

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: March 7, 2014

RE: February 2014 Hydrologic Conditions Report for the District

RAINFALL

- District-wide February rainfall was 4.88", an inch higher than the historic average based on records beginning in 1932 (Table 1, Figure 1). Most counties had above-average rainfall. Madison and Hamilton counties were near normal. Parts of Taylor, Dixie, Lafayette, Suwannee, and Gilchrist received up to 8" (Figure 2).
- The highest gaged monthly total was 7.52" at the Tom Gunter gage in Mallory Swamp (southeast Lafayette County), which also had the highest gaged total in January. The lowest gaged monthly total was 3.35" at Sanderson in Baker County. The highest daily total was 2.75" at Ichetucknee Springs State Park.
- The Alapaha and Withlacoochee basins in south Georgia received less than normal rainfall, with a deficit of 1-2" for the third month in a row. The Okefenokee Swamp (the headwaters of the upper Suwannee River) was also below normal, with up to an inch of deficit (Figure 3).
- Average rainfall for the 12 months ending February 28 was 5" higher than the long-term average of 54.63" (Figure 4). Average rainfall for the 3 months ending February 28 was 2.8" higher than the long-term average of 10.66" (Figure 5).

SURFACEWATER

- **Rivers:** The Steinhatchee River crested at flood stage, its highest level since August. Upper Santa Fe River gages remained above their long-term median levels throughout the month. The Santa Fe at Worthington Springs rose to its highest level since July. The Santa Fe near Fort White on the lower Santa Fe remained near its long-term seasonal median flow throughout the month. Suwannee River gages also maintained levels typical of February. Statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions are in Figure 7.
- **Lakes:** Levels rose at all of the District's monitored lakes. All were above their long-term median levels, except for Waters Lake, which still remained below the District's gage. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.
- **Springs:** The Suwannee River began to flow into White Sulphur Springs on January 4 and continued throughout February. Troy Springs, Lafayette Blue Springs, and Madison Blue Springs remained closed to swimming and diving due to inundation from river water. Flow increased at the Alapaha Rise, the resurgence of the Alapaha River and the largest single contributor of groundwater to the Suwannee River upstream of the Santa Fe River during drought. The flow on February 10 was 427 MGD (million gallons per day). Statistics for the Alapaha Rise and others are shown in Figure 9.

GROUNDWATER

Upper Floridan aquifer levels rose slightly in February, improving for the second month in a row. Overall, levels increased from near the 70th percentile in January to the 78th percentile by the end of February, based on records beginning in the 1970s. Sixty-three percent of monitor wells were above the 75th percentile, considered high. Twenty percent were above the 90th percentile, considered very high. Only 4 wells had levels lower than their long-term median. Statistics for a representative sample of wells are shown in Figure 11, and 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 values for the week ending March 1 indicated normal conditions in north Florida and southeast Georgia.
- The National Weather Service Climate Prediction Center (CPC) three-month outlook showed equal chances of above- or below-normal precipitation through May. Neutral El Niño/Southern Oscillation conditions are expected through the spring, with no tendency toward either El Niño (cooler and wetter) or La Niña (warmer and drier) conditions caused by Pacific Ocean temperatures. For the longer term, the CPC issued an El Niño watch on March 6 giving a 50% chance of El Niño developing in the summer or fall. 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 March 4 showed no drought conditions in north Florida or south Georgia, an improvement since December when abnormally dry conditions existed in the upper Suwannee basin.

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 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.

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	Feb 2014	February Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	4.99	3.59	139%	57.92	114%
Baker	3.80	3.44	110%	52.53	105%
Bradford	4.68	3.64	129%	53.85	106%
Columbia	4.66	3.72	125%	55.35	108%
Dixie	5.42	3.98	136%	62.69	106%
Gilchrist	5.65	4.18	135%	60.69	106%
Hamilton	4.18	4.01	104%	53.92	103%
Jefferson	3.94	4.65	85%	52.56	87%
Lafayette	6.16	3.98	155%	65.74	116%
Levy	4.63	3.63	128%	65.24	109%
Madison	4.22	4.36	97%	59.03	105%
Suwannee	5.08	3.73	136%	62.02	117%
Taylor	5.87	3.94	149%	65.73	111%
Union	4.51	3.63	124%	54.16	100%

February 2014 Average: 4.88
 February Average (1932-2013): 3.87
 Historical 12-month Average (1932-2013): 54.63
 Past 12-Month Total: 59.63
 12-Month Rainfall Surplus: 5.00

Figure 1: Comparison of District Monthly Rainfall

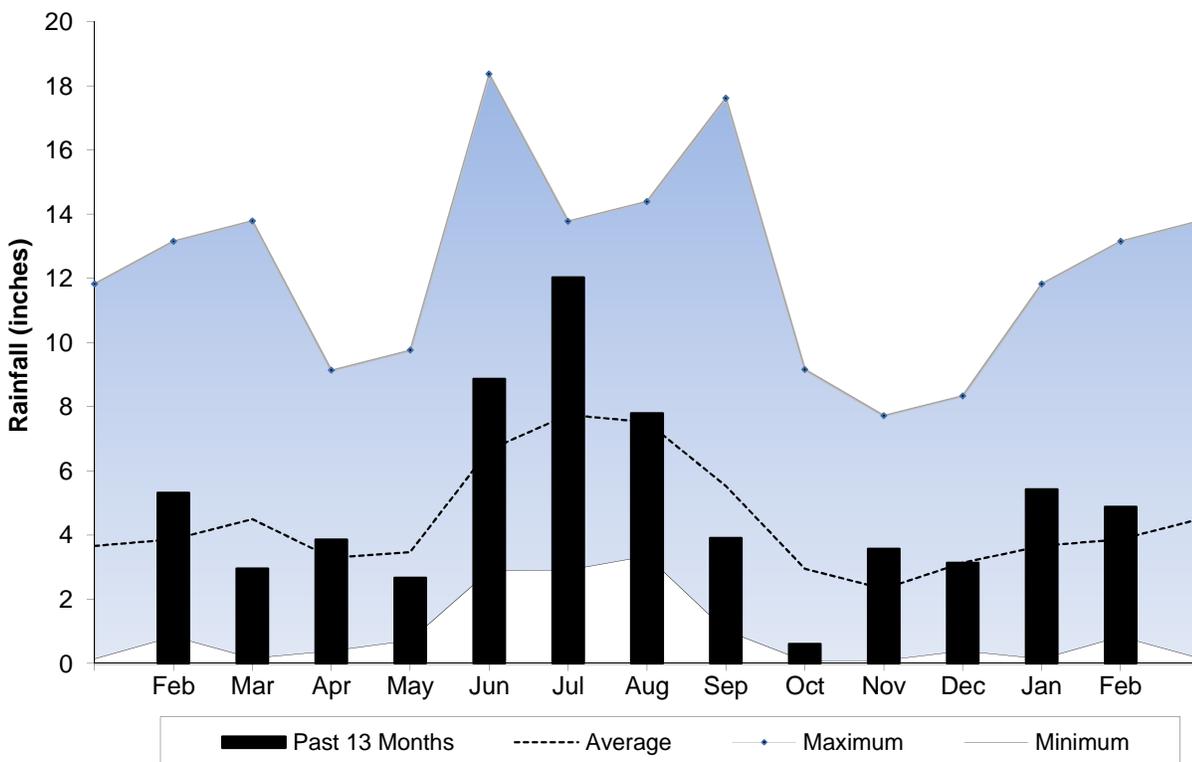


Figure 2: February 2014 Rainfall Estimate

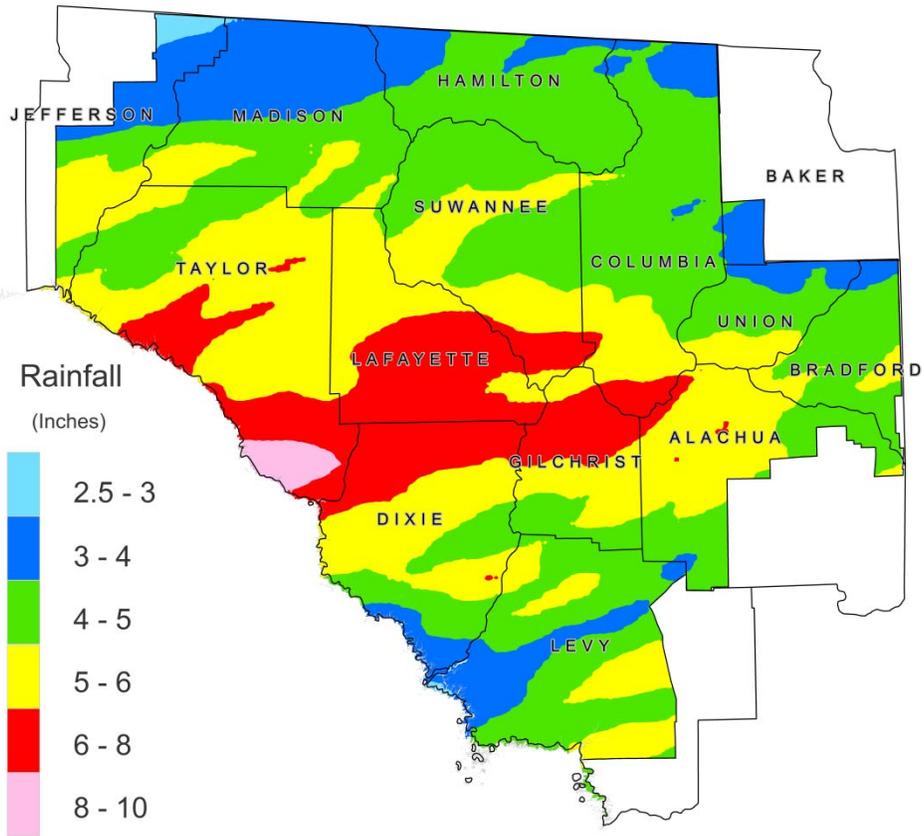


Figure 3: February 2014 Percent of Normal Rainfall

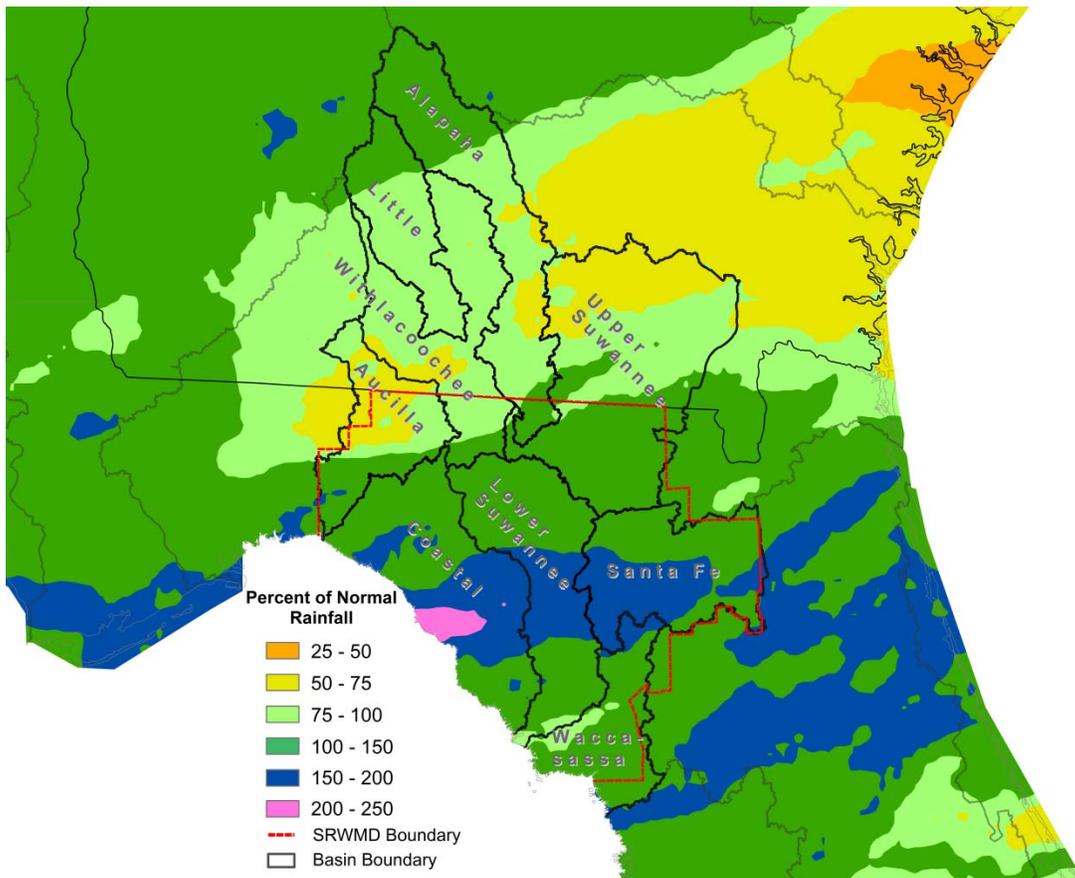


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin Through February 28, 2014

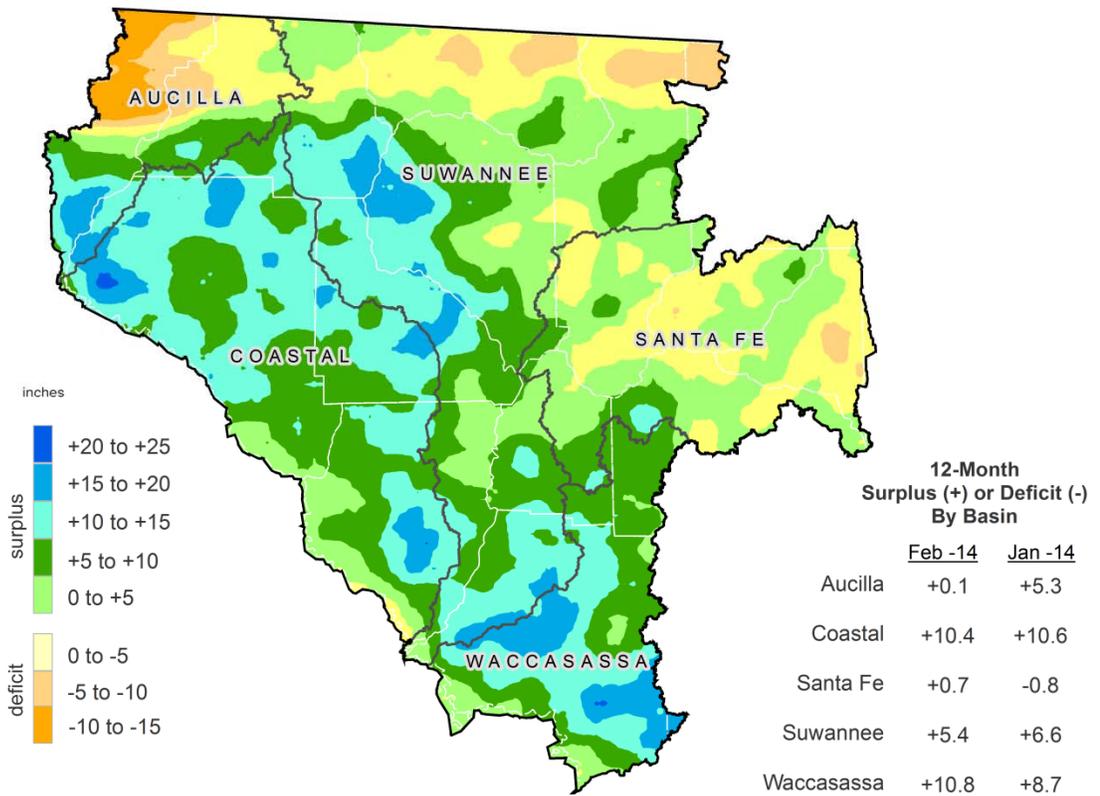


Figure 5: 3-Month Rainfall Surplus/Deficit by River Basin Through February 28, 2014

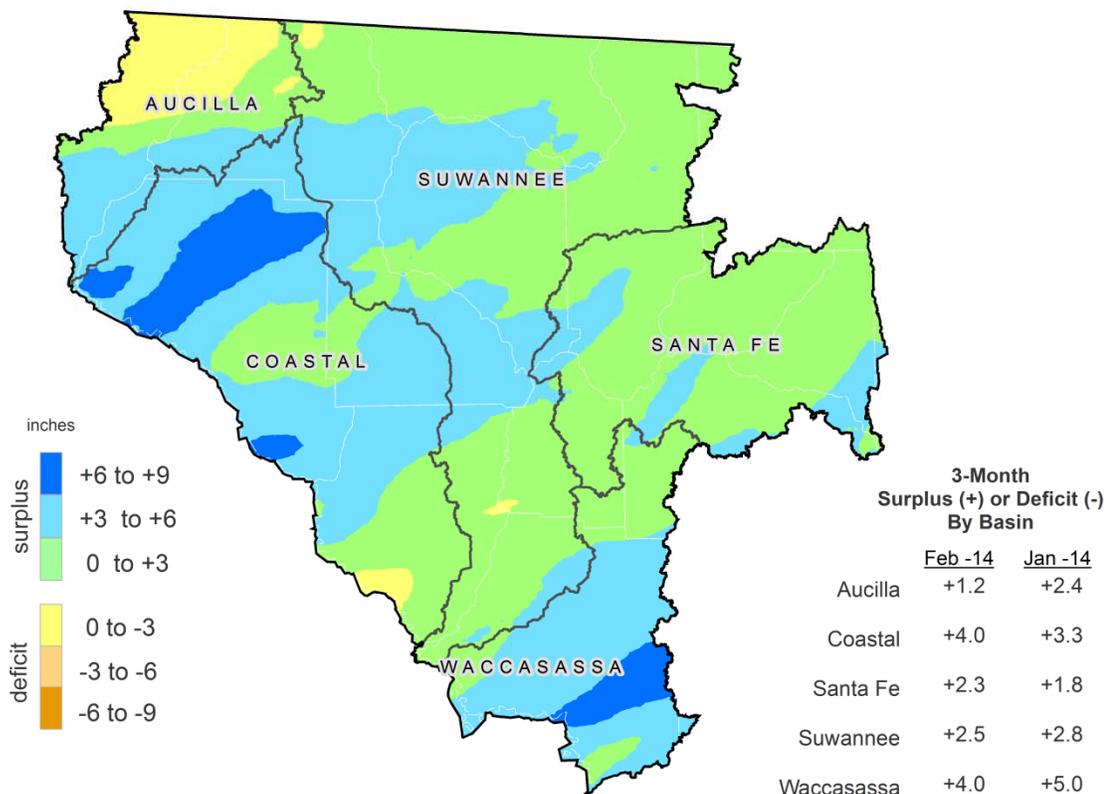
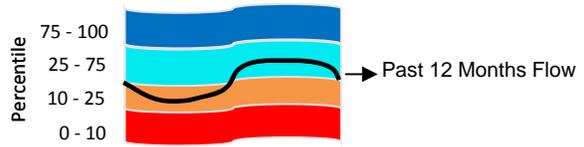


Figure 6: Daily River Flow Statistics
 March 1, 2013 through February 28, 2014



RIVER FLOW, CUBIC FEET PER SECOND

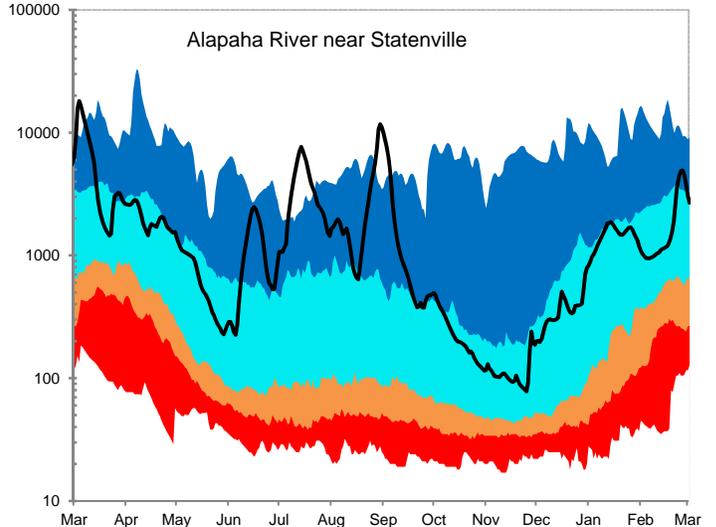
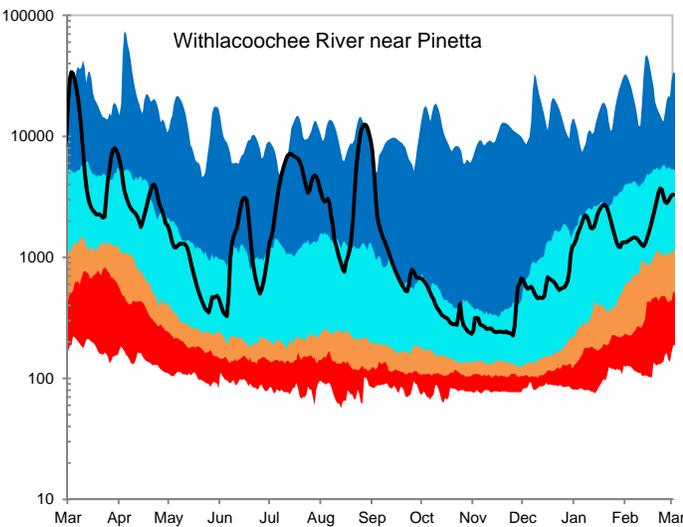
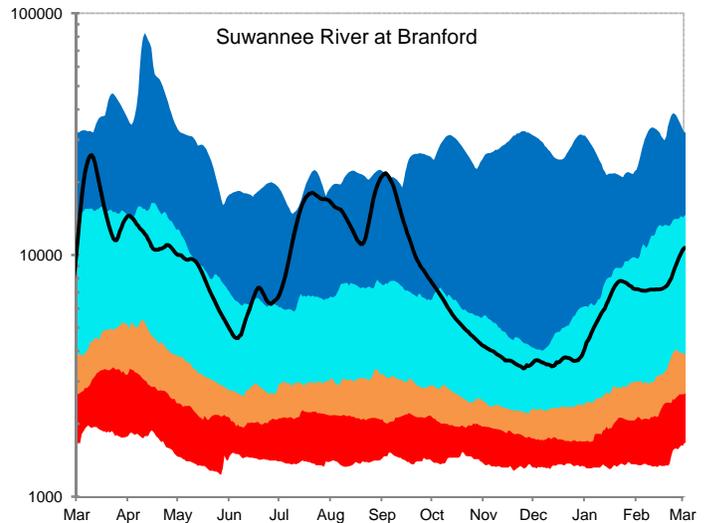
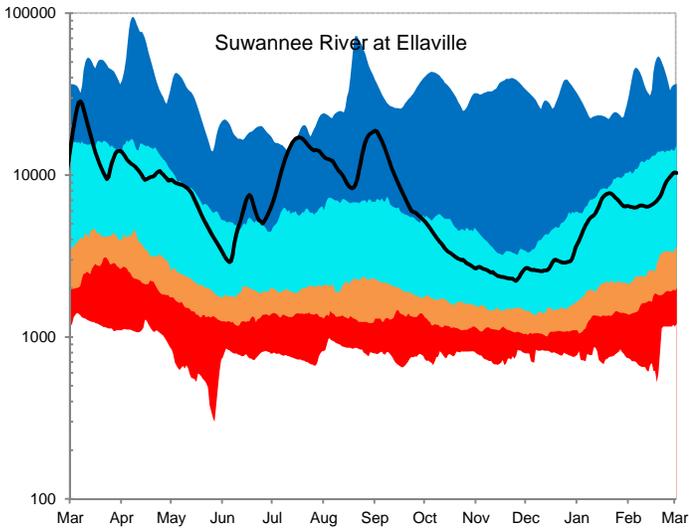
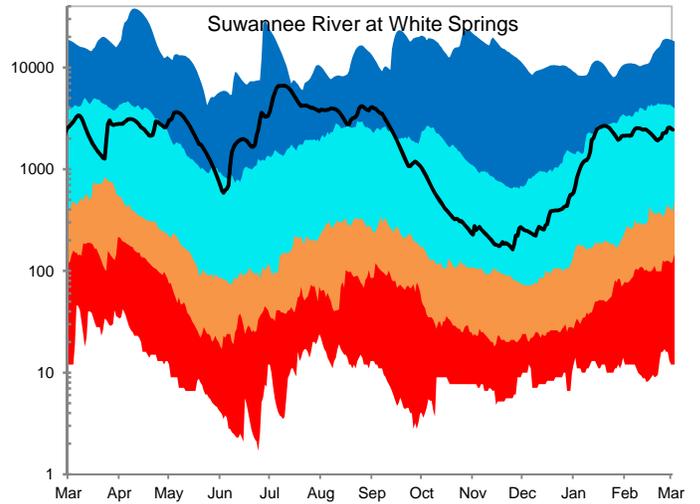
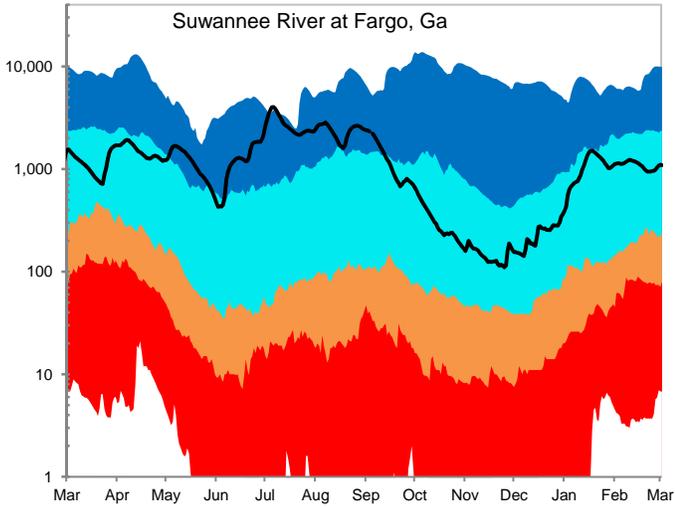
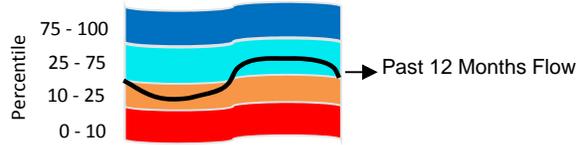
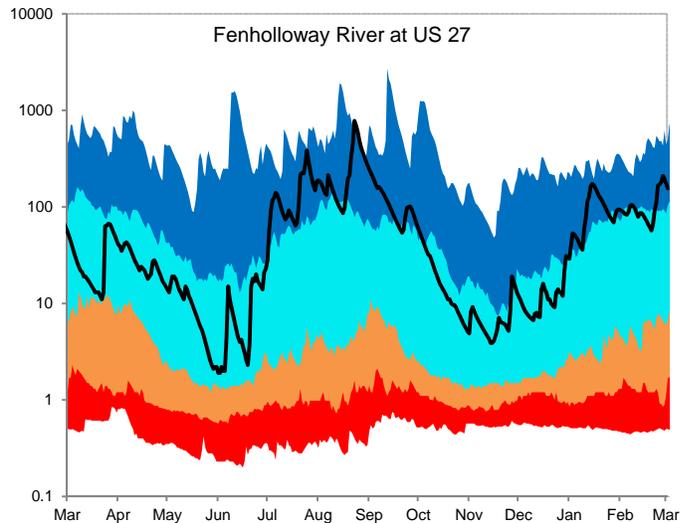
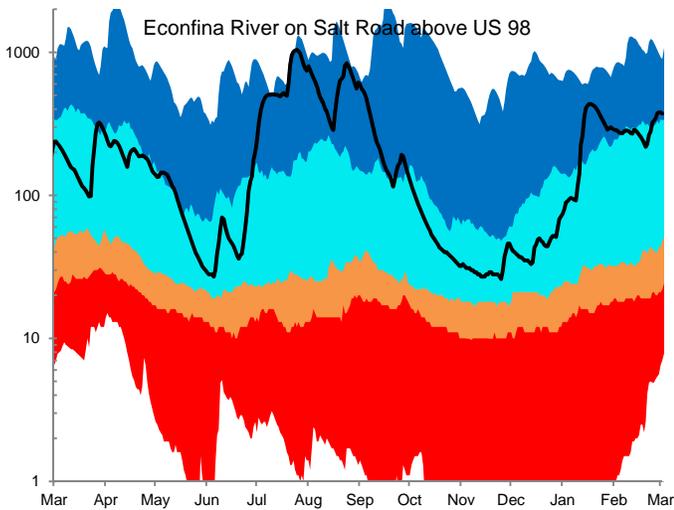
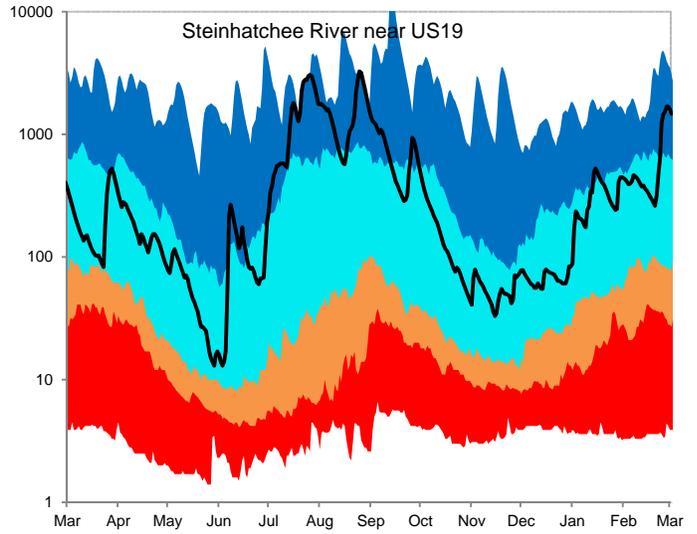
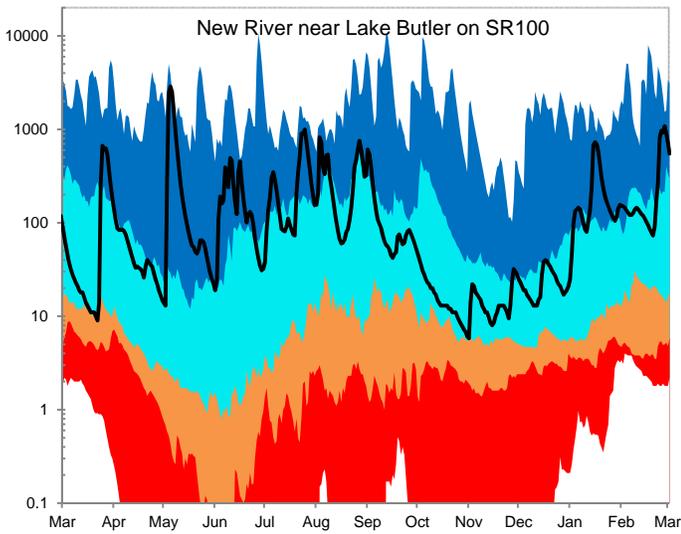
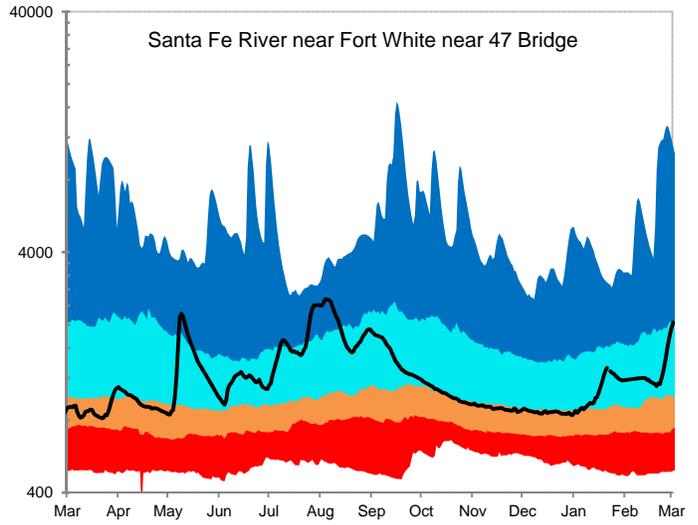
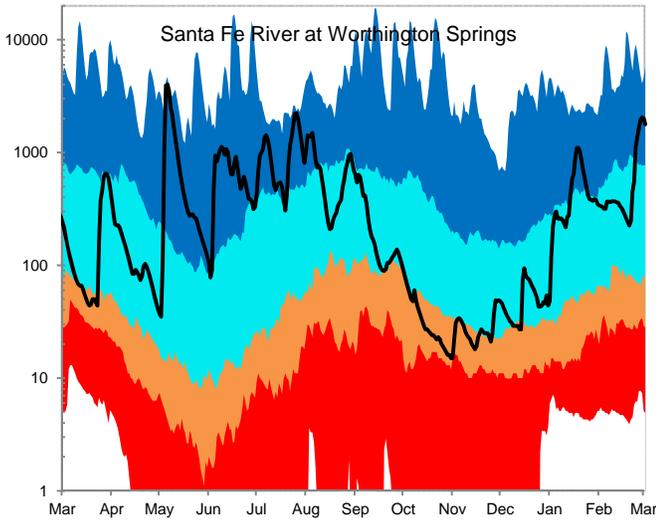
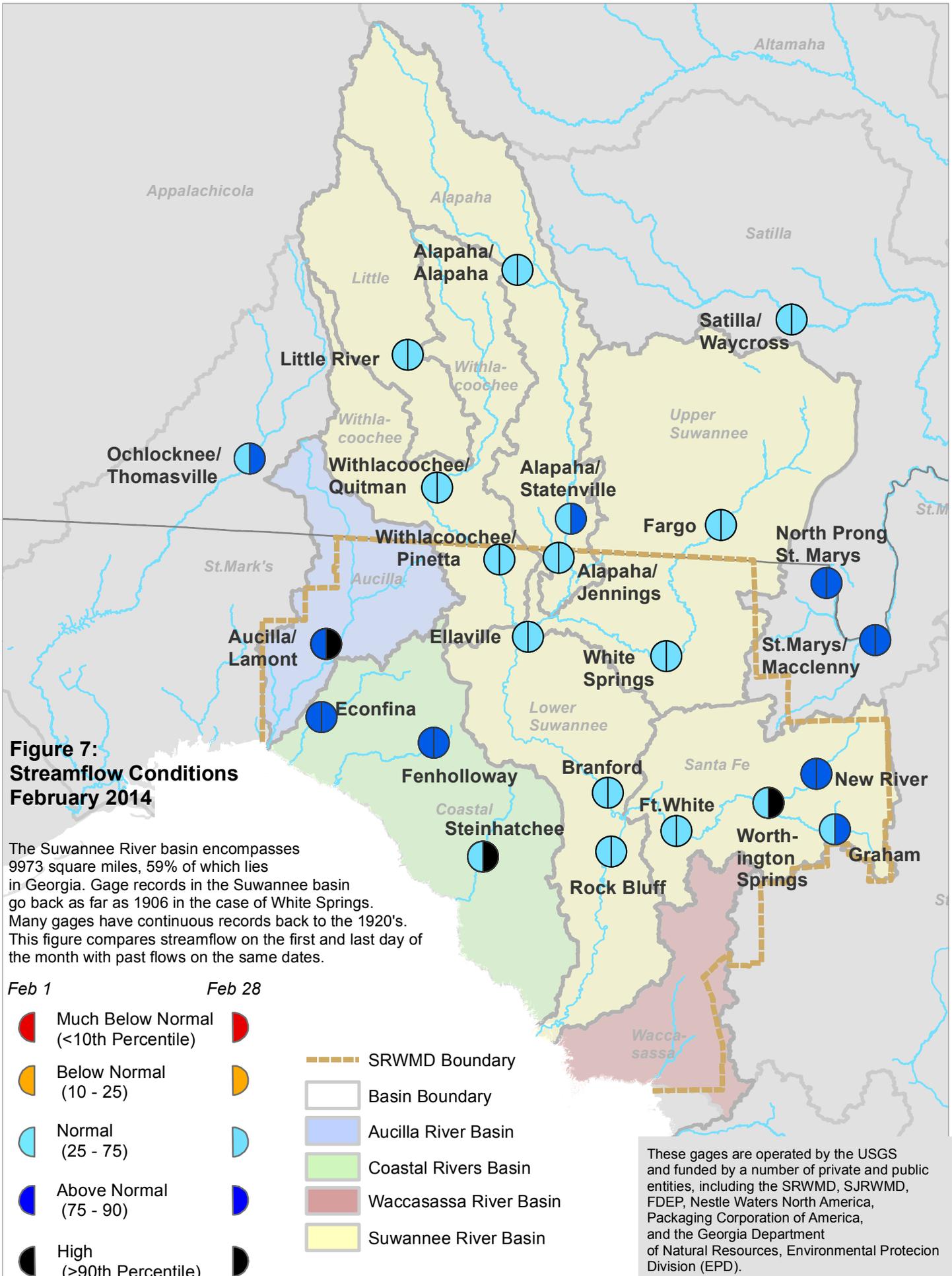


Figure 6, cont: Daily River Flow Statistics
 March 1, 2013 through February 28, 2014



RIVER FLOW, CUBIC FEET PER SECOND





**Figure 7:
Streamflow Conditions
February 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.

Feb 1 Feb 28

-  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 Protection Division (EPD).

Figure 8: February 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.

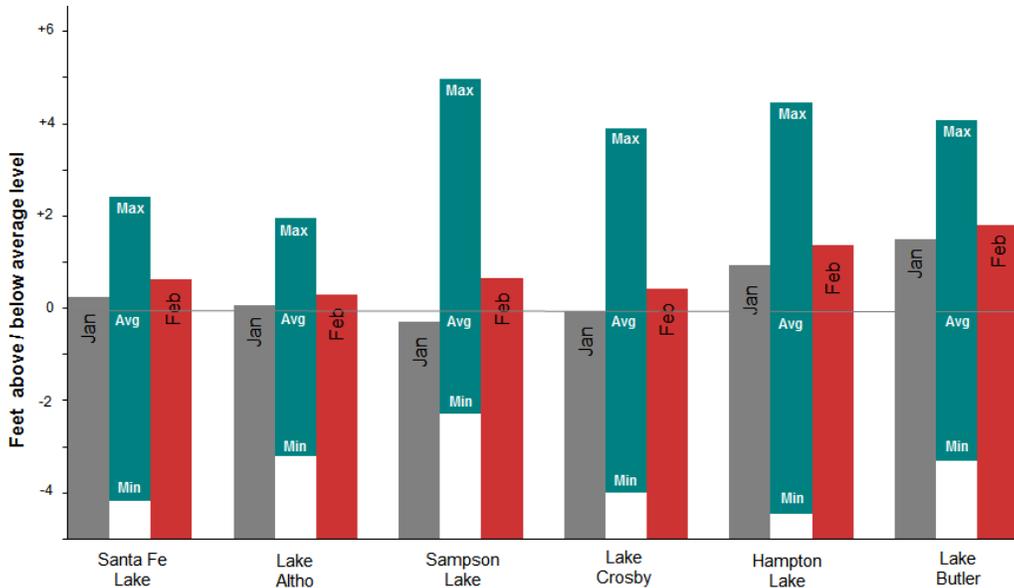
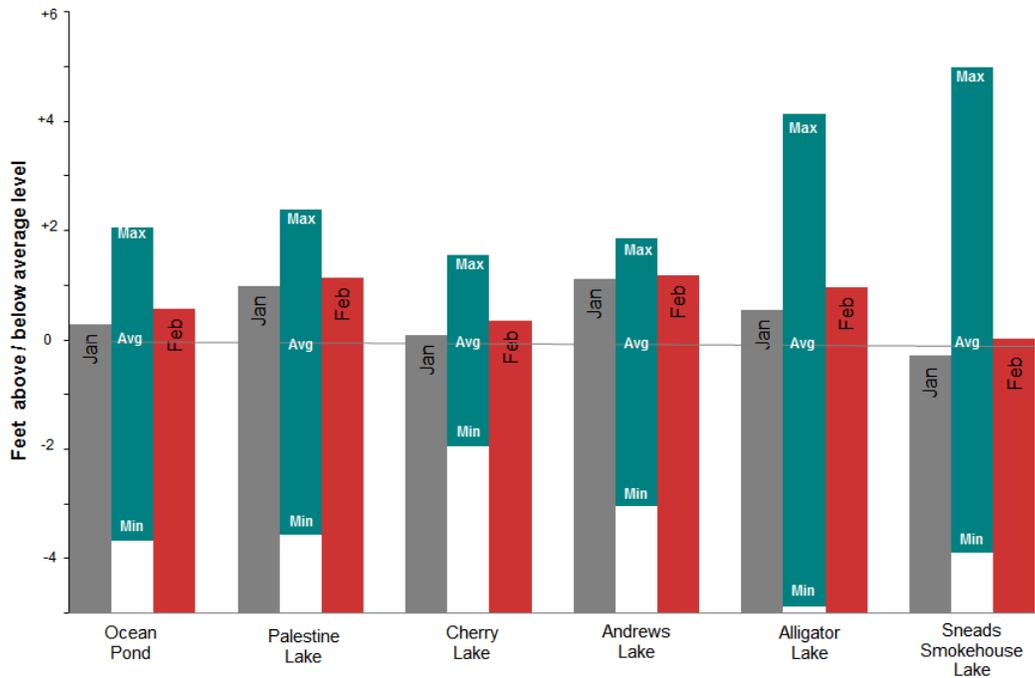
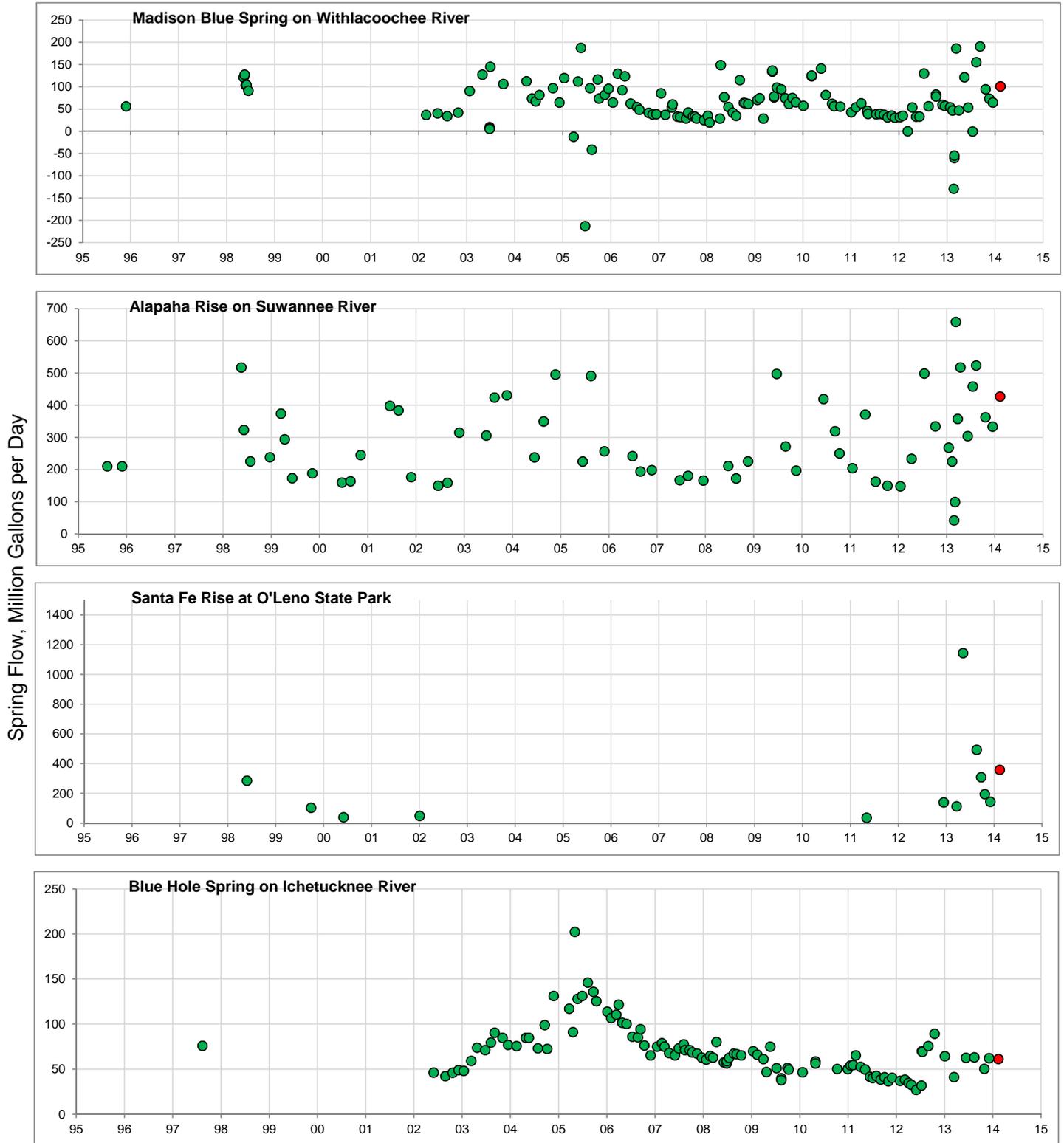


Figure 9: Quarterly Springflow Measurements

The SRWMD monitors water quality at 38 springs. Flow is measured at the time of the sampling. The springs below were measured in February 2014, with the last measurement marked in red. 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.



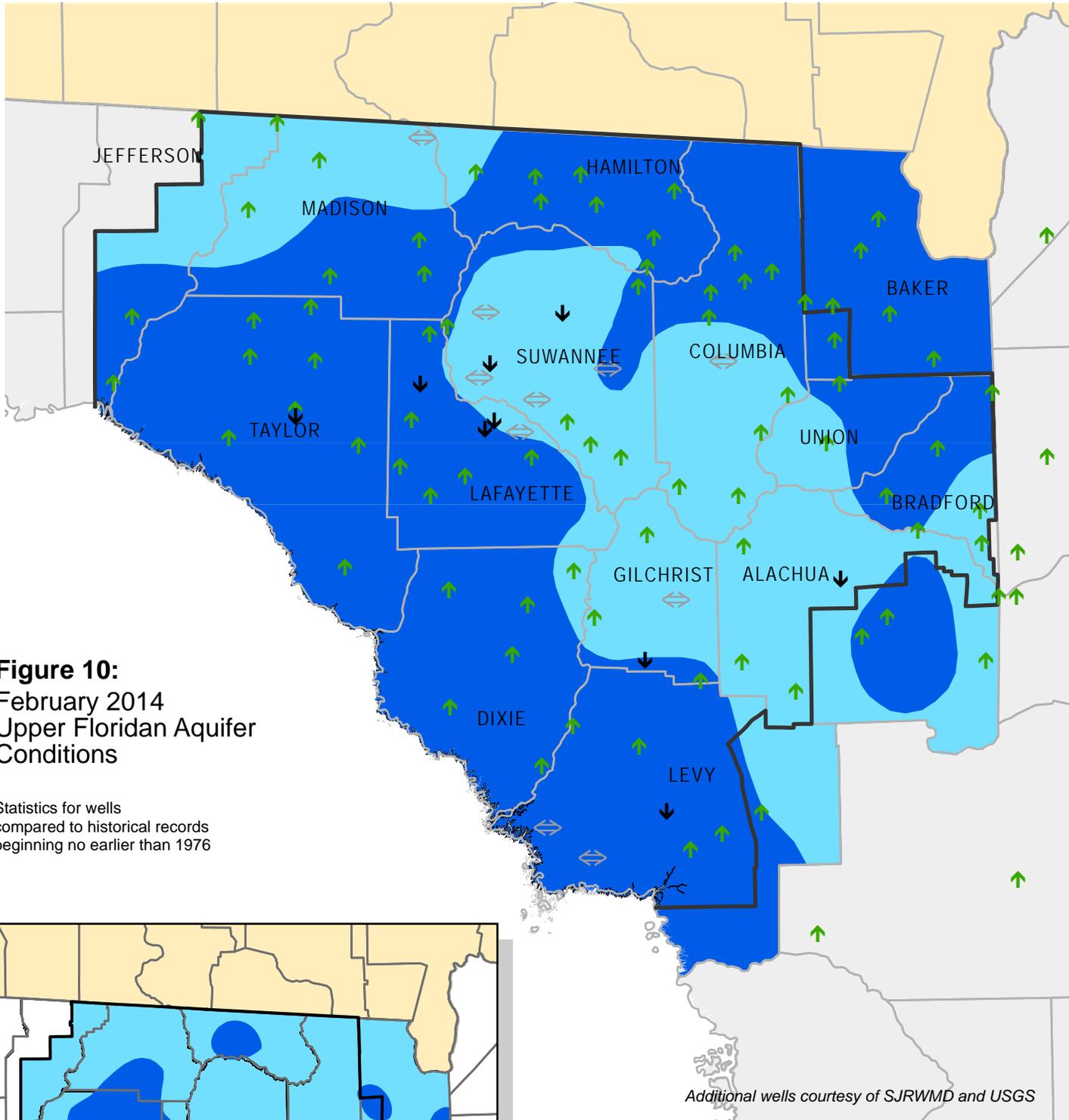
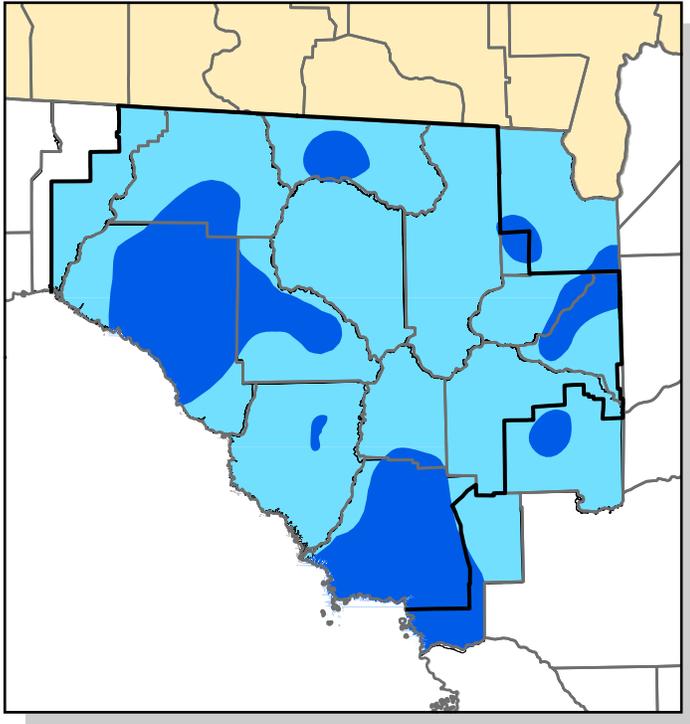


Figure 10:
February 2014
Upper Floridan Aquifer
Conditions

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

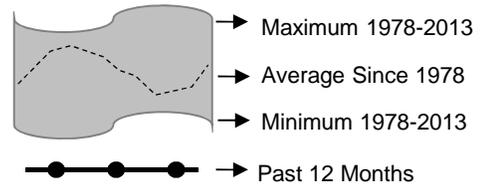
Additional wells courtesy of SJRWMD and USGS



Inset: January 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
- District Boundary

Figure 11: Monthly Groundwater Level Statistics
 Levels March 1, 2013 through February 28, 2014
 Period of Record Beginning 1978



Upper Floridan Aquifer Elevation above NGVD 1929, Feet

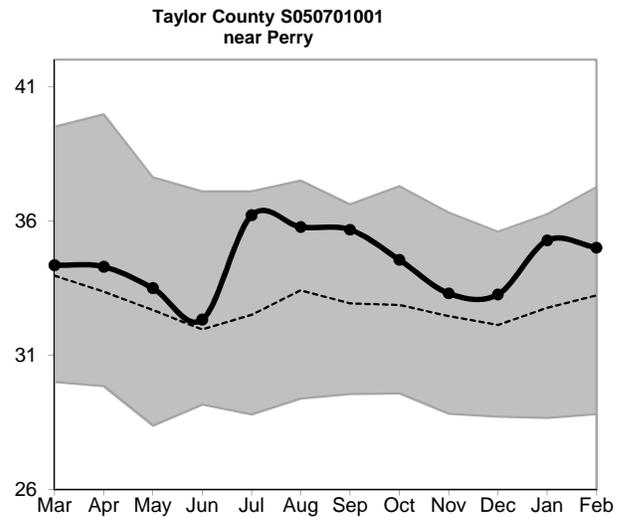
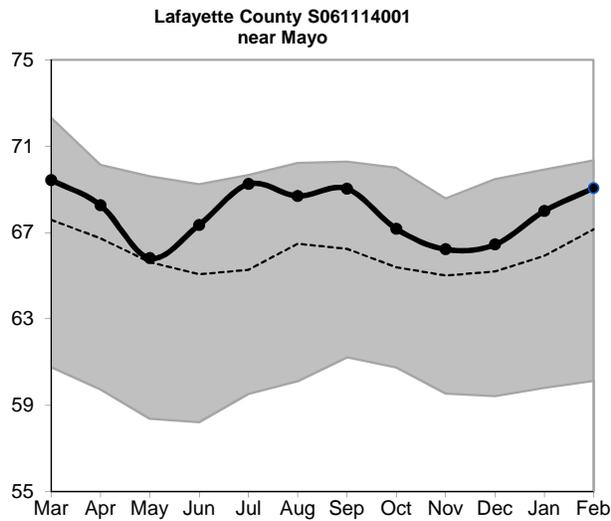
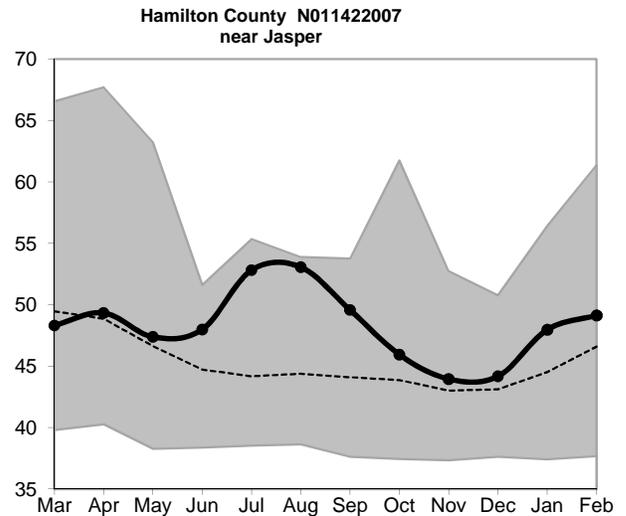
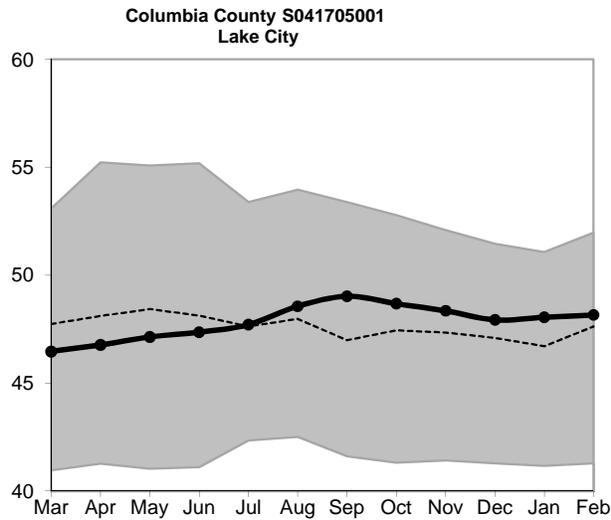
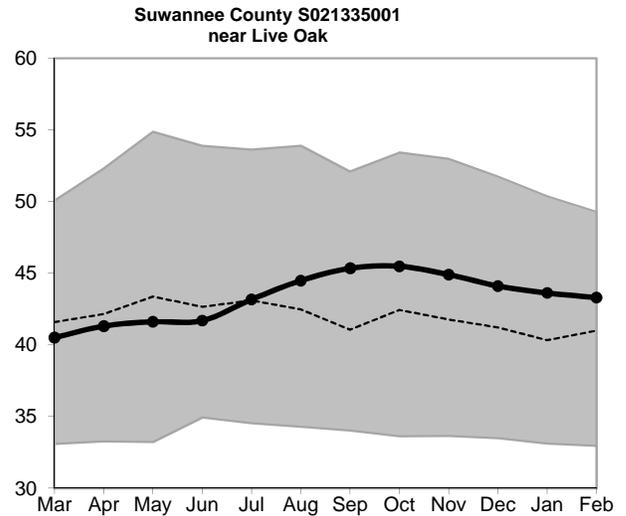
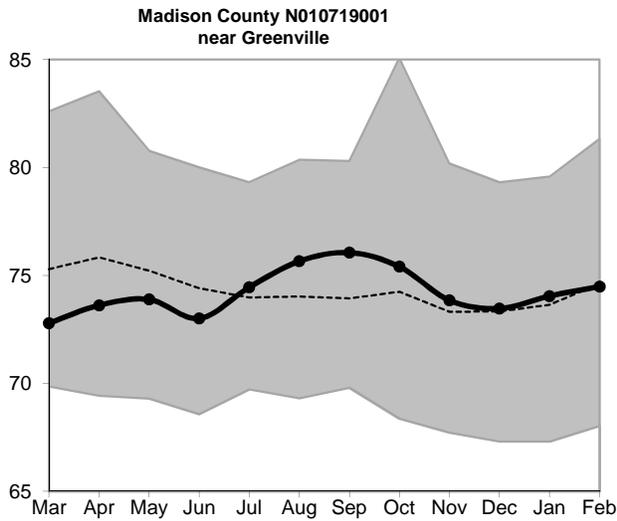
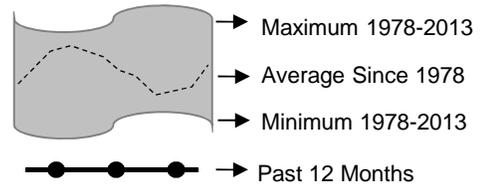
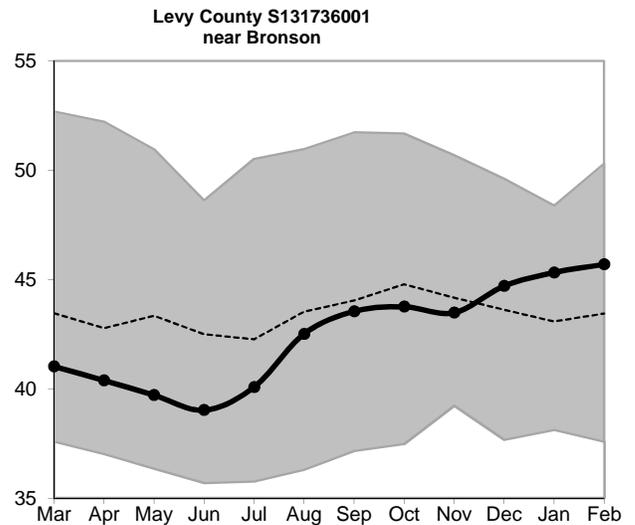
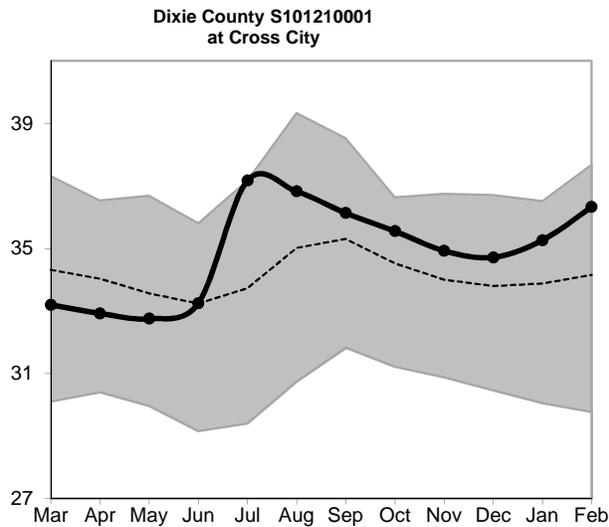
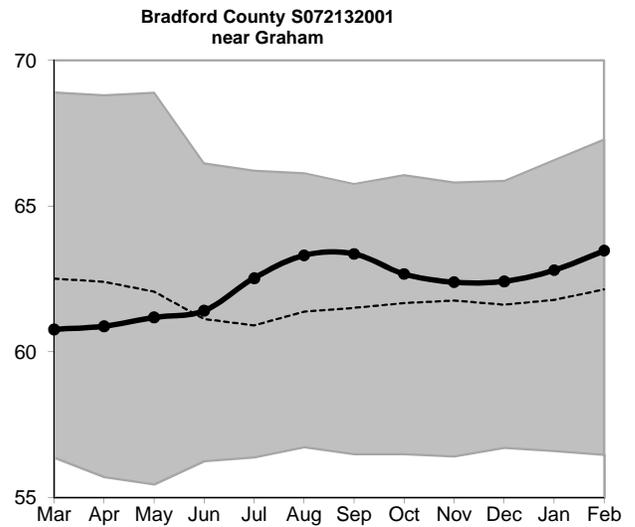
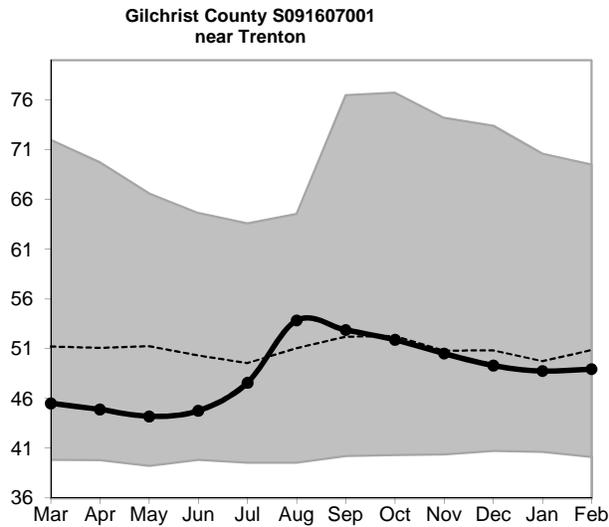
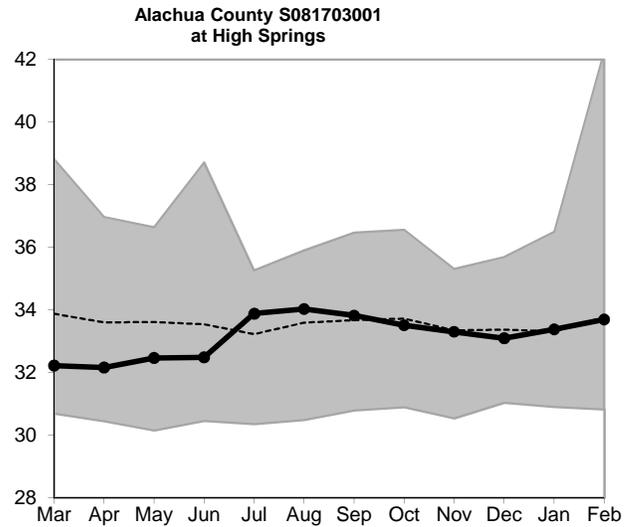
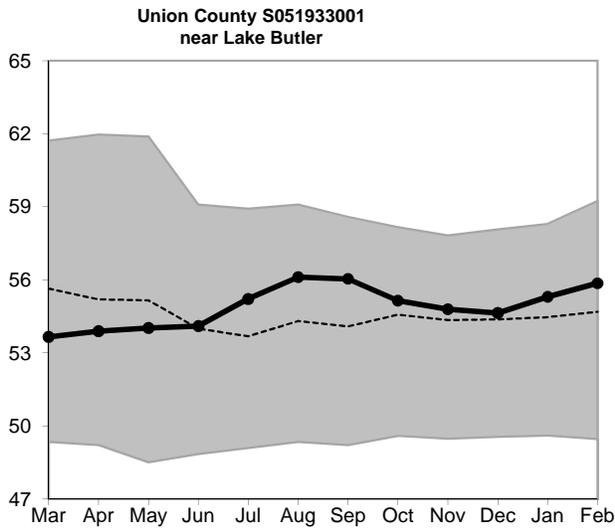


Figure 11, cont.: Groundwater Level Statistics
 Levels March 1, 2013 through February 28, 2014
 Period of Record Beginning 1978



Upper Floridan Aquifer Elevation above NGVD 1929, Feet



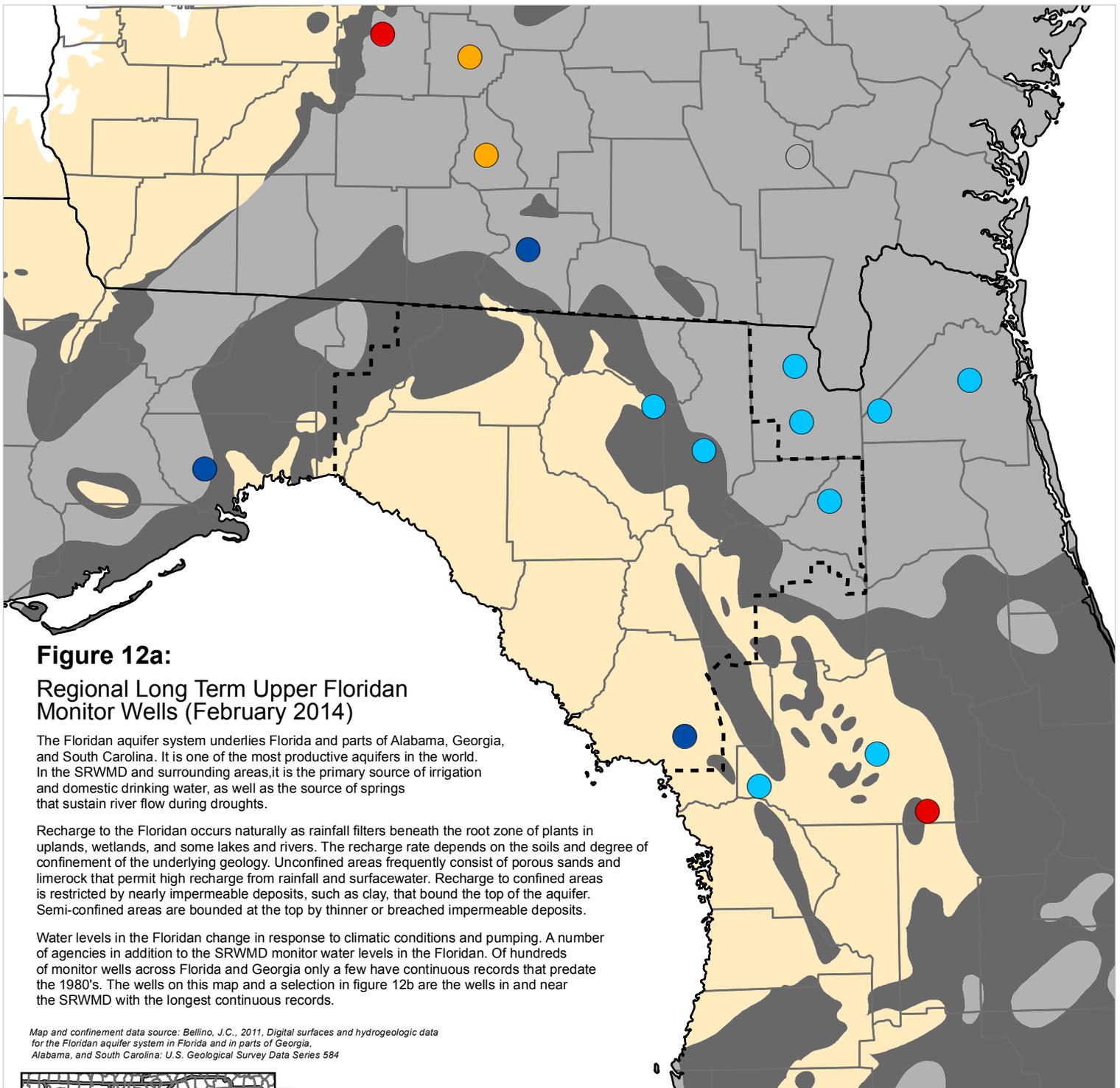


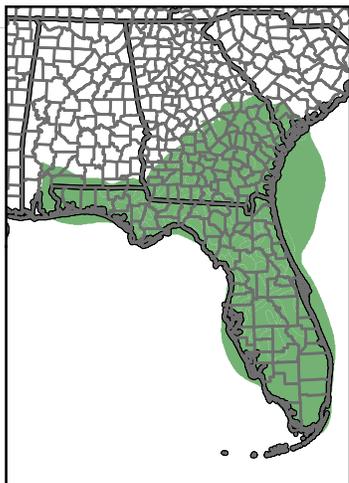
Figure 12a:
Regional Long Term Upper Floridan Monitor Wells (February 2014)

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

Occurrence of Confined and Unconfined Conditions in the Upper Floridan Aquifer

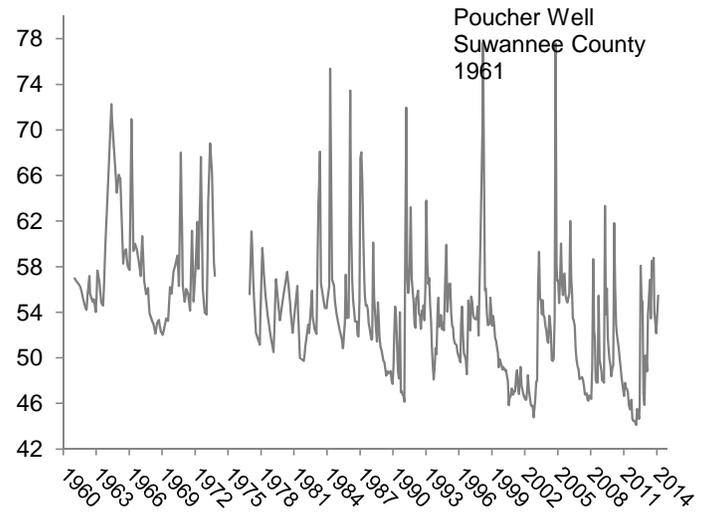
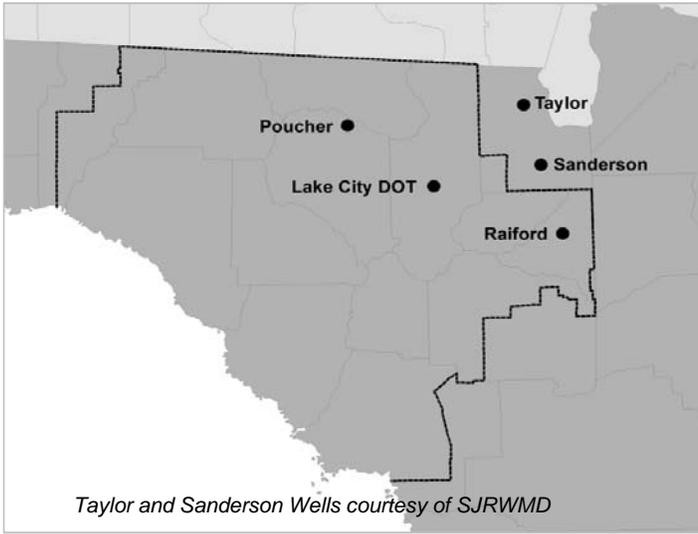
-  Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
-  Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
-  Unconfined: Upper confining unit is absent or very thin. Recharge is high.

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

February 2014



Upper Floridan Aquifer Elevation above NGVD 1929, Feet

