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: June 5, 2014

RE: May 2014 Hydrologic Conditions Report for the District

RAINFALL

- District-wide rainfall in May was 5.81", which is 168% of normal May rainfall based on records beginning in 1932 (Table 1, Figure 1). May was the 5th straight month of above-average rainfall this year. Up to 12" fell around the Lafayette/Dixie county line and in southeastern Alachua County. Accumulations were mostly above normal across the District, although parts of Jefferson County and coastal Dixie and Levy counties were much below normal. Totals were much above normal over the Suwannee River's Georgia tributaries (Figure 3).
- The highest gaged monthly total was 11.1" at the Roberts Grade gage in Mallory Swamp (southern Lafayette County). This gage also reported the highest 24-hour total with 8.33", a storm with a 4% chance of being exceeded in any year (also known as a 25-year storm). The lowest gaged monthly total was 2" at Wacissa Tower in Jefferson County.
- Average rainfall for the 12 months ending May 31 was 15.3" higher than the long-term average of 54.63" (Figure 4), the highest annual surplus since 2005 (Figure 5). Average rainfall for the 3 months ending April 30 was 8.5" higher than the long-term average of 11.3".
- The last major drought ended in May 2012. In the succeeding two years, parts of Taylor, Lafayette, and Suwannee counties have received nearly an extra year's rainfall. Most of the rest of the District has seen at least normal rainfall, with isolated areas that remain below normal (Figure 6). Overall, rainfall has been 20% higher than normal in the last two years, amounting to about 21" above average, the highest such total since 1998 (Figure 7).

SURFACEWATER

- **Rivers:**
  - Middle and lower Suwannee gages crested early in May, after above-average rainfall in April caused minor-to-moderate flooding on the upper Suwannee and Alapaha rivers. Suwannee levels fell steadily until flooding rains on the 14th and 15th in Suwannee and Hamilton counties caused minor rises at Suwannee Springs and White Springs. Levels continued to fall at downstream gages, but at a much slower rate. Branford was falling at 6" per day before the additional rainfall, then slowed to an inch a day. By the end of the month, all Suwannee gages were below flood stage.
  - Upper Santa Fe River gages and gages upstream of Fort White on the lower Santa Fe remained in a range considered normal to above-normal. High water on the Suwannee, however, kept levels on the lower Santa Fe well above flood stage. This is known as a backwater flood, where a downstream waterbody (in this case the Suwannee) keeps a contributing stream from flowing freely, causing it to rise even though its upstream conditions are not conducive to flooding. On June 2, the Santa Fe River at Three Rivers Estates fell below flood stage after 73 consecutive days above it, exceeding the durations seen in 2004 after back-to-back hurricanes (60 days) and 2005 after spring flooding (50 days).

- The May 15th storms caused the Steinhatchee River to rise nearly 3' above flood stage, the highest crest since August 2013 and the ninth time in two years that the river has reached flood stage.
- Flow statistics for a number of rivers are presented graphically in Figure 8, and conditions relative to historic conditions in Figure 9. Figure 10 contains a summary of the highest flood categories reached by area rivers in May.

- **Springs**: Troy Springs, Lafayette Blue Springs, Madison Blue Springs, Manatee Springs, and Fanning Springs remained closed to swimming and diving due to inundation from river water. The USGS reported that the measured flow at the Alapaha Rise was 790 MGD (million gallons per day) on May 2. This was the highest measurement since record-keeping began there in 1975. Madison Blue Springs was measured flowing at 188 MGD, the second-highest flow recorded there. Poe Springs was measured at 36 MGD, about 20% higher than its long-term median. The level of the Suwannee River dropped enough for White Sulphur Springs to begin flowing out into the river after more than 4 months of receiving water due to high river levels. The measured flow on May 27 was 28 MGD. The spring flow was still brown after four months of tannic river water inflow. Statistics for White Springs and others are shown in Figure 11.

- **Lakes**: Levels at most monitored lakes fell in May, with the exception of Andrews Lake in northern Taylor County which rose to its highest level since 2005. Cherry Lake, Sneads Smokehouse, Sampson Lake, and Crosby Lake fell below their long-term average levels. Figure 12 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.

GROUNDWATER

Upper Floridan aquifer levels generally peaked in May after three months of steady improvement. Overall, levels remained near the 95th percentile based on records beginning no earlier than the 1970s (Figure 13). The last month when overall conditions were higher was April 2005, when levels peaked after the September 2004 hurricanes and a spring flood. Eighty-six percent of monitor wells were above the 75th percentile, considered high. Sixty-four percent were above the 90th percentile, considered very high. All the wells had levels higher than their long-term median. Five wells, all west of the Suwannee River in areas with 150% of normal rainfall in the last year, set new record high levels. Overall, conditions were considerably improved since May 2012, when aquifer levels reached a record low. Statistics for a representative sample of wells are shown in Figure 14, and statistics for a number of regional long-term wells are shown in Figure 15 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 May 31 indicated normal conditions in north Florida and southeast Georgia, with moist conditions in south central Georgia.
- The National Weather Service Climate Prediction Center (CPC) three-month outlook showed equal chances of above- or below-normal precipitation through August. The El Niño watch issued by the CPC in March remains in effect. Their June 6 report gives a 70% chance of El Niño in the summer and an 80% chance in the fall and winter. There is still uncertainty about the predicted strength of the El Niño, but most models slightly favor a moderate-strength event in the fall or winter. According to the National Weather Service, El Niño effects, including enhanced precipitation and severe weather in the southeast, are strongest in the

fall, winter, and spring. In the summer, El Niño can reduce the formation of tropical cyclones in the Atlantic by causing increased wind shear.

- The U.S. Drought Monitor report of June 3 showed no drought conditions in north Florida or south Georgia.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Water conservation is as important in wet times as in dry to sustain healthy flows in springs and rivers. All users are urged to eliminate unnecessary uses. Landscape irrigation is limited to twice per week during Daylight Savings Time (between March 9 and November 2, 2014) based on a water conservation rule that applies to residential landscaping, public or commercial recreation areas, and public and commercial businesses that aren't regulated by a District-issued permit. More information about the SRWMD's year-round lawn and landscape irrigation measures is available at www.mysuwanneeriver.com.

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

Table 1: Estimated Rainfall Totals (inches)

County	May 2014	May Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	6.21	2.27	274%	63.68	125%
Baker	5.47	1.89	290%	58.75	118%
Bradford	5.50	2.22	248%	54.63	108%
Columbia	6.63	3.21	207%	64.47	125%
Dixie	6.39	3.43	186%	73.71	125%
Gilchrist	7.08	3.36	211%	72.46	126%
Hamilton	5.19	3.16	164%	64.14	123%
Jefferson	3.41	5.88	58%	65.76	109%
Lafayette	7.81	3.33	235%	80.61	143%
Levy	4.91	2.67	184%	74.48	125%
Madison	5.30	4.73	112%	72.21	128%
Suwannee	6.78	3.24	209%	74.48	141%
Taylor	5.54	4.16	133%	79.87	134%
Union	6.11	2.21	277%	59.53	110%

May 2014 Average:	5.81
May Average (1932-2013):	3.46
Historical 12-month Average (1932-2013):	54.63
Past 12-Month Total:	69.91
12-Month Rainfall Surplus:	15.28

Figure 1: Comparison of District Monthly Rainfall

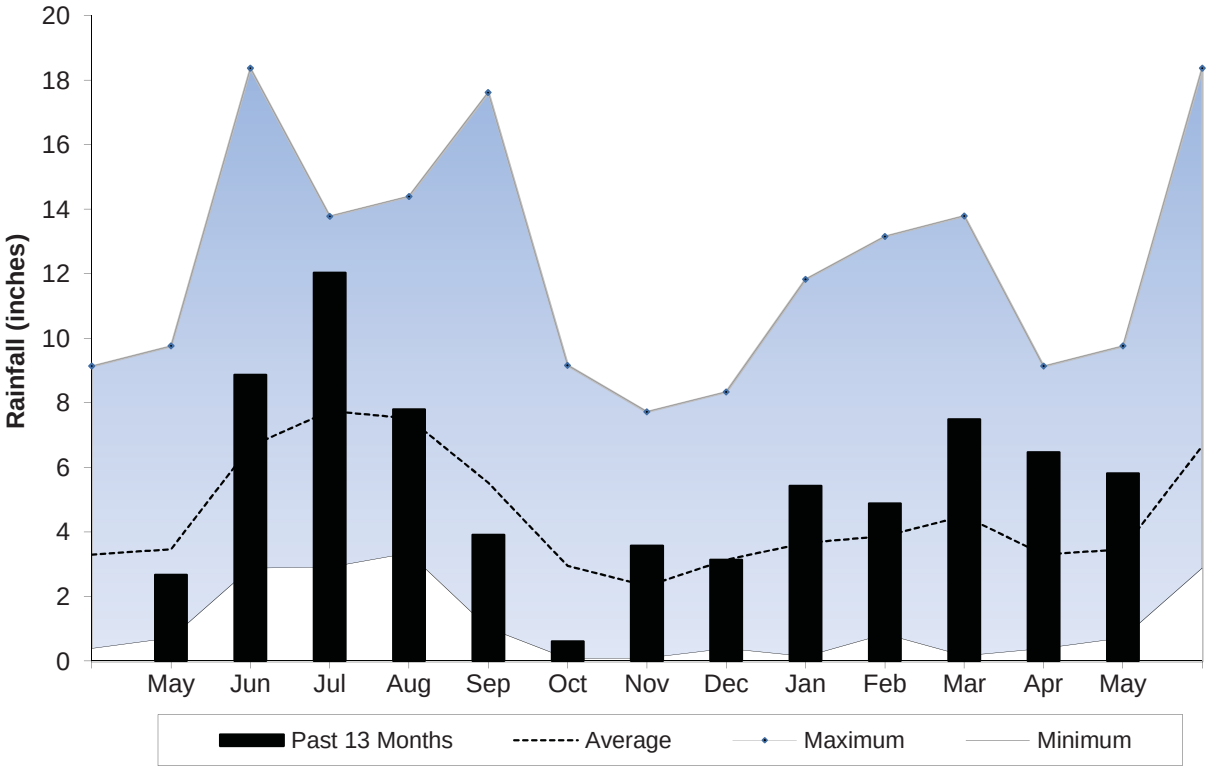


Figure 2: May 2014 Rainfall Estimate

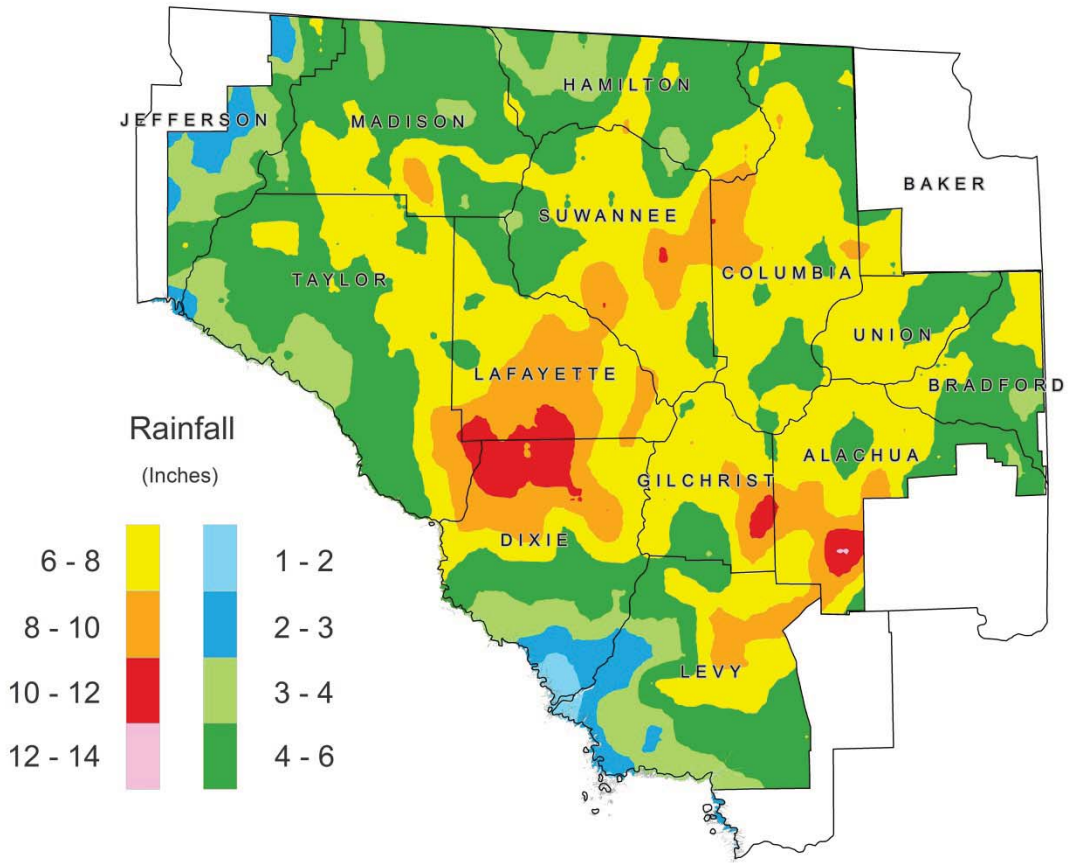


Figure 3: May 2014 Percent of Normal Rainfall

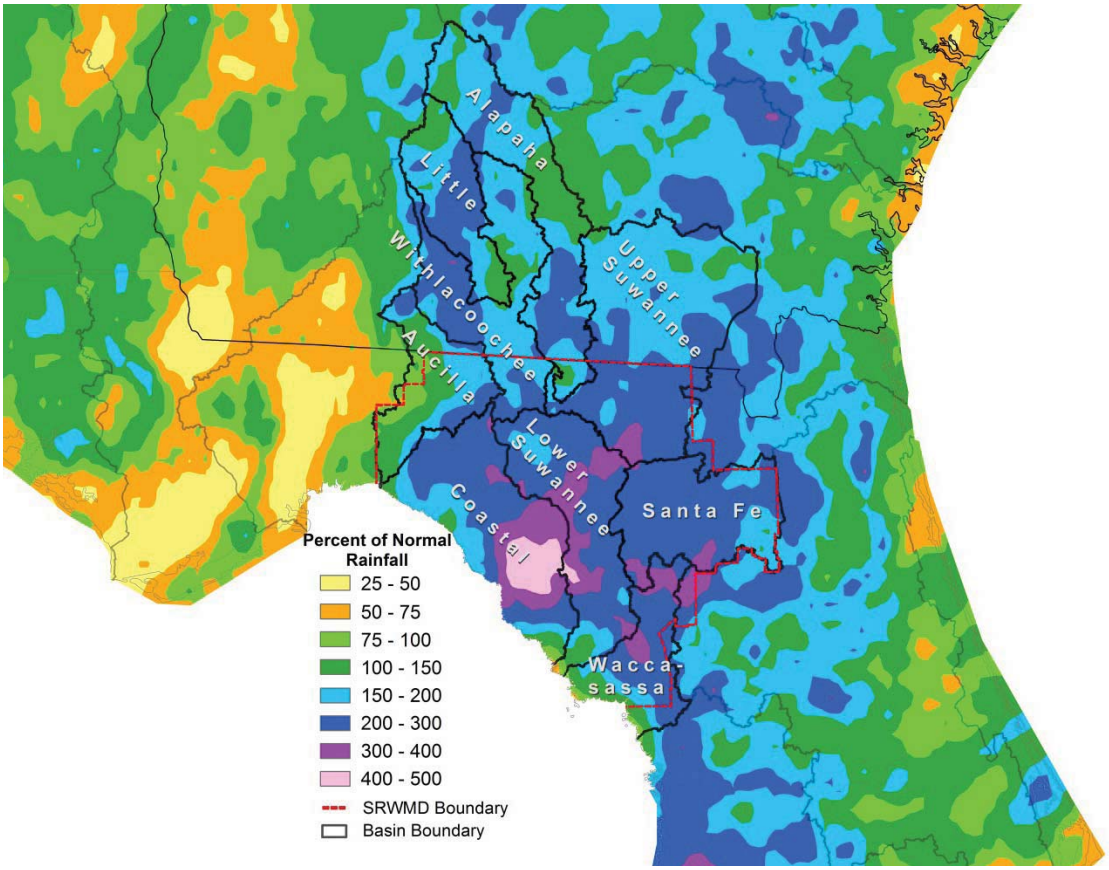


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through May 31, 2014

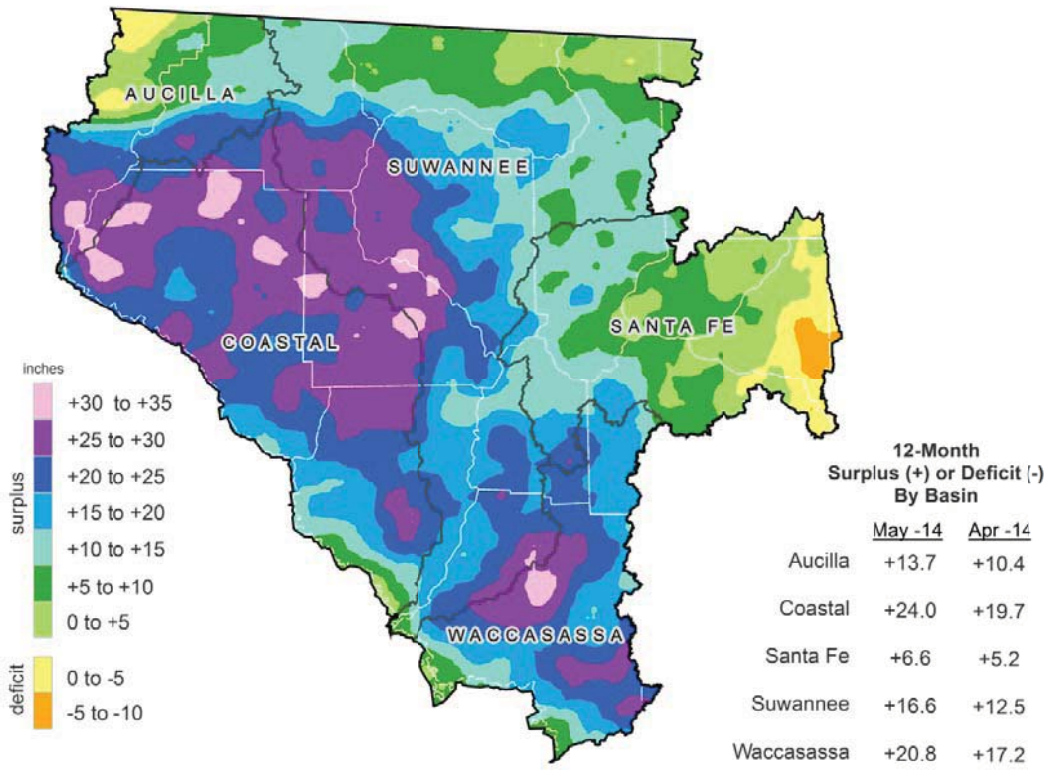


Figure 5: 12-Month Rolling Rainfall Surplus/Deficit
Through May 31, 2014

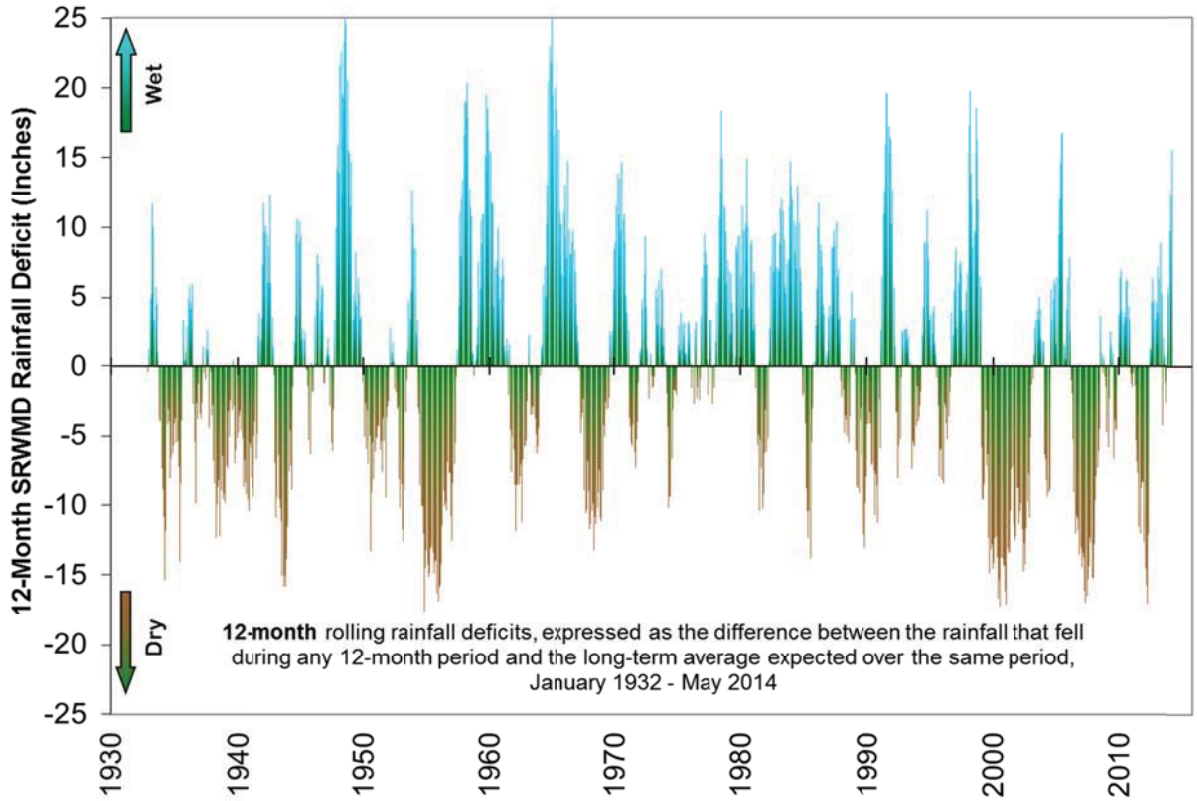


Figure 6: 24-Month Rainfall Surplus/Deficit by River Basin
Through May 31, 2014

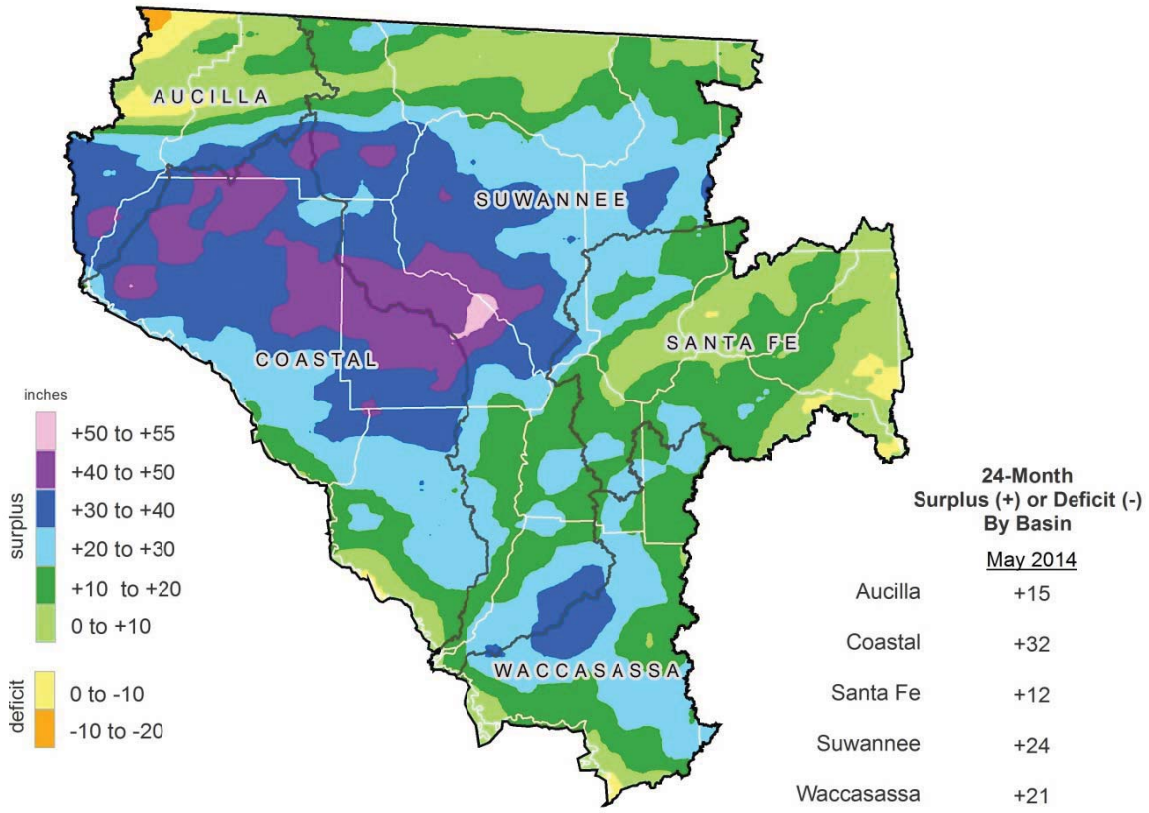


Figure 7: 24-Month Rolling Rainfall Surplus/Deficit
Through May 31, 2014

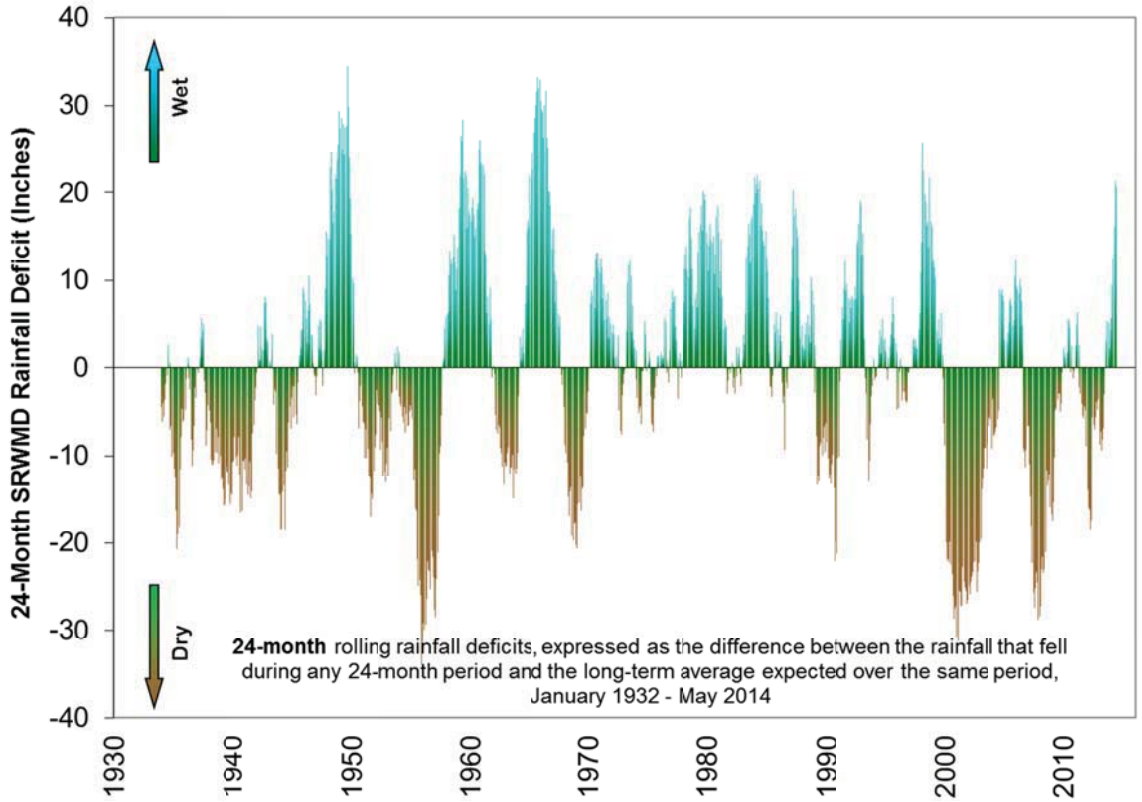
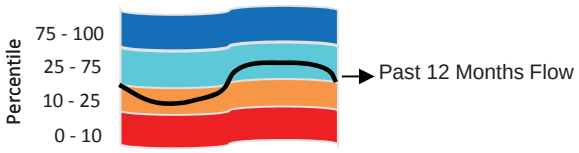
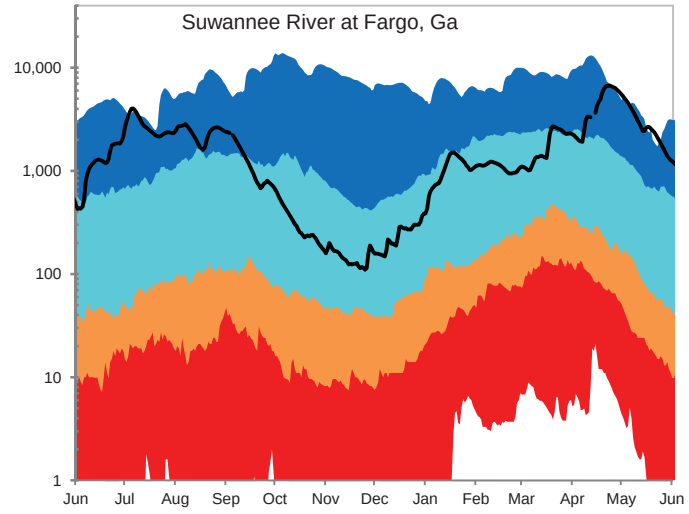


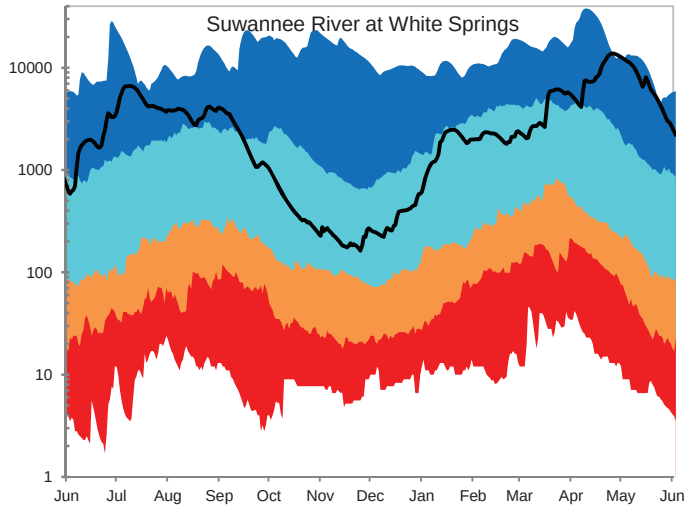
Figure 8: Daily River Flow Statistics

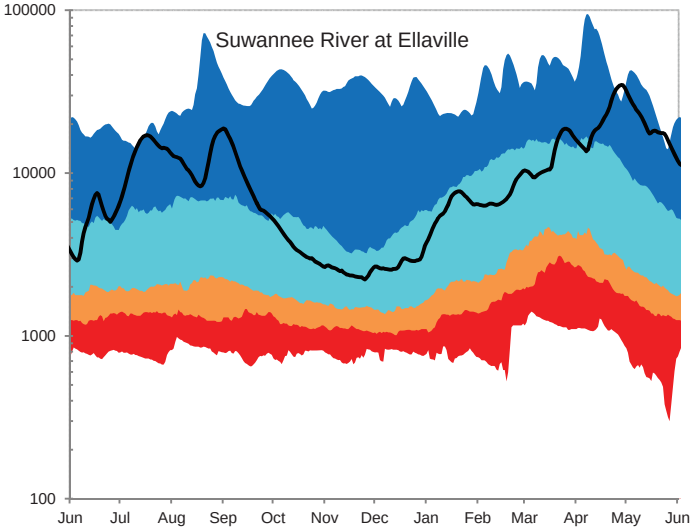
June 1, 2013 through May 31, 2014

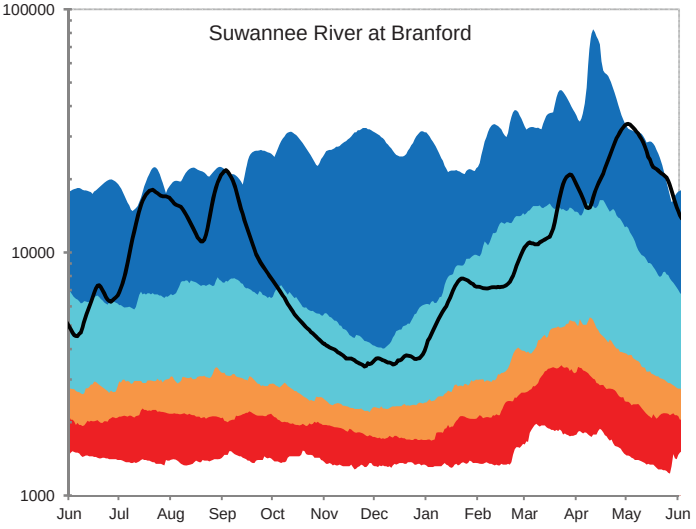


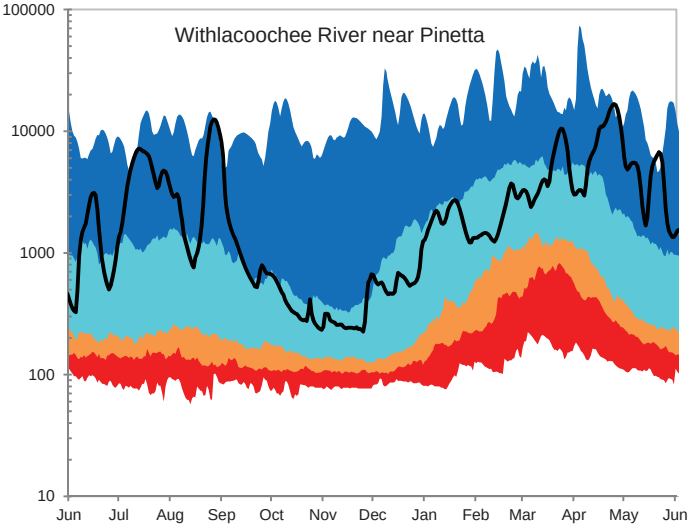
RIVER FLOW, CUBIC FEET PER SECOND











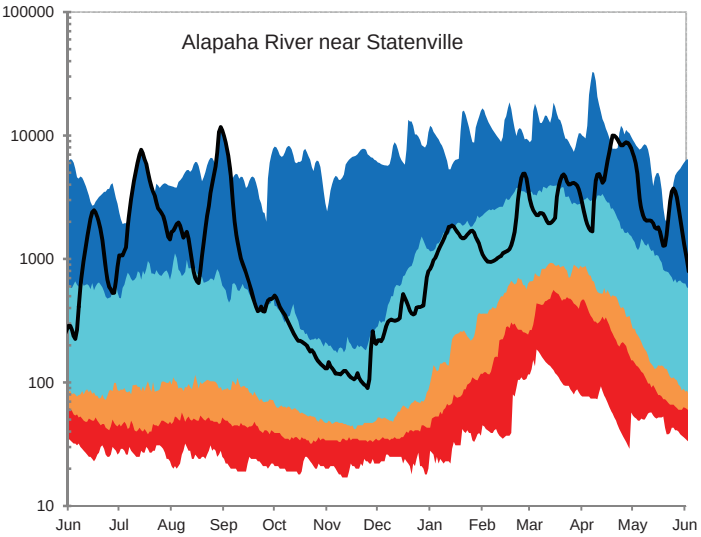
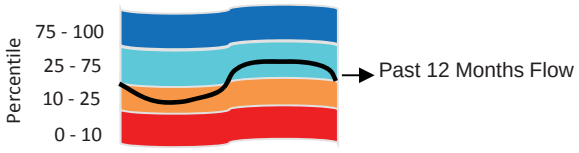


Figure 8, cont: Daily River Flow Statistics
June 1, 2013 through May 31, 2014



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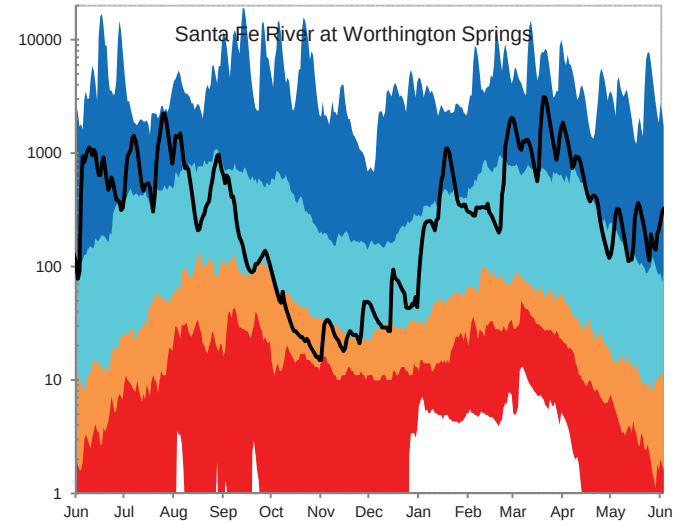
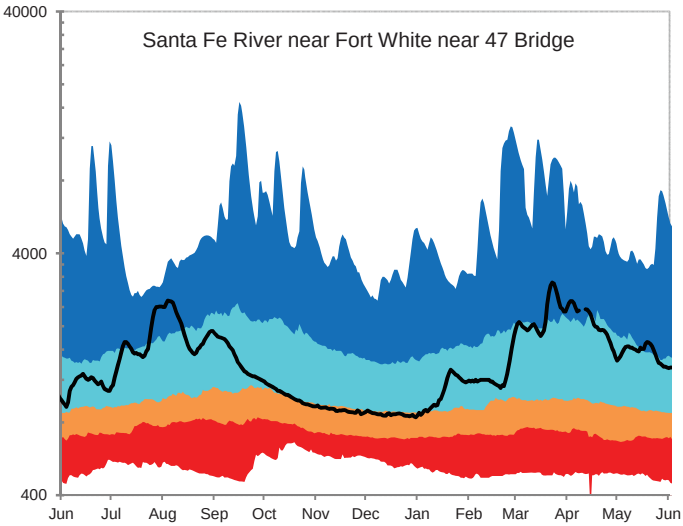
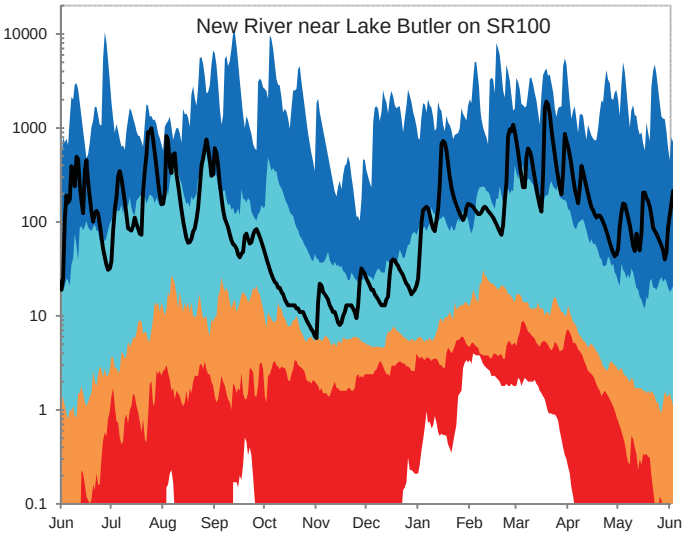
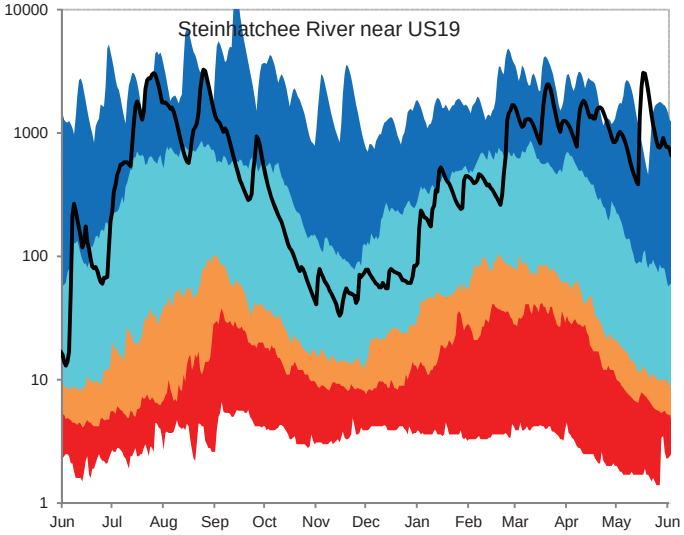
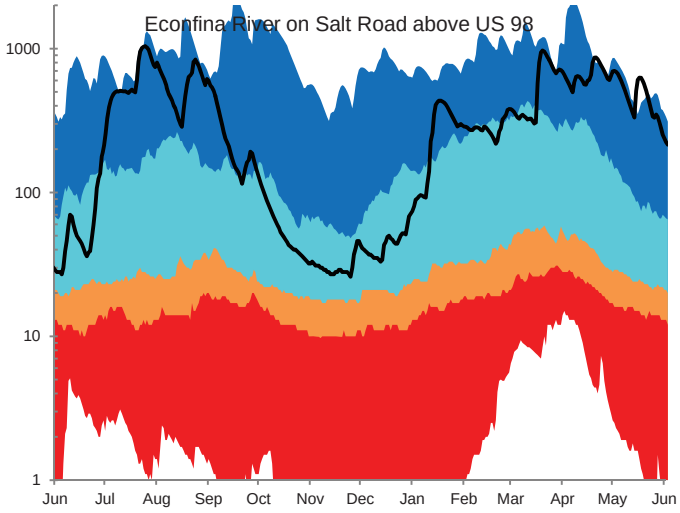
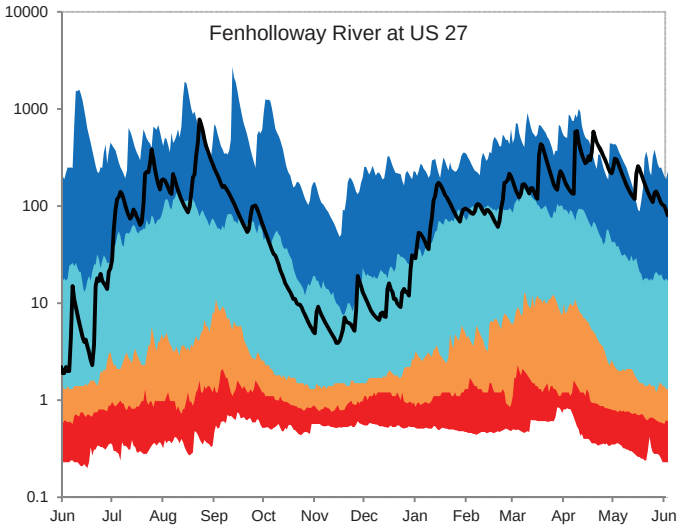


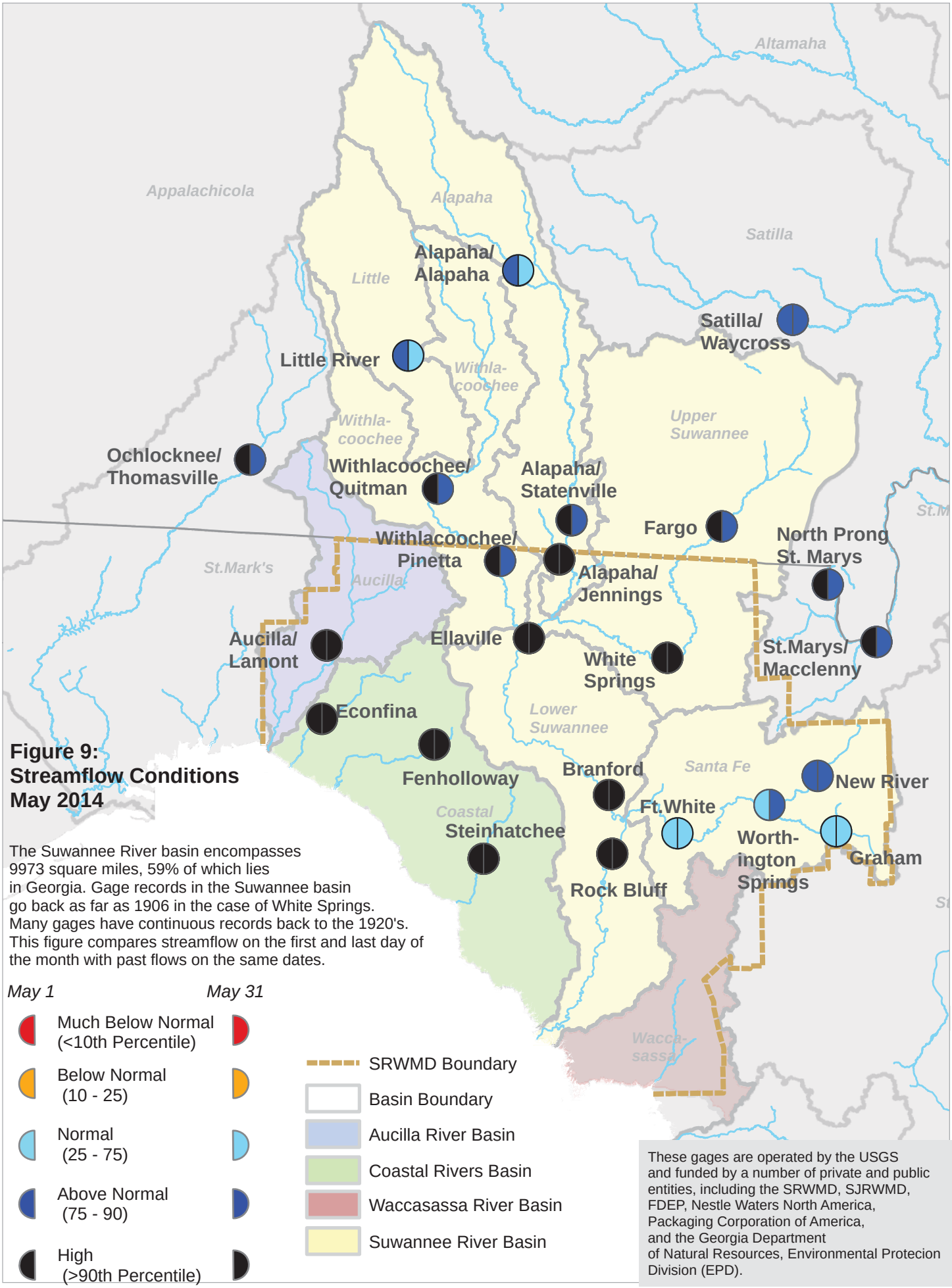











Altamaha
Appalachicola
Alapaha
Satilla
Alapaha/
Alapaha
Little
Satilla/
Waycross
Little River
Withla-
coochee
Withla-
coochee
Upper
Suwannee
Ochlocknee/
Thomasville
Withlacoochee/
Quitman
Alapaha/
Statenville
Fargo
North Prong
St. Marys
St.Mark's
Withlacoochee/
Pinetta
Aucilla
Alapaha/
Jennings
Aucilla/
Lamont
Ellaville
White
Springs
St.Marys/
Macclenny
Econfina
Lower
Suwannee
Fenholloway
Branford
Santa Fe
New River
Ft.White
Coastal
Steinhatchee
Worth-
ington
Springs
Graham
Rock Bluff
Wacca-
sassa
Figure 9:
Streamflow Conditions
May 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.
May 1
May 31
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 Protecion
Division (EPD).

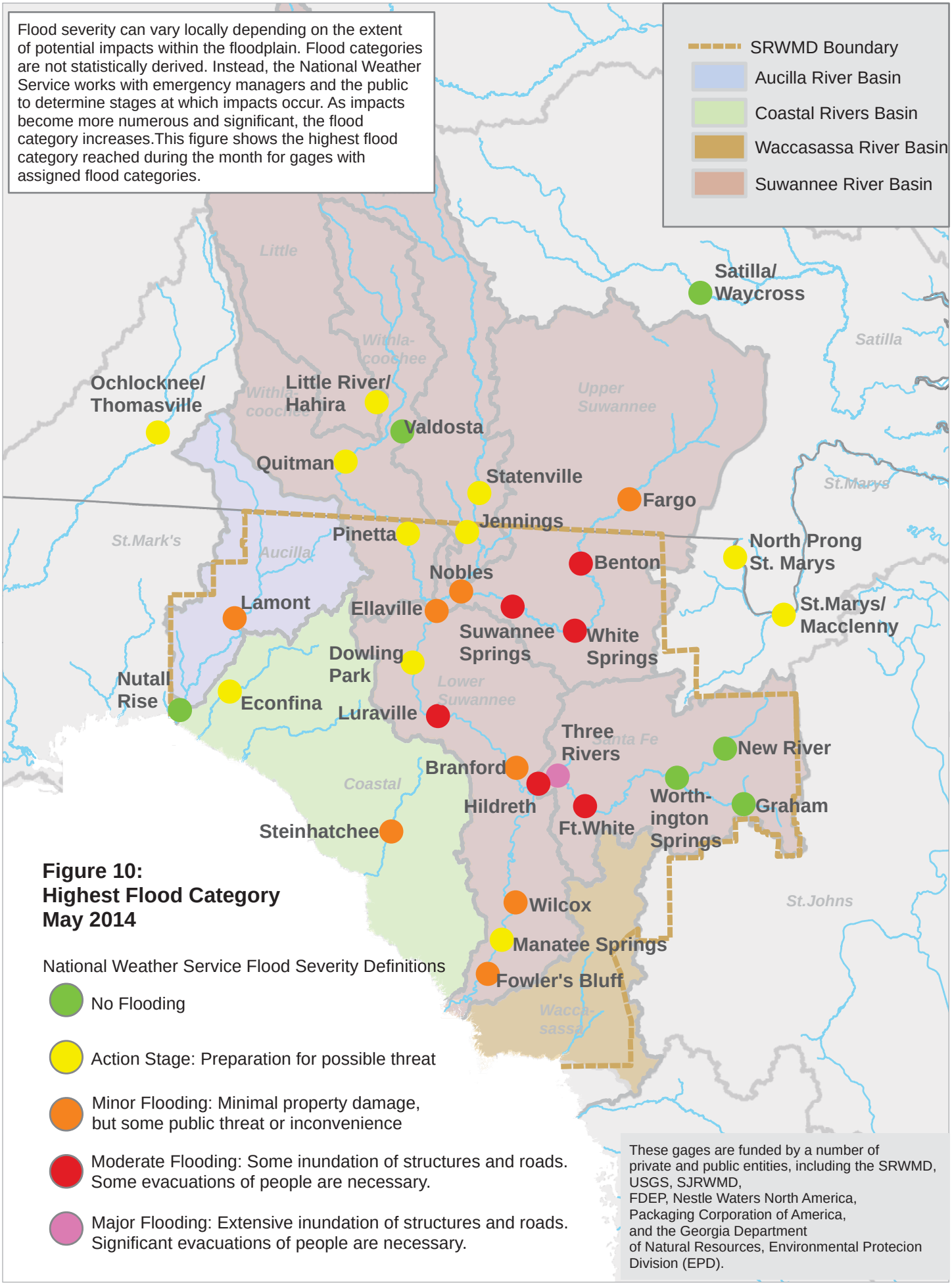
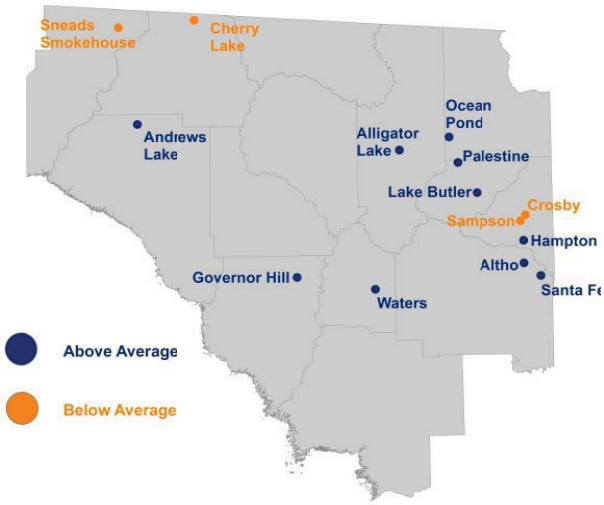

Flood severity can vary locally depending on the extent of potential impacts within the floodplain. Flood categories are not statistically derived. Instead, the National Weather Service works with emergency managers and the public to determine stages at which impacts occur. As impacts become more numerous and significant, the flood category increases.This figure shows the highest flood category reached during the month for gages with assigned flood categories.
SRWMD Boundary
Aucilla River Basin
Coastal Rivers Basin
Waccasassa River Basin
Suwannee River Basin
Little
Withla-coochee
Upper Suwannee
St.Marys
St.Mark's
Aucilla
Lower Suwannee
Coastal
Santa Fe
St.Johns
Wacca-sassa
Satilla/ Waycross
Satilla
Ochlocknee/ Thomasville
Little River/ Hahira
Valdosta
Quitman
Statenville
Fargo
Jennings
Pinetta
Benton
North Prong St. Marys
Nobles
Lamont
Ellaville
Suwannee Springs
White Springs
St.Marys/ Macclenny
Dowling Park
Nutall Rise
Econfina
Luraville
Three Rivers
New River
Branford
Worth-ington Springs
Graham
Hildreth
Ft.White
Steinhatchee
Wilcox
Manatee Springs
Fowler's Bluff
Figure 10:
Highest Flood Category
May 2014
National Weather Service Flood Severity Definitions
No Flooding
Action Stage: Preparation for possible threat
Minor Flooding: Minimal property damage, but some public threat or inconvenience
Moderate Flooding: Some inundation of structures and roads. Some evacuations of people are necessary.
Major Flooding: Extensive inundation of structures and roads. Significant evacuations of people are necessary.
These gages are funded by a number of private and public entities, including the SRWMD, USGS, SJRWMD, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

Figure 11: Quarterly Springflow Measurements

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

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

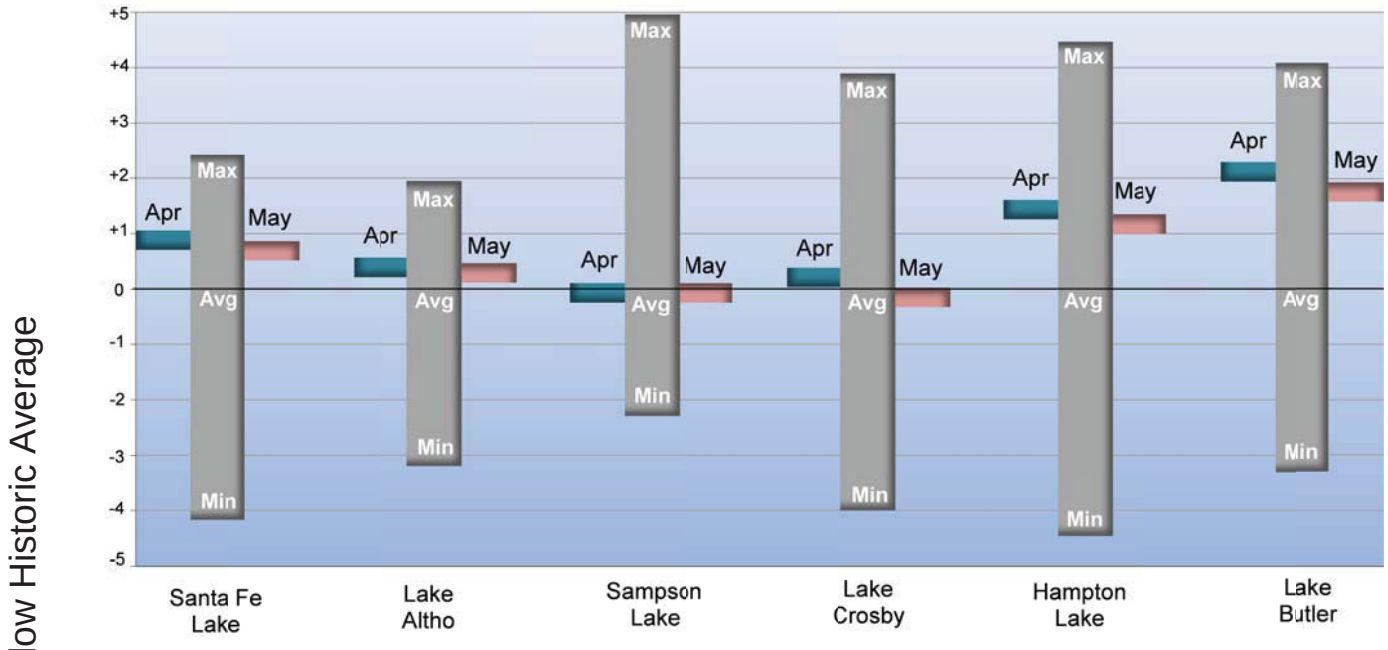
Figure 12: May 2014 Lake Levels

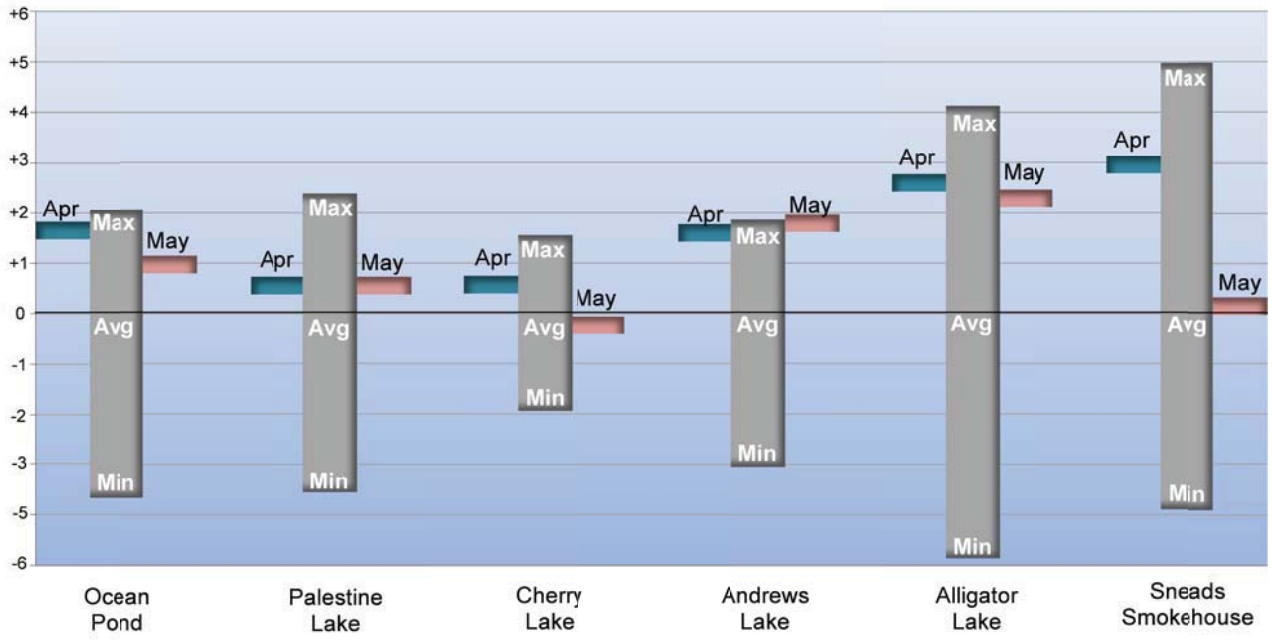


SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular ones in the eastern part of the District, are embedded in a surficial or intermediate aquifer over relatively impermeable clay deposits. These lakes rise and fall according to local 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.

Note: Levels at Sampson Lake and Lake Crosby are affected by the operation of a control structure where Sampson flows into the Sampson River. Cherry Lake levels can be affected by the occasional maintenance of an old drainage path east of the lake.





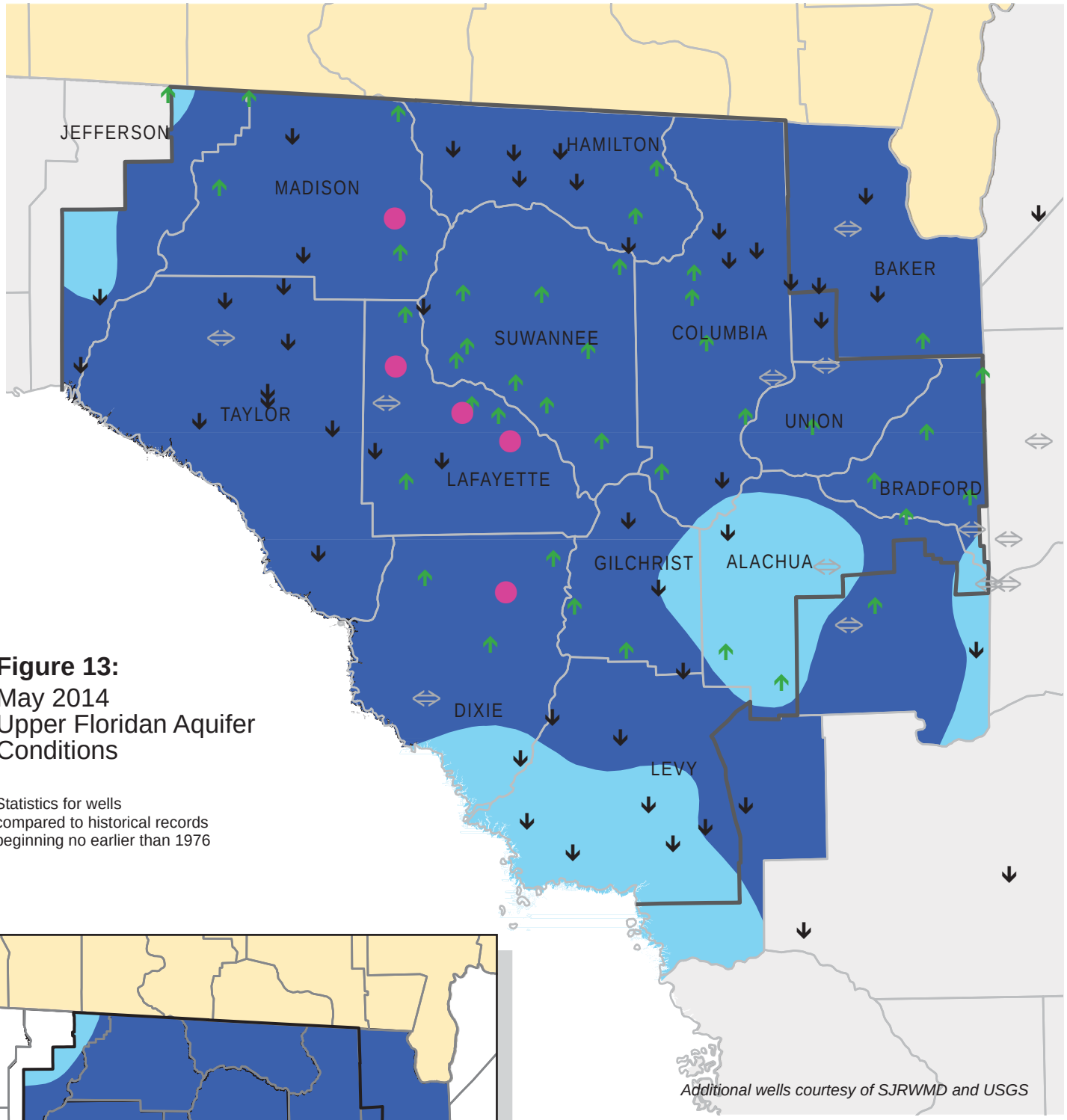
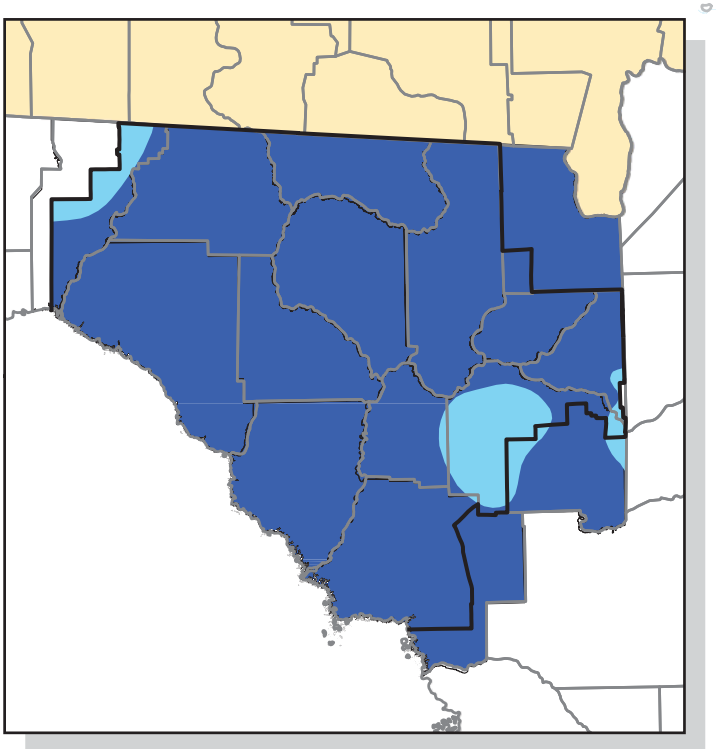


Figure 13:
May 2014
Upper Floridan Aquifer
Conditions

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

Additional wells courtesy of SJRWMD and USGS



Inset: April 2014 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

Extremely Low
(Less than 10th Percentile)

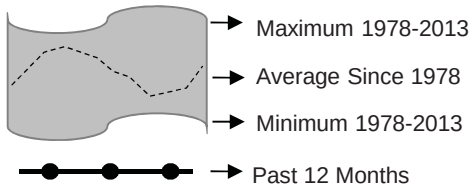
Increase/decrease in level since last month

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

Record High Level

District Boundary

Figure 14: Monthly Groundwater Level Statistics
Levels June 1, 2013 through May 31, 2014
Period of Record Beginning 1978



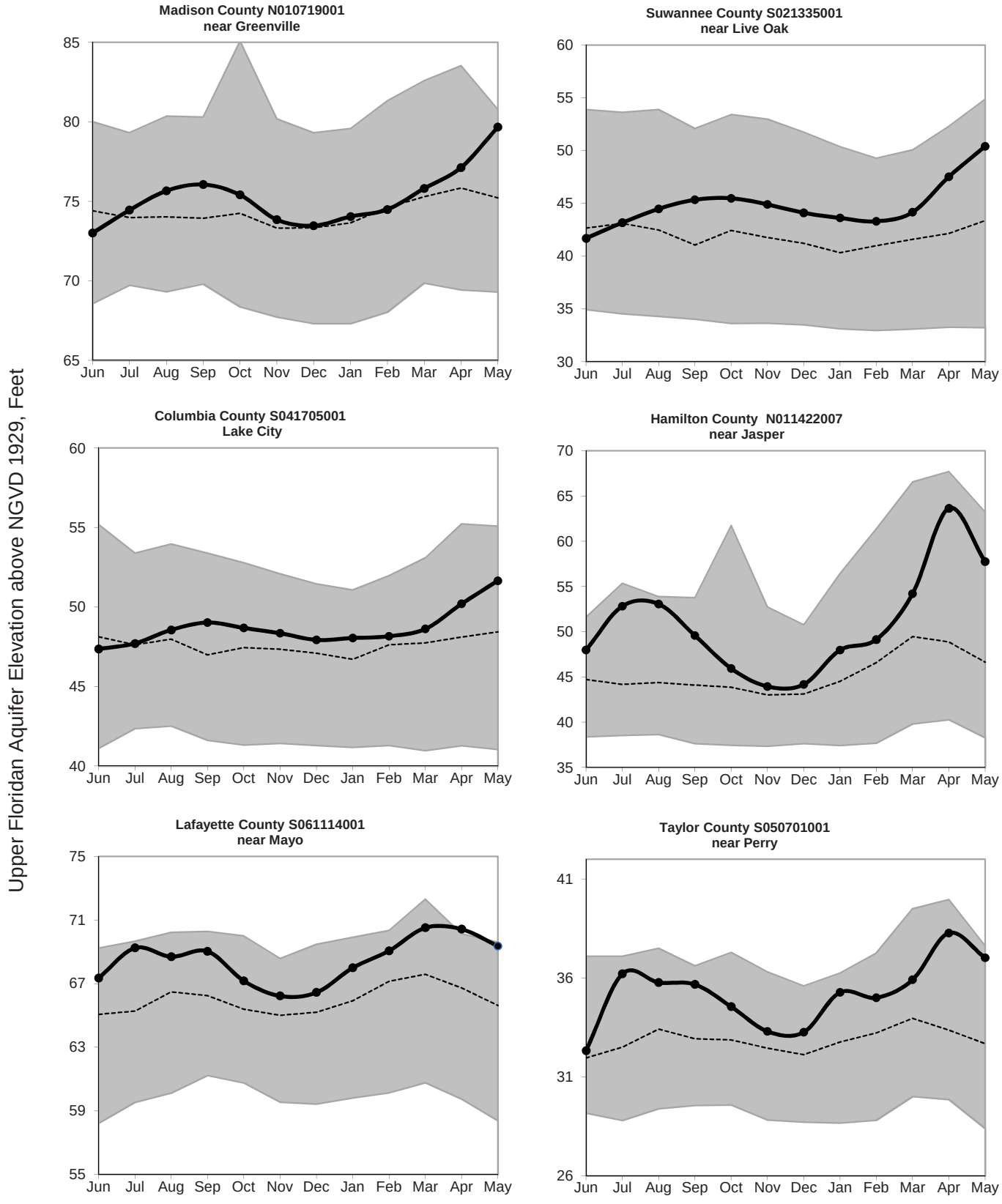
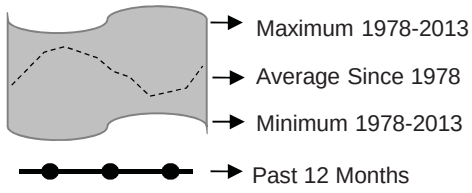
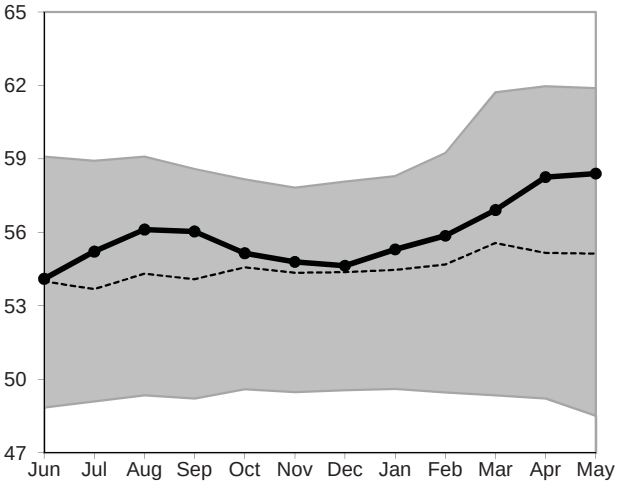


Figure 14, cont.: Groundwater Level Statistics
Levels June 1, 2013 through May 31, 2014
Period of Record Beginning 1978

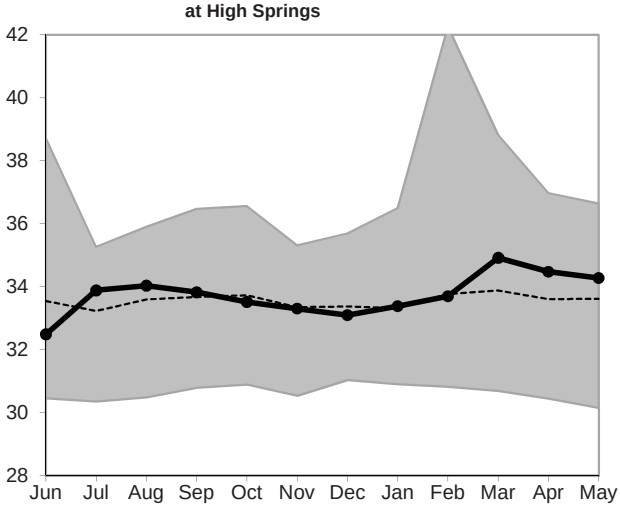


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

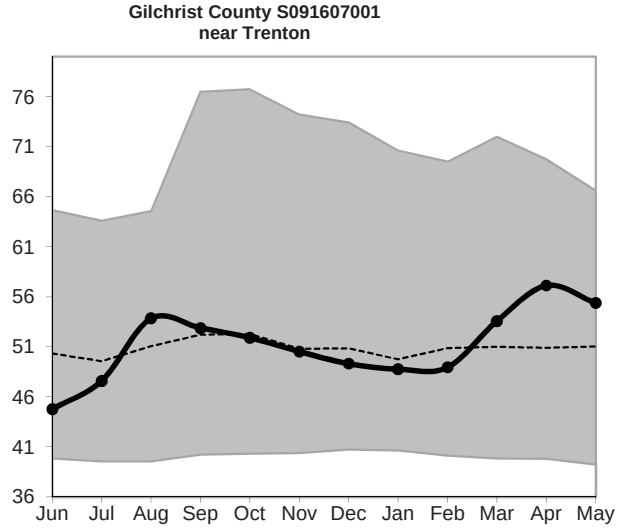
Union County S051933001 near Lake Butler



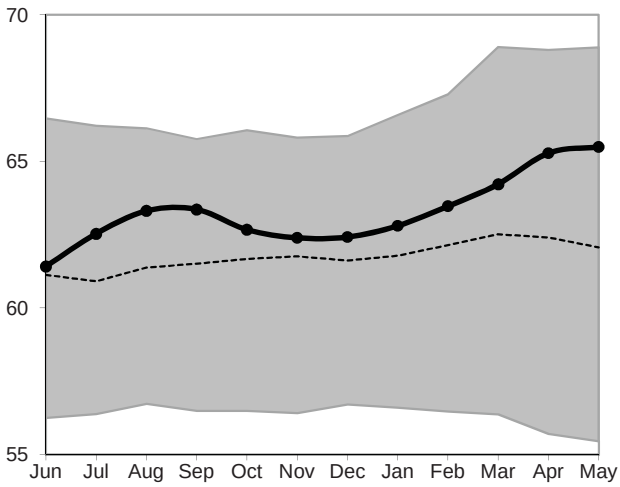
Alachua County S081703001 at High Springs



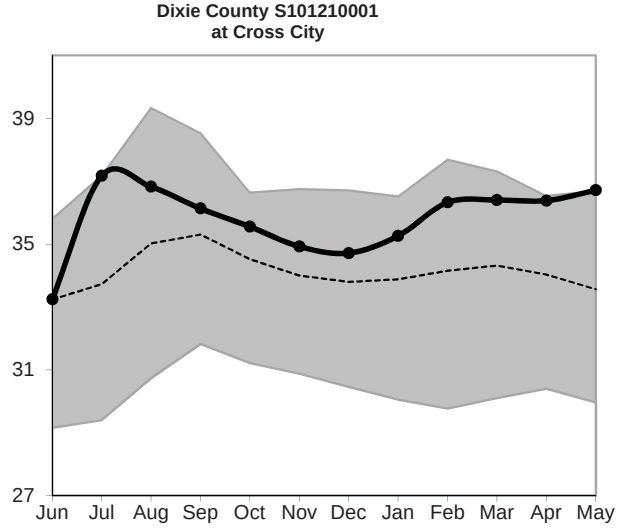
Gilchrist County S091607001 near Trenton



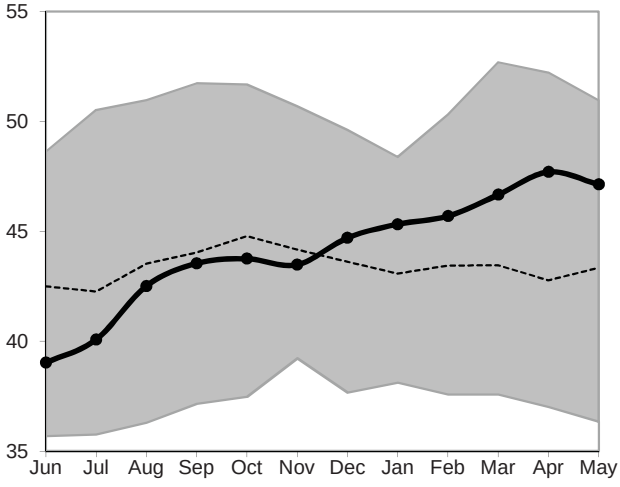
Bradford County S072132001 near Graham



Dixie County S101210001 at Cross City



Levy County S131736001 near Bronson



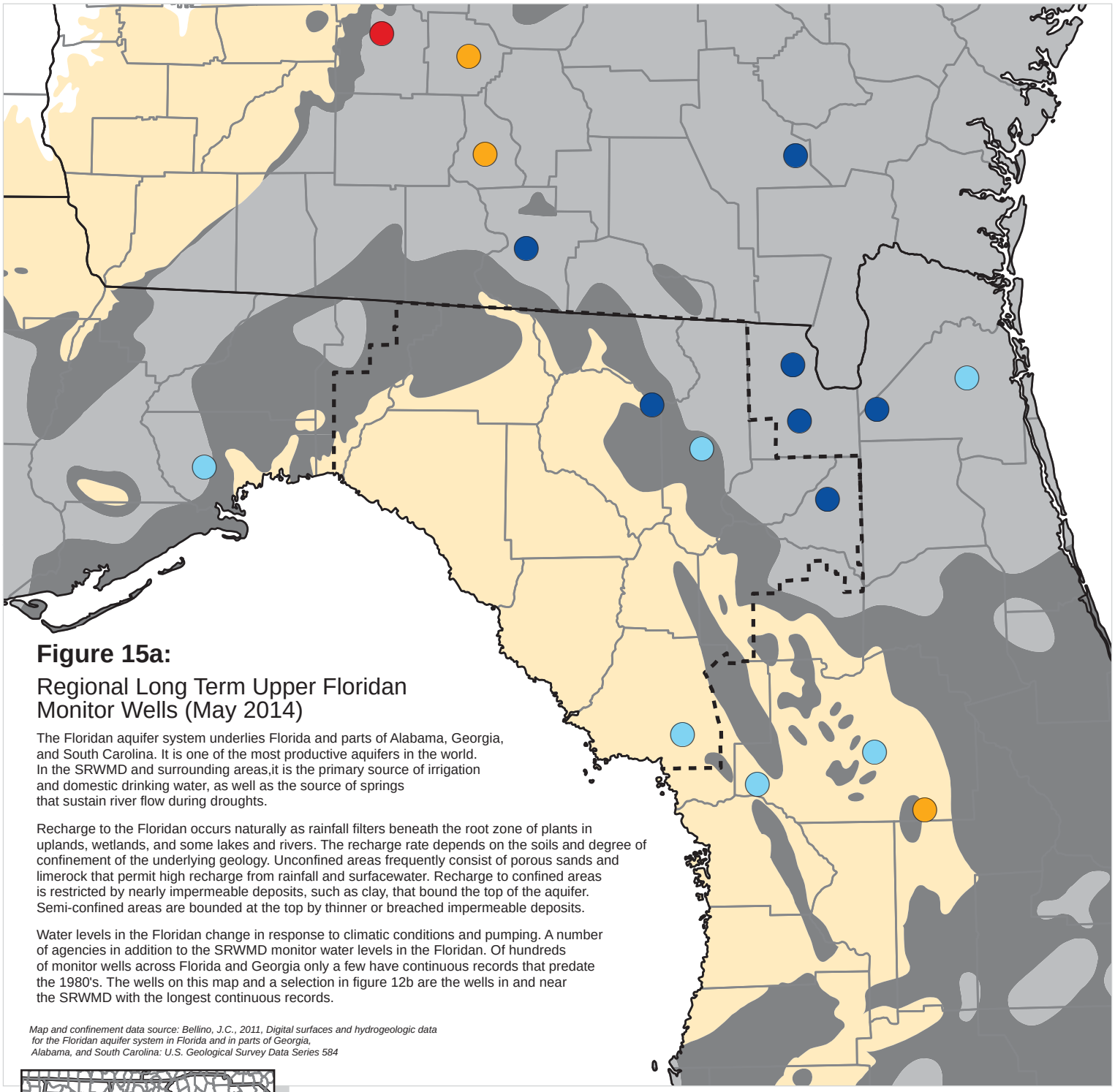


Figure 15a:

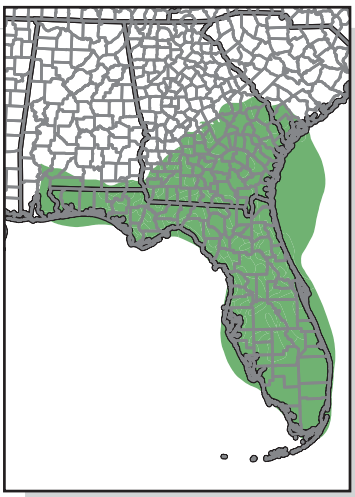
Regional Long Term Upper Floridan Monitor Wells (May 2014)

The Floridan aquifer system underlies Florida and parts of Alabama, Georgia, and South Carolina. It is one of the most productive aquifers in the world. In the SRWMD and surrounding areas,it is the primary source of irrigation and domestic drinking water, as well as the source of springs that sustain river flow during droughts.

Recharge to the Floridan occurs naturally as rainfall filters beneath the root zone of plants in uplands, wetlands, and some lakes and rivers. The recharge rate depends on the soils and degree of confinement of the underlying geology. Unconfined areas frequently consist of porous sands and limerock that permit high recharge from rainfall and surfacewater. Recharge to confined areas is restricted by nearly impermeable deposits, such as clay, that bound the top of the aquifer. Semi-confined areas are bounded at the top by thinner or breached impermeable deposits.

Water levels in the Floridan change in response to climatic conditions and pumping. A number of agencies in addition to the SRWMD monitor water levels in the Floridan. Of hundreds of monitor wells across Florida and Georgia only a few have continuous records that predate the 1980's. The wells on this map and a selection in figure 12b are the wells in and near the SRWMD with the longest continuous records.

Map and confinement data source: Bellino, J.C., 2011, Digital surfaces and hydrogeologic data for the Floridan aquifer system in Florida and in parts of Georgia, Alabama, and South Carolina: U.S. Geological Survey Data Series 584



Inset: Extent of Floridan Aquifer

Occurence of Confined and Unconfined Conditions in the Upper Floridan Aquifer

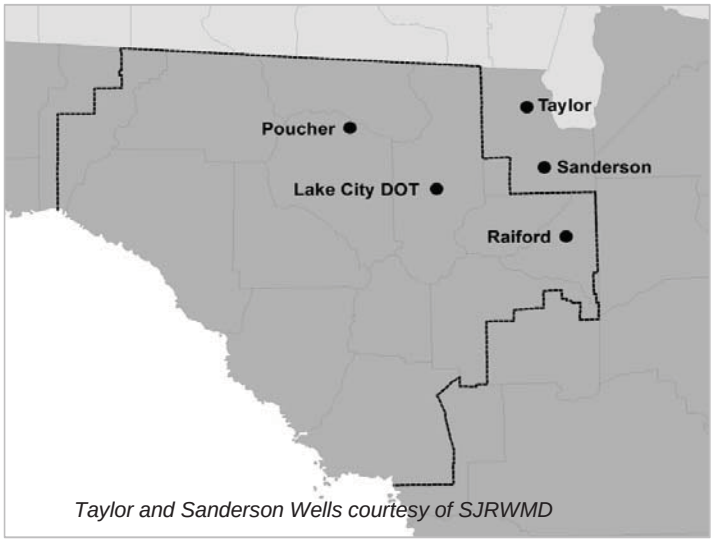
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

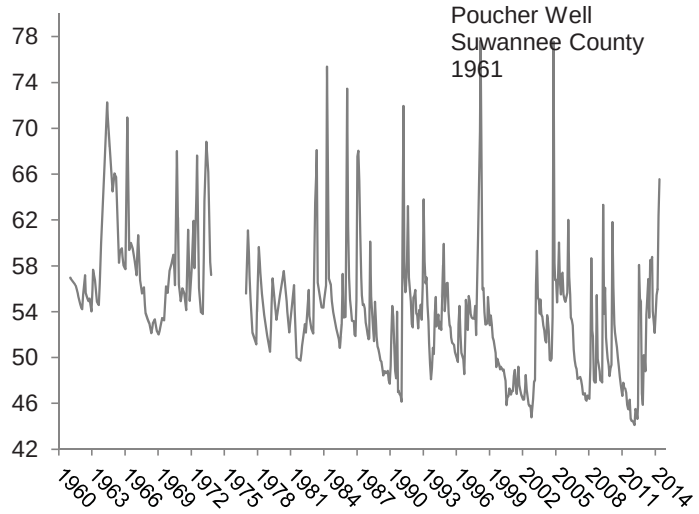
Percentile of Most Recent Water Level Relative to Entire Record

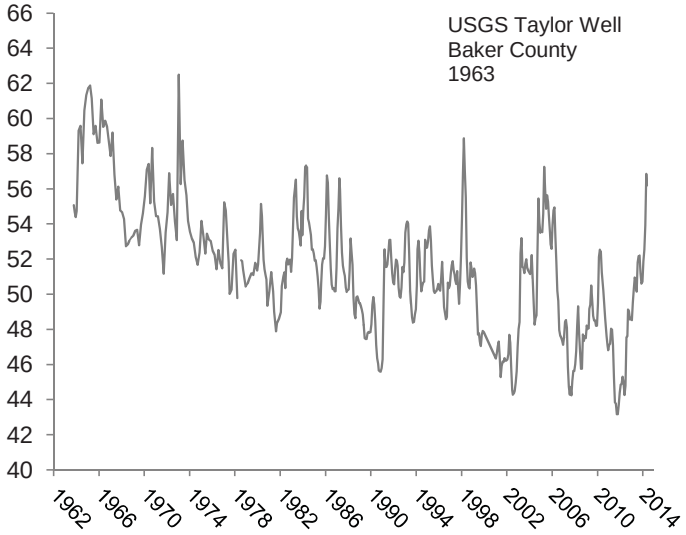
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

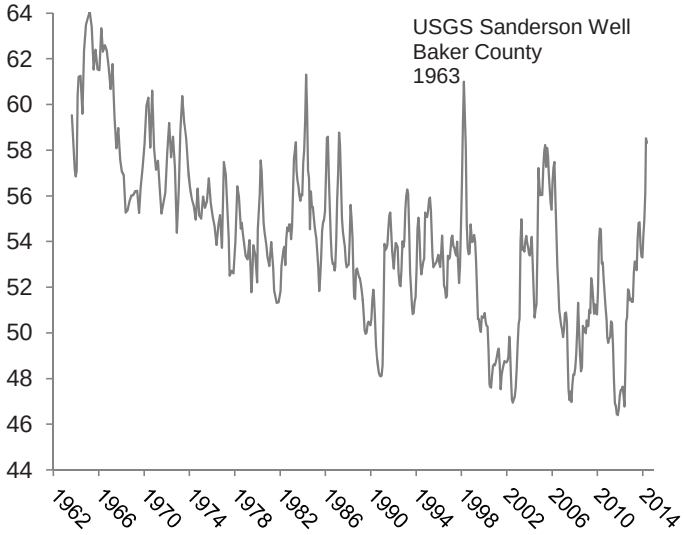
Figure 15b: Regional Long Term Upper Floridan Levels

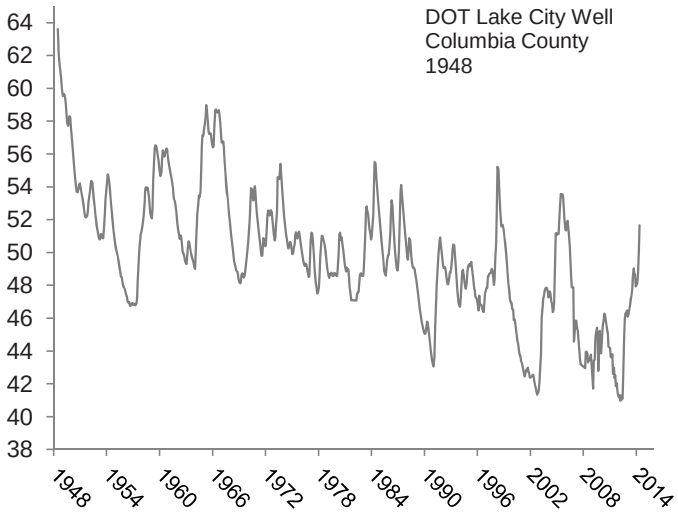
May 2014

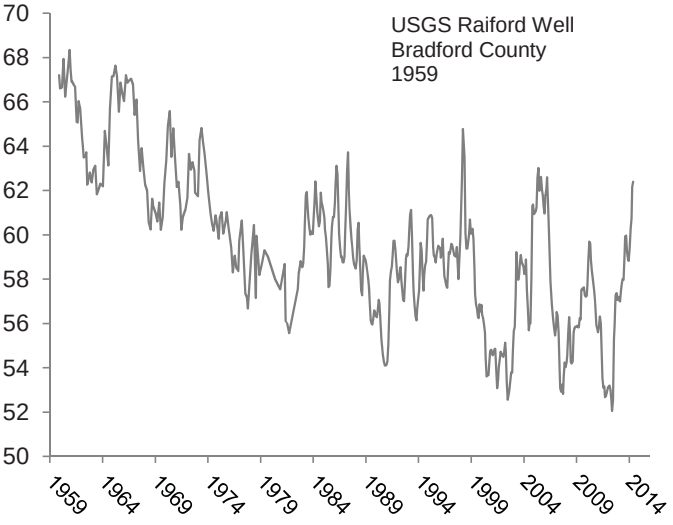












Upper Floridan Aquifer Elevation above NGVD 1929, Feet