MEMORANDUM

TO: Governing Board

FROM: Tom Mirti, Chief, Bureau of Hydrologic Data Services

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

DATE: March 6, 2015

RE: February 2015 Hydrologic Conditions Report for the Suwannee River Water Management District

RAINFALL

- District-wide rainfall in February was 3.71", slightly below the long-term February average rainfall of 3.90". A similar rainfall pattern to the past couple of months again occurred, with higher rainfall amounts in the northwest portion of the District and progressively less toward the southeastern counties of the District (Table 1, Figure 1). Highest monthly totals, generally amounts over 6 inches, occurred in a band from the mouth of the Econfina River in western Taylor County across San Pedro Bay through to northern Suwannee County (Figure 2). Below average totals (less than 3 inches) fell in the Santa Fe and Waccasassa River basins. Rainfall totals in the Suwannee River basin in Georgia were slightly above average monthly rainfall totals (Figure 3).
- The highest gaged monthly total (6.10") was recorded at the Hopewell Tower rainfall gage in south central Madison County, and the highest daily total (2.23") was measured at Blue Spring in eastern Madison County. The lowest gaged monthly total was 2.01" at New River Tower in central Bradford County.
- The total rainfall average across the District for the 12-month period ending February 28 was 59.1", compared to the long-term average of 54.6". Twelve-month rainfall departures continued to improve in the Aucilla River basin. While other District basins maintained an annual surplus, significant declines in the surplus occurred in the Santa Fe and Waccasassa river basins; the Santa Fe River Basin is currently only 0.5" above the long term annual average. Bradford County and coastal Dixie County continue to display the biggest annual rainfall deficits, with deficit areas in Bradford County up to 20 percent below average over the past year (Figure 4).
- Average District rainfall for the 3 months ending February 28 was about 0.4" above the long-term average of 10.7" (Figure 5).

SURFACEWATER

- **Rivers:** Rivers in the northwest of the District (Aucilla, Econfina, and Withlacoochee) all started out the month at very high levels--generally above the 90th percentile. These rivers declined slightly throughout the month but rebounded at the end of the month and remained relatively high. Other rivers in the central and southeast part of the District ended the month in the average flow range by the end of the month due to the lesser amount of rainfall in those basins. The Aucilla River at Lamont again hovered near flood stage for the entire month. The lower Santa Fe River attained the No Wake elevation of 17 feet on January 27th due to backwater from the Suwannee River downstream and remained above that stage for the entire month**.** Flow statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions in Figure 7.
- **Lakes**: All monitored lake levels across the District with the exception of Lake Crosby in Bradford County remained above average by the end of February. Andrews Lake in northern Taylor County showed the highest increase, about 8 inches to 77.8 feet, from

the beginning of the month. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.

- **Springs**: Fourteen springs or spring groups were measured by the USGS, District staff, and District contractors in February. Flows generally increased from the previous month (or measurement) due to the recession of the rivers into which the springs discharge, along with increased Floridan aquifer levels. Flow records for several major springs are shown in Figure 9.

GROUNDWATER

Levels in upper Floridan aquifer monitor wells, on average, ended the month at the 86th percentile, an increase of 6 percentile points from the end of January. This Floridan aquifer condition is the highest February level since the El Nino year of 1998. The area of high aquifer levels expanded in Madison, Jefferson and coastal Taylor counties, with areas of decline to average levels increasing along the Gilchrist/Alachua county line and around Santa Fe Lake in southeastern Bradford County (Figure 10). Only one monitor well remained below its median level, while 79 percent remained above the 75th percentile, considered high. 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 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 February 28 indicated continued near-normal conditions in north Florida and very to extremely moist conditions in south Georgia.
- The National Weather Service Climate Prediction Center (CPC) revised its three-month outlook for the southeastern United States to reflect higher than normal rainfall potential in Florida for the March-April-May projection window, but normal conditions thereafter. The El Niño advisory issued by the CPC in January remains in effect. Their March 5 report restated the 50-60% chance that El Niño conditions would develop during late winter and now projected to possibly last into summer. The model consensus is for a weak event if El Niño fully emerges. 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.
- The U.S. Drought Monitor report of March 3 showed normal conditions across the District and in the contributing drainage areas of southeast Georgia.

CONSERVATION

Water conservation is necessary to sustain healthy flows in springs and rivers. All users are urged to eliminate unnecessary uses. Landscape irrigation is limited to once per week during Eastern Standard Time (between November 2, 2014 and March 8, 2015) 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	February 2015	February Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	2.20	3.59	61%	54.88	108%
Baker	3.25	3.44	94%	57.04	114%
Bradford	2.18	3.64	60%	48.43	95%
Columbia	3.48	3.72	94%	60.61	118%
Dixie	3.40	3.98	85%	55.51	94%
Gilchrist	2.81	4.18	67%	58.67	102%
Hamilton	5.03	4.01	126%	63.69	122%
Jefferson	5.07	4.65	109%	61.61	102%
Lafayette	4.13	3.98	104%	62.42	110%
Levy	2.29	3.63	63%	57.75	97%
Madison	5.70	4.36	131%	60.99	108%
Suwannee	4.54	3.73	122%	63.74	120%
Taylor	5.28	3.94	134%	62.07	104%
Union	2.56	3.63	71%	55.88	103%

February 2015 Average:	3.71
February Average (1932-2013):	3.90
Historical 12-month Average (1932-2013):	54.63
Past 12-Month Total:	59.13
12-Month Rainfall Surplus:	4.50

Figure 1: Comparison of District Monthly Rainfall

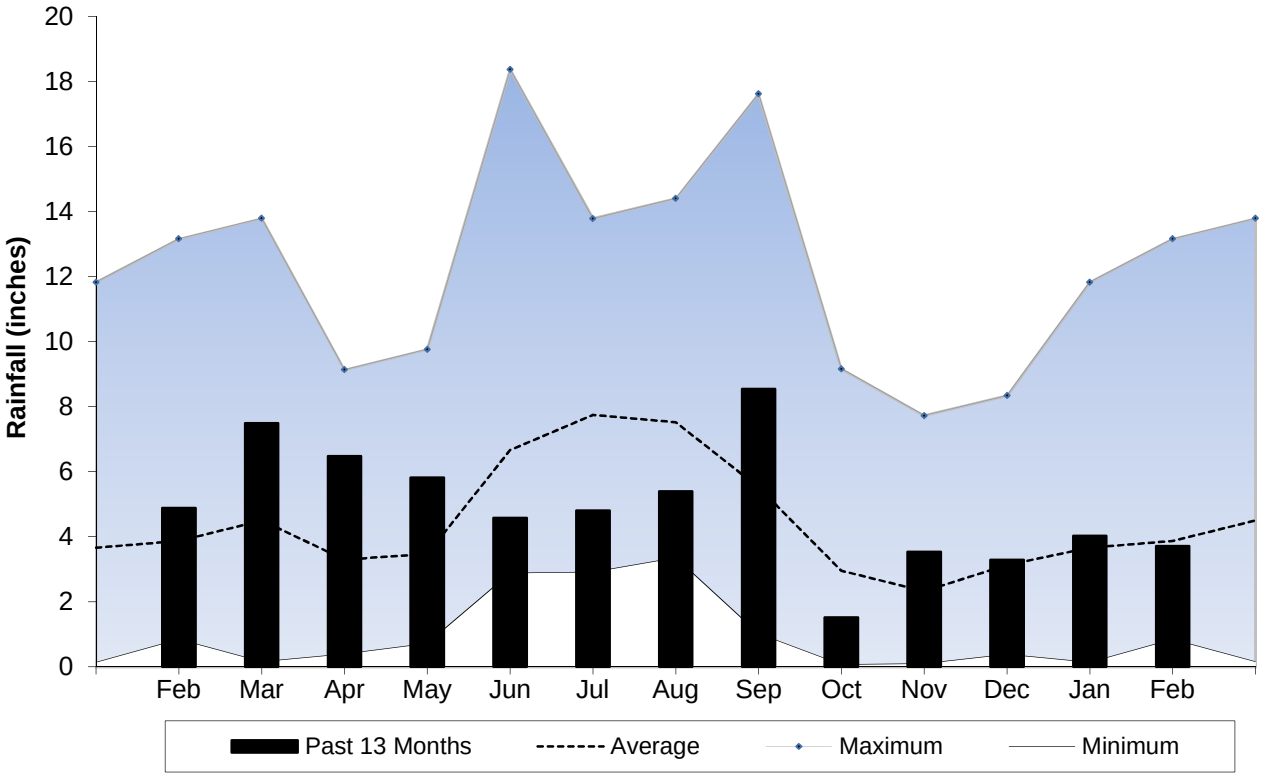


Figure 2: February 2015 Rainfall Estimate

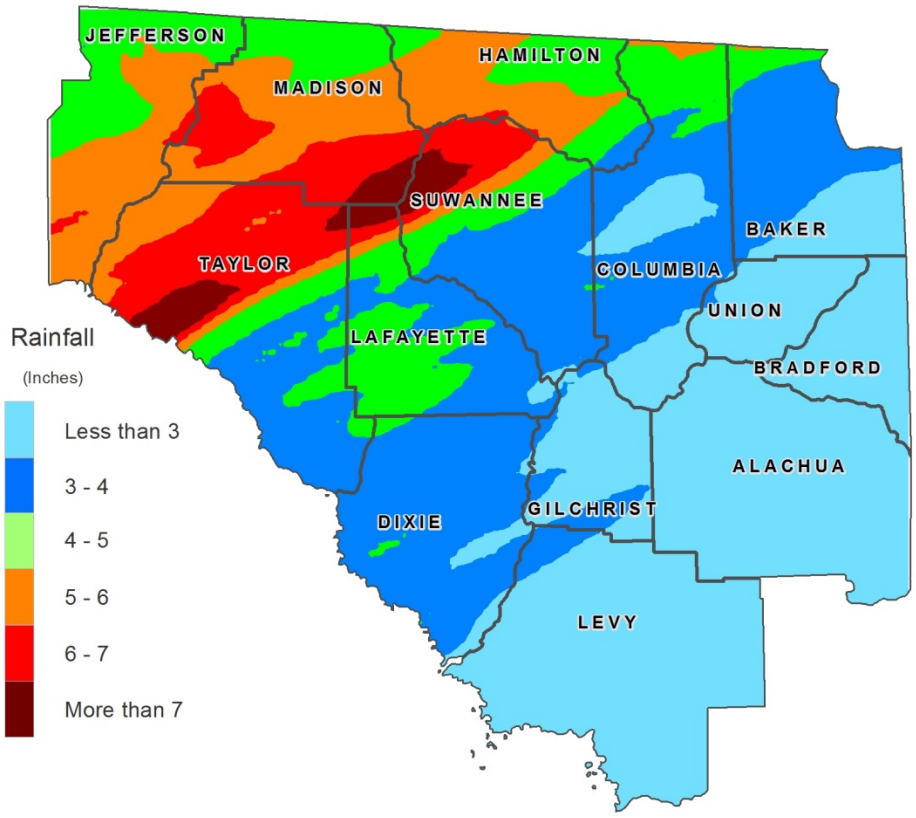


Figure 3: February 2015 Percent of Normal Rainfall

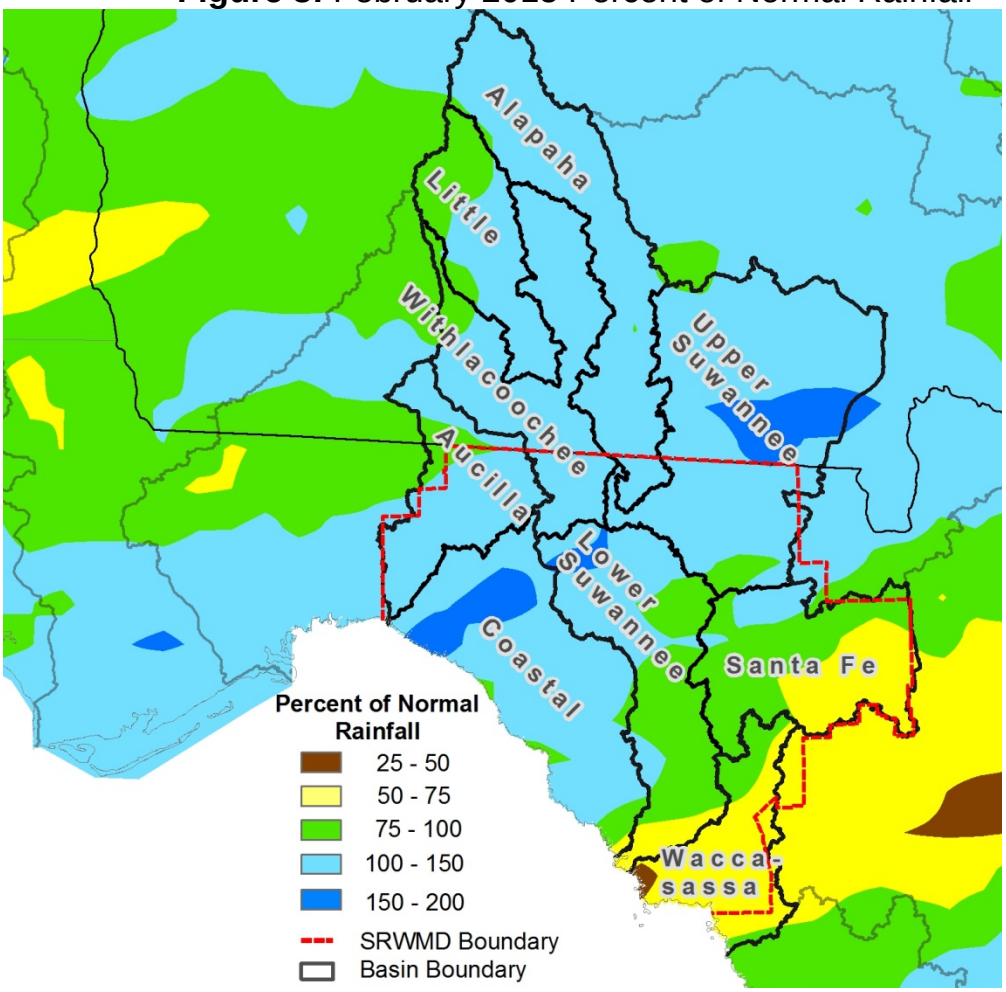


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through February 28, 2015

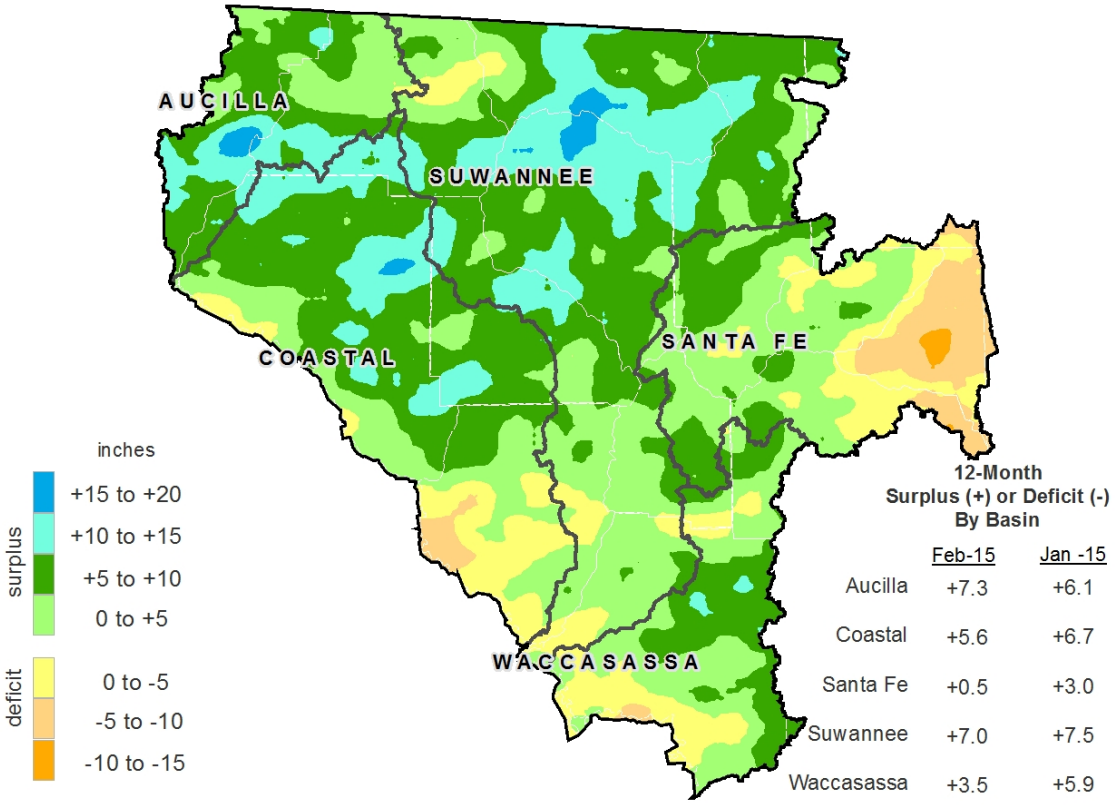


Figure 5: 3-Month Rainfall Surplus/Deficit by River Basin
Through February 28, 2015

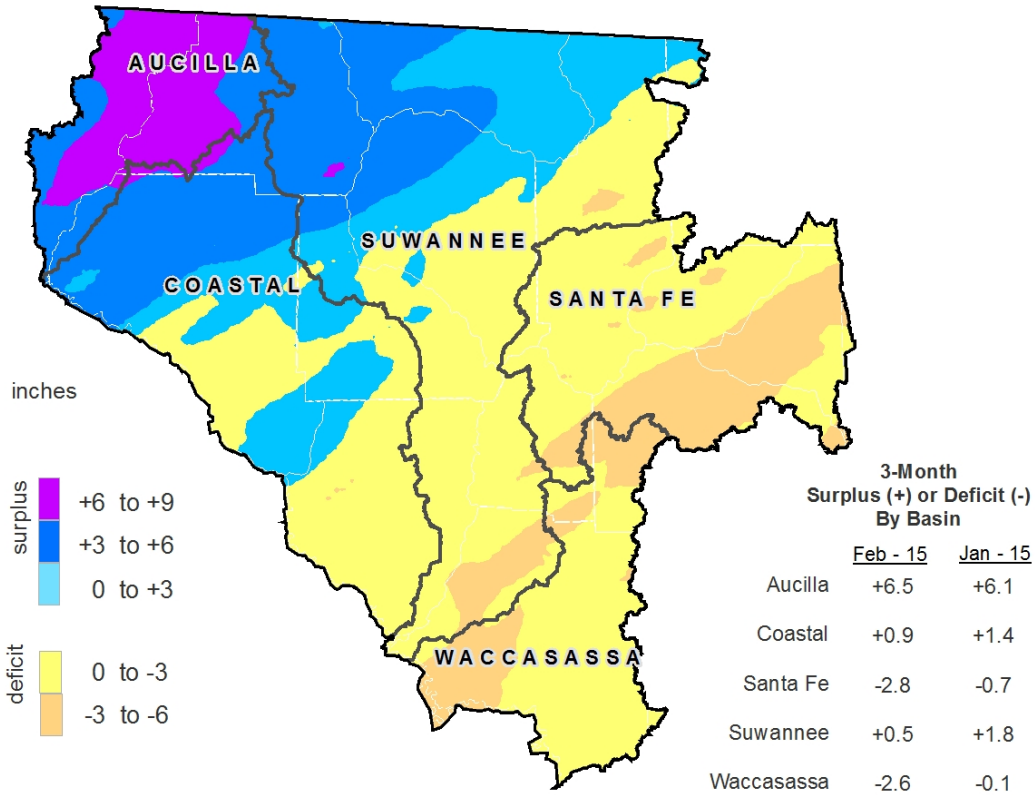
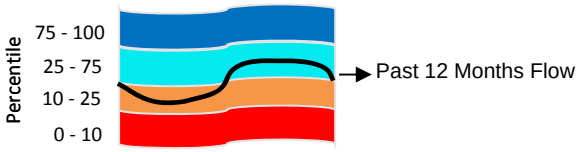
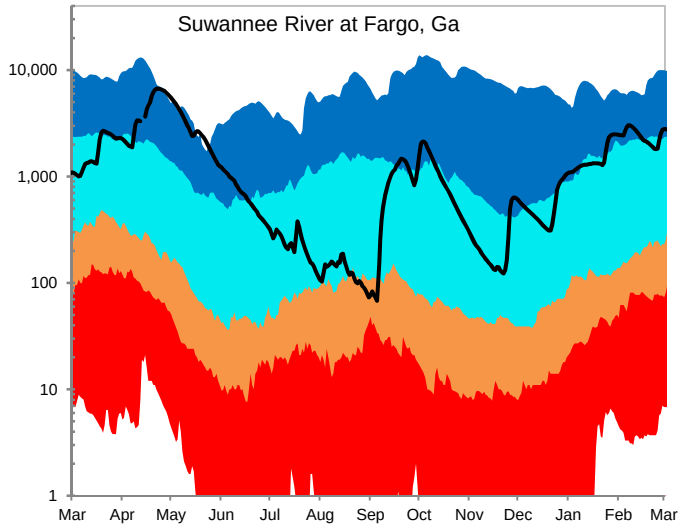
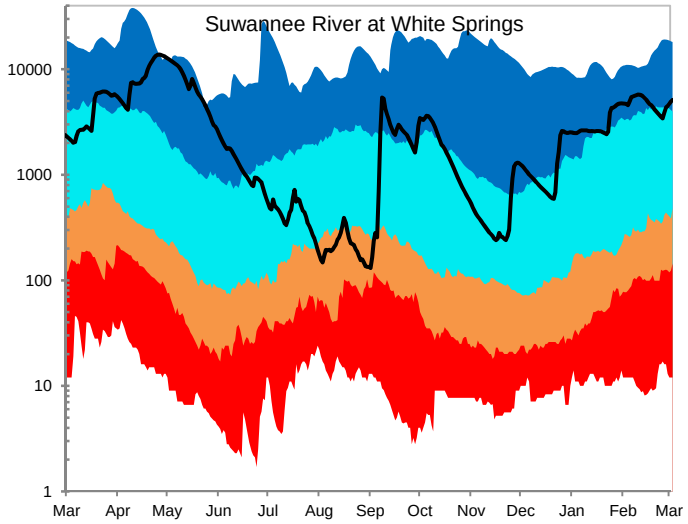


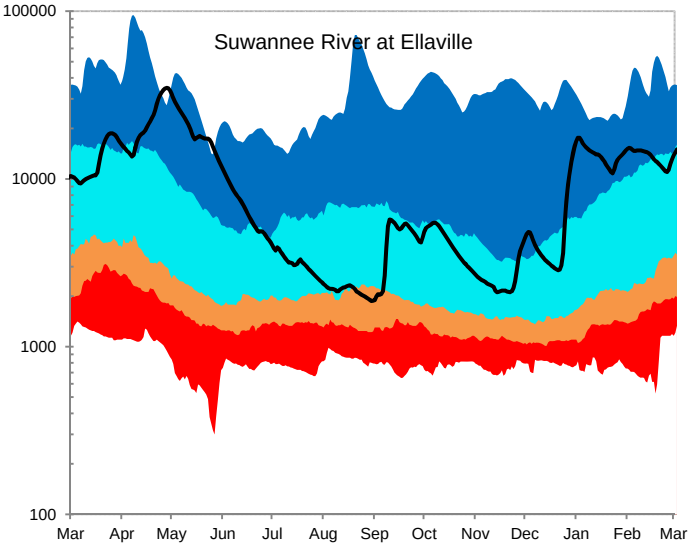
Figure 6: Daily River Flow Statistics
March 1, 2014 through February 28, 2015

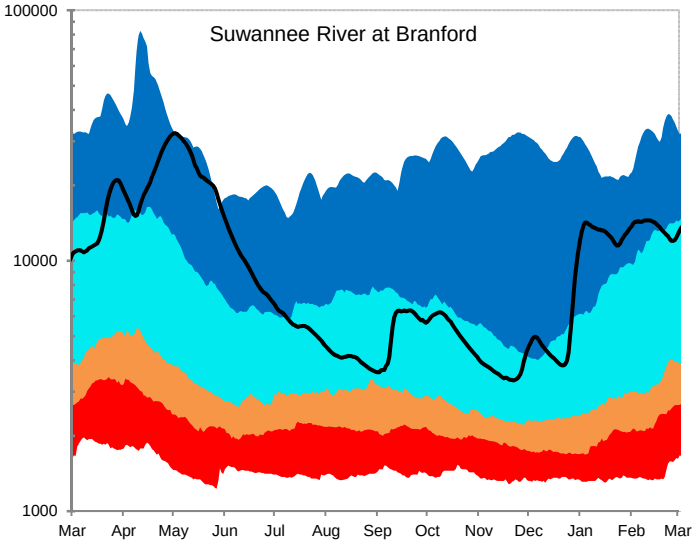


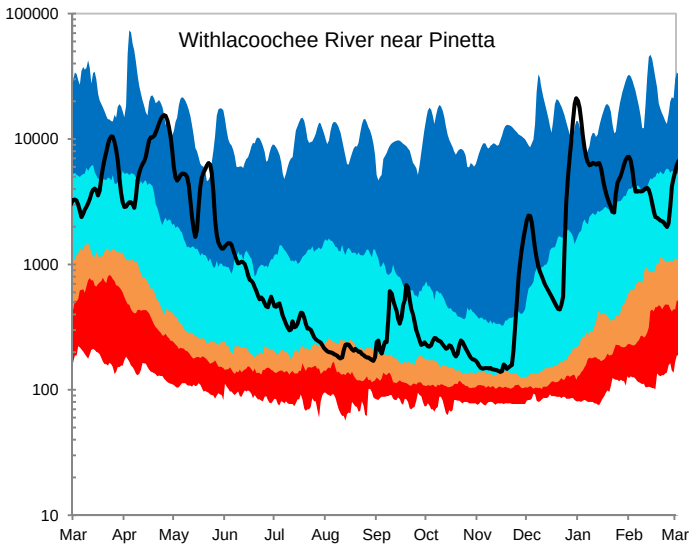
RIVER FLOW, CUBIC FEET PER SECOND











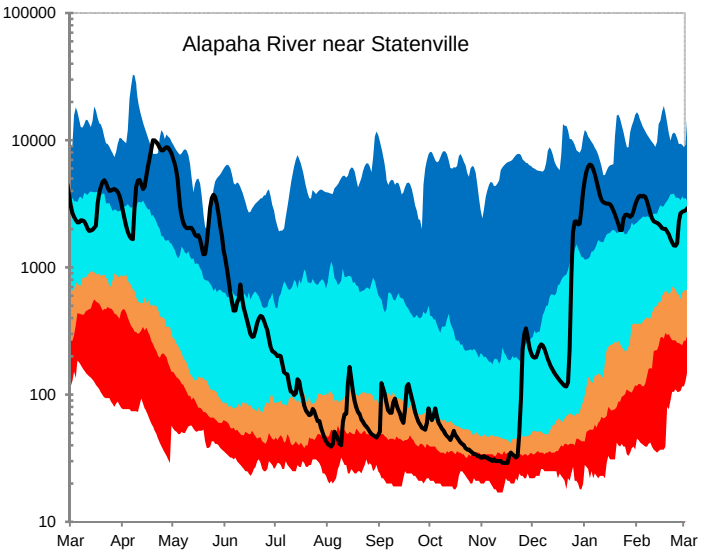
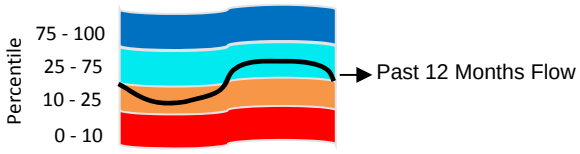
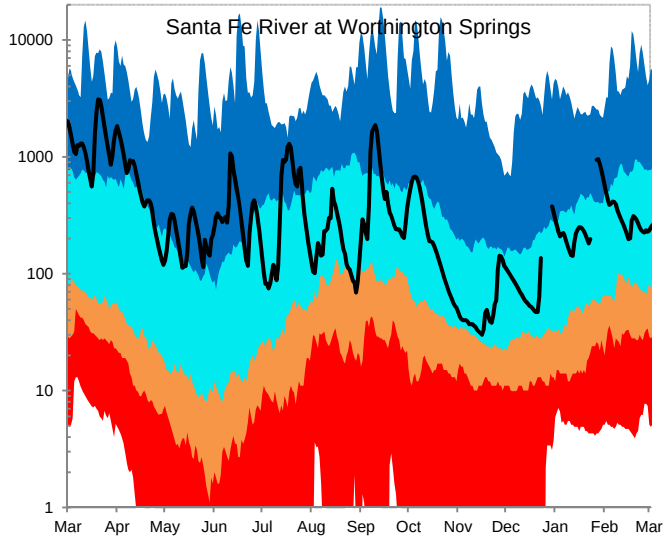
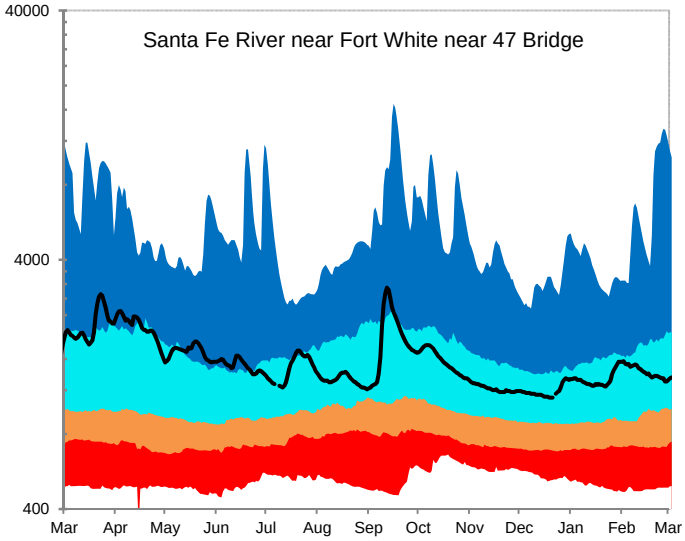


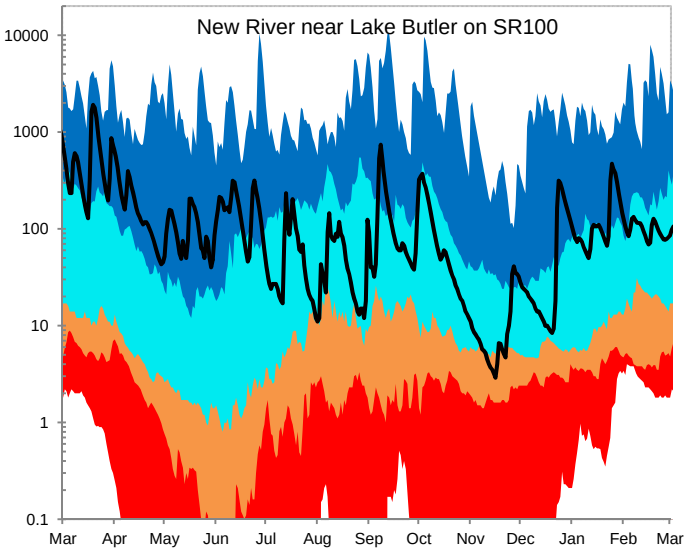
Figure 6, cont: Daily River Flow Statistics
March 1, 2014 through February 28, 2015

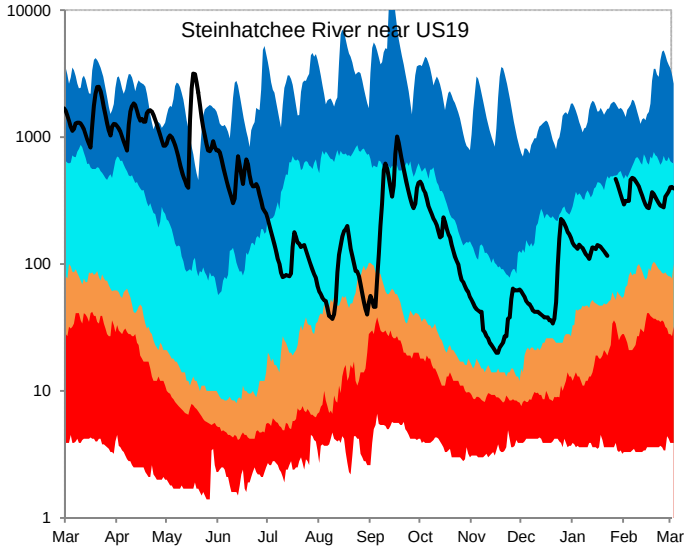


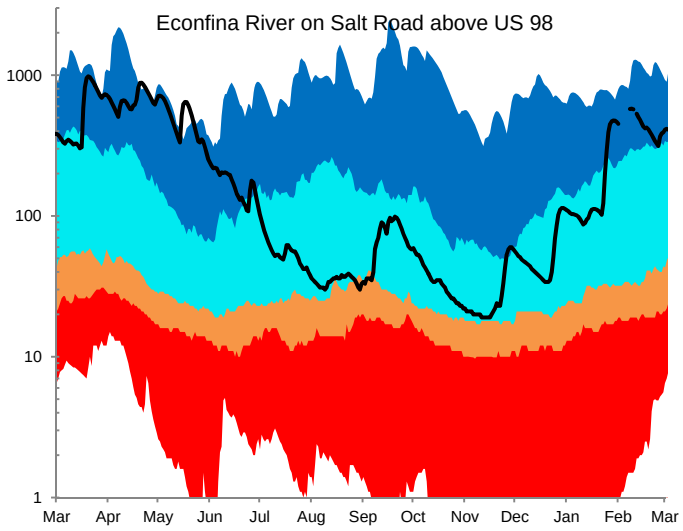
RIVER FLOW, CUBIC FEET PER SECOND

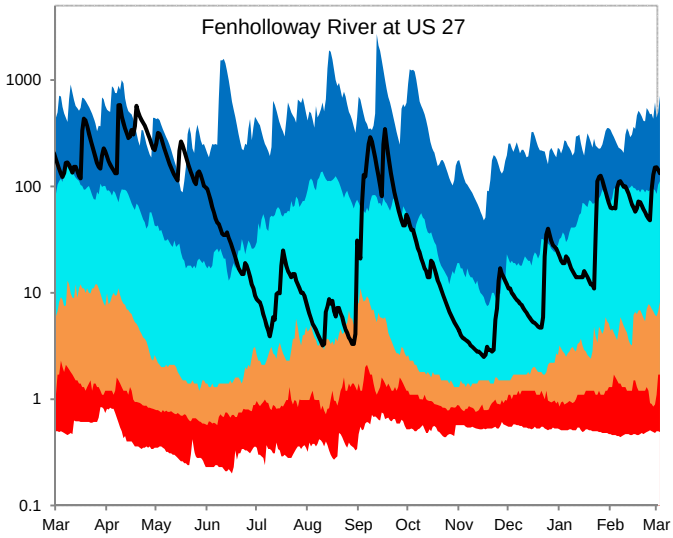












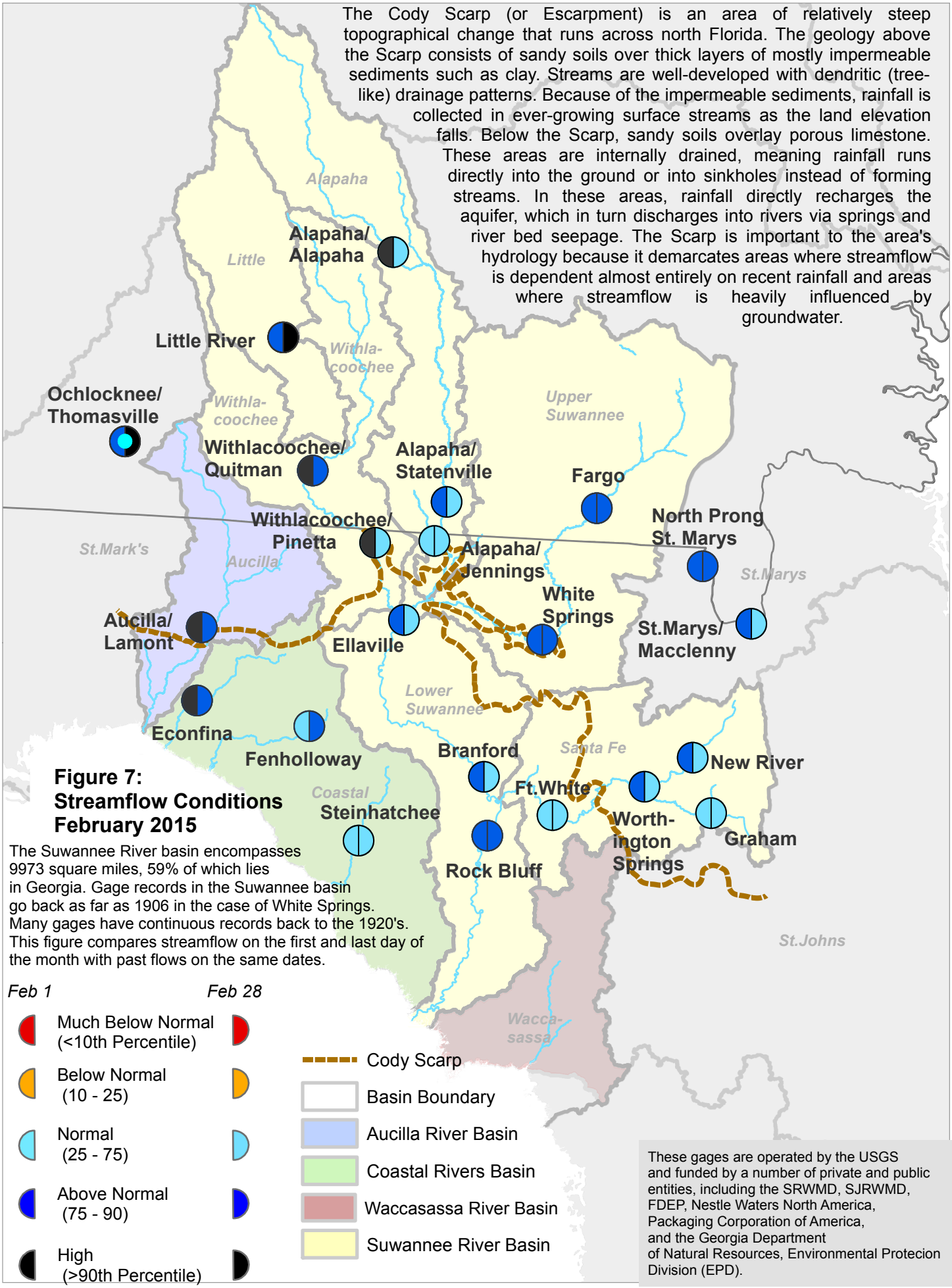
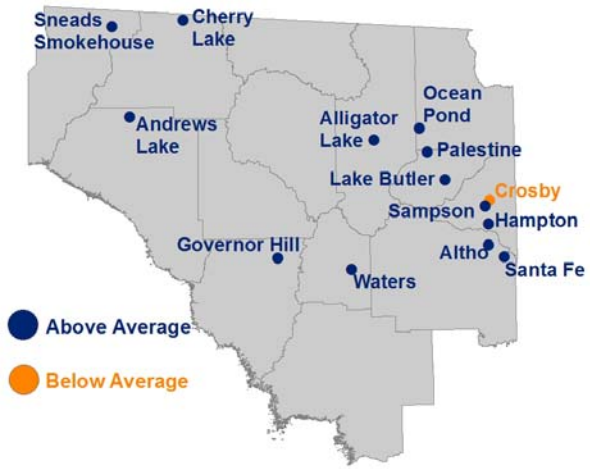

The Cody Scarp (or Escarpment) is an area of relatively steep topographical change that runs across north Florida. The geology above the Scarp consists of sandy soils over thick layers of mostly impermeable sediments such as clay. Streams are well-developed with dendritic (tree-like) drainage patterns. Because of the impermeable sediments, rainfall is collected in ever-growing surface streams as the land elevation falls. Below the Scarp, sandy soils overlay porous limestone. These areas are internally drained, meaning rainfall runs directly into the ground or into sinkholes instead of forming streams. In these areas, rainfall directly recharges the aquifer, which in turn discharges into rivers via springs and river bed seepage. The Scarp is important to the area's hydrology because it demarcates areas where streamflow is dependent almost entirely on recent rainfall and areas where streamflow is heavily influenced by groundwater.
Alapaha
Alapaha/ Alapaha
Little
Little River
Withla-coochee
Ochlocknee/ Thomasville
Withla-coochee
Upper Suwannee
Withlacoochee/ Quitman
Alapaha/ Statenville
Fargo
Withlacoochee/ Pinetta
Alapaha/ Jennings
North Prong St. Marys
St.Mark's
Aucilla
St.Marys
White Springs
Aucilla/ Lamont
Ellaville
St.Marys/ Macclenny
Lower Suwannee
Econfina
Fenholloway
Branford
Santa Fe
New River
Ft.White
Coastal
Steinhatchee
Worth-ington Springs
Graham
Rock Bluff
St.Johns
Wacca-sassa
Figure 7: Streamflow Conditions February 2015
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)
Cody Scarp
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: February 2015 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.

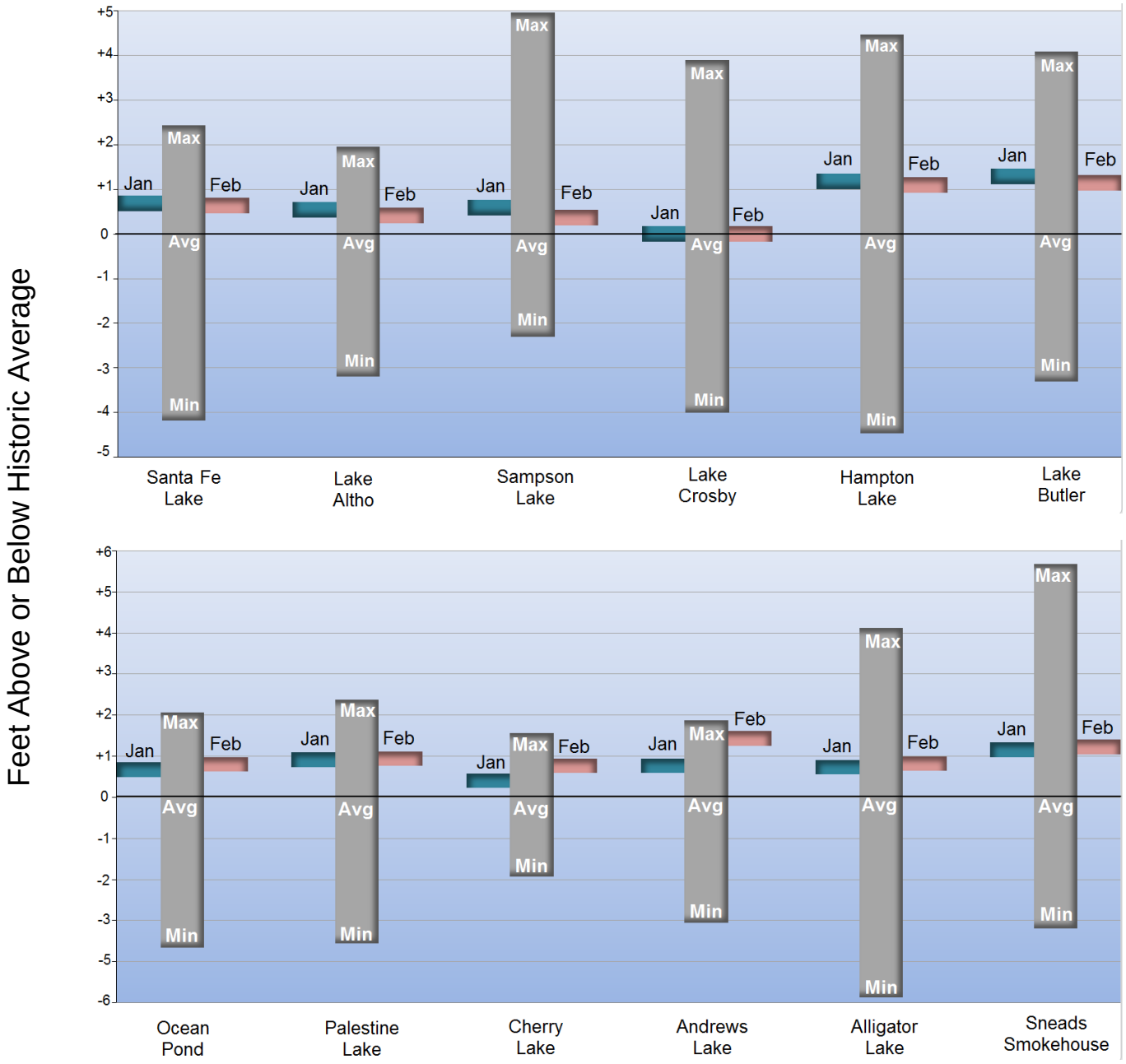


Figure 9: Monthly Springflow Measurements

The SRWMD monitors water quality at 38 springs. Flow is usually measured at the time of the sampling. The springs below were measured in February 2015 by SRWMD staff or by the USGS with the last measurement marked in red. Flow is given in MGD (million gallons per day--a million gallons would fill a football field about 3' deep). With the exception of the Ichetucknee River and the Alapaha Rise, springs in the SRWMD were measured infrequently prior to the late 1990's. 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

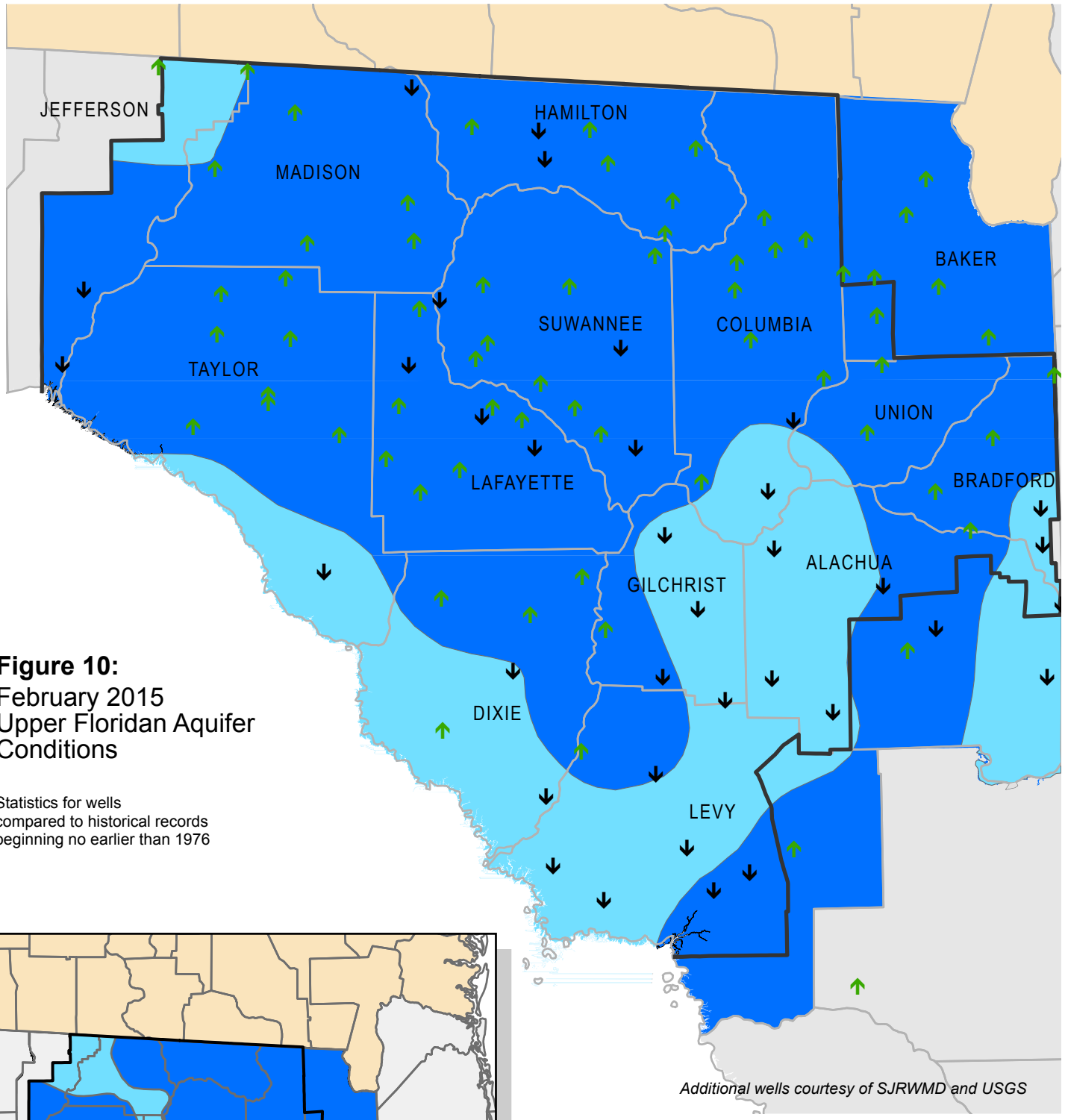
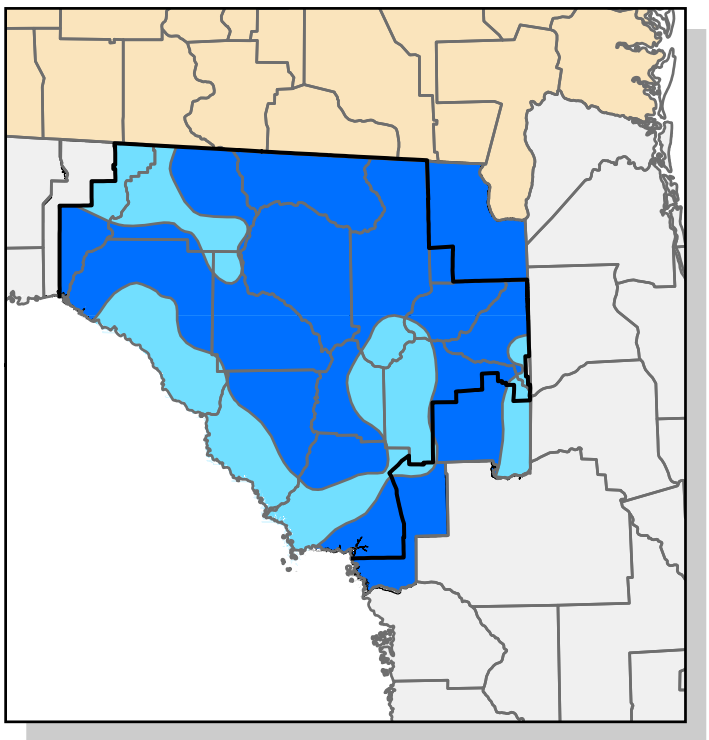


Figure 10:
February 2015
Upper Floridan Aquifer
Conditions

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



Inset: January 2015 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

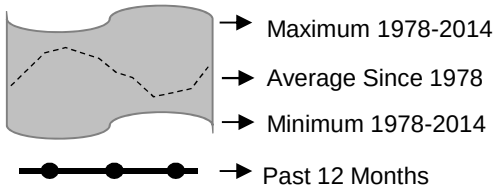
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

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

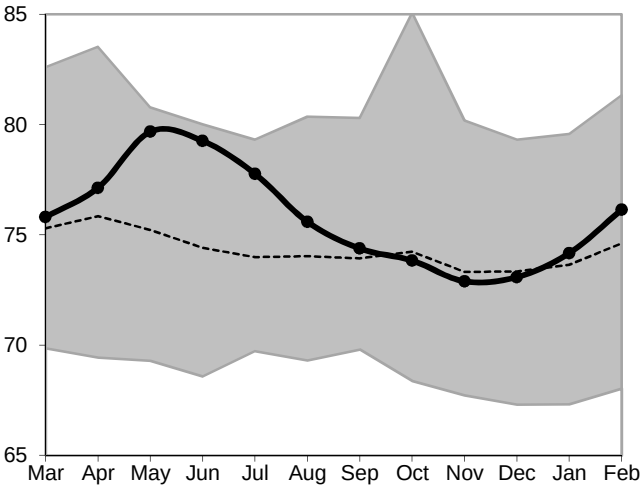
District Boundary

Figure 11: Monthly Groundwater Level Statistics
Levels March 1, 2014 through February 28, 2015
Period of Record Beginning 1978

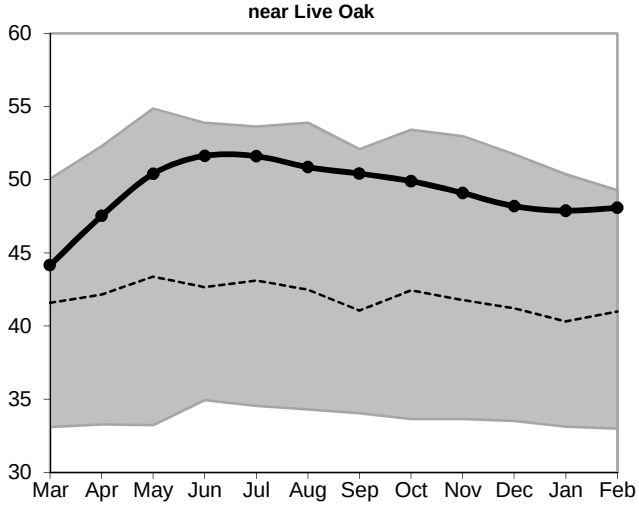


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

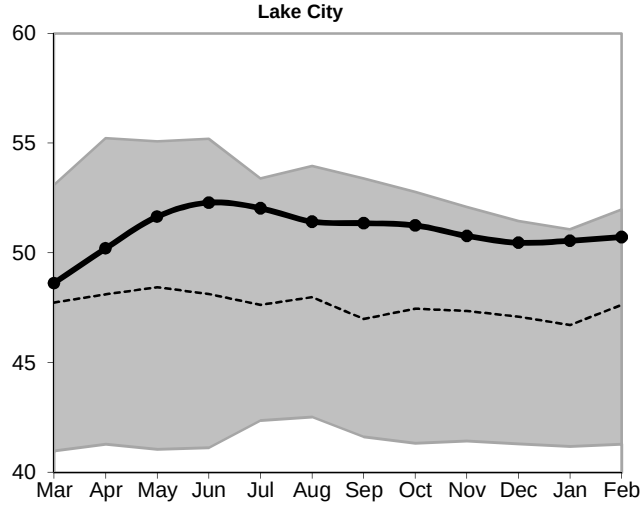
Madison County N010719001
near Greenville



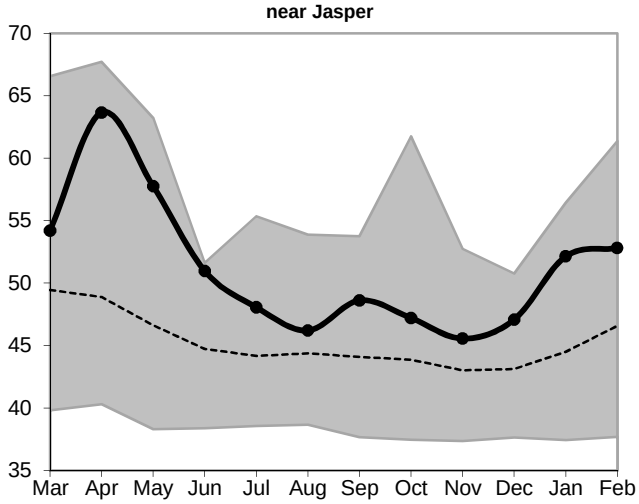
Suwannee County S021335001
near Live Oak



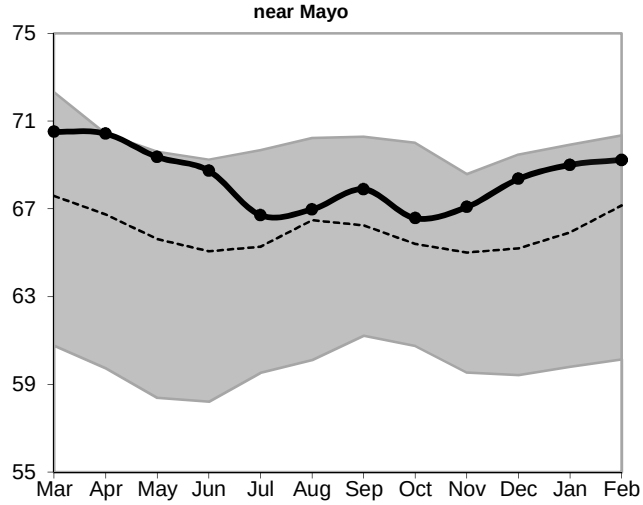
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

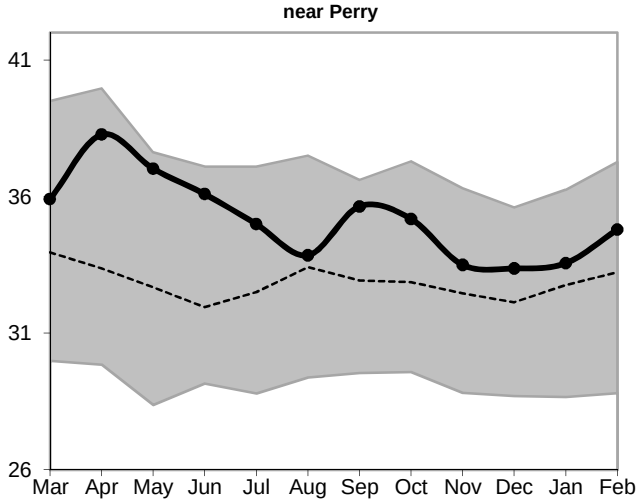
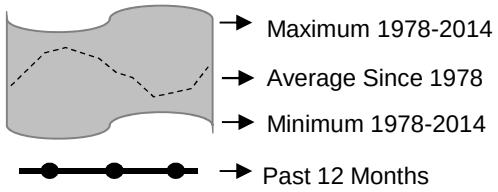
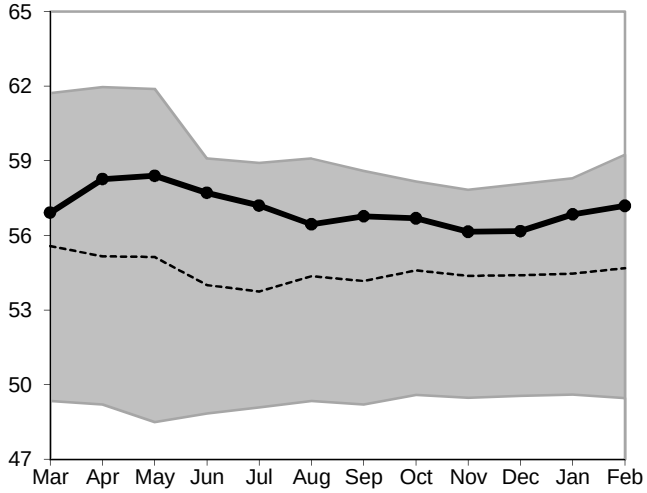


Figure 11, cont.: Groundwater Level Statistics
Levels March 1, 2014 through February 28, 2015
Period of Record Beginning 1978

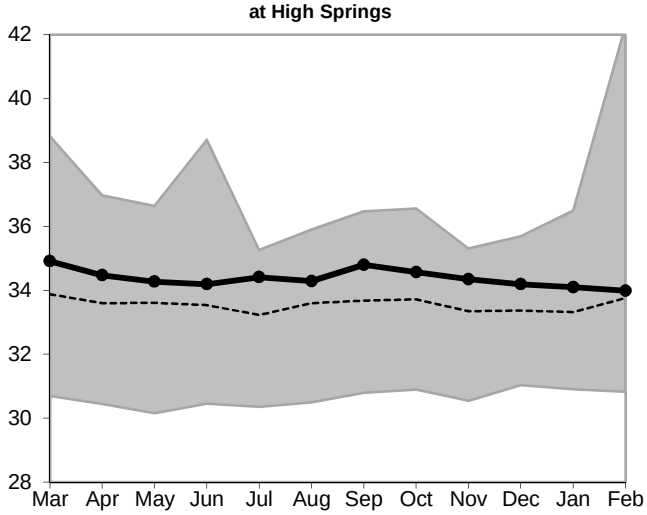


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

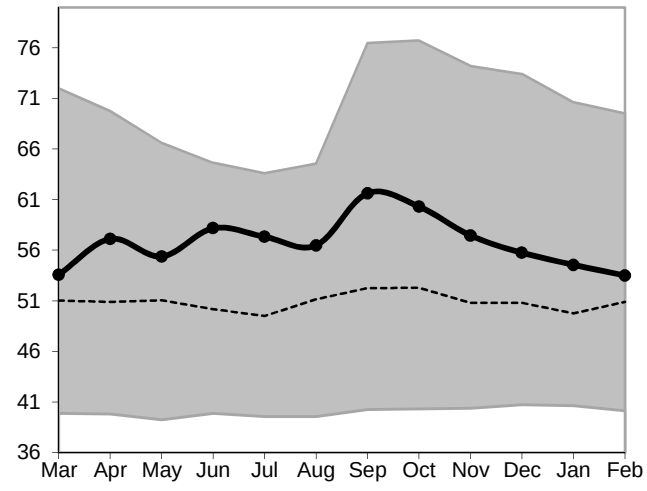
Union County S051933001
near Lake Butler



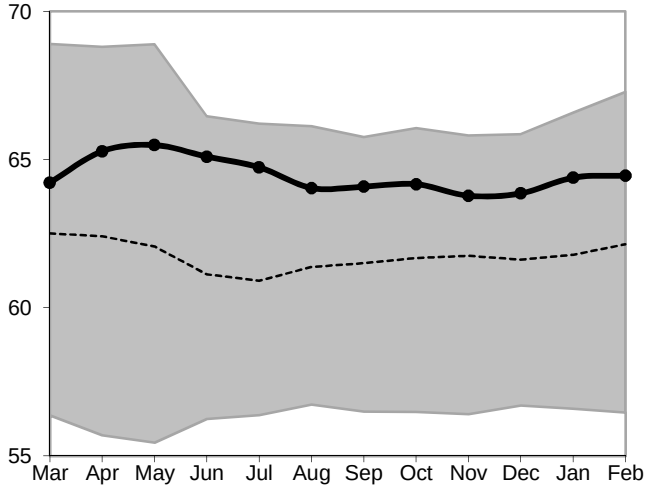
Alachua County S081703001
at High Springs



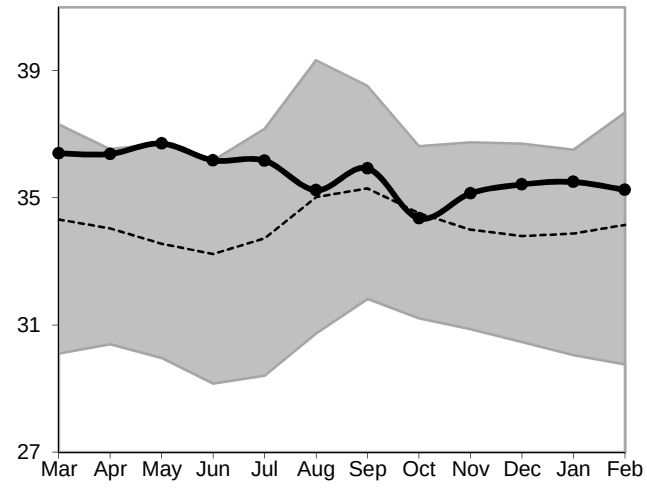
Gilchrist County S091607001
near Trenton



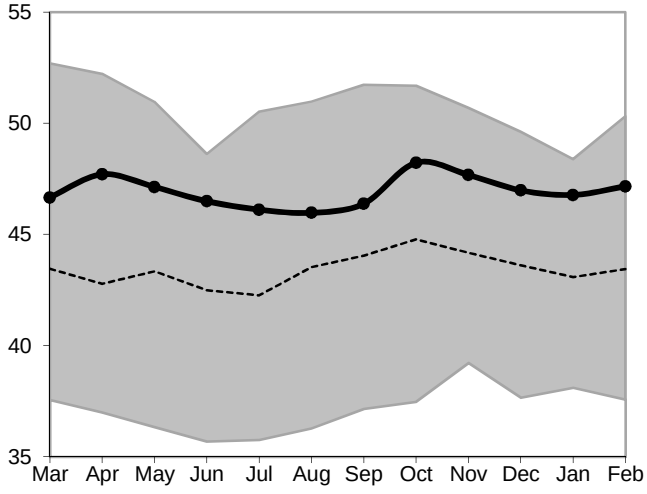
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



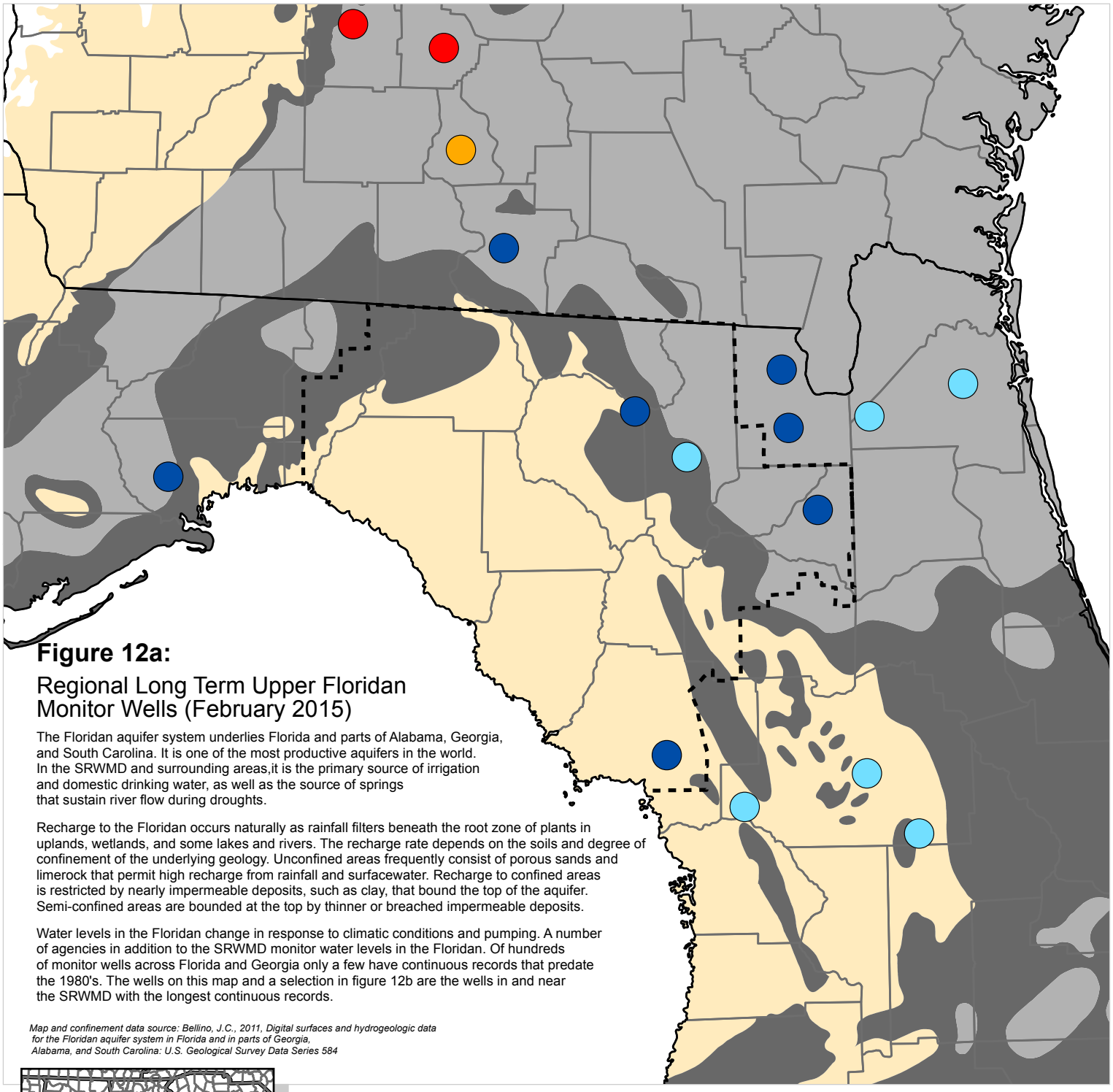


Figure 12a:

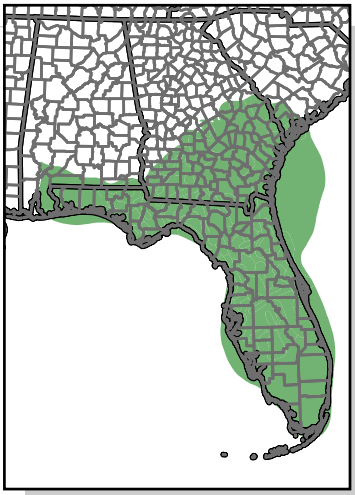
Regional Long Term Upper Floridan Monitor Wells (February 2015)

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

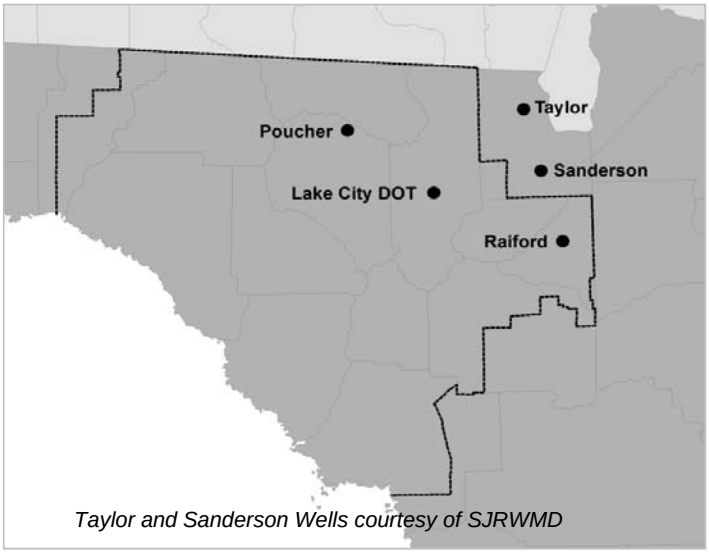
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

Percentile of Most Recent Water Level Relative to Entire Record

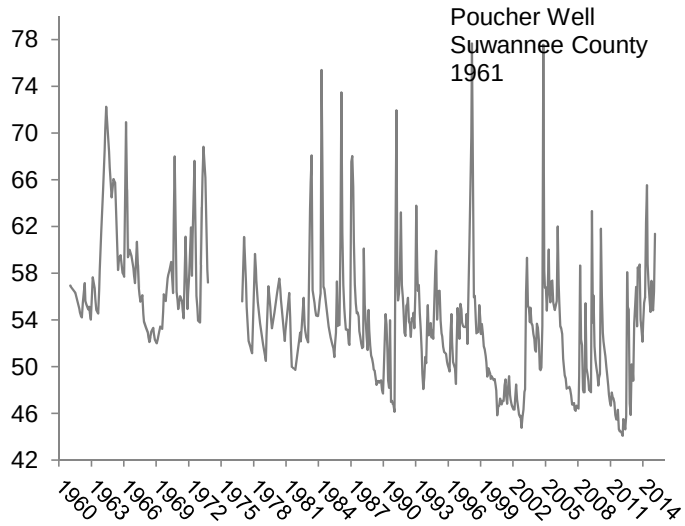
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

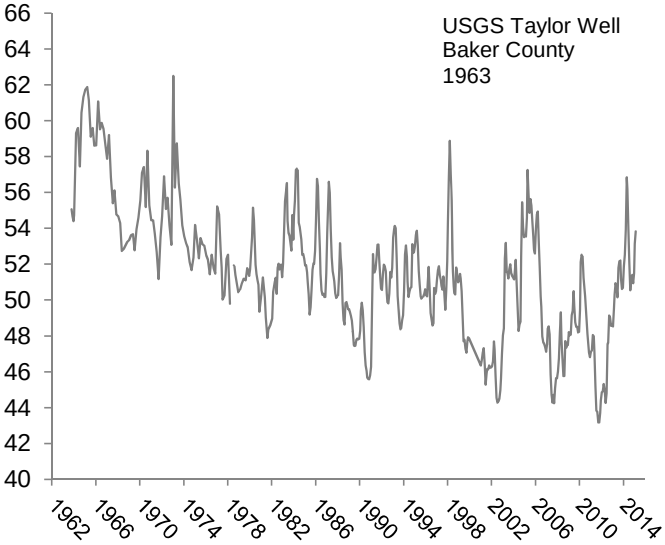
Figure 12b: Regional Long Term Upper Floridan Levels

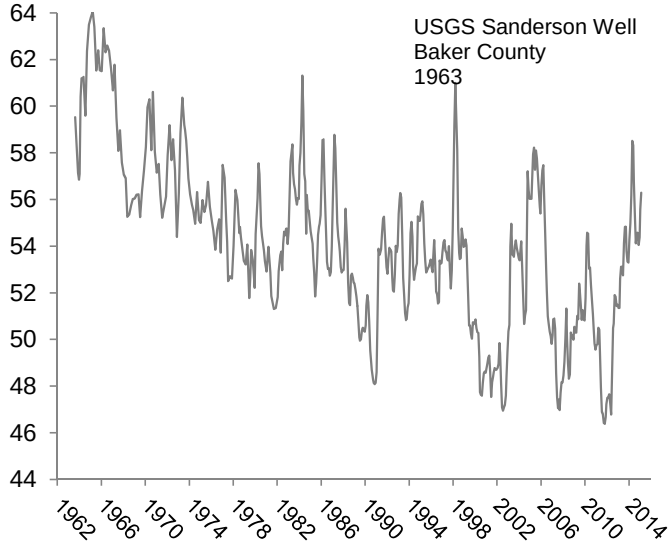
February 2015

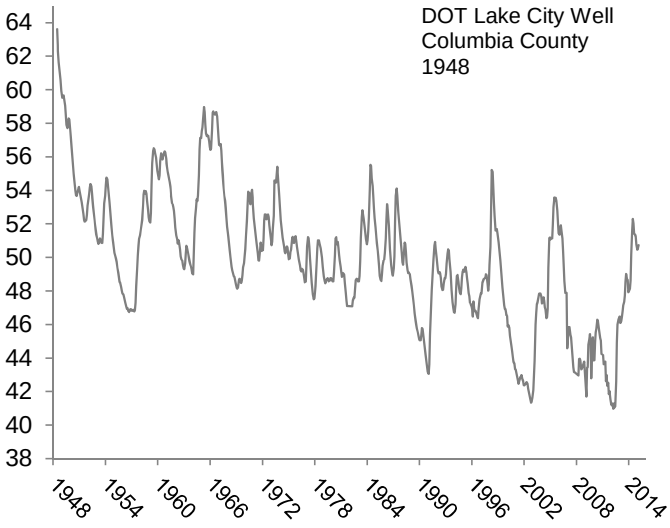


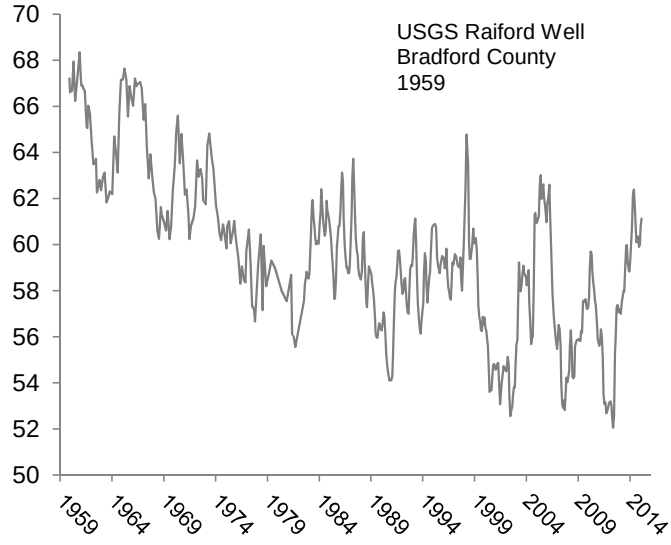
Taylor and Sanderson Wells courtesy of SJRWMD











Upper Floridan Aquifer Elevation above NGVD 1929, Feet