MEMORANDUM

TO: Governing Board

FROM: Tom Mirti, Bureau Chief, Hydrologic Data Services

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

DATE: February 9, 2015

RE: January 2015 Hydrologic Conditions Report for the District

RAINFALL

- District-wide rainfall in January, was 4.02", slightly above the long-term January average based on records beginning in 1932. Four frontal weather systems passed through the District during the month, but a late month system again provided most of the monthly rain amount (Table 1, Figure 1). The late month storm dropped up to five inches of rain in western Madison and smaller portions of Jefferson and Taylor counties (Figure 2). The Aucilla, Withlacoochee and Alapaha basins in Florida received rainfall amounts up to twice the January normal, while below average totals fell generally along a path from Dixie County northeast to Baker County. The Withlacoochee and Alapaha watersheds in Georgia also saw above average rainfall totals, but not as high as previous months (Figure 3).
- The highest gaged monthly total (6.77") was recorded at the Cabbage Grove rainfall gage in western Taylor County, and the highest daily total (4.74") was also measured at Cabbage Grove. The lowest gaged monthly total was 2.63" at Ocean Pond in Baker County.
- The total rainfall average across the District for the 12-month period ending January 31 was 60.3", about 10 percent higher than the long-term average of 54.6". Twelve-month rainfall departures continued to improve in the Aucilla River basin while other District basins maintained a surplus. Eastern Bradford County and coastal Dixie County display the biggest annual rainfall deficits, with some areas about 10 percent below average over the past year (Figure 4).
- Average District rainfall for the 3 months ending January 31 was about 1.75" above the long-term average of 9.1" (Figure 5).

SURFACEWATER

- **Rivers:** River levels began the month at several stations around the District at relatively high levels and held relatively steady thereafter during the month. Several gaging stations were at or near minor flood levels for the entire month, including the Santa Fe River at Three Rivers Estates, Aucilla River at Lamont, and the Suwannee River near Wilcox. The Suwannee River basin in Georgia again received much greater than normal rains and all gaging stations remained above the 75th percentile the entire month. Downstream stations in Florida generally started the month above the 90th percentile and ended it remaining relatively high above the 75th percentile as well. The lower Santa Fe River reached the No Wake elevation of 17 feet on January 2nd, later receded, and again rose above 17 feet on January 27th. The Aucilla River at Lamont hovered just below flood stage for the entire month, and the Econfina River reached very high levels after the January 23rd event that fell heavily within its upper basin, but other coastal basin rivers remained typical of the season. Flow statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions in Figure 7.

- **Lakes**: Monitored lake levels across the District rose by the end of the month, with the exception of Alligator Lake in Lake City. Sneads Smokehouse Lake showed the highest increase, about 8 inches to 80.7 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**: Eighteen springs or spring groups were measured by the USGS, District staff, and District contractors in January. Flows generally remained stable with most above their long-term median. Flow records for several major springs are shown in Figure 9.

GROUNDWATER

Levels in upper Floridan monitor wells on average ended the month at the 80th percentile, an increase of 11 percentile points from the end of December. This level is the highest January Floridan aquifer level since 2005. Overall, 80 percent of Floridan aquifer wells showed an increase in water level during the month, with a few declines generally occurring along the Middle Suwannee River corridor and in Gilchrist and Alachua counties (Figure 10). Only two of 94 wells were below their respective median levels, while 74 percent remained above the 75th percentile, considered high. No wells in the District were below the 25th percentile. 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 January 31 indicated continued near-normal conditions in north Florida and unusually moist conditions in south Georgia.
- The National Weather Service Climate Prediction Center (CPC) projected a higher potential above-average precipitation for the remainder of February, but reduced the three-month outlook for the southeastern United States to reflect normal rainfall potential thereafter. The El Niño watch issued by the CPC in January remains in effect. Their February 2 report restated the 50-60% chance that El Niño conditions would be develop during late winter and last into spring. 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 February 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	January 2015	January Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	3.45	3.39	102%	57.67	113%
Baker	2.99	3.48	86%	57.59	115%
Bradford	3.34	2.90	115%	50.93	100%
Columbia	2.93	3.43	85%	61.79	120%
Dixie	3.12	3.54	88%	57.53	97%
Gilchrist	3.00	4.58	66%	61.52	107%
Hamilton	4.40	4.31	102%	62.85	120%
Jefferson	5.90	4.35	136%	60.48	100%
Lafayette	3.57	4.09	87%	64.45	114%
Levy	4.15	3.99	104%	60.10	101%
Madison	6.38	3.93	162%	59.50	106%
Suwannee	3.80	4.20	90%	64.28	121%
Taylor	4.71	4.10	115%	62.66	105%
Union	3.02	4.00	76%	57.82	107%

January 2015 Average:	4.02
January Average (1932-2013):	3.66
Historical 12-month Average (1932-2013):	54.63
Past 12-Month Total:	60.30
12-Month Rainfall Surplus:	5.67

Figure 1: Comparison of District Monthly Rainfall

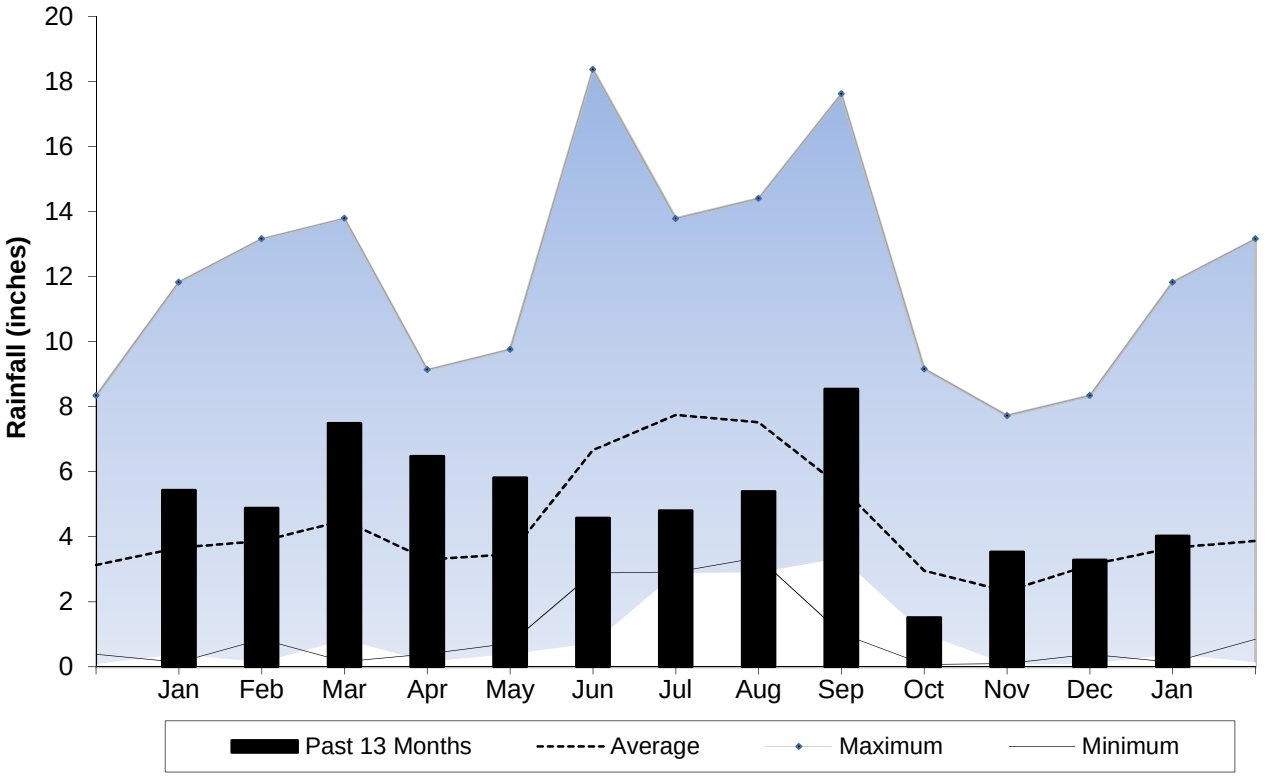


Figure 2: January 2015 Rainfall Estimate

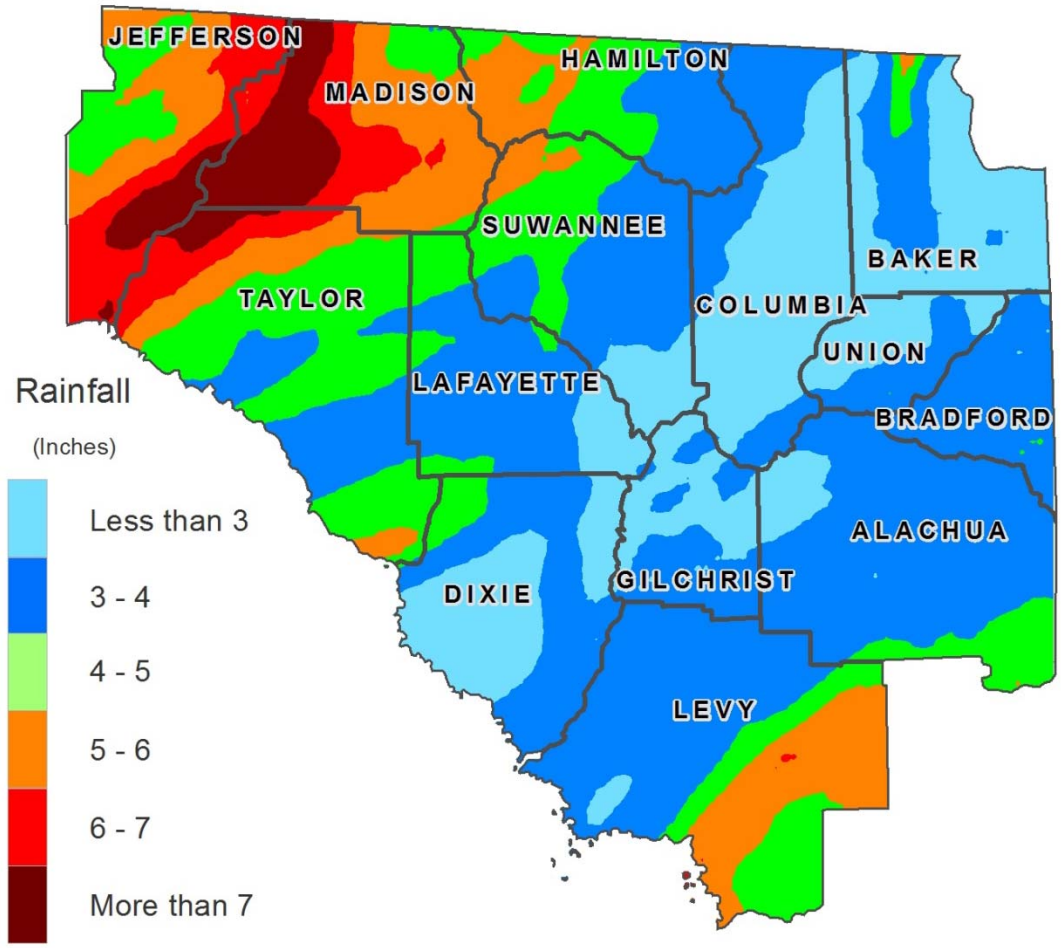


Figure 3: January 2015 Percent of Normal Rainfall

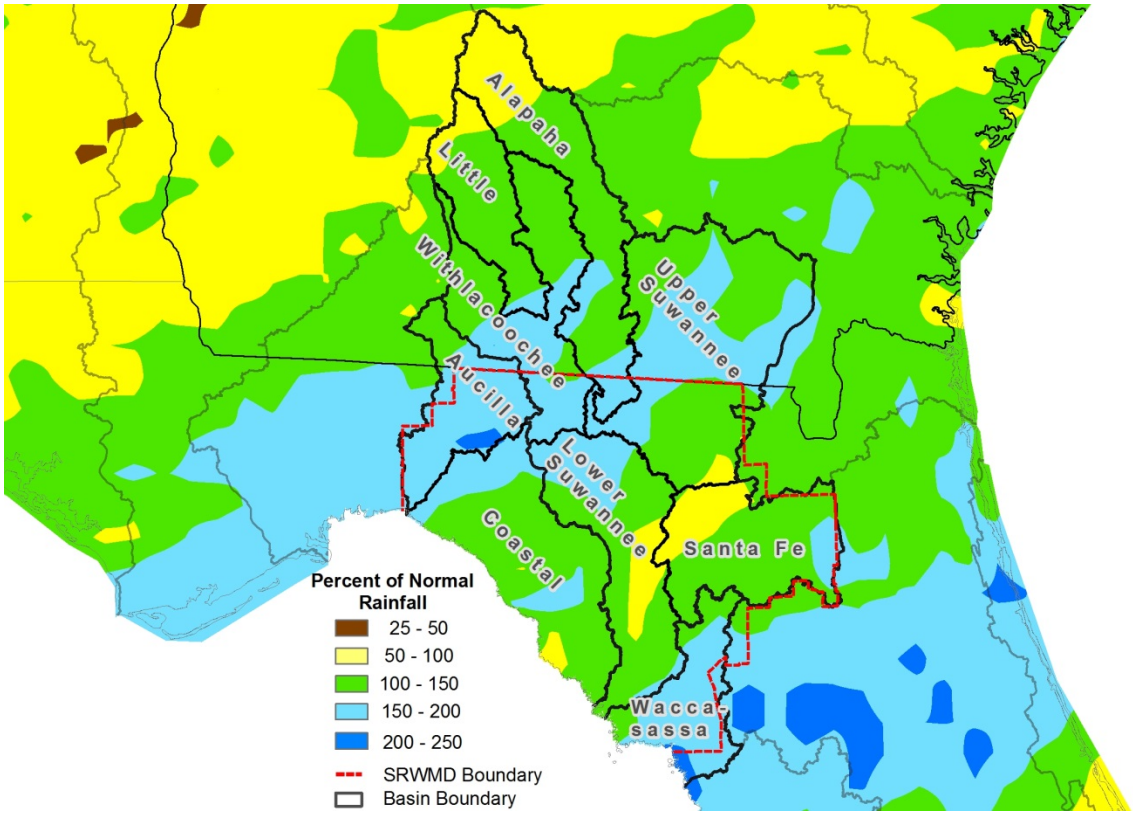


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through January 31, 2015

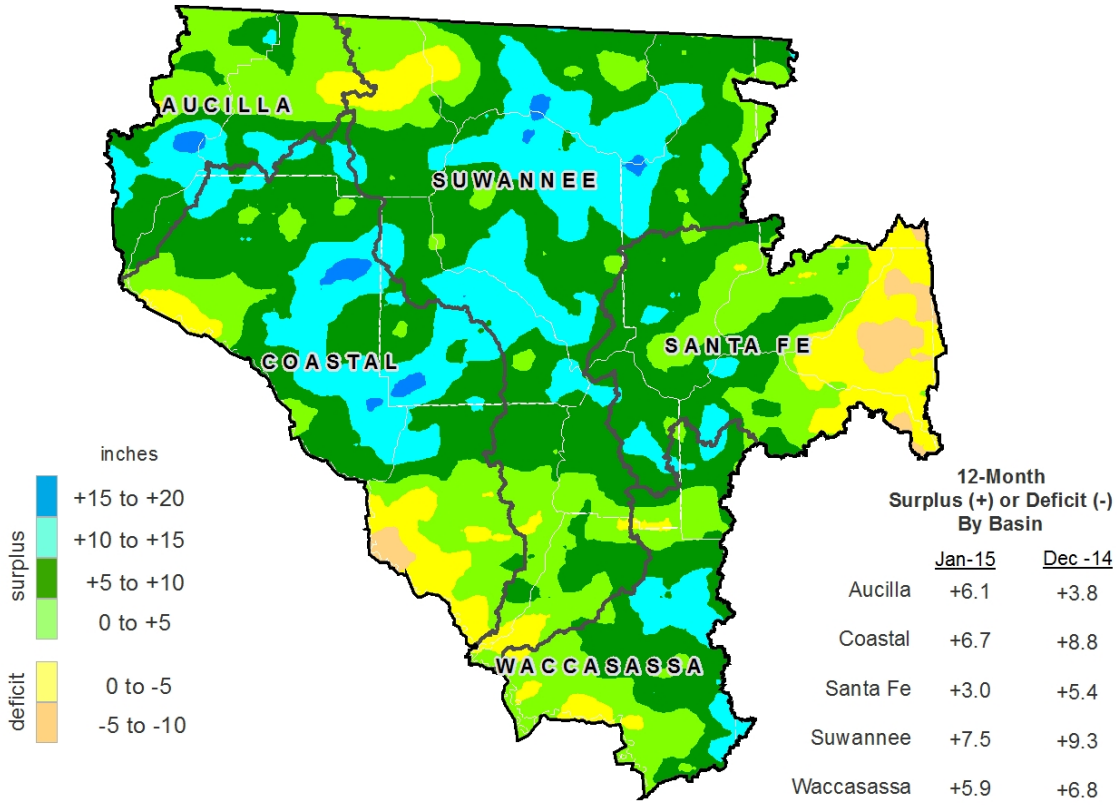


Figure 5: 3-Month Rainfall Surplus/Deficit by River Basin
Through January 31, 2015

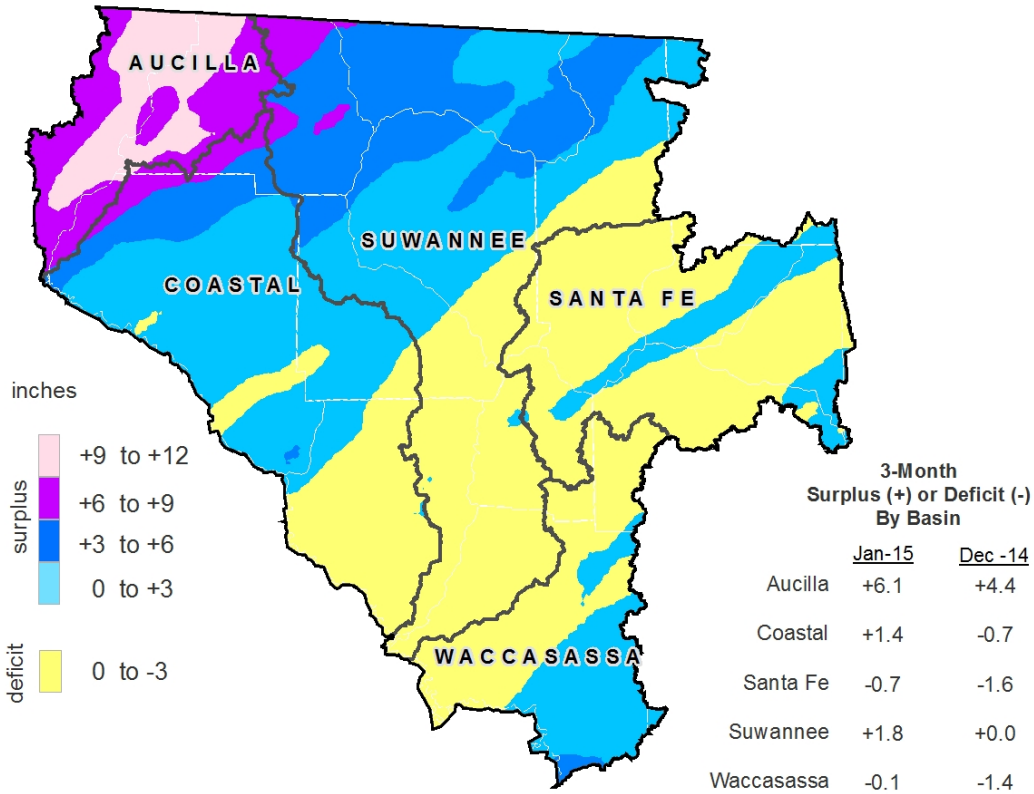
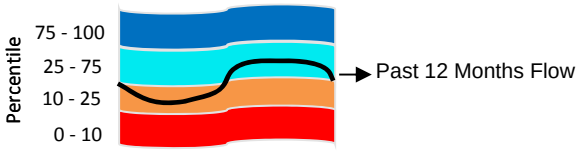
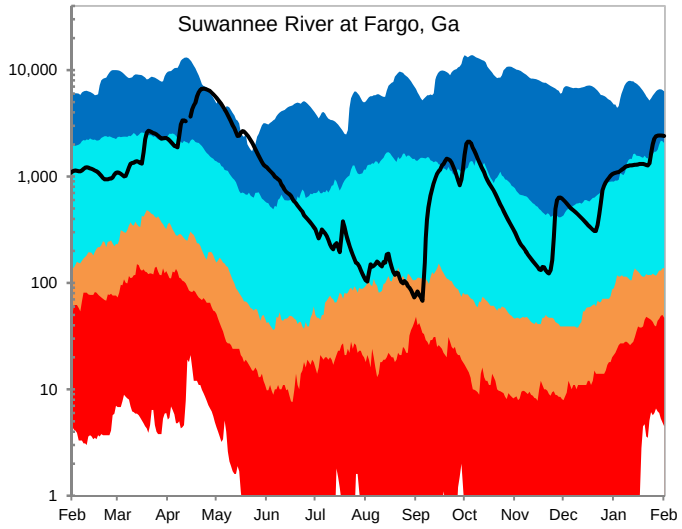
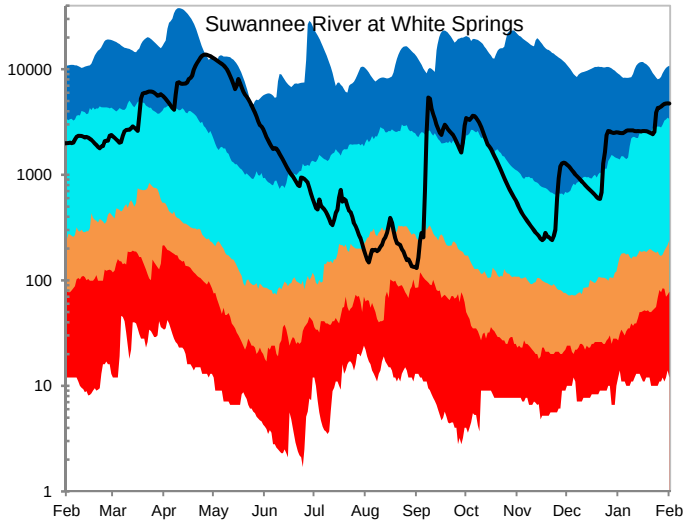


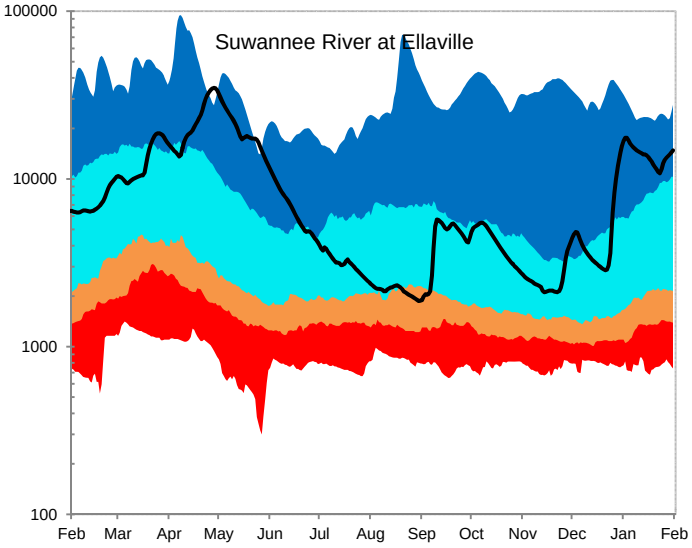
Figure 6: Daily River Flow Statistics
February 1, 2014 through January 31, 2015

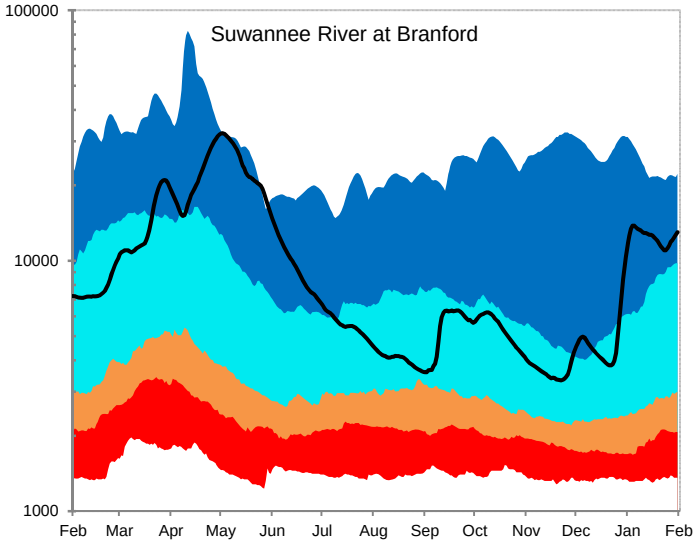


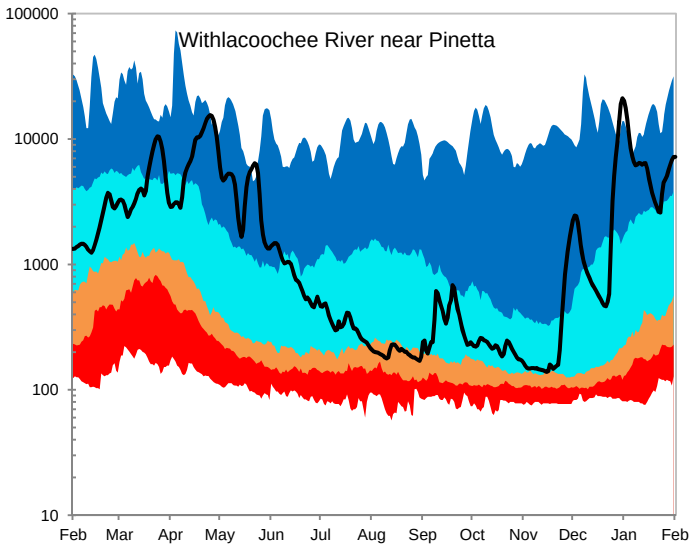
RIVER FLOW, CUBIC FEET PER SECOND











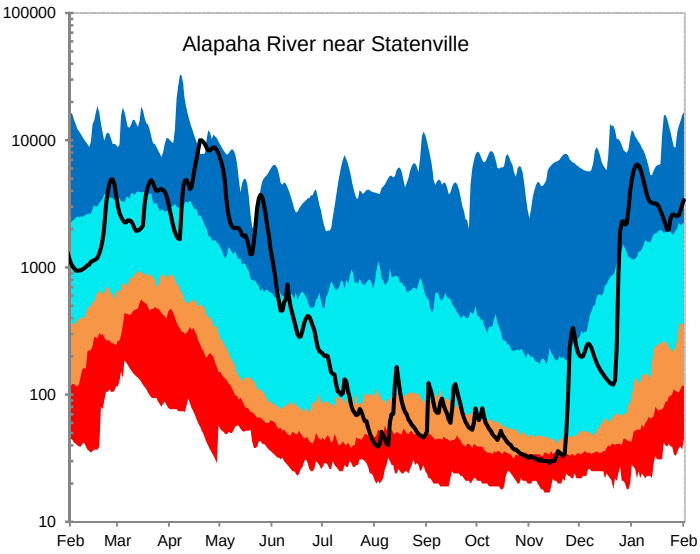
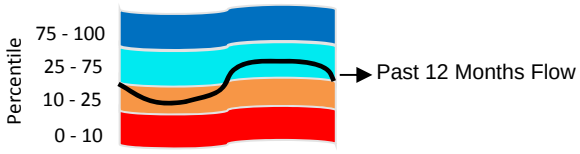
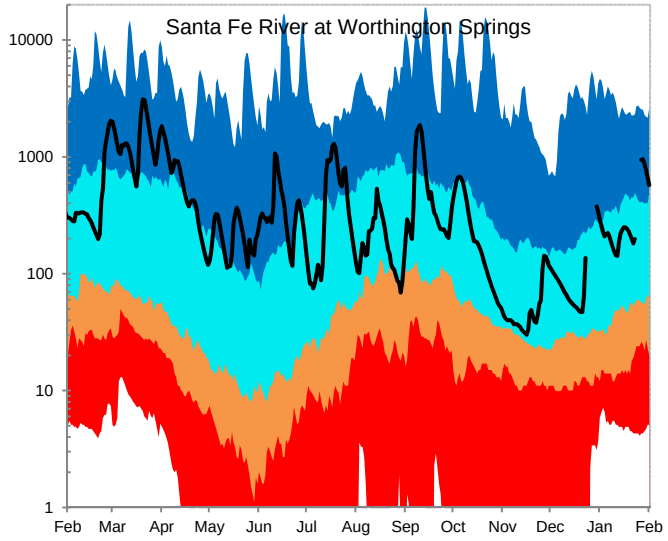
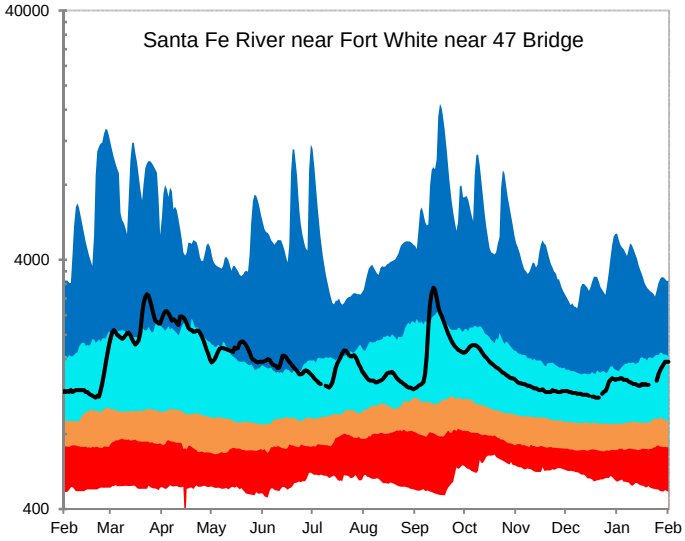


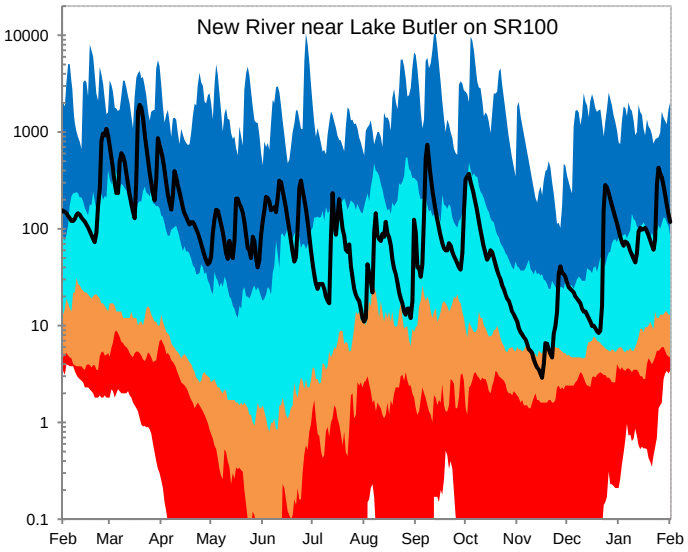
Figure 6, cont: Daily River Flow Statistics
February 1, 2014 through January 31, 2015

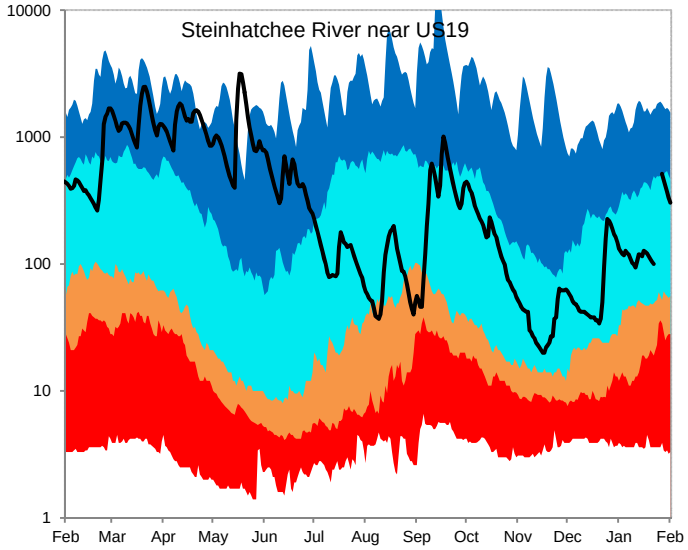


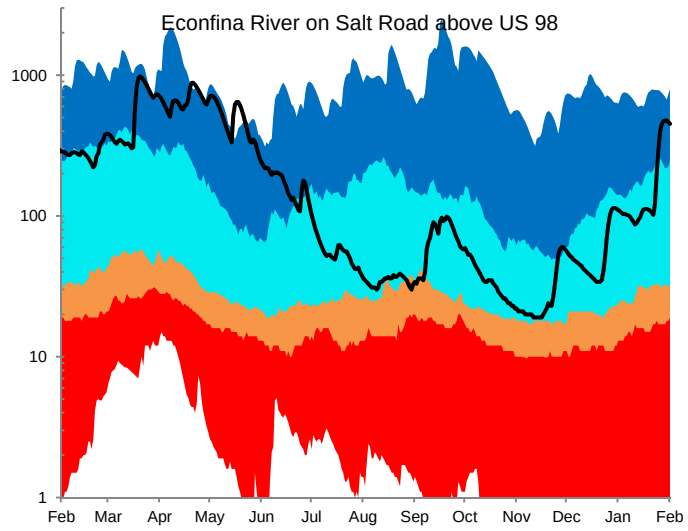
RIVER FLOW, CUBIC FEET PER SECOND

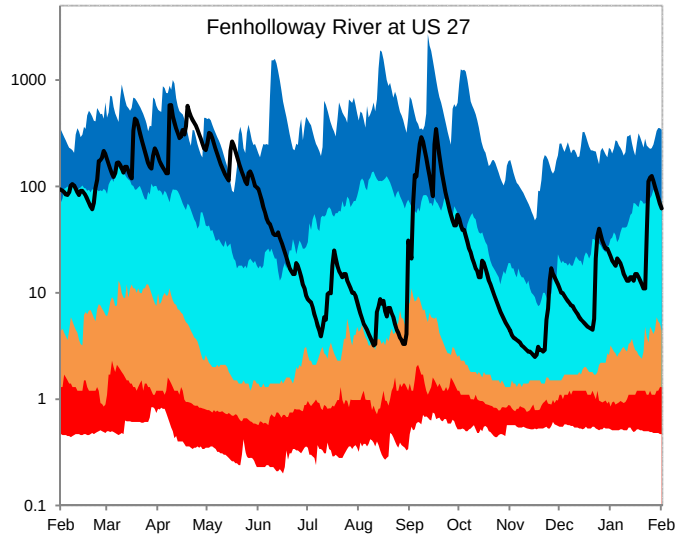












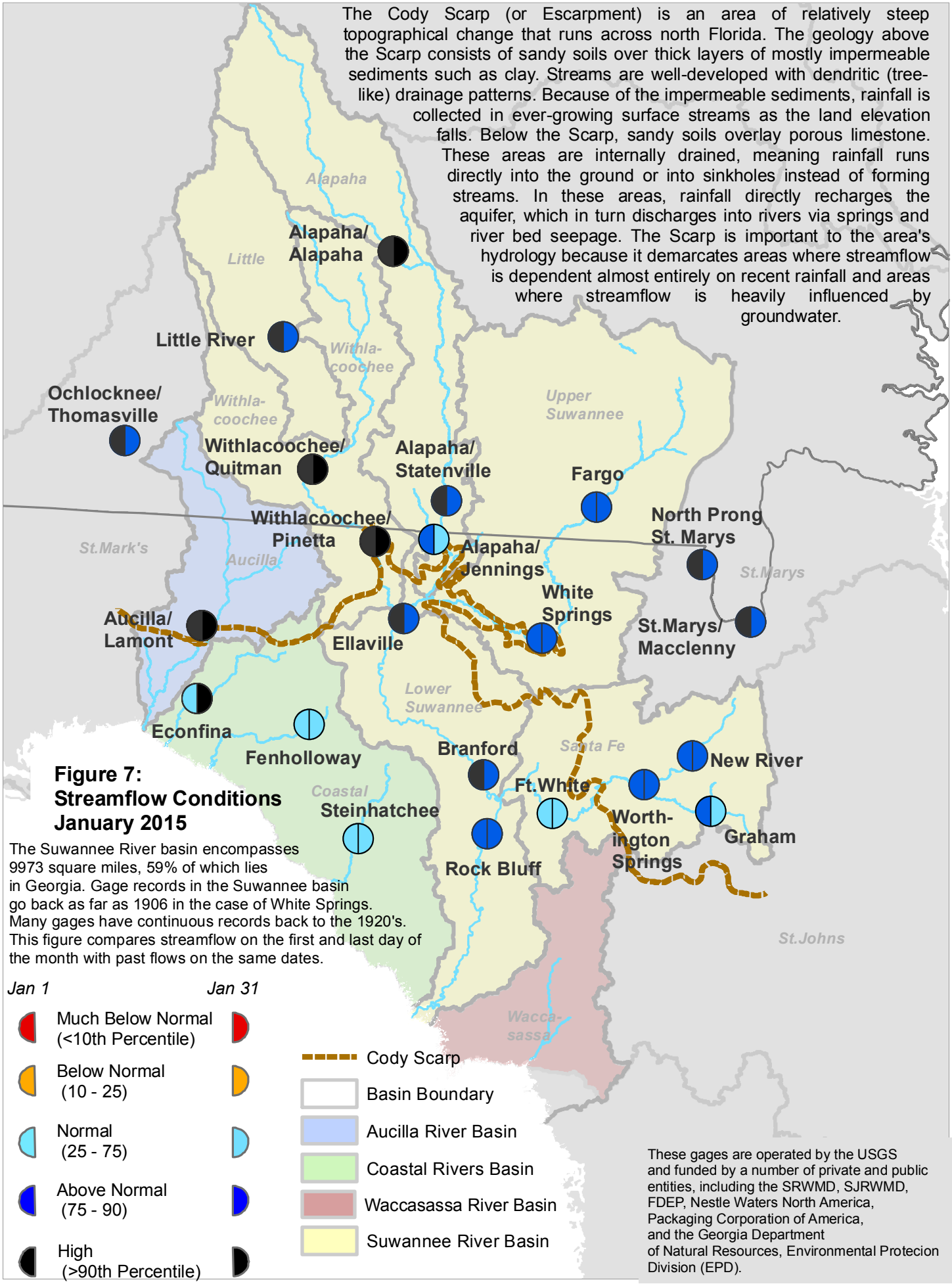
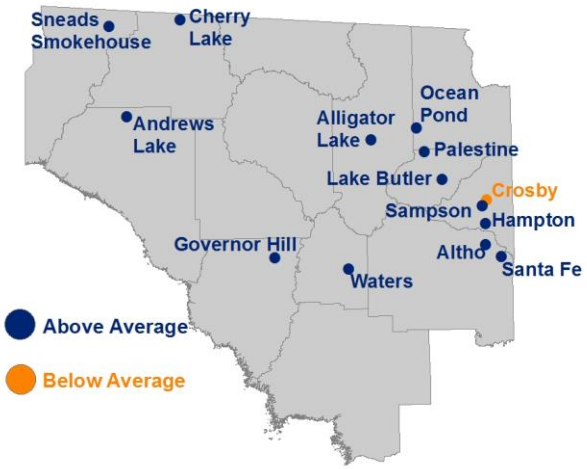

The Cody Scarp (or Escarpment) is an area of relatively steep topographical change that runs across north Florida. The geology above the Scarp consists of sandy soils over thick layers of mostly impermeable sediments such as clay. Streams are well-developed with dendritic (tree-like) drainage patterns. 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 January 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.
Jan 1
Jan 31
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: January 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.

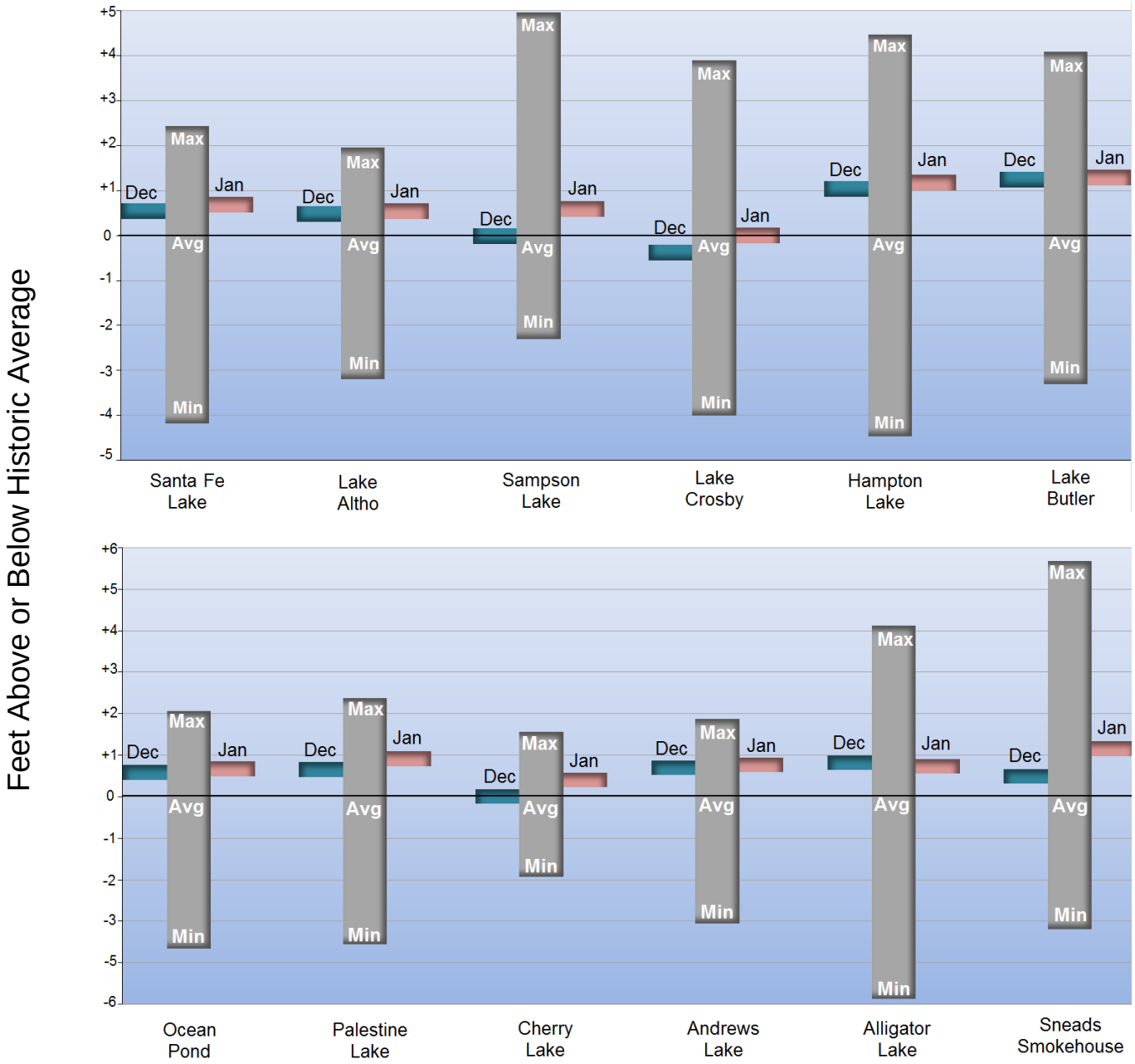


Figure 9: Monthly Springflow Measurements

The SRWMD monitors water quality at 38 springs. Flow is usually measured at the time of the sampling. The springs below were measured in January 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

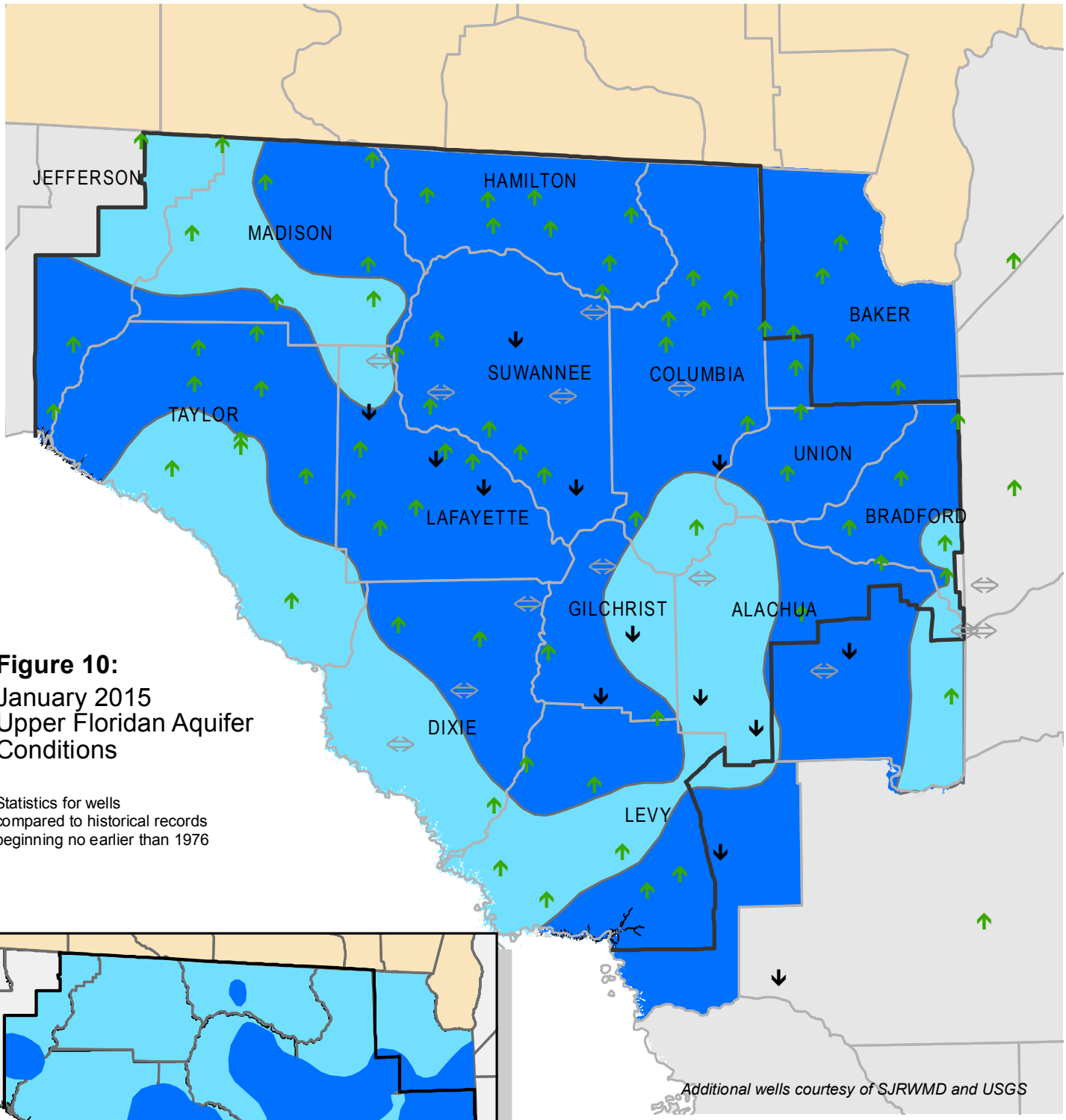
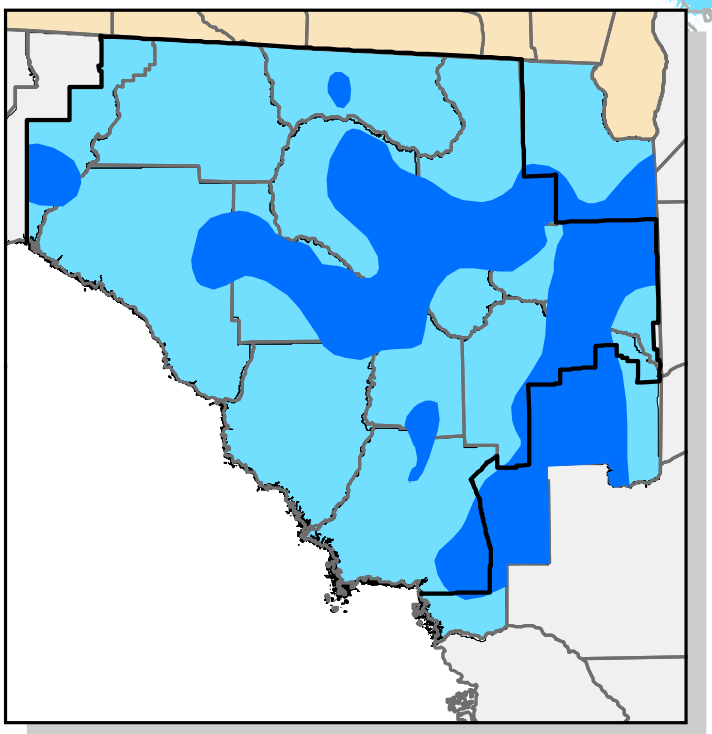


Figure 10:
January 2015
Upper Floridan Aquifer
Conditions

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



Inset: December 2014 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

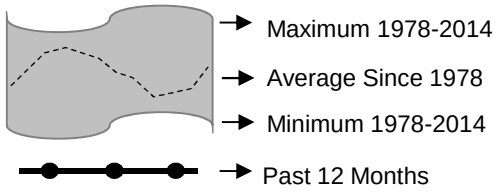
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

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

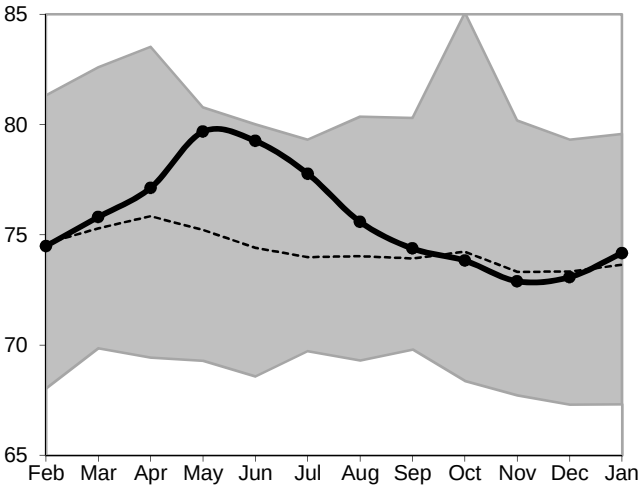
District Boundary

Figure 11: Monthly Groundwater Level Statistics
Levels February 1, 2014 through January 31, 2015
Period of Record Beginning 1978

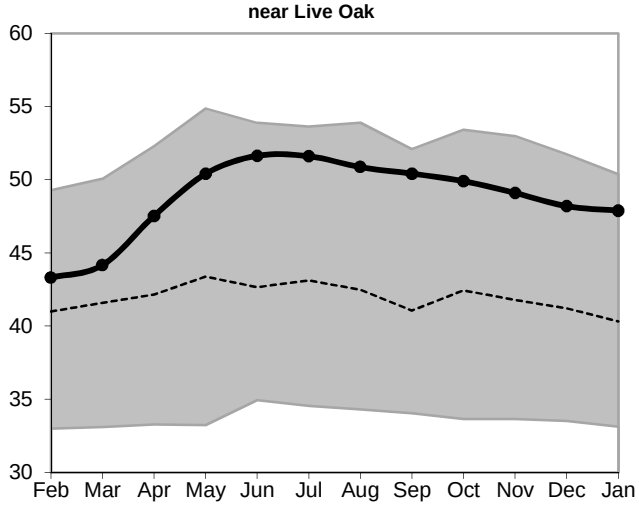


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

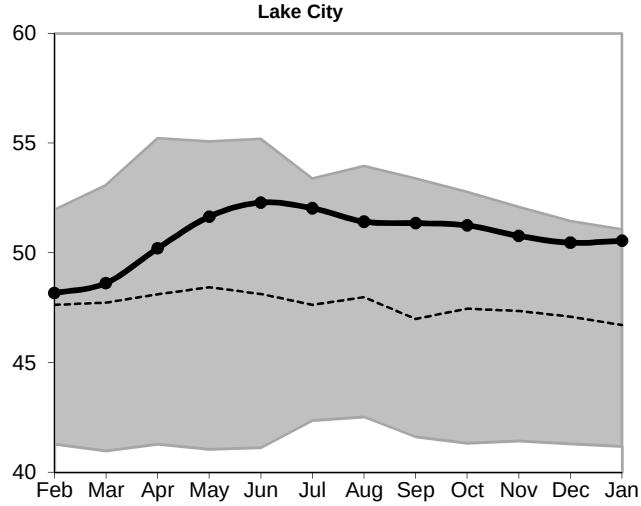
Madison County N010719001
near Greenville



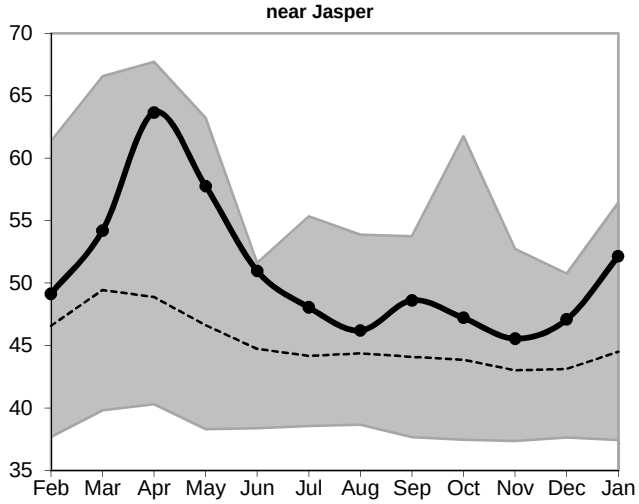
Suwannee County S021335001
near Live Oak



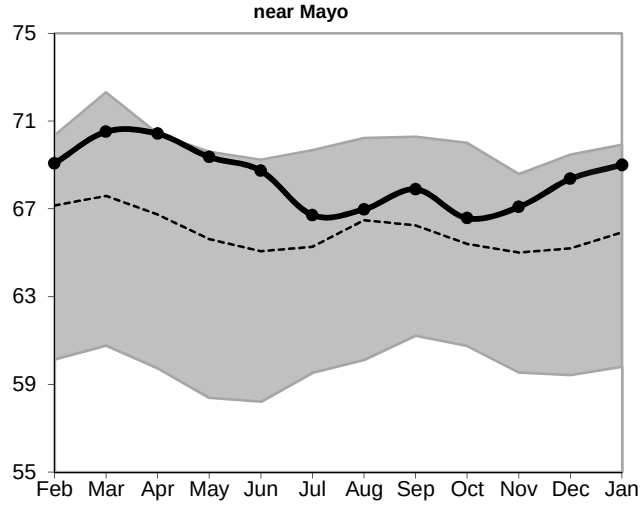
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

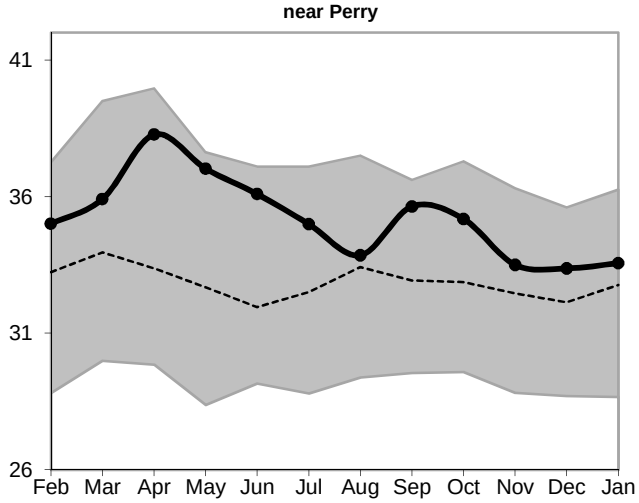
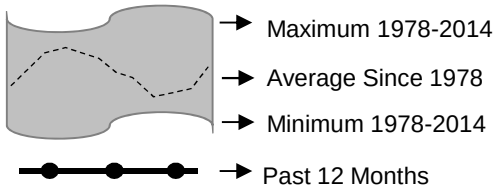
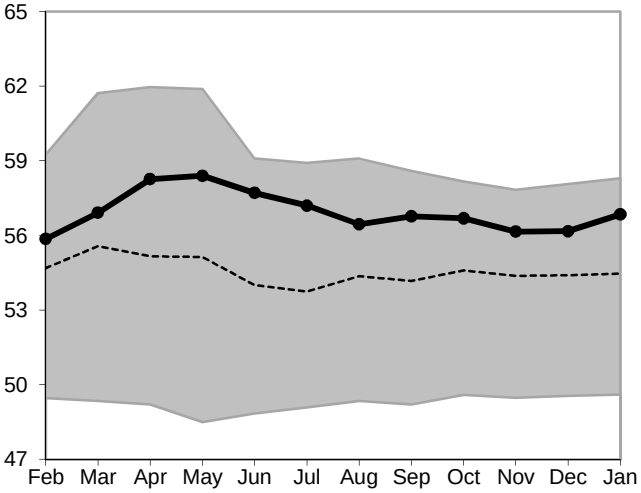


Figure 11, cont.: Groundwater Level Statistics
Levels February 1, 2014 through January 31, 2015
Period of Record Beginning 1978

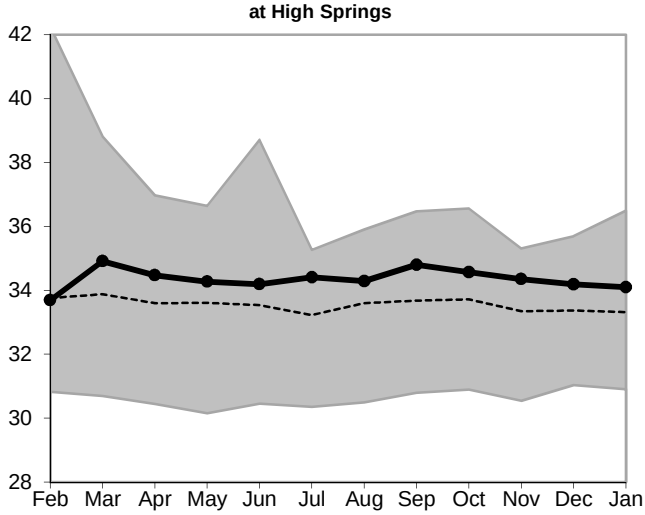


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

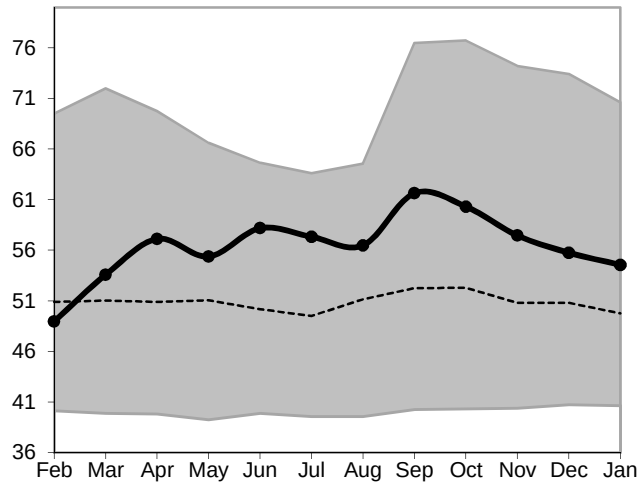
Union County S051933001
near Lake Butler



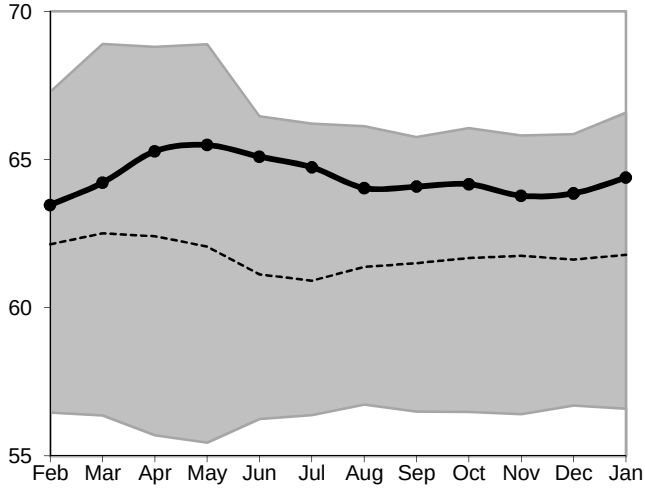
Alachua County S081703001
at High Springs



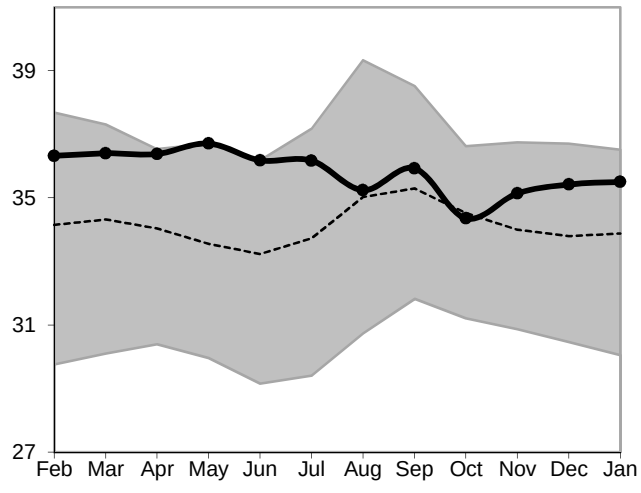
Gilchrist County S091607001
near Trenton



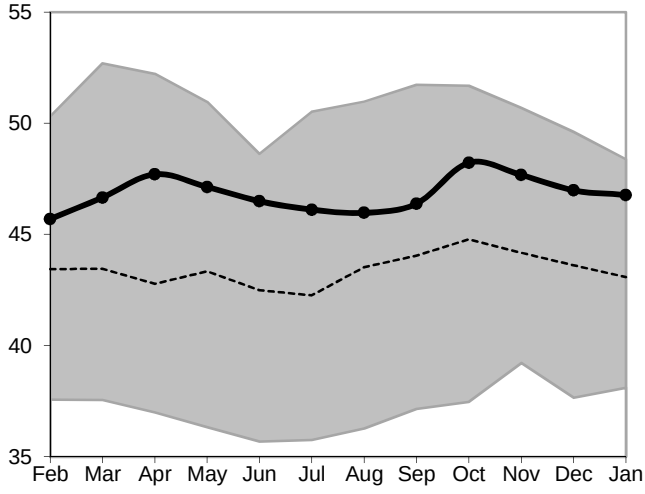
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



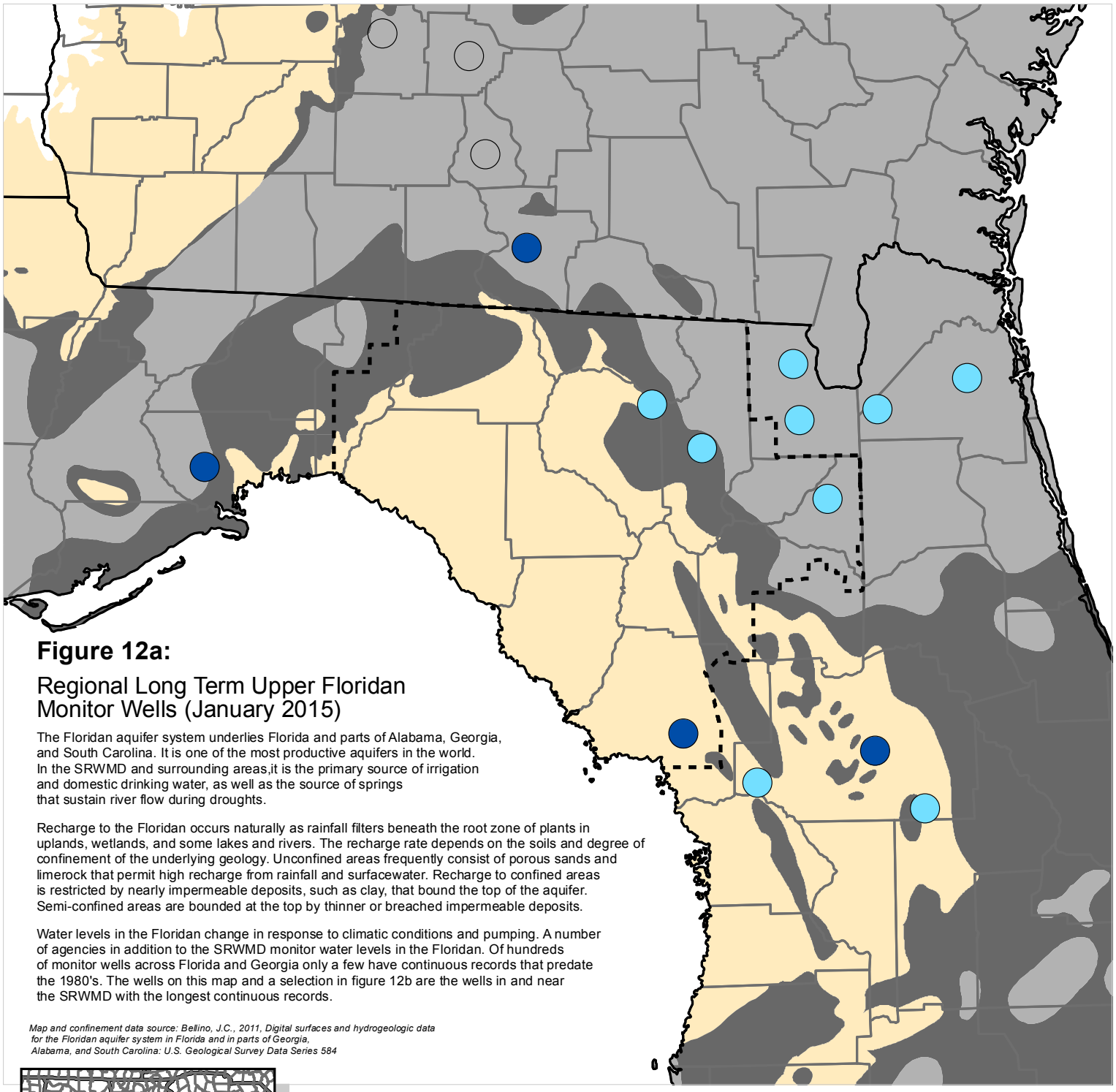


Figure 12a:

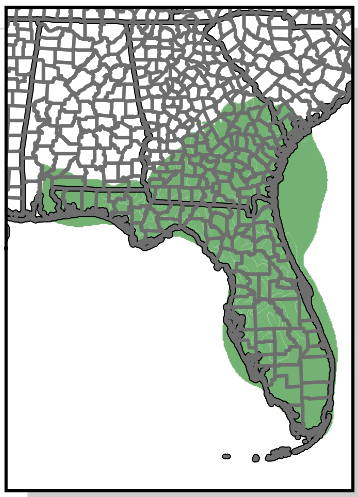
Regional Long Term Upper Floridan Monitor Wells (January 2015)

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

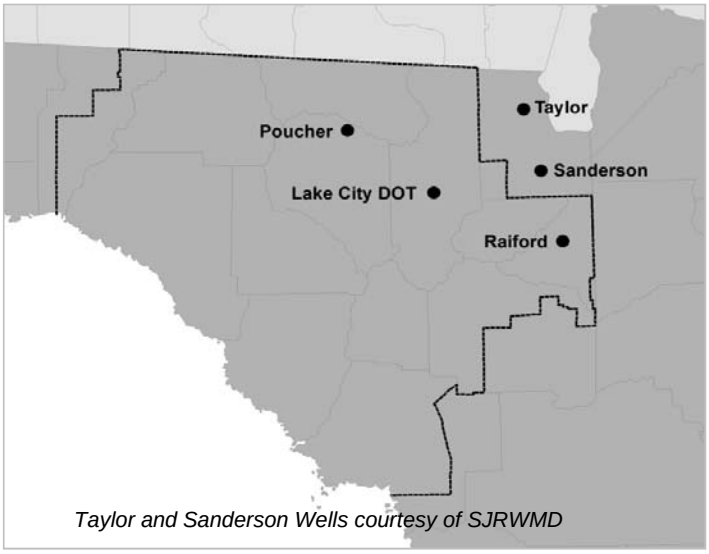
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

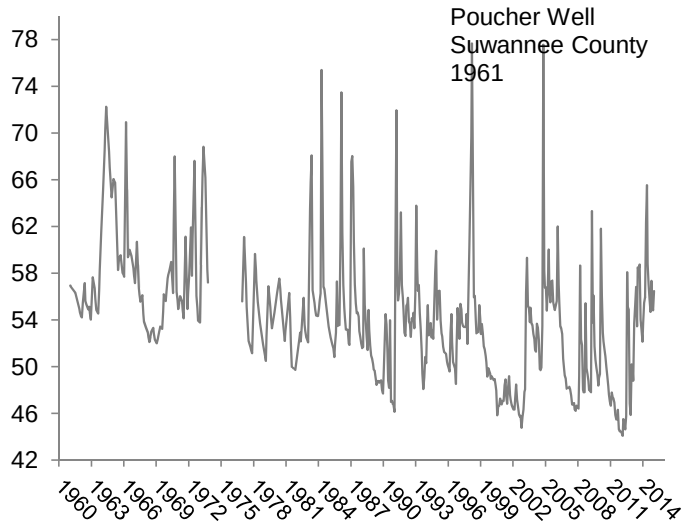
Percentile of Most Recent Water Level Relative to Entire Record

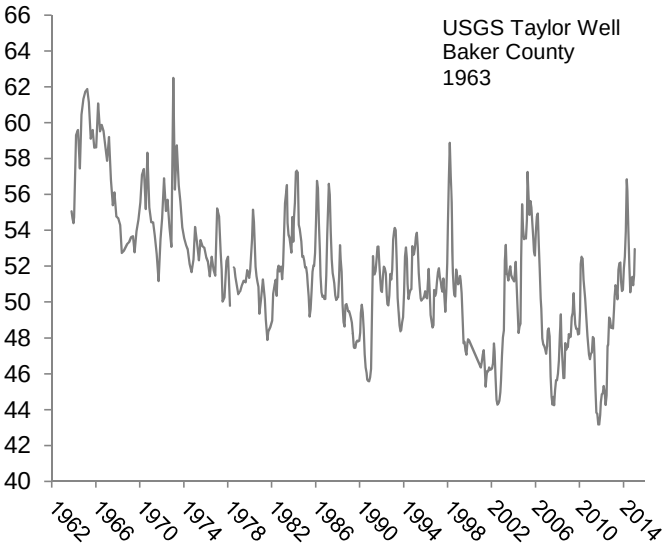
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

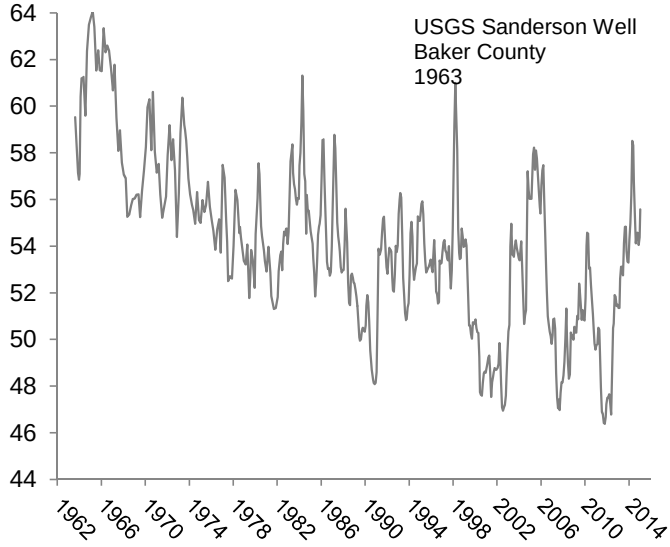
Figure 12b: Regional Long Term Upper Floridan Levels

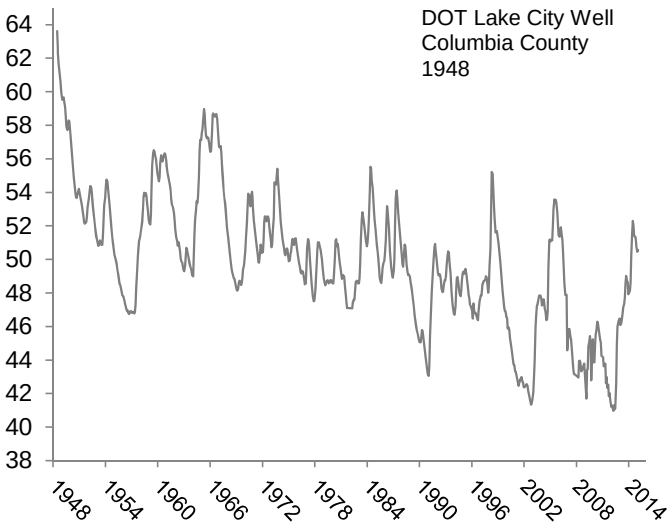
January 2015

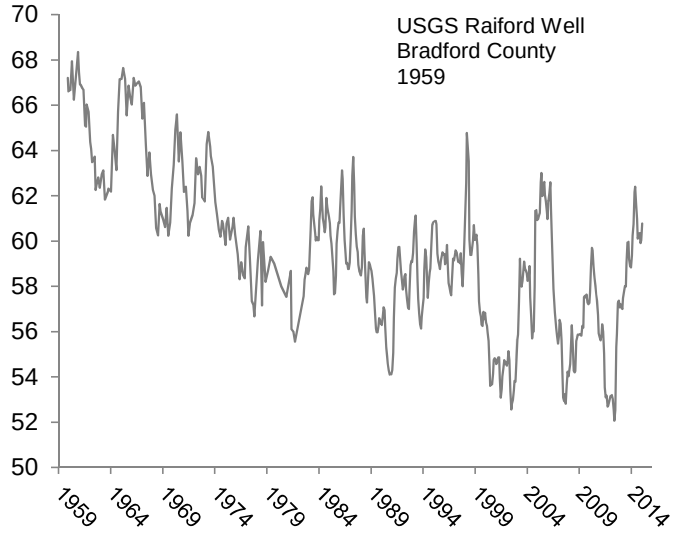












Upper Floridan Aquifer Elevation above NGVD 1929, Feet