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: April 9, 2015

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

RAINFALL

- District-wide rainfall in March was 2.10", slightly less than half of the long-term monthly average rainfall of 4.53". Overall, only Jefferson and Hamilton counties approached 2.5" during the month, while coastal counties received about a third of the normal March rainfall (Table 1, Figure 1). Small, scattered locales received as high as monthly average amounts—along the state line in Jefferson and Madison counties and on the Hamilton-Suwannee county boundary—and rainfall patterns appeared more characteristic of summer-type rains than that of early spring (Figure 2). Rainfall totals in the Suwannee River basin in Georgia were below normal except near the Florida-Georgia line (Figure 3).
- The highest gaged monthly total (4.60") was recorded at the Sneads Smokehouse Lake rainfall gage in northern Jefferson County, and the highest daily total (2.20" on March 12) was also recorded there. The lowest gaged monthly total was 1.13" at Hopewell Tower in southern Madison County.
- The total rainfall average across the District for the 12-month period ending March 31 was 53.7", compared to the long-term average of 54.6", leading to a current deficit of just under one inch. Twelve-month rainfall departures declined about 6 inches throughout the District, reflecting the relatively low March rainfall amounts. Only the Aucilla and Suwannee river basins maintain modest annual surpluses, while the Santa Fe and Waccasassa basins are 5-10 percent below average. Bradford County and coastal Dixie County continue to display the largest annual rainfall deficits, with one area in Bradford County almost 30 percent below average over the past year (Figure 4).
- Average District rainfall for the 3 months ending March 31 was about 2" below the long-term average of 12.1". The northern Aucilla River Basin displays the greatest surplus for the period, while the Santa Fe, Waccasassa and Lower Suwannee river basins are 3 to 6 inches below average (Figure 5).

SURFACEWATER

- **Rivers:** River level monitoring stations across the District began the month in the high (above the 75th percentile) or near-high ranges. Levels declined steadily thereafter through the month and all ended the March at or near average levels, with the exception of the Aucilla River at Lamont. Flooding conditions had dissipated at all National Weather Service forecast stations by month's end, and the lower Santa Fe River at Three Rivers Estates receded below the No Wake elevation of 17 feet on March 23rd. Flow statistics for major river stations are presented graphically in Figure 6, and river level conditions relative to historic conditions are provided in Figure 7.
- **Lakes**: Most monitored lake levels across the District receded slightly during March. Cherry Lake in northern Madison County did rise three inches to 153.25 feet, and both it and Andrews Lake in northern Taylor County remain near the top of their fluctuation ranges. Lake Crosby remains slightly below average, and other lakes in the eastern

portion of the District have declined to near average levels. Figure 8 shows lake levels relative to their respective long-term average, minimum, and maximum levels.

- **Springs**: Eleven springs or spring groups were measured by the USGS, District staff, and District contractors in March. Many springs along the Withlacoochee and Suwannee rivers came out of backwater conditions during the month and began flowing out for the first time in several months. Flow records for several major springs are provided in Figure 9.

GROUNDWATER

Levels in upper Floridan aquifer monitor wells, on average, ended the month approximately where they began, at the 86th percentile. Despite the monthly rainfall deficit, typical lag time in the rainfall-recharge relationship helped the aquifer maintain its level. The area of high aquifer levels (those above the 75th percentile) continued to shrink in the Gilchrist and Alachua counties and along the coast in Levy and Taylor counties, and extended inland in the Steinhatchee Basin (Figure 10). Two monitor wells are now below their respective median levels, while 77 percent remained in the high category. Statistics for a representative sample of wells are shown in Figure 11, and statistics for a number of regional long-term wells are provided 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 April 4 indicated near-normal conditions in north Florida and south Georgia.
- The National Weather Service Climate Prediction Center (CPC) is projecting higher than normal rainfall potential in the southeastern United States, including Florida, for the April through July projection window, but normal rainfall conditions thereafter. Weak El Niño conditions are currently in place. 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. Increased rainfall impacts during summer months are mitigated by the suppressing effect the El Nino phenomenon has on tropical storm generation.
- The U.S. Drought Monitor report of March 31 showed continued normal conditions across the District and in the contributing drainage areas of southeast Georgia. Abnormally dry conditions are beginning to extend east from the Florida Panhandle.

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	March 2015	March Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	2.25	4.21	53%	54.88	108%
Baker	1.86	4.36	43%	57.04	114%
Bradford	2.01	4.29	47%	48.43	95%
Columbia	2.17	4.62	47%	60.61	118%
Dixie	1.72	4.79	36%	55.51	94%
Gilchrist	1.95	4.84	40%	58.67	102%
Hamilton	2.41	5.17	46%	63.69	122%
Jefferson	2.47	5.80	43%	61.61	102%
Lafayette	2.11	5.03	42%	62.42	110%
Levy	1.81	5.03	36%	57.75	97%
Madison	2.27	5.72	40%	60.99	108%
Suwannee	2.38	5.17	46%	63.74	120%
Taylor	1.80	5.34	34%	62.07	104%
Union	2.23	4.85	46%	55.88	103%

March 2015 Average:	2.10
March Average (1932-2013):	4.53
Historical 12-month Average (1932-2013):	54.63
Past 12-Month Total:	53.74
12-Month Rainfall Surplus:	-0.89

Figure 1: Comparison of District Monthly Rainfall

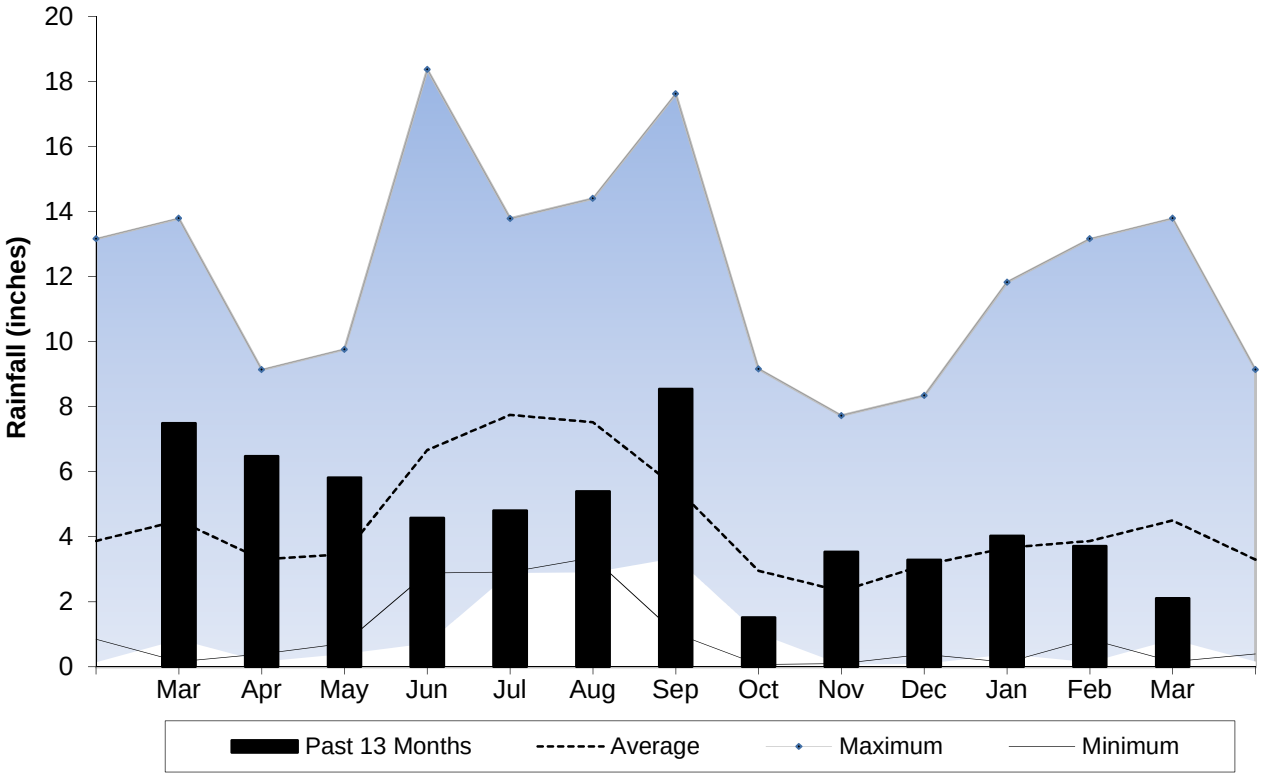


Figure 2: March 2015 Rainfall Estimate

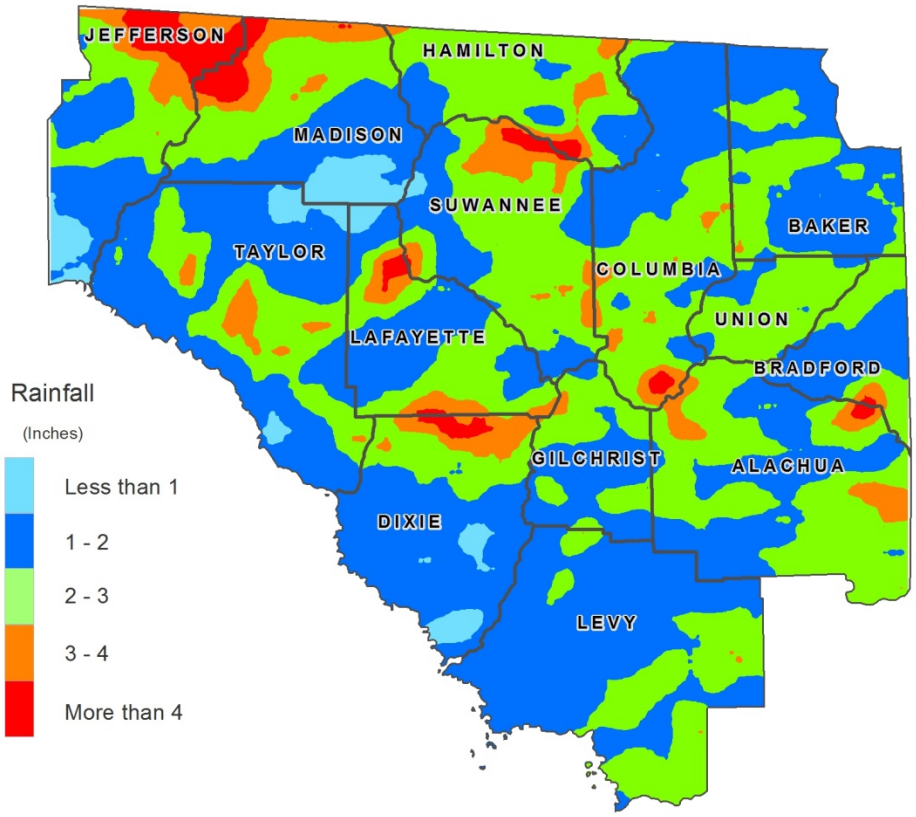


Figure 3: March 2015 Percent of Normal Rainfall

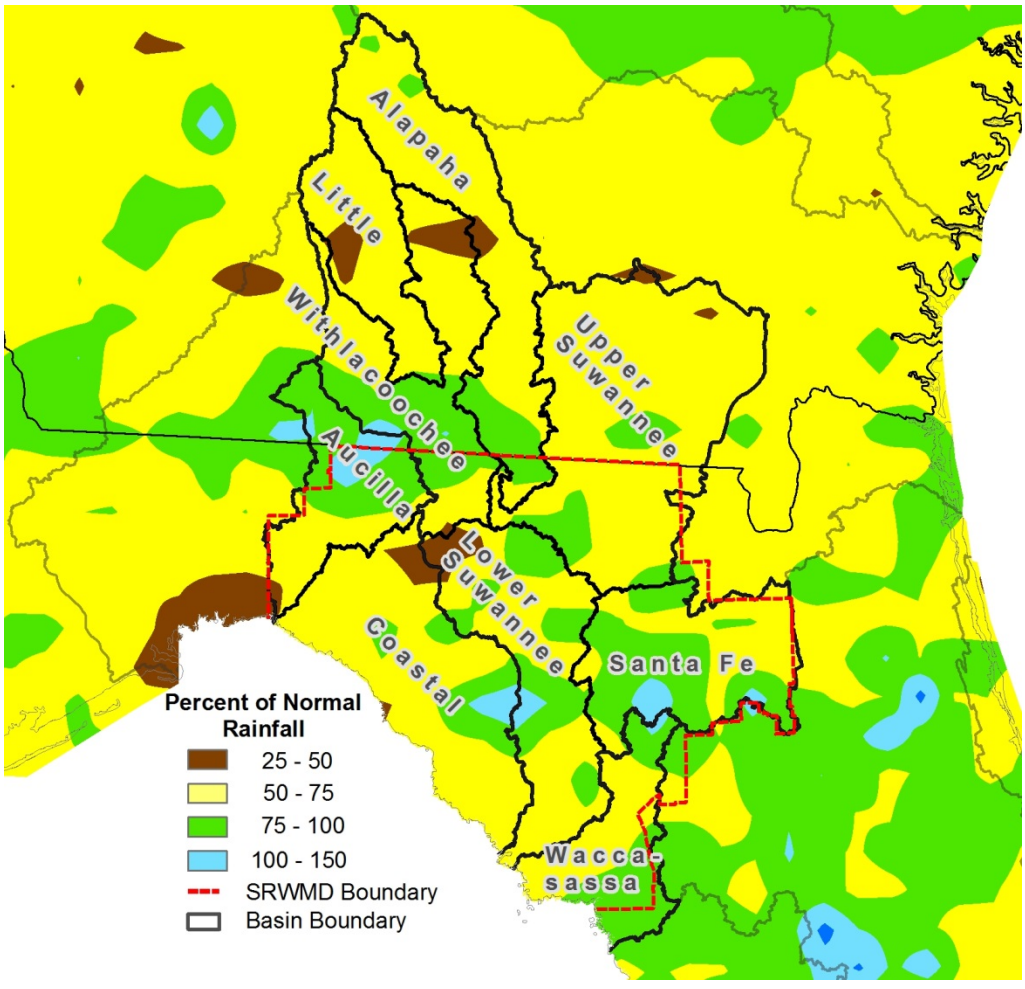


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through March 31, 2015

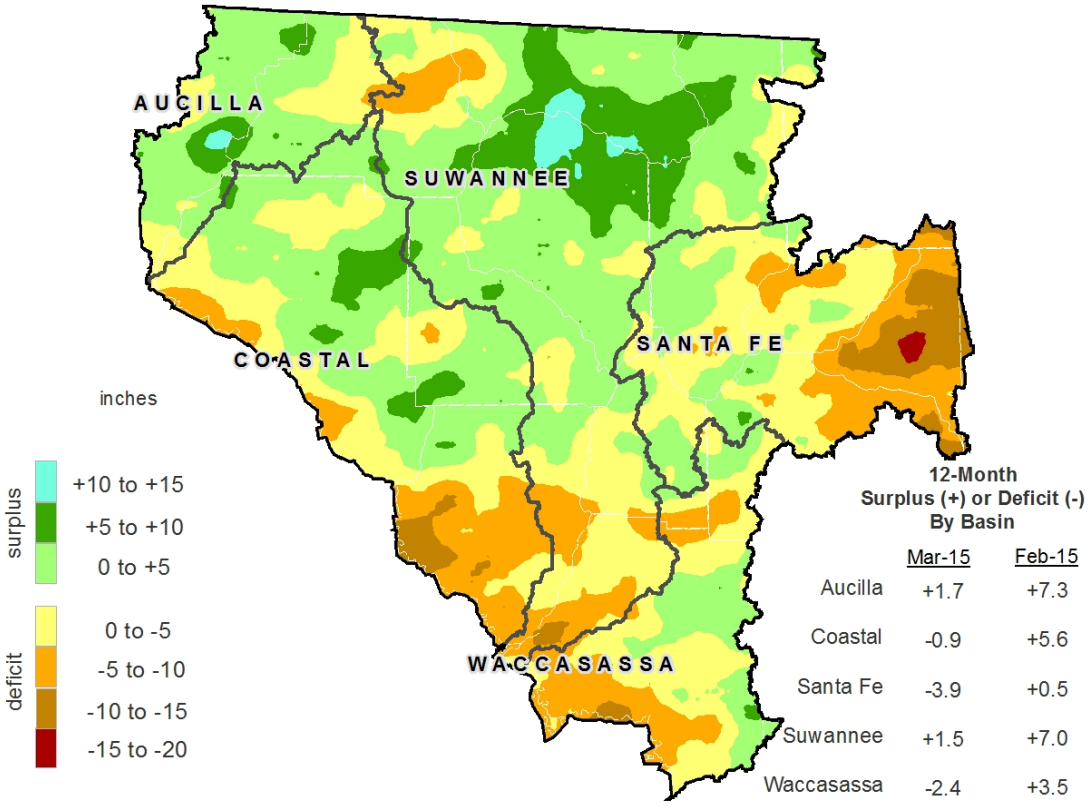


Figure 5: 3-Month Rainfall Surplus/Deficit by River Basin
Through March 31, 2015

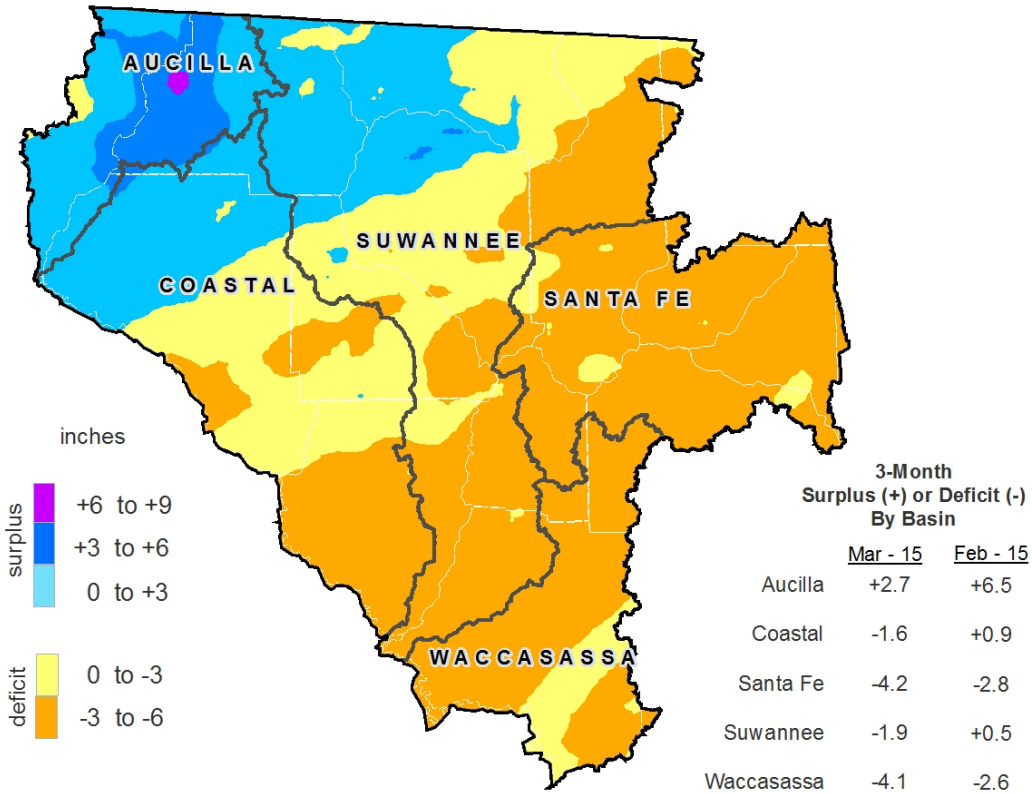
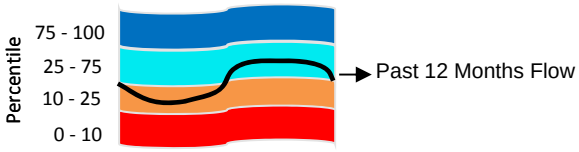
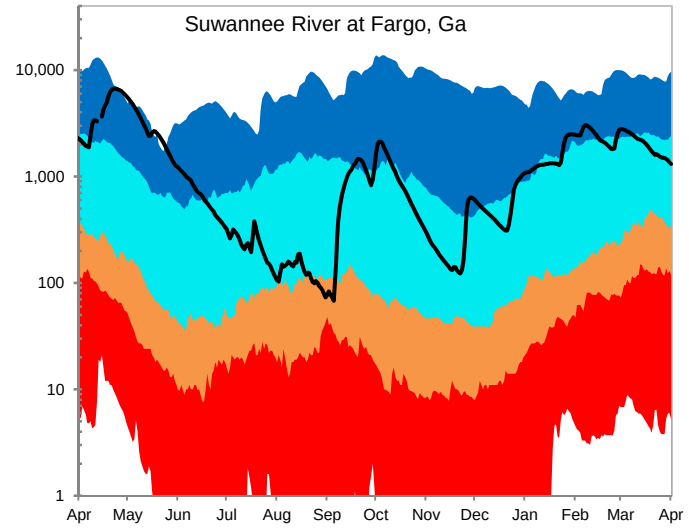
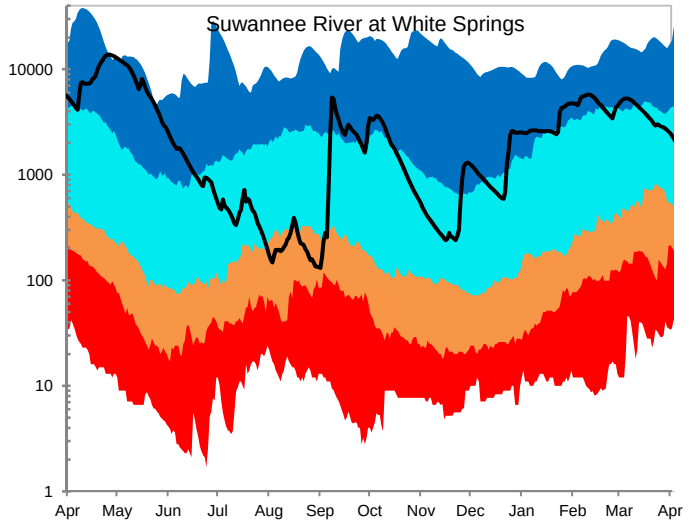


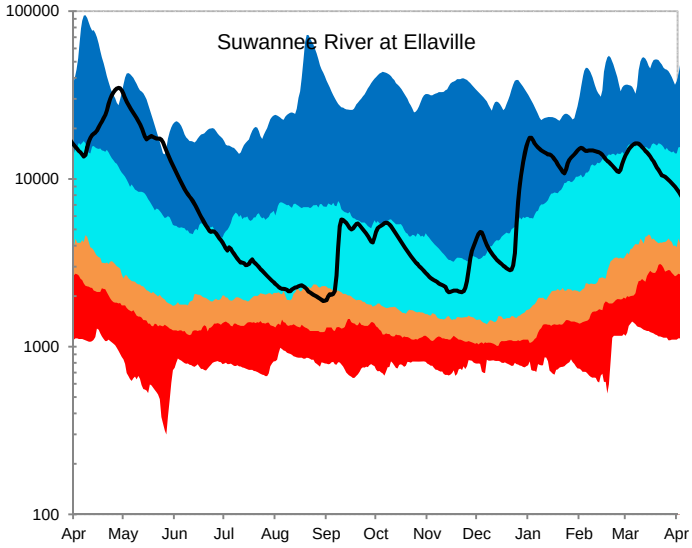
Figure 6: Daily River Flow Statistics
April 1, 2014 through March 31, 2015

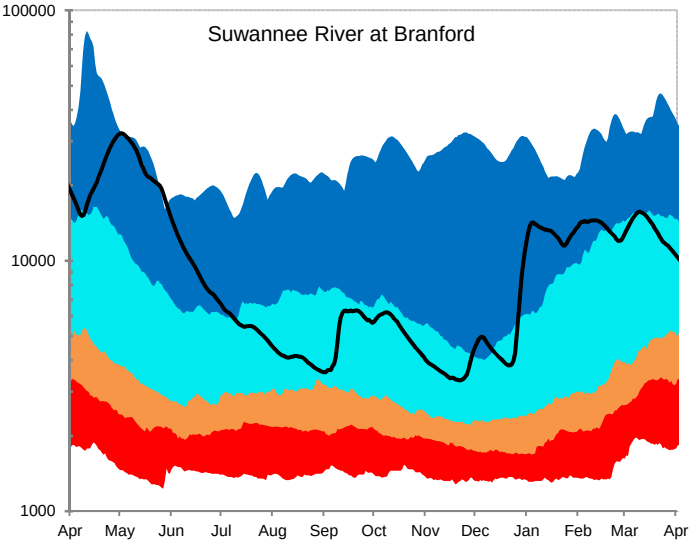


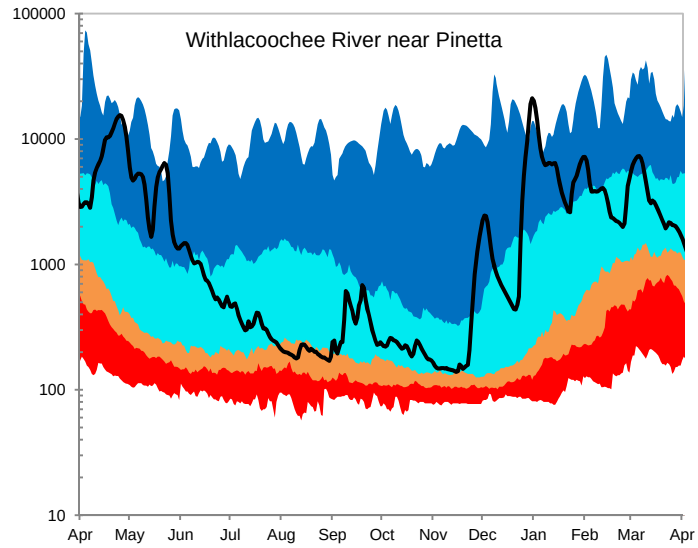
RIVER FLOW, CUBIC FEET PER SECOND











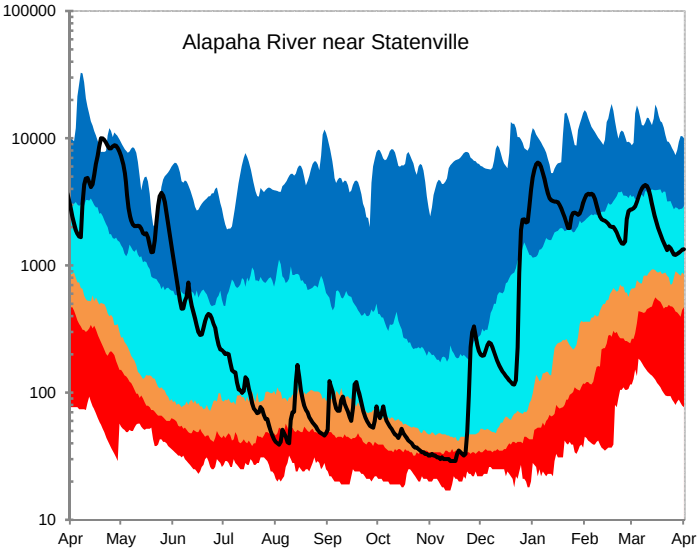
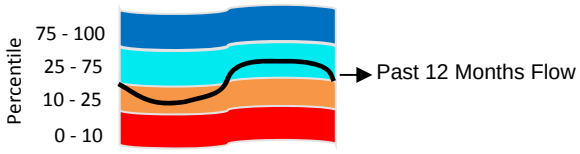
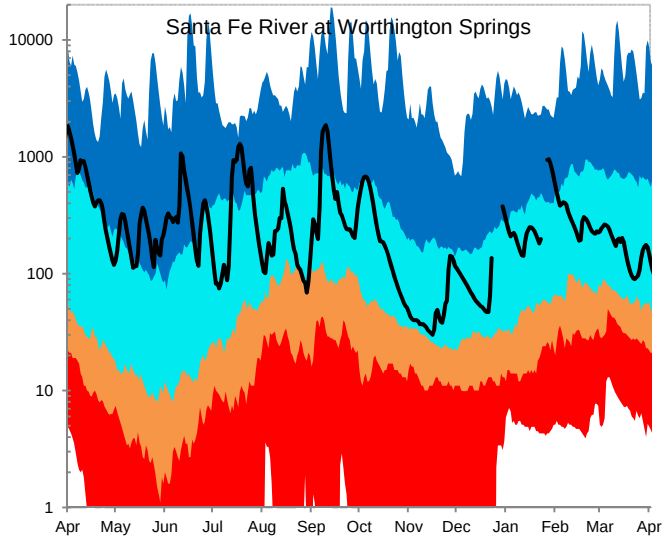
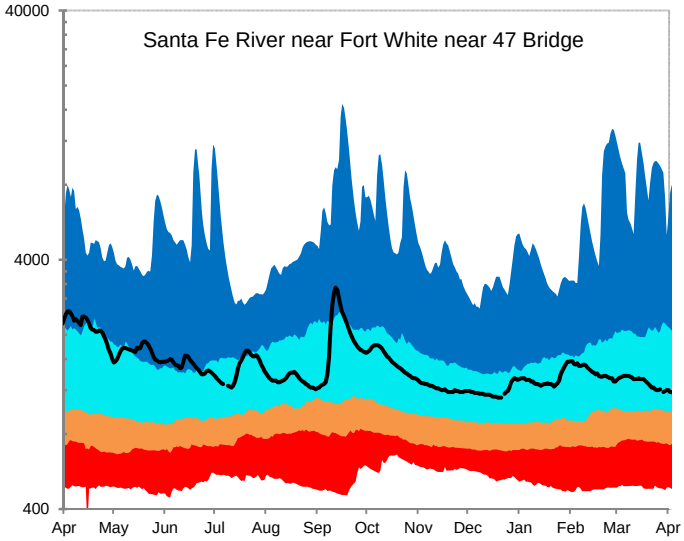


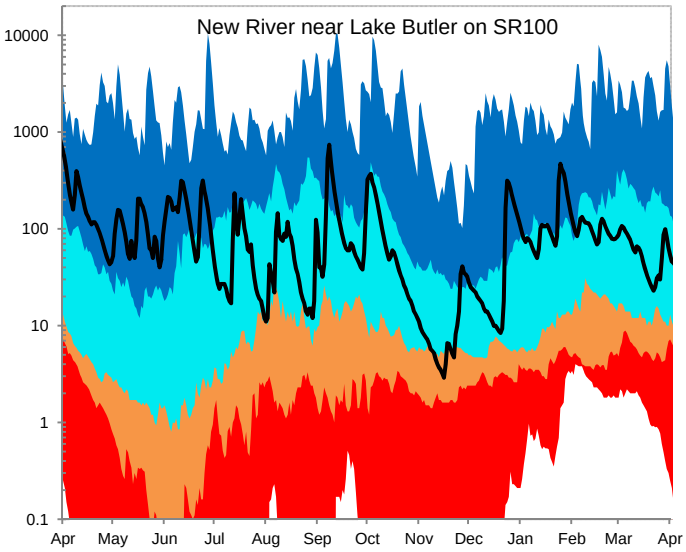
Figure 6, cont: Daily River Flow Statistics
April 1, 2014 through March 31, 2015

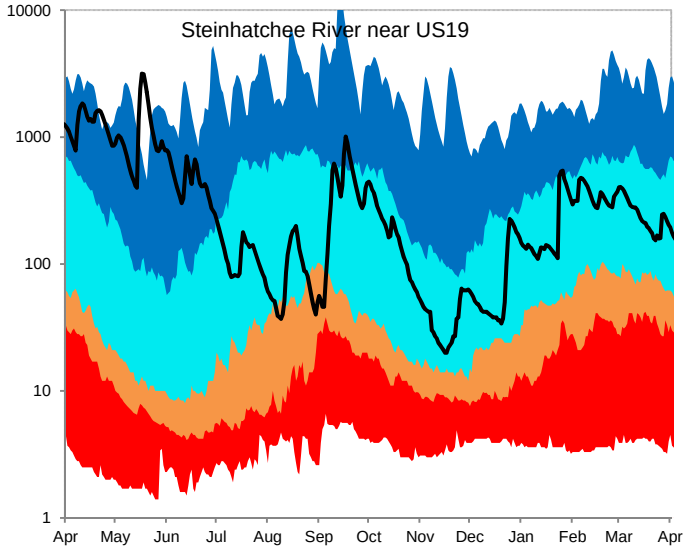


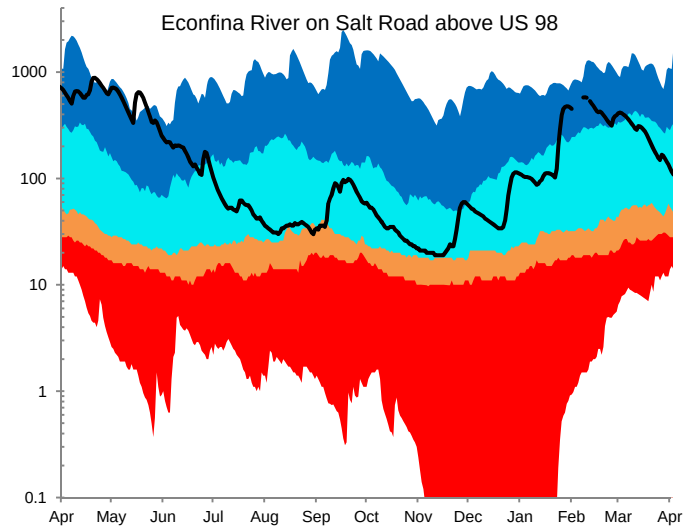
RIVER FLOW, CUBIC FEET PER SECOND

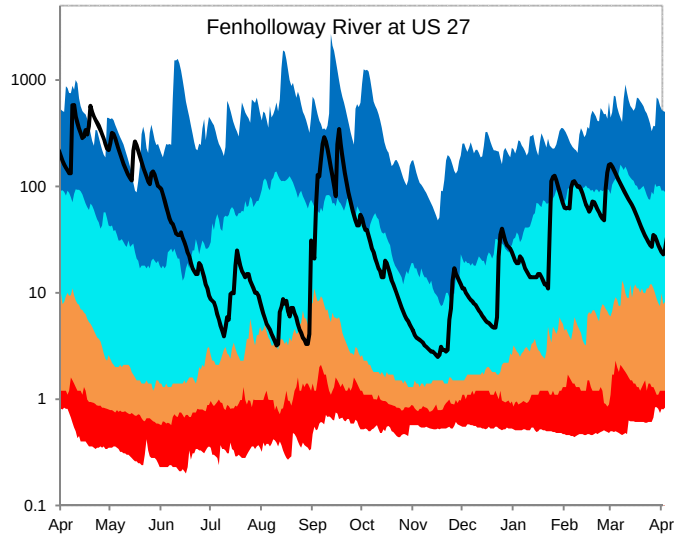












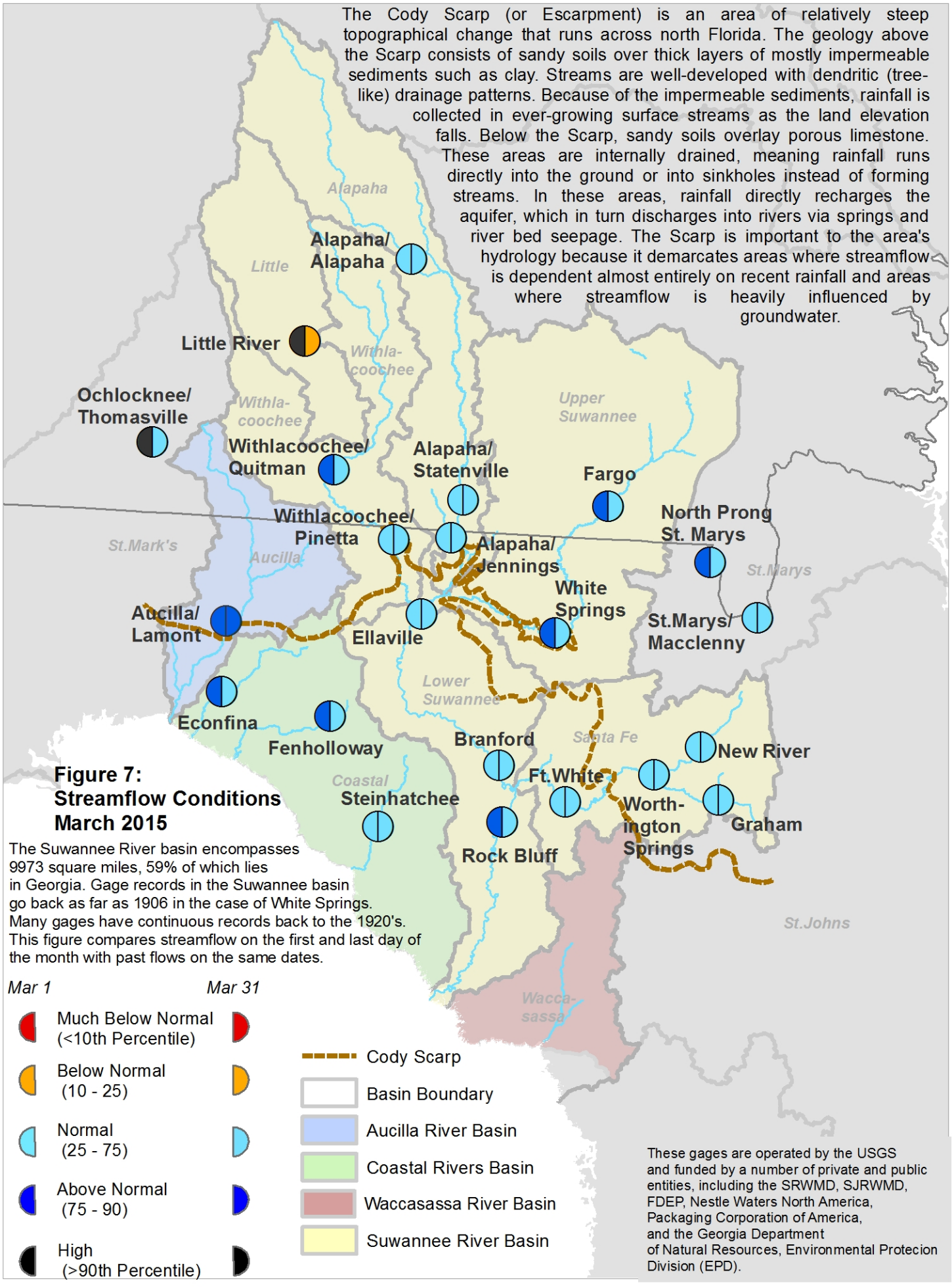
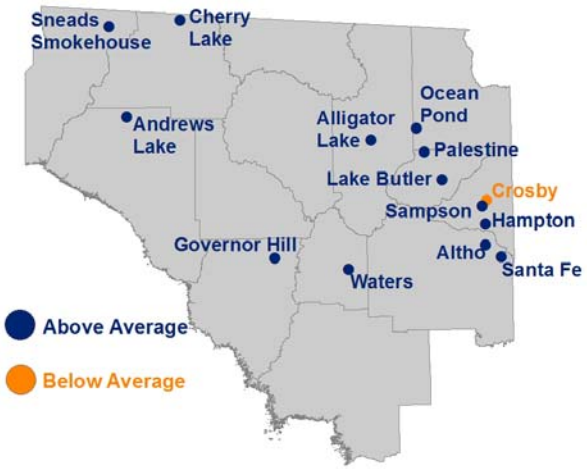

The Cody Scarp (or Escarpment) is an area of relatively steep topographical change that runs across north Florida. The geology above the Scarp consists of sandy soils over thick layers of mostly impermeable sediments such as clay. Streams are well-developed with dendritic (tree-like) drainage patterns. 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
North Prong St. Marys
Withlacoochee/ Pinetta
Alapaha/ Jennings
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
March 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.
Mar 1
Mar 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: March 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 monitoring records begin in the 1970s, although the Sampson Lake record starts in 1957.

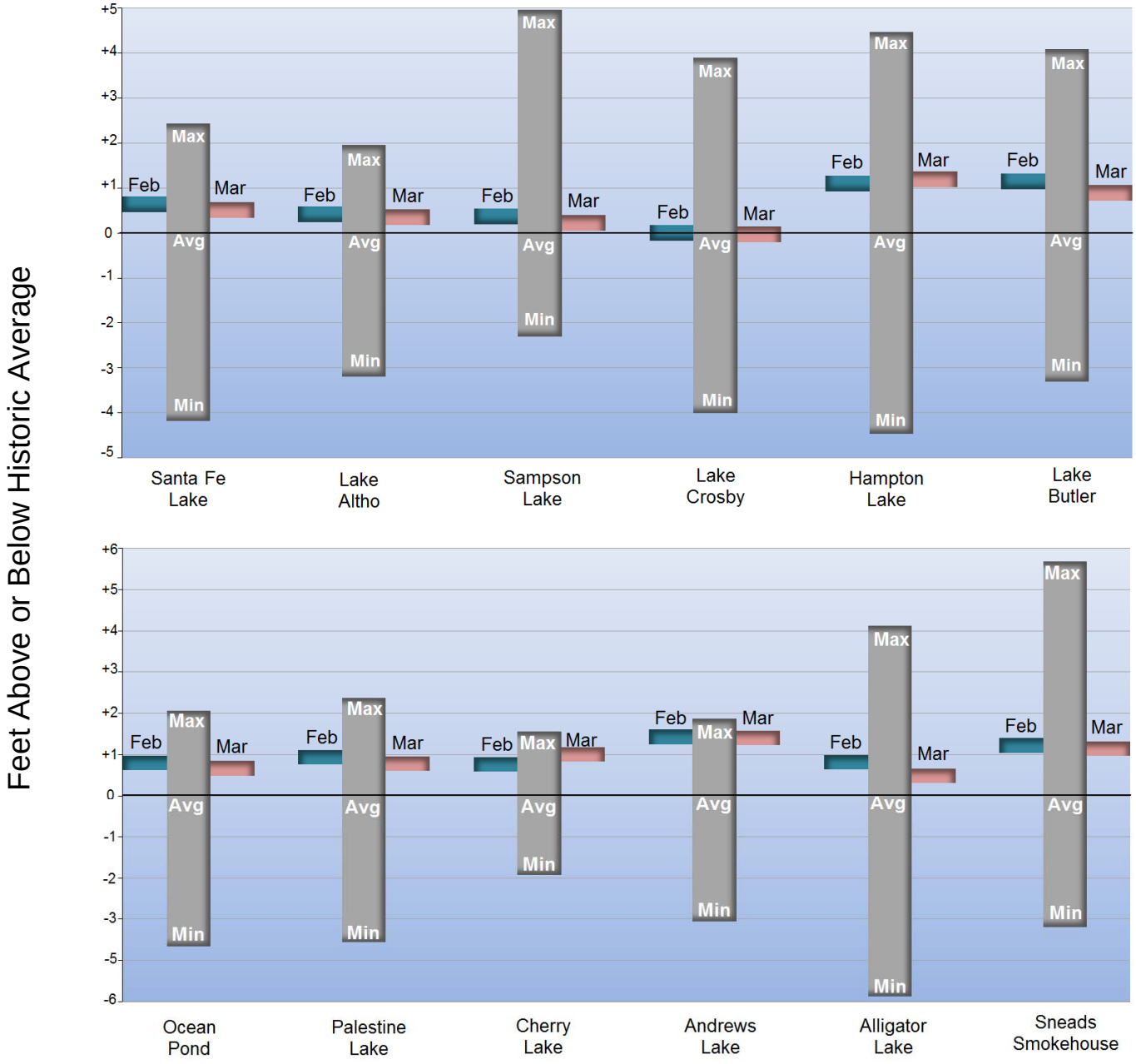


Figure 9: Monthly Springflow Measurements

The SRWMD monitors water quality at 38 springs. Flow is usually measured at the time of the sampling. The springs below were measured in March 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 receiving water body, some low flows in this data are the result of flooding and not necessarily drought conditions.

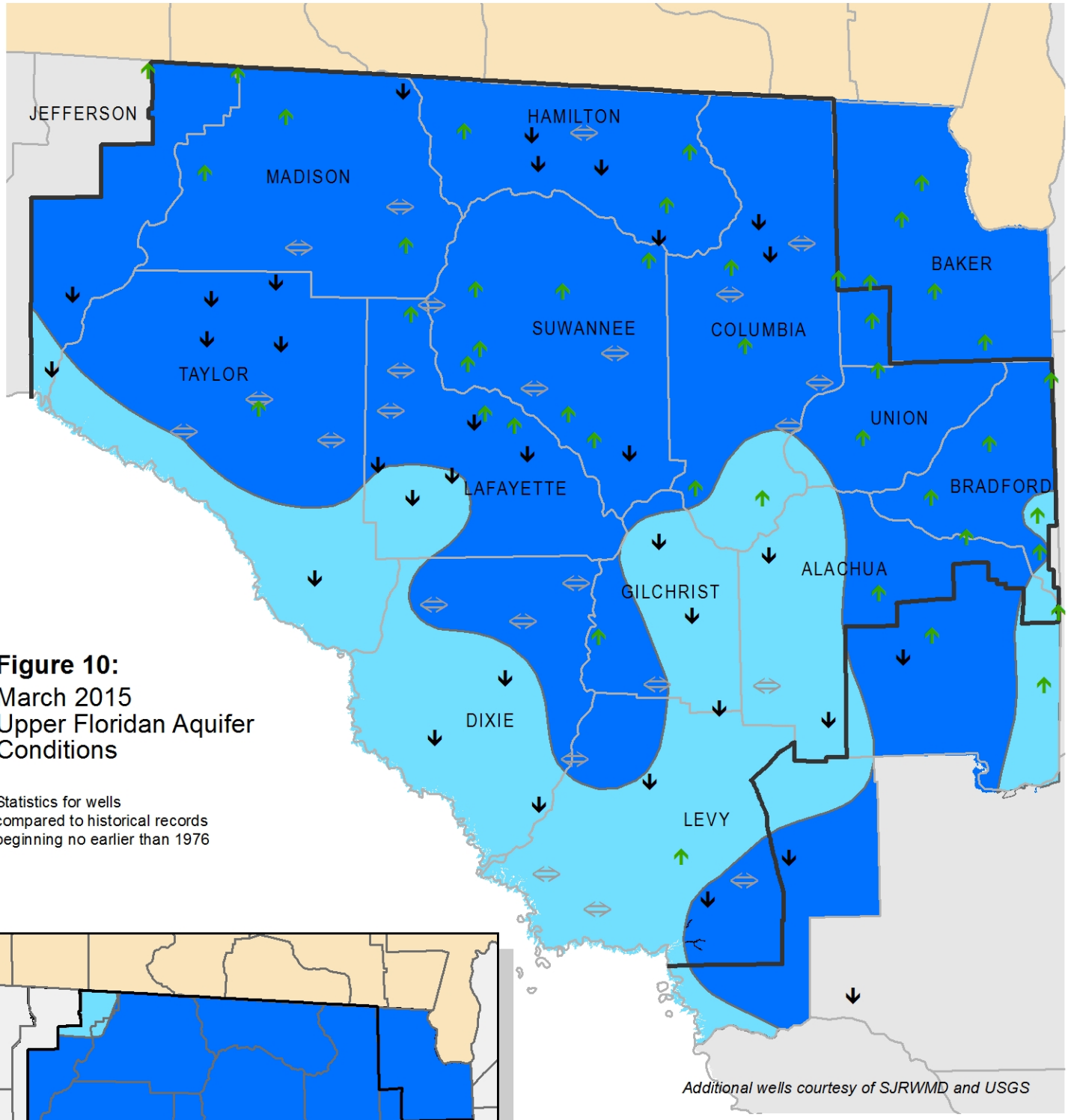
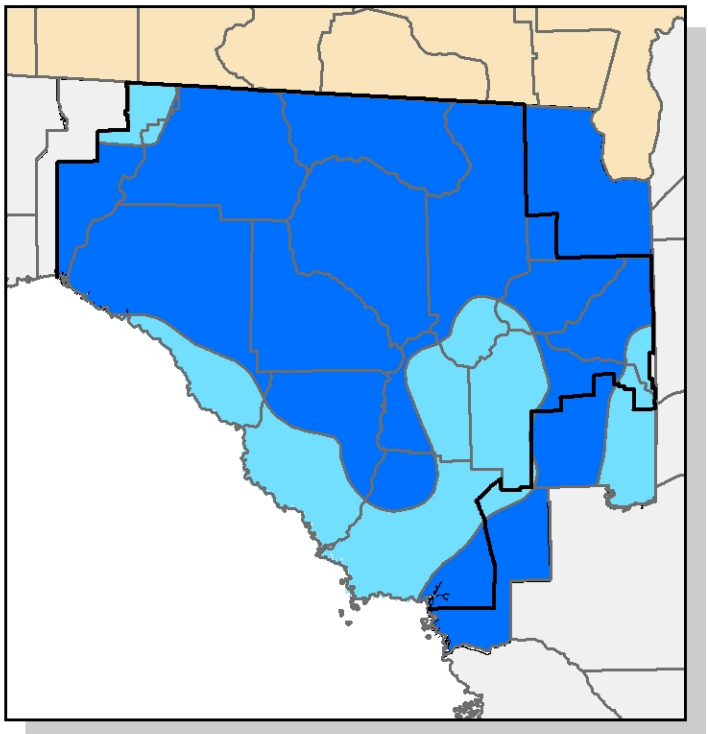


Figure 10:
March 2015
Upper Floridan Aquifer
Conditions

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



Inset: February 2015 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

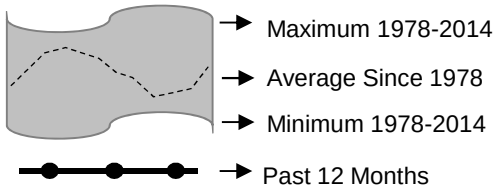
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

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

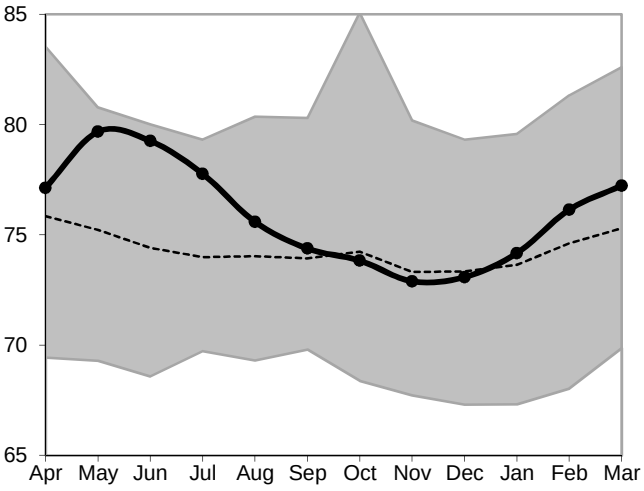
District Boundary

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

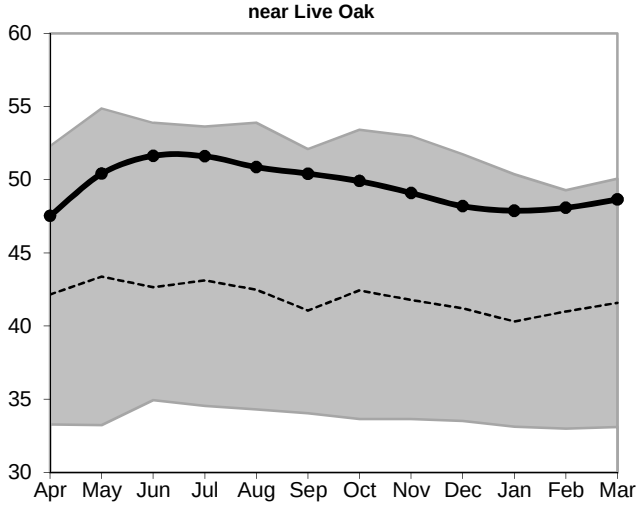


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

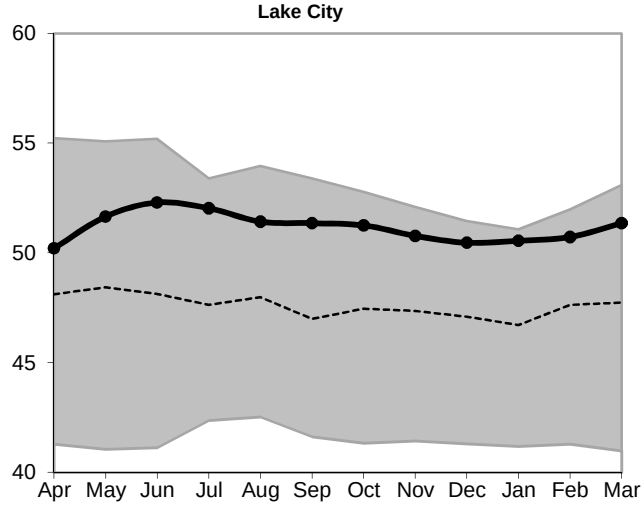
Madison County N010719001
near Greenville



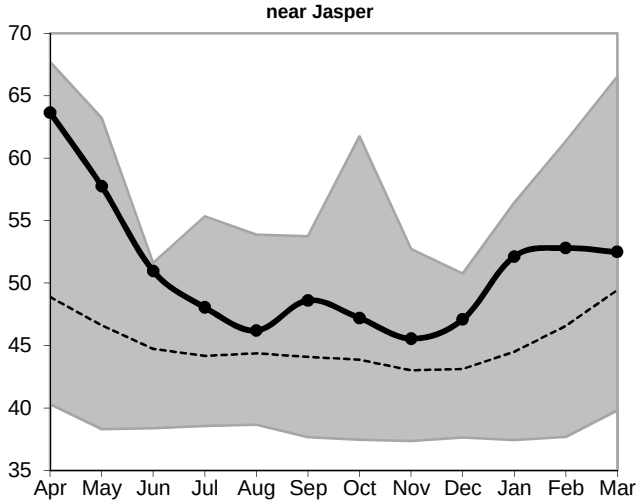
Suwannee County S021335001
near Live Oak



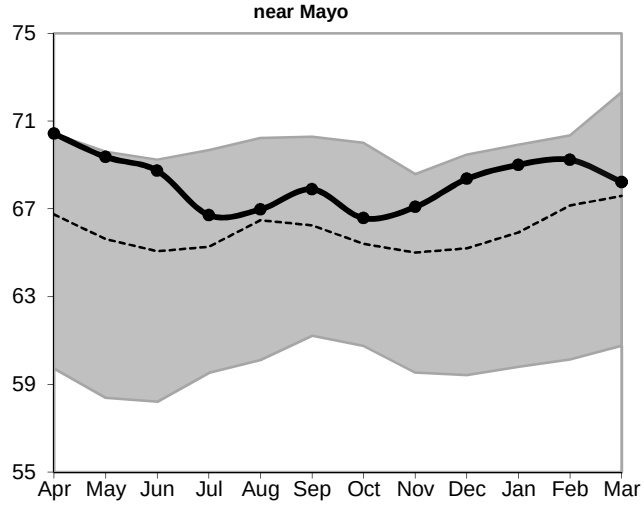
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

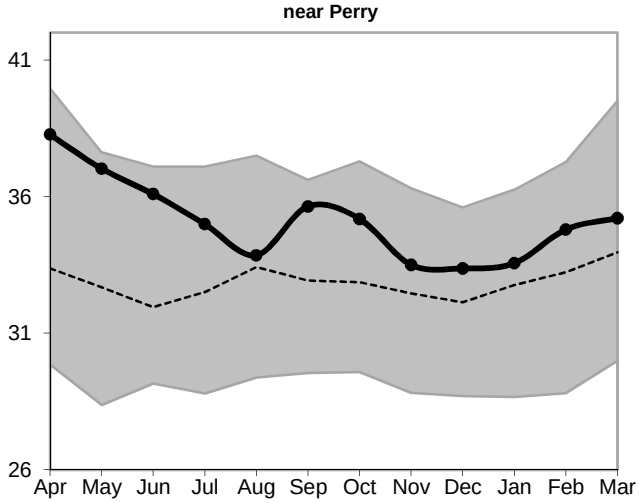
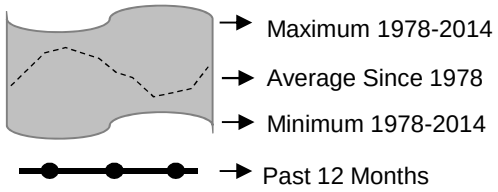
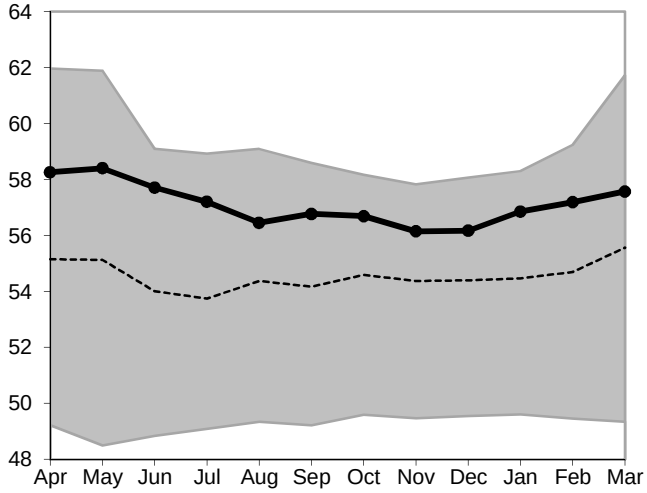


Figure 11, cont.: Groundwater Level Statistics
Levels April 1, 2014 through March 31, 2015
Period of Record Beginning 1978

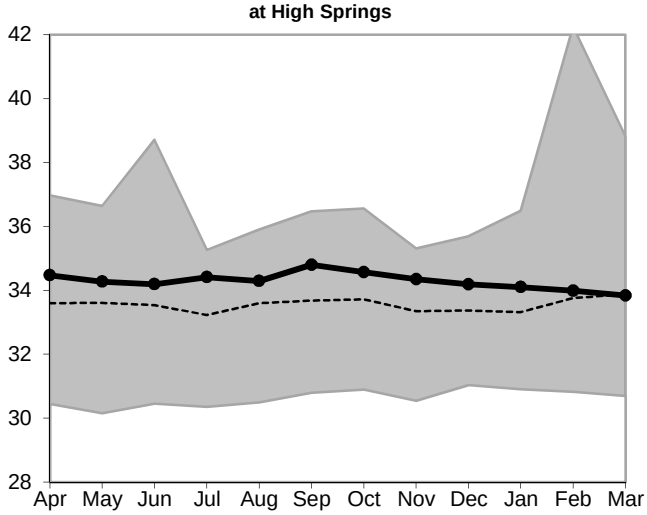


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

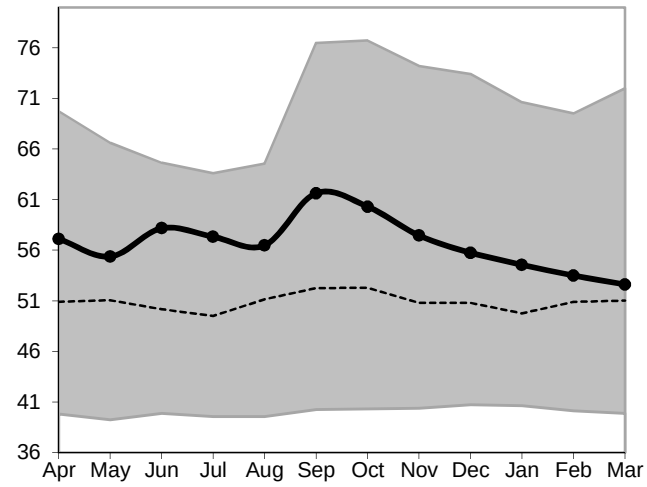
Union County S051933001
near Lake Butler



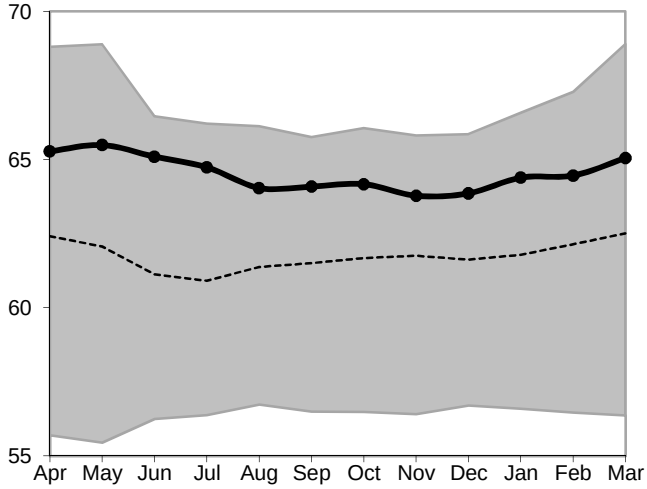
Alachua County S081703001
at High Springs



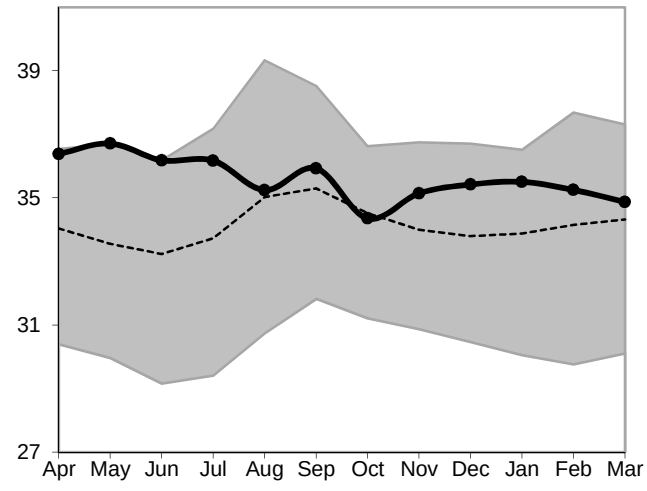
Gilchrist County S091607001
near Trenton



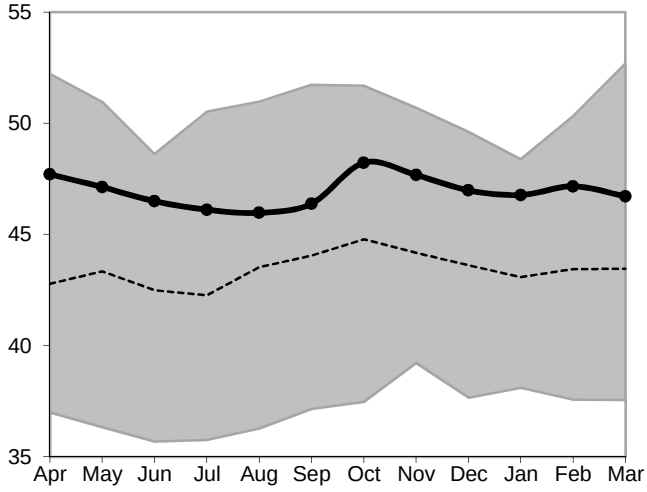
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



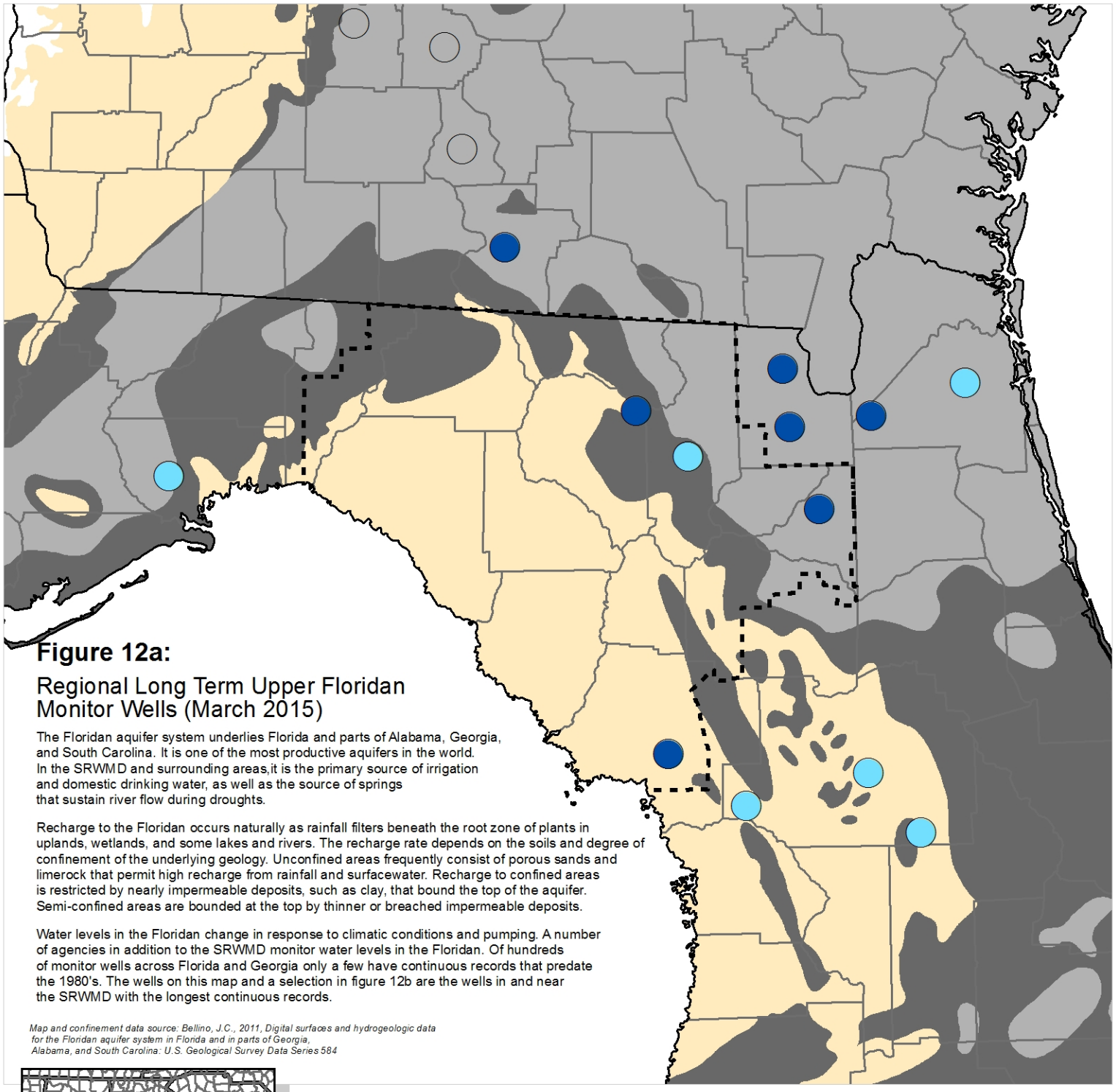


Figure 12a:

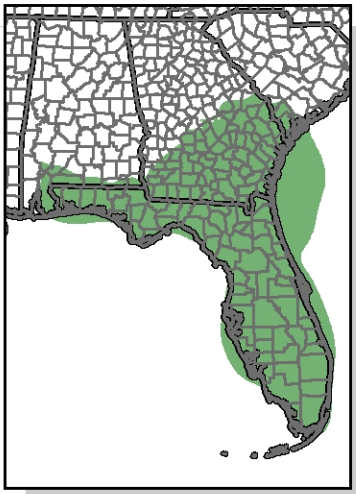
Regional Long Term Upper Floridan Monitor Wells (March 2015)

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