MEMORANDUM

TO: Governing Board

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

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

DATE: July 3, 2014

RE: June 2014 Hydrologic Conditions Report for the District

RAINFALL

- District-wide rainfall in June was 4.57", which is only 70% of normal based on records beginning in 1932 (Table 1, Figure 1). Isolated areas in Madison, Hamilton, and Taylor counties saw less than 2" (Figure 2). This was the 13th driest June in 82 years and the driest since 1998. June ended 5 months of above-average rainfall resulting in the wettest winter and spring since 1998. Totals were also much below normal over the Suwannee River's Georgia tributaries, with most areas receiving less than 50% of normal (Figure 3).
- The highest gaged monthly total was 8.86" at Lake Butler, which also had the highest 24-hour total with 3.08". The lowest gaged monthly total was 1.80" at the District's Pineview gage southeast of Quitman.
- Average rainfall for the 12 months ending June 30 was 11.1" higher than the long-term average of 54.63" (Figure 4), a decrease of about 4" since May (Figure 5). Average rainfall for the 3 months ending June 30 was 3.4" higher than the long-term average of 13.4". Rainfall in the last two years was 7" above normal overall, (Figures 6 and 7), with coastal areas receiving up to 30" above normal.

SURFACEWATER

- **Rivers:** Levels fell steadily at gages across the District. Middle- and lower-Suwannee River gages ended the month with flows higher than normal for the time of year as spring floodwaters continued to recede. Flows were typical of the month on the upper Suwannee and Georgia tributaries and on the Santa Fe River. The Aucilla and Steinhatchee rivers remained above normal after months of flooding. Flow statistics for a number of rivers are presented graphically in Figure 8, and conditions relative to historic conditions in Figure 9.

- **Lakes**: Levels at most monitored lakes fell slightly but remained above their long-term average levels. Figure 12 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.

- **Springs**: High aquifer levels and falling river levels along the Suwannee corridor resulted in strong spring flow, but many springs were still producing tannic water by the end of the month after being inundated by river water since March. Lafayette Blue Springs was measured flowing at 127 MGD (million gallons per day), its highest flow since 1998 and the third highest in its record. The flow on June 19 was tea-colored and the spring was closed to swimming and diving. Suwannee Springs was still returning tannic water to the river on June 26, but was measured at 43 MGD, the highest recorded flow since 1964 and the second-highest in its record. Its flow was also tannic. Little River Springs was measured with its highest flow since 2005, with a mostly clear flow of 73 MGD. On the Santa Fe, Ginnie Spring was measured at 32 MGD on May 30, its highest measured flow since 1998. White Sulphur Springs continued to flow into the Suwannee River, but its flow was too fast to safely measure. Statistics for a number of springs are shown in Figure 11.

GROUNDWATER

Upper Floridan aquifer levels fell in June after peaking in the spring with the highest levels since 2005. Overall levels dropped to the 89th percentile by the end of June from the 95th percentile in May based on records beginning no earlier than the 1970s (Figure 12). Seventy-six percent of monitor wells were above the 75th percentile, considered high. Forty-three percent were above the 90th percentile, considered very high. One well in Lafayette County was measured with its highest level since monitoring began there in 1988. Only one well, in southern Jefferson County, fell below its long-term median. Statistics for a representative sample of wells are shown in Figure 13, and statistics for a number of regional long-term wells are shown in Figure 14 along with a description of aquifer characteristics.

HYDROLOGICAL/METEOROLOGICAL 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 values for the week ending June 28 indicated normal conditions in north Florida and south Georgia.
- The National Weather Service Climate Prediction Center (CPC) three-month outlook showed equal chances of above- or below-normal precipitation through September. The El Niño watch issued by the CPC in March remains in effect. Their June 6 report gave a 70% chance of El Niño in the summer and an 80% chance in the fall and winter. There is still uncertainty about the predicted strength of the El Niño, but most models slightly favor a moderate-strength event in the fall or winter. According to the National Weather Service, El Niño effects, including enhanced precipitation and severe weather in the southeast, are strongest in the fall, winter, and spring. In the summer, El Niño can reduce the formation of tropical cyclones in the Atlantic by causing increased wind shear.
- The U.S. Drought Monitor report of July 1 showed no drought conditions in north Florida or south Georgia.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Water conservation is as important in wet times as in dry to sustain healthy flows in springs and rivers. All users are urged to eliminate unnecessary uses. Landscape irrigation is limited to twice per week during Daylight Savings Time (between March 9 and November 2, 2014) 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. More information about the SRWMD's year-round lawn and landscape irrigation measures is available at www.mysuwanneeriver.com.

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

Table 1: Estimated Rainfall Totals (inches)

County	June 2014	June Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	5.27	6.57	80%	60.20	118%
Baker	4.85	6.29	77%	56.74	114%
Bradford	4.98	6.11	81%	51.94	102%
Columbia	4.03	6.25	64%	59.35	115%
Dixie	5.19	6.42	81%	70.69	120%
Gilchrist	5.77	6.43	90%	67.61	118%
Hamilton	3.86	6.13	63%	57.93	111%
Jefferson	3.57	6.09	59%	62.83	104%
Lafayette	4.61	6.25	74%	75.93	134%
Levy	5.53	6.87	81%	71.54	120%
Madison	3.03	6.08	50%	65.40	116%
Suwannee	4.14	6.20	67%	68.97	130%
Taylor	4.27	6.93	62%	74.91	126%
Union	5.32	6.78	78%	56.75	105%

June 2014 Average:	4.57
June Average (1932-2013):	6.66
Historical 12-month Average (1932-2013):	54.63
Past 12-Month Total:	65.71
12-Month Rainfall Surplus:	11.08

Figure 1: Comparison of District Monthly Rainfall

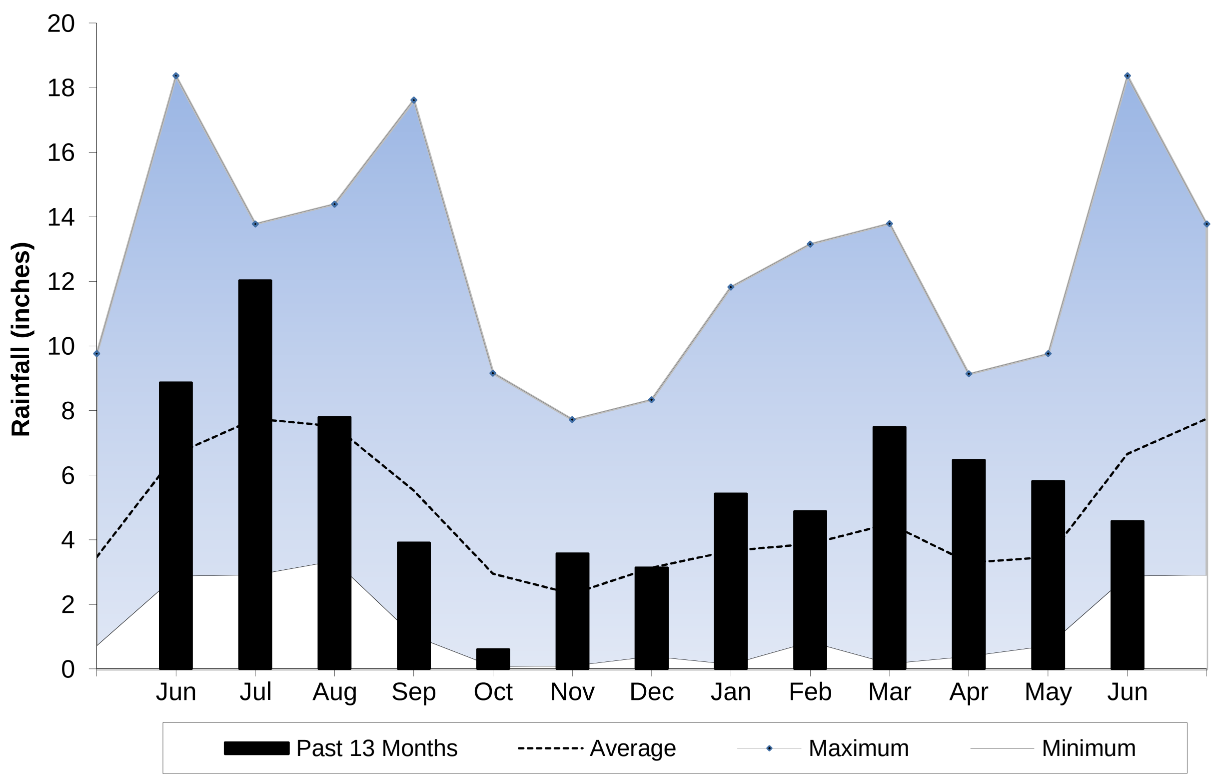


Figure 2: June 2014 Rainfall Estimate

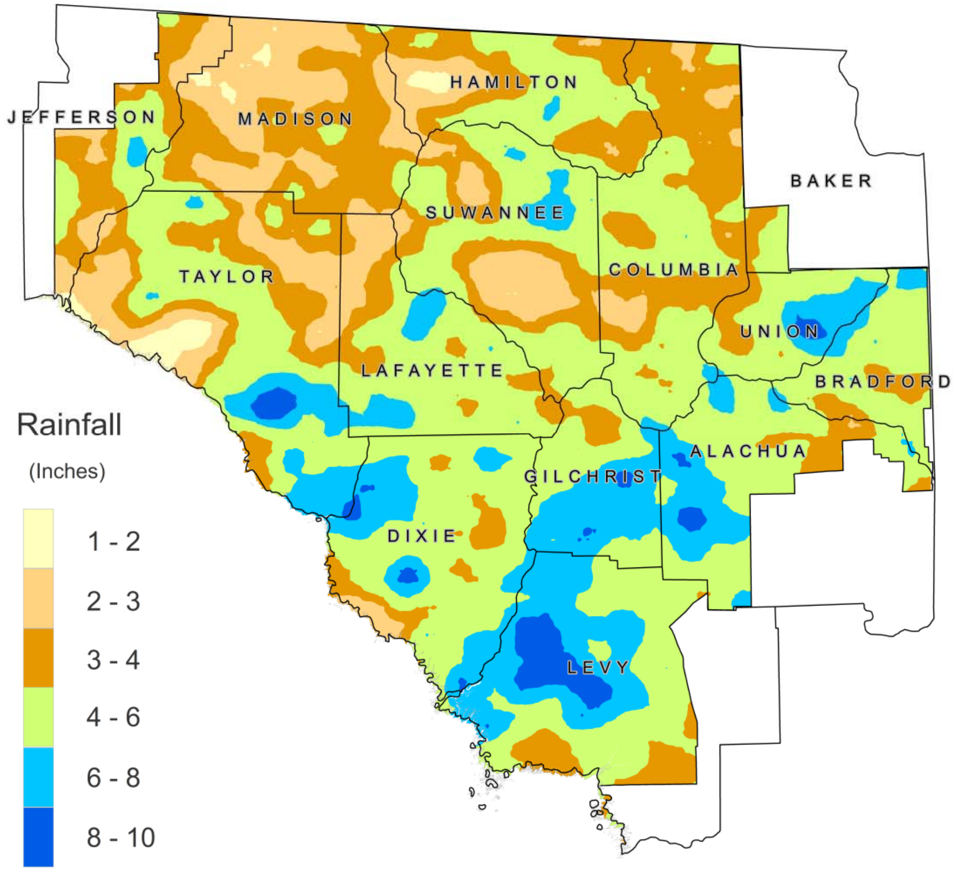


Figure 3: June 2014 Percent of Normal Rainfall

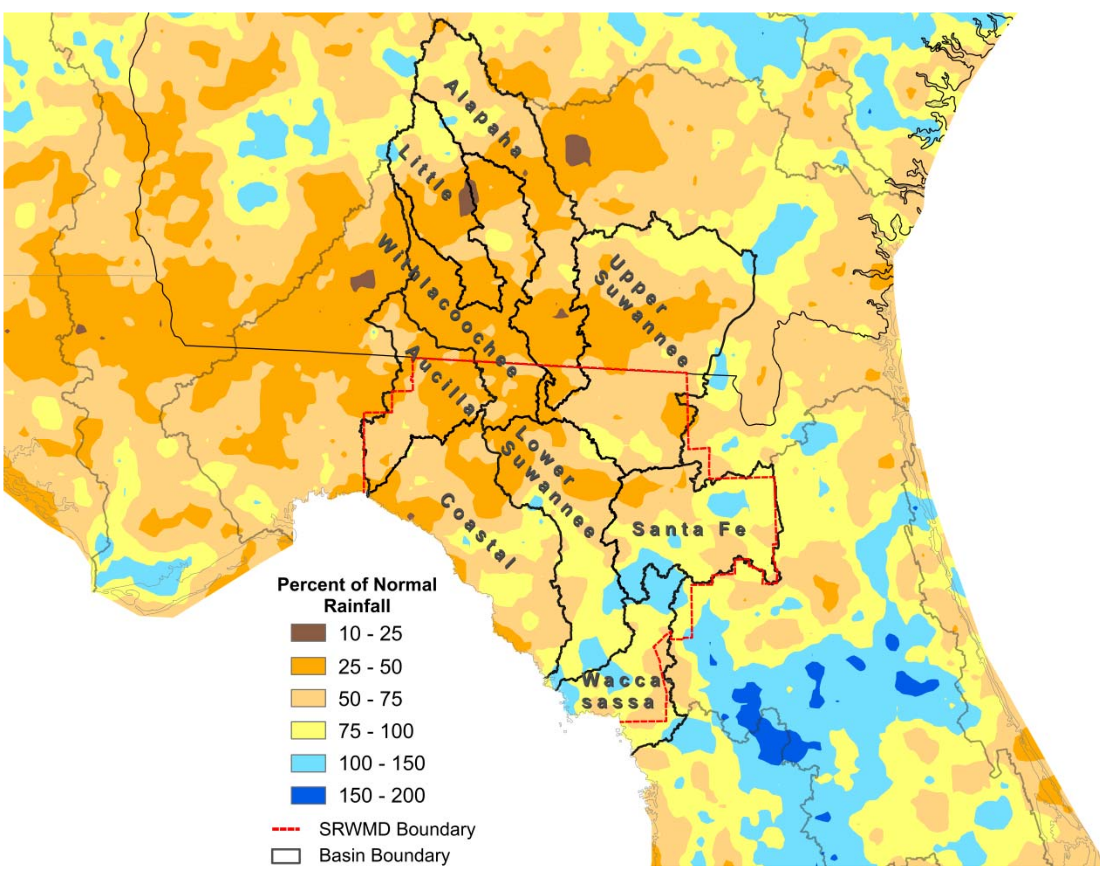
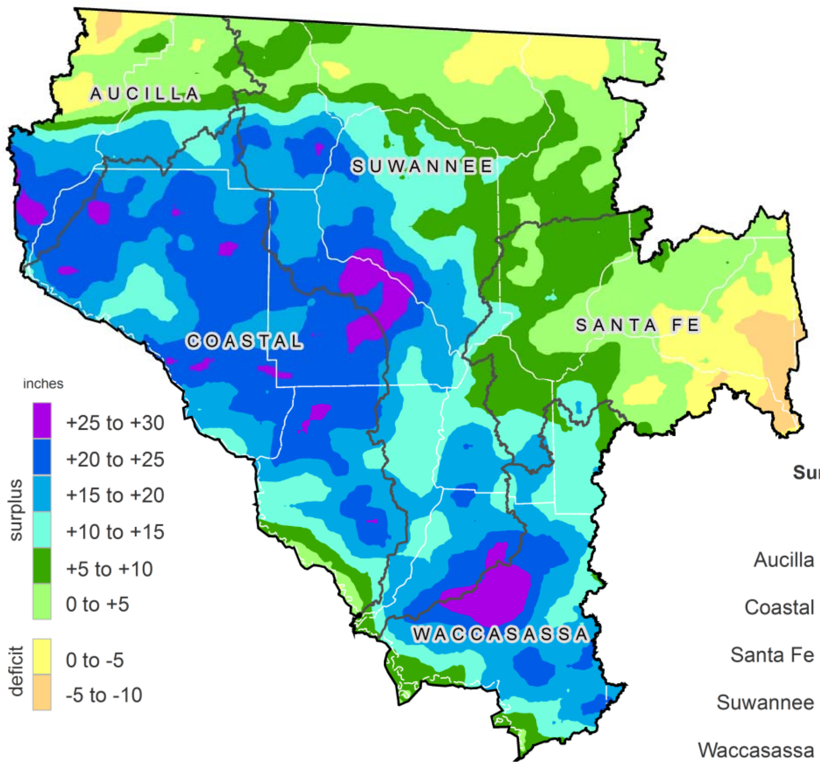


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through June 30, 2014



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

	Jun -14	May -14
Aucilla	+8.8	+13.7
Coastal	+19.7	+24.0
Santa Fe	+2.8	+6.6
Suwannee	+11.4	+16.6
Waccasassa	+17.4	+20.8

Figure 5: 12-Month Rolling Rainfall Surplus/Deficit
Through June 30, 2014

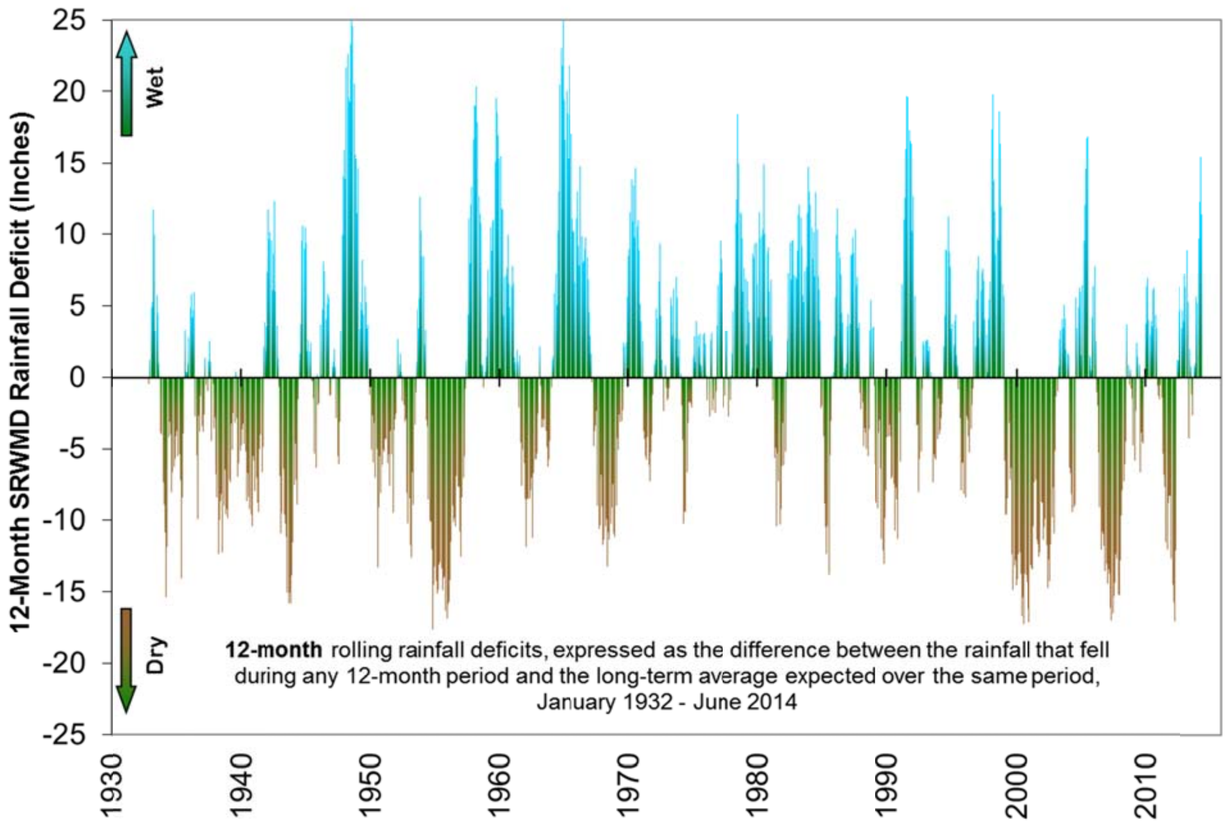


Figure 6: 24-Month Rainfall Surplus/Deficit by River Basin
Through June 30, 2014

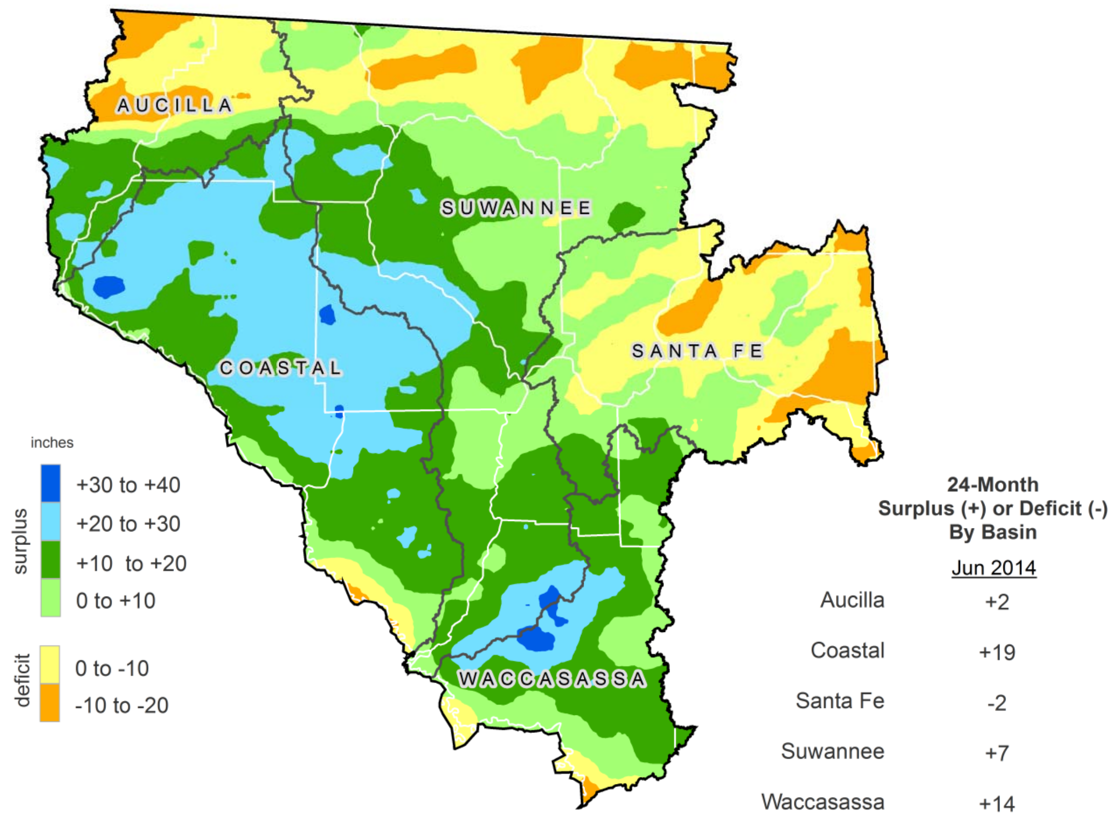


Figure 7: 24-Month Rolling Rainfall Surplus/Deficit
Through June 30, 2014

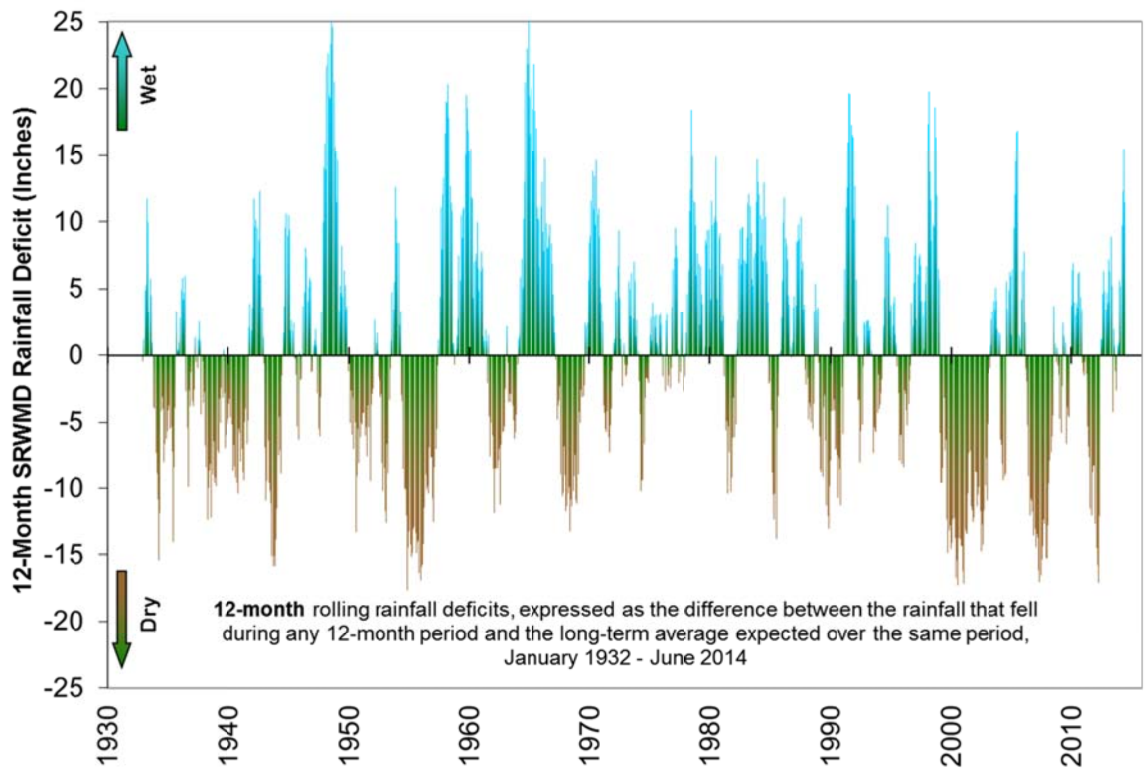
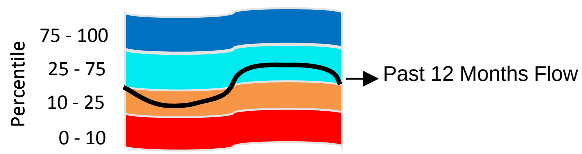


Figure 8: Daily River Flow Statistics

July 1, 2013 through June 30, 2014



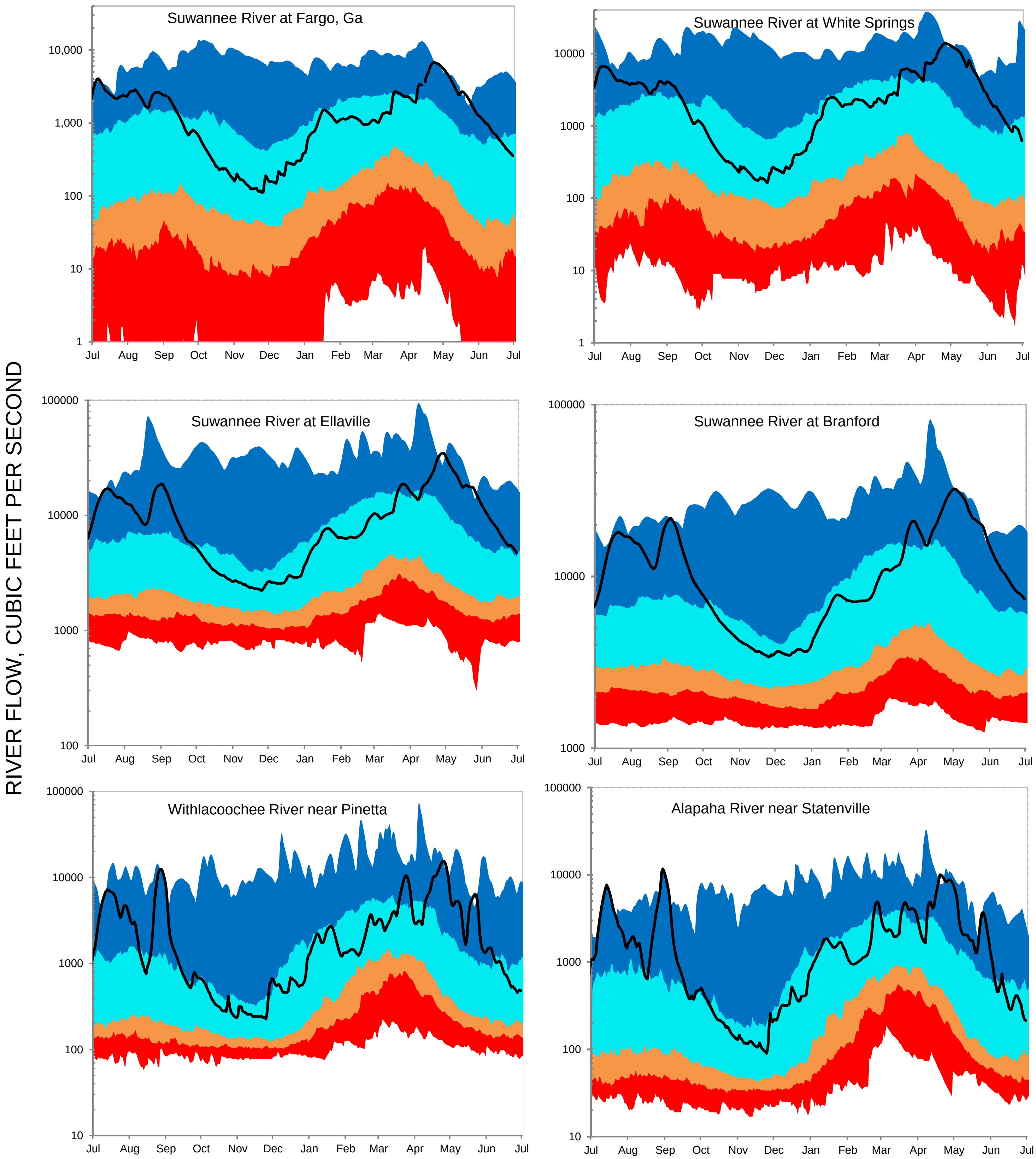
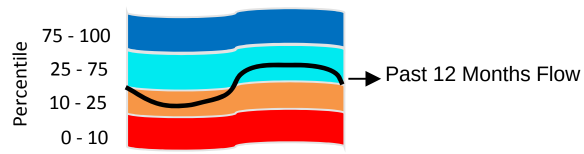
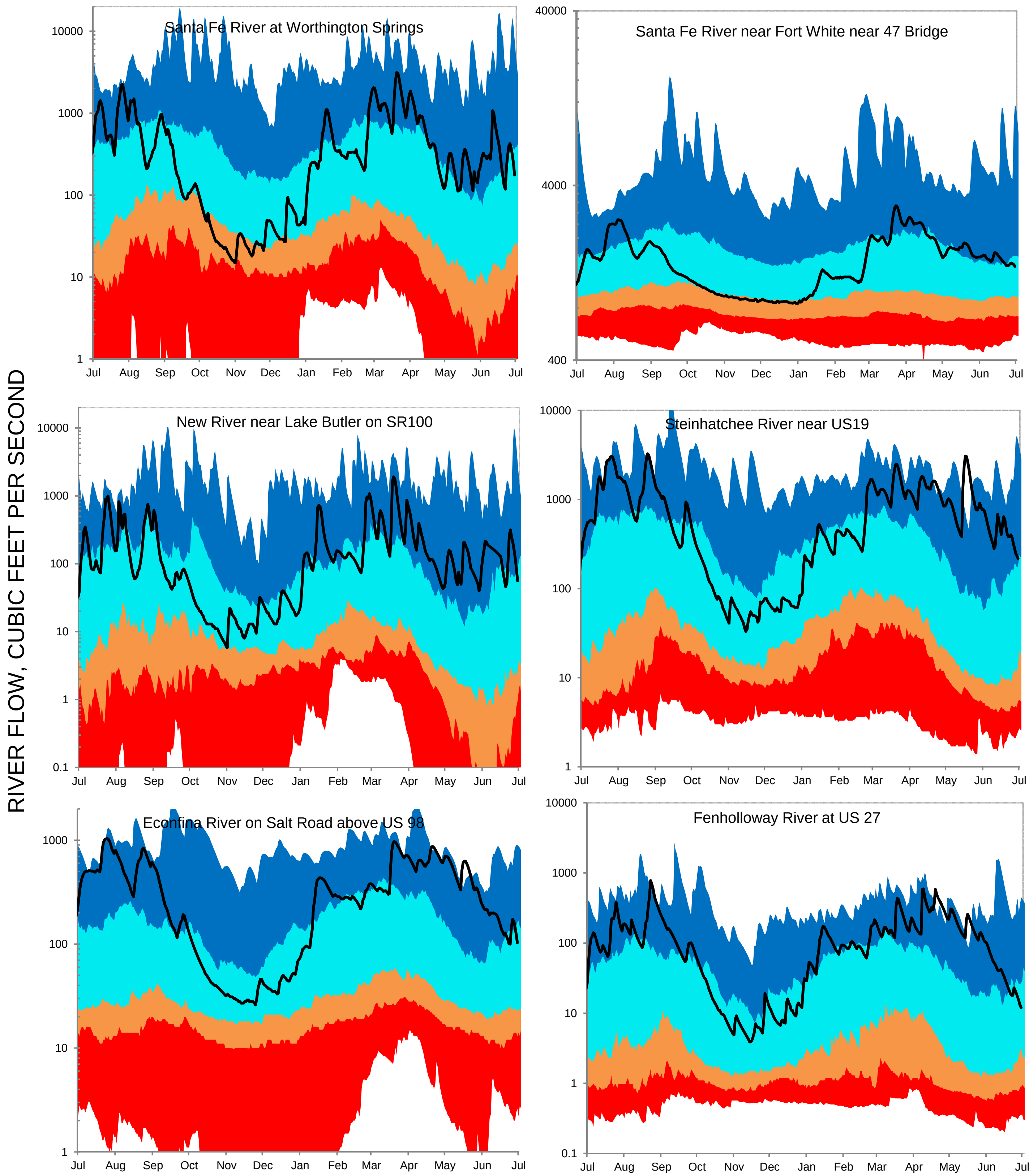


Figure 8, cont: Daily River Flow Statistics
July 1, 2013 through June 30, 2014





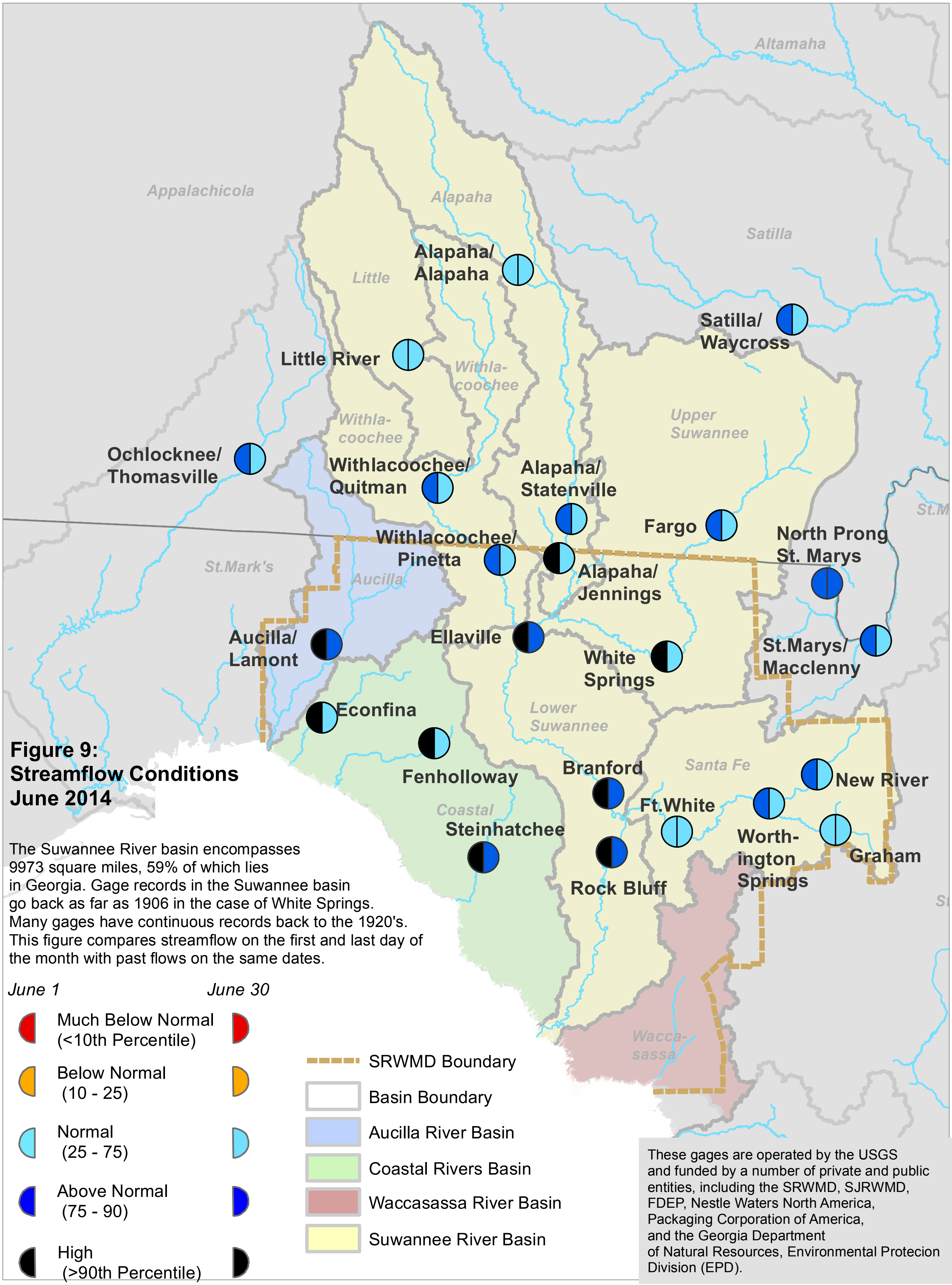
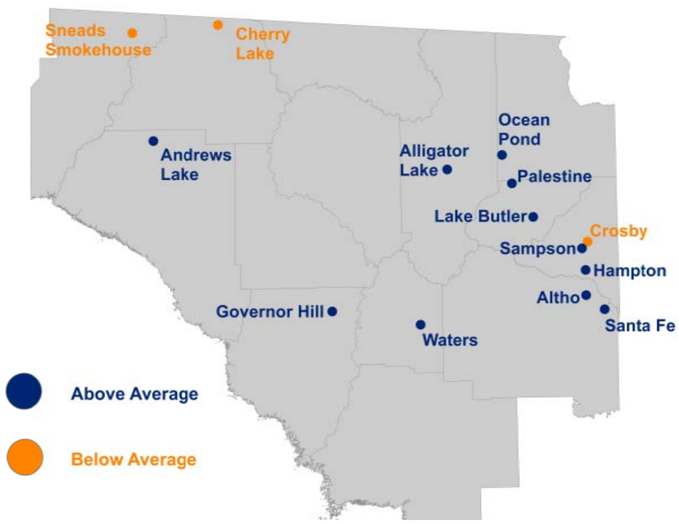


Figure 9:
Streamflow Conditions
June 2014

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 10: June 2014 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.

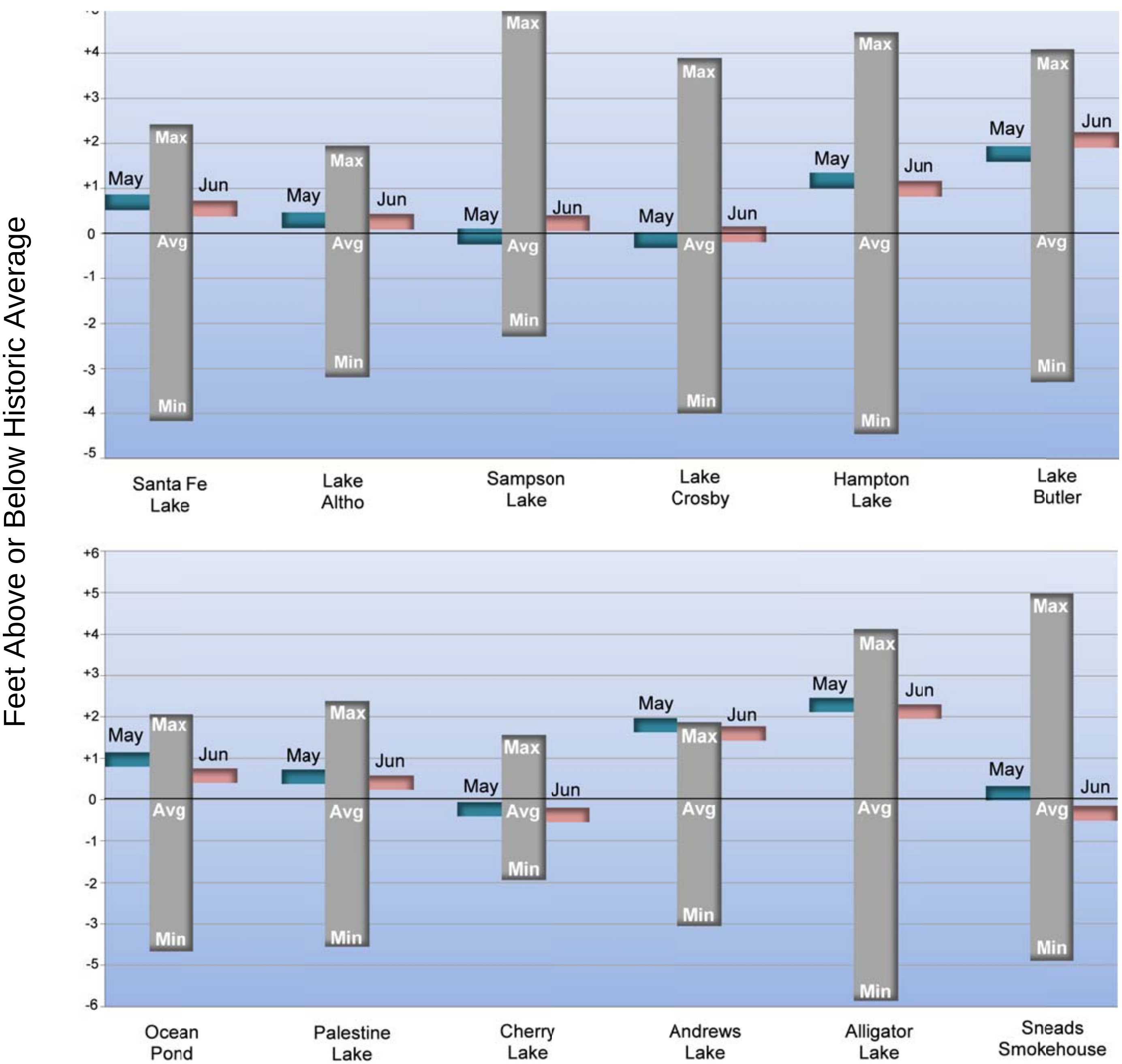


Figure 11: Quarterly Springflow Measurements

The SRWMD monitors water quality at 38 springs. Flow is usually measured at the time of the sampling. The springs below were measured between May 30 and June 30, 2014, with the last measurement marked in red. Flow is given in million gallons per day (MGD). With the exception of the Ichetucknee River and the Alapaha Rise, springs in the SRWMD were measured infrequently prior to the late 1990s. Springs with long records were rarely measured more than once per decade.

A spring's flow can be greatly affected by the level of the river it runs into. Rising river levels can act like a dam and slow spring flow causing what is known as a backwater effect. A river can flood a spring completely, known colloquially as a "brown-out". If the river levels are high enough, river water can flow back into the spring vent and thus into the aquifer, resulting in a negative flow rate. Because of the interaction between a spring and its receiving water body, some low flows in this data are the result of flooding and not necessarily drought conditions.

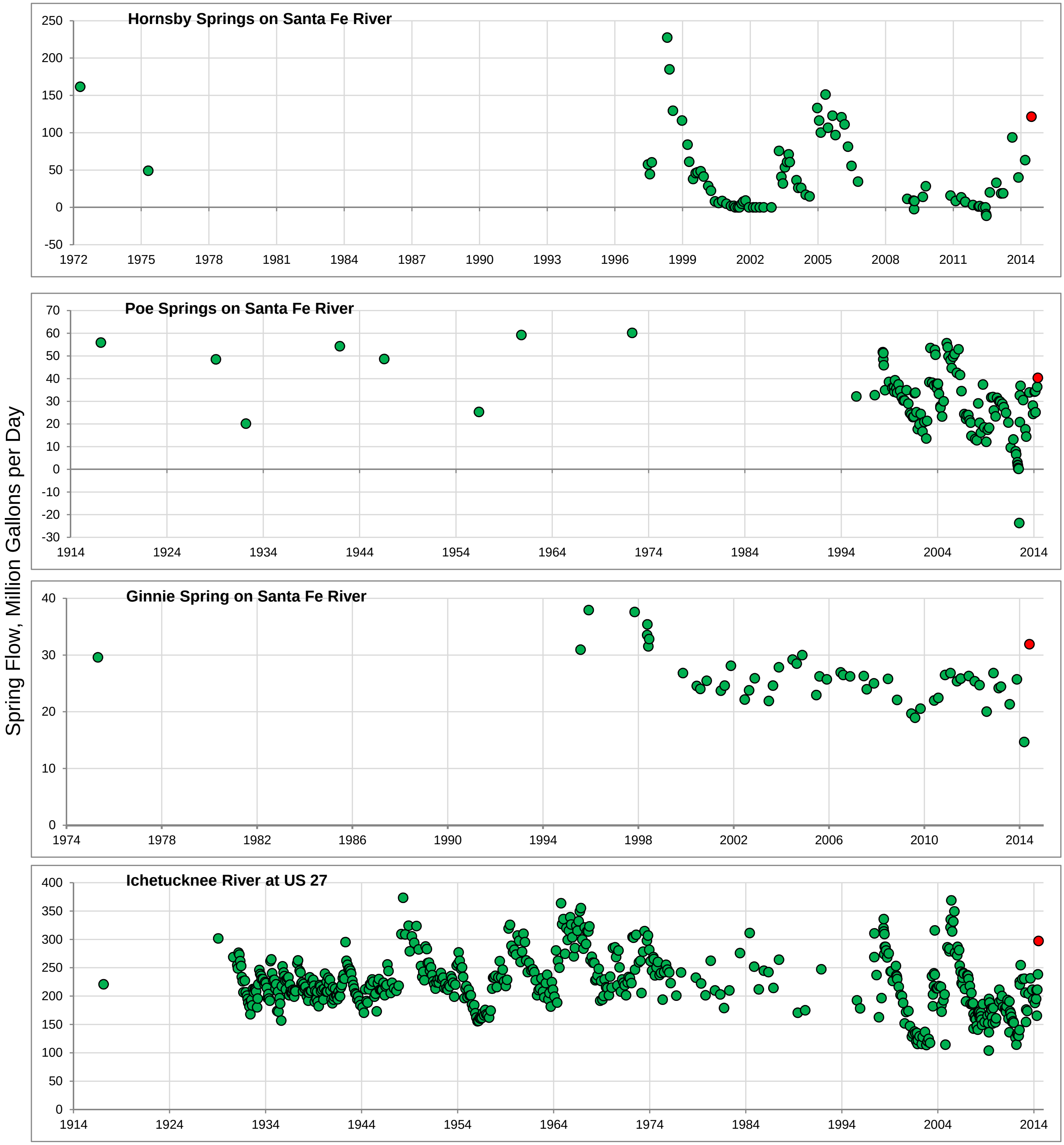


Figure 11: Quarterly Springflow Measurements, continued

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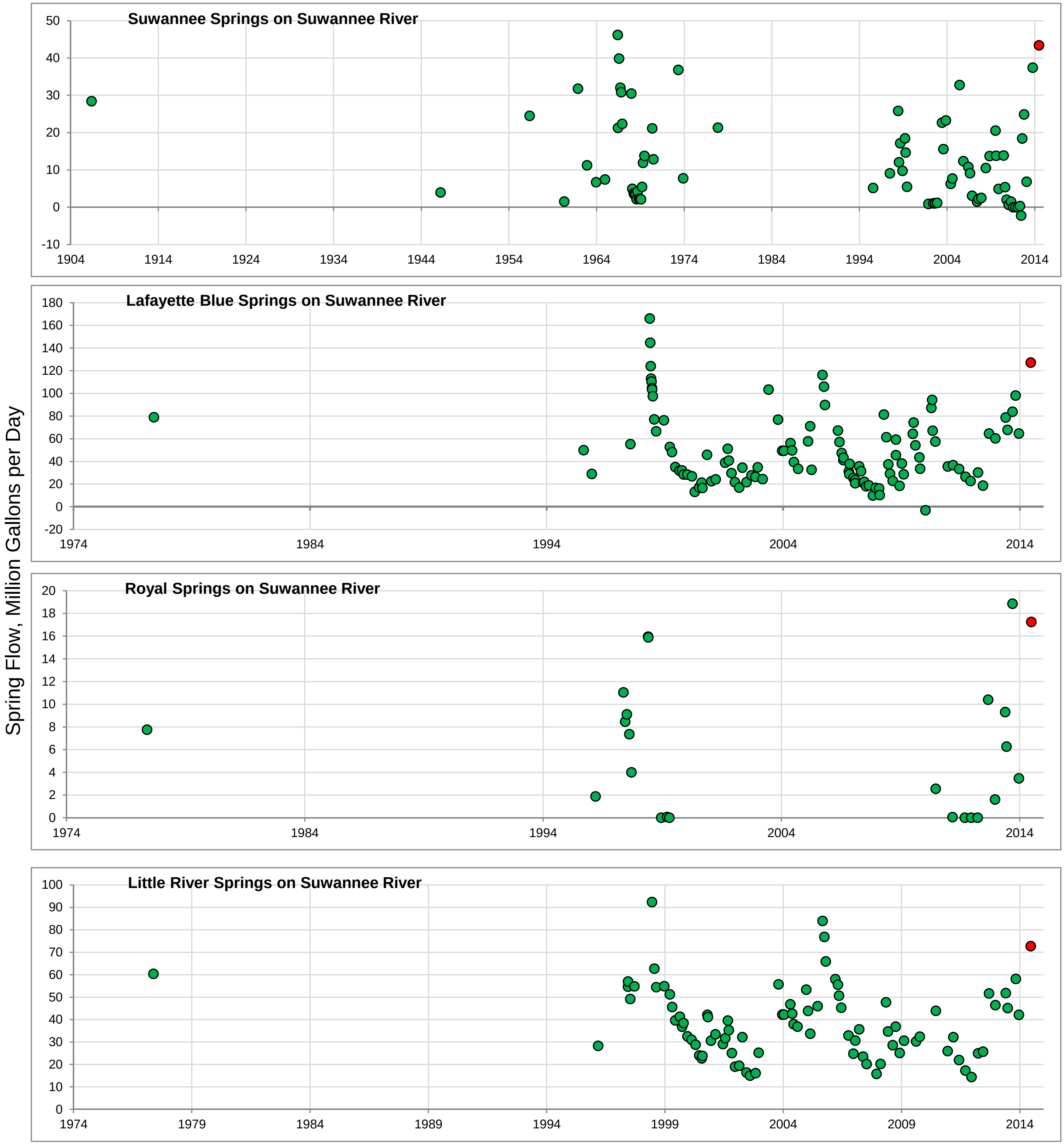


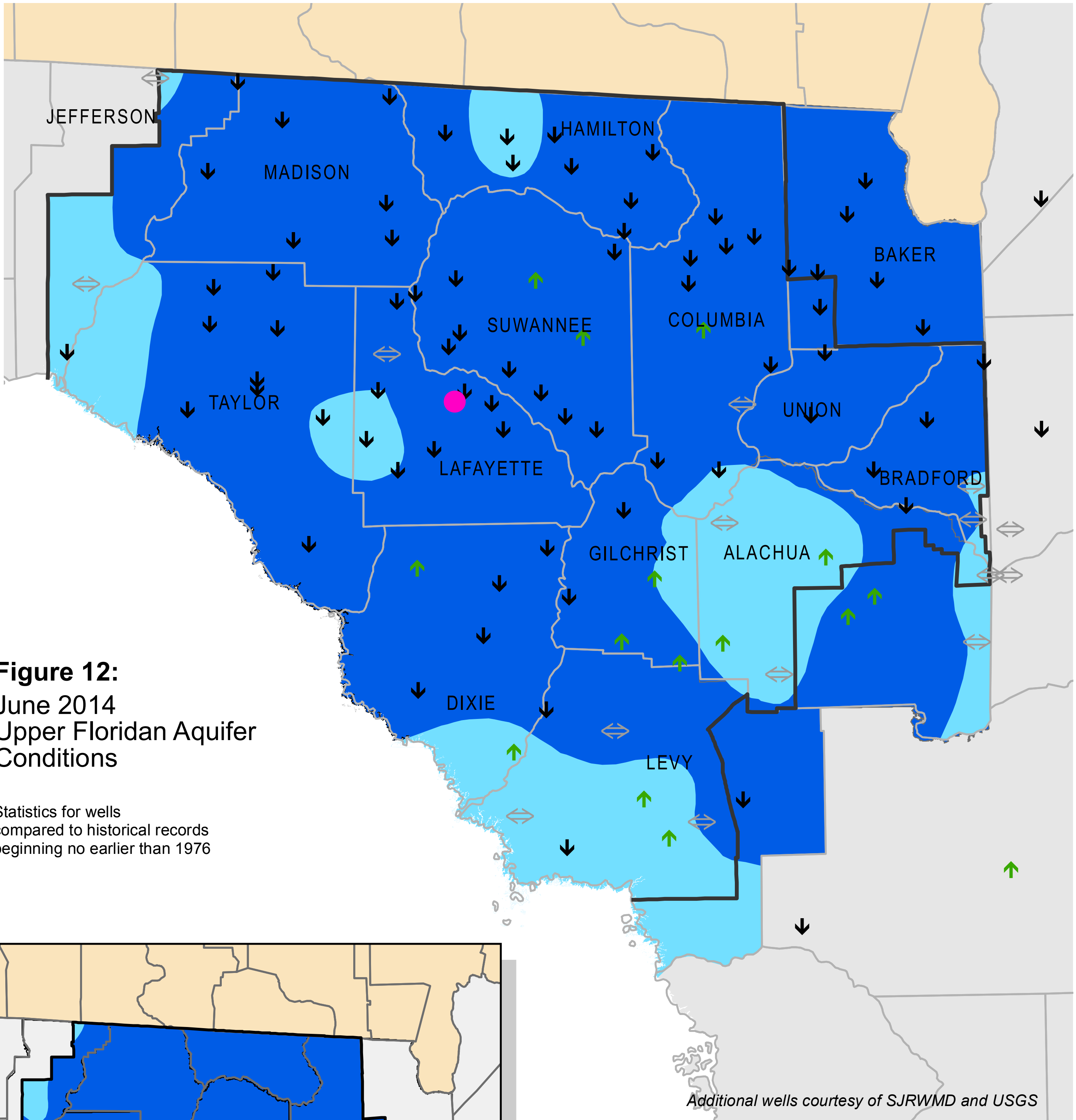
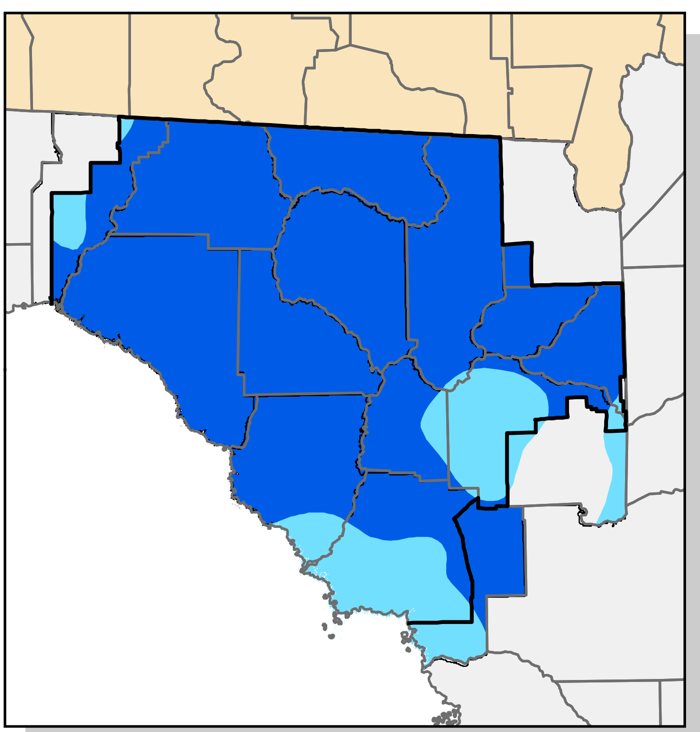


Figure 12:
June 2014
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records
beginning no earlier than 1976



Inset: May 2014 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

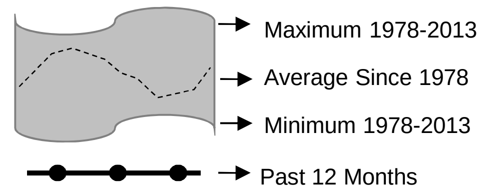
Record High Level

District Boundary

Figure 13: Monthly Groundwater Level Statistics

Levels July 1, 2013 through June 30, 2014

Period of Record Beginning 1978



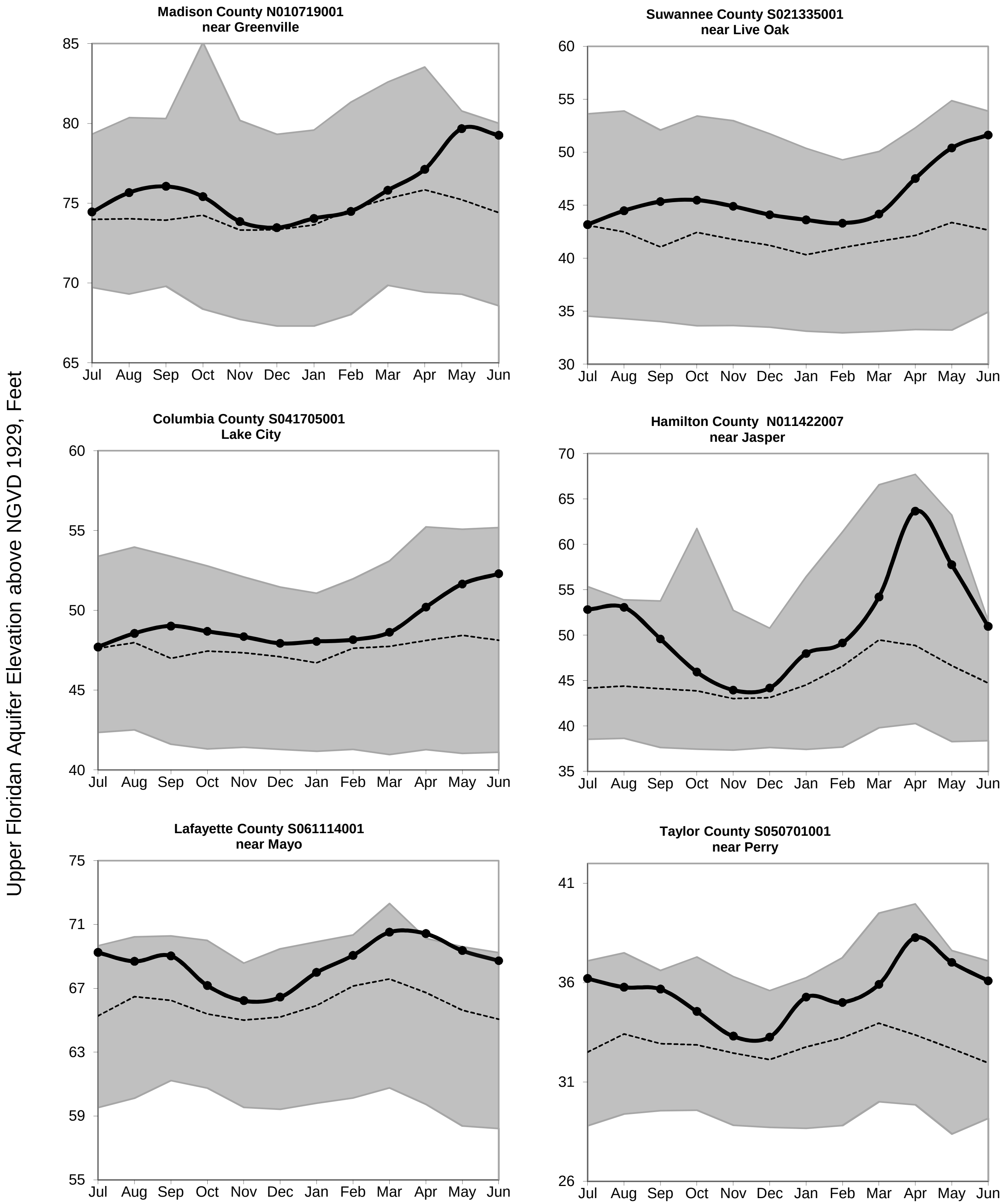
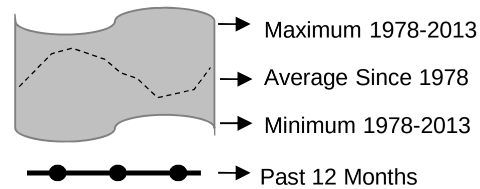
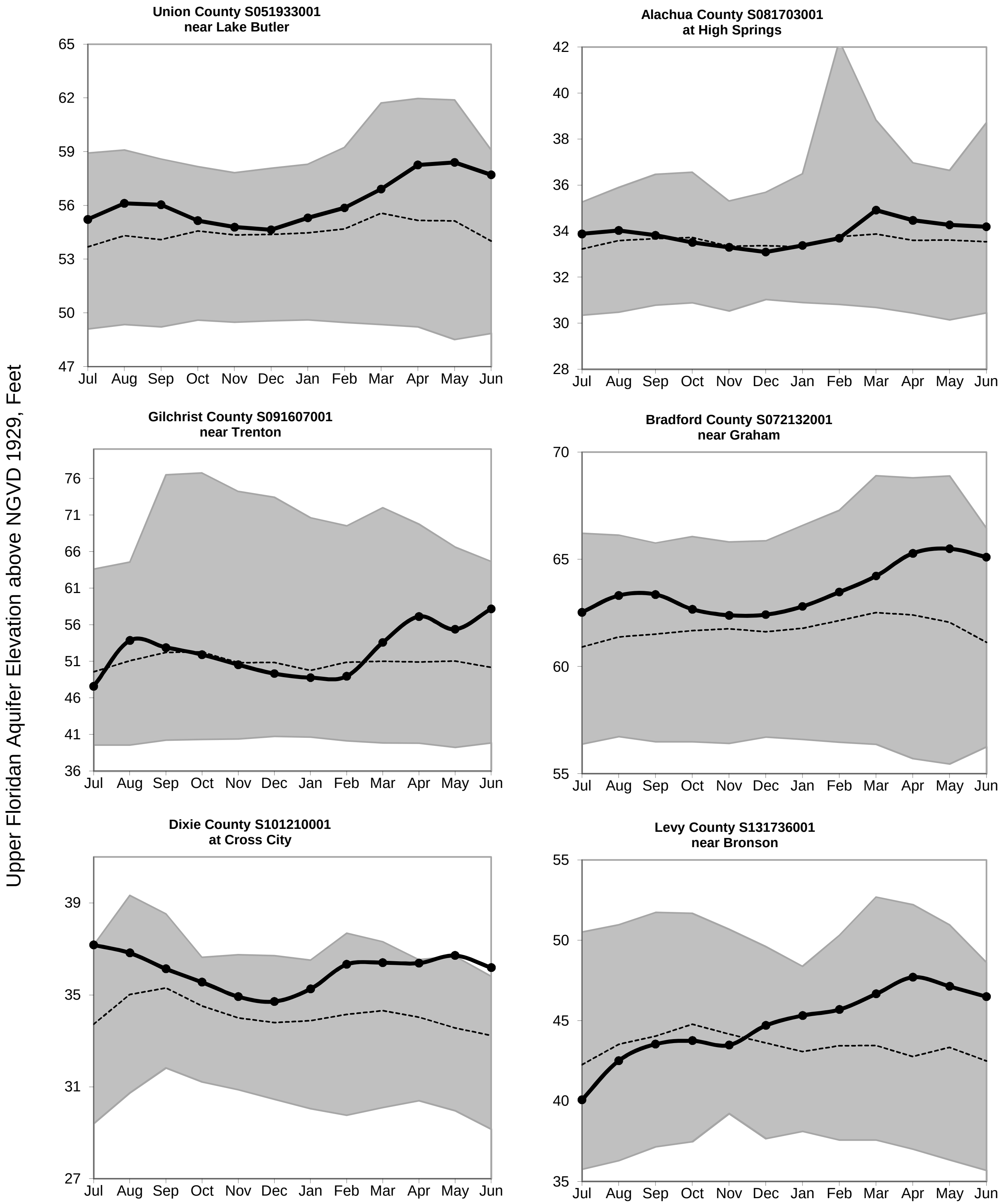


Figure 13, cont.: Groundwater Level Statistics
Levels July 1, 2013 through June 30, 2014
Period of Record Beginning 1978





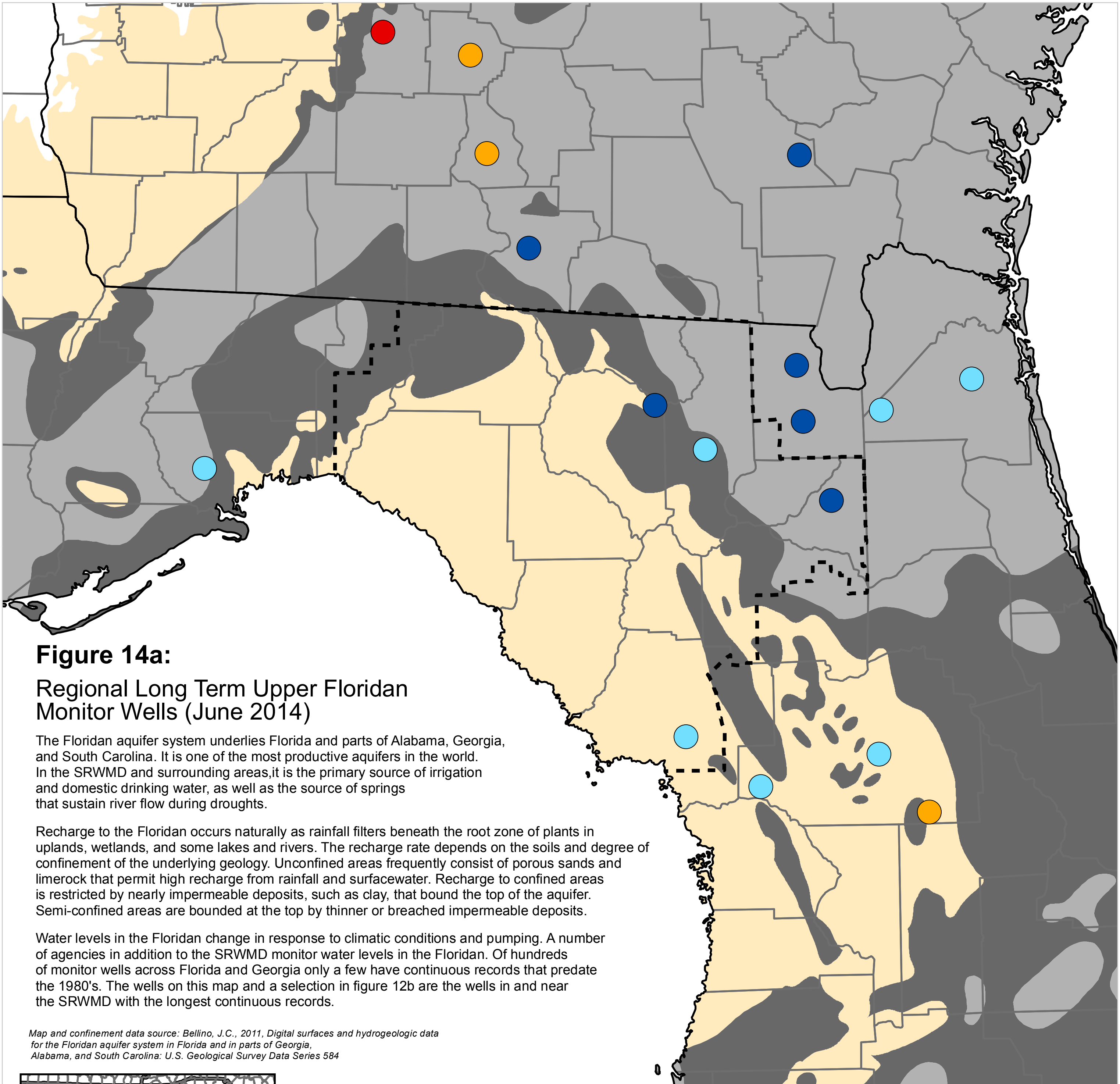


Figure 14a:

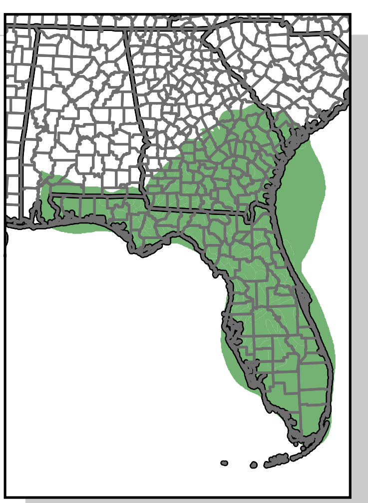
Regional Long Term Upper Floridan Monitor Wells (June 2014)

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 14b: Regional Long Term Upper Floridan Levels

June 2014