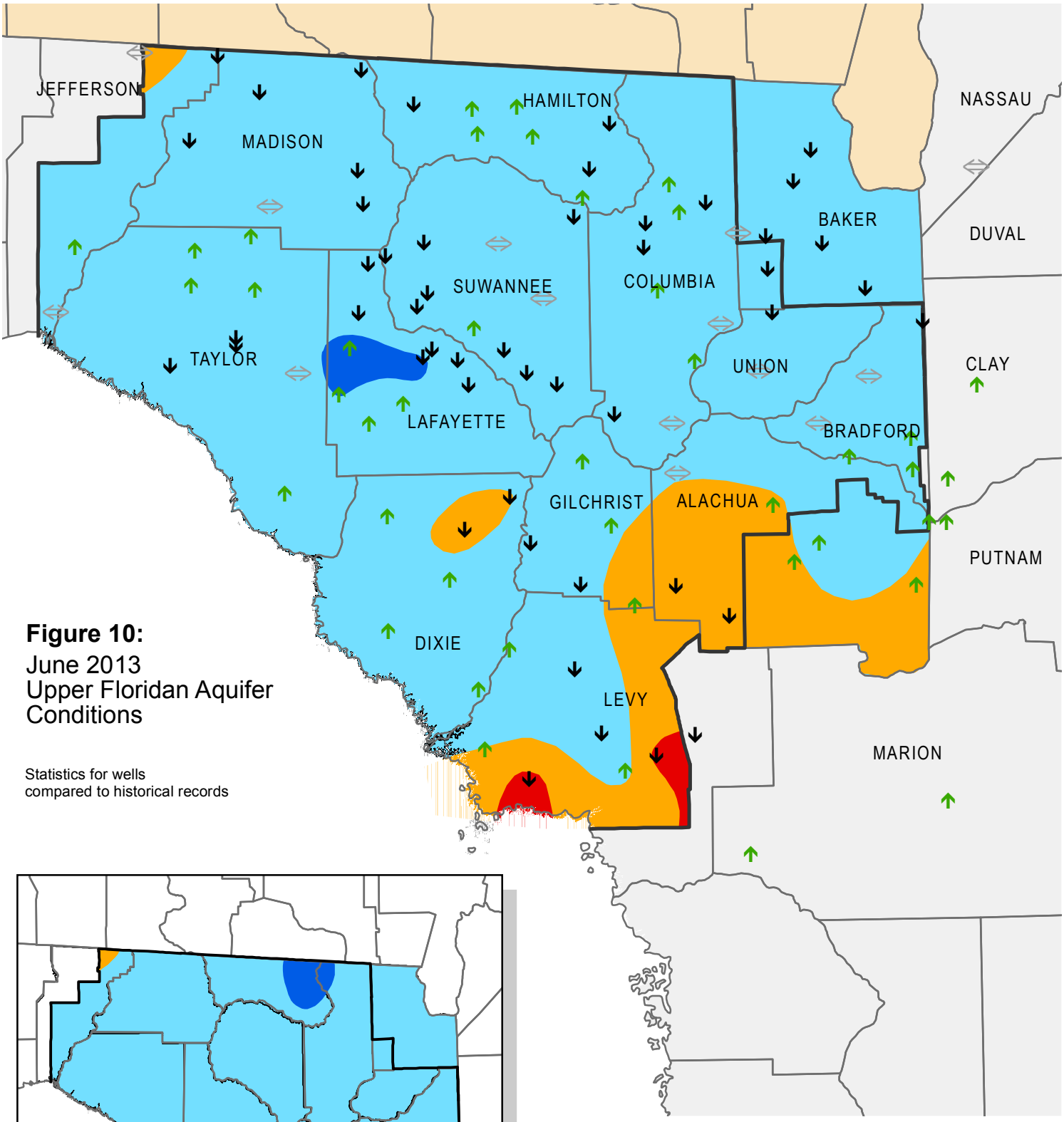
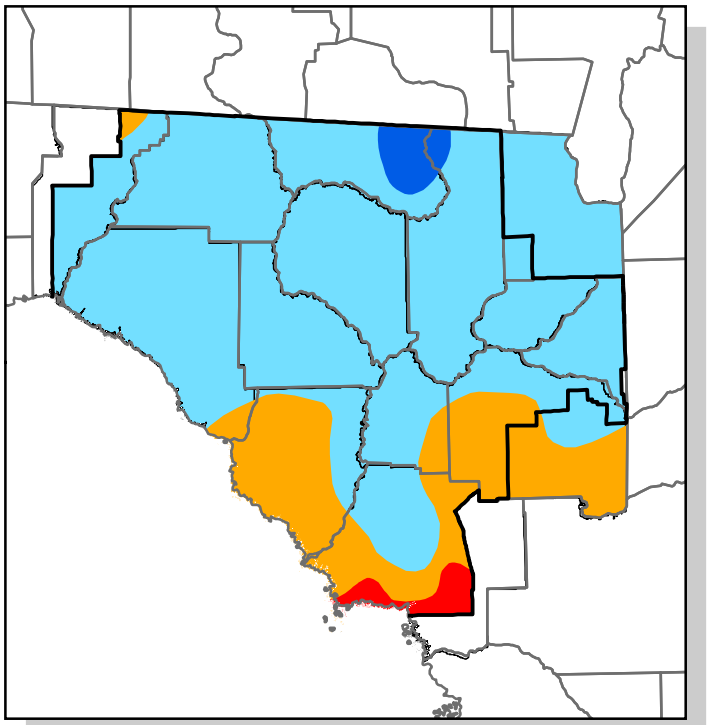


Figure 10:
June 2013
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: May 2013 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

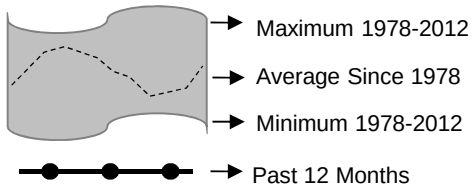
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

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

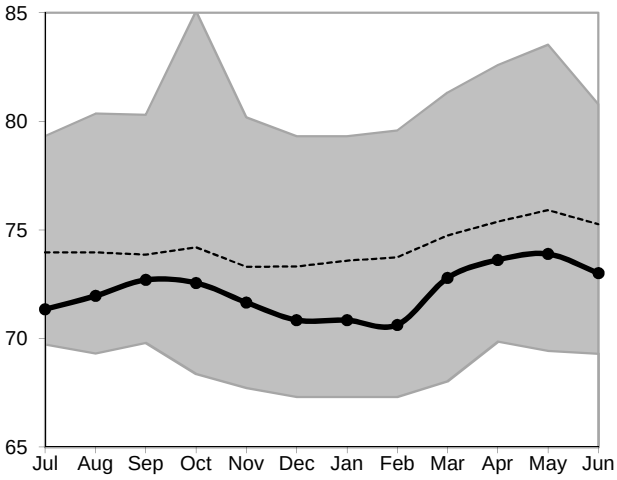
District Boundary

Figure 11: Monthly Groundwater Level Statistics
Levels July 1, 2012 through June 30, 2013
Period of Record Beginning 1978

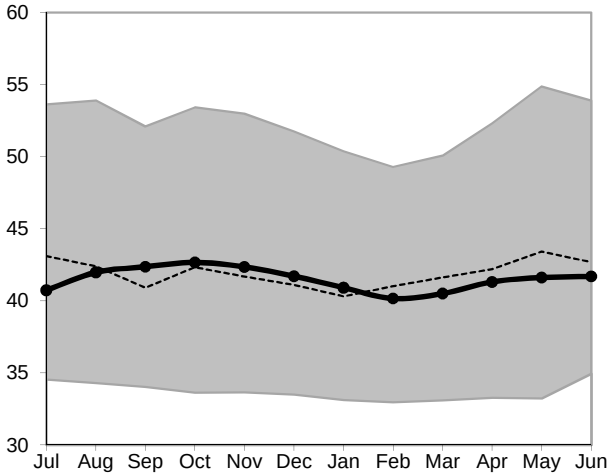


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

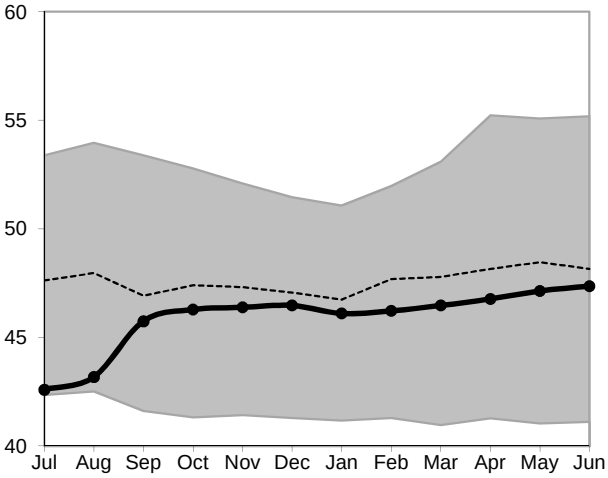
Madison County N010719001
near Greenville



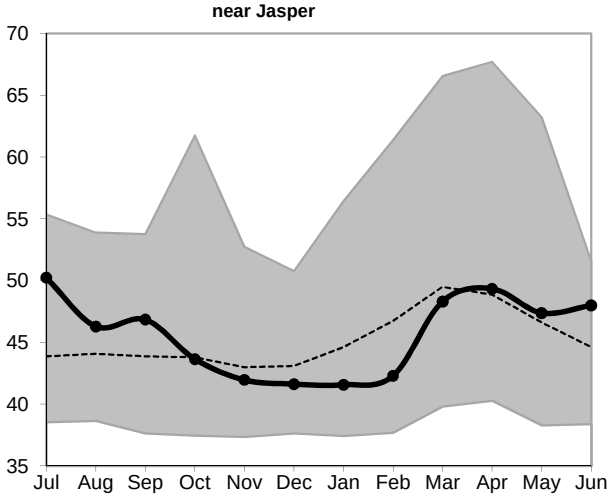
Suwannee County S021335001
near Live Oak



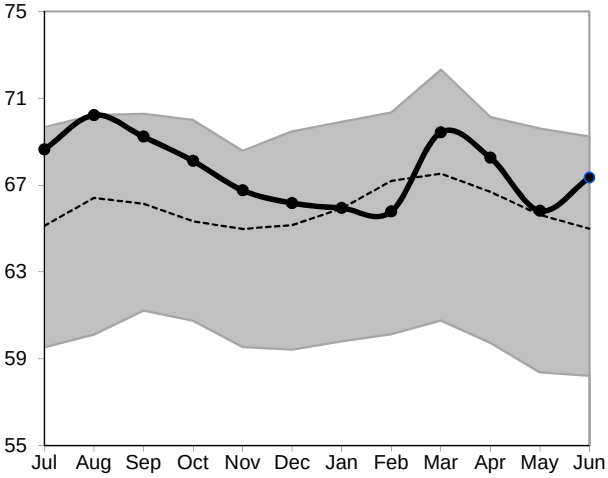
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

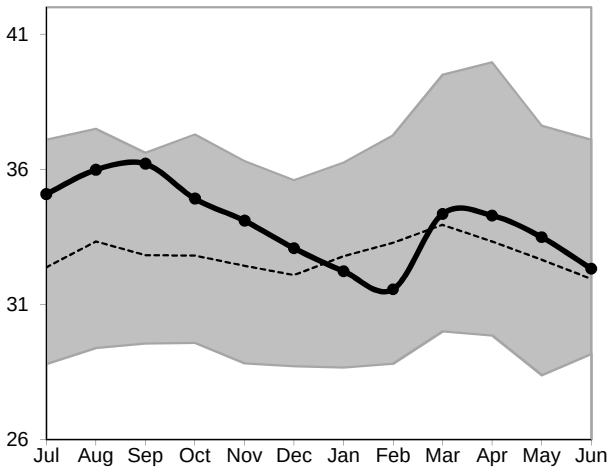
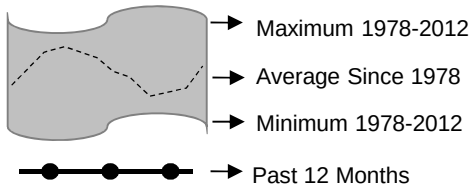
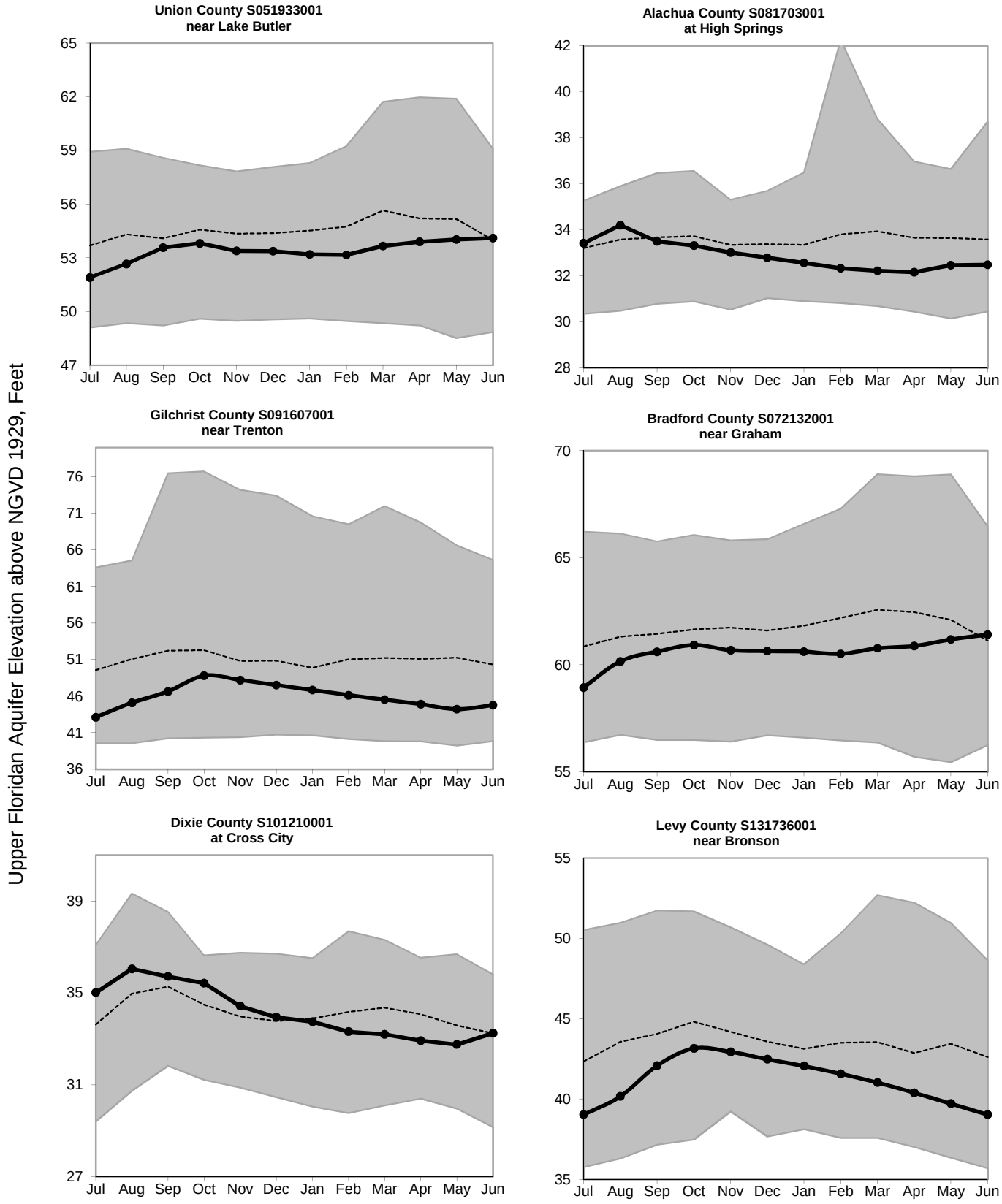


Figure 11, cont.: Groundwater Level Statistics
Levels July 1, 2012 through June 30, 2013
Period of Record Beginning 1978





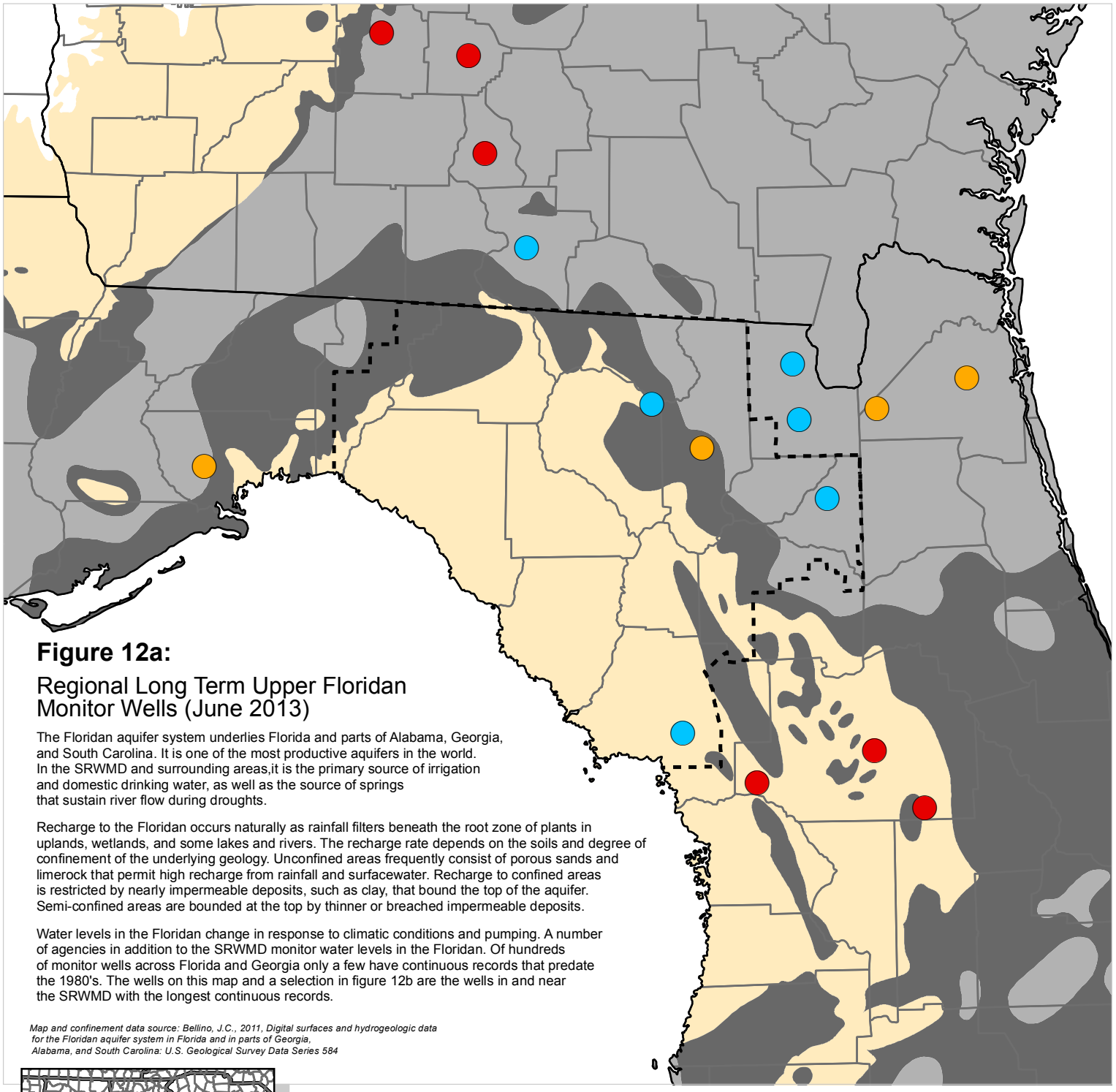


Figure 12a:

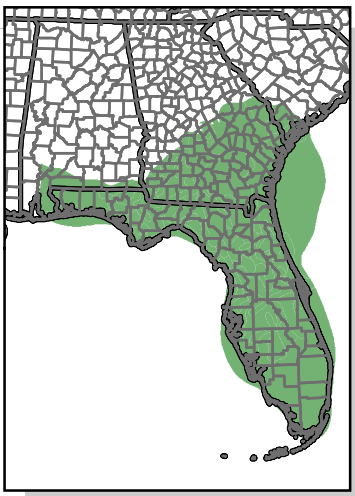
Regional Long Term Upper Floridan Monitor Wells (June 2013)

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

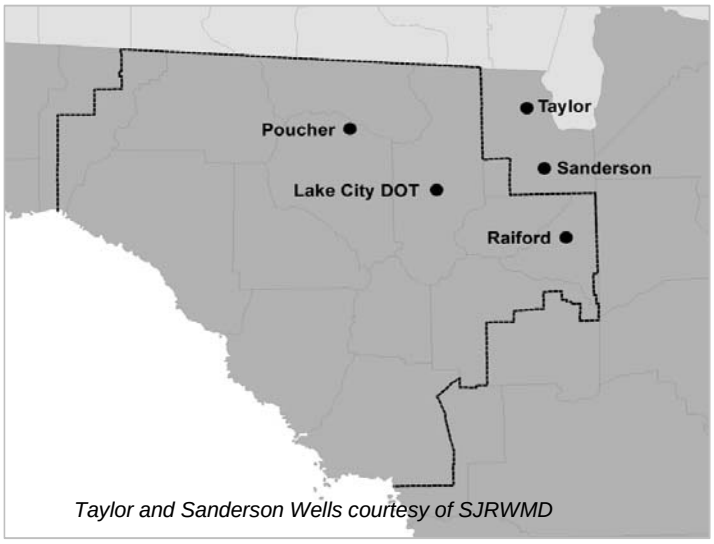
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

Percentile of Most Recent Water Level Relative to Entire Record

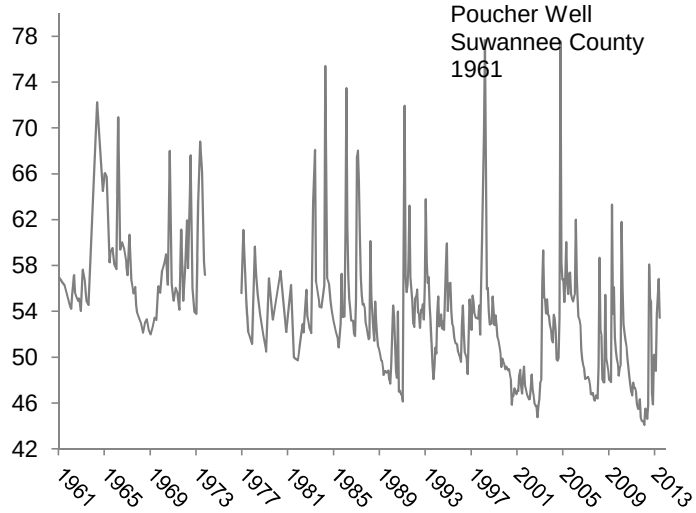
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

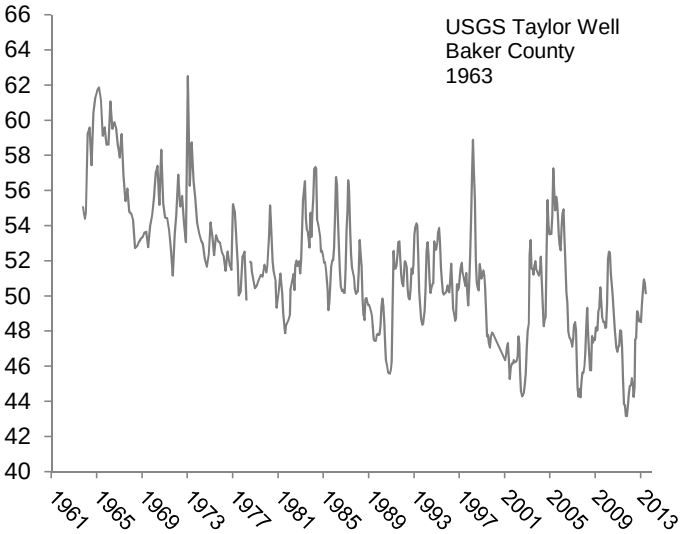
Figure 12b: Regional Long Term Upper Floridan Levels

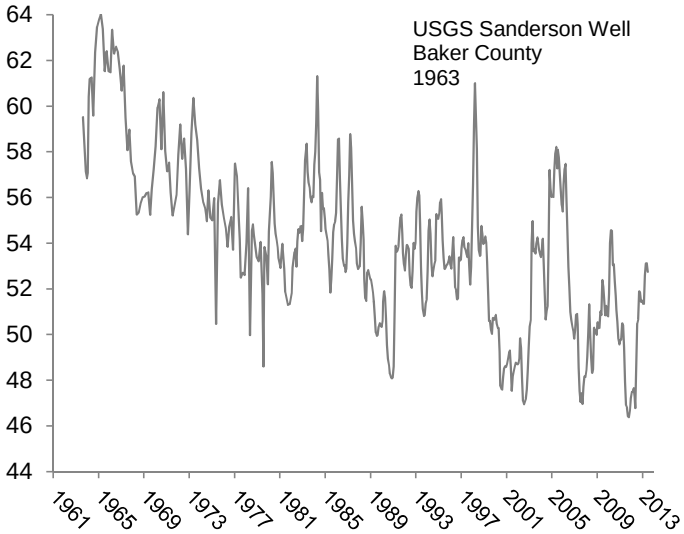
June 2013

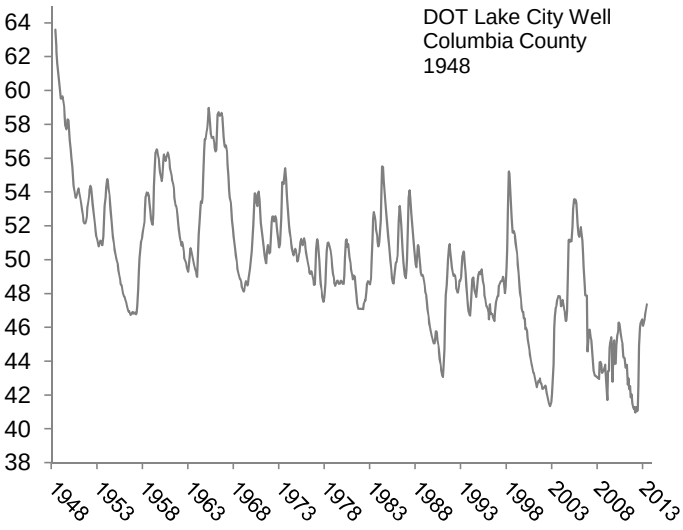


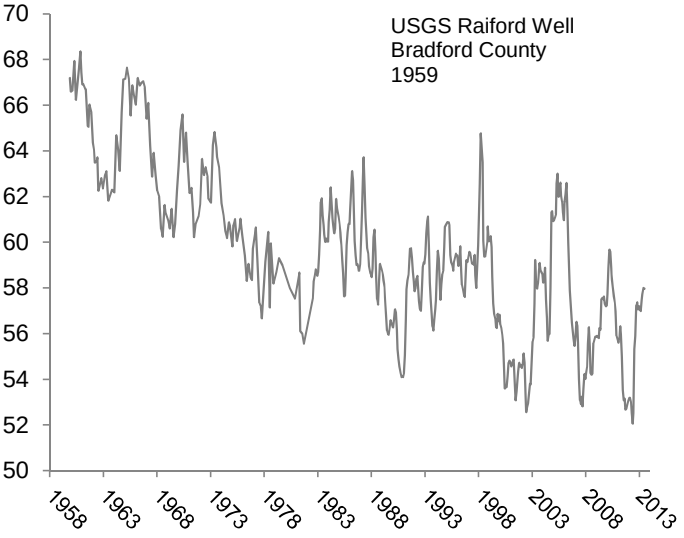
Taylor and Sanderson Wells courtesy of SJRWMD











Upper Floridan Aquifer Elevation above NGVD 1929, Feet