

## MEMORANDUM

TO: Governing Board

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

THRU: Charles Houder, Assistant Executive Director *CH*  
Jon Dinges, Department Director *JMD*

DATE: March 7, 2012

RE: February 2012 Hydrologic Conditions Report for the District

### RAINFALL

- Average rainfall in February was 2.00", which is 52% of the long-term February average based on records starting in 1932 (Table 1, Figure 1). Parts of Jefferson County received over 4", while much of Bradford saw less than 1" (Figure 2). Suwannee tributaries in Georgia had their highest totals since October, with some areas receiving 4-5" (Figure 3). The highest monthly gaged total in the District's network was 4.98" at Clyattville in Georgia, and the lowest was 0.73" at Louis Hill Tower near Lawtey.
- The average 12-month deficit increased by nearly 2" to 14.5". The upper Suwannee basin and upper Santa Fe basin had deficits approaching 25" (Figure 4). The annual deficit was the highest in 4 years (Figure 5). The average 3-month deficit was 5.4", with rainfall about 50% of the long-term average.

### SURFACEWATER

- **Rivers:** Rainfall in Georgia caused flows to increase by at least 300% on the Withlacoochee and Alapaha rivers, but these improved flows still remained extremely low for this time of year. Flows at the Suwannee River at White Springs, Ellaville, and Branford remained in the lowest 1% of all records throughout most of February. The stage at Branford rose by 9" near the end of the month, but not before setting the apparent lowest 365-day average flow since record-keeping began in 1931, falling below the previous annual average low flow observed in 1955. The flow on February 29<sup>th</sup> was in the bottom 3% of all readings. The Santa Fe River at Fort White stayed in the lowest 1% of all records for daily, 7-day, and 60-day flows. Upper Santa Fe gages were in the bottom 10% of all records. The Aucilla, Econfinia, and Steinhatchee rivers remained below the 5<sup>th</sup> percentile of daily flows but no all-time record lows were observed. Daily discharge statistics for six river stations are presented in Figure 6 and streamflow conditions for major gages are shown in Figure 7.

- **Lakes:** All monitored lakes were below their long-term average levels. Sneads Smokehouse Lake, which is part of the Aucilla River in northern Jefferson County, rose to its highest level since September, but still remained below its previous record low set in 2007. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for 14 lakes.
- **Springs:** Average February flow relative to historical flows is shown for 6 spring systems in Figure 9. Daily flow rates at the spring-fed Ichetucknee River and Wacissa River were approximately 20% higher than record drought-induced lows observed in 2002 and 2001, respectively.

## GROUNDWATER

Floridan aquifer levels remained extremely low. Record low levels for February occurred at 93% of monitor wells, with slightly higher but still below-normal conditions in the Waccasassa Flats and San Pedro Bay areas of confinement. All-time lows were observed at 17 wells, mainly in the upper Santa Fe basin, along the Suwannee River corridor, and in the upper Aucilla basin (Figure 10). Levels improved in 30% of the monitored wells, but the average change across the District was a drop of 2". Levels continued to rise slowly in the northeast portion of the District where all-time lows were observed in late 2011, but conditions remained in the lowest 5% of all observations. Conditions averaged across the District compared to all historic levels remained below the 5<sup>th</sup> percentile (based on records beginning no earlier than 1978). Eighty-eight percent of the wells were in the bottom 10% of all recorded levels, and 77% were in the bottom 5%. Statistics for a representative sample of wells are shown in Figure 11, and Figure 12 shows graphs of Floridan aquifer wells in or near the District with the longest continuous records.

## HYDROLOGICAL/METEOROLOGICAL/WATER USE INFORMATION

- The District monitors agricultural water use on 106 overhead irrigation systems. The average daily application rate in February was 0.02", the same rate observed since November. Figure 13 shows average daily application and evapotranspiration since 2008.
- 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 indicated severe drought during the last week of February in the District and less severe "incipient dry spell" conditions in south central Georgia.
- The U.S. Geological Survey categorized the District's rivers including the Georgia basins as experiencing severe hydrologic drought.
- A La Niña advisory remains in effect from the National Weather Service Climate Prediction Center, although the Pacific Ocean cooling anomaly

responsible for the La Niña effect has peaked and is expected to transition to neutral conditions by May.

## CONSERVATION

A Water Shortage Advisory is in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to two days per week between March and November based on a 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 (109 wells), surfacewater (35 stations), agricultural water use (106 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](http://www.mysuwanneeriver.com) or by request.*

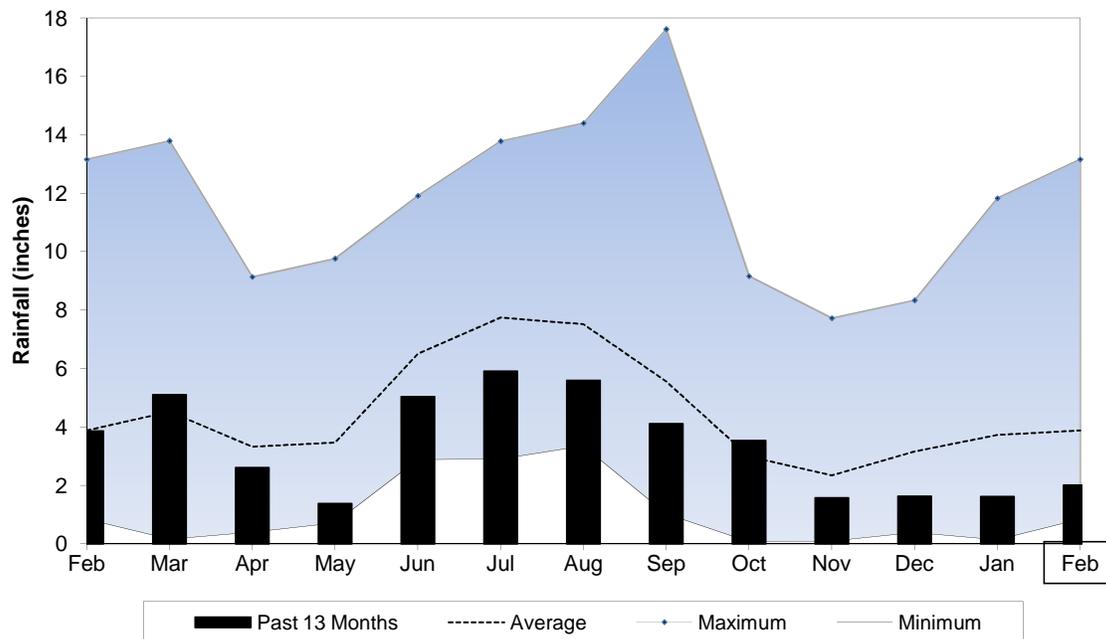
**Table 1: Estimated Rainfall Totals**

County	Feb-2012	February Average	Last 3 Months	Last 12 Months
Alachua	1.72	3.59	3.64	37.01
Baker	1.68	3.44	3.73	35.57
Bradford	1.13	3.64	2.56	34.86
Columbia	1.77	3.72	4.23	37.66
Dixie	2.09	3.98	5.36	43.88
Gilchrist	1.84	4.18	4.55	41.53
Hamilton	2.37	4.01	6.23	36.47
Jefferson	3.13	4.65	7.31	38.10
Lafayette	1.49	3.98	5.39	39.69
Levy	2.23	3.63	4.56	42.10
Madison	3.21	4.36	7.91	43.16
Suwannee	1.80	3.73	5.81	42.73
Taylor	1.45	3.94	5.90	39.80
Union	1.56	3.63	3.56	38.80

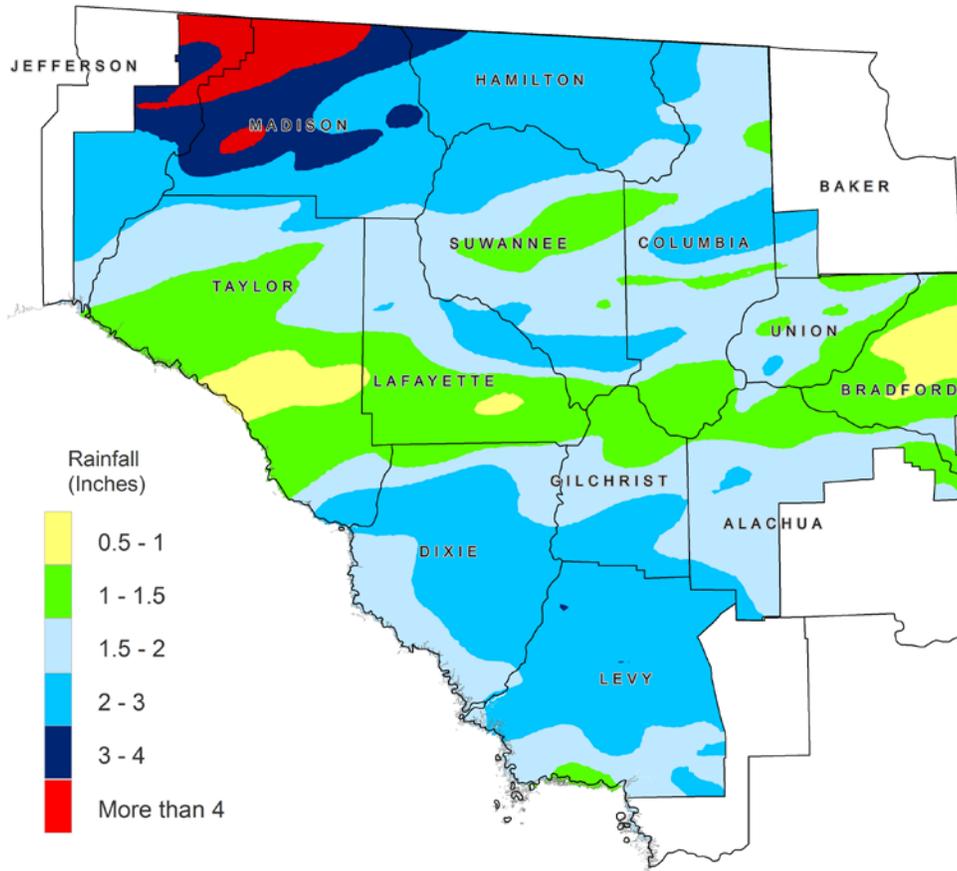
February 2012 Average: 2.00  
 Historical February Average (1932-2011): 3.87  
 Historical 12-month Average (1932-2011): 54.56  
 Past 12-Month Total: 40.03  
 12-month Rainfall Deficit: -14.53

(Rainfall reported in inches)

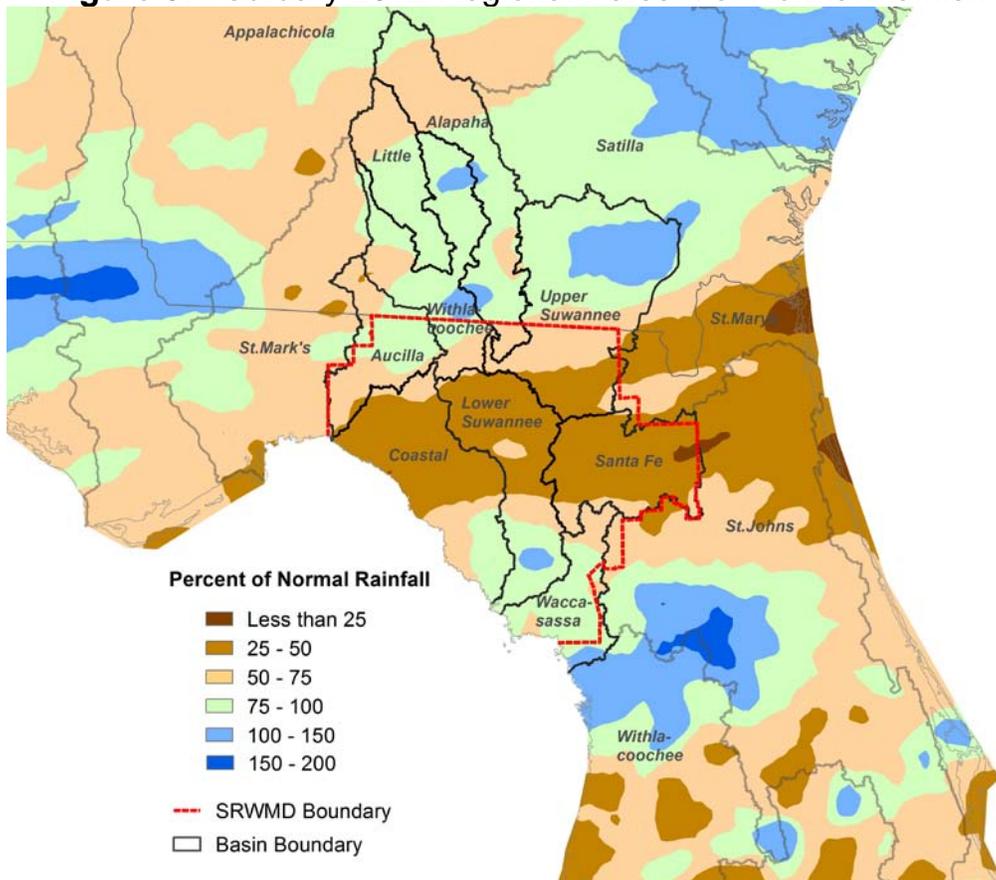
**Figure 1: Comparison of District Monthly Rainfall**



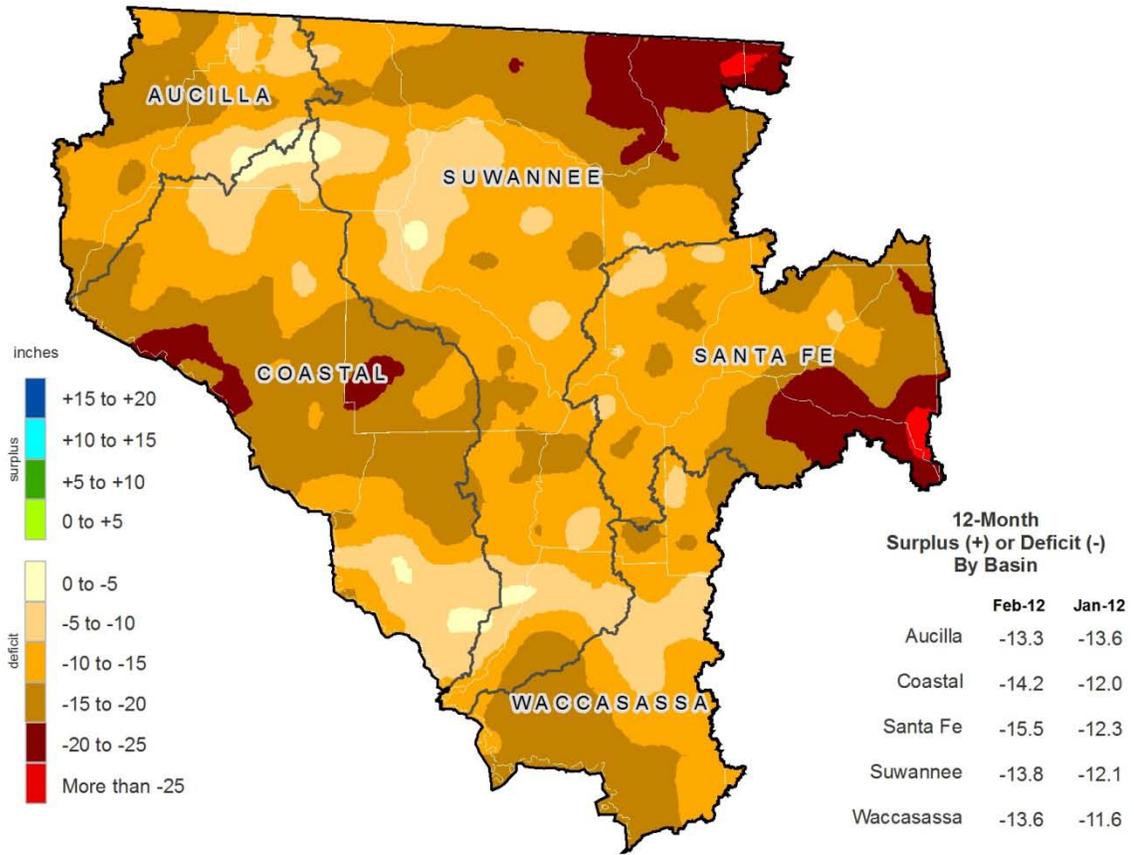
**Figure 2: February 2012 Rainfall Estimate**



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

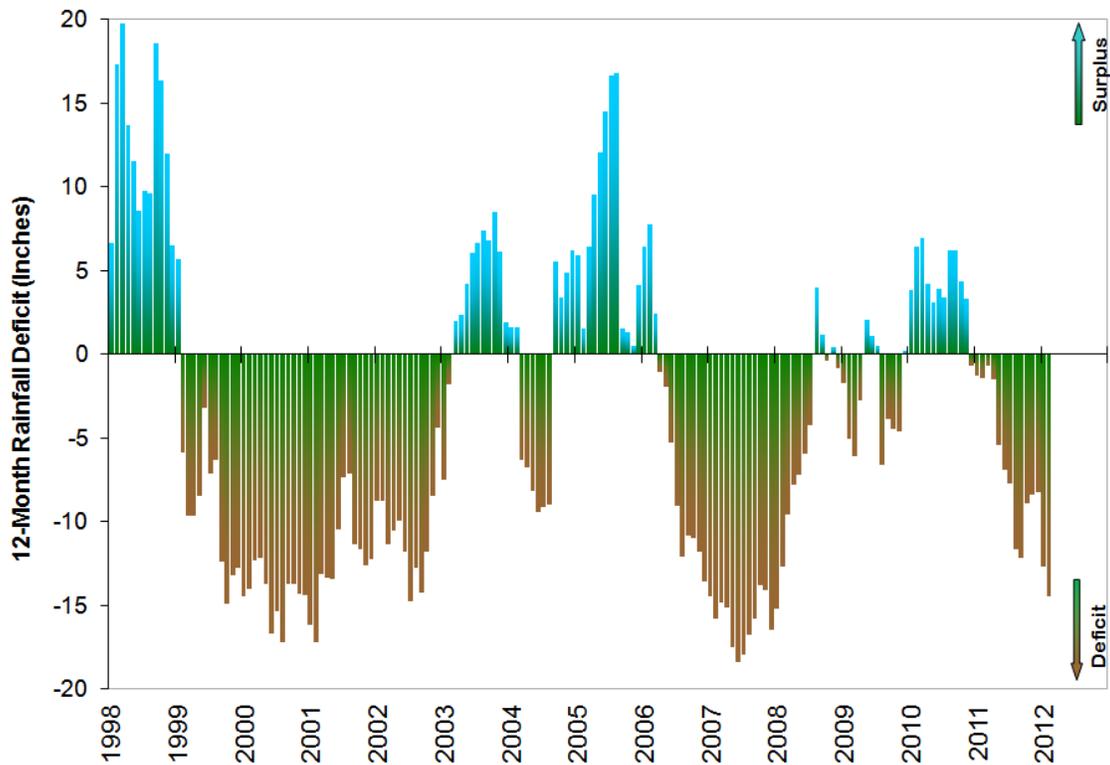


**Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin Ending February 29, 2012**

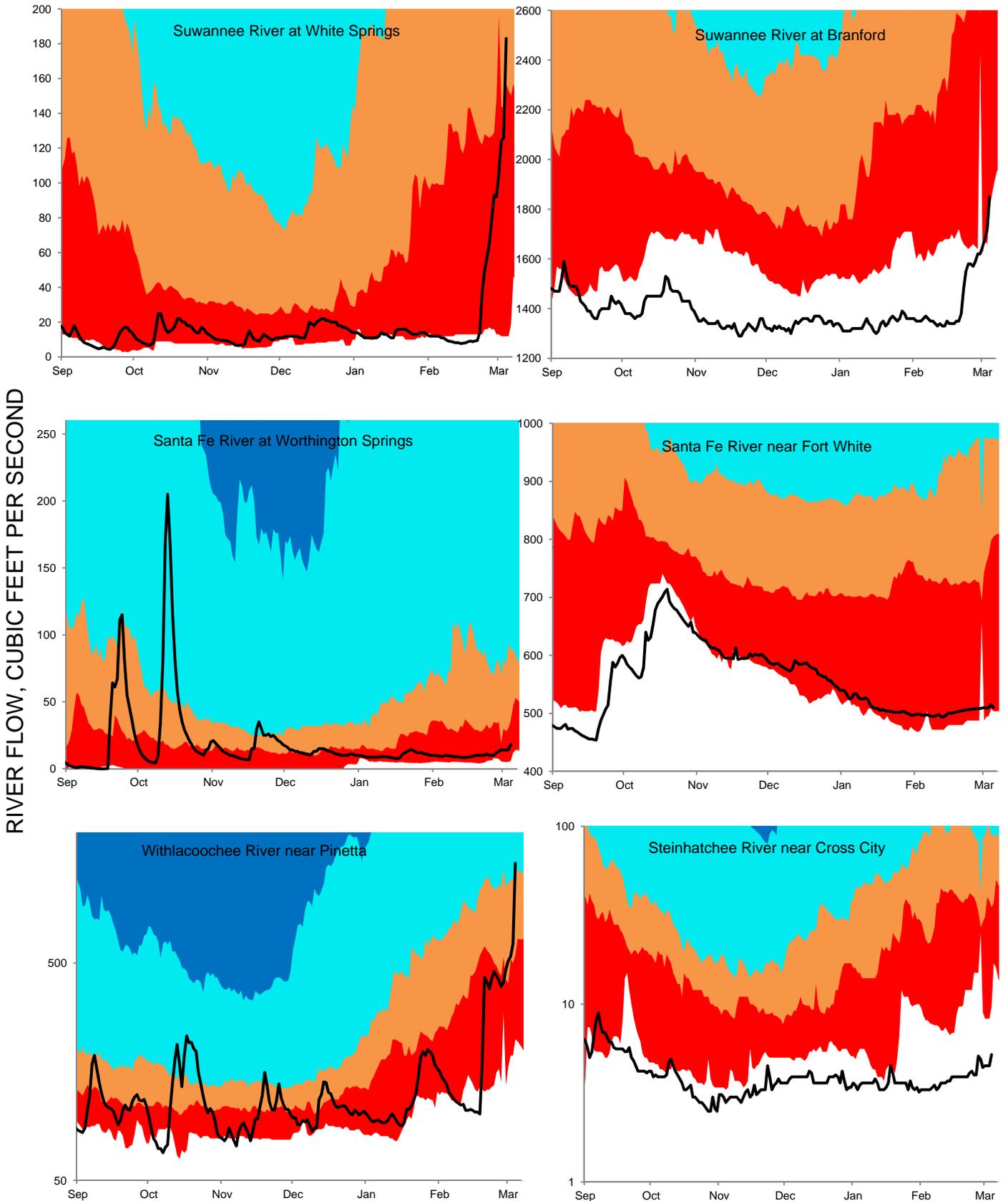
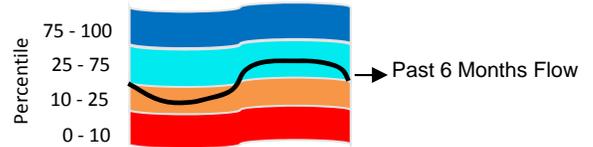


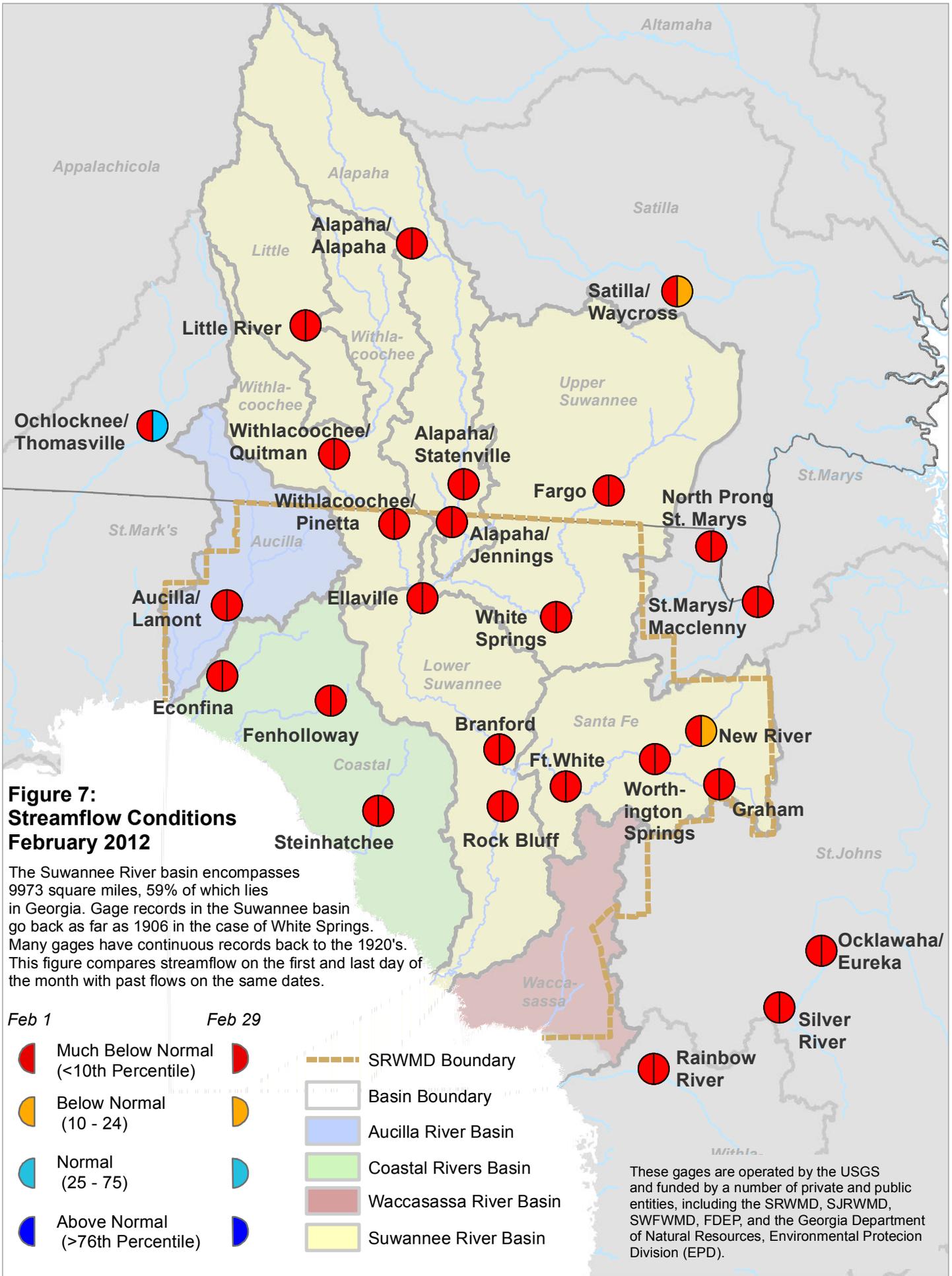
**Figure 5: 12-Month Rolling Rainfall Deficit Since 1998**

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



**Figure 6: Daily River Flow Statistics**  
 September 1, 2011 through March 4, 2012





**Figure 7: Streamflow Conditions February 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.

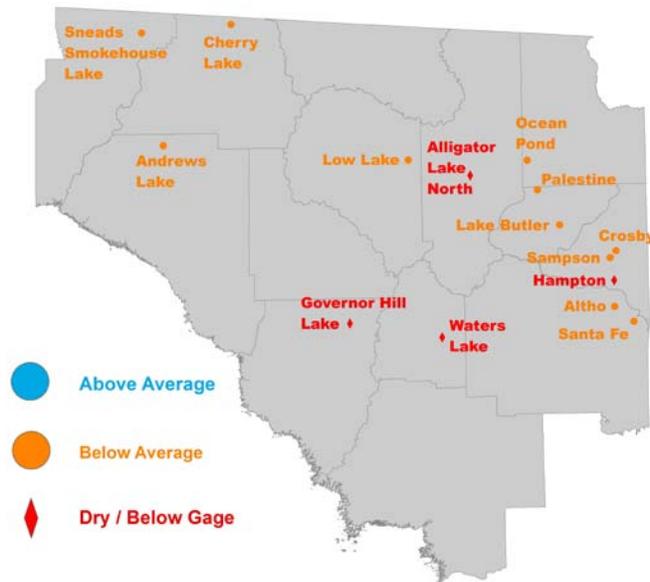
Feb 1                      Feb 29

- 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

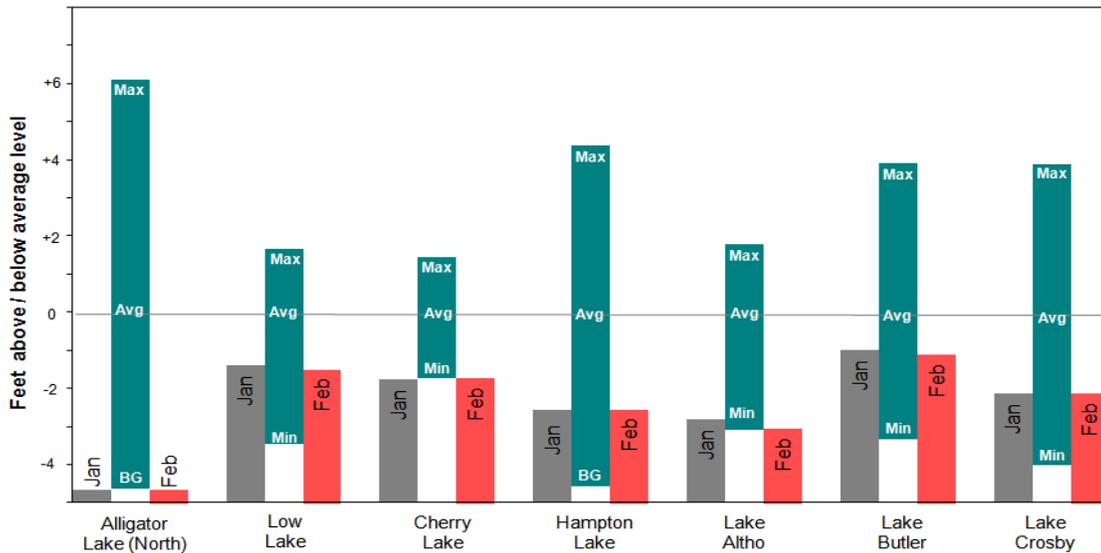
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, SWFWMD, FDEP, and the Georgia Department of Natural Resources, Environmental Protection Division (EPD).

**Figure 8: February 2012 Lake Levels**

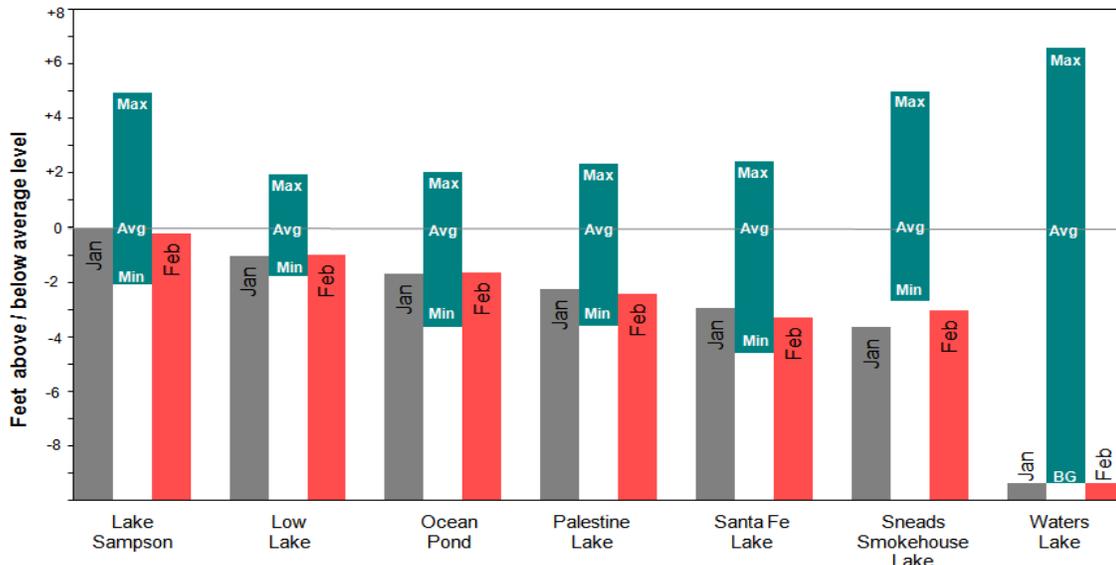


SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular ones in the eastern part of the District, are embedded in a surficial or intermediate aquifer over relatively impermeable clay deposits. These lakes rise and fall according to local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



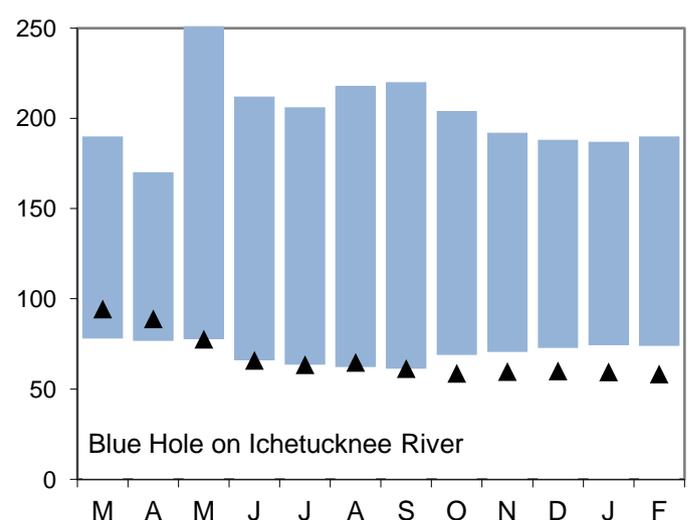
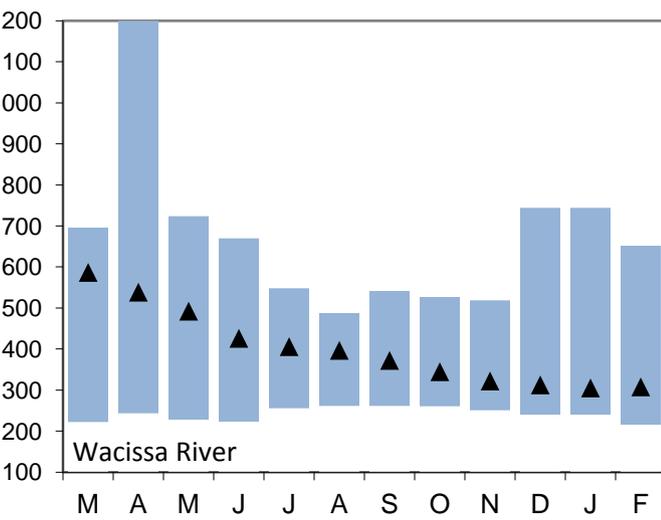
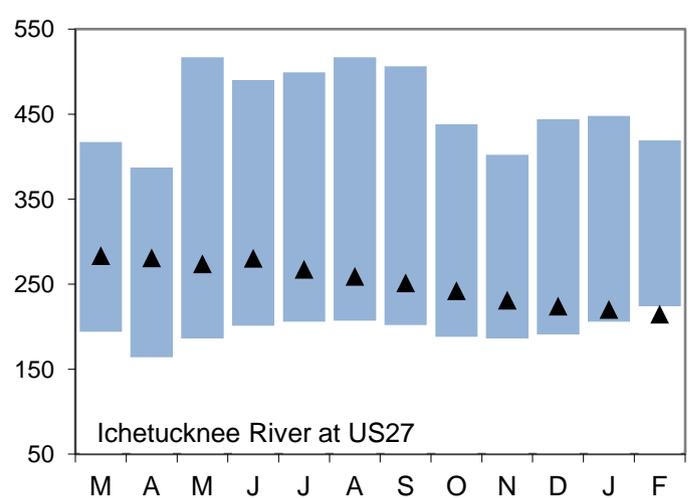
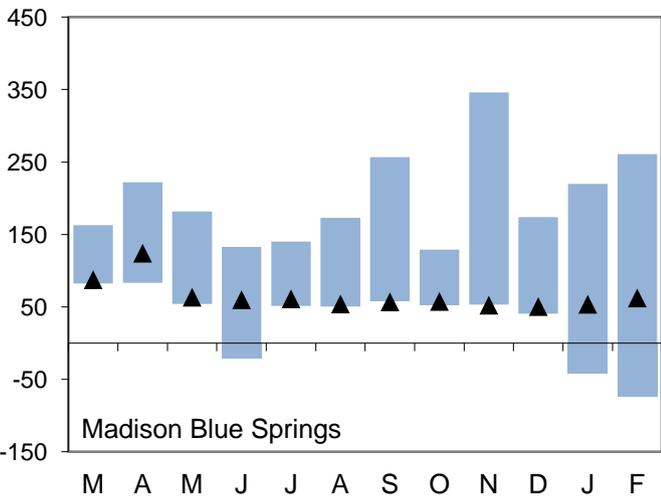
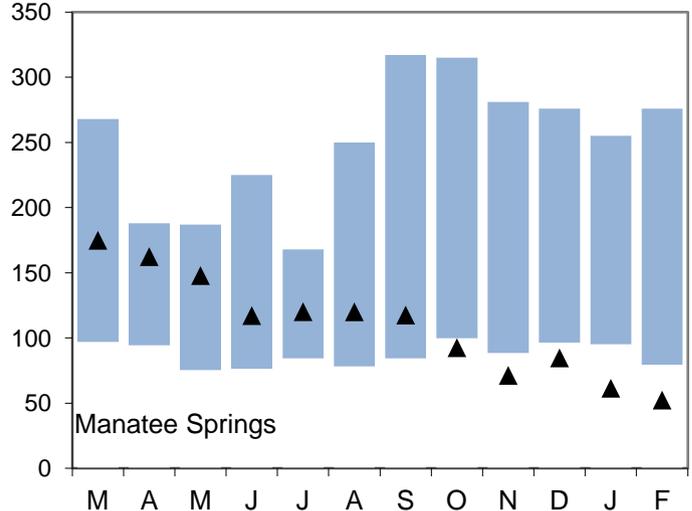
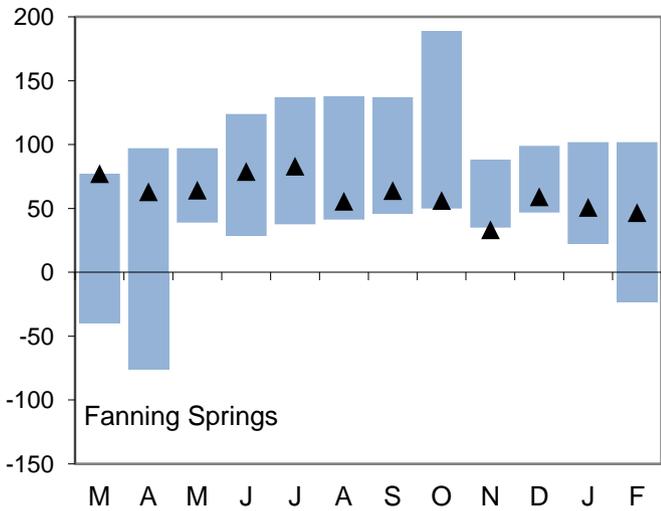
BG = Below Lowest Limit of Gage



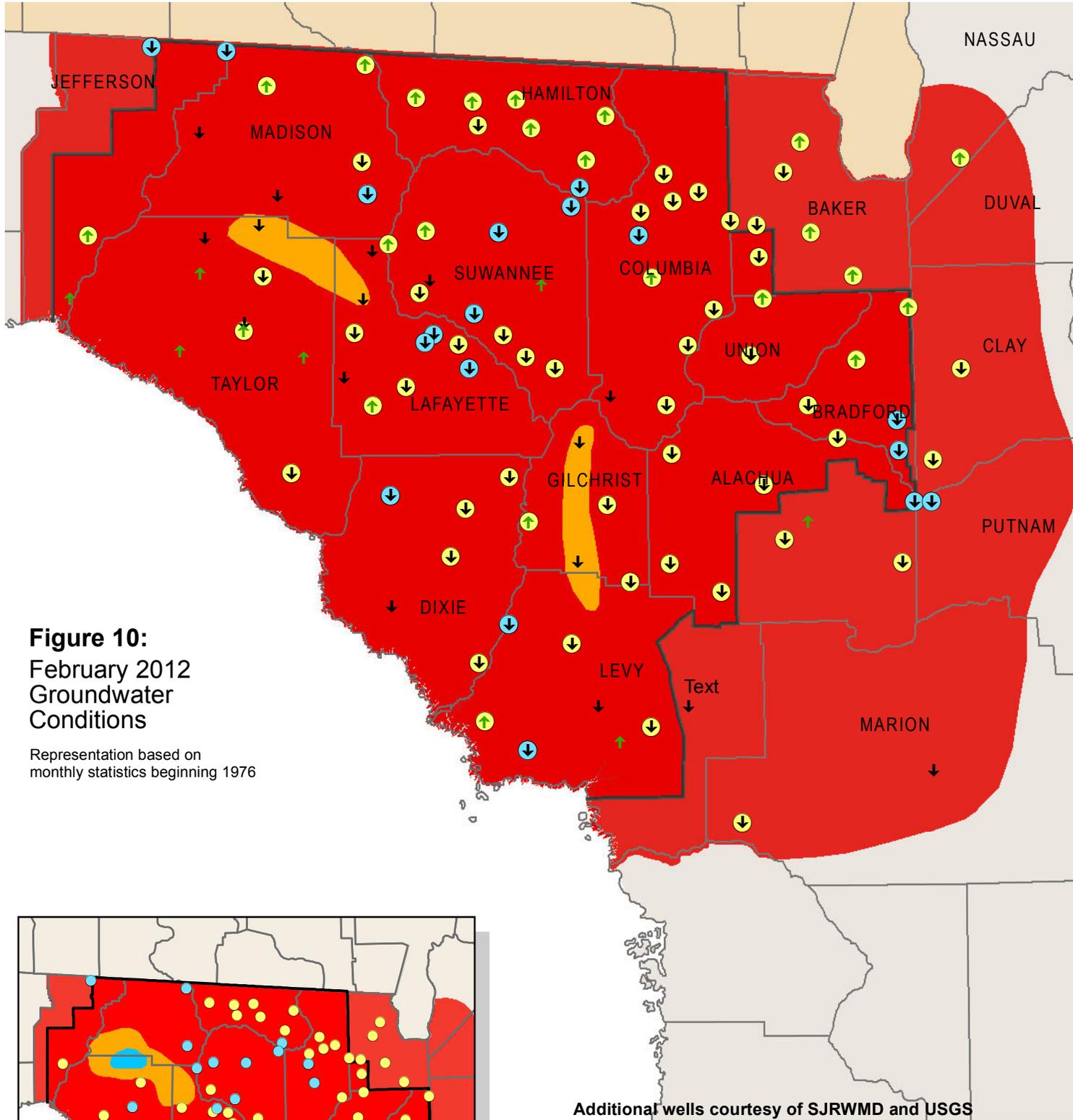
BG = Below Lowest Limit of Gage

**Figure 9: Monthly Springflow Statistics**  
 Flows March 1, 2011 through February 29, 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.

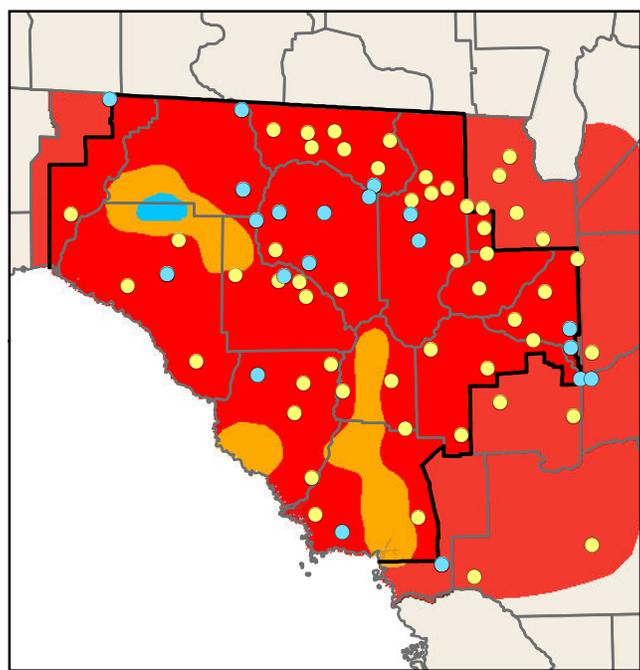


Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse. Springflow for months marked by an asterisk (\*) was strongly affected by river conditions. Data will be revised once approved and published by the U.S. Geological Survey.



**Figure 10:**  
February 2012  
Groundwater  
Conditions

Representation based on  
monthly statistics beginning 1976



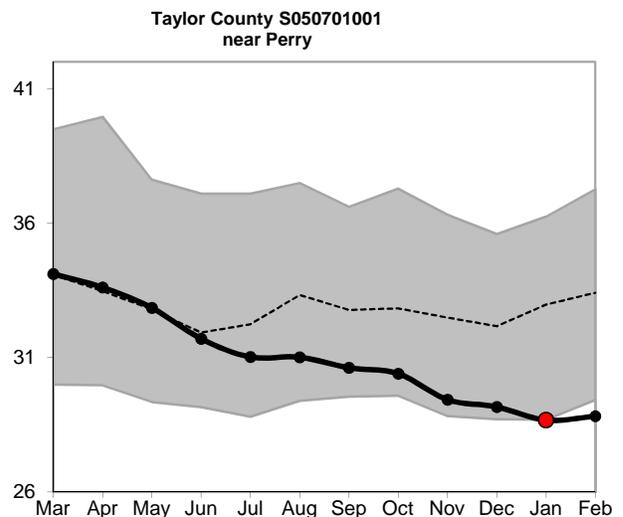
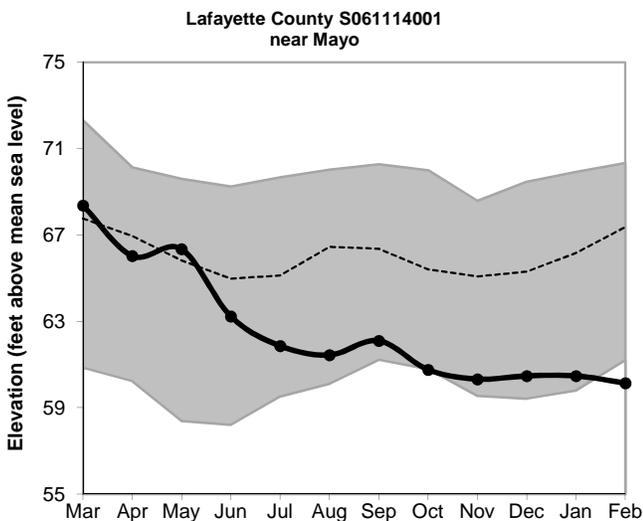
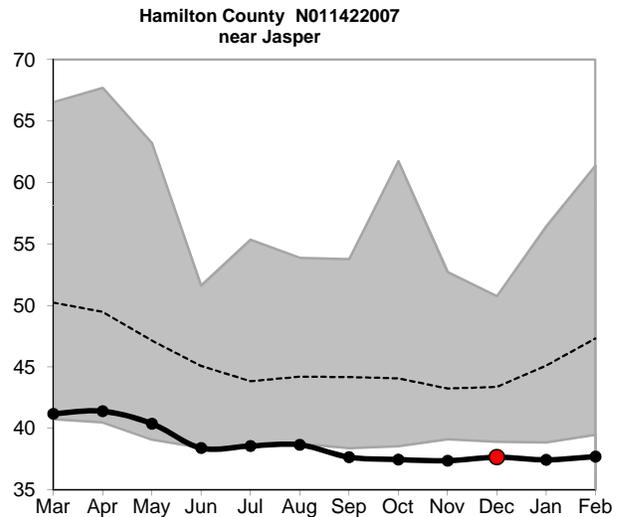
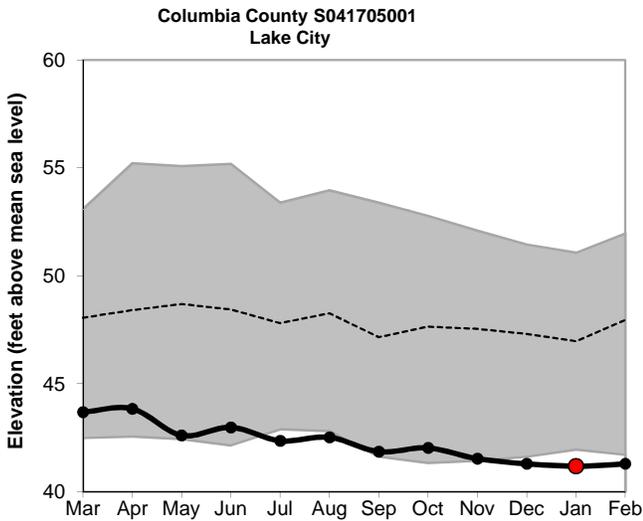
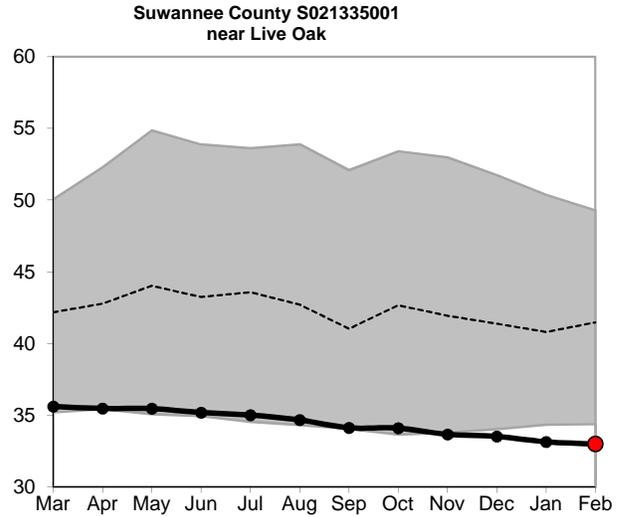
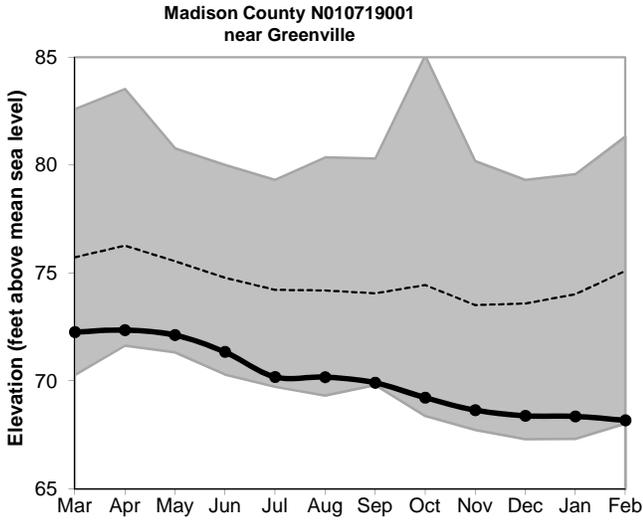
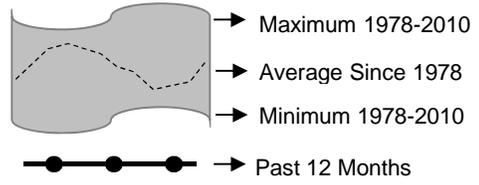
Inset: January 2012 Groundwater Levels

Additional wells courtesy of SJRWMD and USGS

- 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 Low for Month
- Historic Low

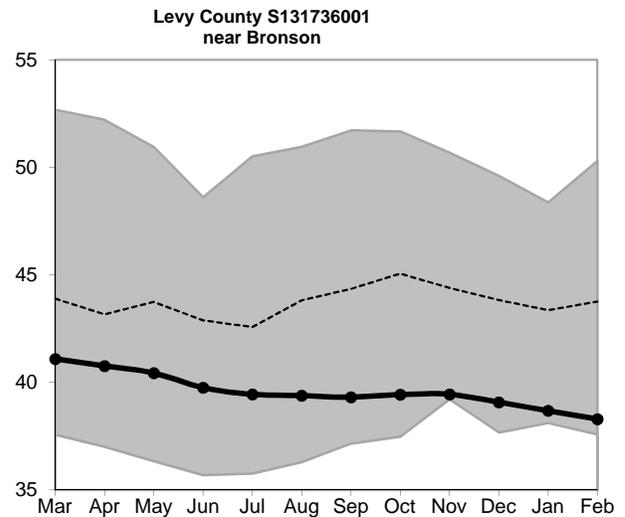
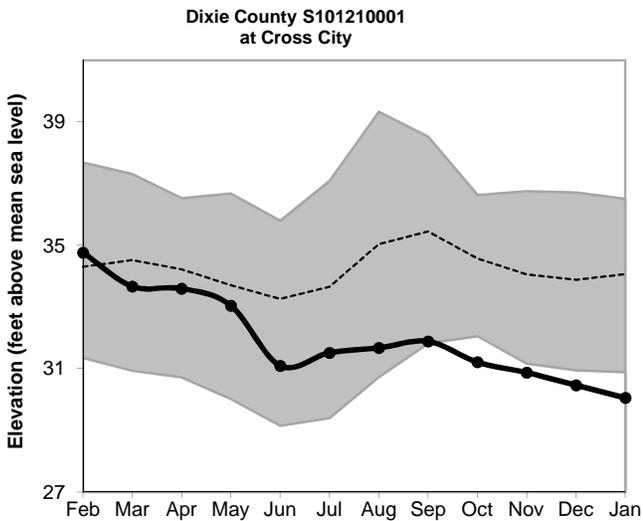
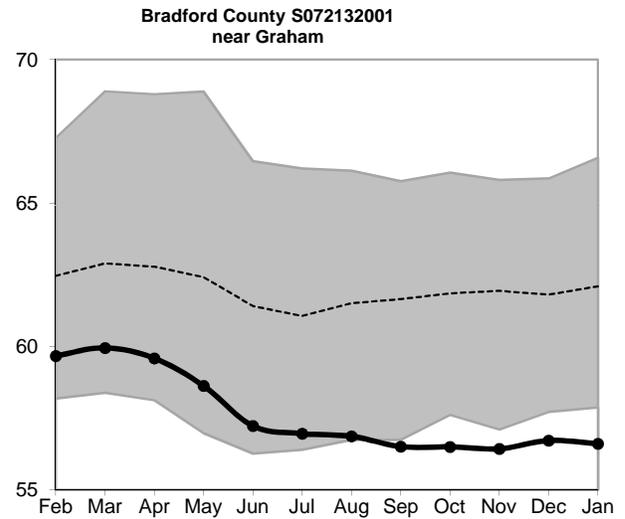
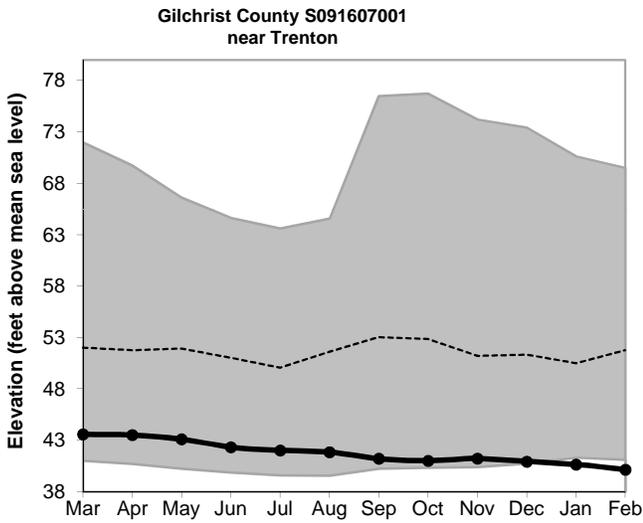
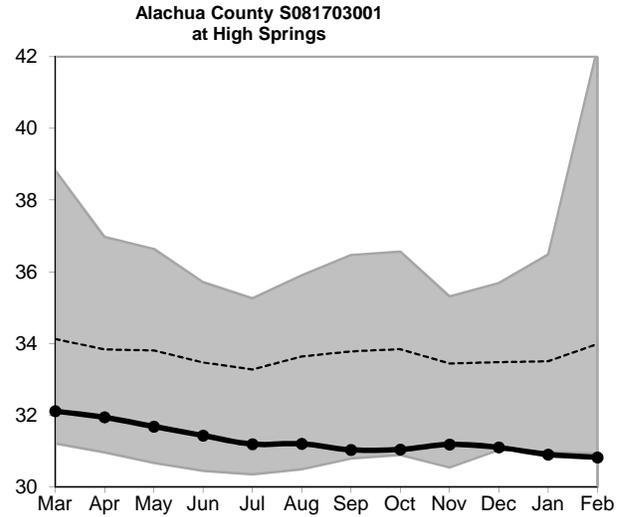
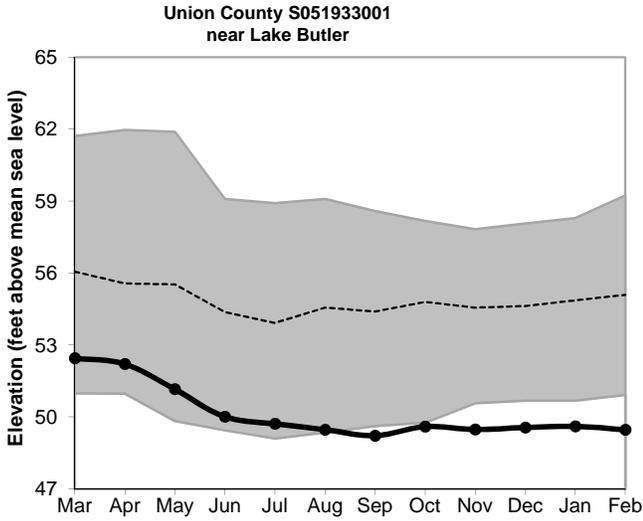
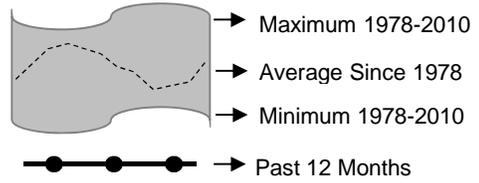
# Figure 11: Monthly Groundwater Level Statistics

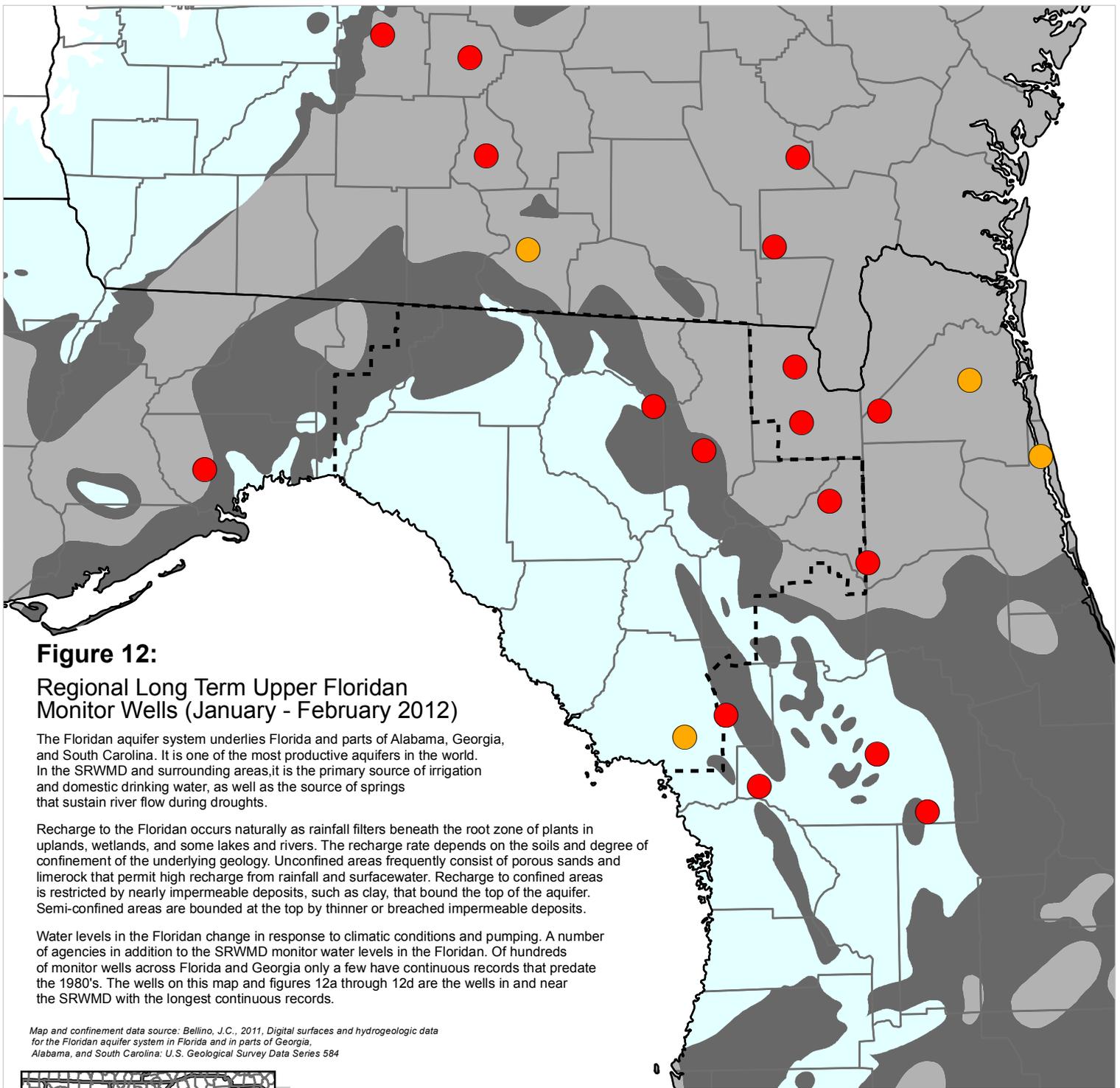
Levels March 1, 2011 through February 29, 2012  
 Period of Record Beginning 1978



# Figure 11, cont.: Groundwater Level Statistics

Levels March 1, 2011 through February 29, 2012  
 Period of Record Beginning 1978





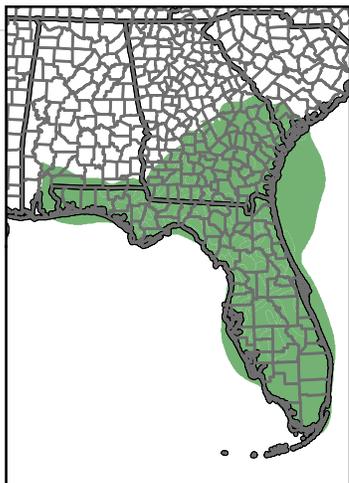
**Figure 12:**  
**Regional Long Term Upper Floridan Monitor Wells (January - February 2012)**

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**

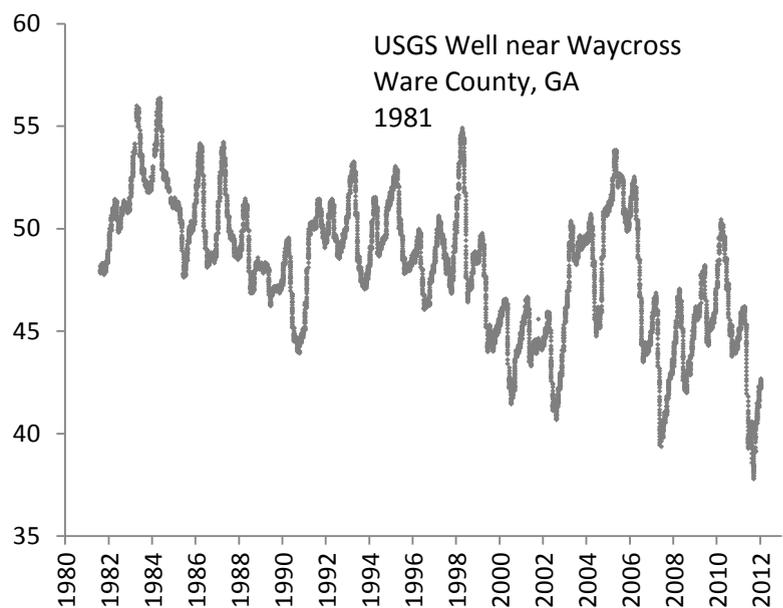
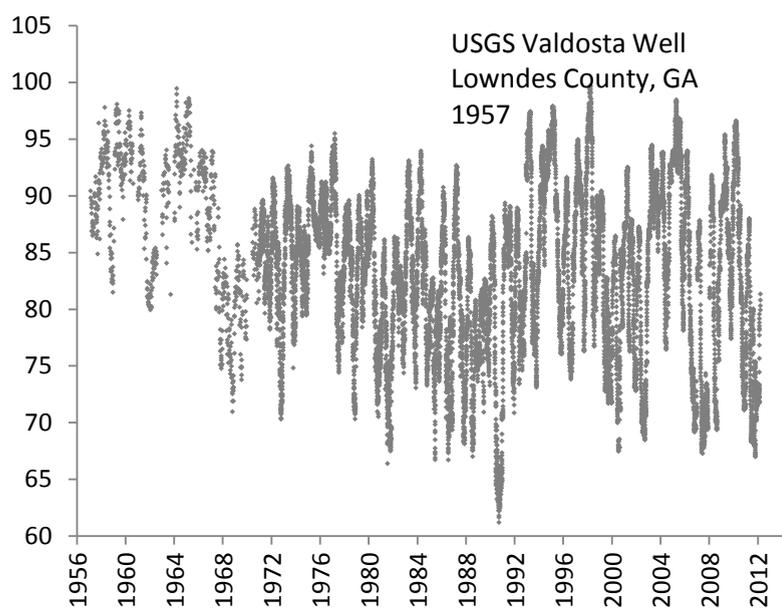
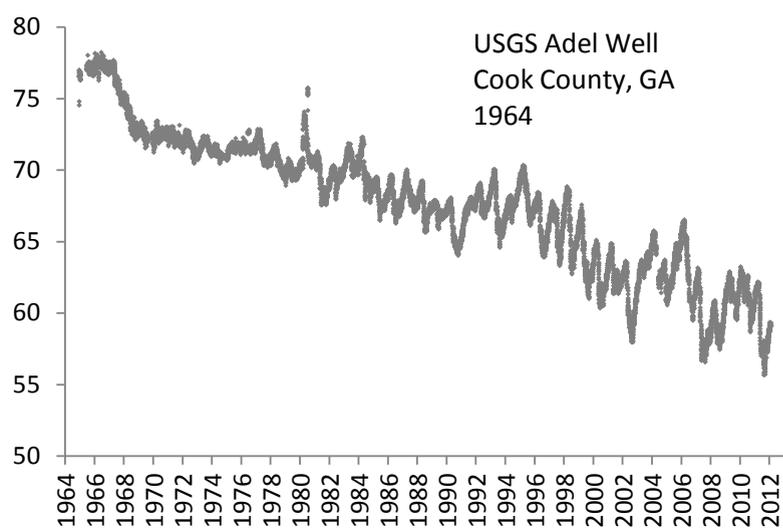
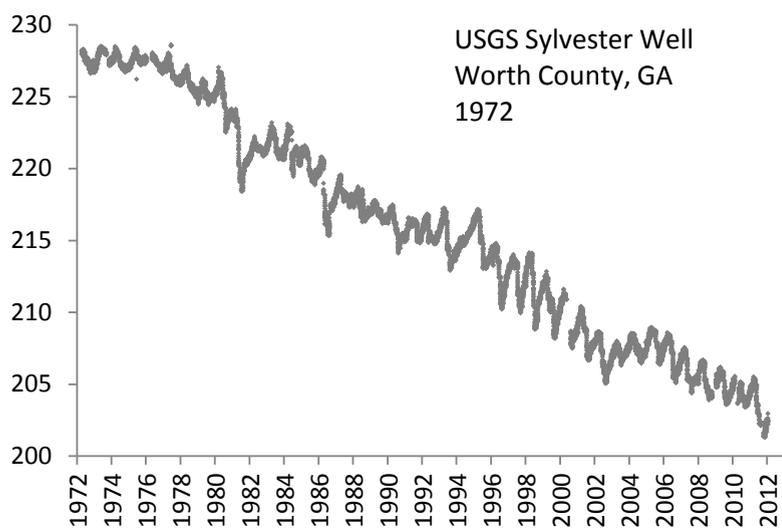
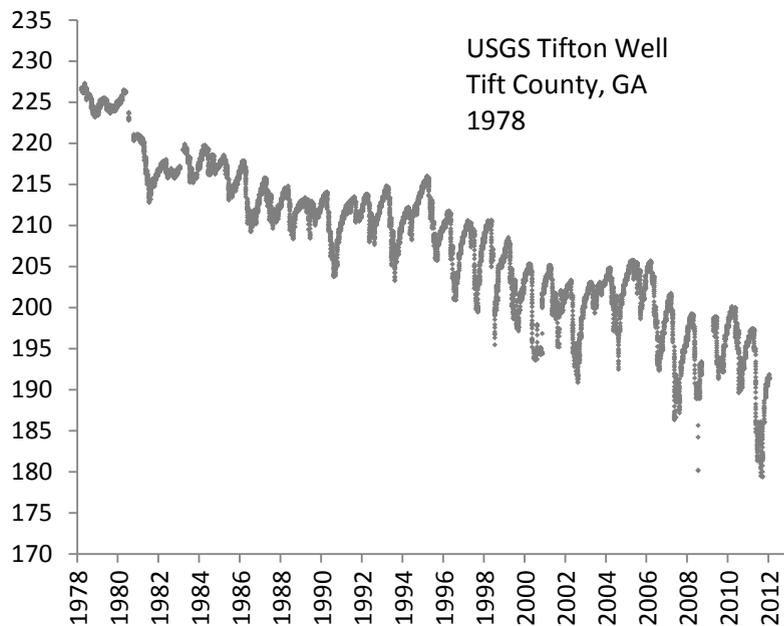
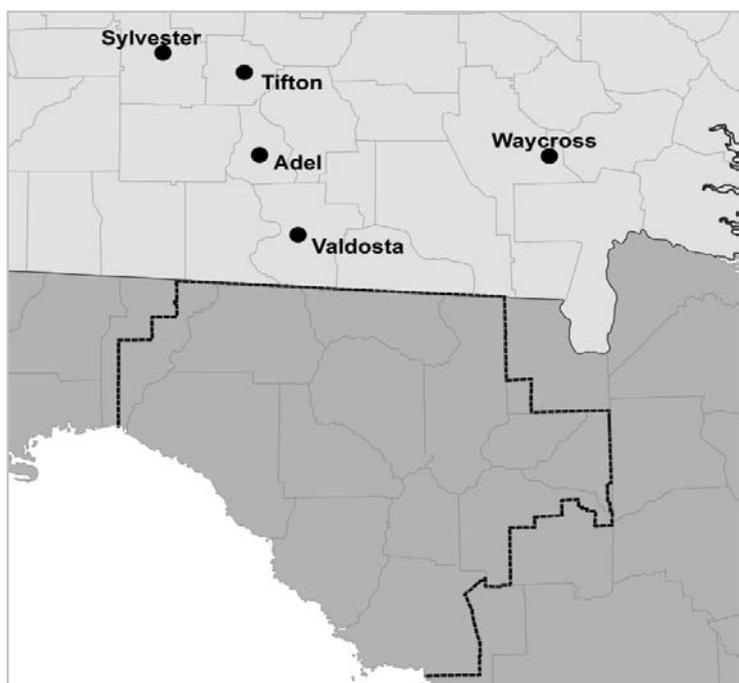
-  High (Greater than 75th Percentile)
-  Normal (25th to 75th Percentile)
-  Low (10th to 25th Percentile)
-  Extremely Low (Less than 10th Percentile)
-  Not Available
-  SRWMD Boundary

# Figure 12a: Regional Long Term Upper Floridan Levels

Ending January-February 2012

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS and Georgia EPD

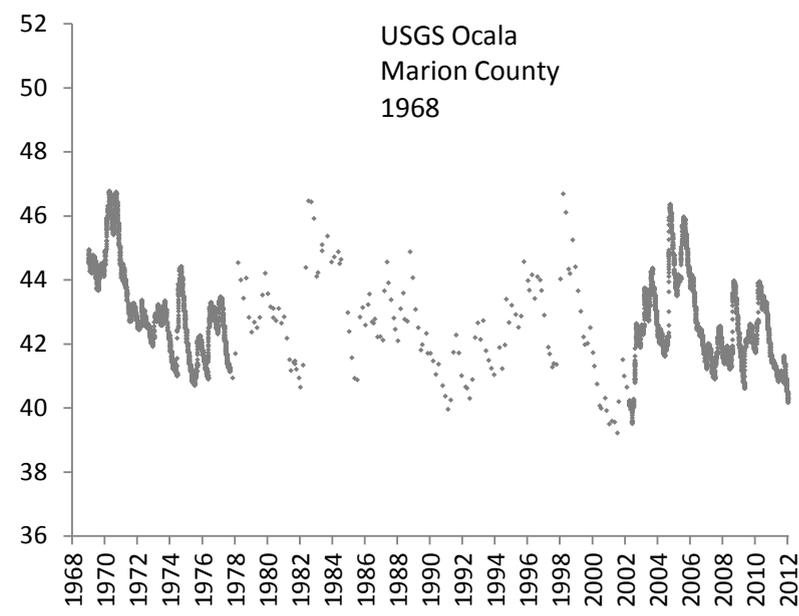
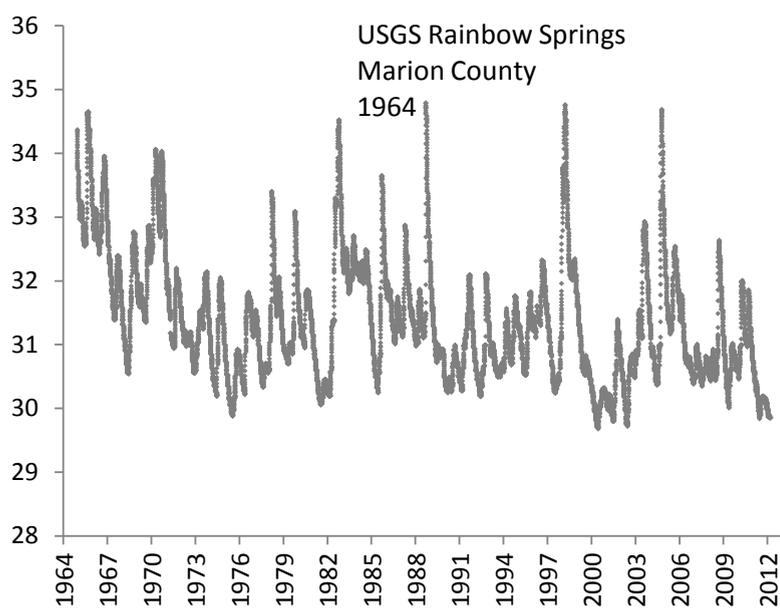
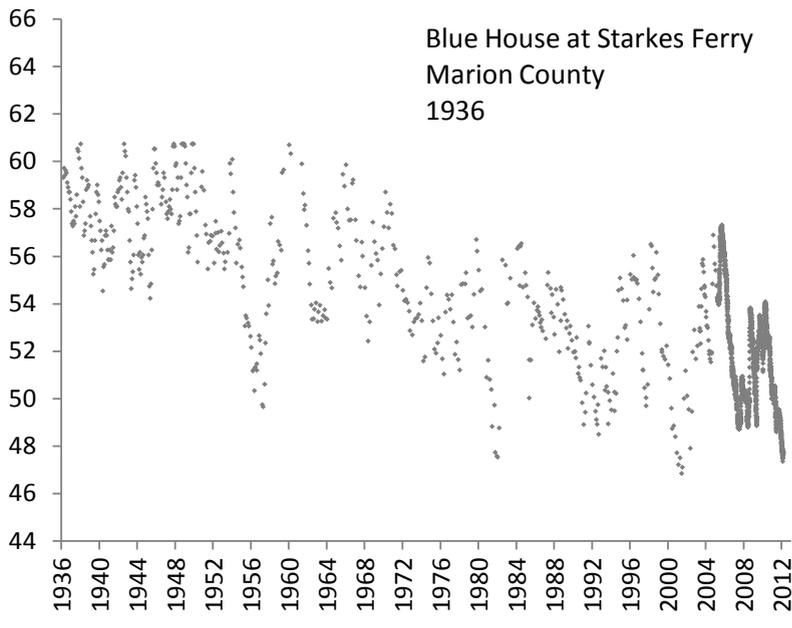
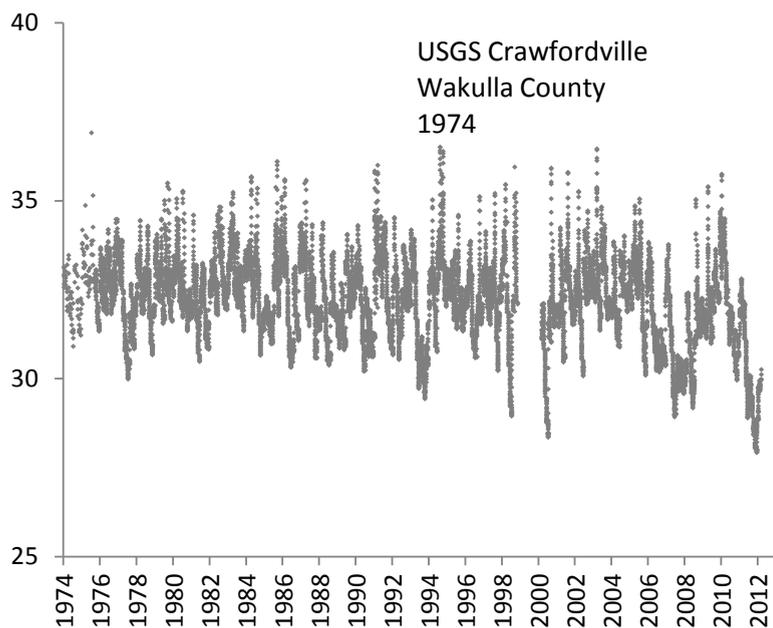
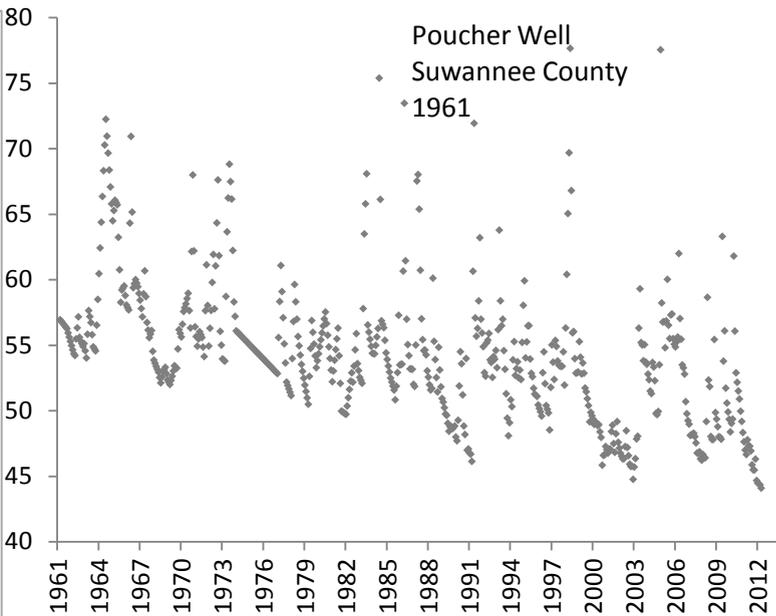
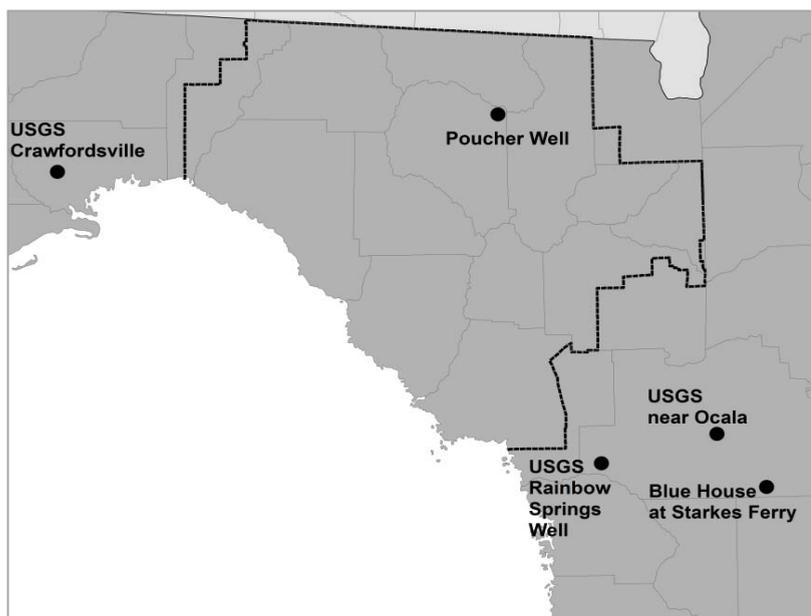


# Figure 12b: Regional Long Term Upper Floridan Levels

Ending February 2012

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS, SWFWMD, and SJRWMD

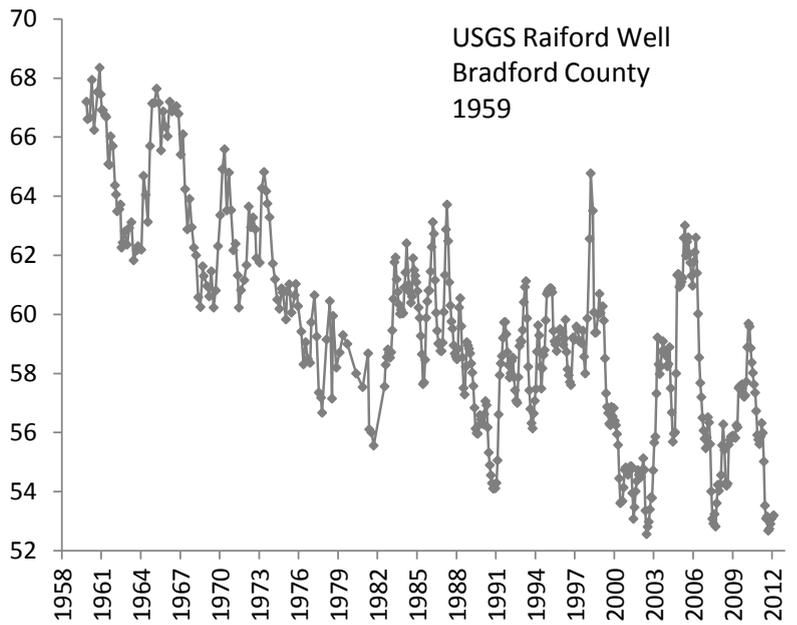
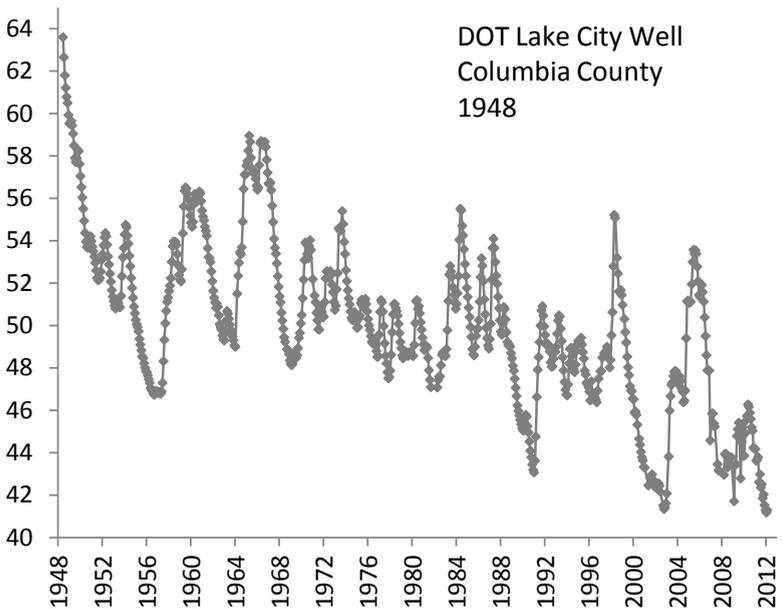
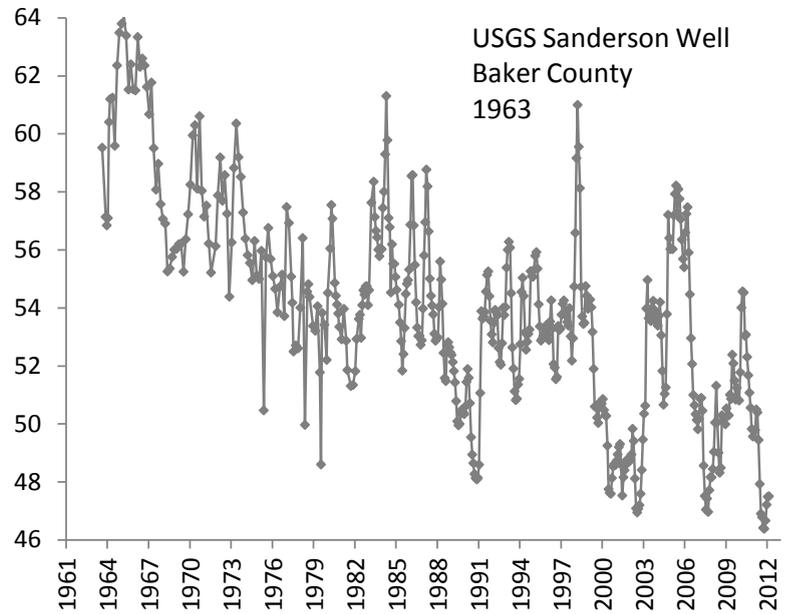
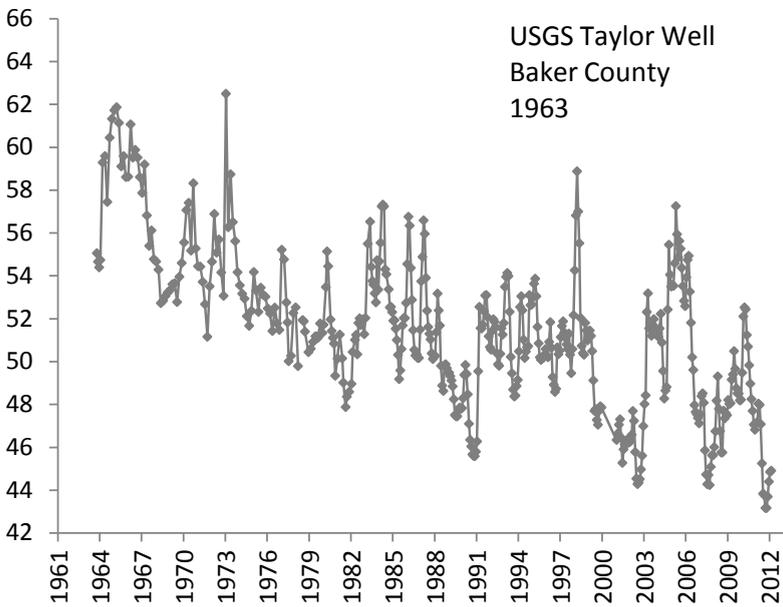
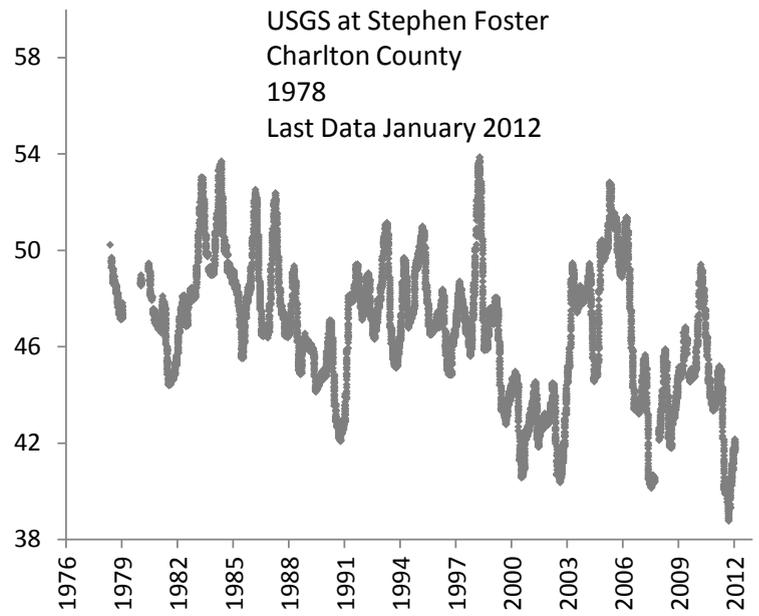
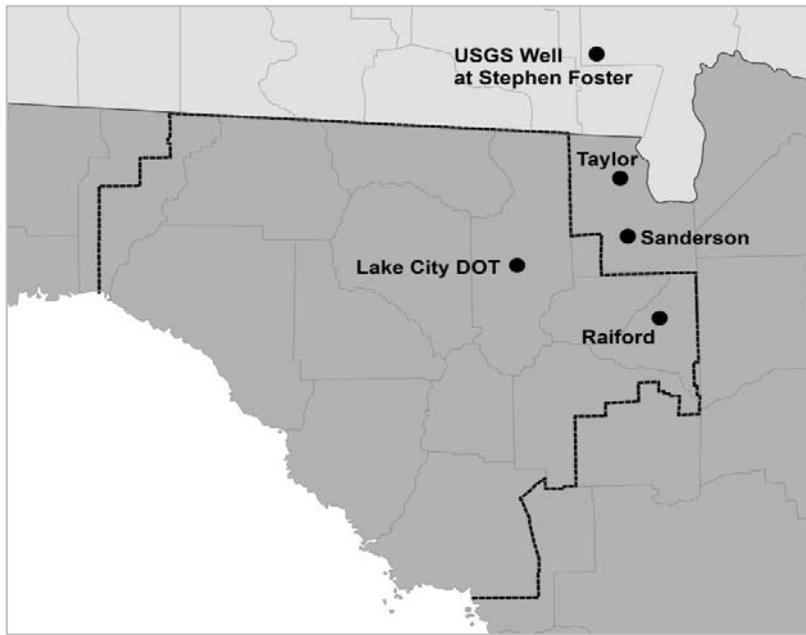


# Figure 12c: Regional Long Term Upper Floridan Levels

Ending January 2012-February 2012

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS and SJRWMD

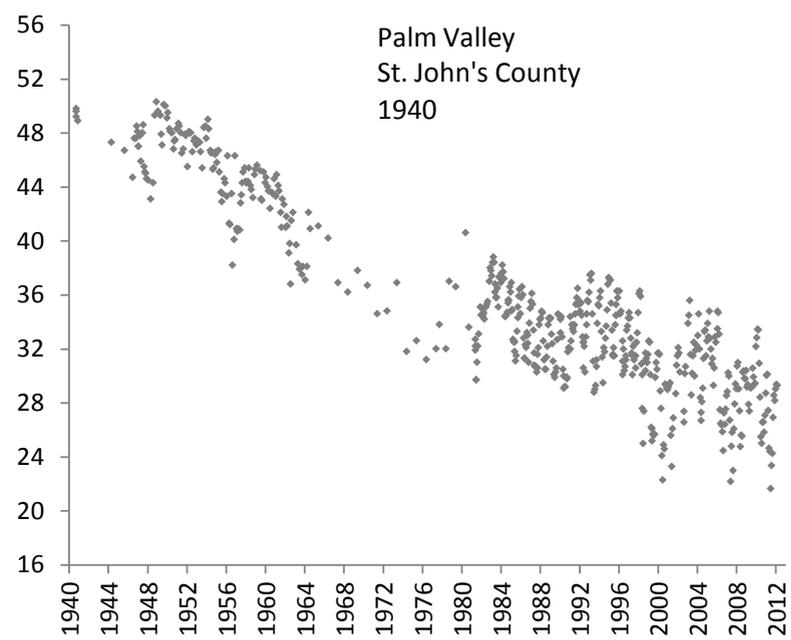
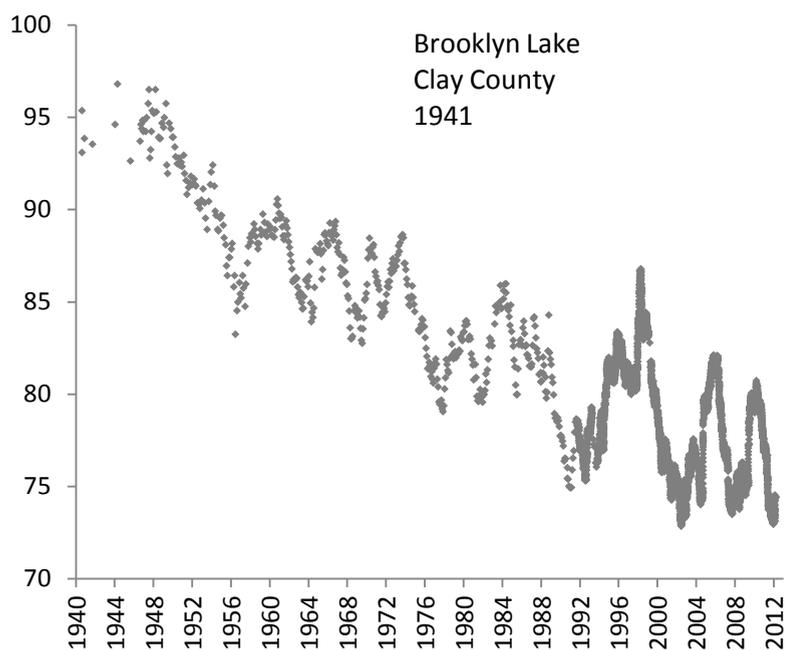
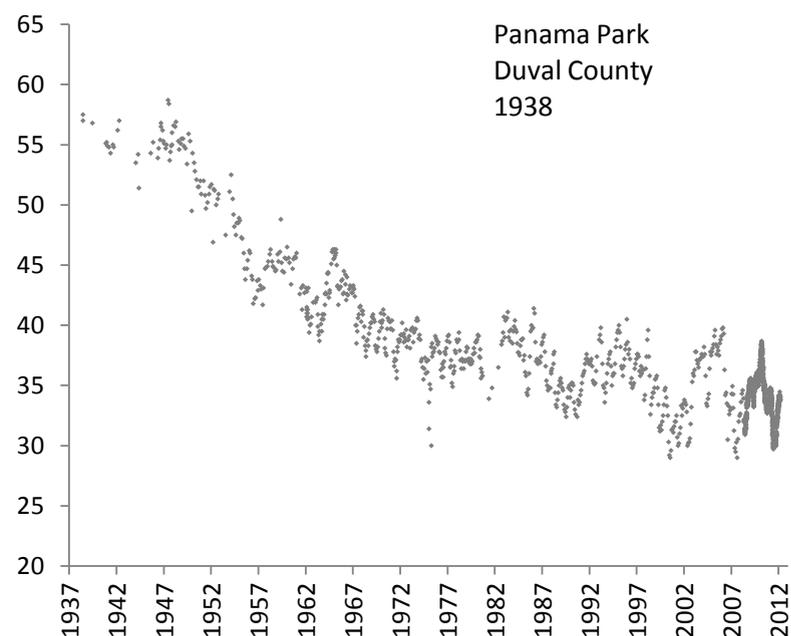
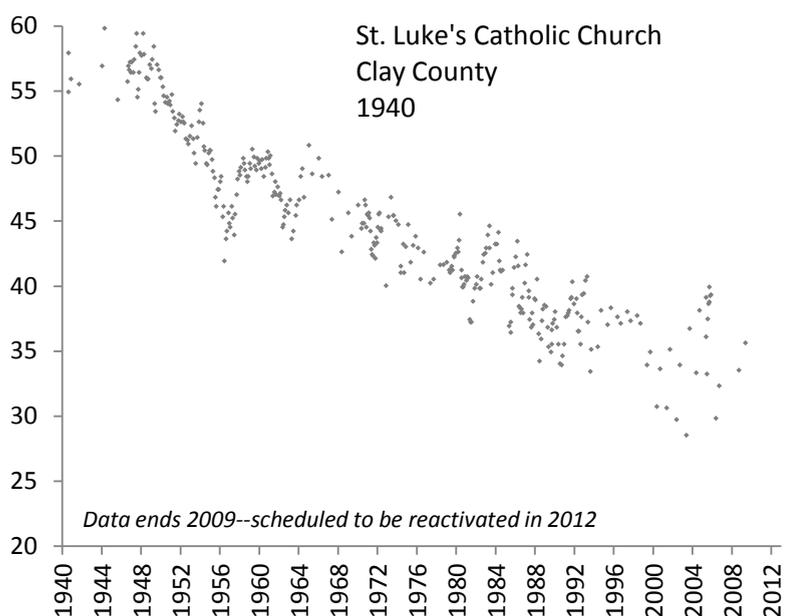
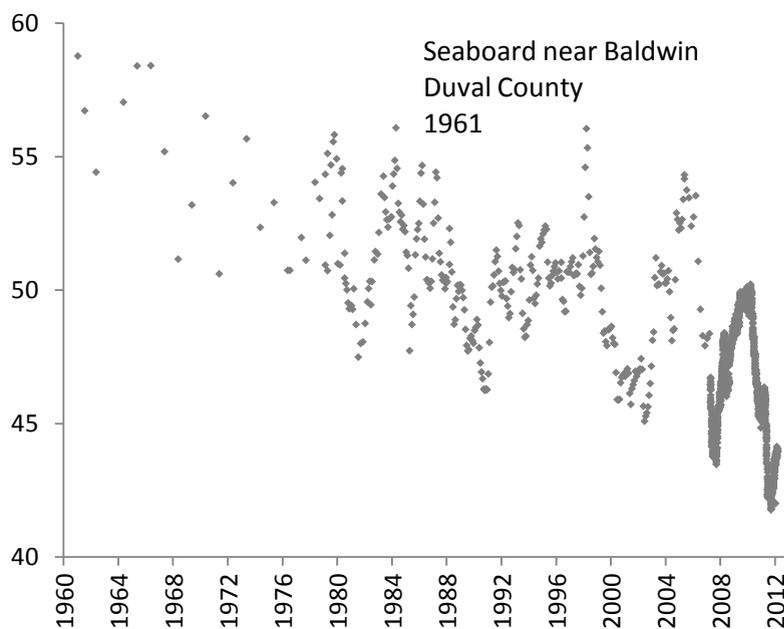
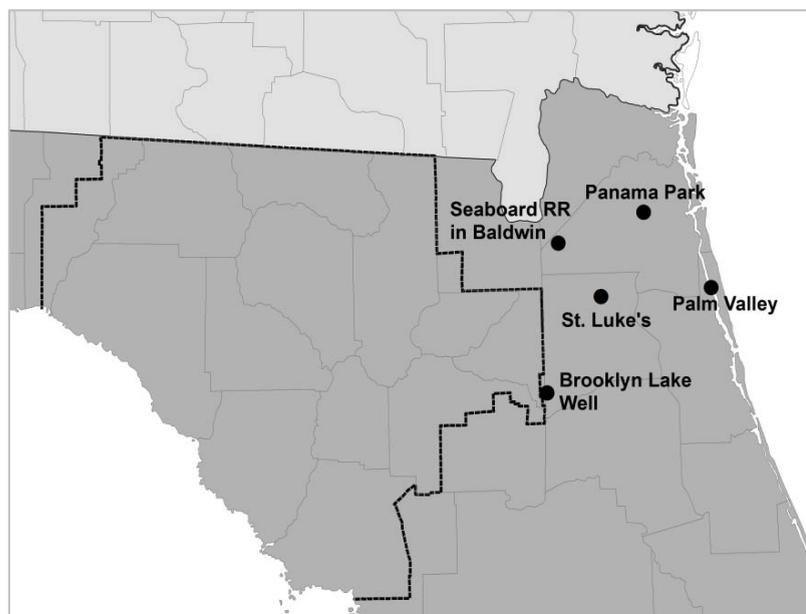


# Figure 12d: Regional Long Term Upper Floridan Levels

Ending February 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 192 units installed at 48 agricultural operations by permission of the owners. Evapotranspiration data courtesy of University of Florida IFAS Extension.

