MEMORANDUM

TO: Governing Board

FROM: Megan Wetherington, P.E., Senior Professional Engineer

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

DATE: September 6, 2013

RE: August 2013 Hydrologic Conditions Report for the District

RAINFALL

- Average August rainfall was 7.8", slightly above the long-term average of 7.5" (Figure 1, Table 1).
- Up to 15" fell in parts of Taylor, Lafayette, Suwannee, and Levy counties (Figure 2). This was the third straight month of unusually high rainfall in coastal counties and along the middle Suwannee corridor, with some areas receiving in excess of 40" since June. The highest gaged daily total was 4.32" at Midway Tower near Mayo, which also had the highest monthly total of 14.08". The 3-month total at this gage was 35.4".
- The July-August total for the NOAA raingage at Mayo was 28.3". This was the third-highest 2-month total since gaging began there in 1950, exceeded only in 2012 (tropical storms Beryl and Debby) and 1964 (Hurricane Dora).
- The upper Suwannee basin in Florida and the upper Santa Fe basin had significantly less rainfall than the coastal counties. Parts of Hamilton, Columbia, and Bradford counties saw less than 4". The lowest gaged monthly total was 4.74" at Santa Fe Lake.
- Up to 15" fell in the upper Alapaha and Withlacoochee basins in Georgia, more than double the typical August rainfall for that area. Most of the Suwannee basin in Georgia had above-normal rainfall (Figure 3).
- Despite the wet summer, average rainfall for the 12 months ending August 31 was only a half inch higher than the long-term average of 54.61" (Figure 4). Average rainfall for the 3 months ending August 31 was 6.8" higher than the long-term average of 21.8" (Figure 5).

SURFACEWATER

- **Rivers:**
  - Most river gages fell during the first half of the month after reaching unseasonably high levels in July. Mid-month rainfall in the upper Alapaha basin caused the Alapaha River near Statenville to reach 4 feet above flood stage, considered major flooding and setting a new record high for the month of August. This was the third flood on the Alapaha this year and only the third time it reached flood stage during any summer month since 1932 (the second time was in July and the first was in 1945). Heavy rain also fell in the Withlacoochee basin causing minor flooding at the river gage in Valdosta and the third wastewater release into the Withlacoochee River this year. Subsequent tests on the Withlacoochee and Suwannee rivers by the Florida Department of Environmental Protection met state water quality standards.
  - The Georgia flooding brought the Suwannee River up to levels even higher than July, although no gages reached flood stage. The Suwannee River at Branford ended the month about 12 feet higher than its historic median stage. The flow at Branford was the highest in August since 1991, and the third highest in August since 1945. The Santa Fe River at Three Rivers Estates rose above flood stage on August 27, the third Suwannee-based flood for the lower Santa Fe this year.

- The Okefenokee Swamp (headwaters of the Suwannee River) had significantly less rainfall than the Alapaha and Withlacoochee basins, resulting in only minor rises on the upper Suwannee gages. Upper Santa Fe gages also had flows more typical of the season.
- Coastal rivers (Aucilla, Econfina, Steinhatchee, Fenholloway, and Waccasassa) had flows much above normal throughout the month. Statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions are in Figure 7.

- **Lakes**: Lake levels fell slightly in August with the exception of Andrews Lake in Taylor County. Lake Sampson fell below its long-term average level after its gates were opened due to the threat of heavy rain. Waters Lake in Gilchrist County rose to a measurable level for the first time since 2007. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for a number of monitored lakes.

- **Springs**: Most springs on the Suwannee River remained inundated by tannic river water, and those on public lands were closed to swimming and diving. A flow measurement made at Hornsby Springs was the highest since 2006, with a flow of 94 million gallons per day (145 cubic feet per second). Statistics for a representative sample of springs are shown in Figure 9.

GROUNDWATER

Levels in most upper Floridan monitor wells in the coastal counties fell in August after nearly setting record highs in July (Figure 10). Levels in wells along the Suwannee corridor and in the confined aquifer in the east continued to climb. Overall, District wells rose to nearly the 90th percentile, the highest such rank since May 2005. Only ten percent of the wells were below the 50th percentile and none were below the 25th. Two wells set historic high levels: Midway Tower near Mayo, with records beginning 1993, and Circle K near Gulf Hammock, with records beginning 1976. Statistics for a representative sample of wells are shown in Figure 11, and statistics for a number of regional long-term wells are shown in Figure 12 along with a description of aquifer characteristics.

HYDROLOGICAL/METEOROLOGICAL/WATER USE INFORMATION

- The Palmer Drought Severity Index (PDSI), a climatological tool produced by the National Climatic Data Center, evaluates the severity and frequency of abnormally dry or wet weather using precipitation, temperature, and soil moisture data. The PDSI value for the week ending August 31 indicated slightly to moderately wet conditions in north Florida and very wet 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 November. Neutral El Niño/Southern Oscillation conditions are expected into spring 2014, with no tendency toward either El Niño (cooler and wetter) or La Niña (warmer and drier) conditions.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to twice per week between March and November based on a water conservation rule that applies to residential landscaping, public or commercial recreation areas, and public and commercial businesses that aren't regulated by a District-issued permit.

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

Table 1: Estimated Rainfall Totals (inches)

County	Aug 2013	August Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	6.65	7.10	94%	52.40	103%
Baker	6.57	6.59	100%	49.49	99%
Bradford	6.52	7.39	88%	49.36	97%
Columbia	6.59	6.63	99%	52.05	101%
Dixie	7.51	9.11	82%	55.47	94%
Gilchrist	8.81	7.83	113%	55.96	98%
Hamilton	5.40	6.13	88%	52.52	101%
Jefferson	6.85	6.46	106%	54.10	89%
Lafayette	9.93	7.78	128%	60.98	108%
Levy	9.57	9.80	98%	55.00	92%
Madison	8.20	6.13	134%	59.66	106%
Suwannee	8.56	6.40	134%	58.90	111%
Taylor	8.92	8.01	111%	59.51	100%
Union	6.75	7.77	87%	49.97	93%

August 2013 Average:	7.80
August Average (1932-2012):	7.51
Historical 12-month Average (1932-2012):	54.61
Past 12-Month Total:	55.17
12-Month Rainfall Surplus:	0.56

Figure 1: Comparison of District Monthly Rainfall

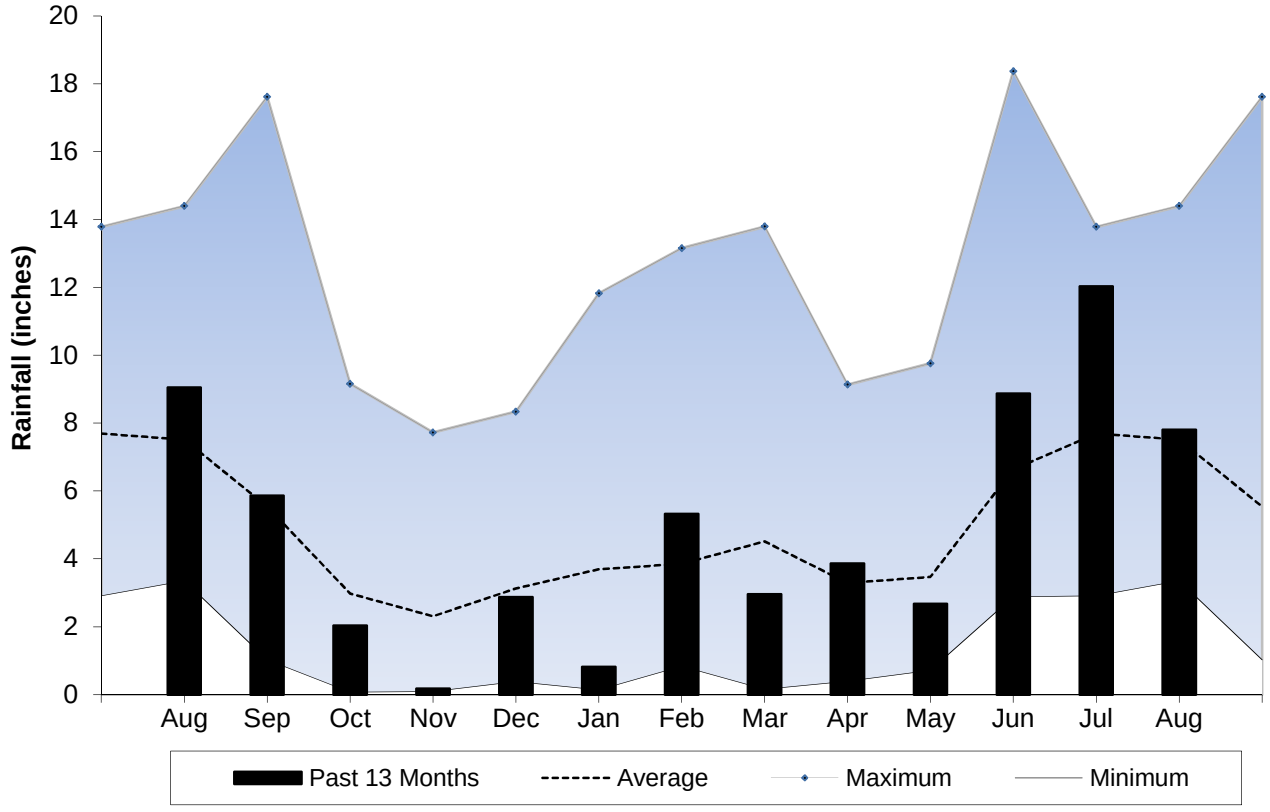


Figure 2: August 2013 Rainfall Estimate

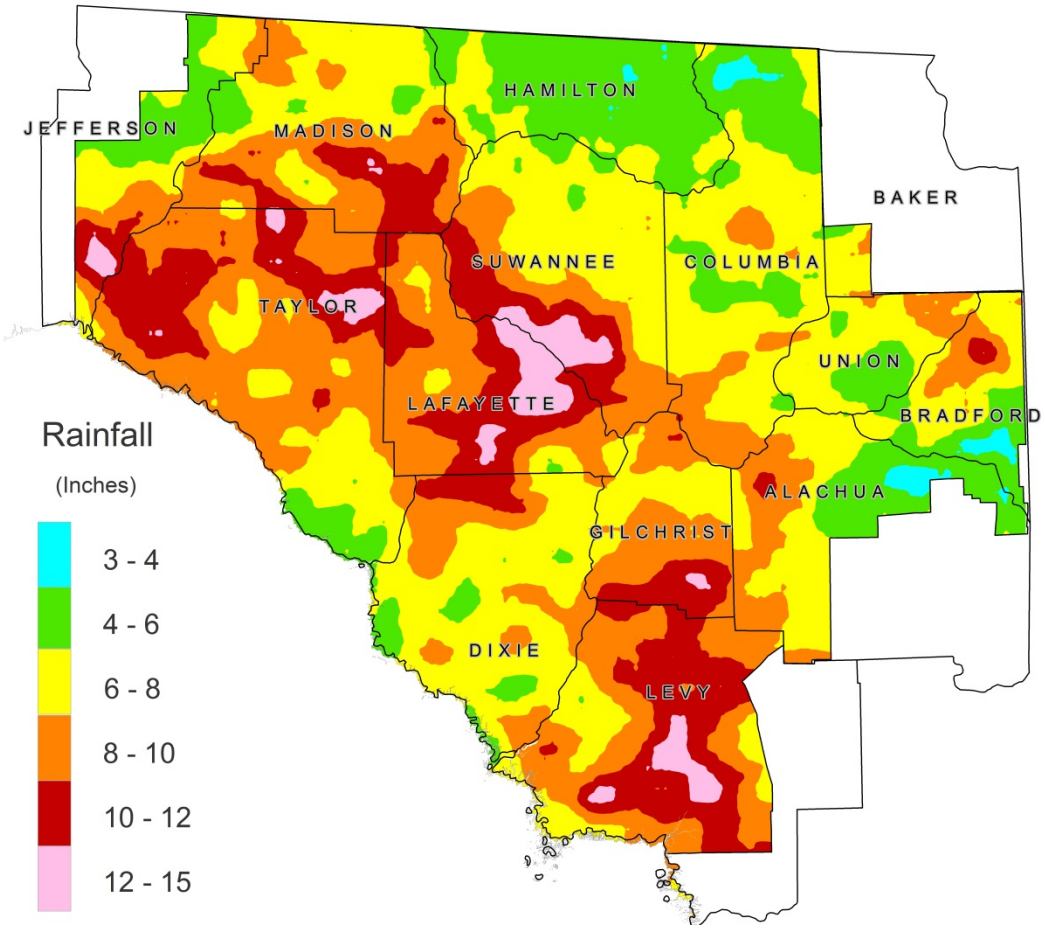


Figure 3: August 2013 Percent of Normal Rainfall

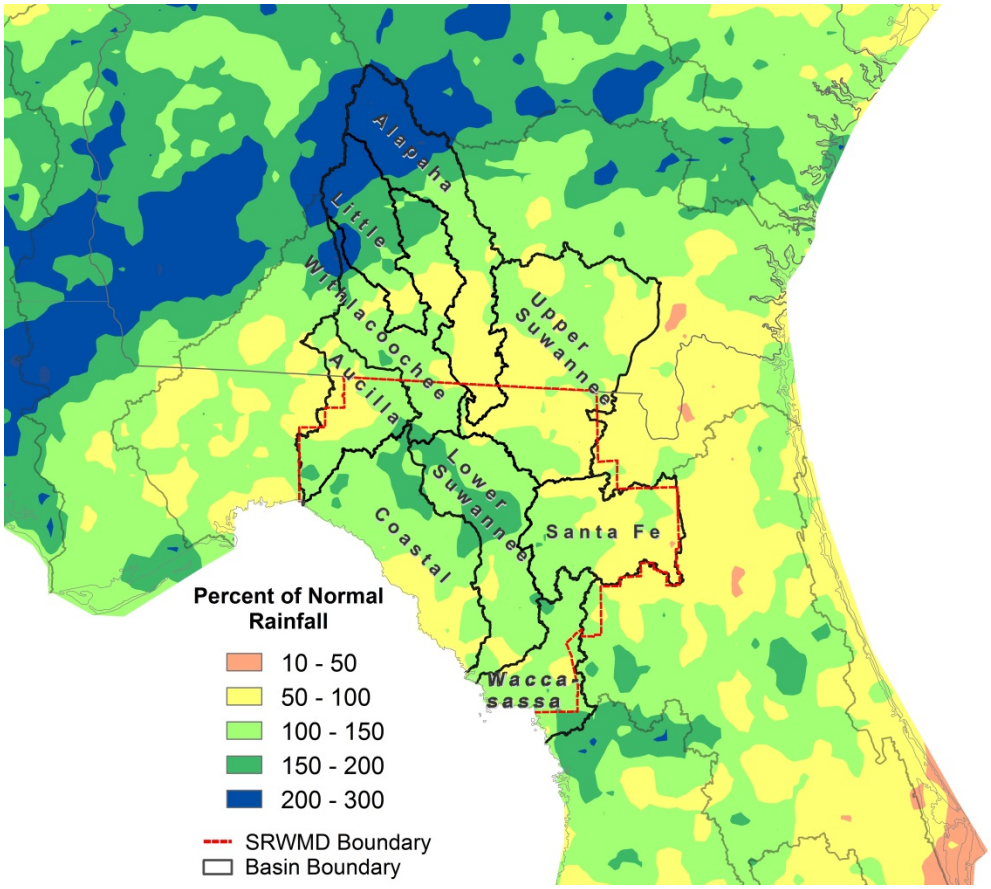


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Through August 31, 2013

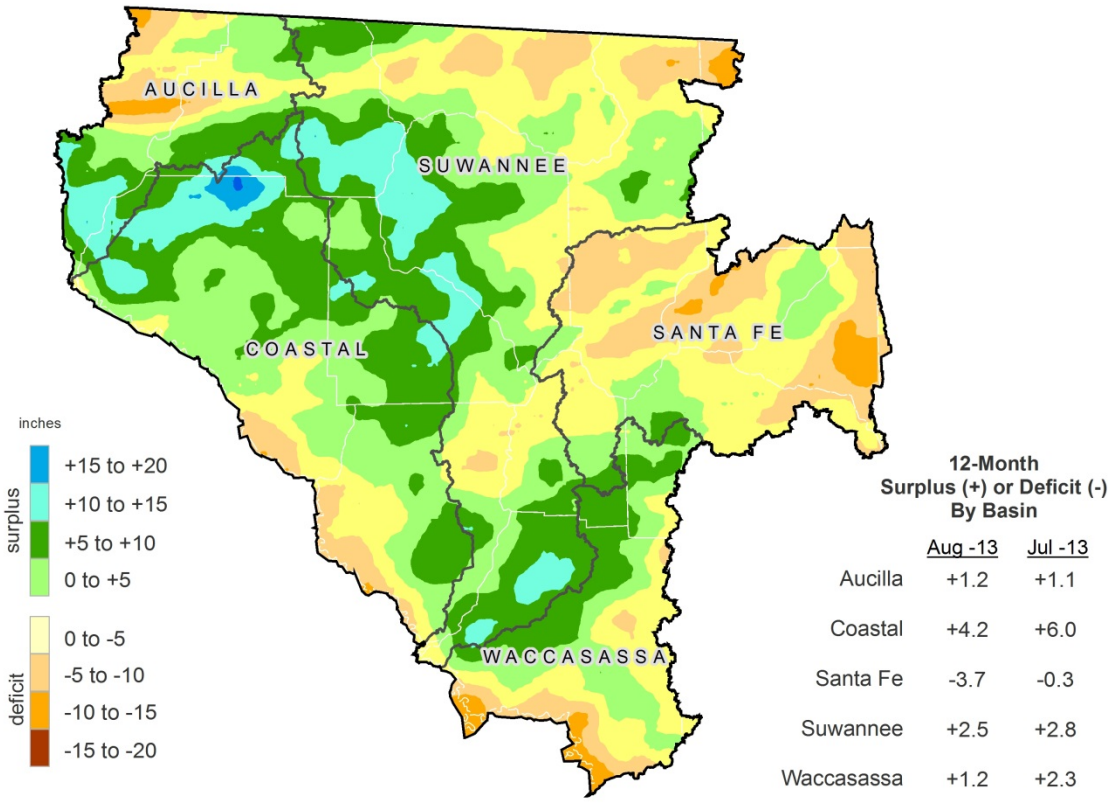


Figure 5: 3-Month Rainfall Surplus/Deficit by River Basin
Through August 31, 2013

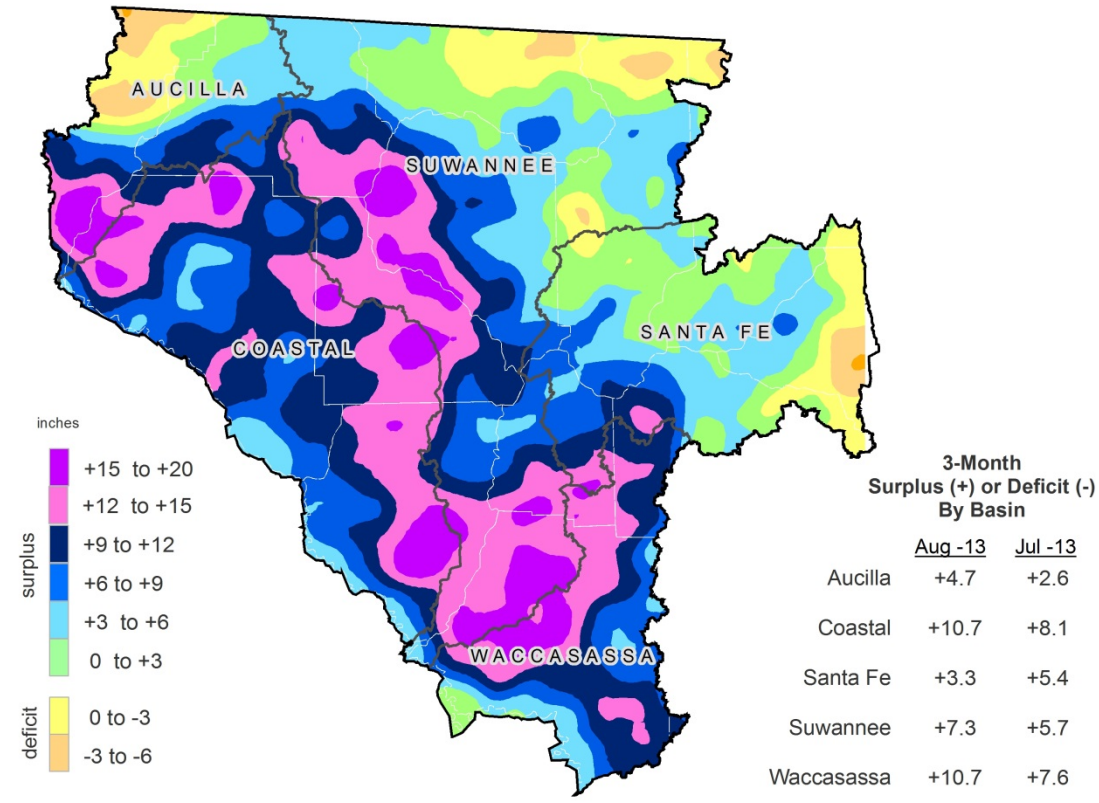


Figure 6: Daily River Flow Statistics
September 1, 2012 through August 31, 2013

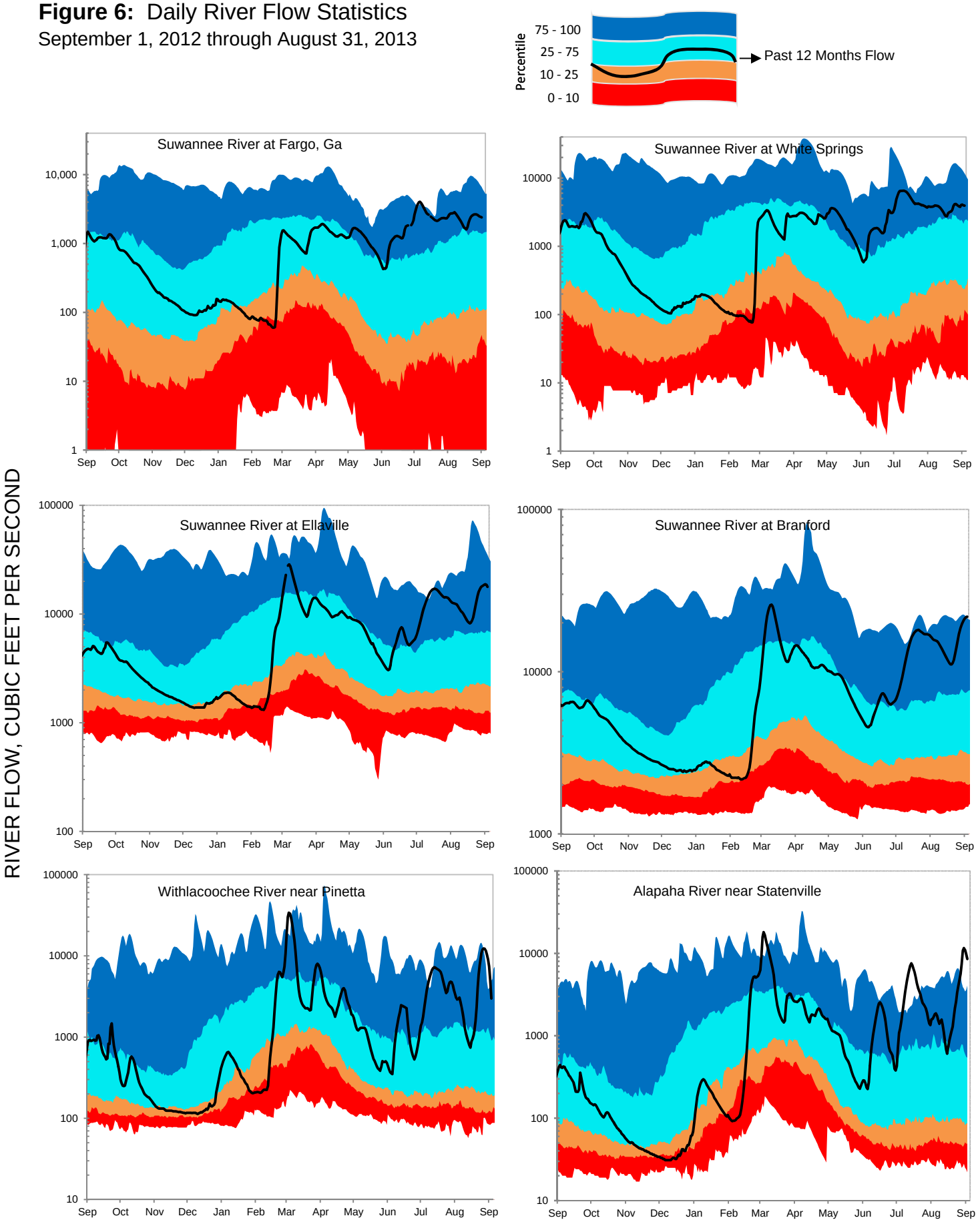
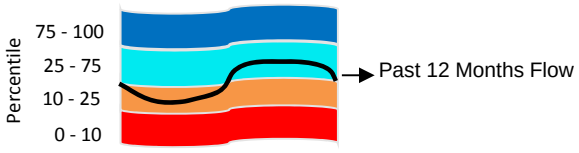
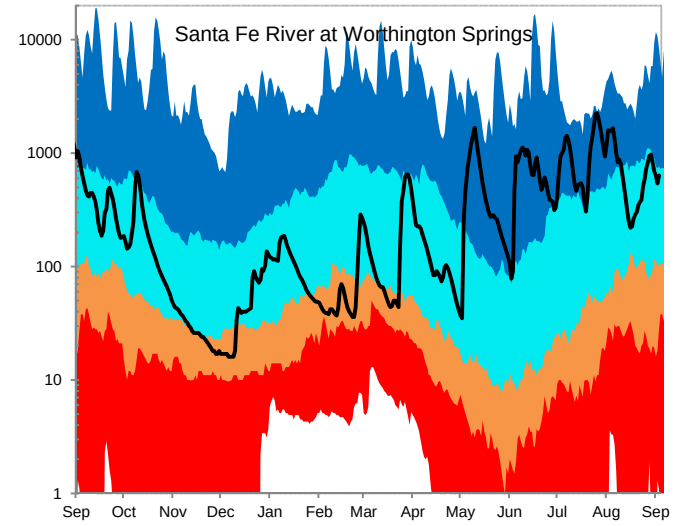
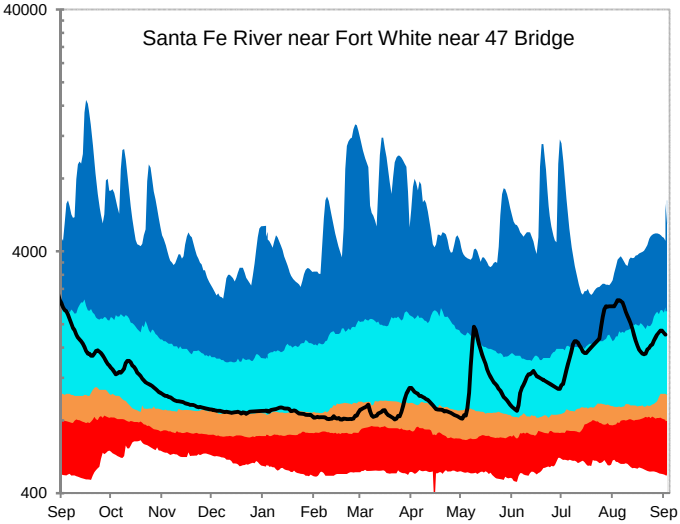


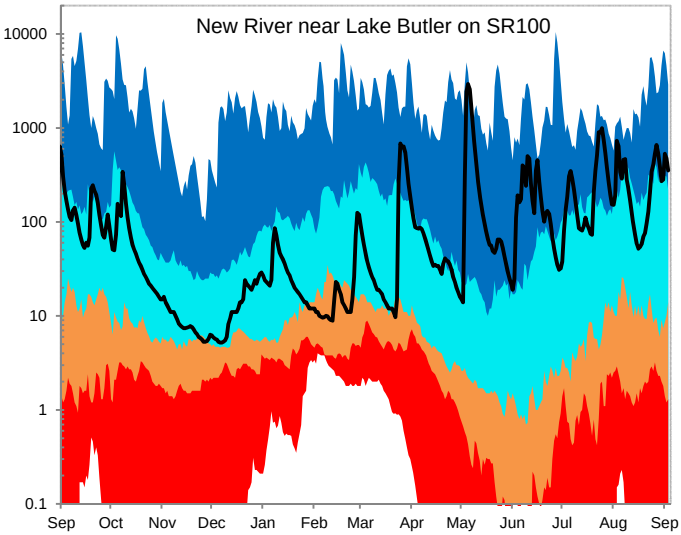
Figure 6, cont: Daily River Flow Statistics
September 1, 2012 through August 31, 2013

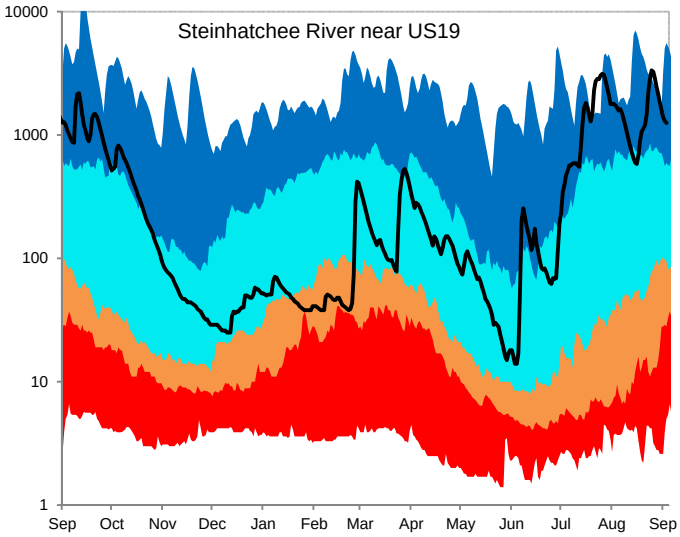


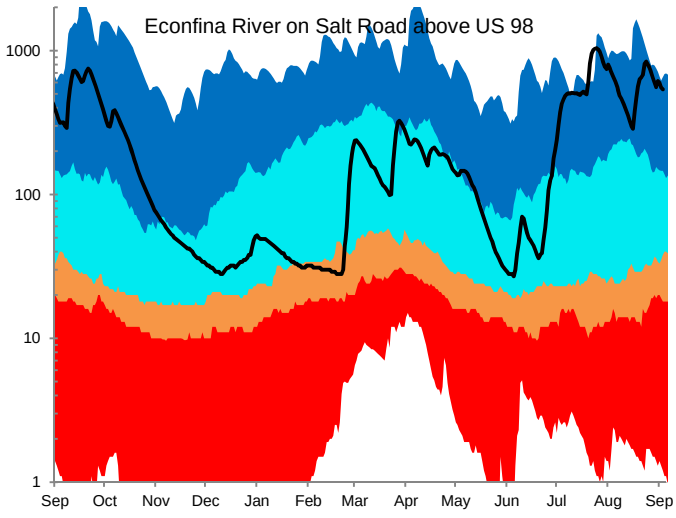
RIVER FLOW, CUBIC FEET PER SECOND

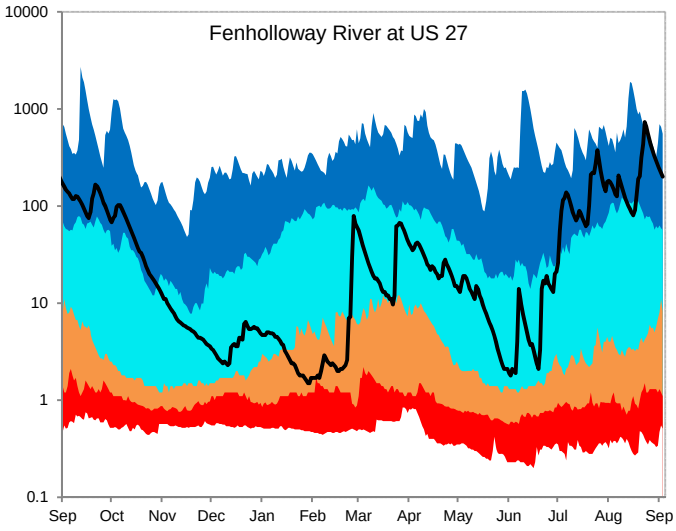












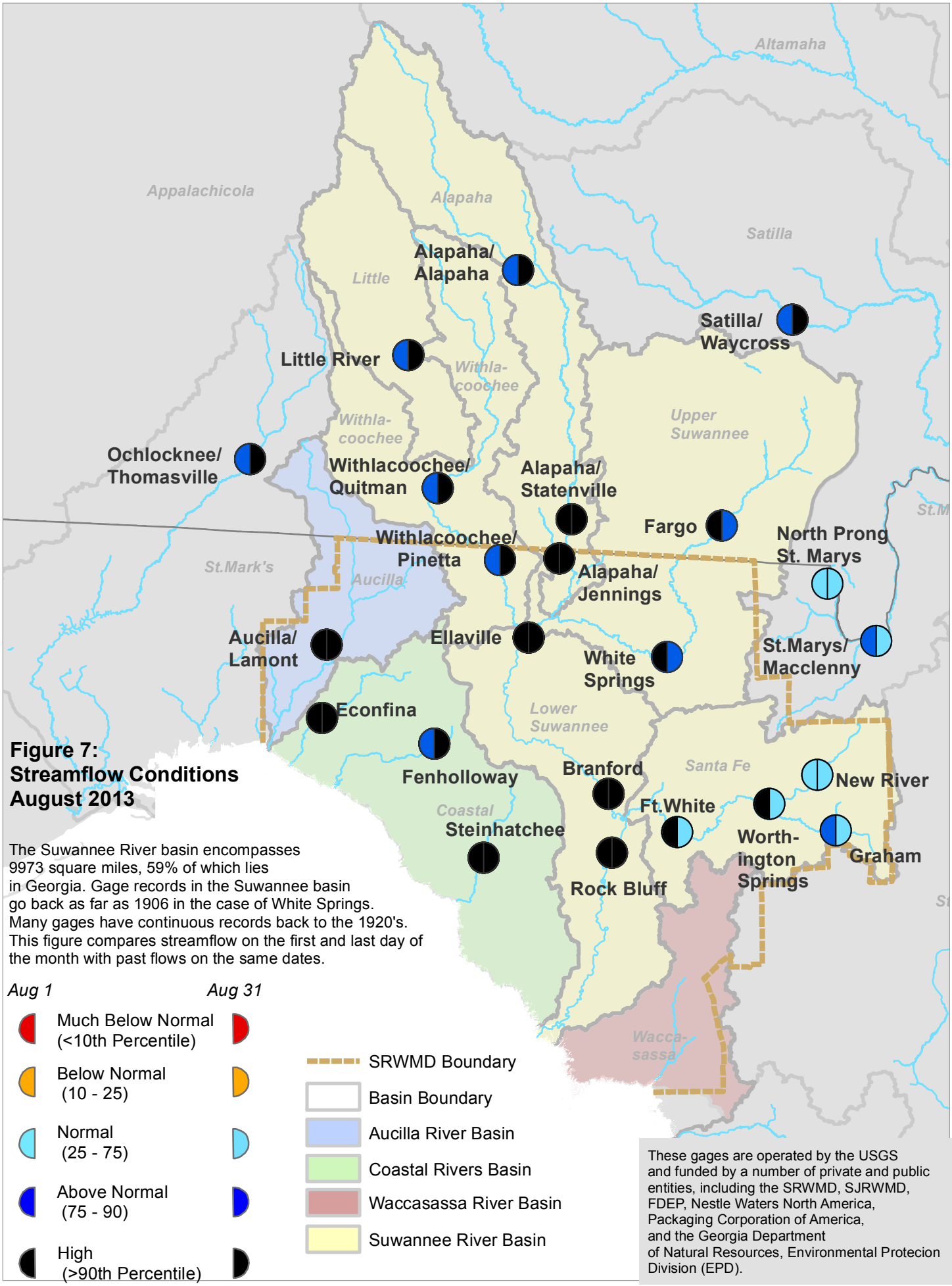
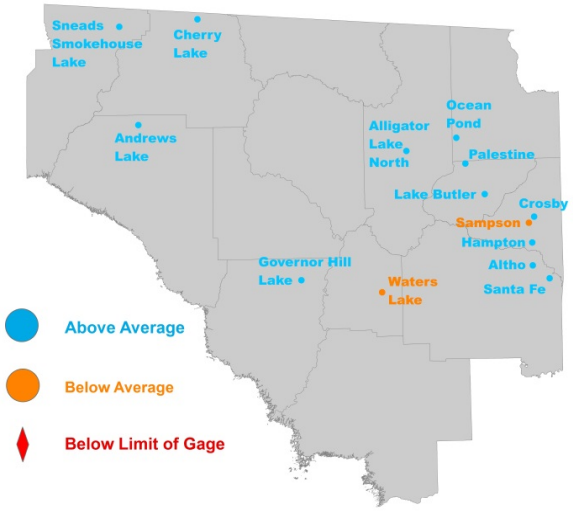
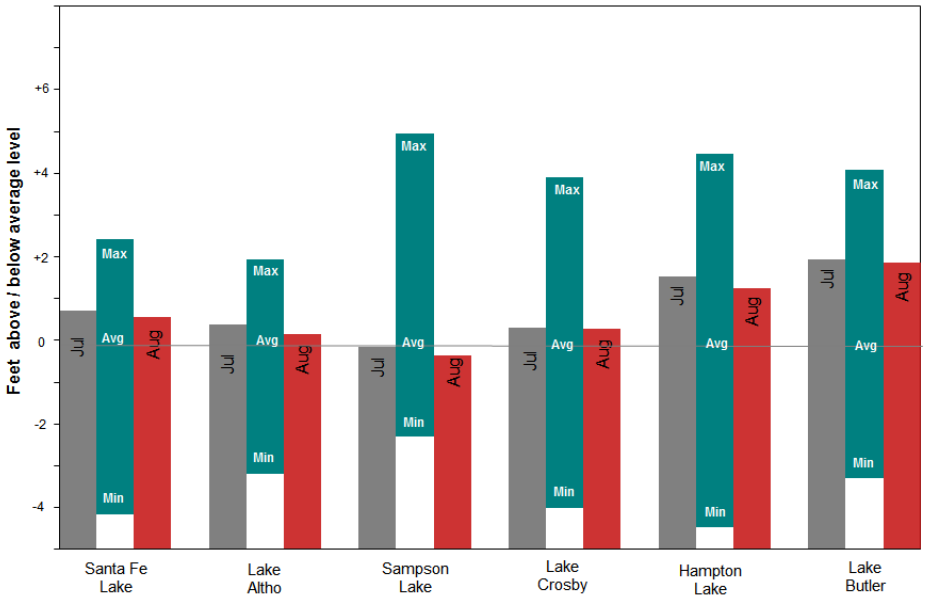

Altamaha
Appalachicola
Alapaha
Satilla
Little
Alapaha/
Alapaha
Satilla/
Waycross
Little River
Withla-
coochee
Withla-
coochee
Upper
Suwannee
Ochlocknee/
Thomasville
Withlacoochee/
Quitman
Alapaha/
Statenville
Fargo
North Prong
St. Marys
St.Mark's
Aucilla
Withlacoochee/
Pinetta
Alapaha/
Jennings
Aucilla/
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 7:
Streamflow Conditions
August 2013
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.
Aug 1
Aug 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).

Figure 8: August 2013 Lake Levels



SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular ones in the eastern part of the District, are embedded in a surficial or intermediate aquifer over relatively impermeable clay deposits. These lakes rise and fall according to local rainfall and surface runoff. They retain water during severe droughts since most losses occur from evaporation. Other lakes, such as Governor Hill and Waters Lake, have porous or "leaky" bottoms that interact with the Floridan aquifer. These lakes depend on groundwater levels to stay high. If aquifer levels are low, these lakes go dry even if rainfall is normal.

The District monitors 14 lakes with much of the data provided by volunteer observers. Most records go back to the 1970s, although the Sampson Lake record starts in 1957.



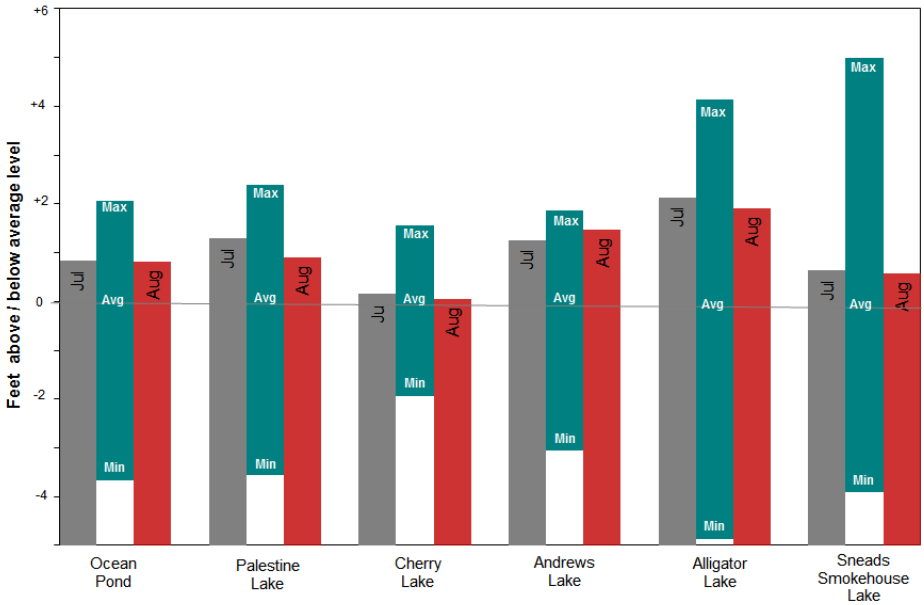
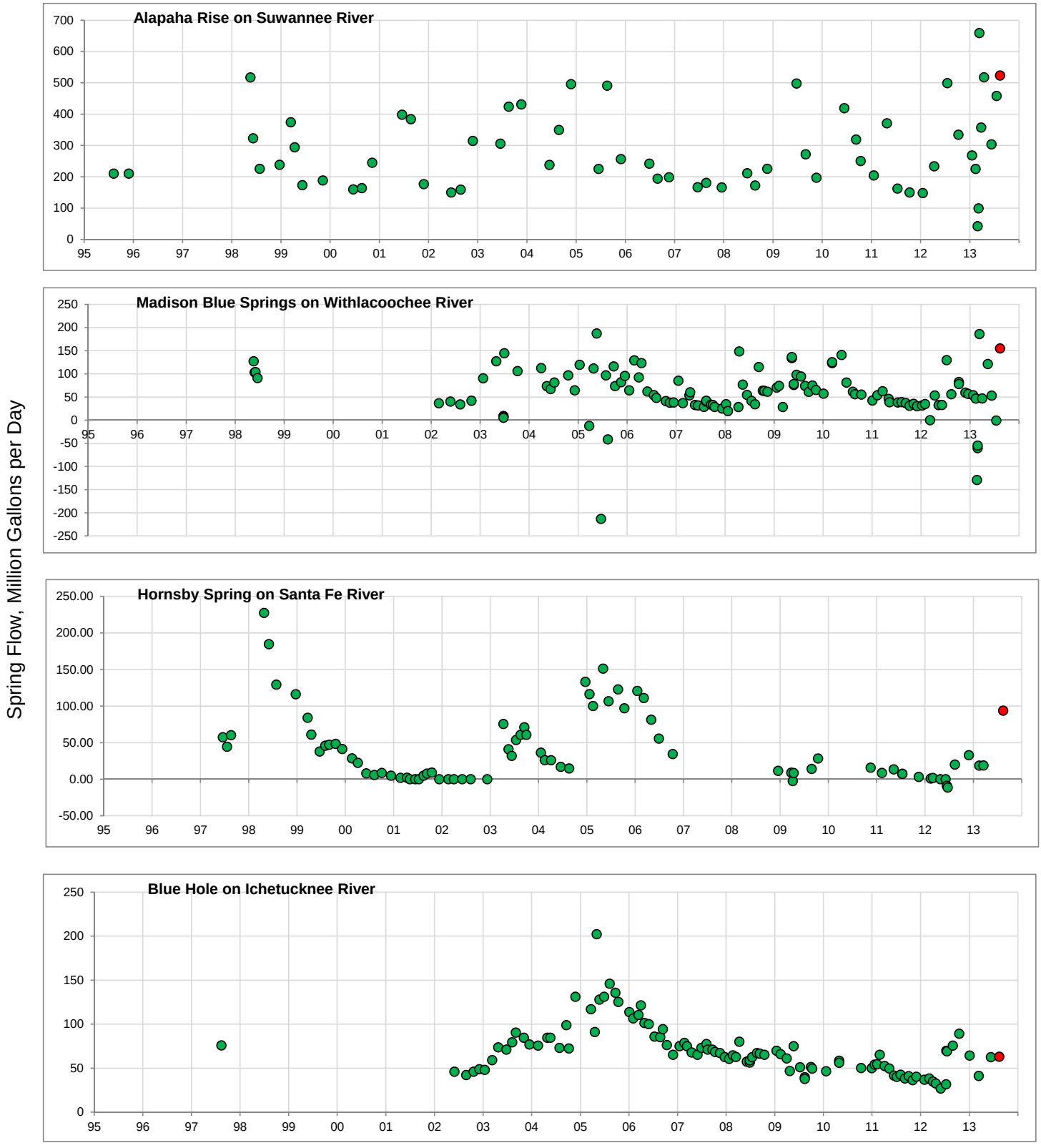


Figure 9: Quarterly Springflow Measurements

The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were measured in August 2013, with the latest measurement marked in red. Flow is given in million gallons per day (MGD).

Spring flow is greatly affected by river levels. Rising river levels or high tides can slow spring flow or even reverse it, resulting in negative flow rates as river water enters the spring. Some low flows in this data may not be representative of drought conditions.



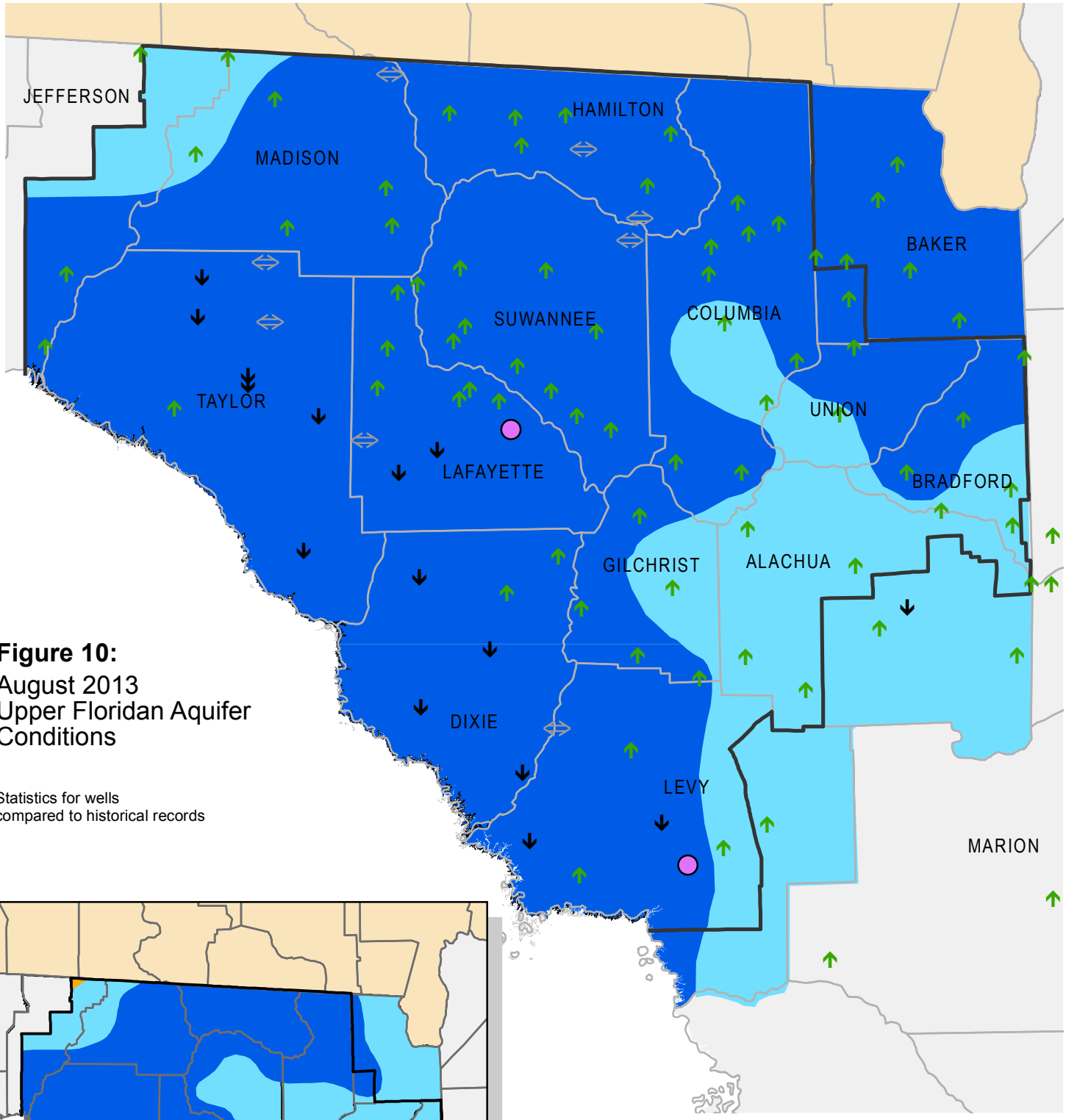
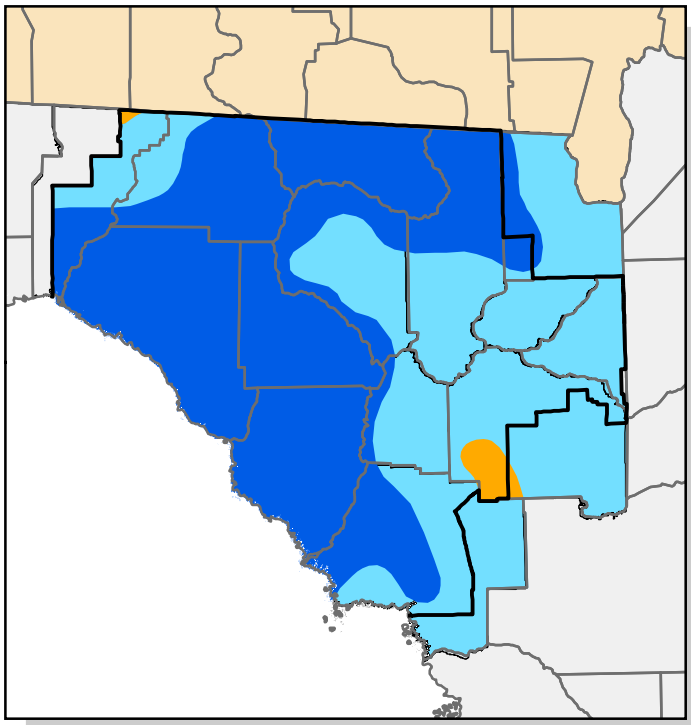


Figure 10:
August 2013
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: July 2013 Groundwater Levels

Historical High Level

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

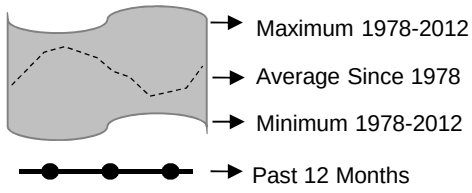
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

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

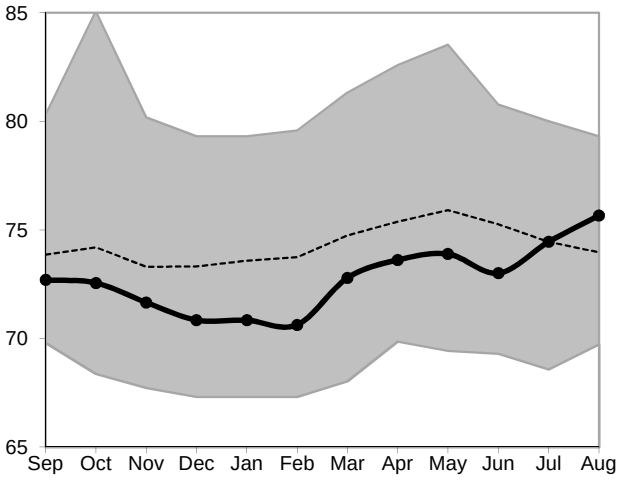
District Boundary

Figure 11: Monthly Groundwater Level Statistics
Levels September 1, 2012 through August 31, 2013
Period of Record Beginning 1978

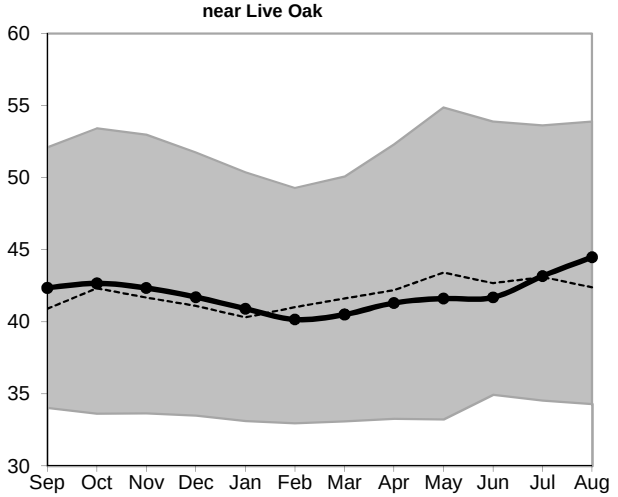


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

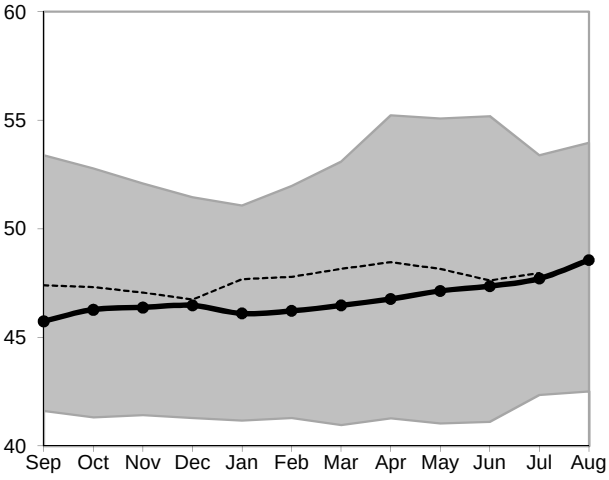
Madison County N010719001
near Greenville



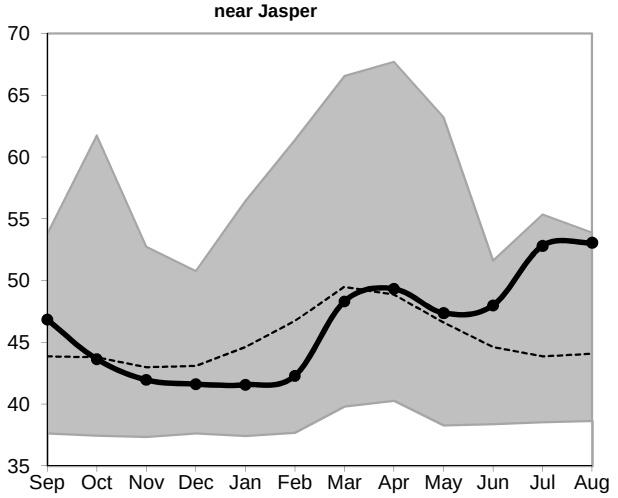
Suwannee County S021335001
near Live Oak



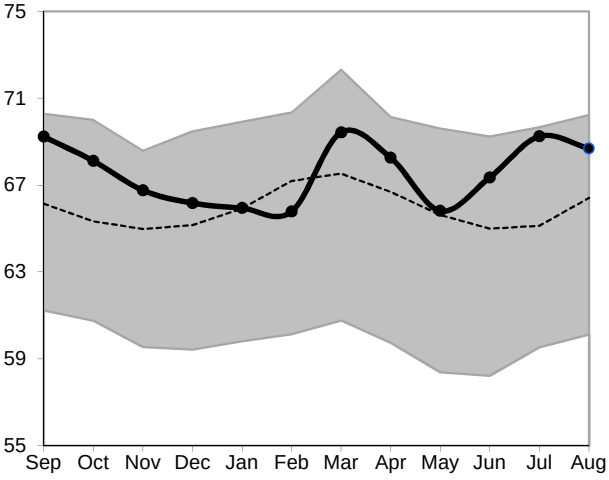
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

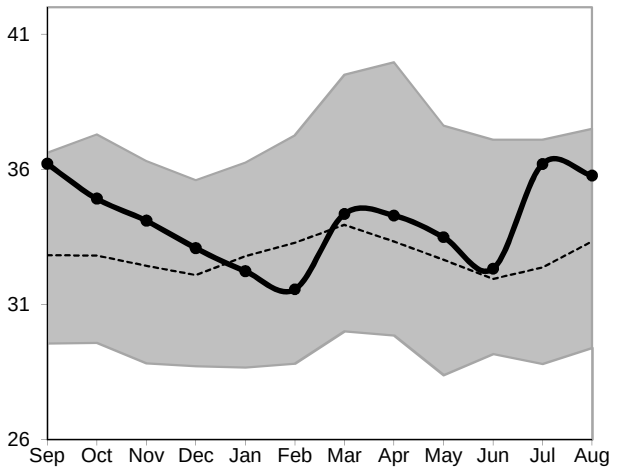
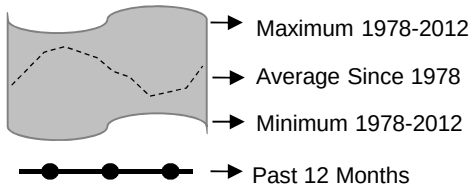
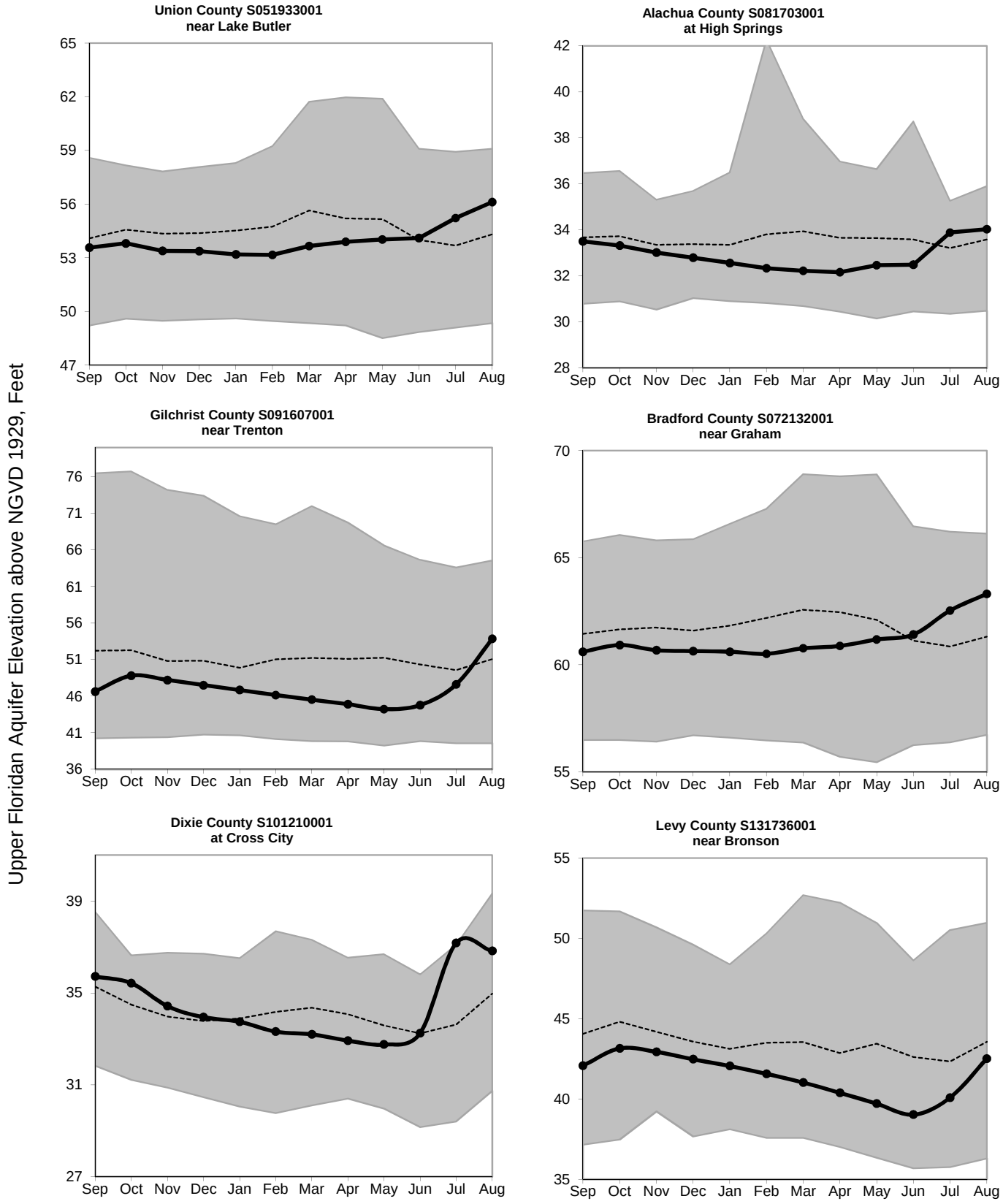


Figure 11, cont.: Groundwater Level Statistics
Levels September 1, 2012 through August 31, 2013
Period of Record Beginning 1978





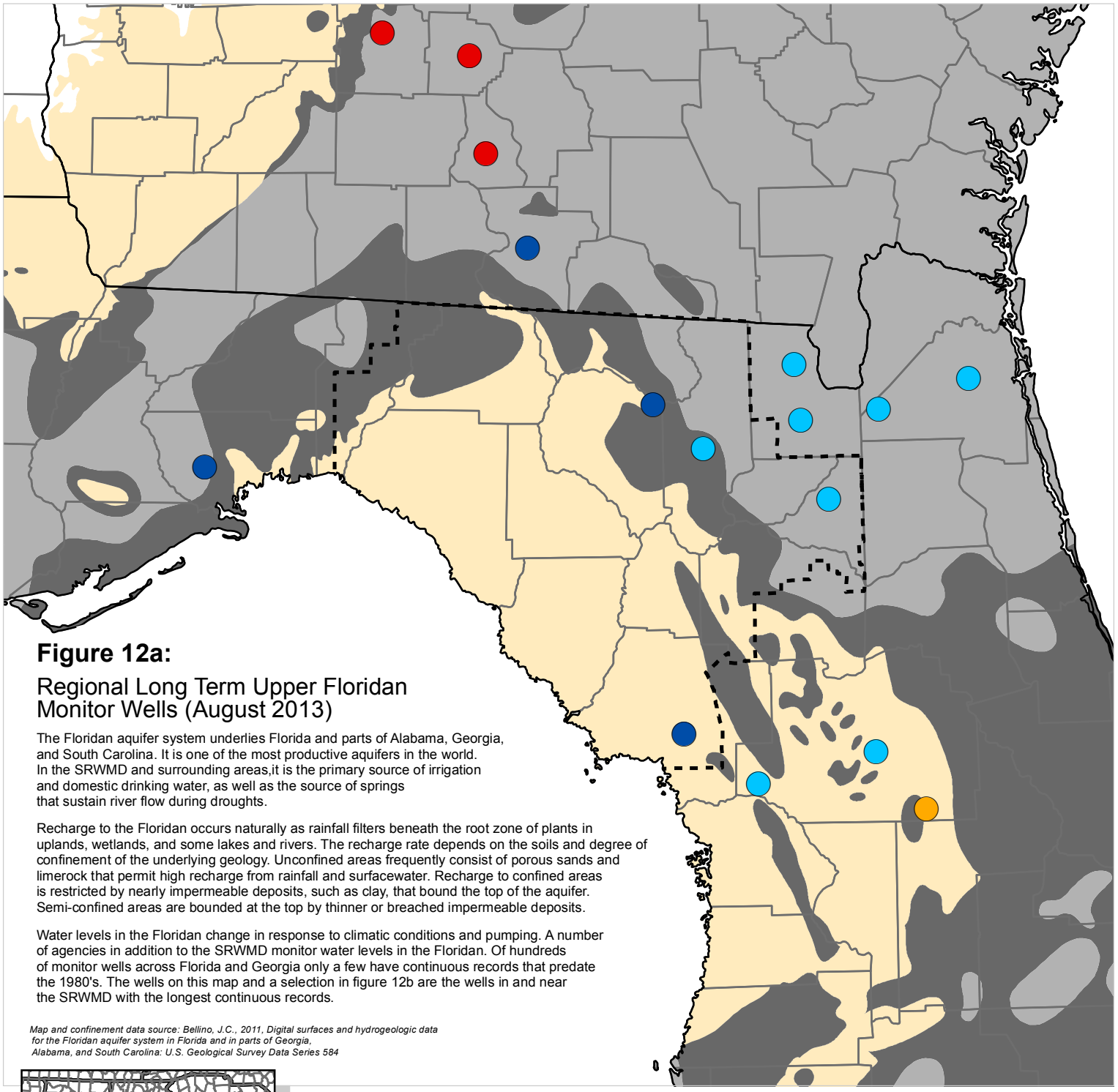


Figure 12a:

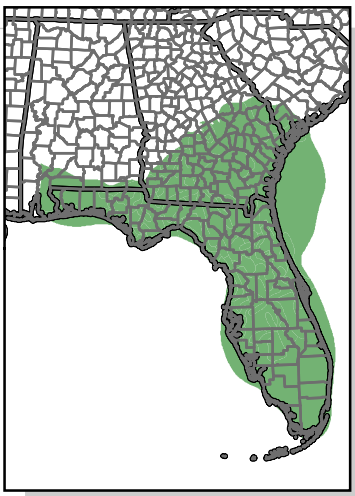
Regional Long Term Upper Floridan Monitor Wells (August 2013)

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

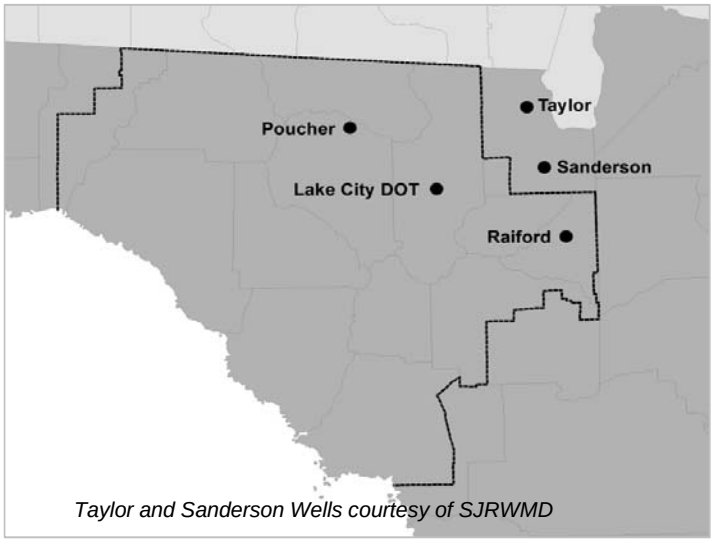
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

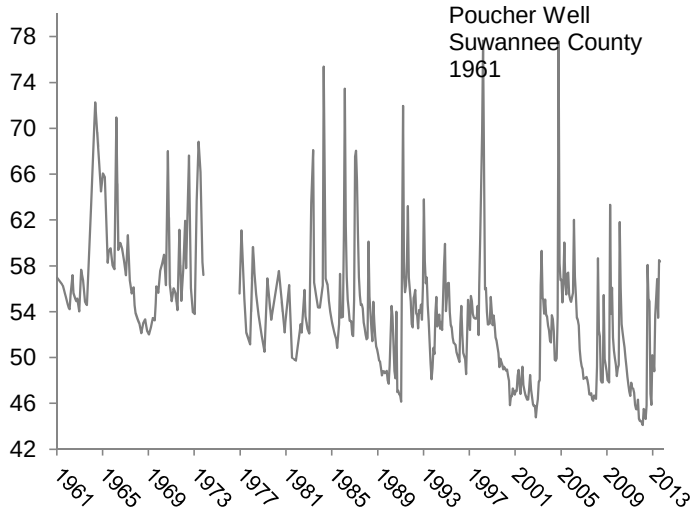
Percentile of Most Recent Water Level Relative to Entire Record

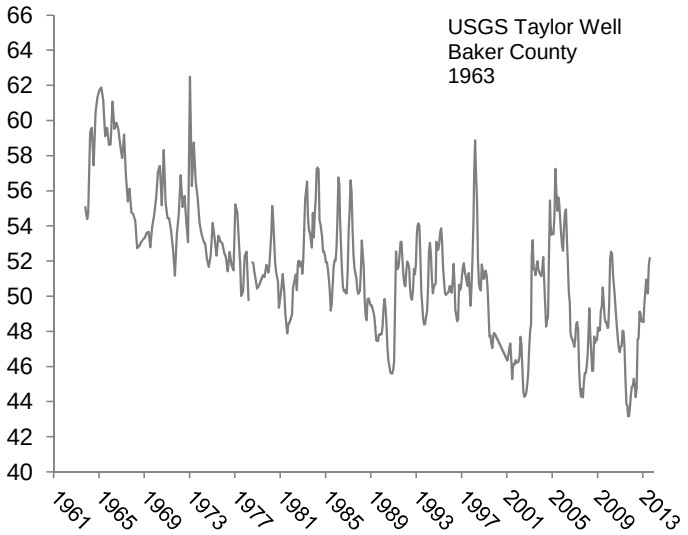
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

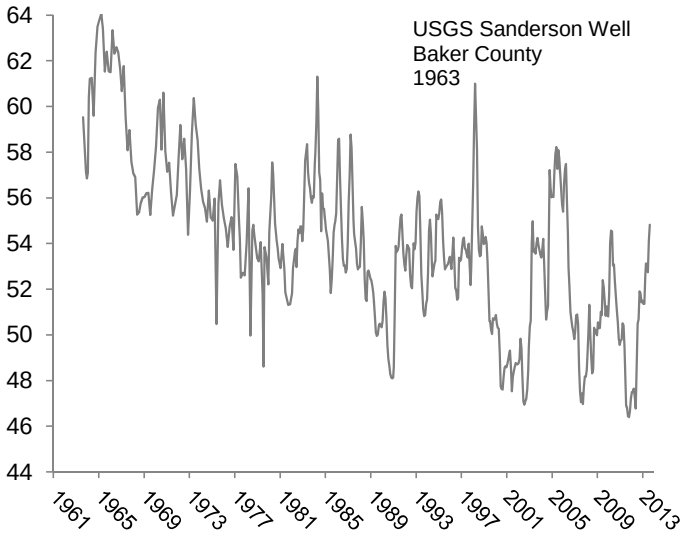
Figure 12b: Regional Long Term Upper Floridan Levels

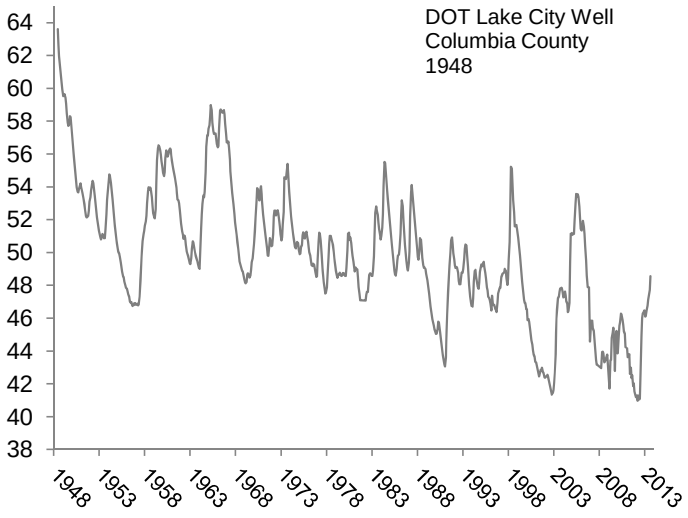
August 2013

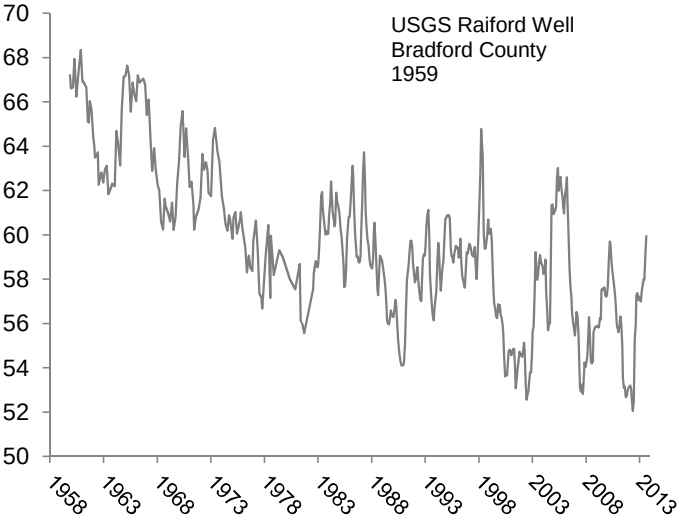












Upper Floridan Aquifer Elevation above NGVD 1929, Feet