MEMORANDUM

TO: Governing Board

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

THRU: Ann B. Shortelle, Ph.D., Executive Director
Jon Dinges, P.E., Department Director JWD

DATE: August 9, 2012

RE: July 2012 Hydrologic Conditions Report for the District

RAINFALL

- Average rainfall in the District was 5.81", which is 75% of the long-term July average of 7.72" (Table 1, Figure 1). Rainfall was distributed in typical summer patterns, with localized storms inland and higher amounts along the coast where accumulations neared 15" (Figure 2). The lowest gaged total was 1.93" near Sanderson in southern Baker County, and the highest was 10.9" at Cook's Hammock in Lafayette County. Rainfall was generally less than typical in the south Georgia basins that contribute to Suwannee River flow (Figure 3).
- Average SRWMD rainfall for the 12 months ending July 31 was 1.14" higher than the long-term average of 54.65". This average surplus is the result of wide range accumulations, with areas in the central part of the District having received 30-40" more than the northern and southern counties.

SURFACEWATER

- **Rivers:** Levels at Suwannee and Santa Fe river gages fell steadily throughout the month after flooding from Tropical Storm Debby in June. Levels at the end of the month were in a range considered normal for this time of year. The Steinhatchee, Econfina, and Fenholloway rivers, whose upper basins received up to 30" of excess rain in two months, remained high, with the Steinhatchee staying bank-full much of the month. Statistics for a number of rivers are presented graphically in Figure 6, and conditions relative to historic conditions for the time of year in Figure 7.

- **Lakes**: Lakes in the western part of the District remained below average, although Cherry Lake rose more than 6" after setting a 37-year low in May. Levels at Sampson and Crosby dropped after severe flooding but remained above average. Waters Lake near Trenton and Governor Hill Lake in Dixie County remained dry at the gages. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for lakes where the gages were accessible.

GROUNDWATER

Upper Floridan Aquifer levels in most of Taylor and Lafayette counties rose to their highest levels since 2005. Levels in wells near the Suwannee and Santa Fe rivers dropped along with the river levels, ending in a range considered normal in most of the river corridors. Levels in northern Madison and Jefferson counties remained extremely low, as did levels in Alachua County in wells away from the Santa Fe River. Levels in Union and Bradford counties rose to their highest levels in a year to a range considered below normal, but the rising levels appeared to level off at the end of the month. Ten percent of the monitored wells were in the lowest 10% of records, 15% were below normal, 40% were normal, and 35% were above normal (Figure 10). Median conditions across the District compared to all historic levels rose from the 1st percentile in May to the 65th percentile in July (based on records beginning no earlier than 1978). 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.

SPRINGS

The Suwannee River flowed into White Sulphur Springs for almost 4 weeks before the flow reversed on July 22. The flow measured on July 27 was the highest since 2004, but the outflow was brown river water mixed with groundwater. Springs on the middle- and lower-Suwannee were slowed by high river levels. Fanning Springs was closed to swimming for 5 weeks until the river dropped enough to reopen at the end of the month. Springs on the Santa Fe River rebounded by mid-July, with the highest flow in two years recorded at Poe Springs. The highest flow since 2008 was recorded on the Ichetucknee. Statistics for a representative sample of wells are shown in Figure 12.

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 4 indicated moderately wet conditions in north Florida and mild drought in south central Georgia.
- The 3-month outlook issued by the Climate Prediction Center calls for above-normal temperatures and equal chances of wet or dry conditions through October.
- Figure 13 shows overhead irrigation application at a number of farms in the District. The average daily application rate fell slightly in July to 0.05".

CONSERVATION

A modified Phase III Water Shortage remains in effect. All users are strongly urged to eliminate unnecessary uses. Details of the restrictions contained in the order are available on the District's webpage (www.mysuwanneeriver.com).

Table 1: Estimated Rainfall Totals

County	July 2012	July Average	Last 3 Months	Last 12 Months
Alachua	4.50	7.01	26.60	50.28
Baker	4.16	7.06	35.32	59.83
Bradford	5.37	6.92	32.53	54.54
Columbia	4.71	7.01	37.86	64.26
Dixie	9.53	9.14	27.88	52.93
Gilchrist	5.59	8.03	25.04	51.06
Hamilton	2.36	6.79	28.88	53.65
Jefferson	3.61	7.23	23.62	46.47
Lafayette	8.04	8.21	40.71	66.18
Levy	8.54	8.98	24.89	49.47
Madison	3.10	7.29	25.60	54.15
Suwannee	5.18	7.17	40.35	68.54
Taylor	8.10	8.62	31.31	54.25
Union	3.63	7.49	31.24	58.35

July 2012 Average:	5.81
Historical July Average (1932-2011):	7.72
Historical 12-month Average (1932-2011):	54.56
Past 12-Month Total:	55.70
12-month Rainfall Surplus:	1.14

(Rainfall reported in inches)

Figure 1: Comparison of District Monthly Rainfall

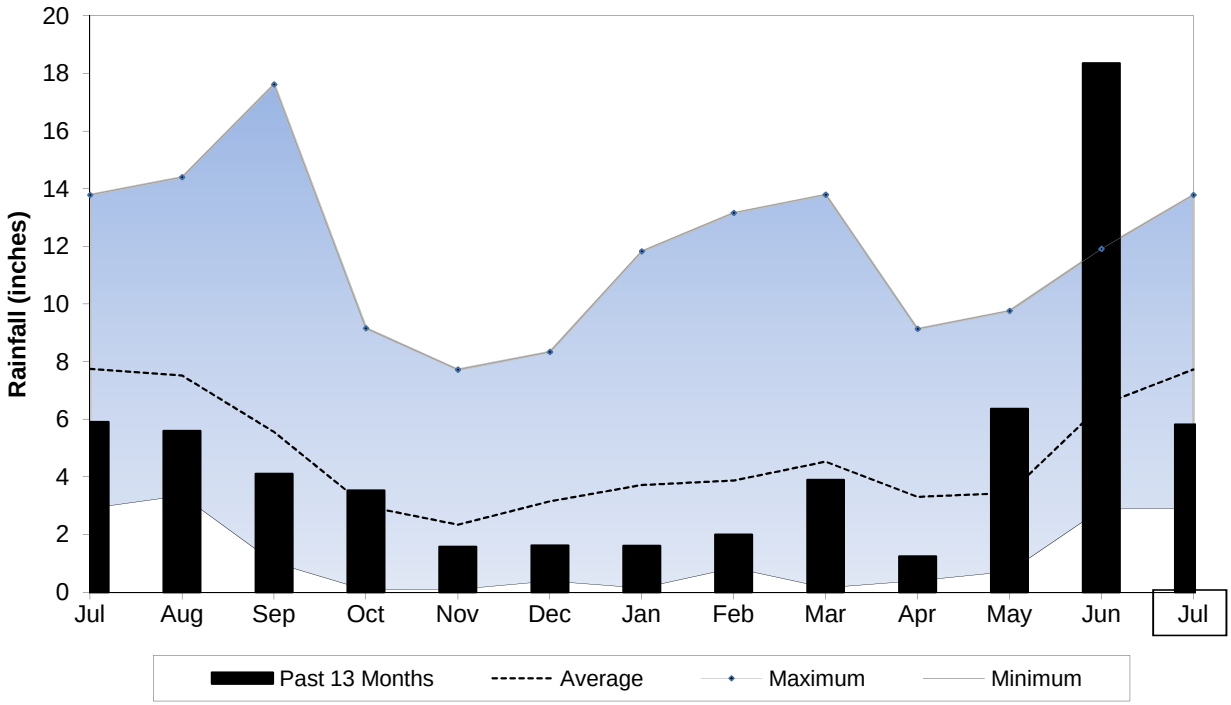


Figure 2: July 2012 Rainfall Estimate

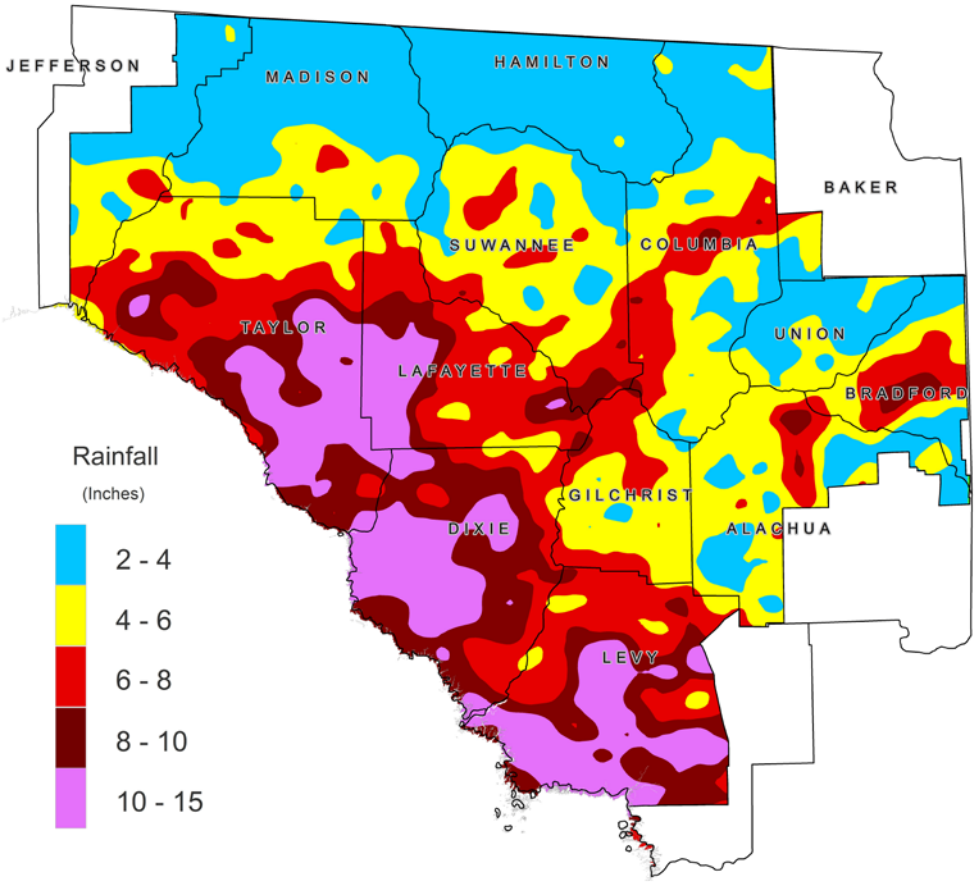


Figure 3: July 2012 Regional Percent of Normal Rainfall

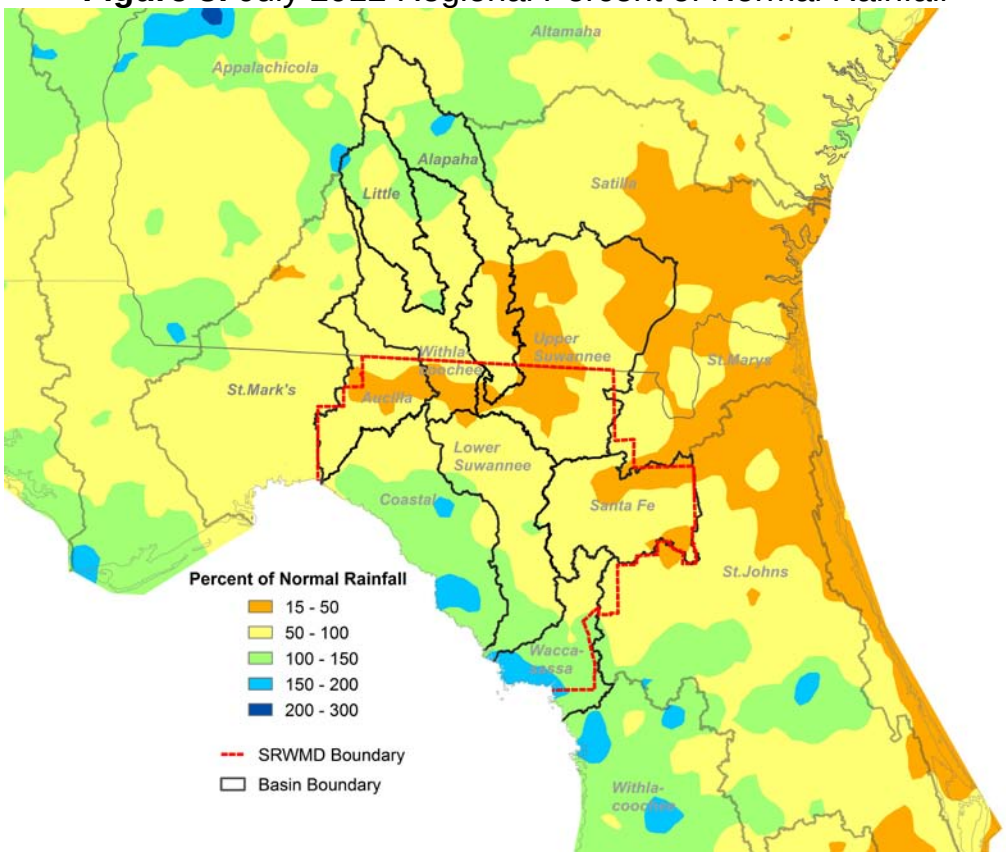


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Ending July 31, 2012

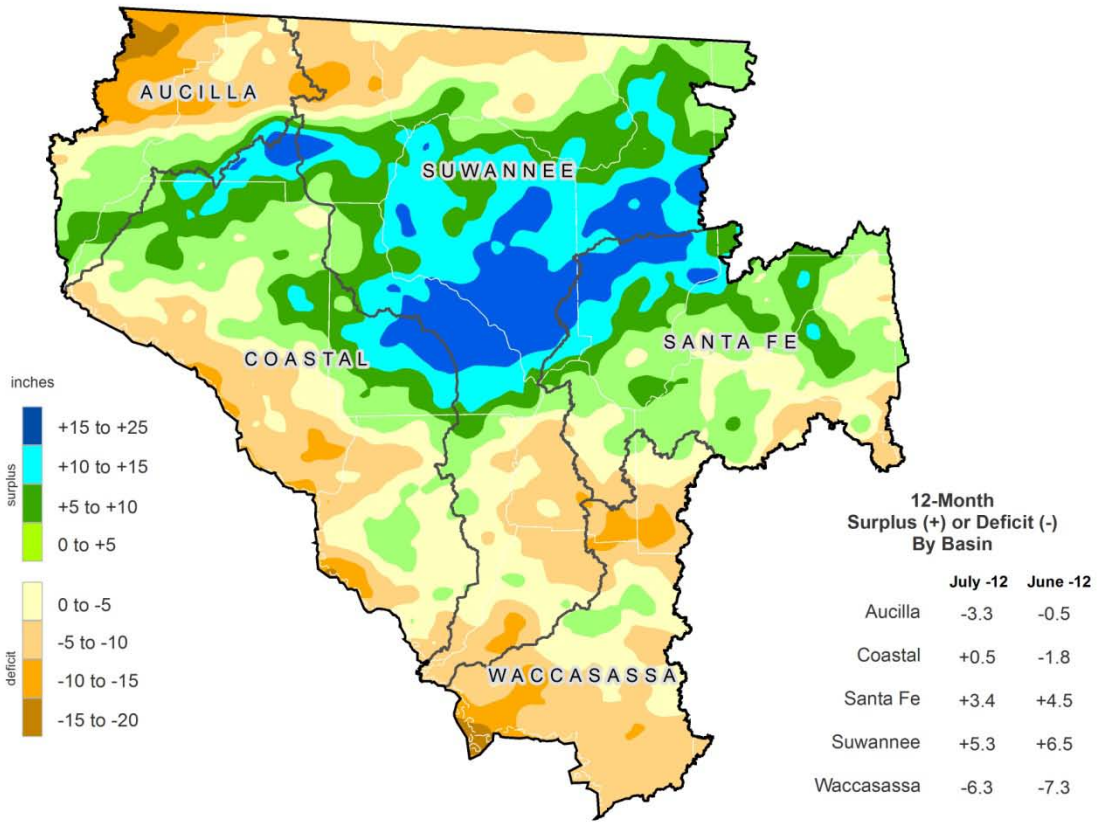


Figure 5: 12-Month Rolling Rainfall Deficit Since 1998
Difference between observed 12-month rainfall and the long-term average over the same period

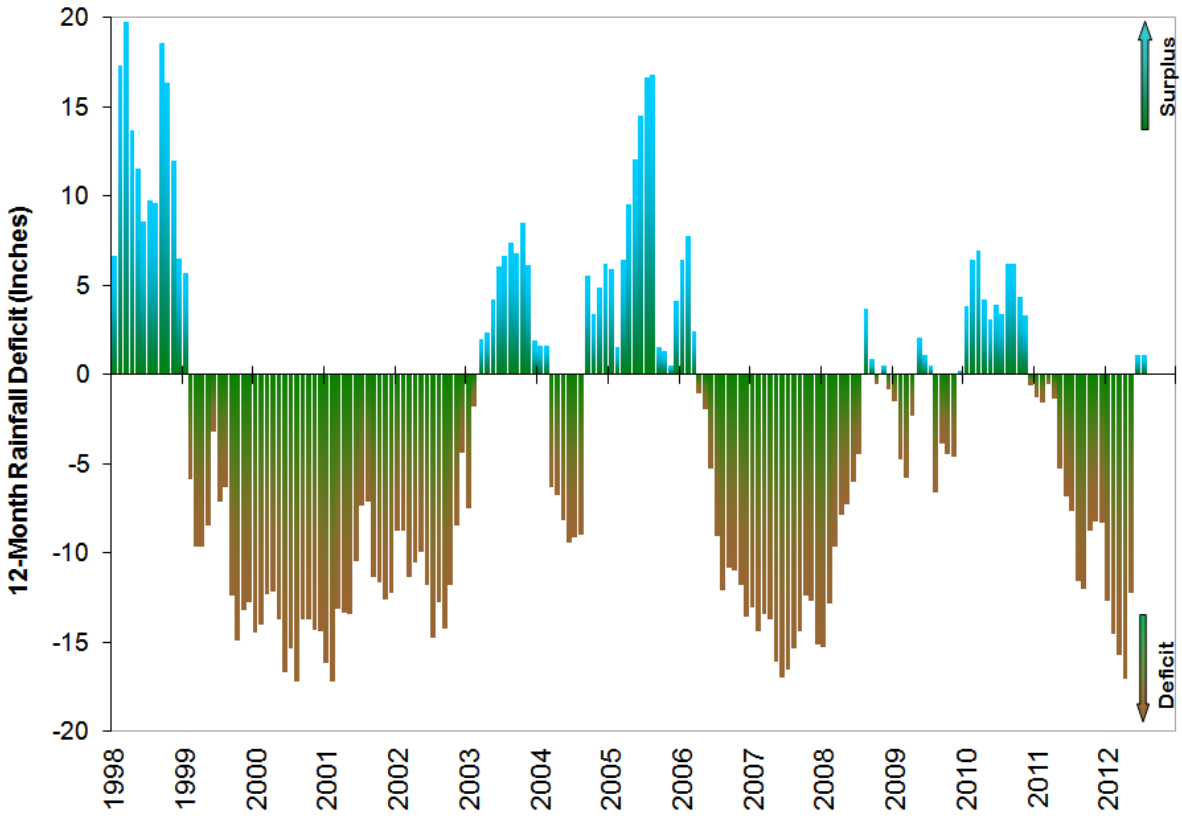


Figure 6: Daily River Flow Statistics
August 1, 2011 through August 4, 2012

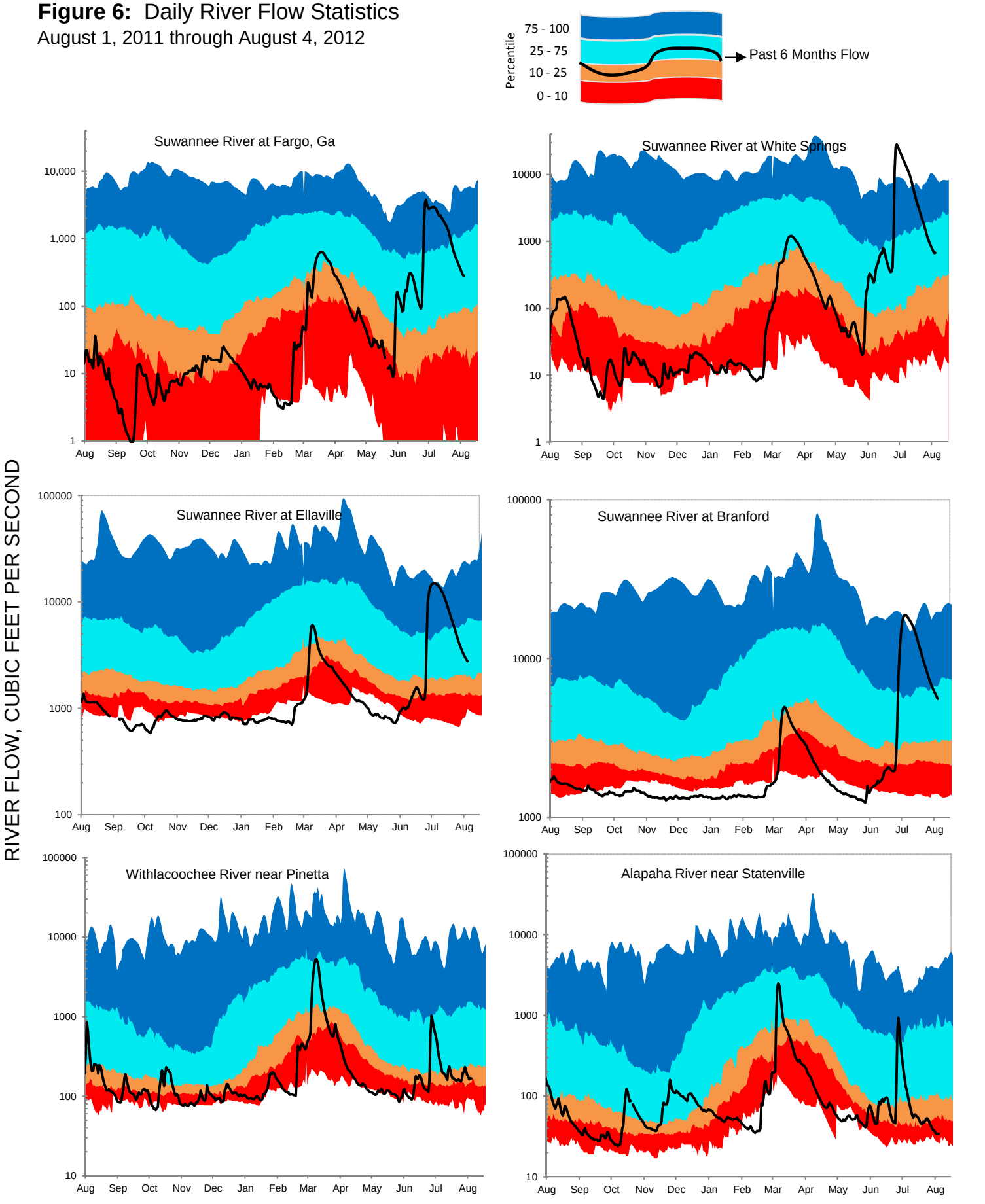
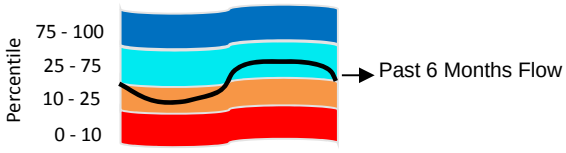
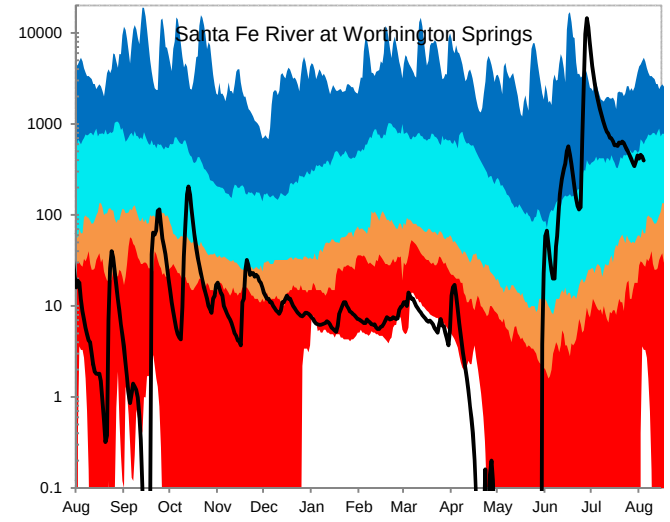
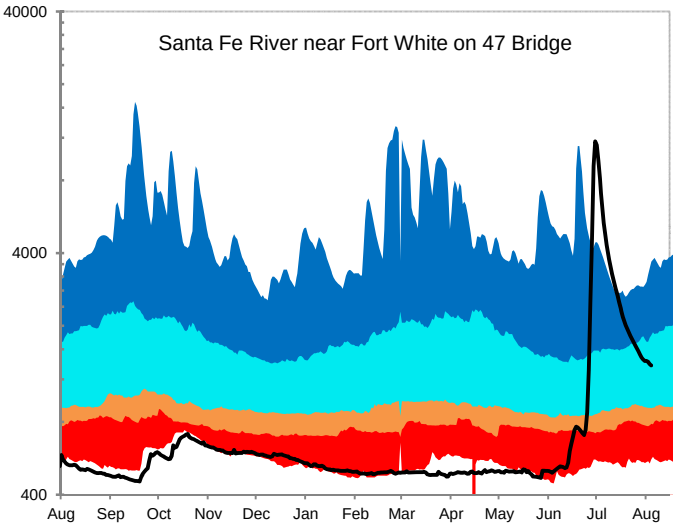


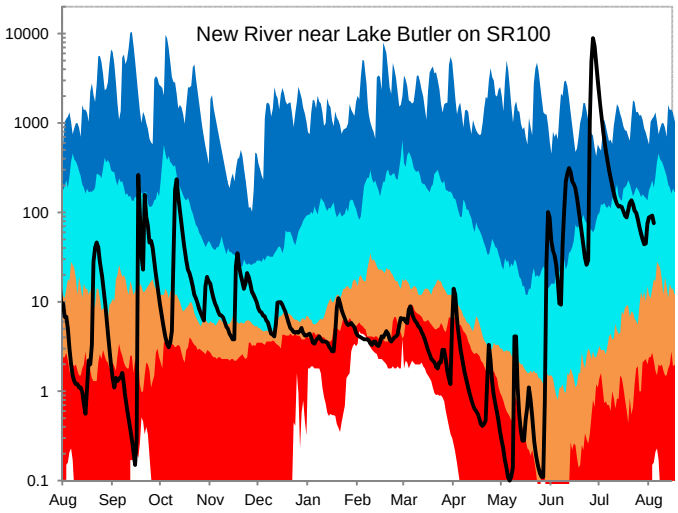
Figure 6, cont: Daily River Flow Statistics
August 1, 2011 through August 4, 2012

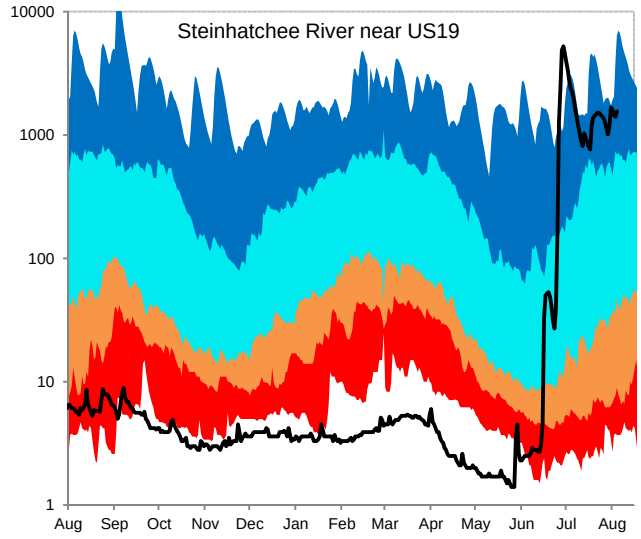


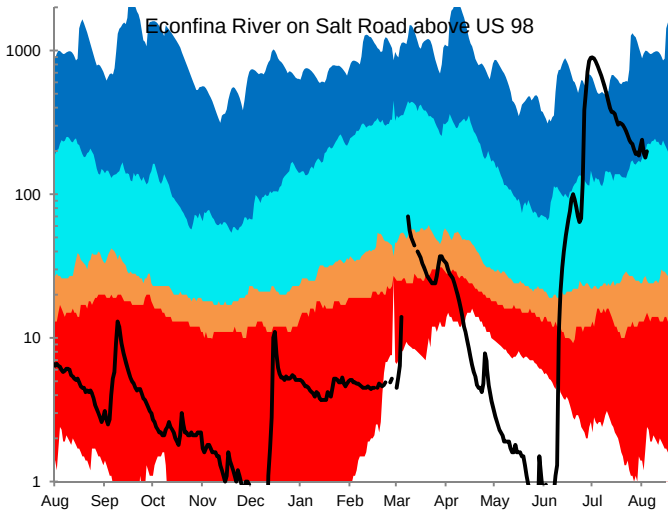
RIVER FLOW, CUBIC FEET PER SECOND

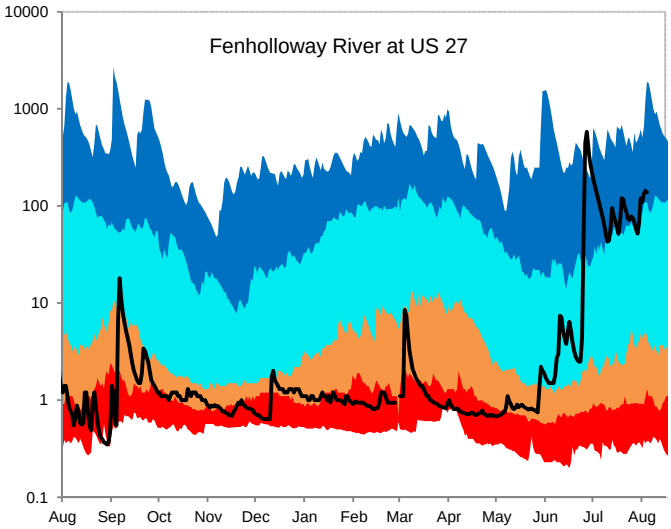












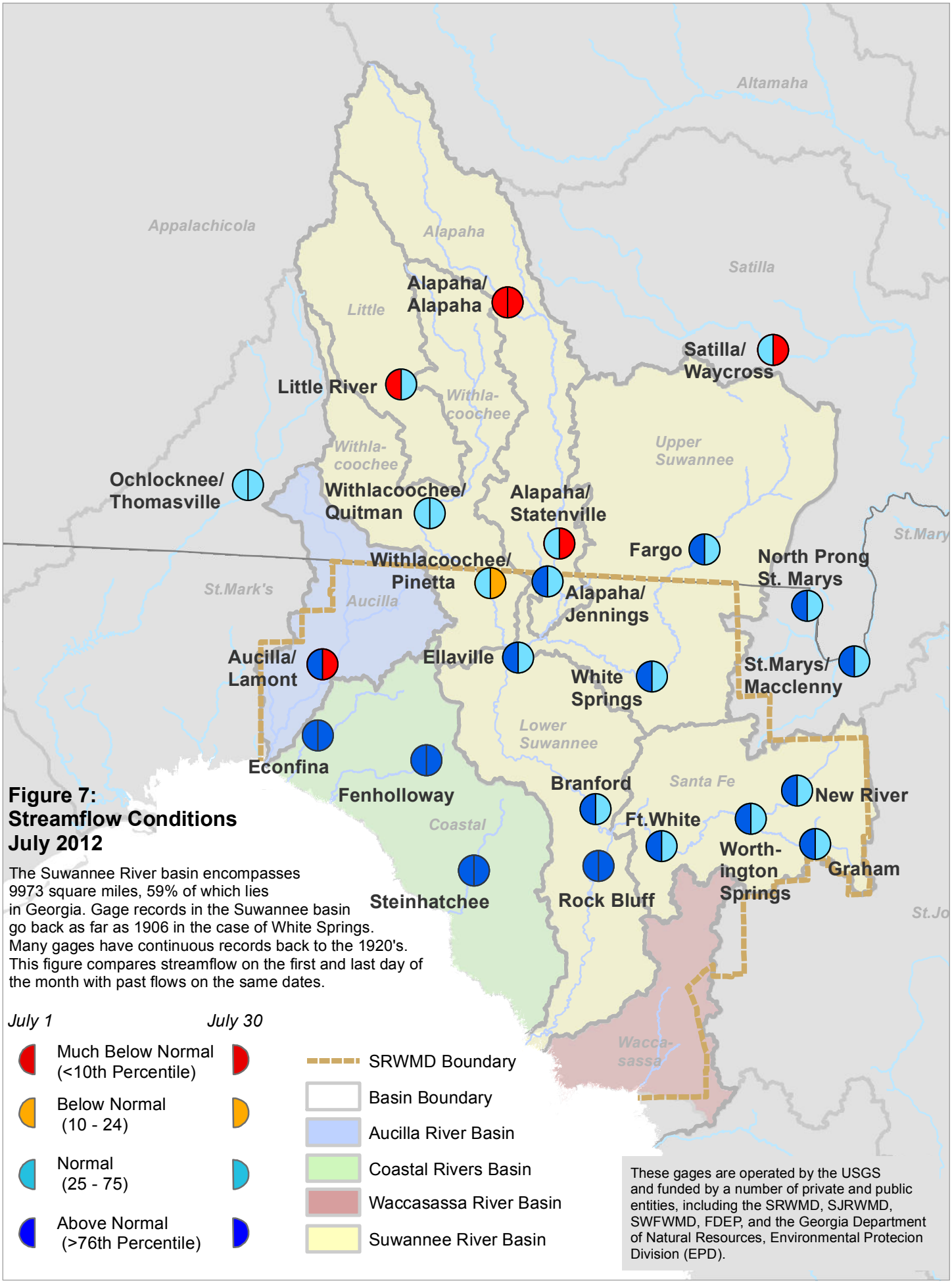
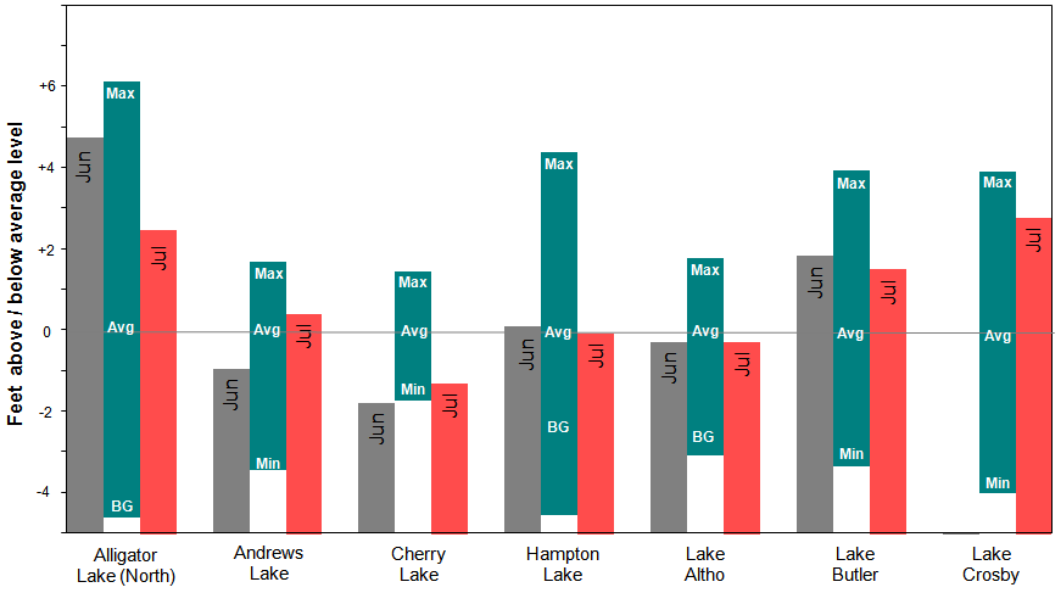
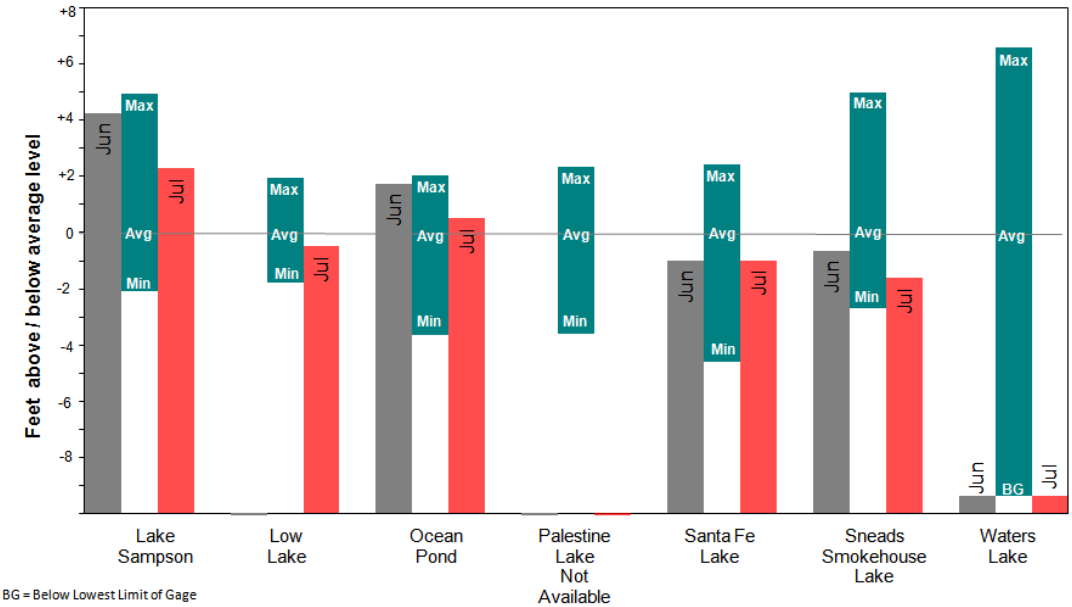

Altamaha
Appalachicola
Alapaha
Satilla
Little
Alapaha/
Alapaha
Satilla/
Waycross
Little River
Withla-
coochee
Withla-
coochee
Upper
Suwannee
Ochlocknee/
Thomasville
Withlacoochee/
Quitman
Alapaha/
Statenville
St.Mary
Fargo
North Prong
St. Marys
Withlacoochee/
Pinetta
St.Mark's
Aucilla
Alapaha/
Jennings
Aucilla/
Lamont
Ellaville
White
Springs
St.Marys/
Macclenny
Lower
Suwannee
Econfina
Fenholloway
Branford
Santa Fe
New River
Ft.White
Coastal
Worth-
ington
Springs
Graham
Steinhatchee
Rock Bluff
St.Jo
Wacca-
sassa
Figure 7:
Streamflow Conditions
July 2012
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.
July 1
July 30
Much Below Normal (<10th Percentile)
Below Normal (10 - 24)
Normal (25 - 75)
Above Normal (>76th 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, SWFWMD, FDEP, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

Figure 8: July 2012 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 full. If aquifer levels are low, these lakes go dry even if rainfall is normal.

The District monitors 15 lakes with much of the data provided by volunteer observers. Most records go back to the 1970's, although the Sampson Lake record starts in 1957.





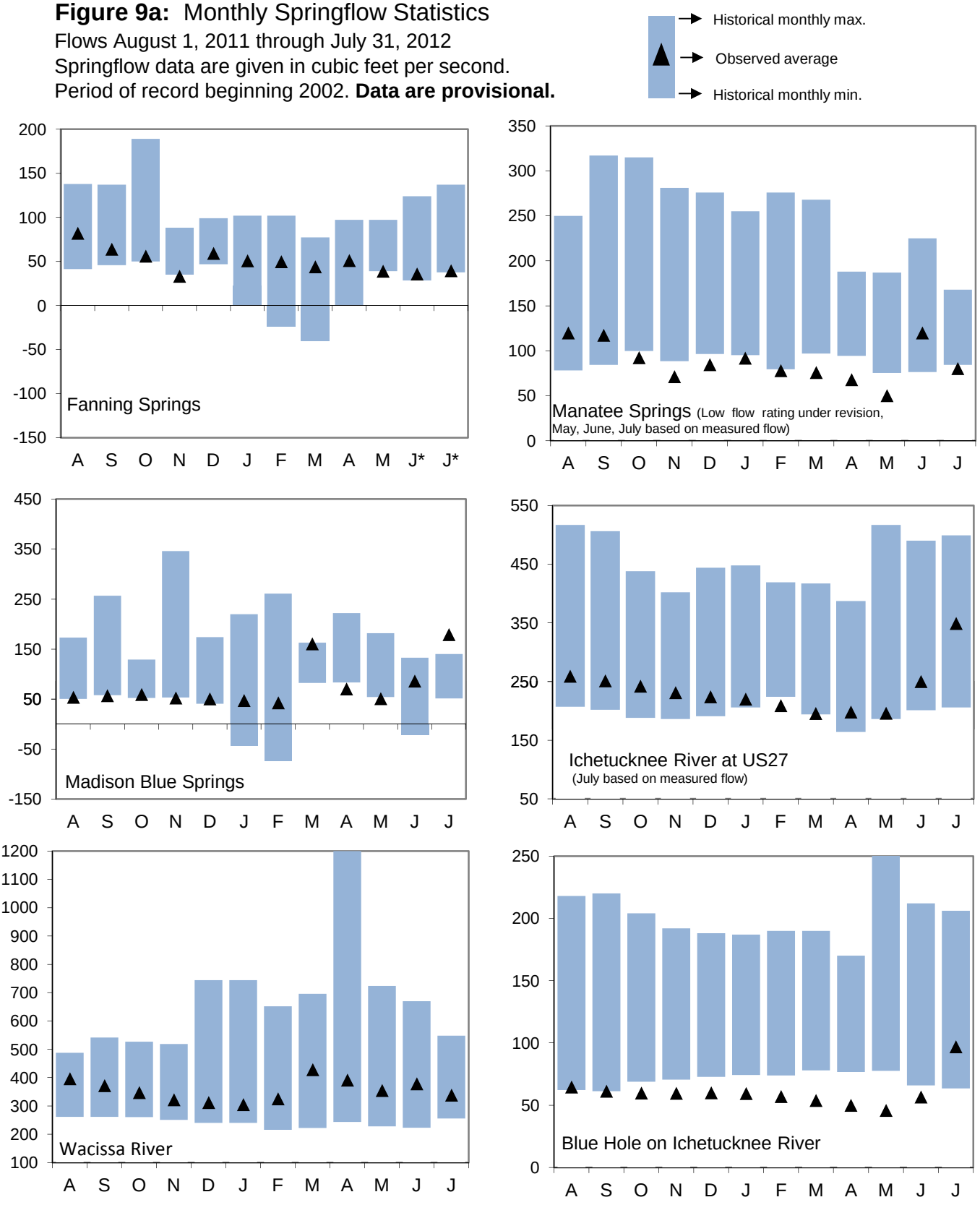
BG = Below Lowest Limit of Gage

Figure 9a: Monthly Springflow Statistics

Flows August 1, 2011 through July 31, 2012

Springflow data are given in cubic feet per second.

Period of record beginning 2002. **Data are provisional.**

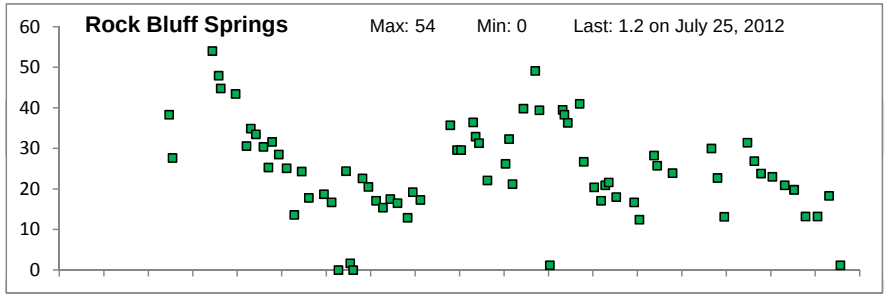


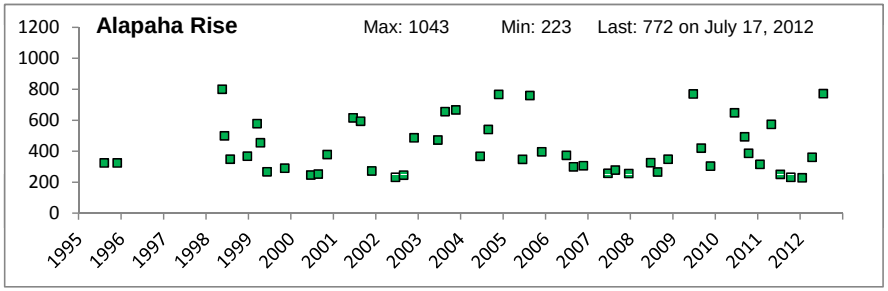
Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse.
Springflow for months marked by an asterisk (*) was strongly affected by river conditions.
Data will be revised once approved and published by the U.S. Geological Survey.

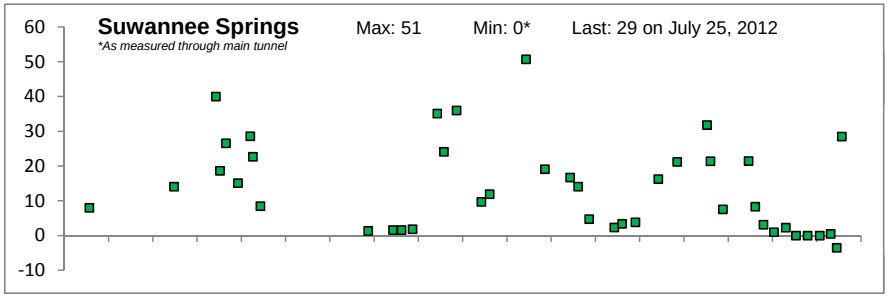
Figure 9b: Quarterly Springflow Measurements
These springs are measured at least once per quarter.
Springflow data are given in cubic feet per second.

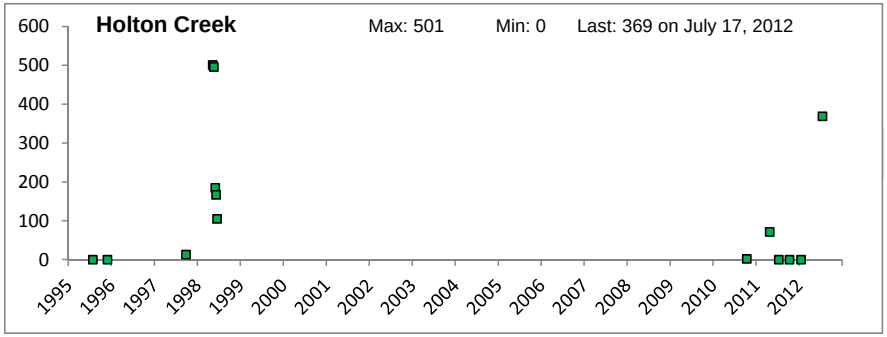
Spring flow is greatly affected by river levels. Rising river levels or high tides can slow spring flow or even reverse it. Some low flows in this data may not be representative of drought conditions.

Springs on Suwannee River

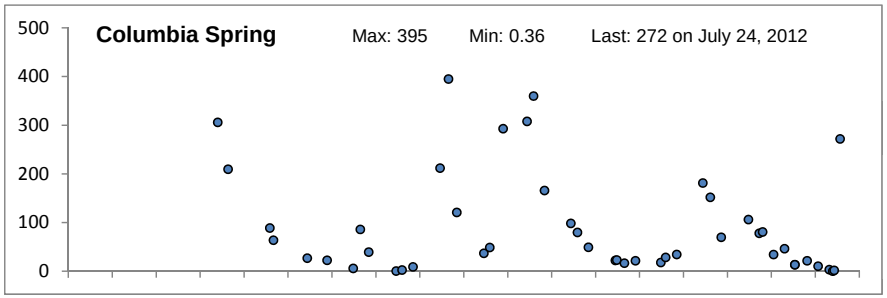


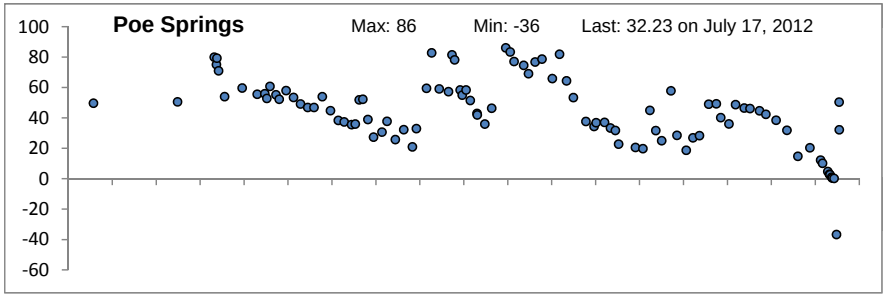


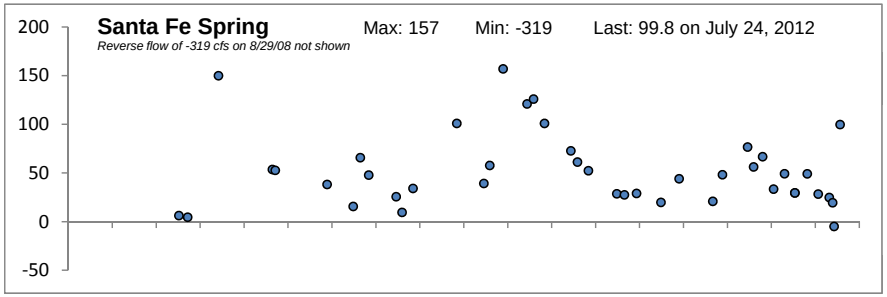


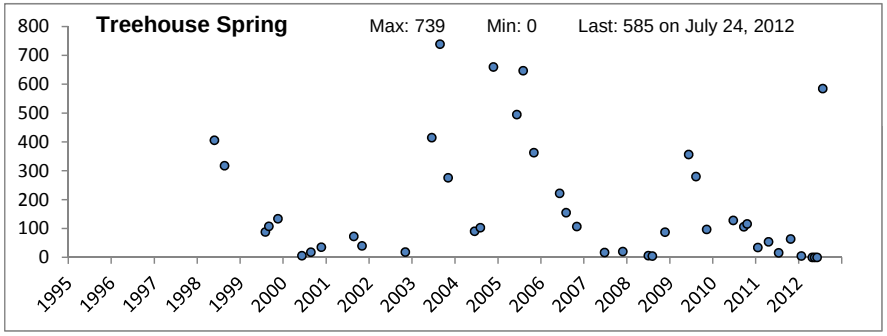


Springs on Santa Fe River









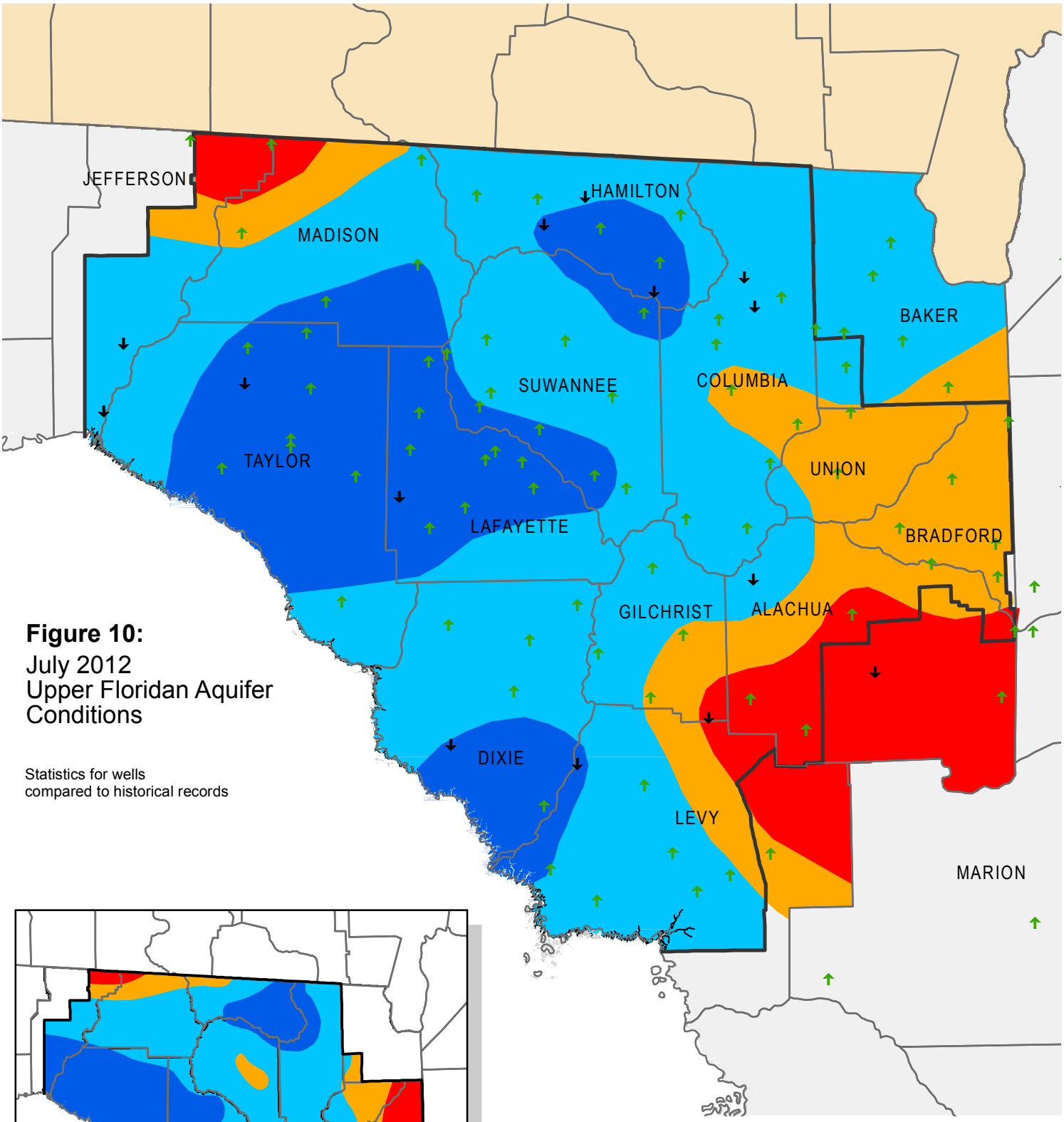
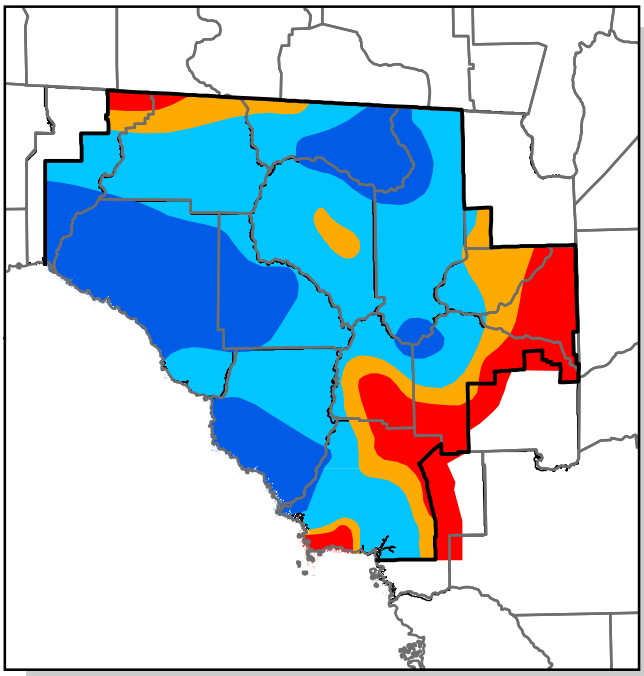


Figure 10:
July 2012
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records



Inset: End of June 2012 Groundwater Levels

High
(Greater than 75th Percentile)

Normal
(25th to 75th Percentile)

Low
(10th to 25th Percentile)

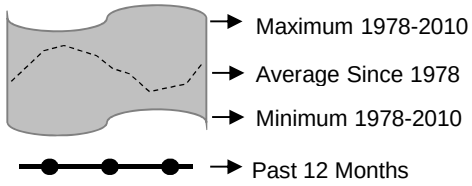
Extremely Low
(Less than 10th Percentile)

Increase/decrease in level since last month

District Boundary

Figure 11: Monthly Groundwater Level Statistics

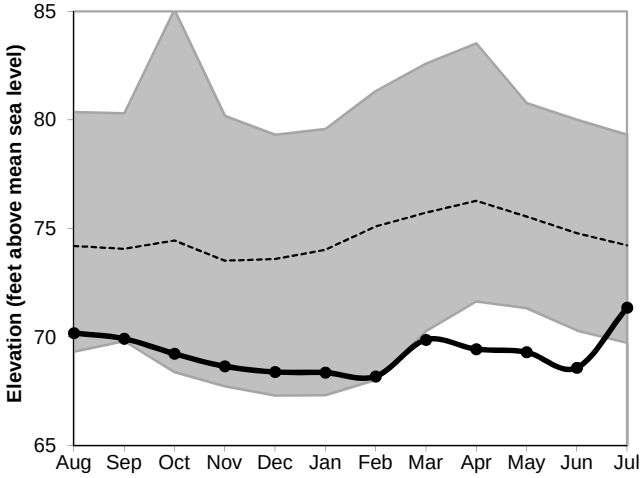
Levels August 1, 2011 through July 31, 2012
Period of Record Beginning 1978



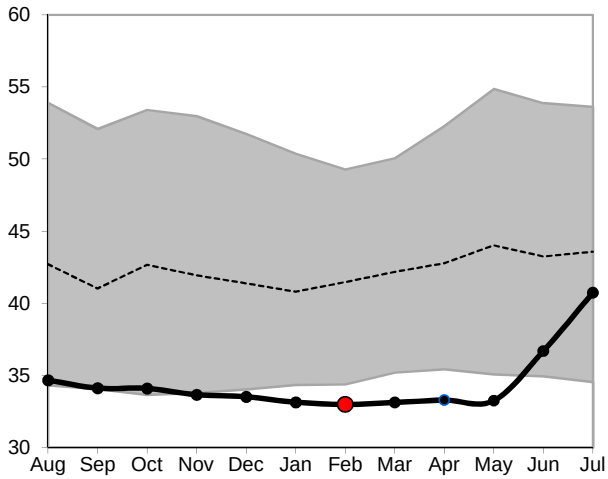
Historic Low

Past 12 Months

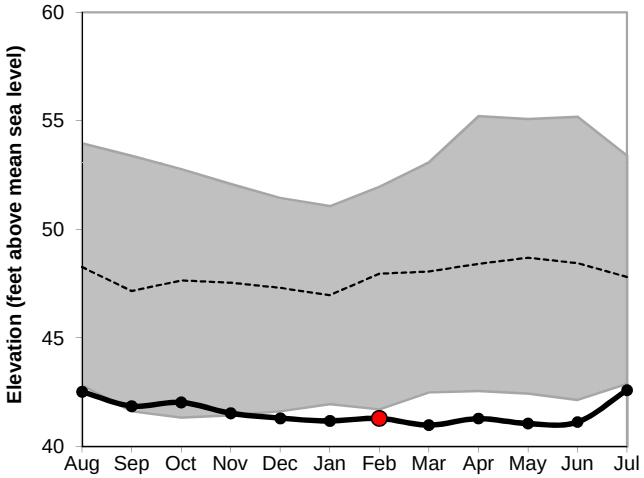
Madison County N010719001
near Greenville



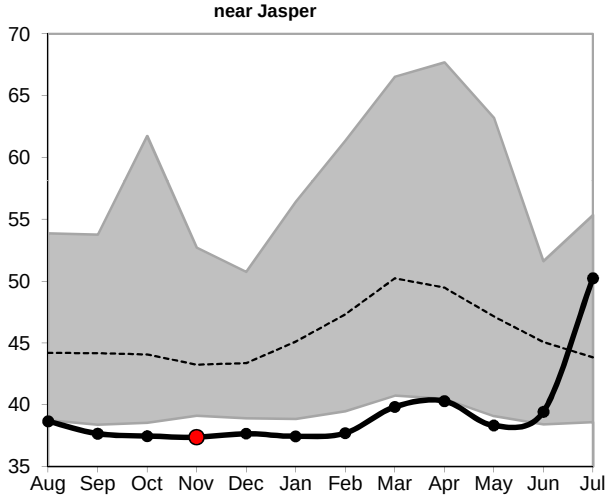
Suwannee County S021335001
near Live Oak



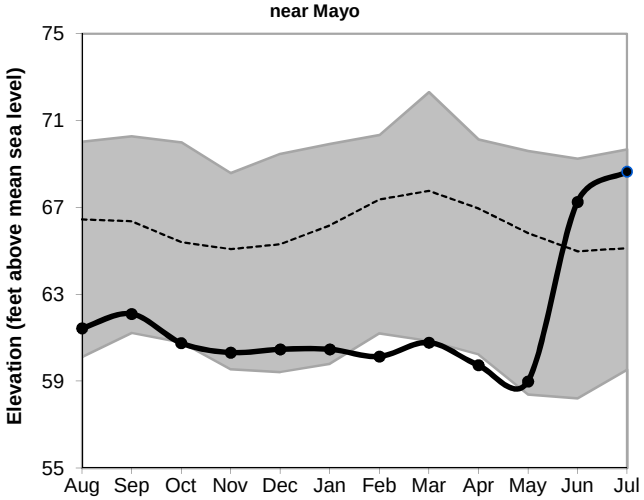
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S050701001
near Perry

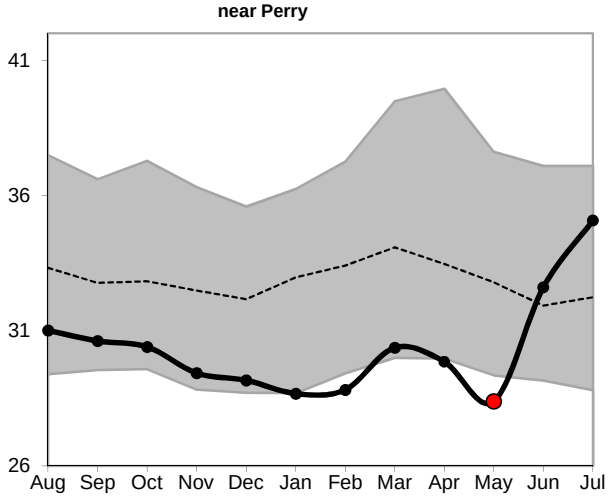
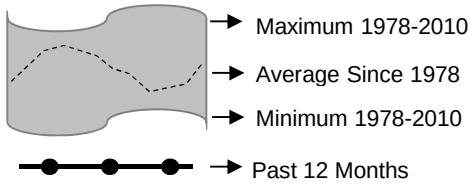
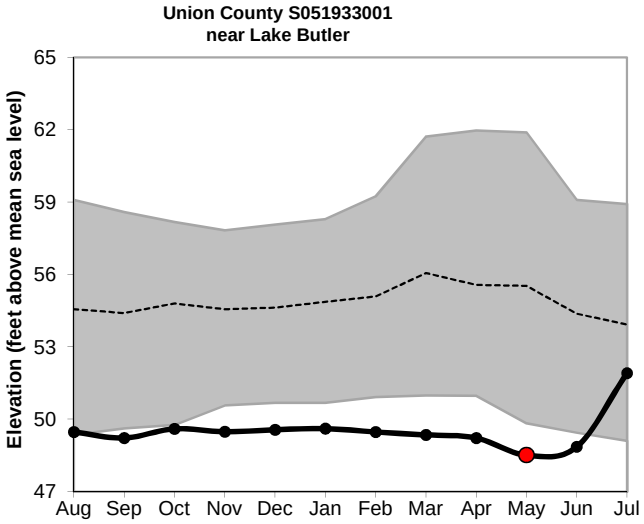
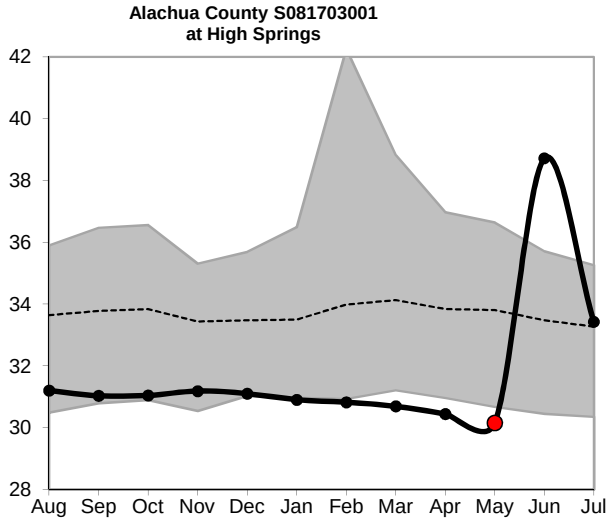


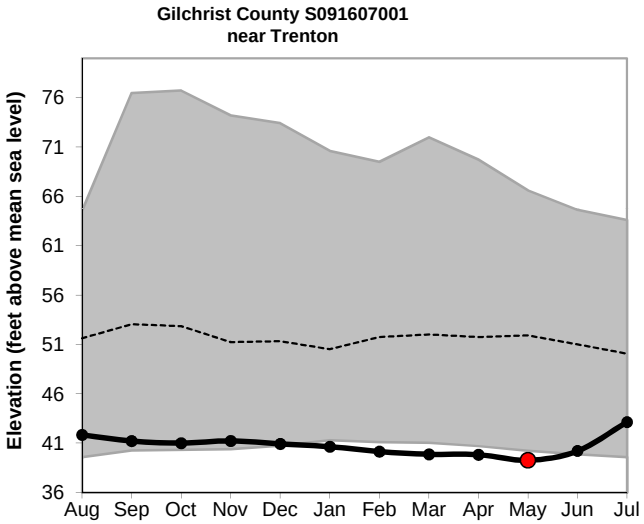
Figure 11, cont.: Groundwater Level Statistics

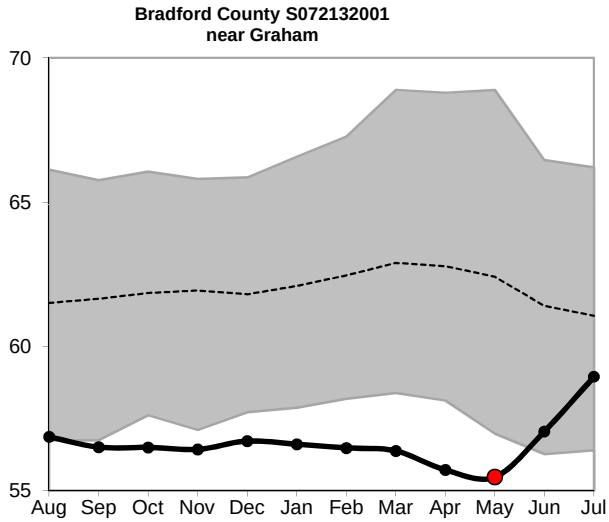
Levels August 1, 2011 through July 31, 2012
Period of Record Beginning 1978

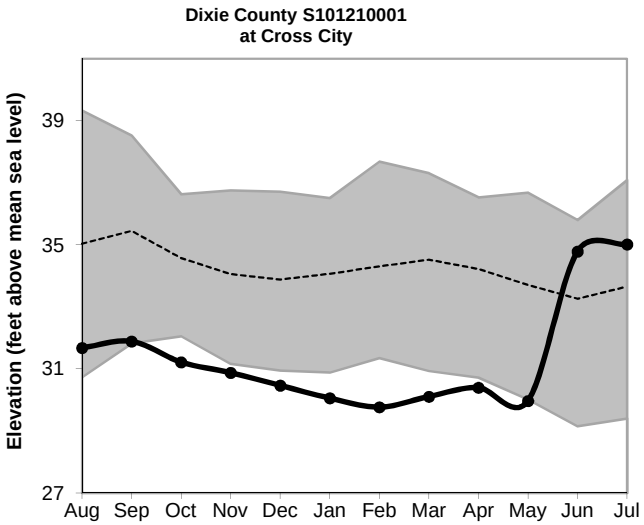


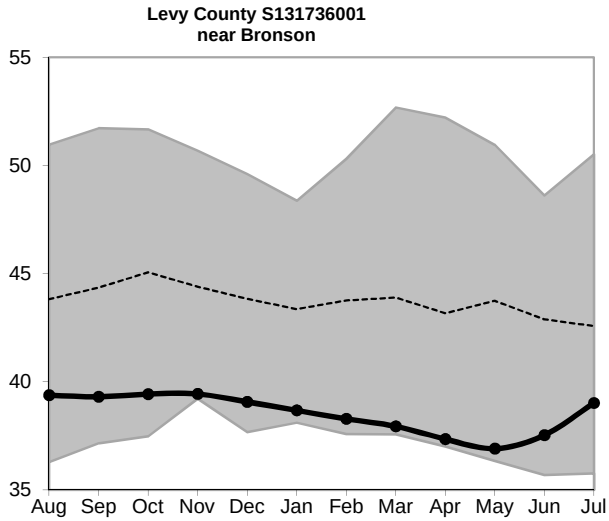












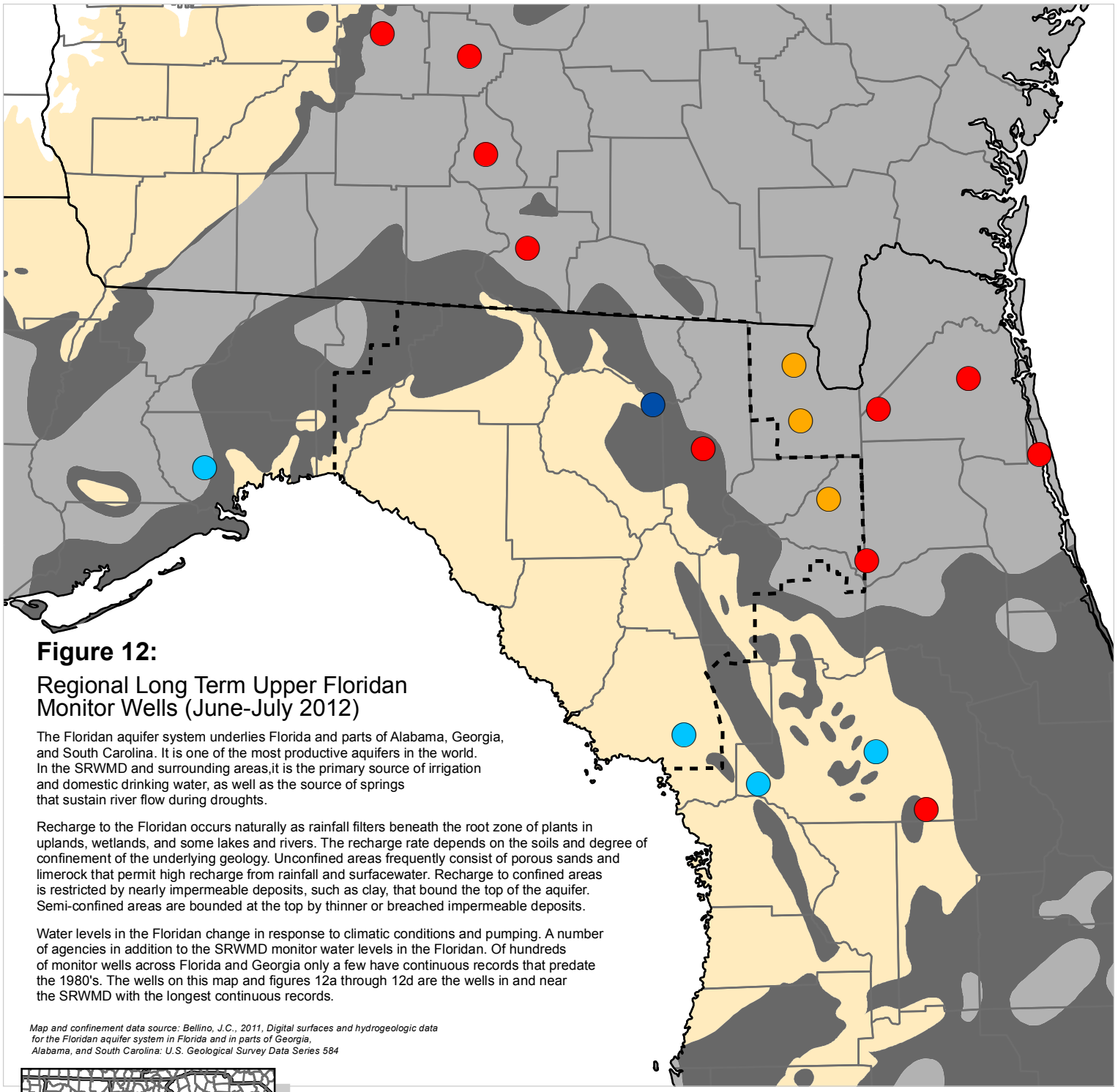


Figure 12:

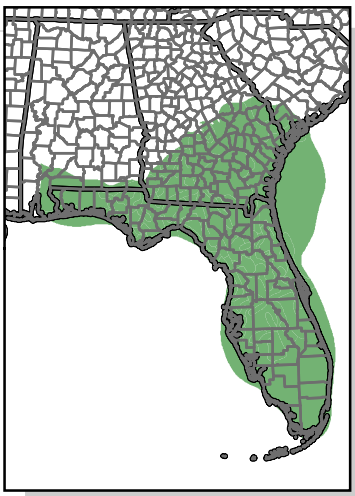
Regional Long Term Upper Floridan Monitor Wells (June-July 2012)

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 figures 12a through 12d 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

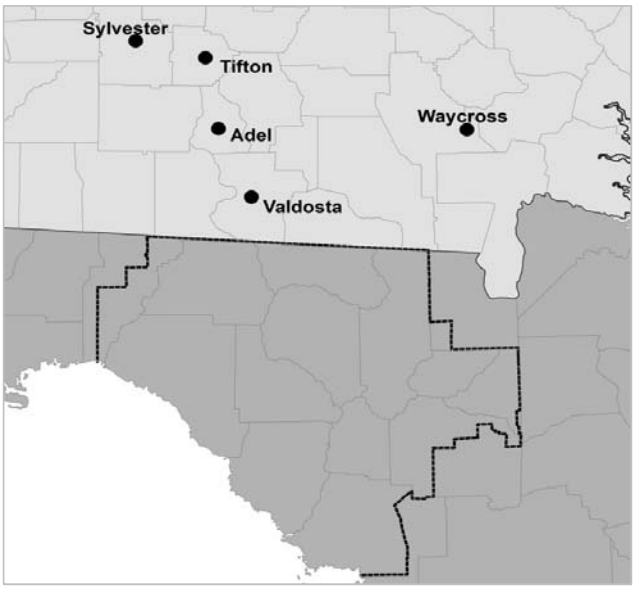
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

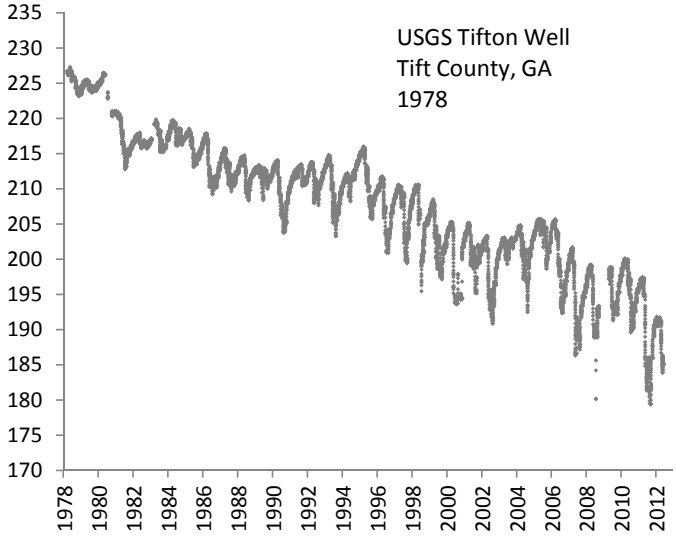
Percentile of Most Recent Water Level Relative to Entire Record

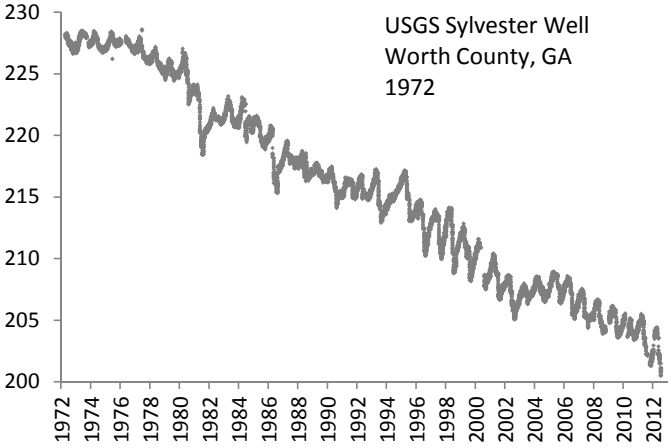
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

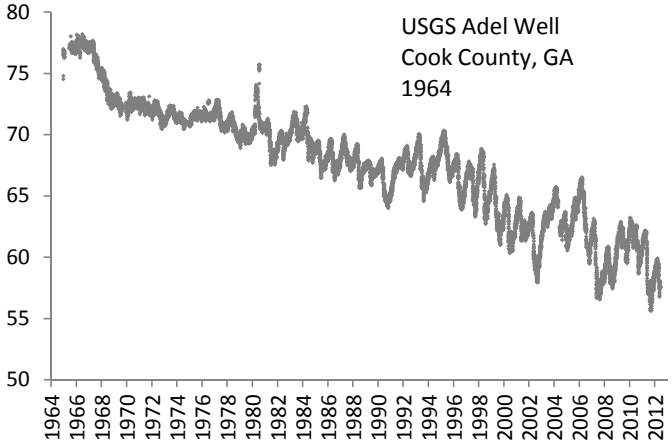
Figure 12a: Regional Long Term Upper Floridan Levels

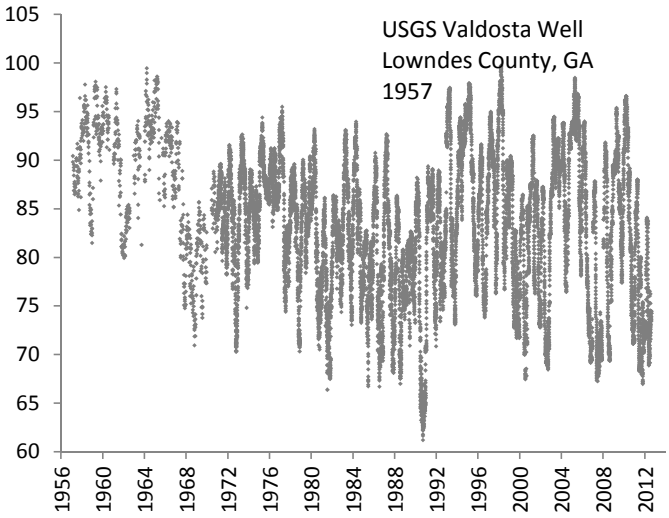
Ending March-July 2012
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS and Georgia EPD











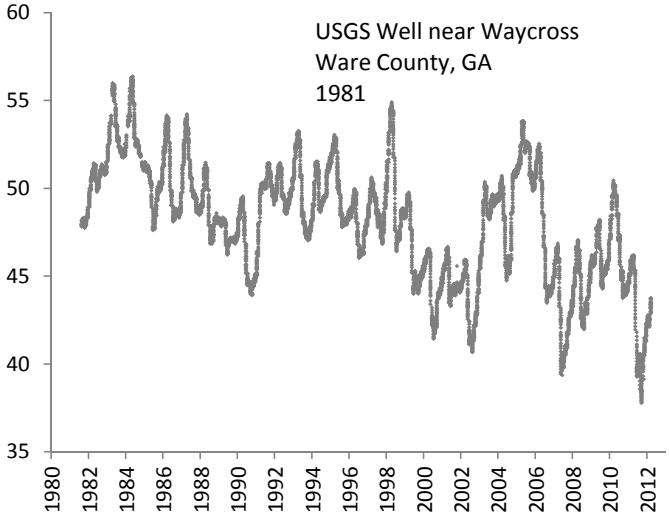
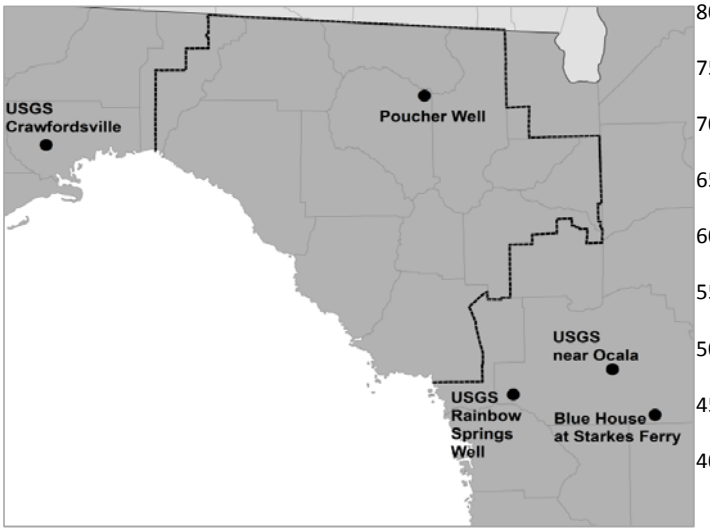
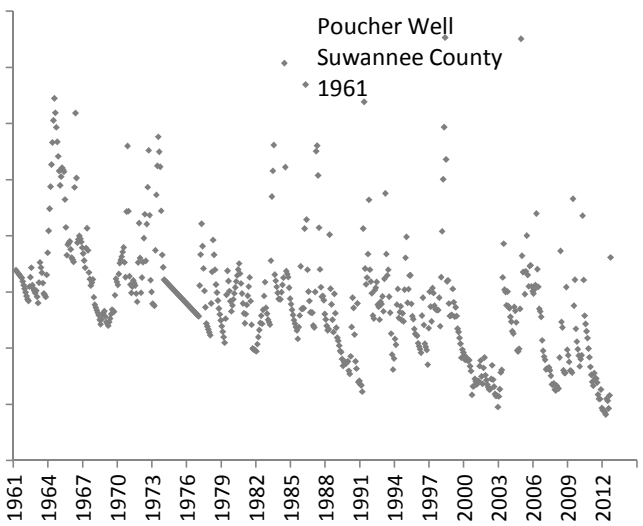
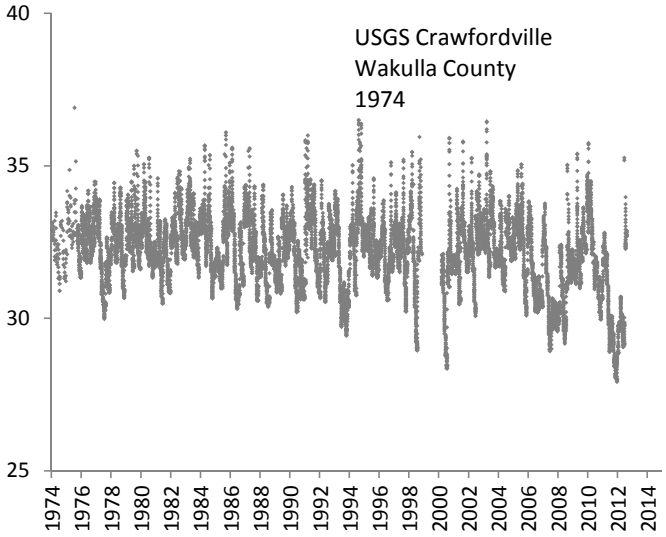


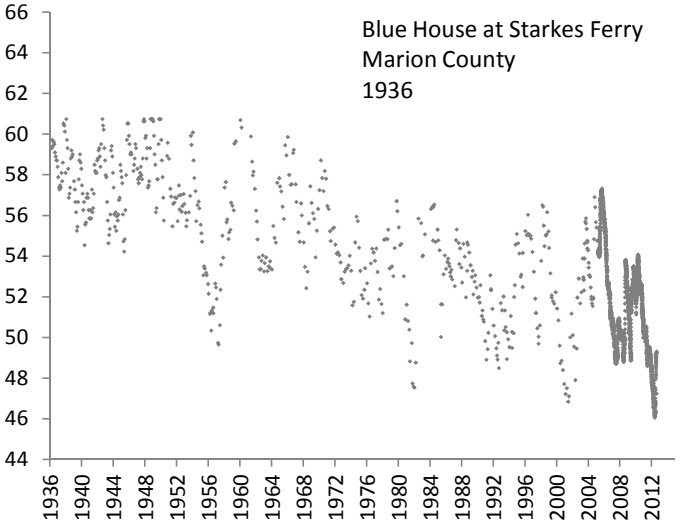
Figure 12b: Regional Long Term Upper Floridan Levels

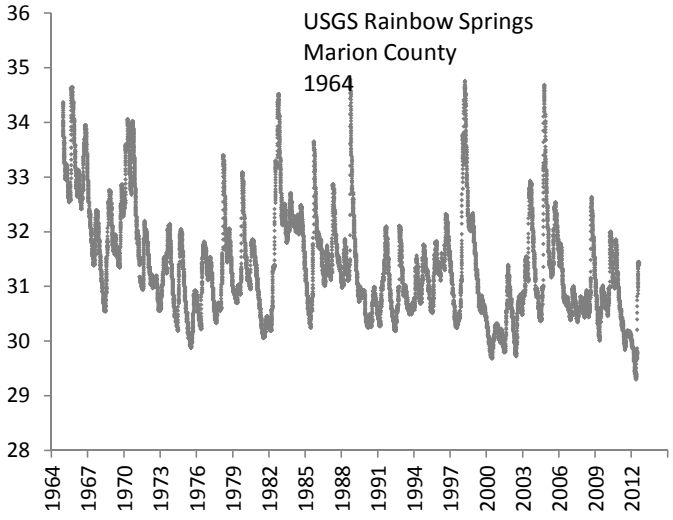
Ends July 31, 2012
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS, SWFWMD, and SJRWMD











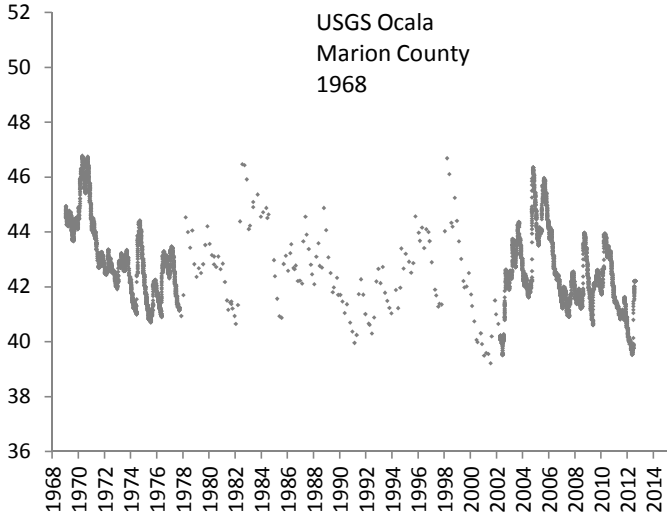
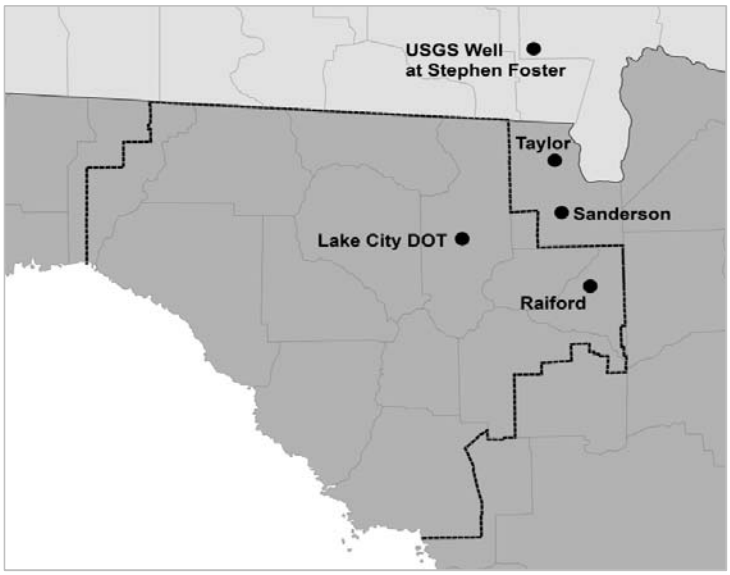
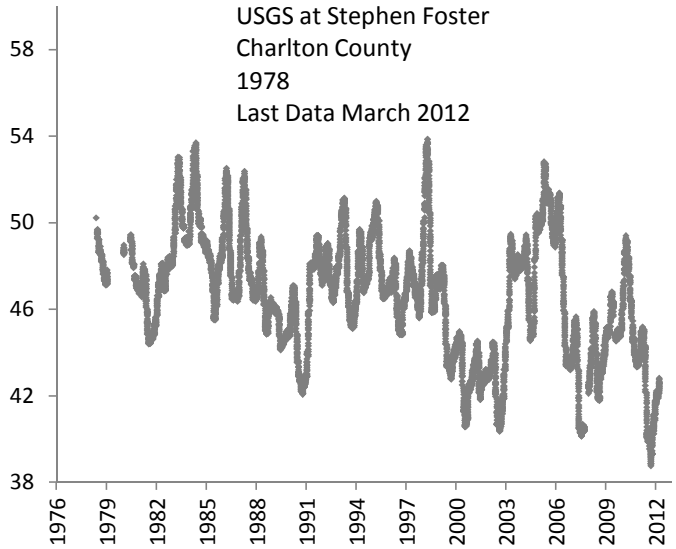
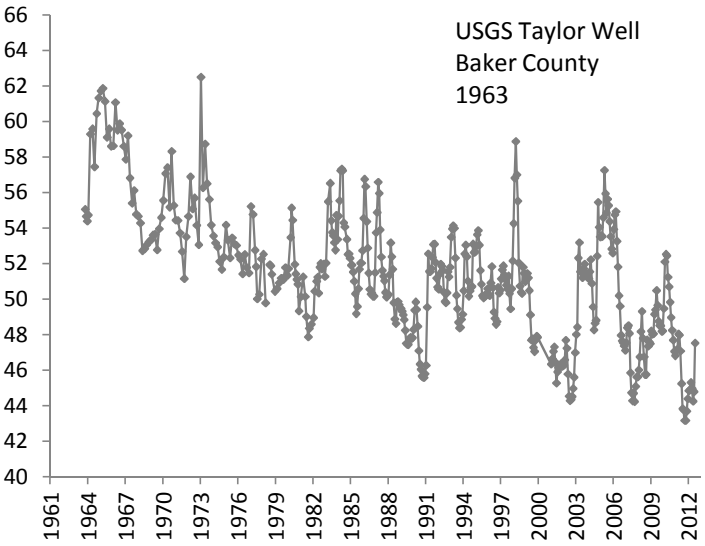


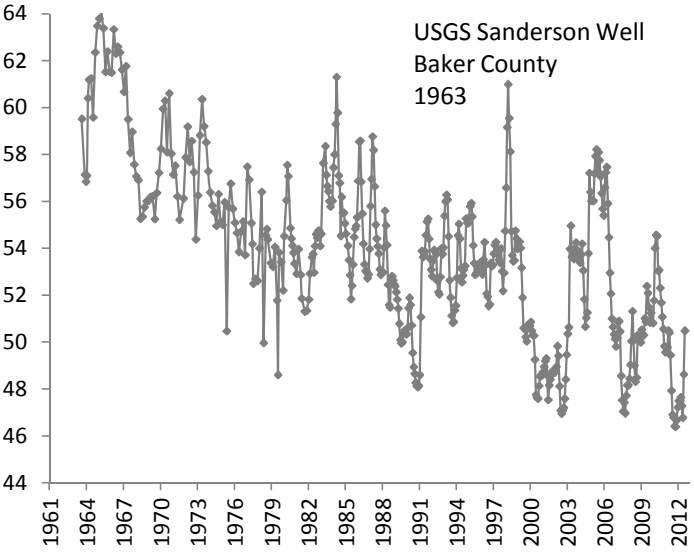
Figure 12c: Regional Long Term Upper Floridan Levels

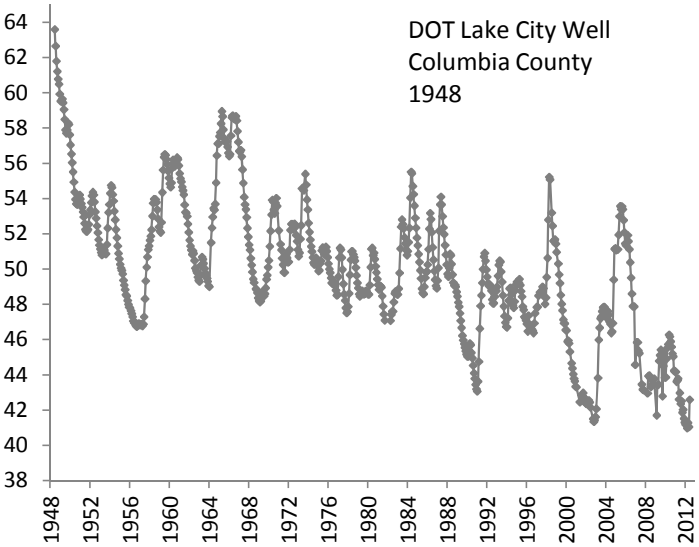
Ending March - July 2012
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS and SJRWMD











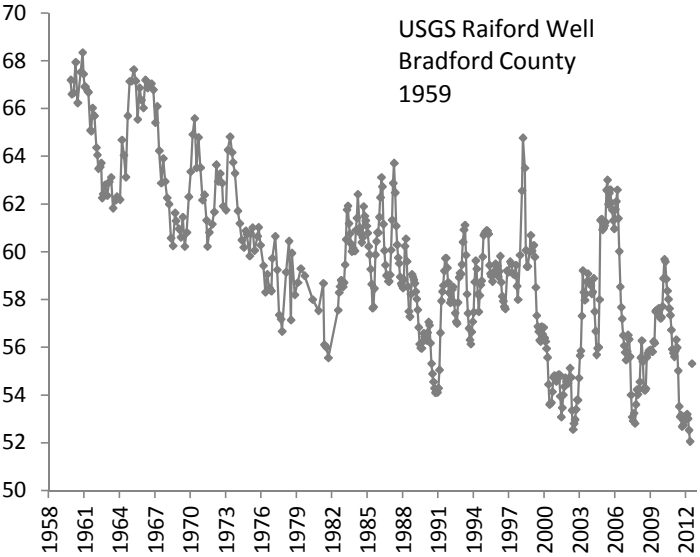
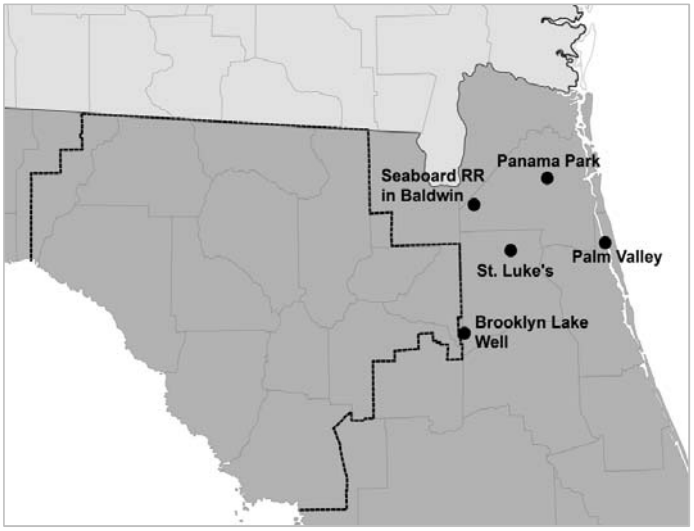


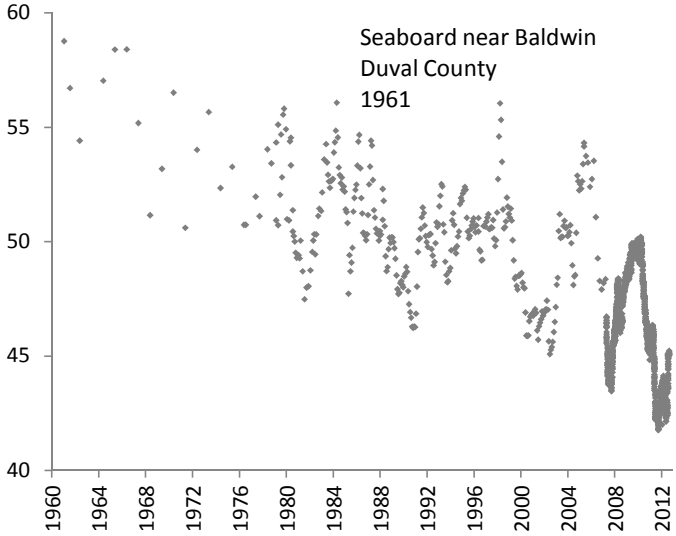
Figure 12d: Regional Long Term Upper Floridan Levels

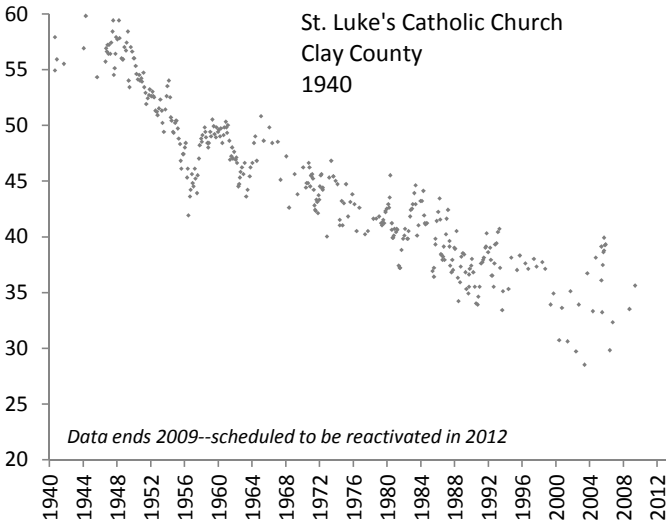
Ending July 2012

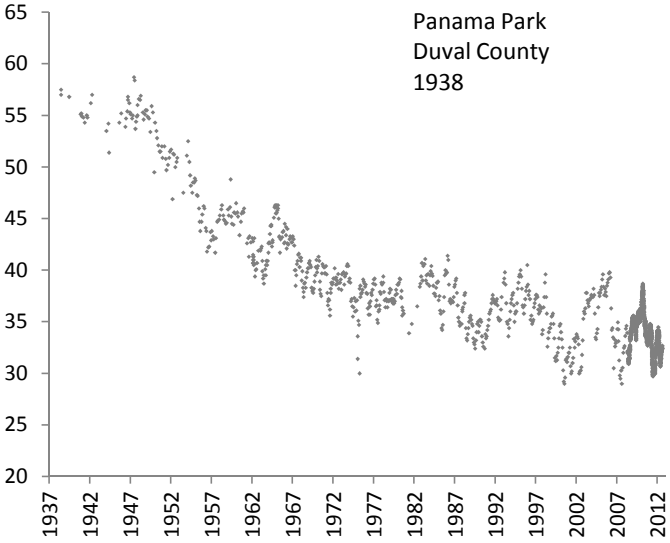
Upper Floridan Aquifer levels in feet above mean sea level

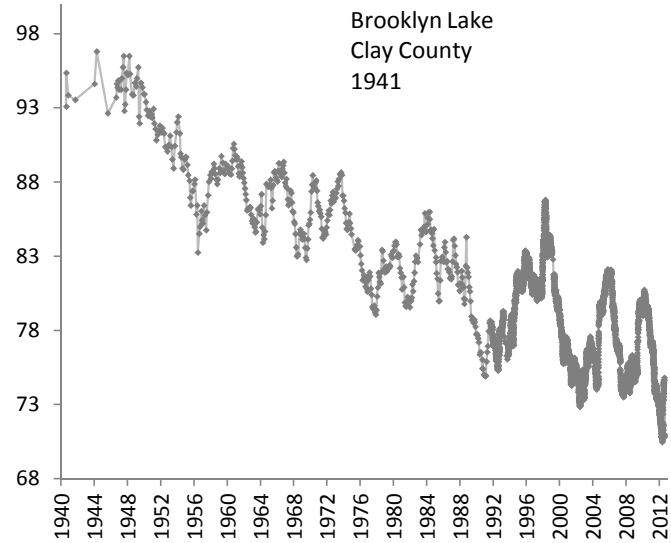
Courtesy of SJRWMD











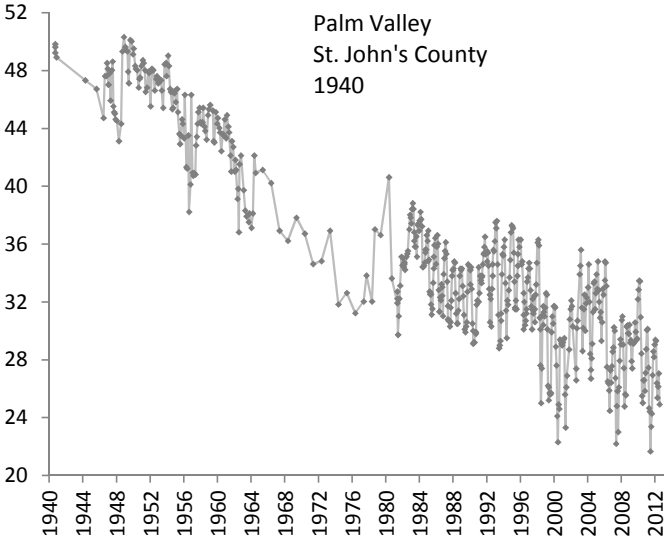


Figure 13: Agricultural Water Use

Daily evapotranspiration (loss of water by evaporation and plant transpiration) and irrigation based on usage reported by up to 106 overhead irrigation systems (12,250 acres total) on a variety of crops throughout the District. These units are part of a network of 190 units installed at 48 agricultural operations by permission of the owners. Evapotranspiration data courtesy of University of Florida IFAS Extension.