

## MEMORANDUM

TO: Governing Board

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

THRU: Ann B. Shortelle, Ph.D., Executive Director *AS*  
Jon Dinges, Department Director *JND*

DATE: September 7, 2012

RE: August 2012 Hydrologic Conditions Report for the District

### RAINFALL

- Average rainfall in the District was 9.05", which is 120% of the long-term August average of 7.49" (Table 1, Figure 1). Rainfall patterns favored the District south of Interstate 10 as systems emerged from the Gulf into coastal Dixie and Levy counties and moved northeast into the Santa Fe Basin (Figure 2). Only Hamilton County had below-normal rainfall. The highest gaged total was 14.77" in Bell in Gilchrist County, and the lowest was 4.54" at Madison Blue Springs. Watersheds in south Georgia that contribute to the Suwannee River were near normal, although an unusually localized and intense storm dropped over 10" near Tifton on August 8 (Figure 3).
- Average SRWMD rainfall for the 12 months ending August 31 was 4.6" higher than the long-term average of 54.65". This average surplus is the result of a wide range of accumulation, with areas in the central part of the District seeing 30"-40" more than the northern and southern counties in the last year (Figure 4). The surplus was the highest since September 2010. Figure 5 shows the history of rainfall deficits beginning in 1932.

### SURFACEWATER

- **Rivers:** Taylor, Dixie, and Levy counties were saturated after receiving double the normal rainfall since June, and coastal rivers remained bank-full or out-of-bank throughout August. The Steinhatchee River remained above the 90<sup>th</sup> percentile of August flows for most of the month and the Waccasassa River saw its third highest stage in 10 years. Upper Santa Fe gages remained above normal throughout the month, keeping the lower Santa Fe vulnerable to flooding. The Santa Fe River near Fort White crested at 0.3' above flood stage, considered a minor flood, on the 26th. Flooding did not occur downstream in the Three Rivers Estates area. Suwannee River gages generally remained in a range considered normal for the time of year. 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:** Four of sixteen monitored lakes remained below their long-term average levels, including Santa Fe Lake. 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.

### SPRINGS

The flow at White Sulphur Springs reversed three times as the Suwannee River rose and fell. Middle- and lower-Suwannee springs had improved flow, but were still slowed by relatively high river levels. Hart Springs had its highest flow since 2010 but was still affected by tannic water.

The Ichetucknee River had sustained flows not seen since 2006. Statistics for a representative sample of wells are shown in Figure 9.

## GROUNDWATER

Upper Floridan Aquifer levels at most monitor wells in Taylor, Dixie, and Lafayette counties remained above the 90<sup>th</sup> percentile. A monitor well at Cooks Hammock in Lafayette County had the highest level in 20 years. Levels in the Santa Fe Basin began to plateau in the beginning of August, but responded to later heavy rains and began climbing again. Conditions in most of the Santa Fe Basin were in a range considered normal. Three wells in southeastern and central Alachua County remained extremely low but continued to make steady improvement. Levels in extreme northern Madison and Jefferson counties remained extremely low with only modest improvement since July. Seven percent of the monitored wells were in the lowest 10% of records, 8% were below normal, 46% were normal, and 39% were above normal (Figure 10). Median conditions across the District compared to all historic levels remained near the 65<sup>th</sup> percentile 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.

## 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 September 1 indicated very wet conditions in north Florida and incipient dry spell conditions in south central Georgia.
- The National Weather Service Climate Prediction Center issued an El Niño watch after models indicated El Niño conditions are likely to develop in the coming months. A weak-to-moderate El Niño is possible which could mean cooler and wetter conditions in the fall and winter.
- Figure 13 shows overhead irrigation application at a number of farms in the District. The average daily application rate fell in August to 0.02", the lowest overall rate since February.

## CONSERVATION

A modified Phase III Water Shortage remains in effect for Alachua, Bradford, Columbia, Gilchrist, Jefferson, Levy, Madison, and Union counties but is scheduled to expire on September 30. All users are urged to eliminate unnecessary uses. Details of the restrictions contained in the order are available on the District's webpage ([www.mysuwanneeriver.com](http://www.mysuwanneeriver.com)).

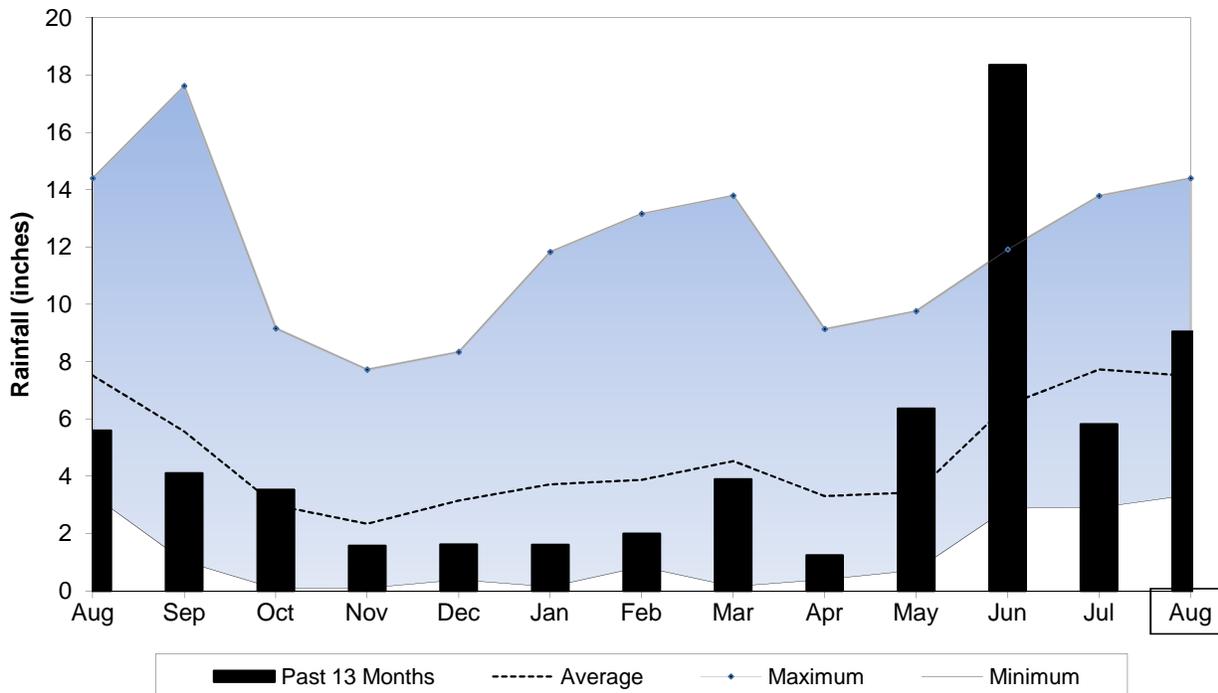
**Table 1: Estimated Rainfall Totals**

County	Aug 2012	August Average	Last 3 Months	Last 12 Months
Alachua	11.09	7.10	30.45	56.22
Baker	6.98	6.59	34.08	61.32
Bradford	10.57	7.39	34.25	61.04
Columbia	7.66	6.63	36.20	65.85
Dixie	10.32	9.11	33.85	55.08
Gilchrist	11.60	7.83	31.14	56.92
Hamilton	5.31	6.13	28.57	54.61
Jefferson	7.49	6.46	27.03	50.40
Lafayette	10.27	7.78	41.36	70.47
Levy	10.15	9.80	31.29	52.05
Madison	6.92	6.13	28.31	55.97
Suwannee	7.89	6.40	39.33	70.19
Taylor	10.29	8.01	36.14	60.69
Union	9.56	7.77	32.97	63.18

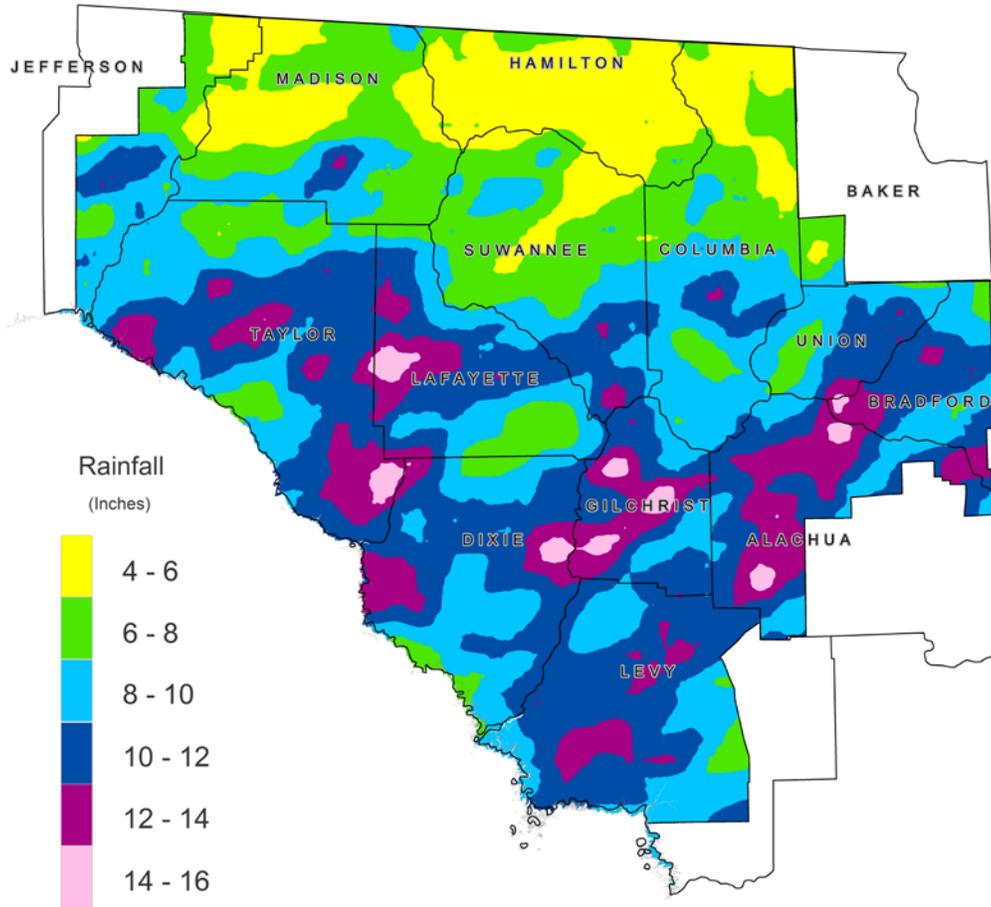
August 2012 Average: 9.05  
 Historical August Average (1932-2011): 7.49  
 Historical 12-month Average (1932-2011): 54.56  
 Past 12-Month Total: 59.16  
 12-month Rainfall Surplus: 4.60

(Rainfall reported in inches)

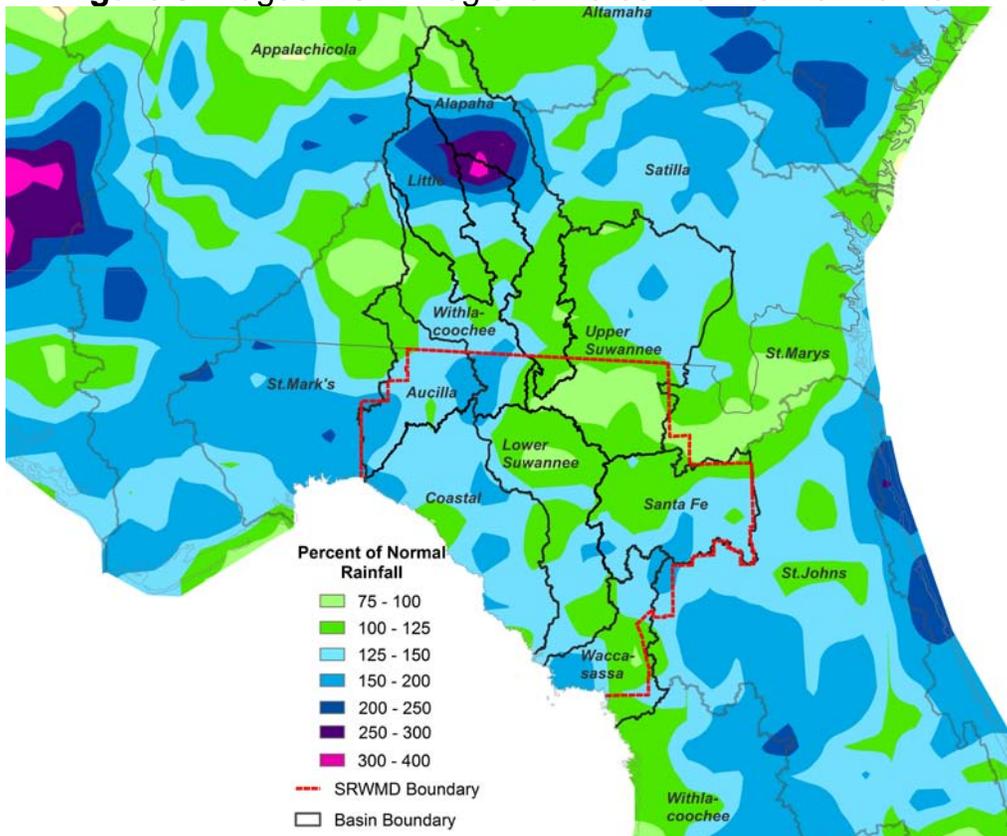
**Figure 1: Comparison of District Monthly Rainfall**



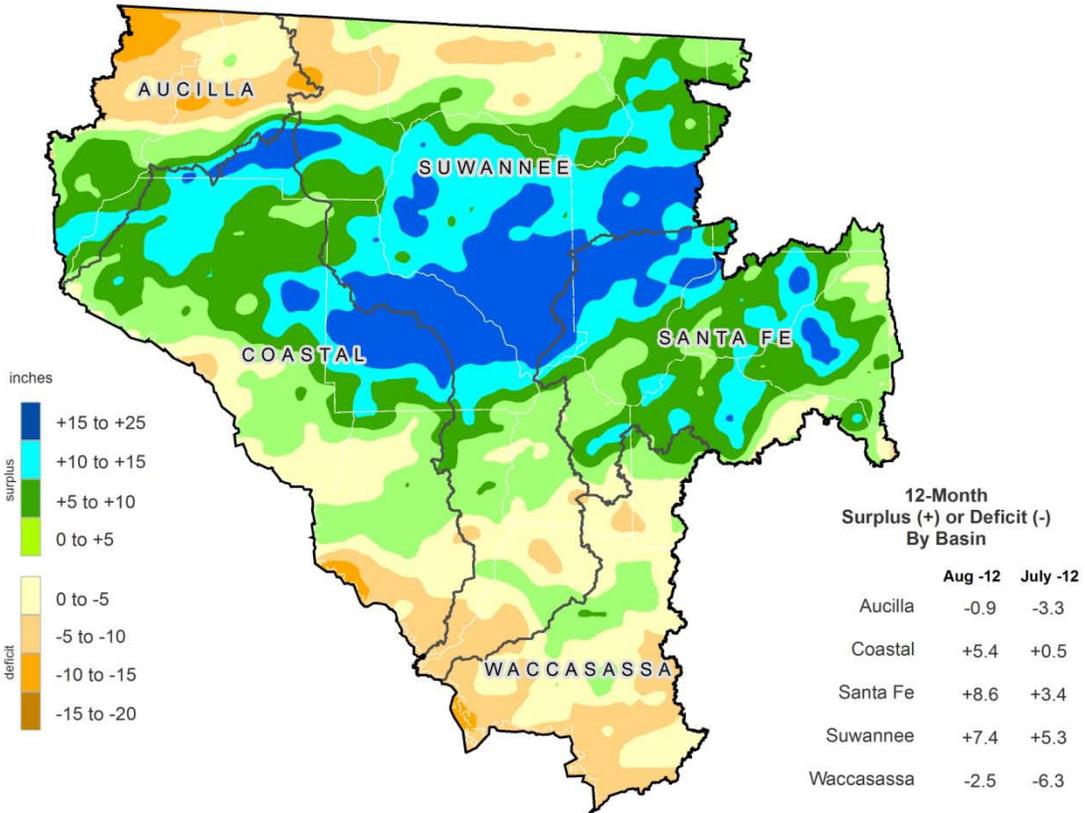
**Figure 2: August 2012 Rainfall Estimate**



**Figure 3: August 2012 Regional Percent of Normal Rainfall**

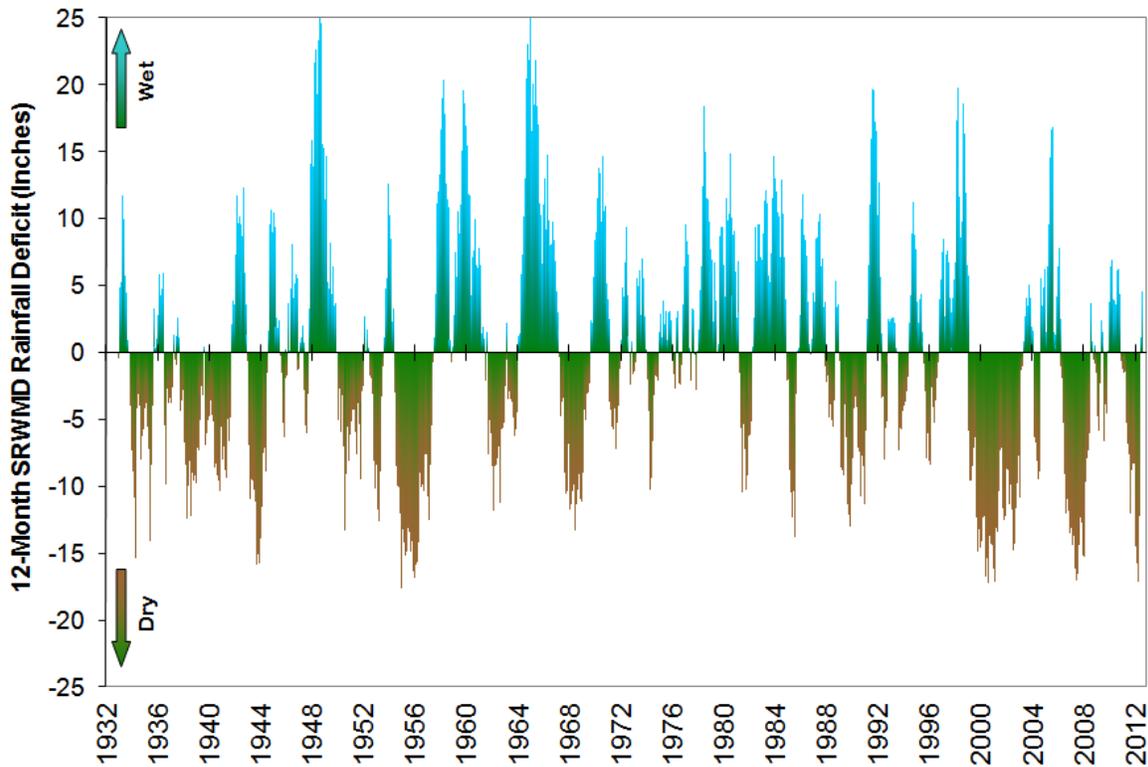


**Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin Ending August 31, 2012**

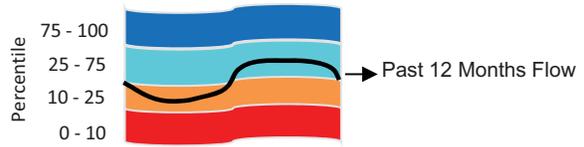


**Figure 5: 12-Month Rolling Rainfall Deficit Since 1932**

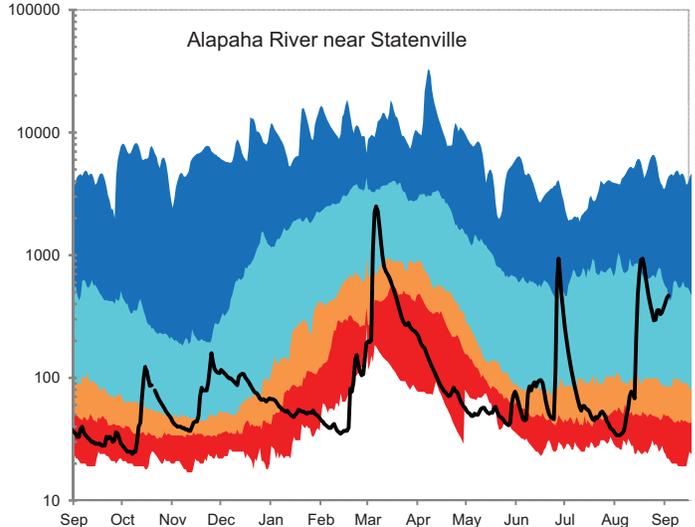
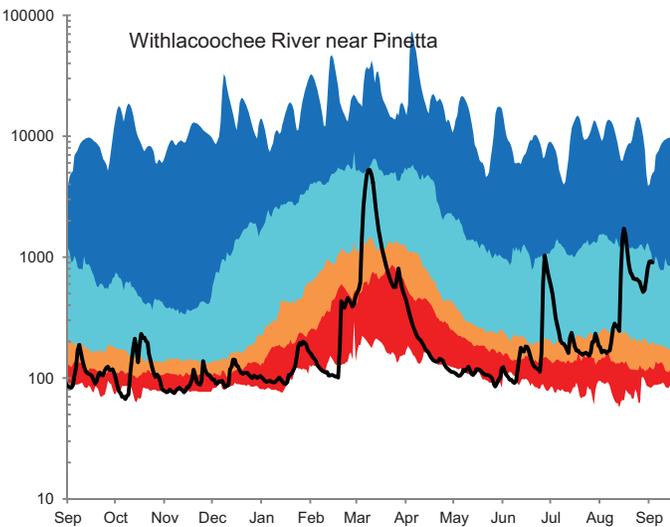
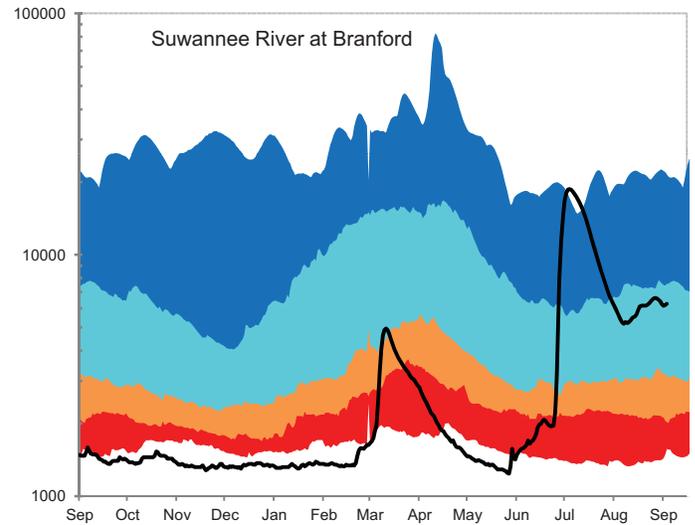
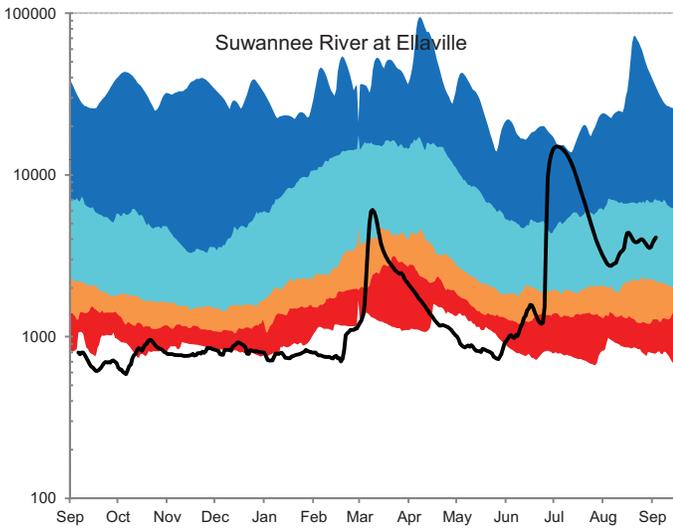
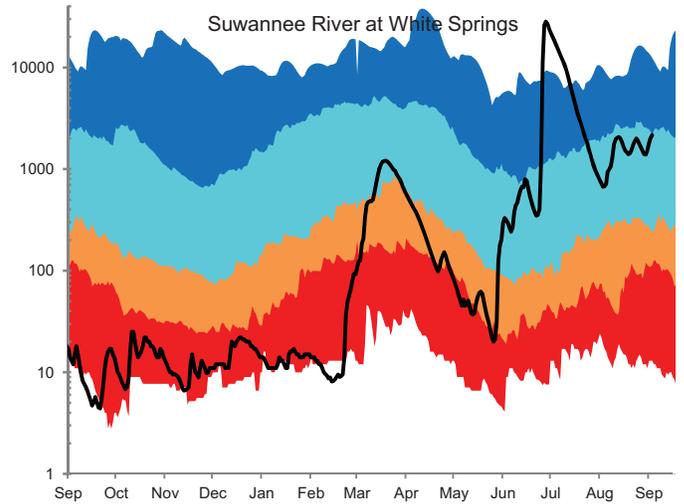
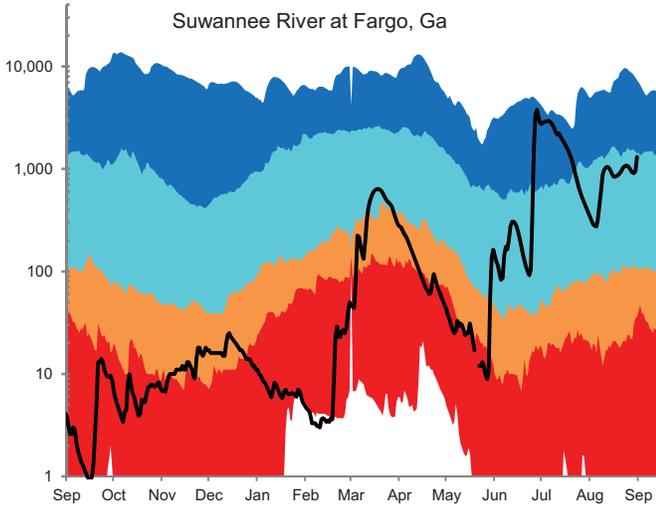
Difference between observed 12-month rainfall and the long-term average over the same period



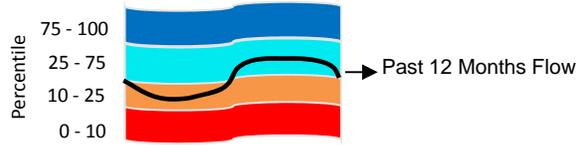
**Figure 6: Daily River Flow Statistics**  
September 1, 2011 through August 31, 2012



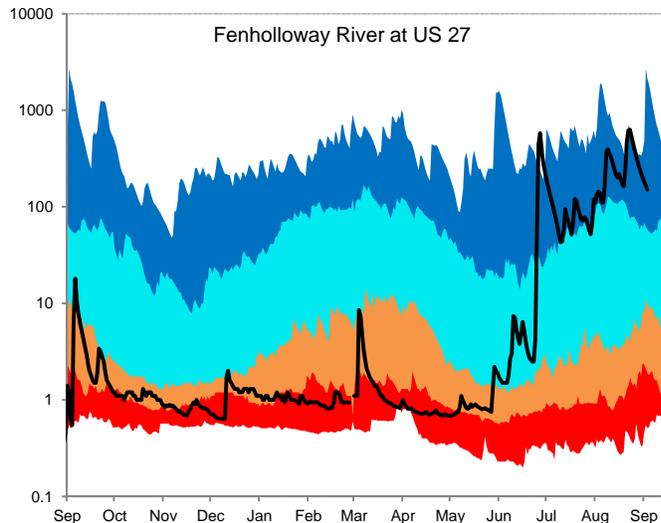
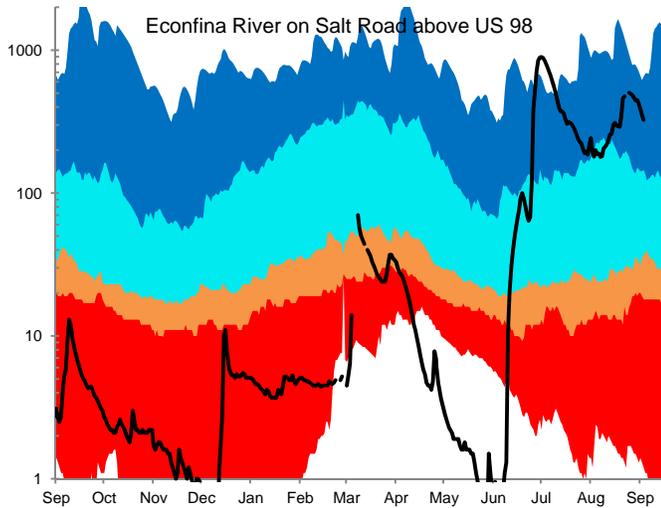
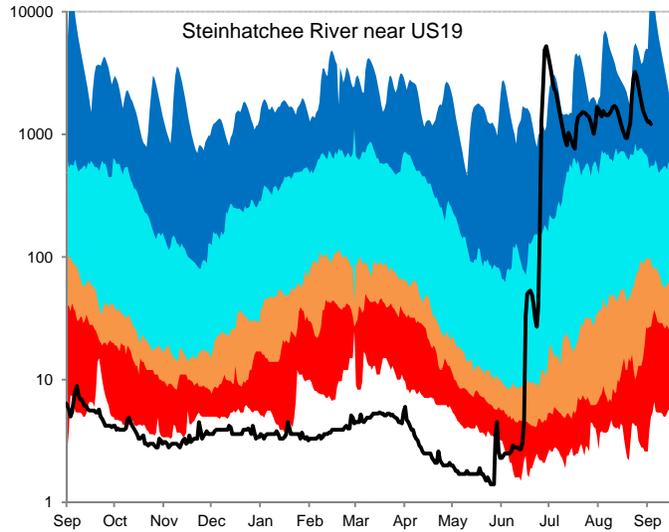
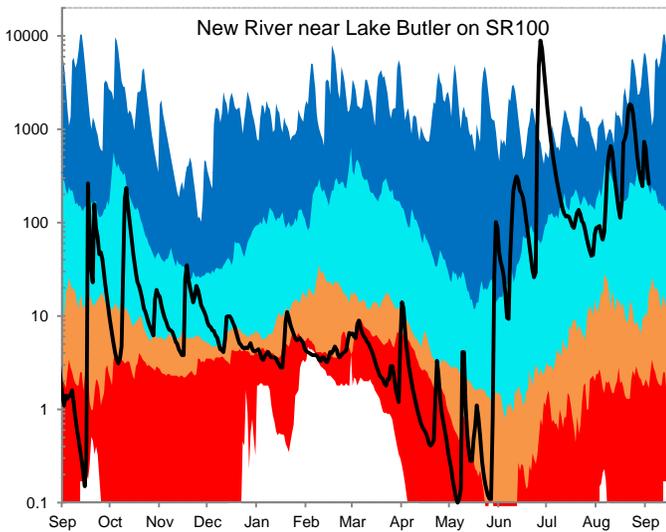
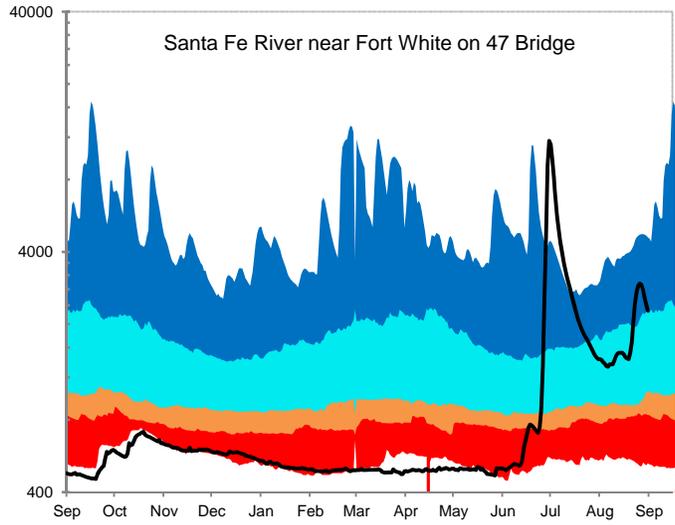
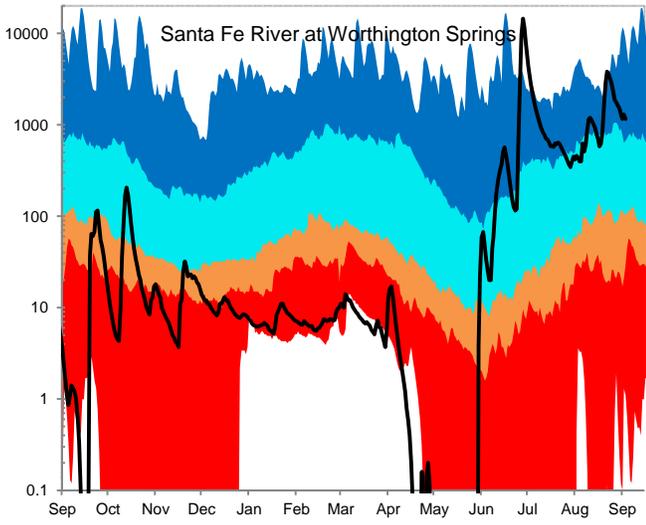
RIVER FLOW, CUBIC FEET PER SECOND

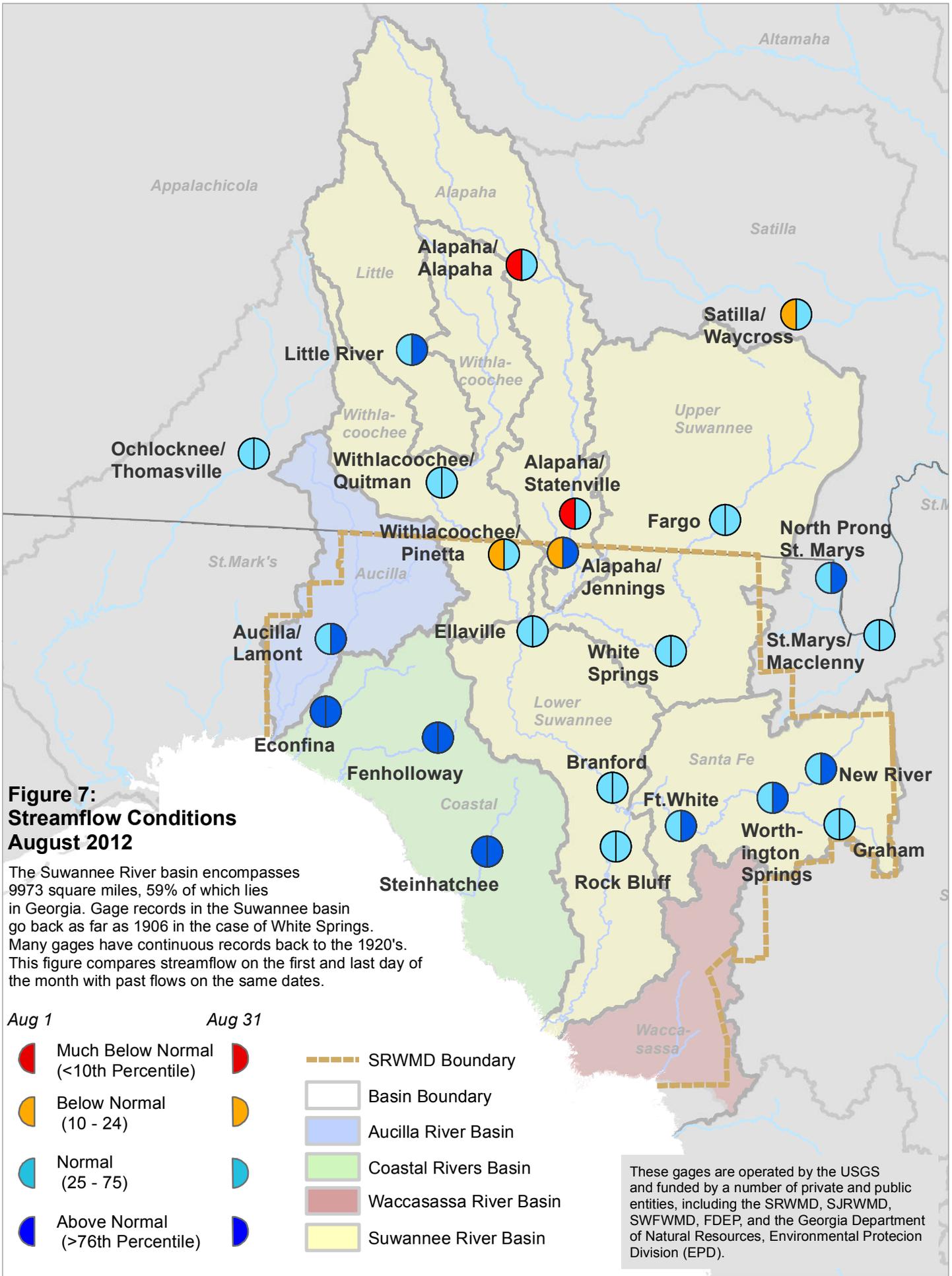


**Figure 6, cont:** Daily River Flow Statistics  
 September 1, 2011 through August 31, 2012



RIVER FLOW, CUBIC FEET PER SECOND



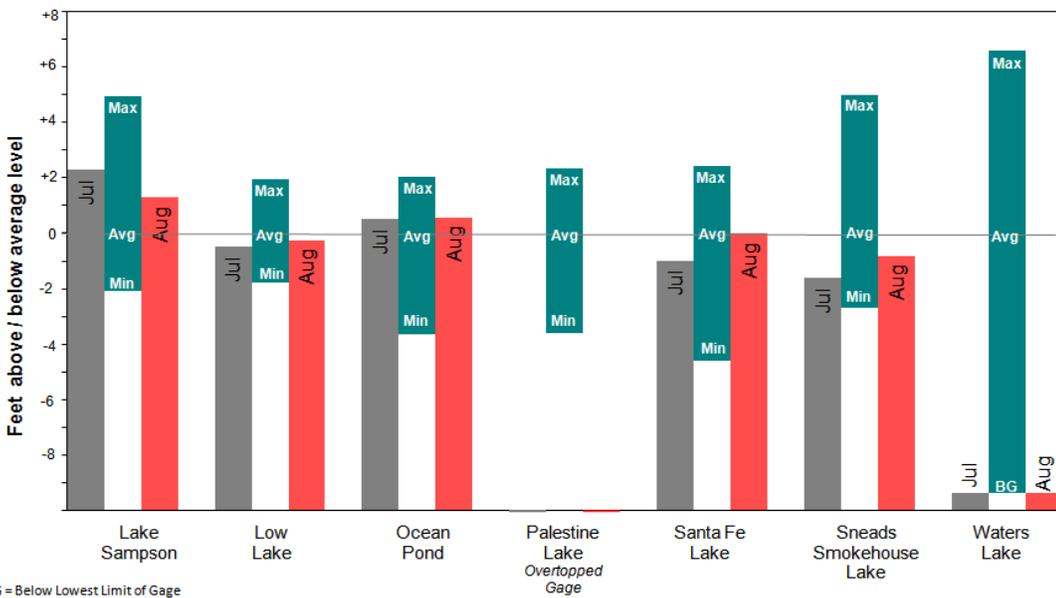
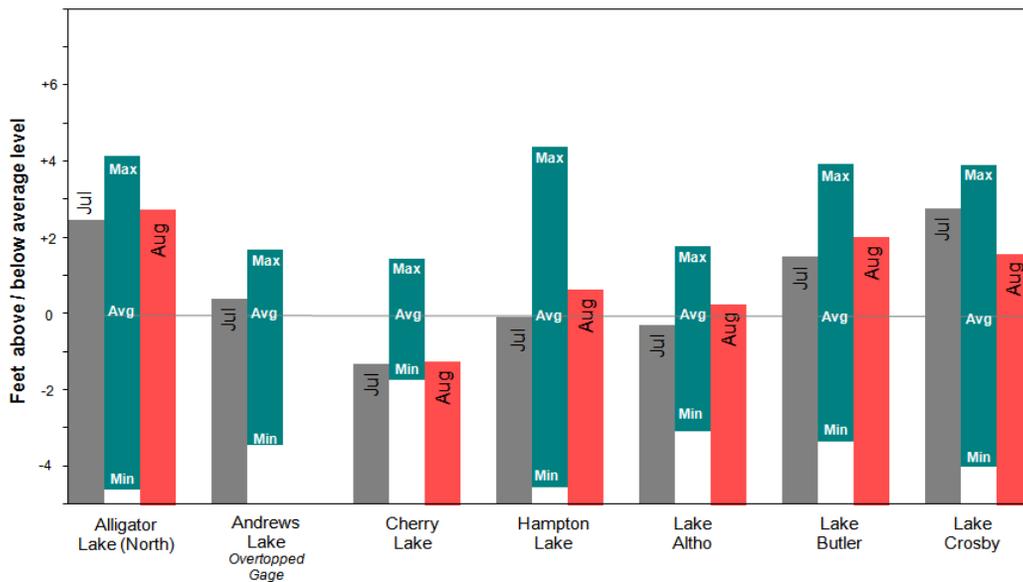


**Figure 8: August 2012 Lake Levels**



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.

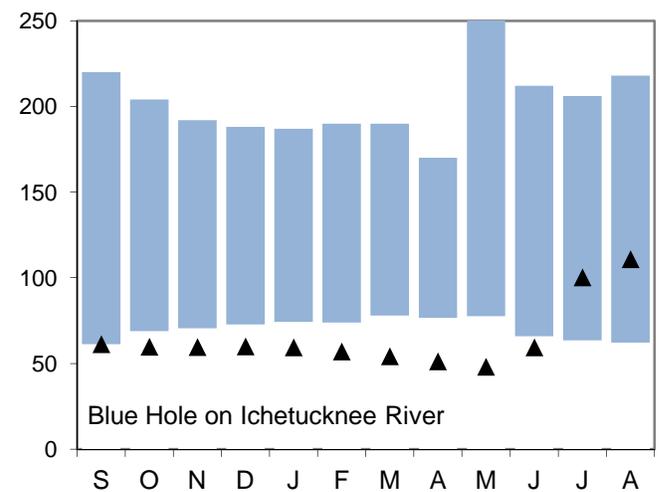
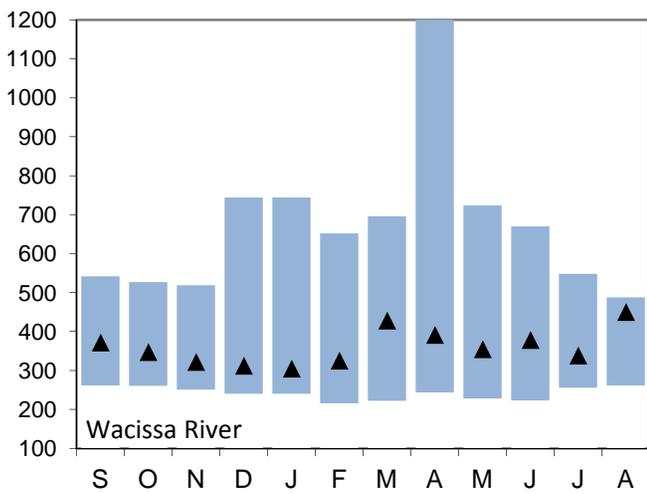
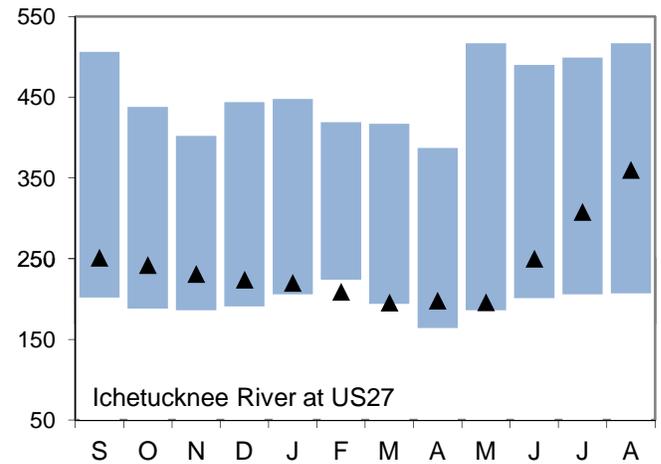
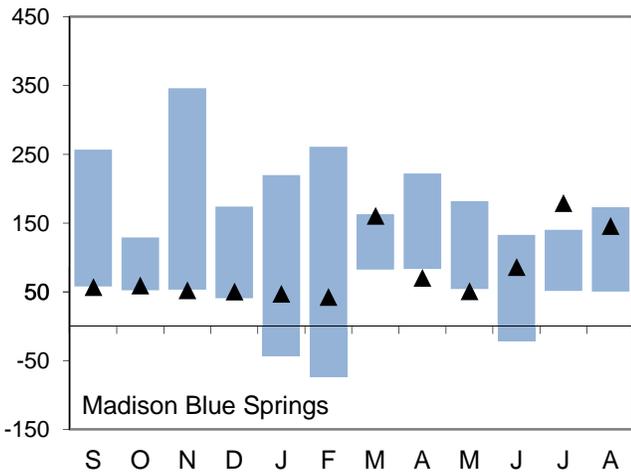
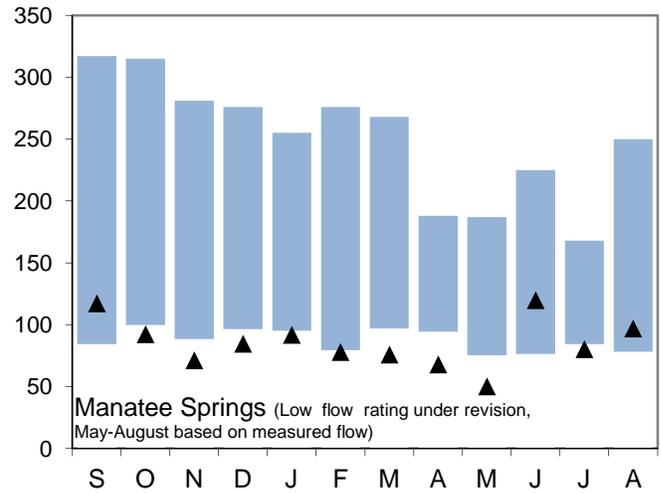
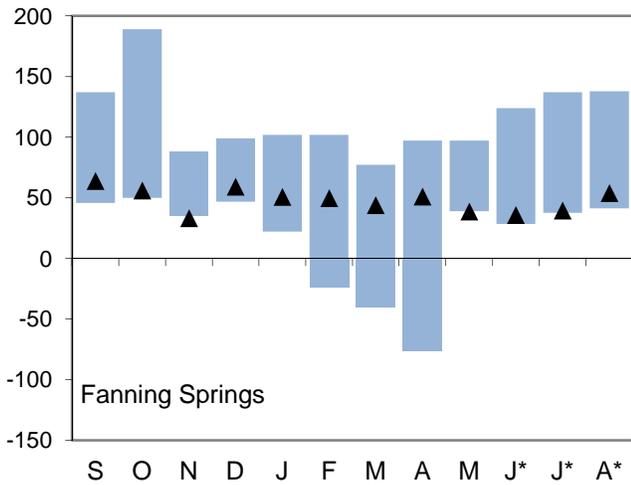
The District monitors 15 lakes with much of the data provided by volunteer observers. Most records go back to the 1970’s, although the Sampson Lake record starts in 1957.



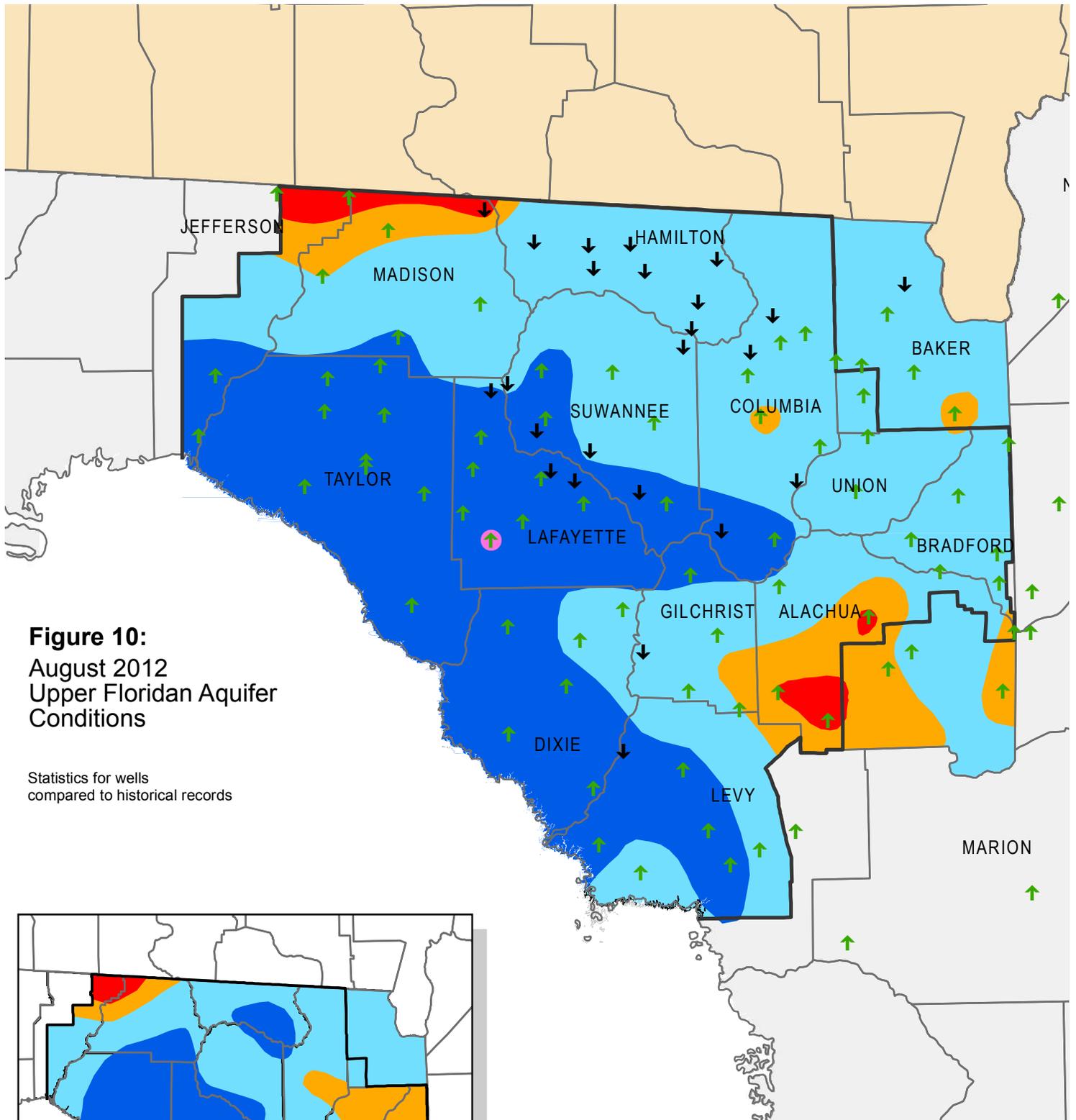
BG = Below Lowest Limit of Gage

**Figure 9: Monthly Springflow Statistics**  
 Flows September 1, 2011 through August 31, 2012  
 Springflow data are given in cubic feet per second.  
 Period of record beginning 2002. **Data are provisional.**

 Historical monthly max.  
 Observed average  
 Historical monthly min.

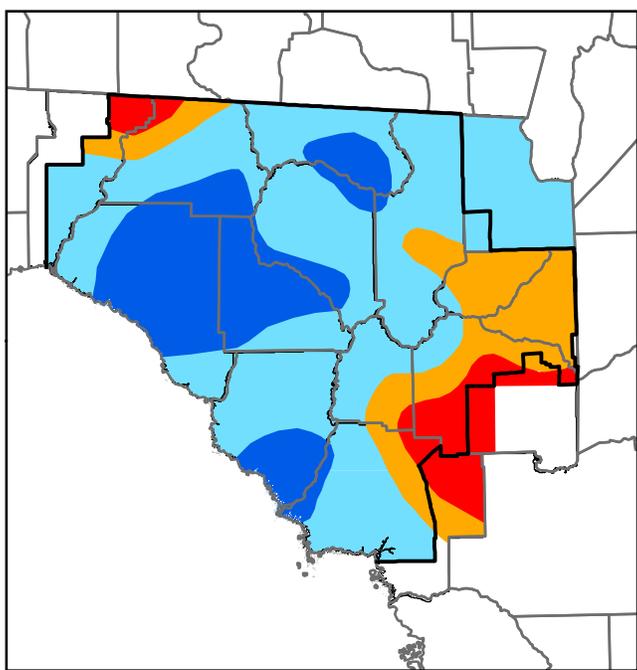


Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse. Springflow for months marked by an asterisk (\*) was strongly affected by river conditions. Data will be revised once approved and published by the U.S. Geological Survey.



**Figure 10:**  
August 2012  
Upper Floridan Aquifer  
Conditions

Statistics for wells  
compared to historical records

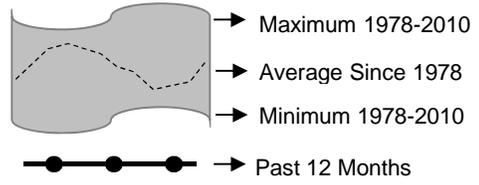


Inset: July 2012 Groundwater Levels

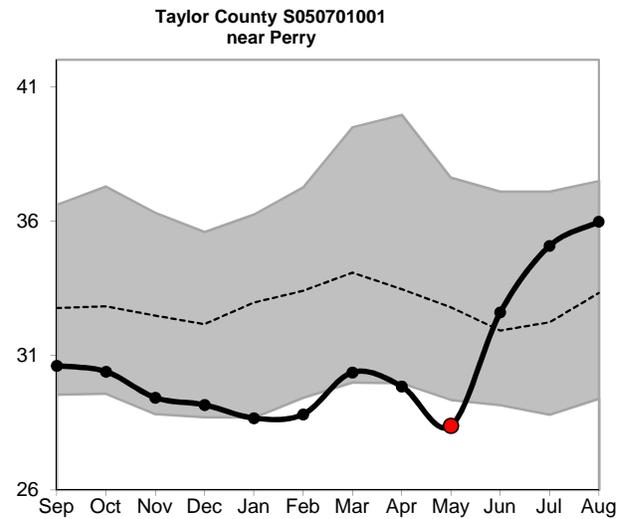
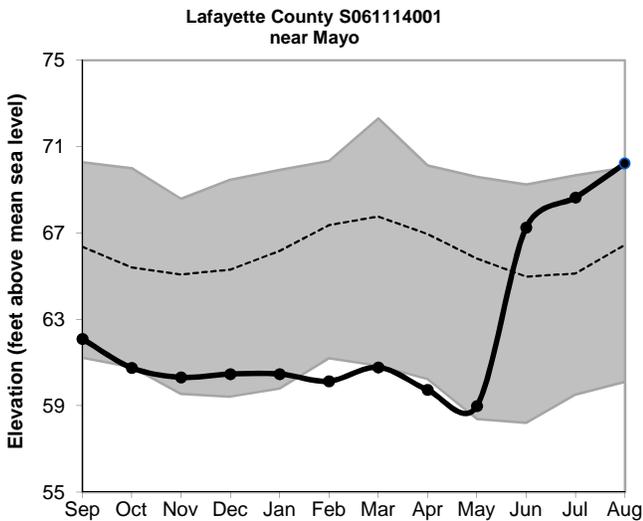
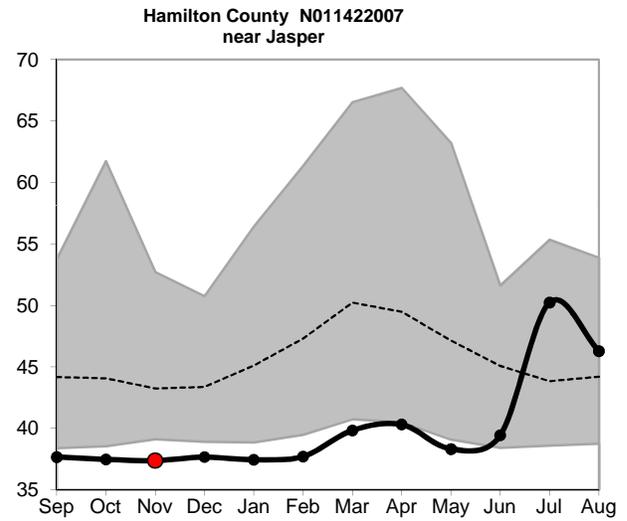
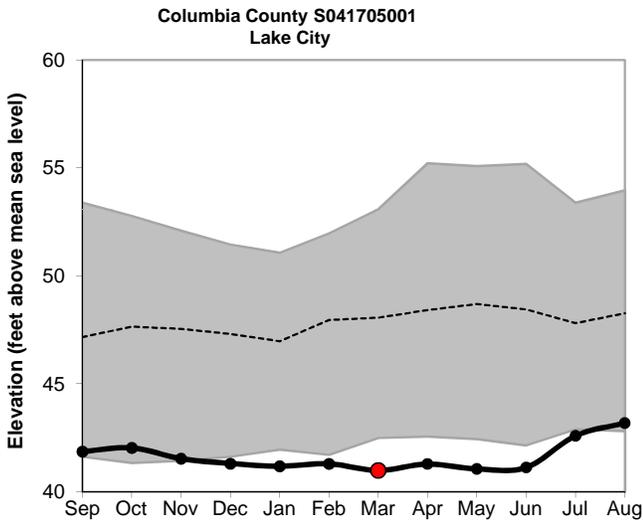
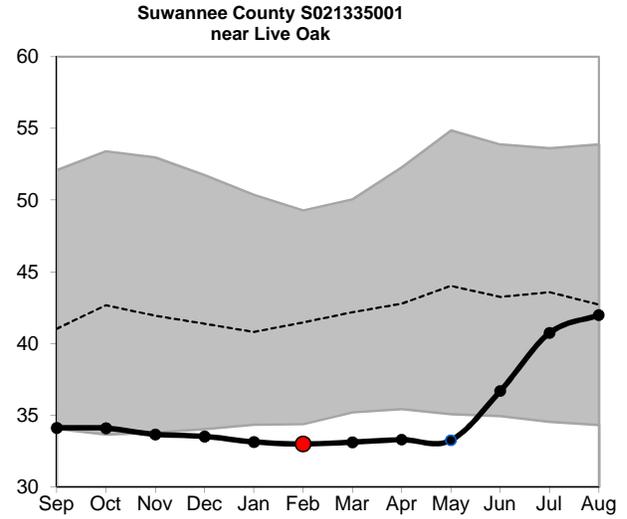
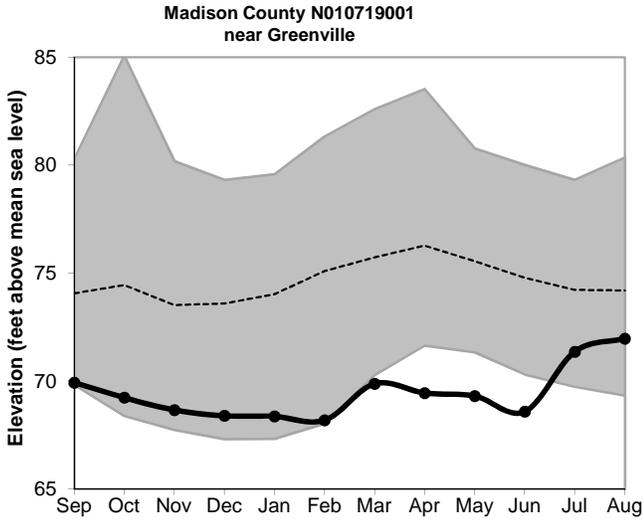
- High  
(Greater than 75th Percentile)
- Normal  
(25th to 75th Percentile)
- Low  
(10th to 25th Percentile)
- Extremely Low  
(Less than 10th Percentile)
- Increase/decrease in level since last month
- District Boundary
- Record High Level

# Figure 11: Monthly Groundwater Level Statistics

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

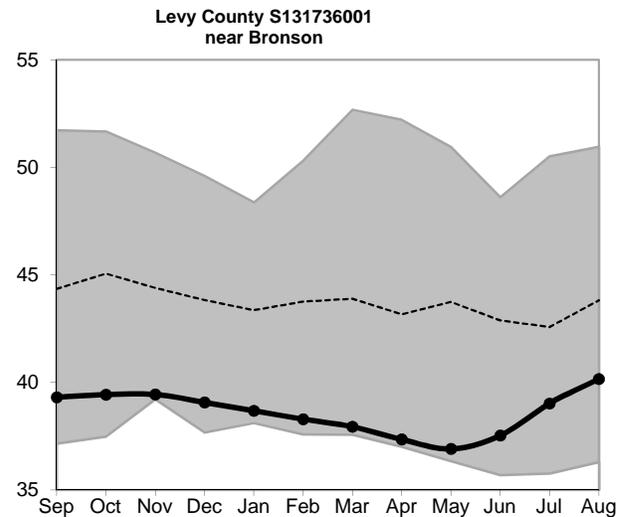
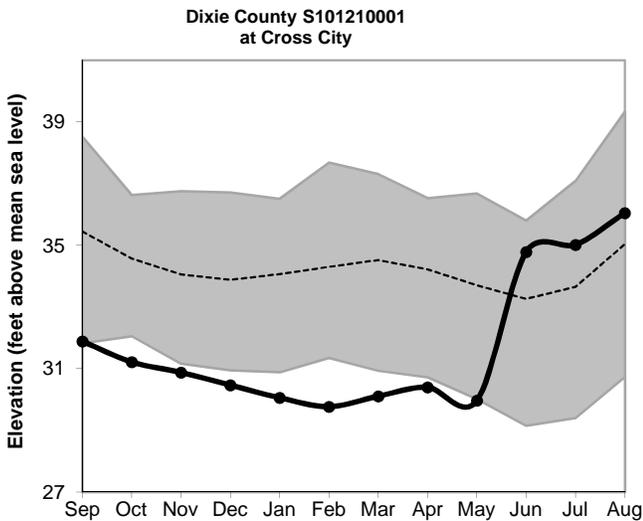
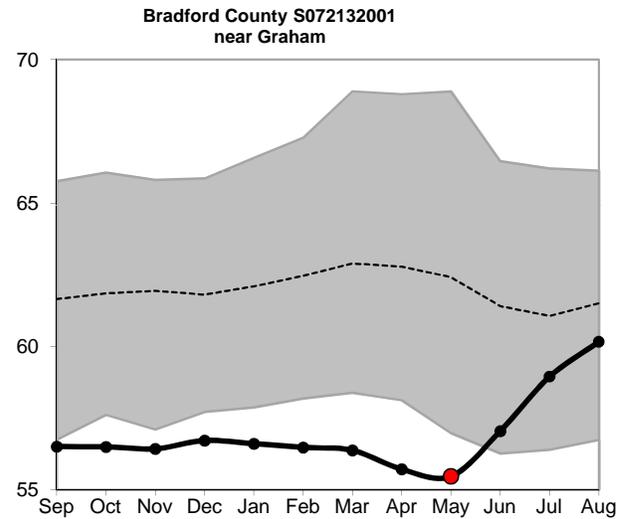
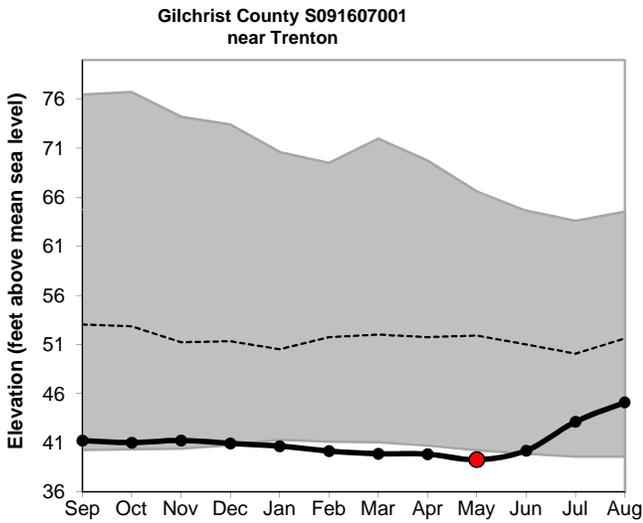
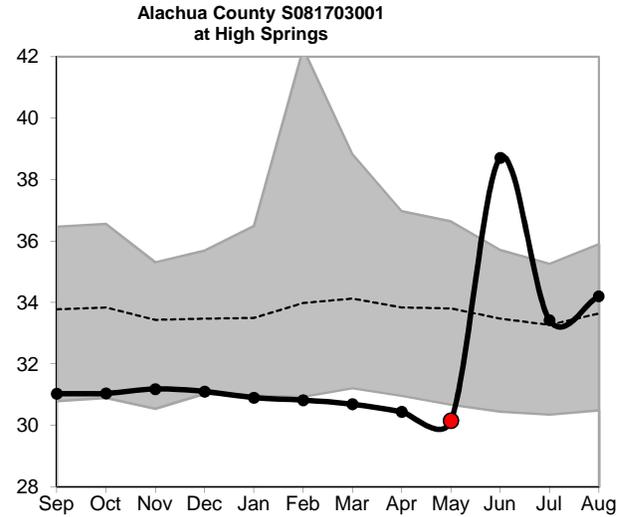
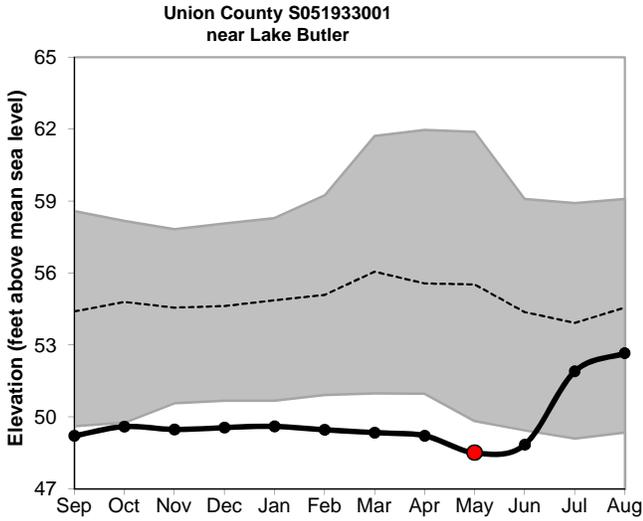
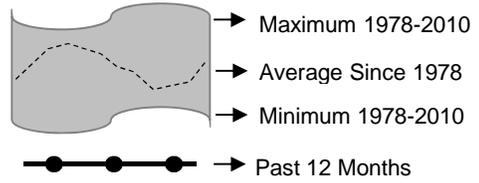


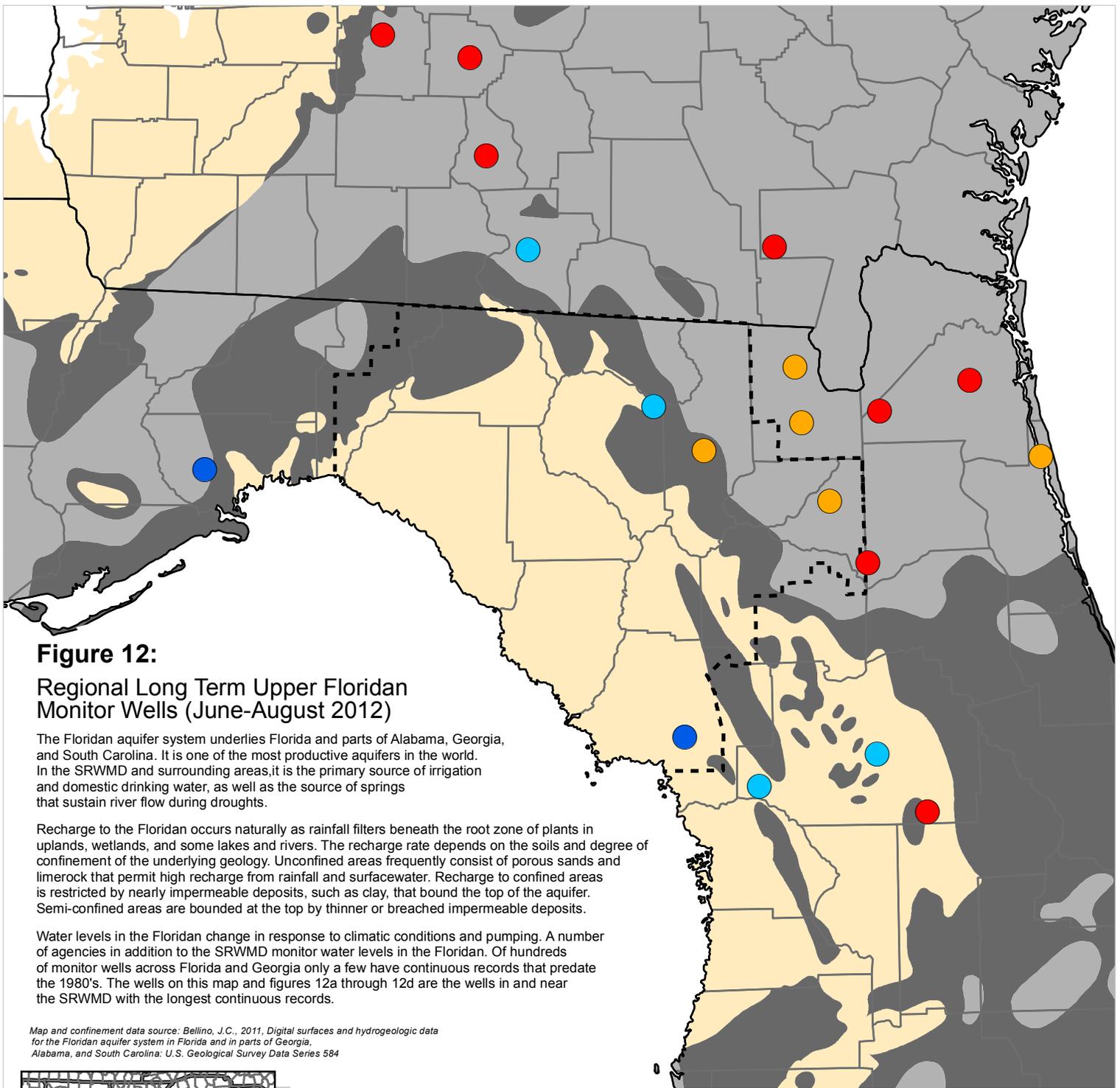
Historic Low



# Figure 11, cont.: Groundwater Level Statistics

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





**Figure 12:**

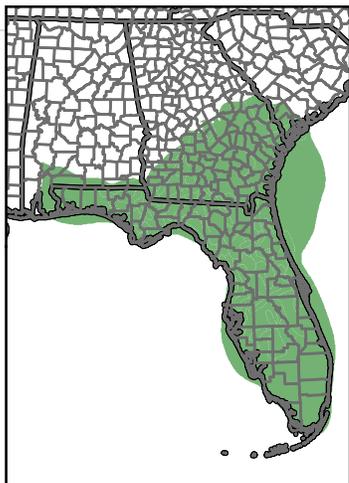
**Regional Long Term Upper Floridan Monitor Wells (June-August 2012)**

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

**Occurrence 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**

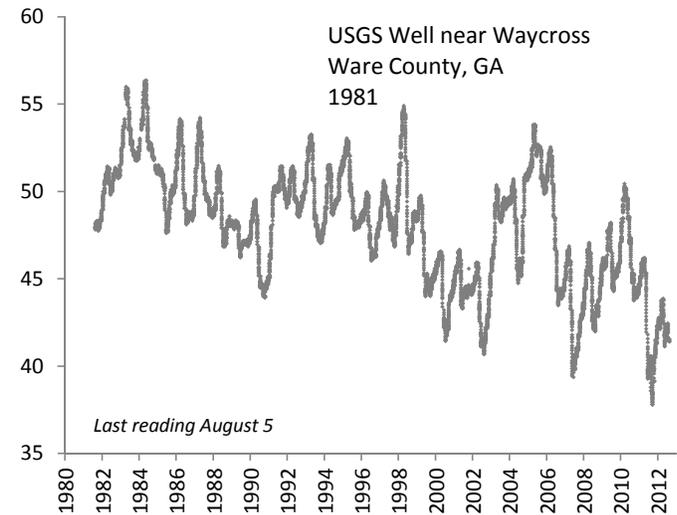
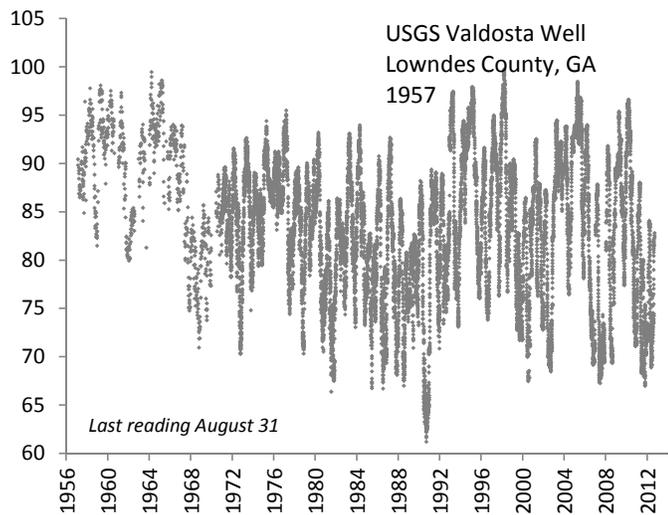
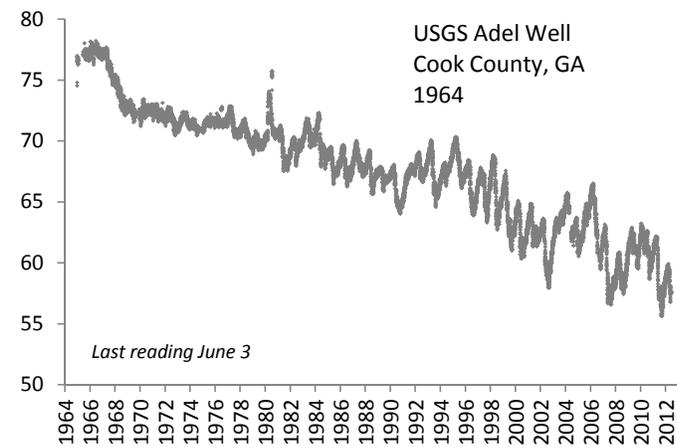
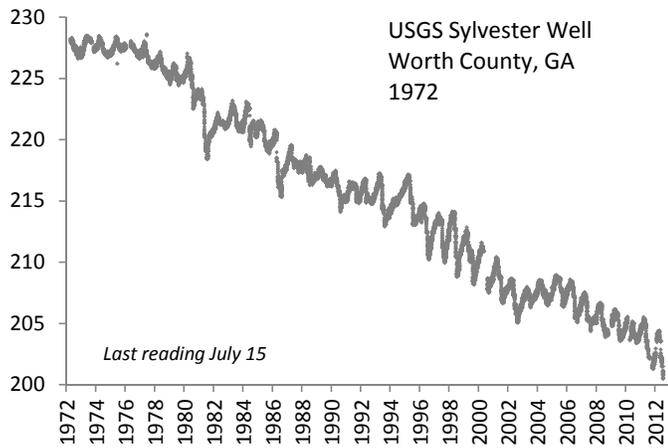
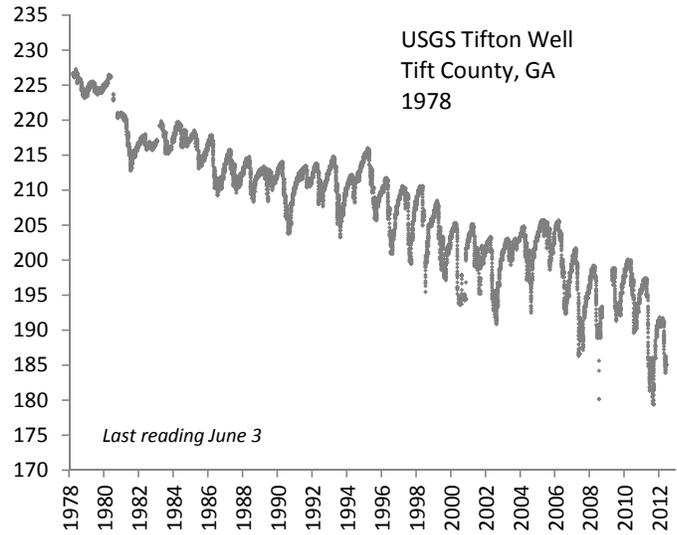
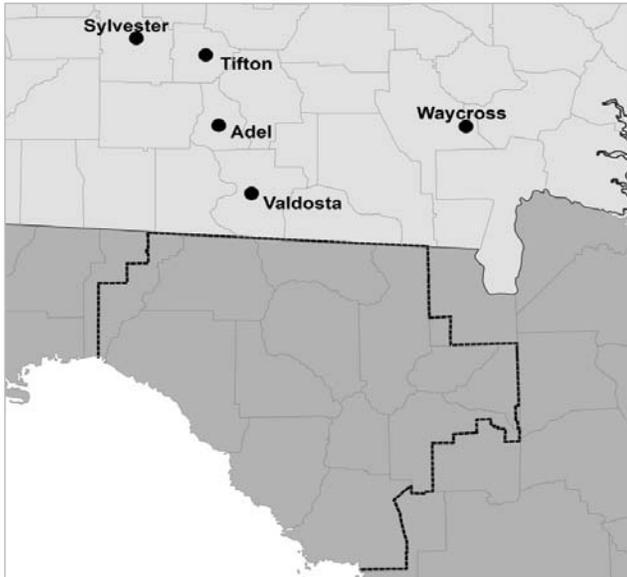
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

# Figure 12a: Regional Long Term Upper Floridan Levels

Ending June-August 2012

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS and Georgia EPD

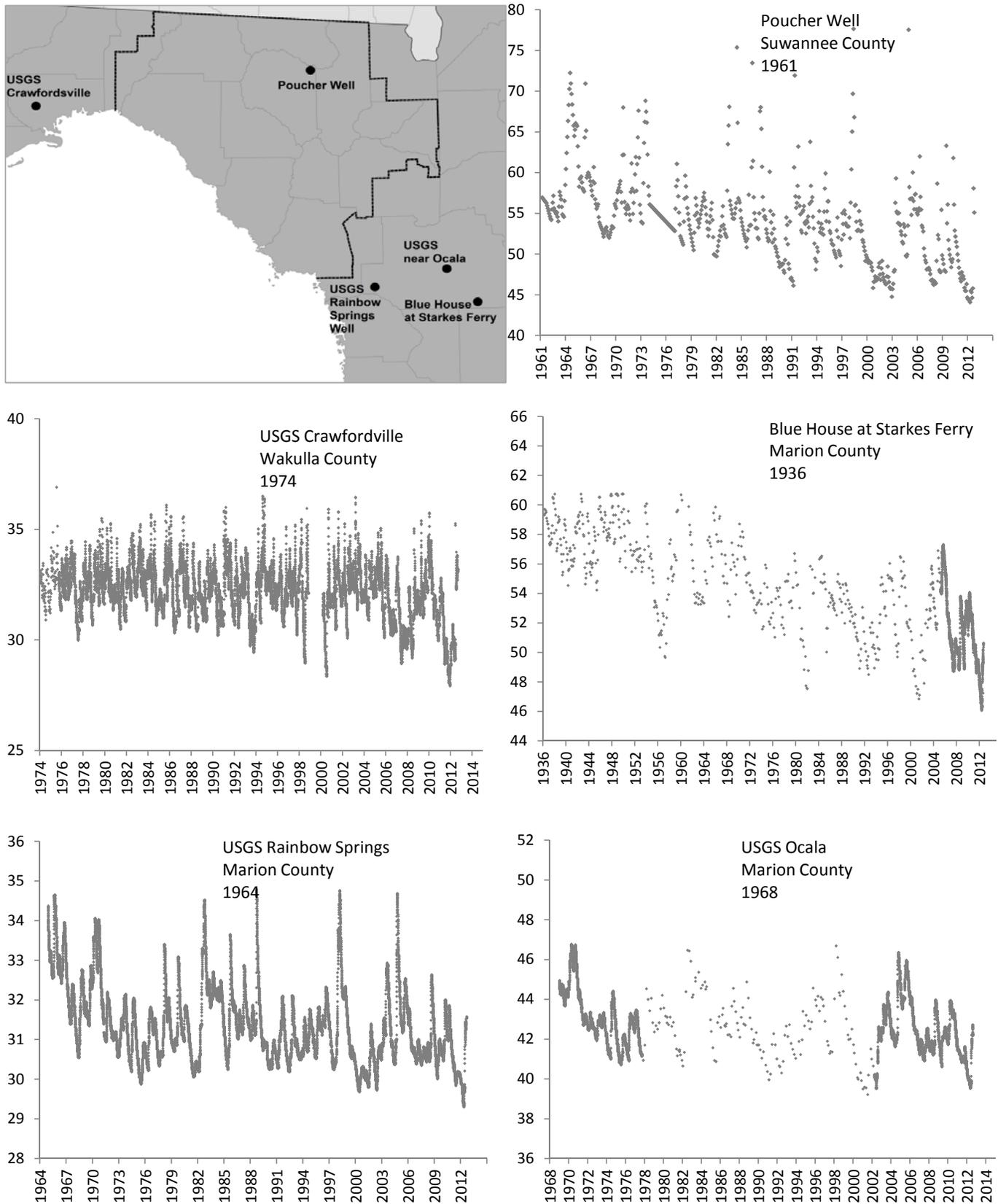


# Figure 12b: Regional Long Term Upper Floridan Levels

Ends August 31, 2012

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS, SWFWMD, and SJRWMD

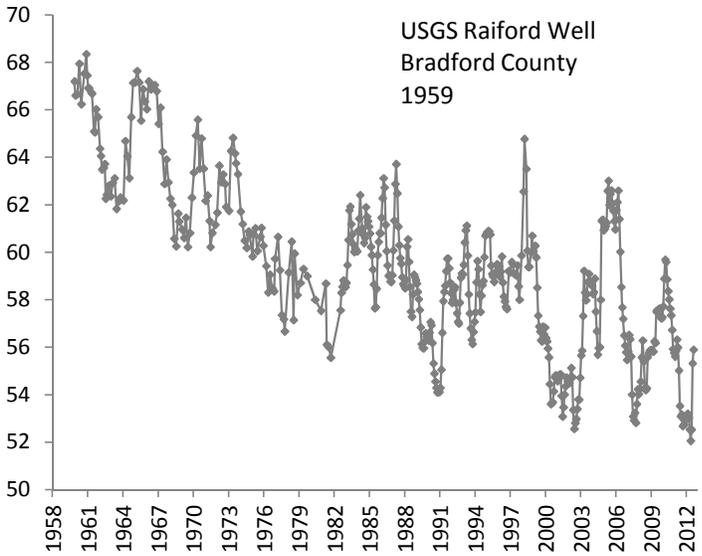
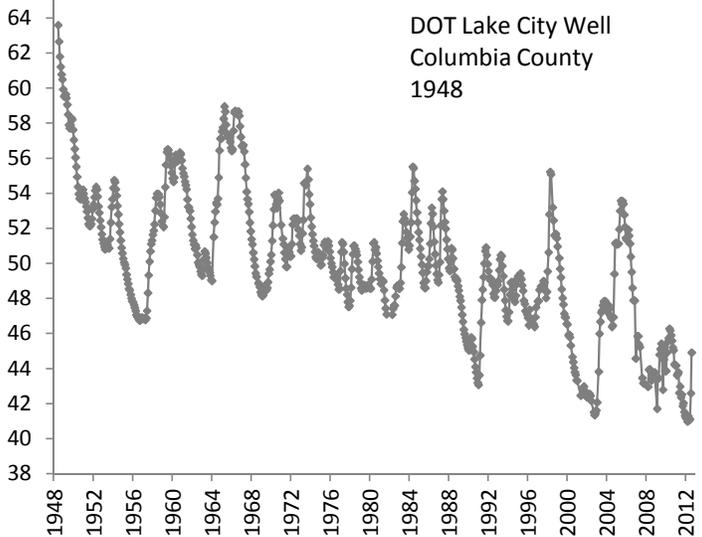
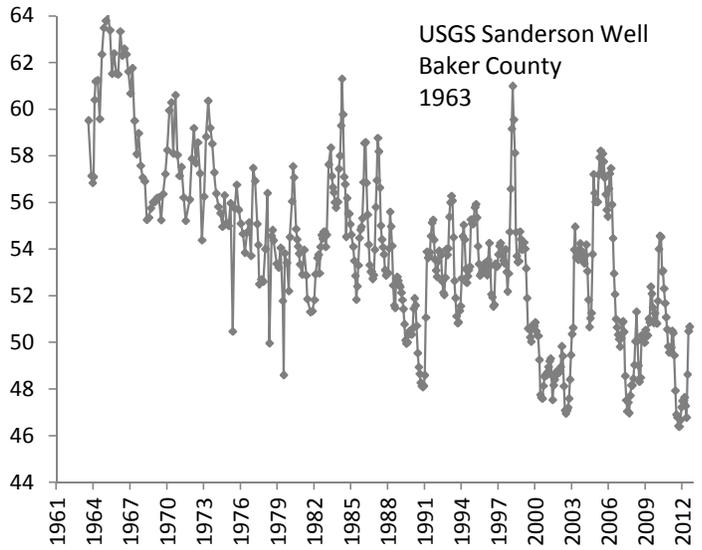
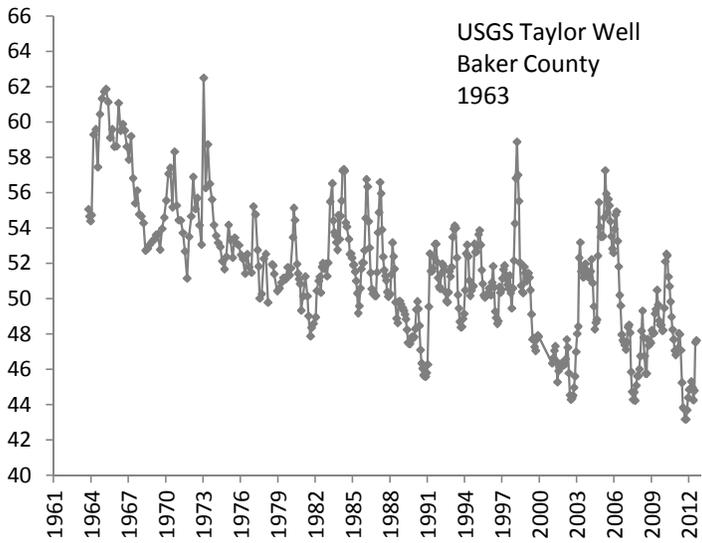
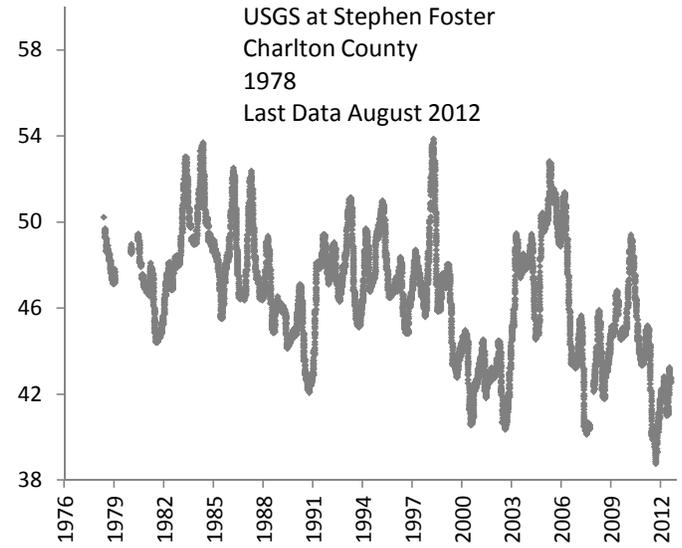
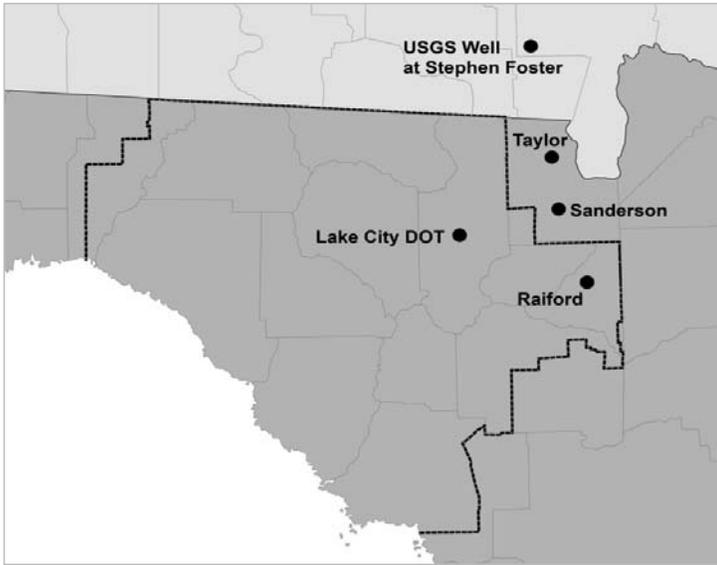


# Figure 12c: Regional Long Term Upper Floridan Levels

Ends August 2012

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS and SJRWMD

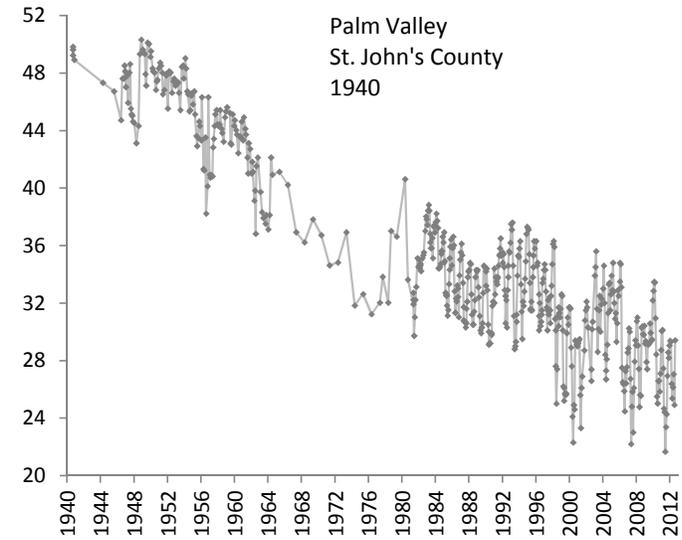
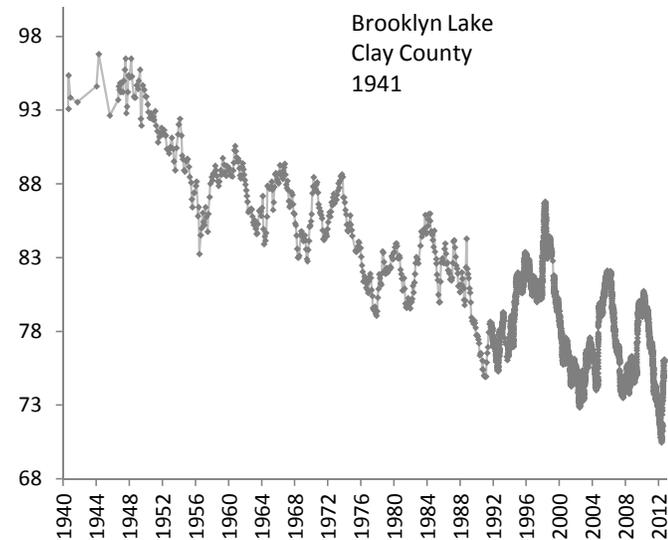
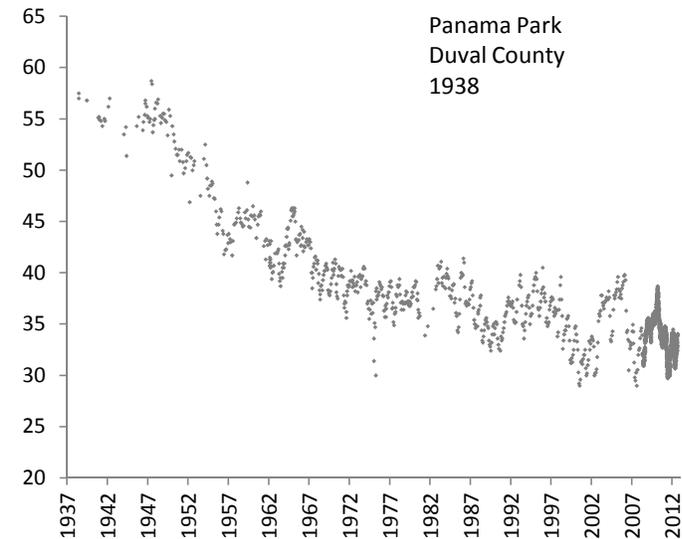
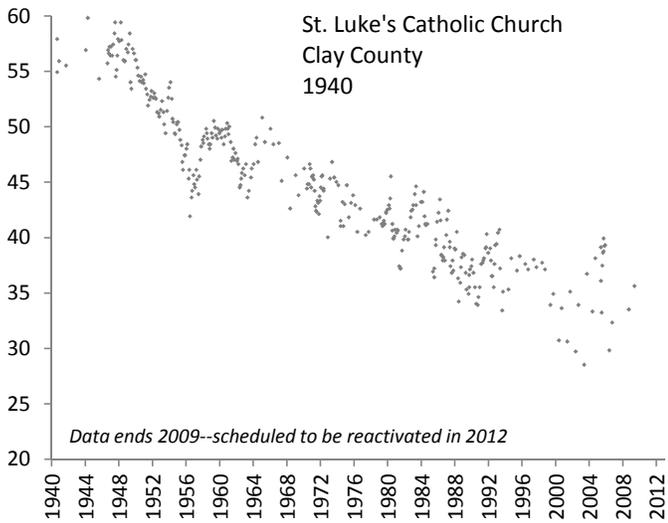
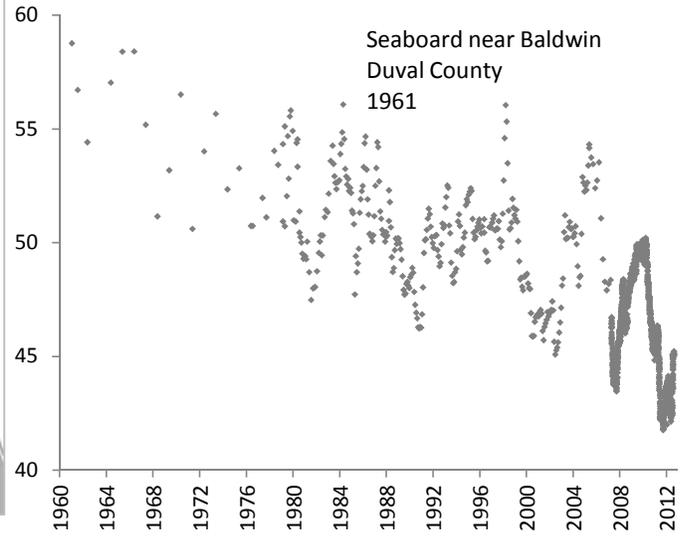
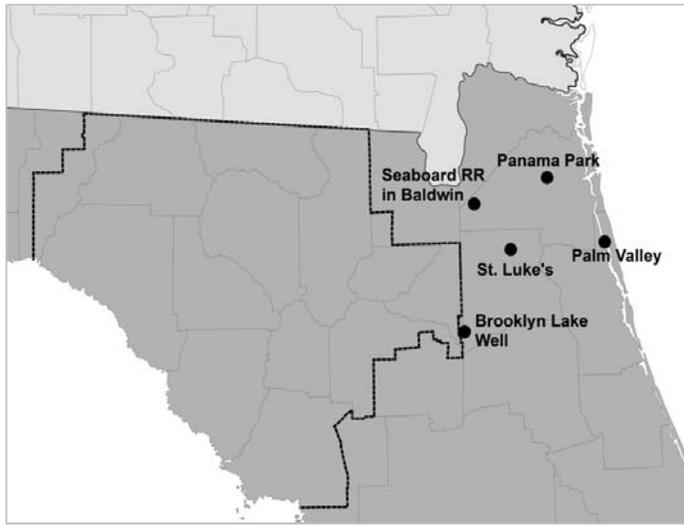


# Figure 12d: Regional Long Term Upper Floridan Levels

Ends August 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.

