

MEMORANDUM

TO: Governing Board

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

THRU: David Still, Executive Director *DAS*
Jon Dinges, Department Director *JMD*

DATE: January 5, 2012

RE: December 2011 Hydrologic Conditions Report for the District

RAINFALL

- December rainfall was 1.62" or 51% of average based on records starting in 1932 (Table 1, Figure 1). The highest totals fell in the northern half of the District during one frontal system on the 12th. While some localized areas received more than 6", most of the northern counties saw less than 3" (Figure 2). Southern counties and the upper Santa Fe Basin had less than 1" overall, with large areas of less than 0.5". Georgia basins that contribute to Suwannee River flow generally received less than 50% of normal December rainfall (Figure 3). The highest 24-hour gaged total was 3.06" at Hopewell in Madison County.
- The average 12-month deficit stayed at 8.4" (Figure 4). Figure 5 shows the change in annual deficits beginning in 1998. The deficit since October was 8.5".

SURFACEWATER

- **Rivers:** With the exception of the Alapaha River at Statenville, flows at all Suwannee and tributary gages were below the 10th percentile for December, a range considered extremely low. Flows at the Suwannee at Branford hovered slightly above the record low observed in October and set new December daily low flow records, with flows lower than any observed in December since gaging began in 1931. Flows averaged over periods longer than a single day are useful for comparing the duration of hydrologic drought. Average 60-day and 180-day flows at the Branford gage were the lowest since 1931, dropping below the previous records set in 2000 and 2002. 60-day and 180-day flows at the Suwannee River at Ellaville were the lowest since 1927 when gaging began there. The Santa Fe River at Fort White set new daily record flows throughout the month, with flows in the lowest 1% of all records for daily, 7-day, and 60-day flows. The Aucilla, Econfinia, and Steinhatchee rivers also remained extremely low, with the latter setting new daily December record low flows and tying the record low measured in 2000. Daily discharge statistics

for six river stations are presented in Figure 6 and streamflow conditions for major gages are shown in Figure 7.

- **Lakes:** With the exception of Lake Sampson in Bradford County, all monitored lakes remained below their long-term average levels. Sneads Smokehouse Lake (part of the Aucilla River) in Jefferson County rose almost a foot after setting 4 consecutive months of record lows. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for 14 lakes.
- **Springs:** Average December 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 30% higher than record drought-induced lows observed in 2002 and 2001, respectively.

GROUNDWATER

Localized rain in Jefferson and Taylor counties helped some wells rise significantly and wells in the northeast part of the District had modest rises. Overall, however, Floridan aquifer levels remained extremely low. Record low levels for December occurred at 48 upper Floridan aquifer wells and all-time lows at 12 wells (Figure 10). Levels dropped in half of the monitored wells, with an average drop of about 4". Conditions across the District compared to both historic December data and all data remained near the 5th percentile (based on records beginning no earlier than 1978). Eighty-six percent of the wells were in the bottom 10% of all recorded levels, and 72% 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 December was 0.02", the same rate observed in November. Figure 13 shows average daily application and evapotranspiration since 2008.
- The Palmer Drought Severity Index (PDSI), a climatological tool produced by the National Weather Service, 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 December in the District, and moderate drought in south central Georgia.
- The U.S. Geological Survey categorized the Suwannee and its tributaries as being under severe hydrologic drought, and coastal rivers as moderate hydrologic drought.
- A La Niña advisory is in effect from the National Weather Service Climate Prediction Center. A weak-to-moderate La Niña is expected through March, bringing the potential of drier-than-average conditions.

CONSERVATION

A Water Shortage Advisory is in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to one day per week between November and March 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 or by request.

Table 1: Estimated Rainfall Totals

County	Dec-2011	December Average	Last 3 Months	Last 12 Months
Alachua	0.50	2.77	6.44	43.97
Baker	1.57	2.77	5.95	43.08
Bradford	0.63	2.95	7.33	41.90
Columbia	2.11	3.08	6.62	44.87
Dixie	0.48	3.17	6.08	51.58
Gilchrist	0.67	3.07	8.21	48.89
Hamilton	2.18	2.98	6.54	41.14
Jefferson	2.62	4.25	5.70	40.86
Lafayette	1.32	3.33	7.48	46.86
Levy	0.48	3.18	5.69	48.55
Madison	2.96	3.79	7.35	45.91
Suwannee	2.20	2.79	7.80	49.22
Taylor	2.03	3.39	6.42	45.95
Union	1.66	2.86	7.59	46.06

December 2011 Average: 1.62
 Historical December Average (since 1932): 3.15
 Historical 12-month Average (since 1932): 54.68
 Past 12-Month Total: 46.26
 12-month Rainfall Deficit: -8.42

(Rainfall reported in inches)

Figure 1: Comparison of District Monthly Rainfall

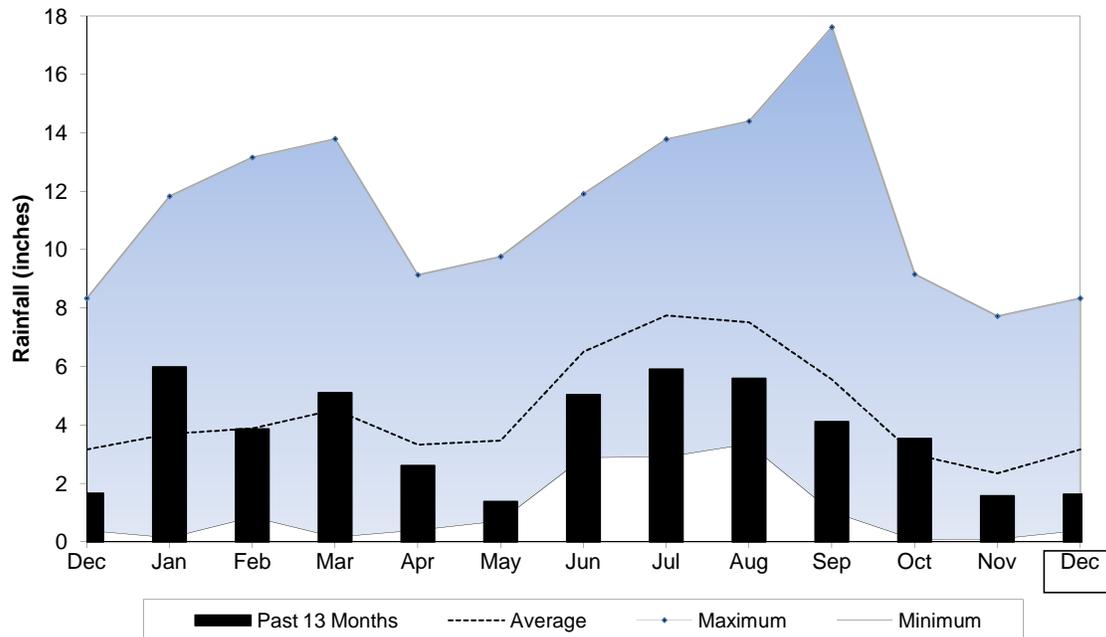


Figure 2: December 2011 Rainfall Estimate

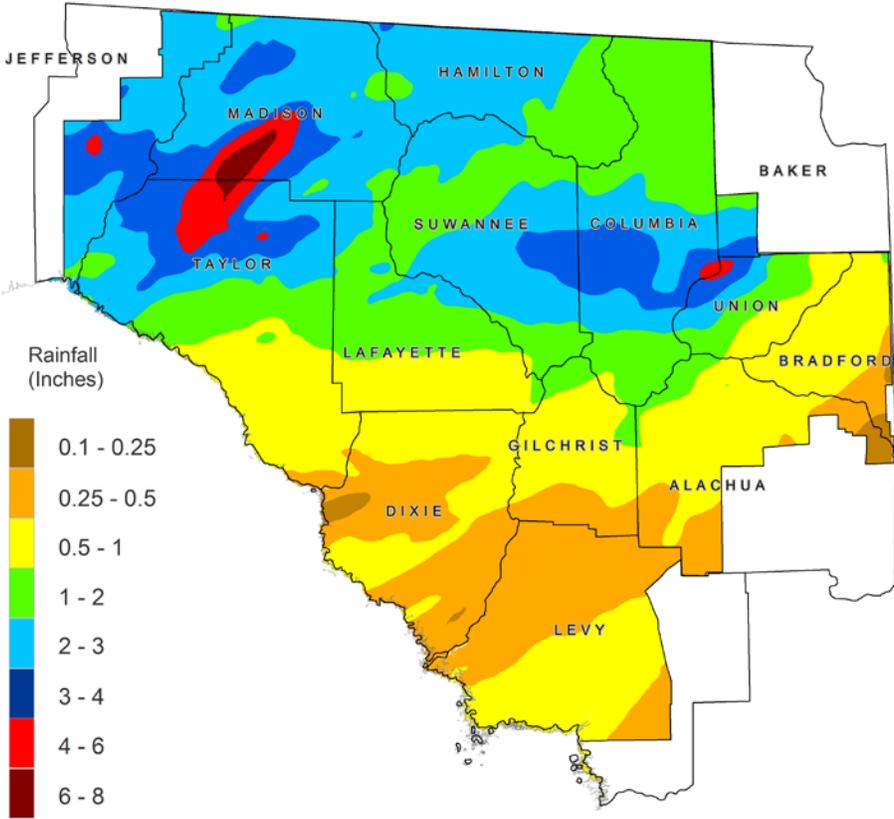


Figure 3: December 2011 Regional Percent of Normal Rainfall

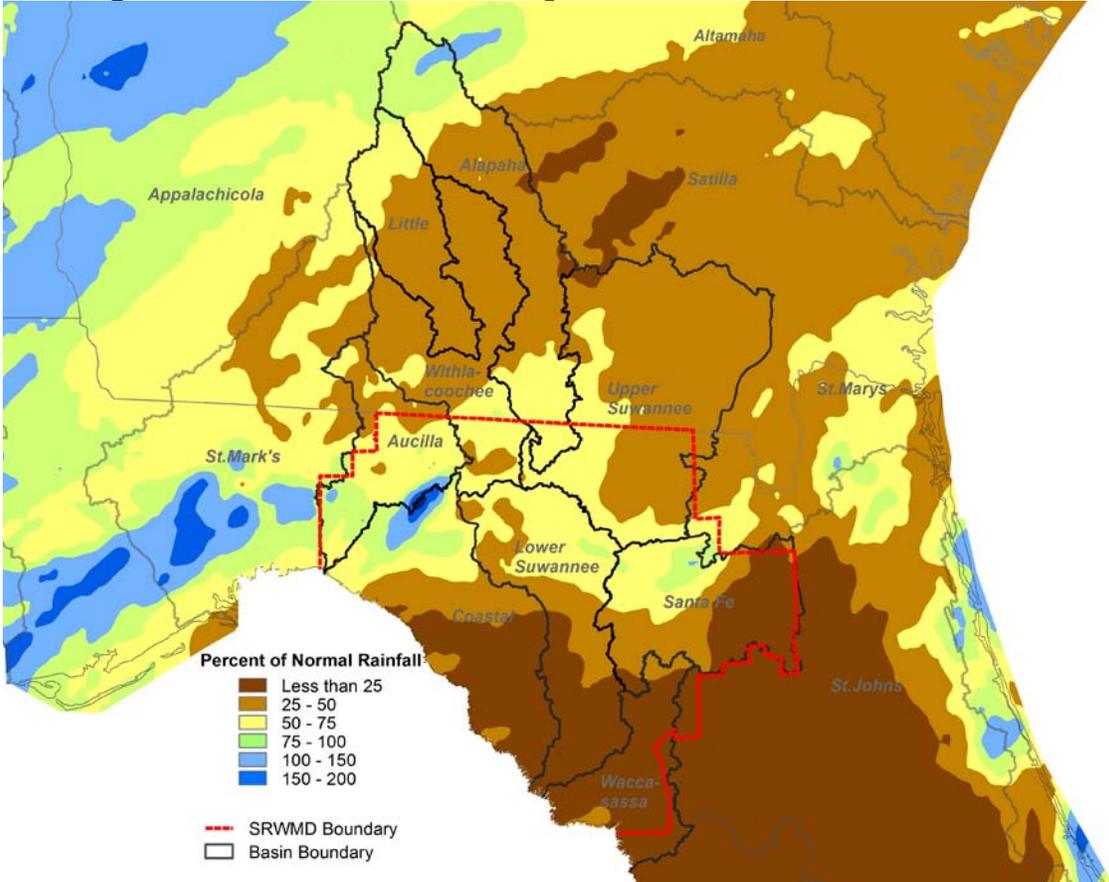


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin Ending December 31, 2011

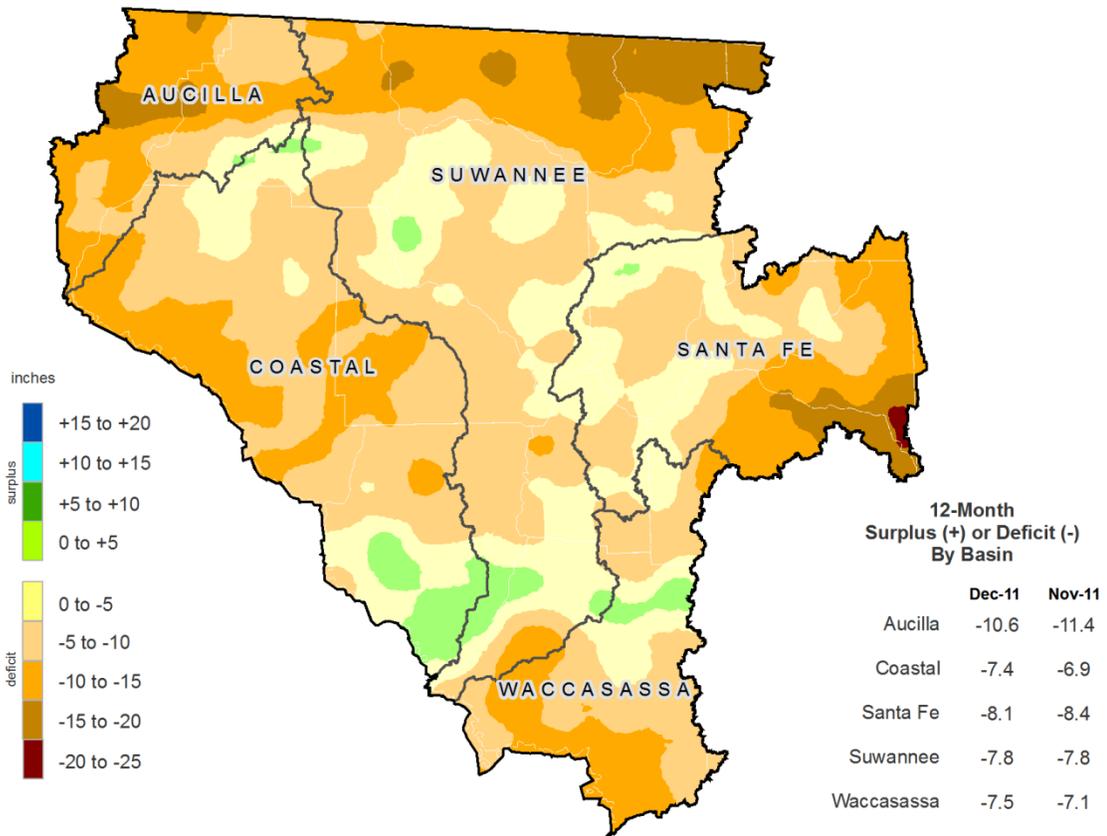


Figure 5: 12-Month Rolling Rainfall Deficit Since 1998
 Difference between observed 12-month rainfall and the long-term average over the same period

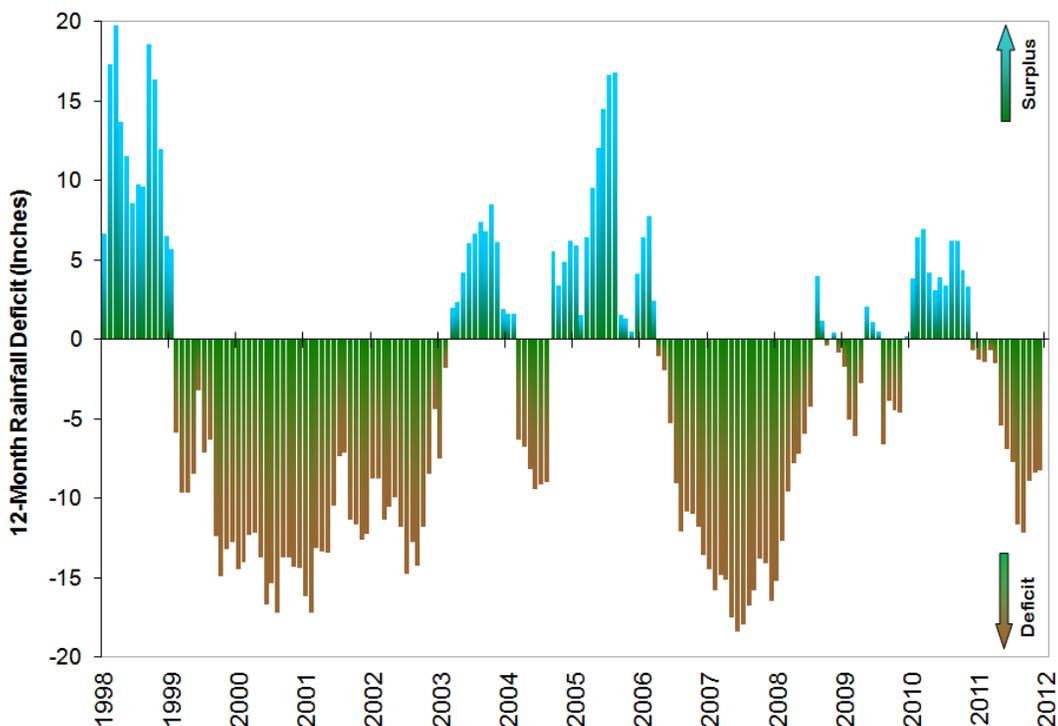
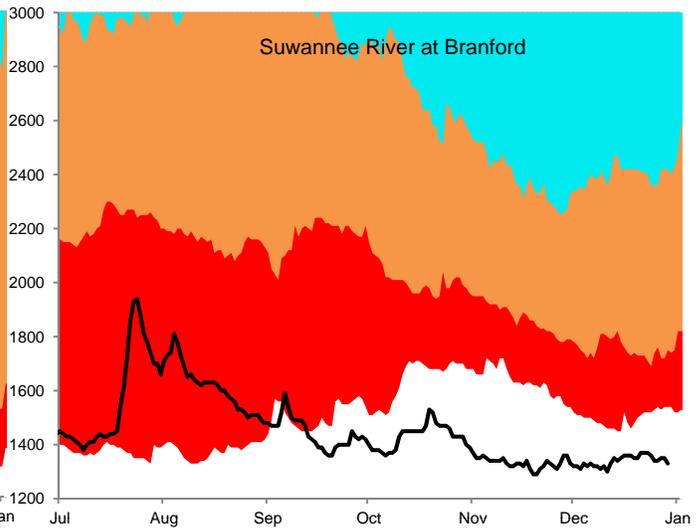
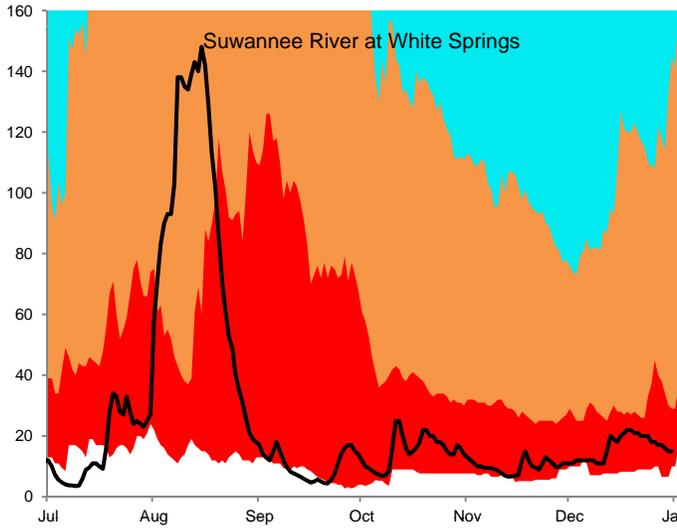
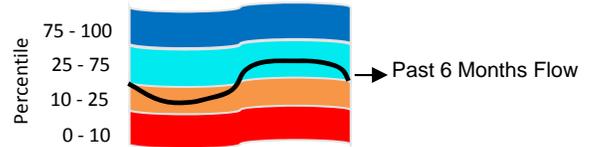
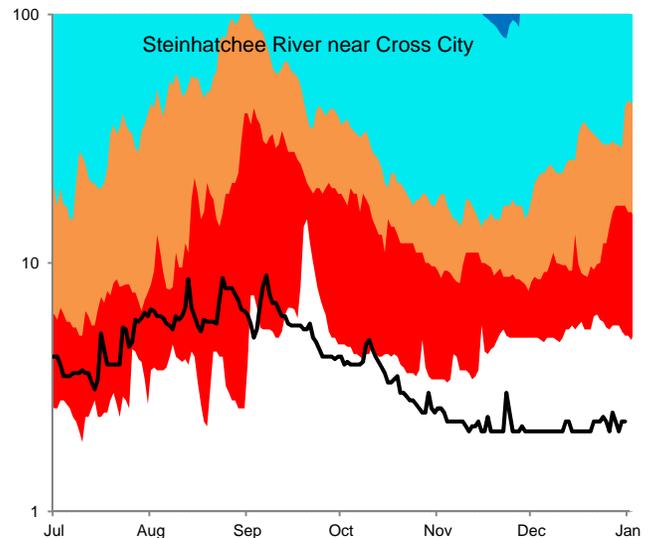
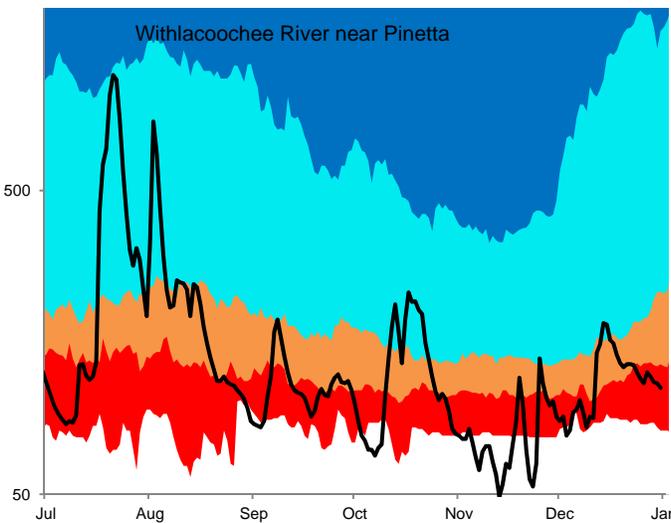
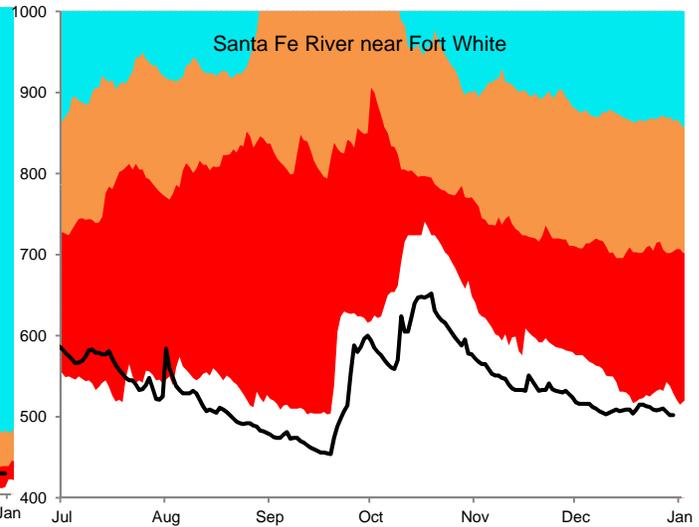
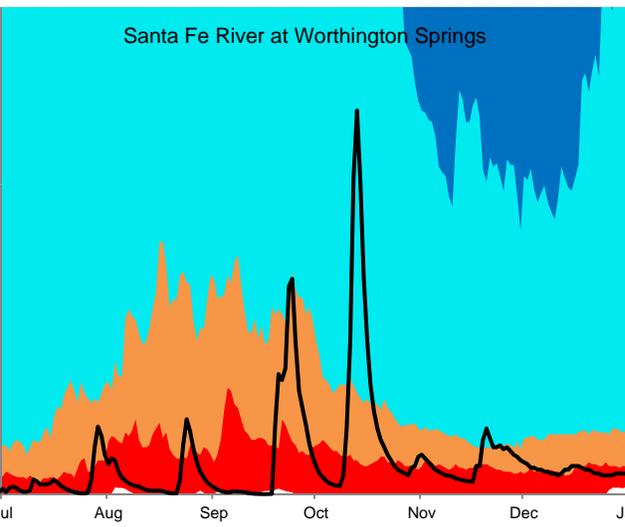


Figure 6: Daily River Flow Statistics

July 1, 2011 through December 31, 2011



RIVER FLOW, CUBIC FEET PER SECOND



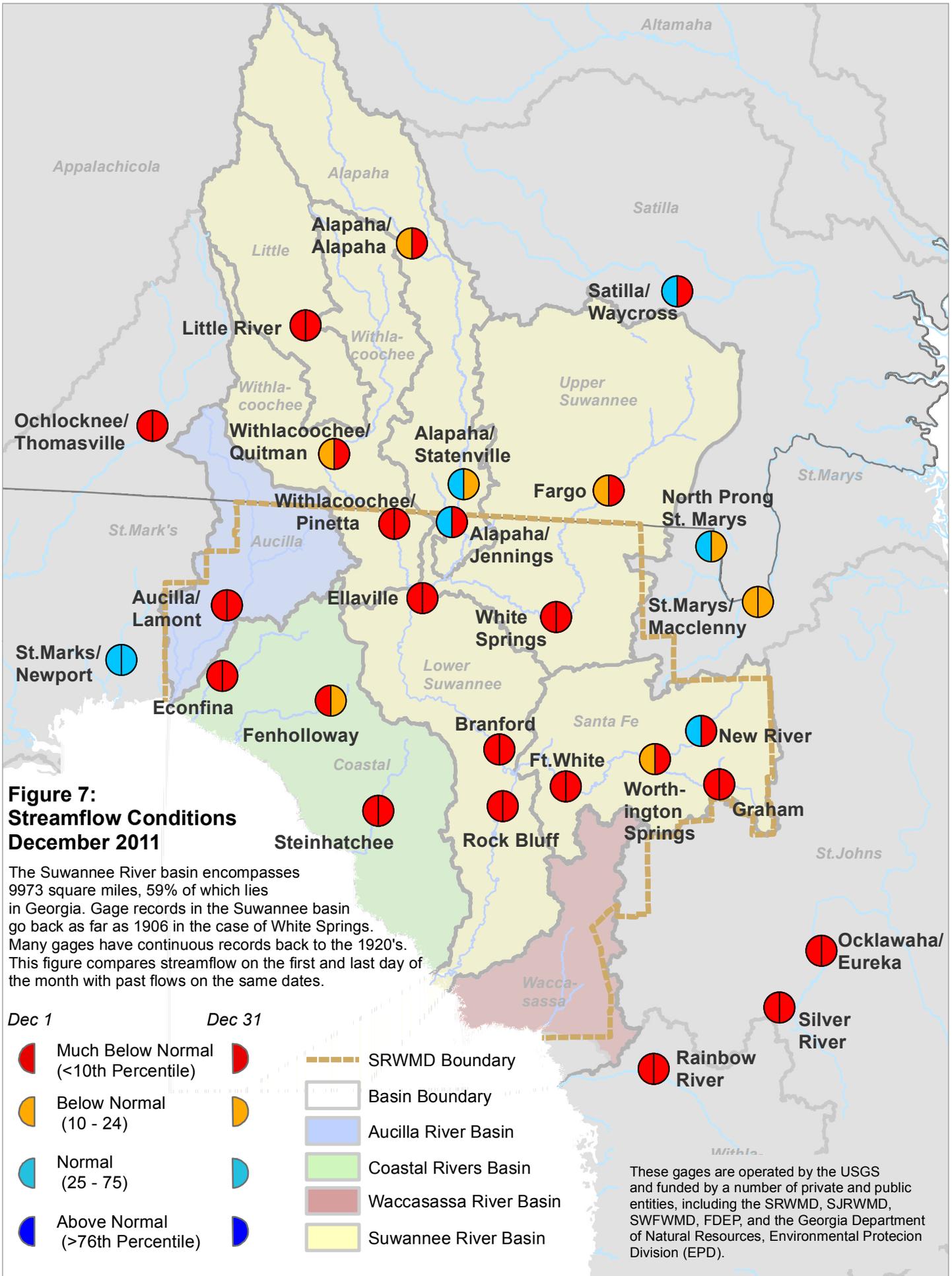


Figure 7: Streamflow Conditions December 2011

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.

Dec 1 Dec 31

- 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

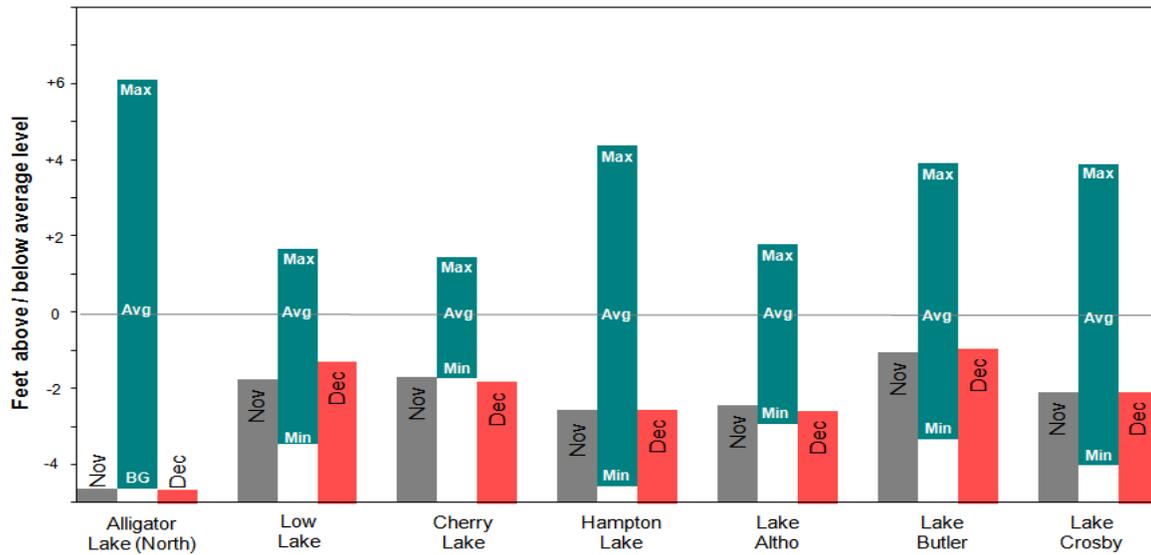
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, SWFWMD, FDEP, and the Georgia Department of Natural Resources, Environmental Protection Division (EPD).

Figure 8: December 2011 Lake Levels

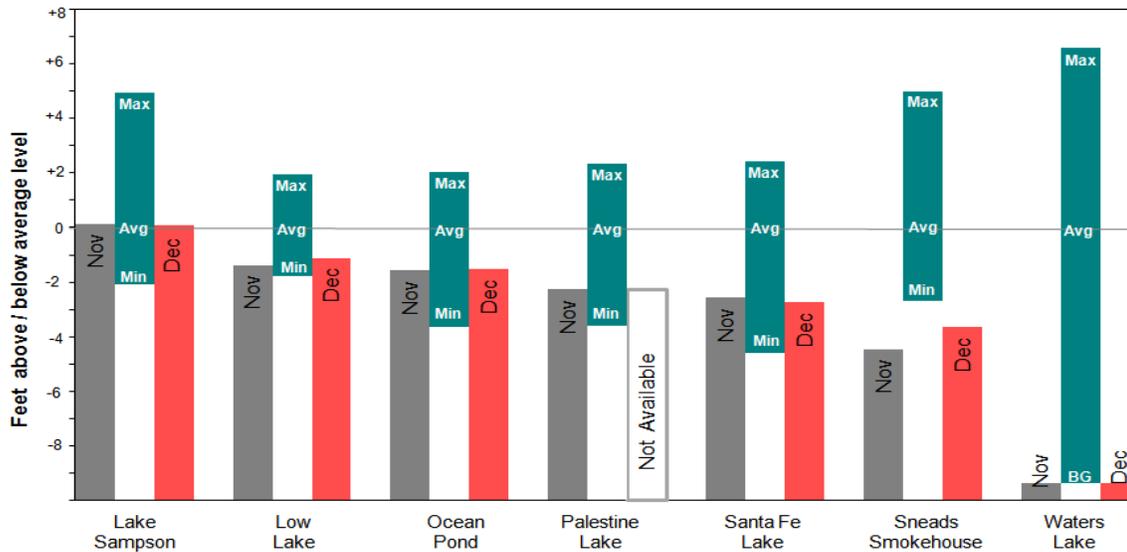


SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular ones in the eastern part of the District, are embedded in a surficial or intermediate aquifer over relatively impermeable clay deposits. These lakes rise and fall according to local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



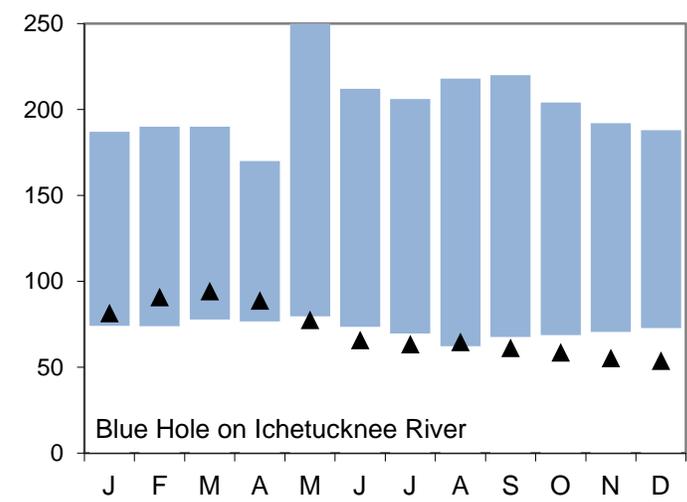
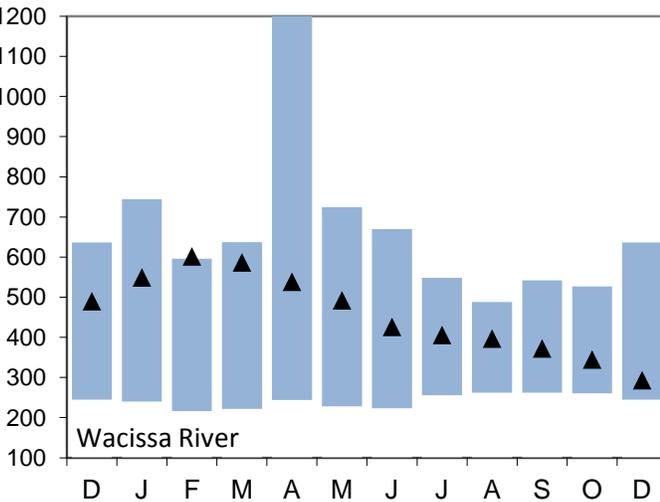
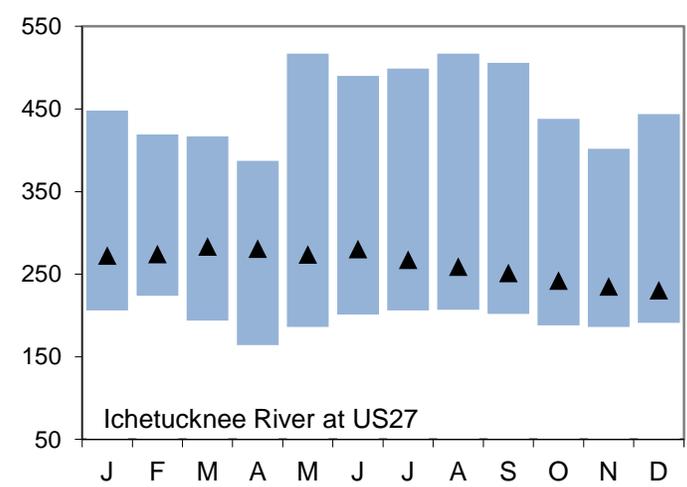
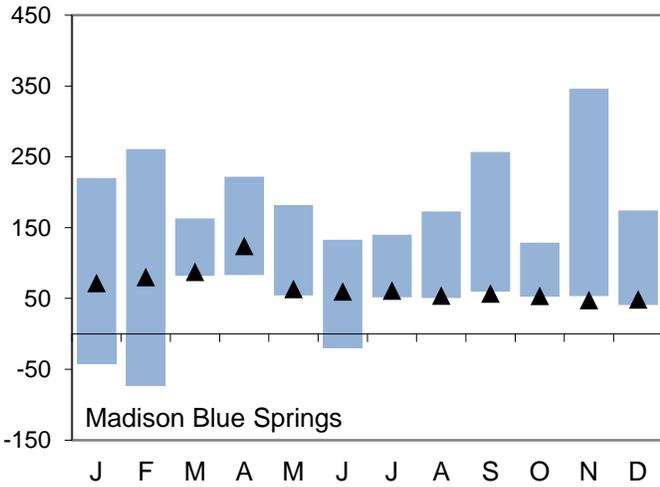
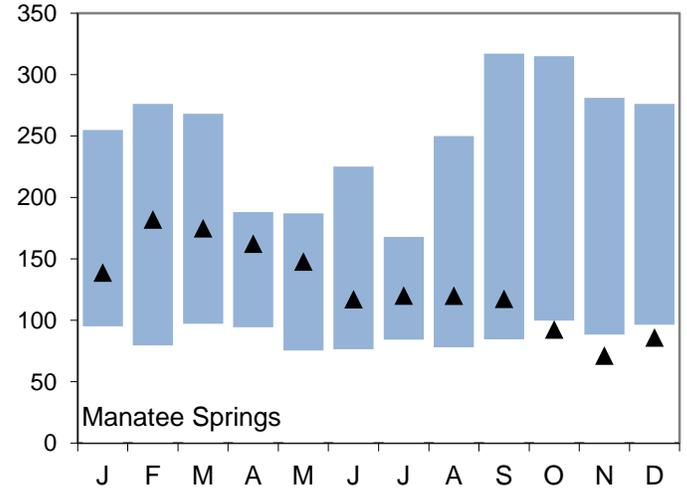
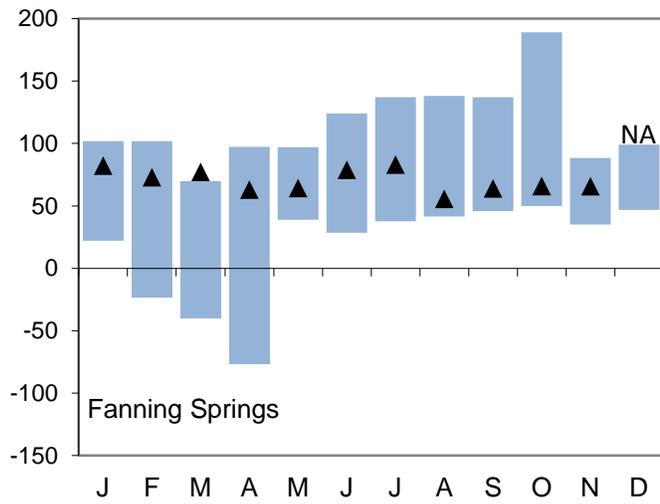
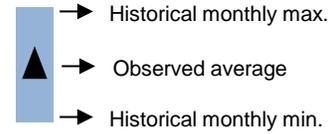
BG = Below Lowest Limit of Gage



BG = Below Lowest Limit of Gage

Figure 9: Monthly Springflow Statistics

Flows January 1, 2011 through December 31, 2011
 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.

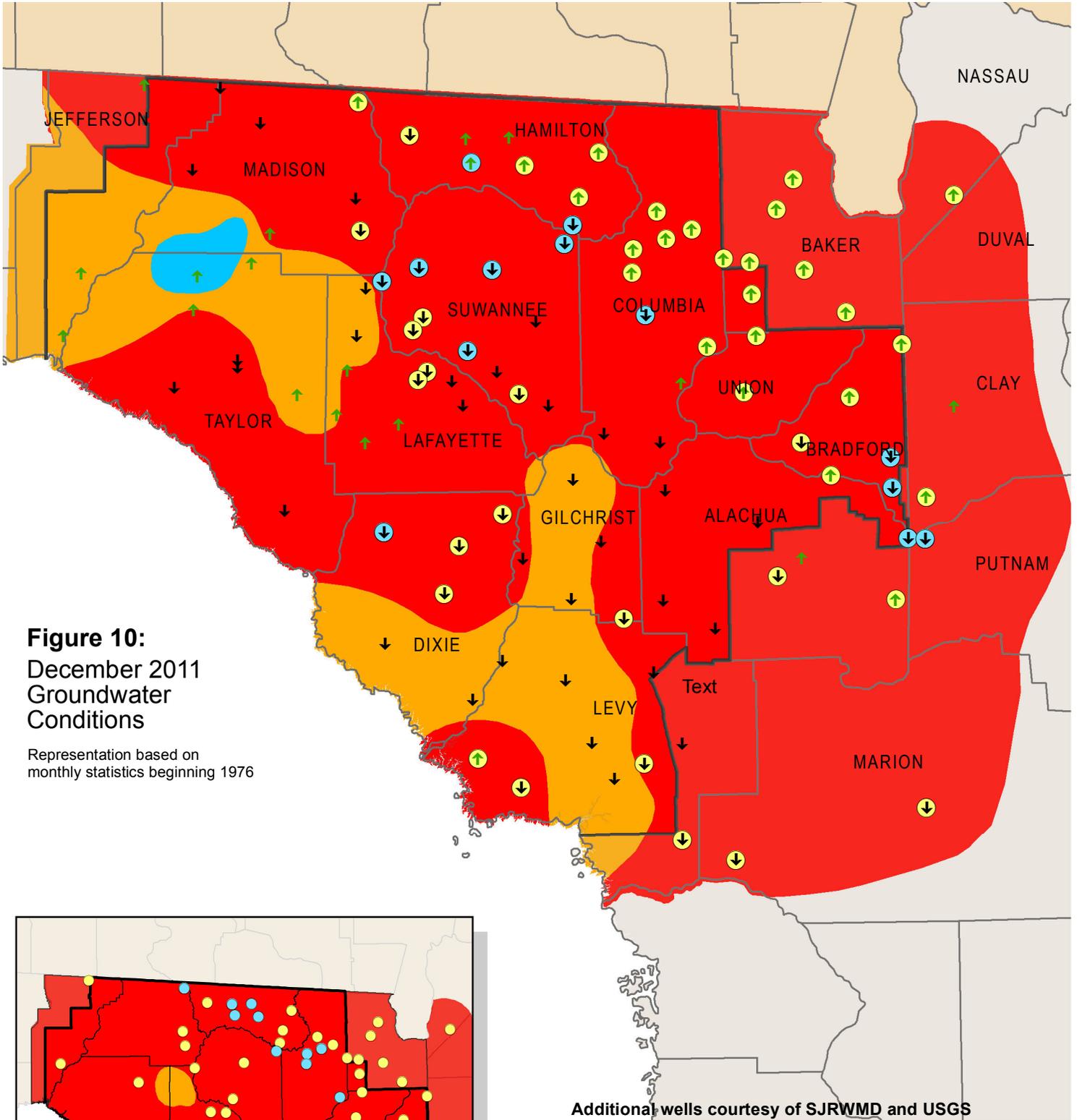
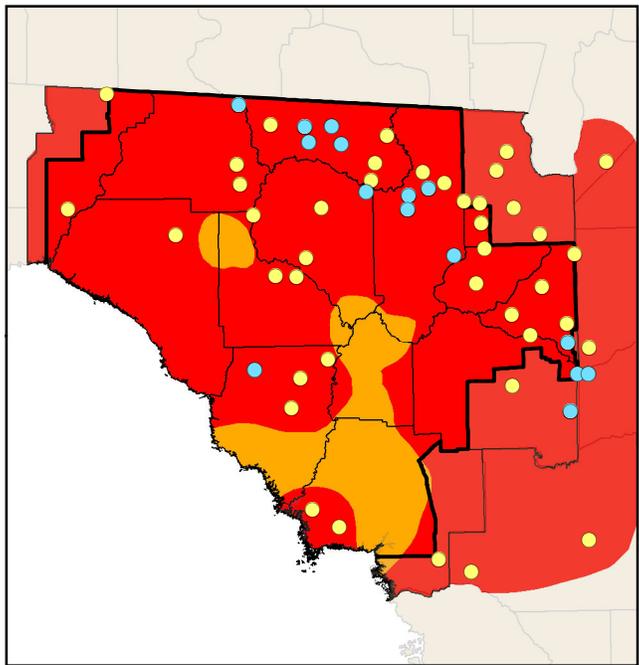


Figure 10:
December 2011
Groundwater
Conditions

Representation based on
monthly statistics beginning 1976

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



Inset: November 2011 Groundwater Levels

Figure 11: Monthly Groundwater Level Statistics

Levels January 1, 2011 through December 31, 2011
 Period of Record Beginning 1978

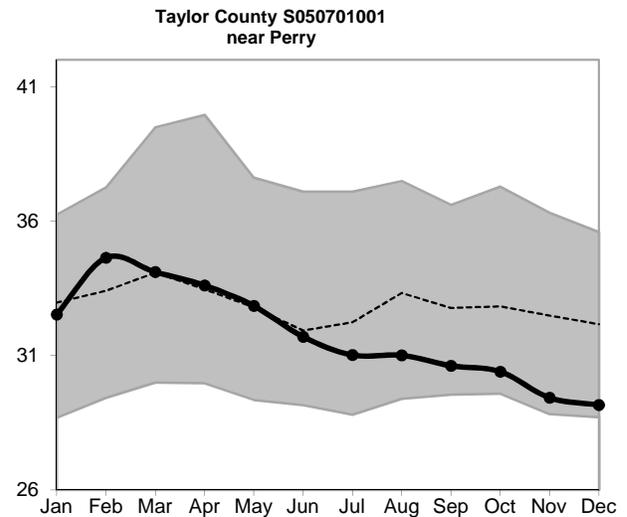
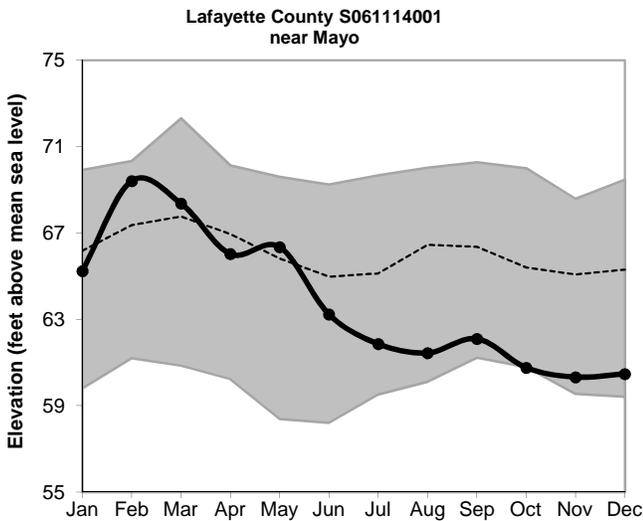
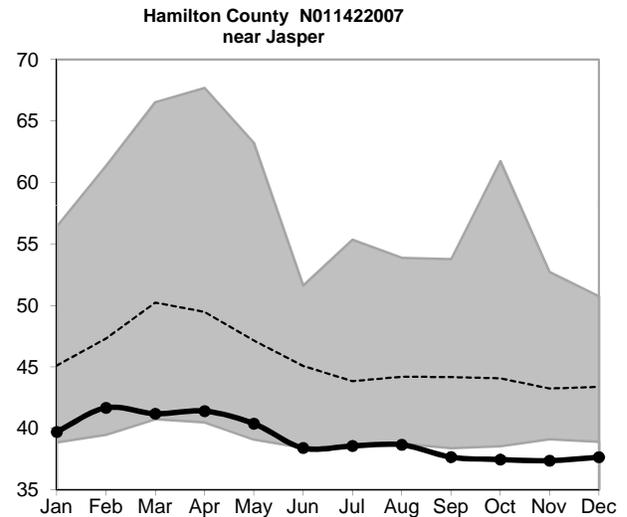
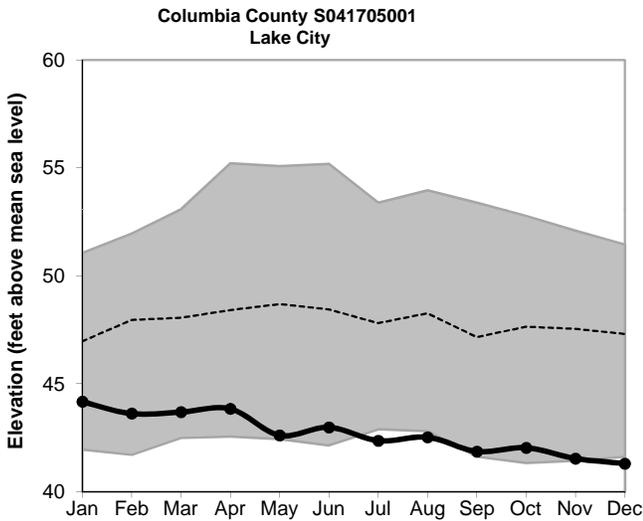
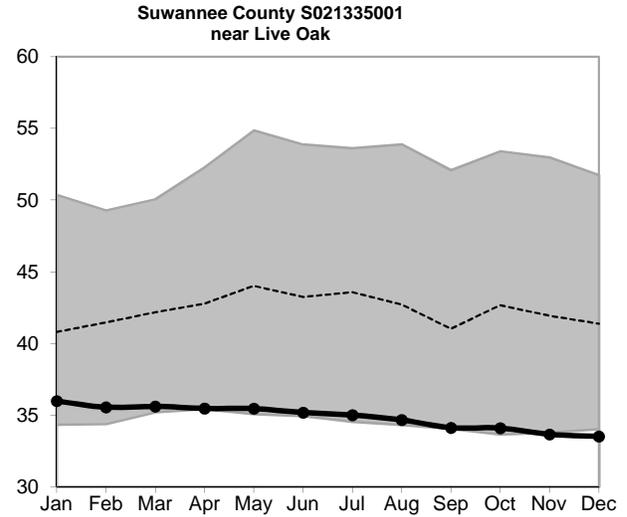
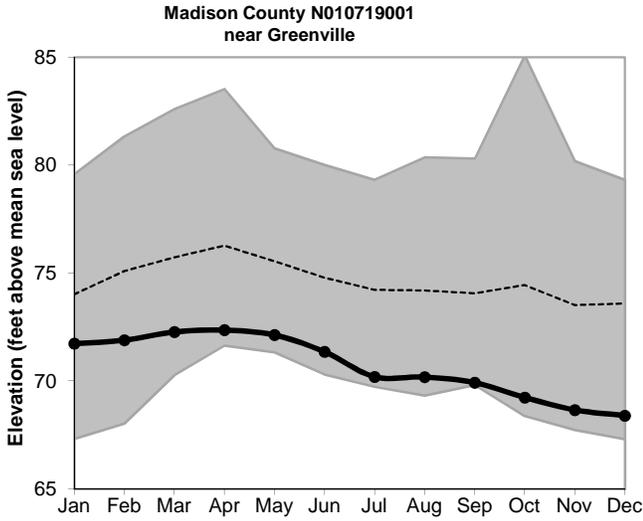
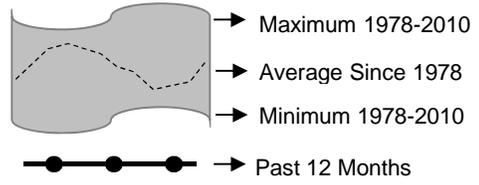


Figure 11, cont.: Groundwater Level Statistics

Levels January 1, 2011 through December 31, 2011
 Period of Record Beginning 1978

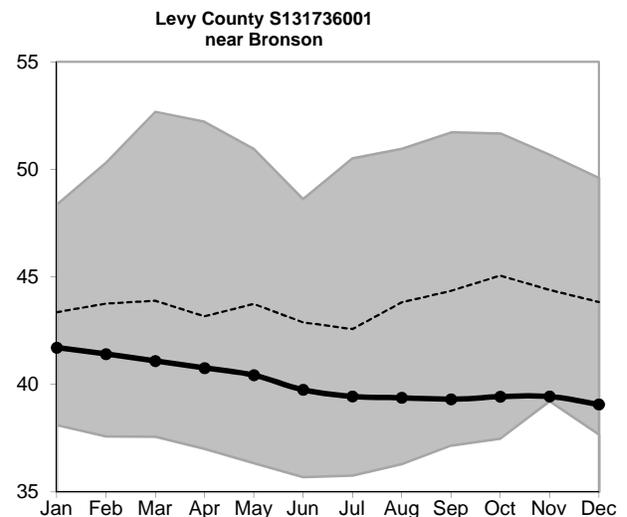
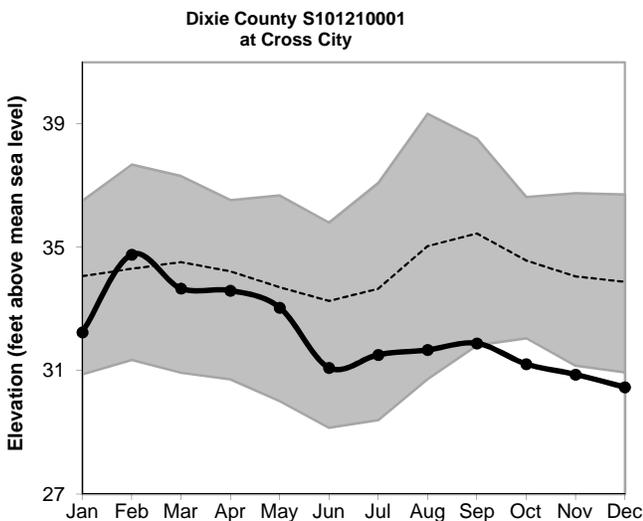
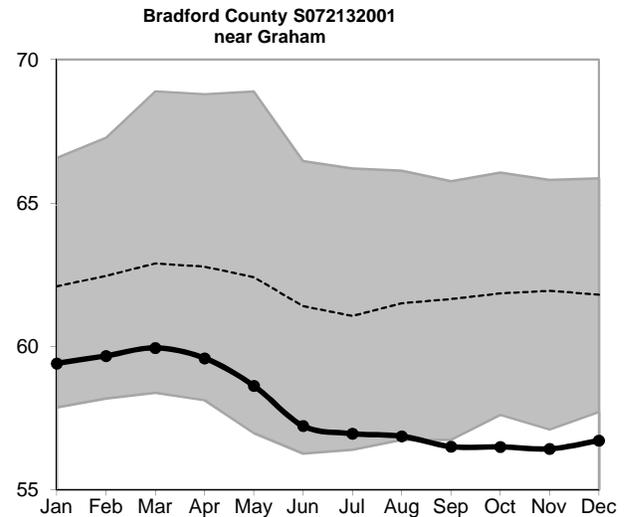
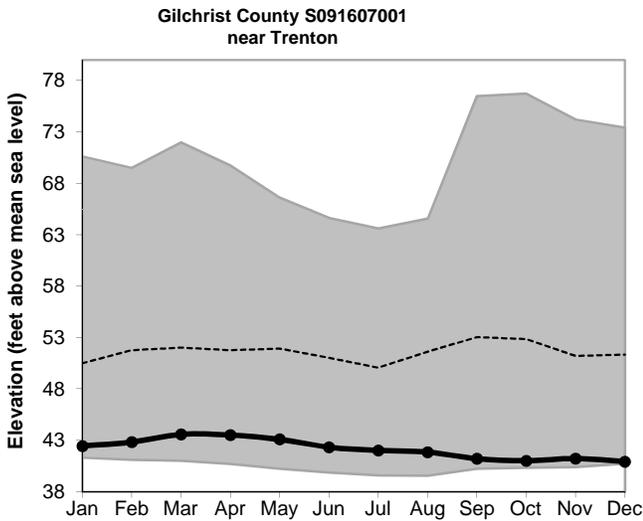
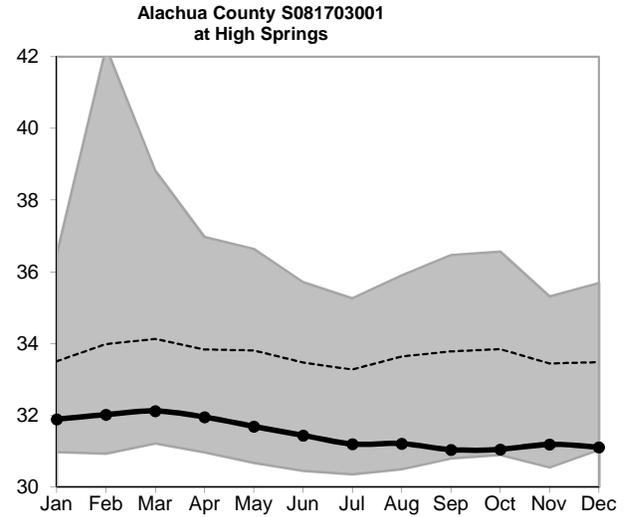
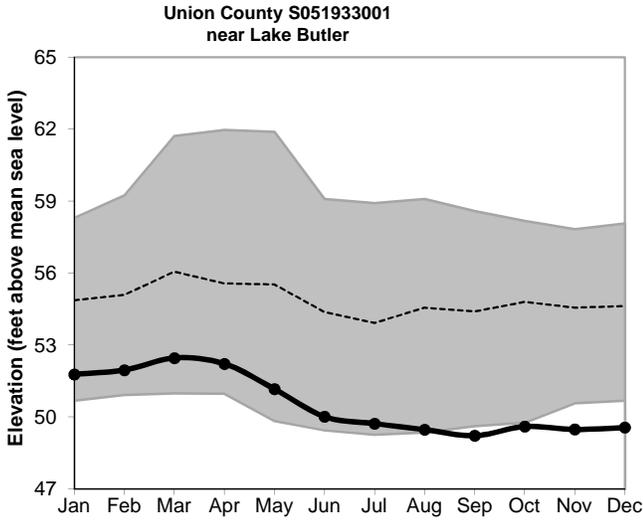
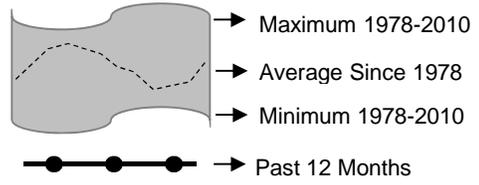


Figure 12a: Regional Long Term Upper Floridan Levels

Ending October-December 2011

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS and Georgia EPD

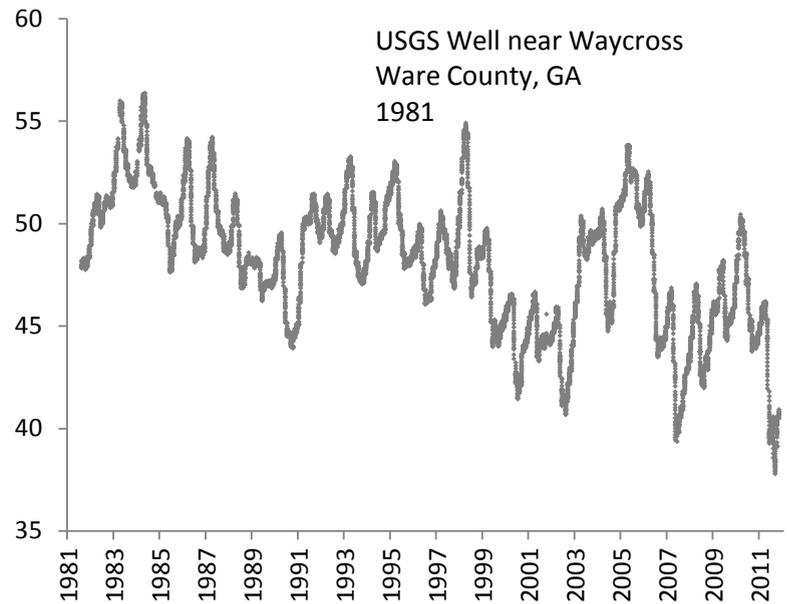
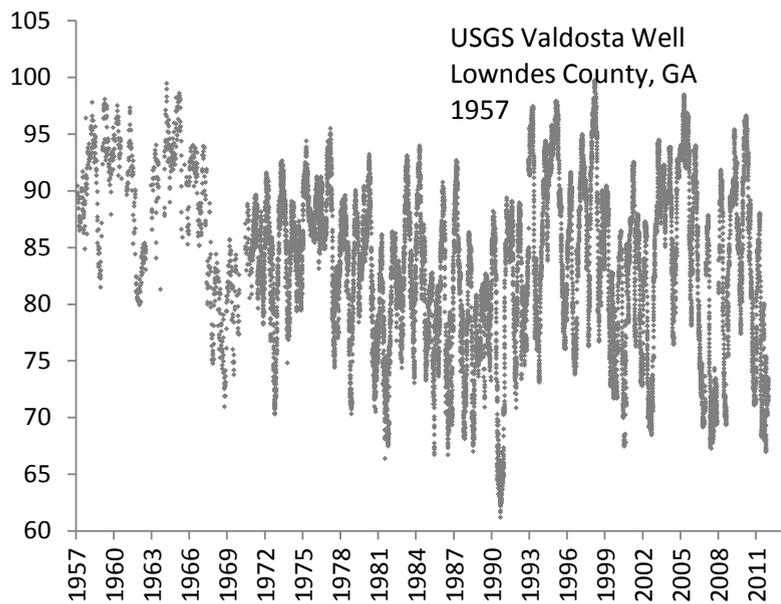
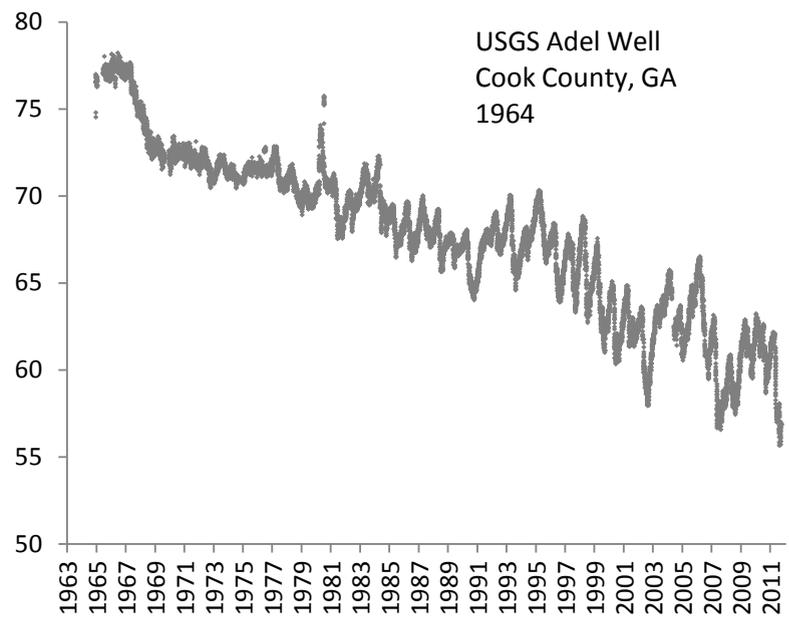
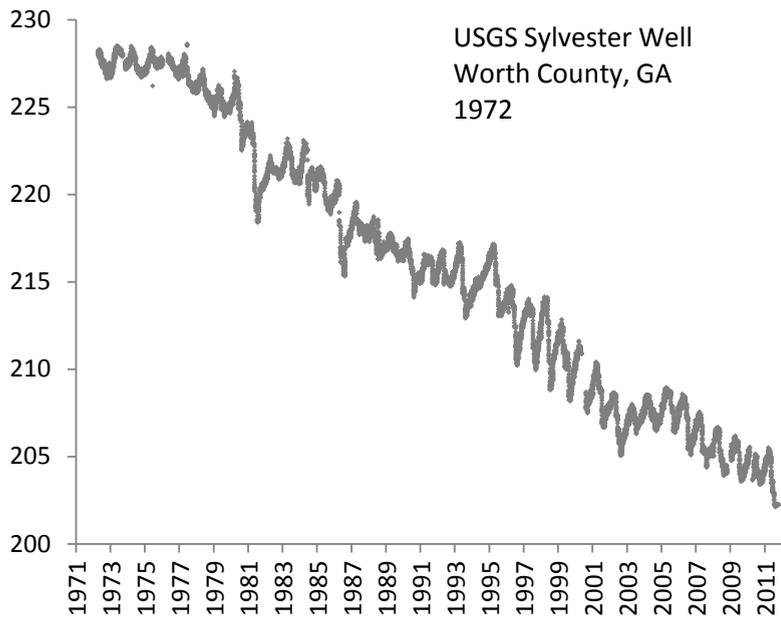
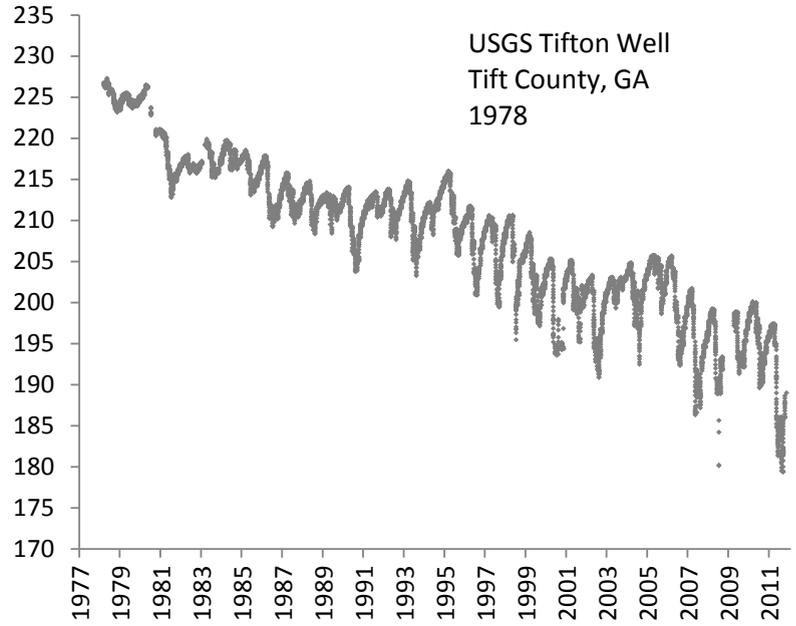
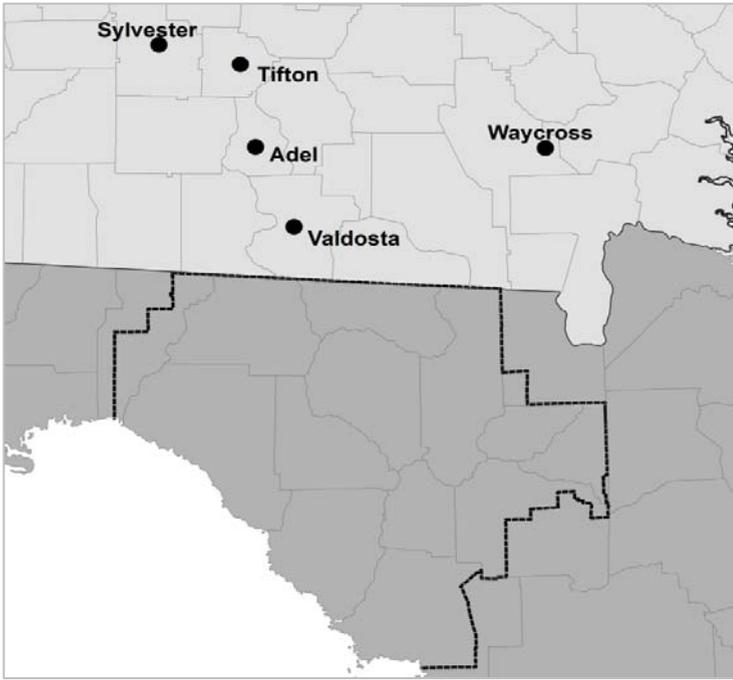


Figure 12b: Regional Long Term Upper Floridan Levels

Ending December 2011

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS, SWFWMD, and SJRWMD

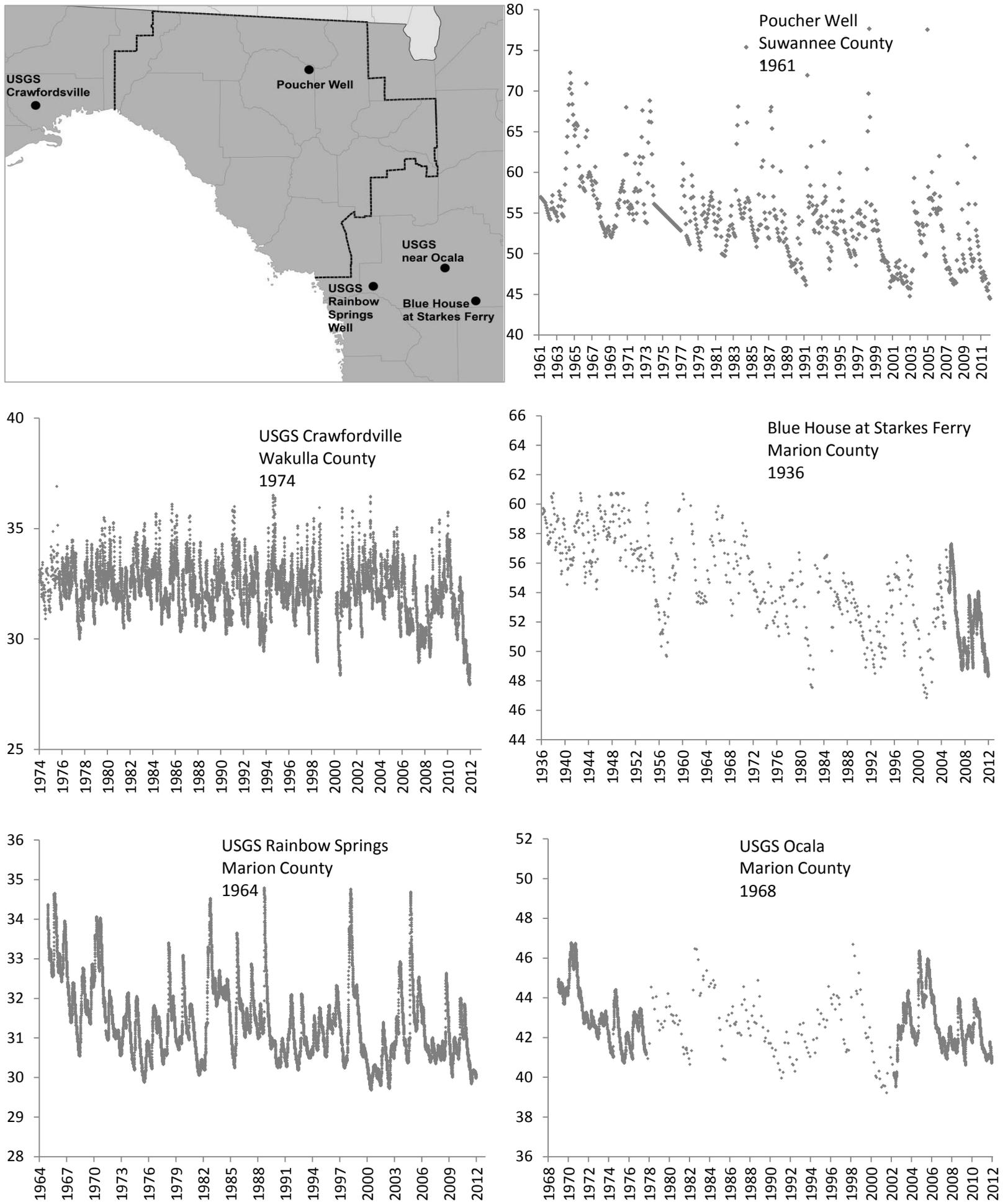


Figure 12c: Regional Long Term Upper Floridan Levels

Ending November-December 2011

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of USGS and SJRWMD

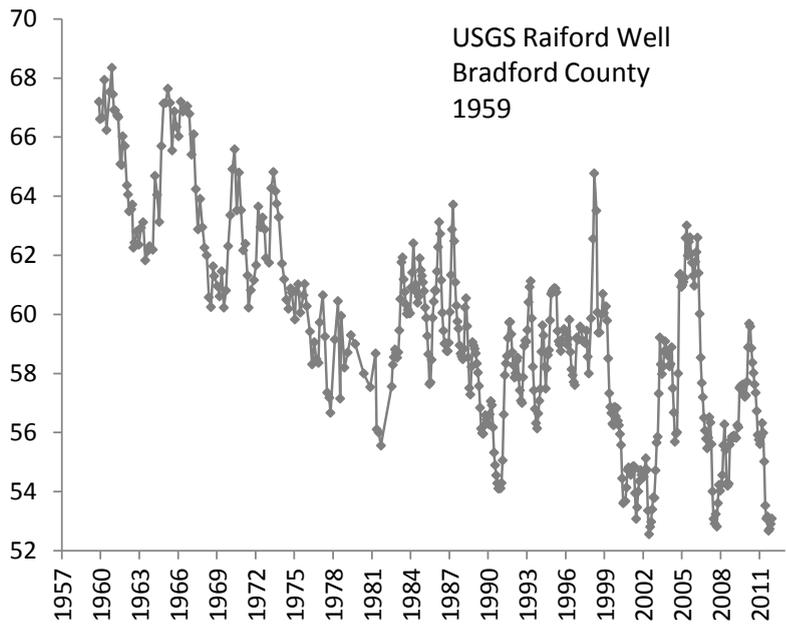
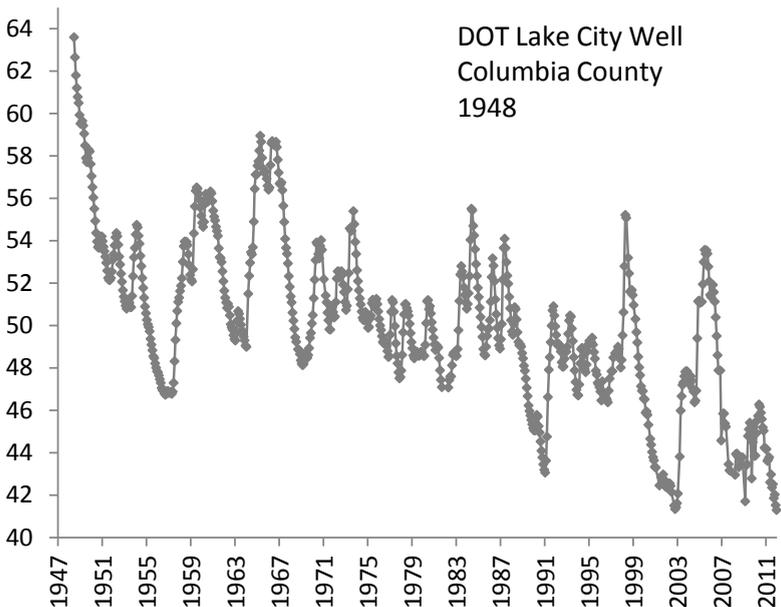
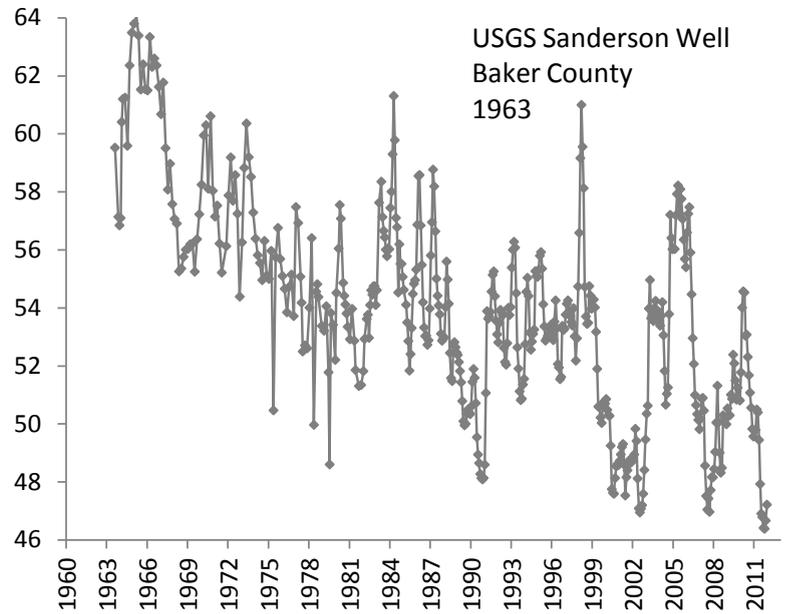
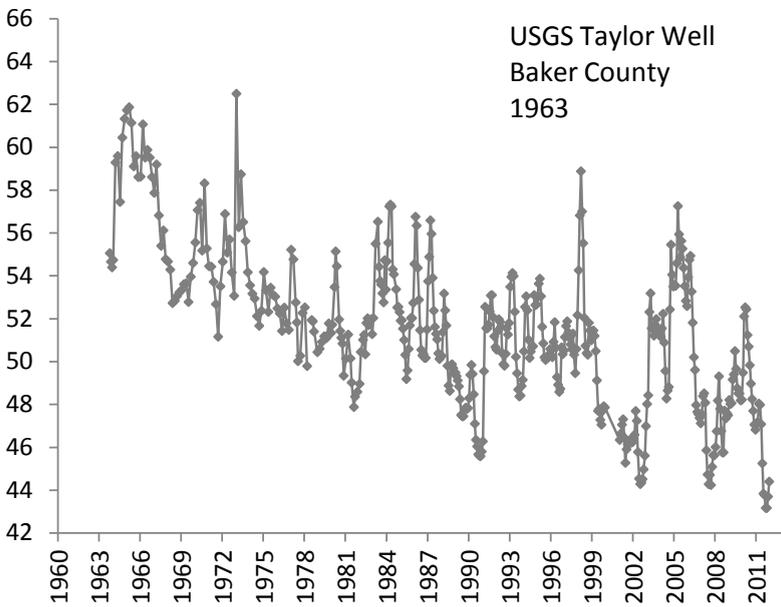
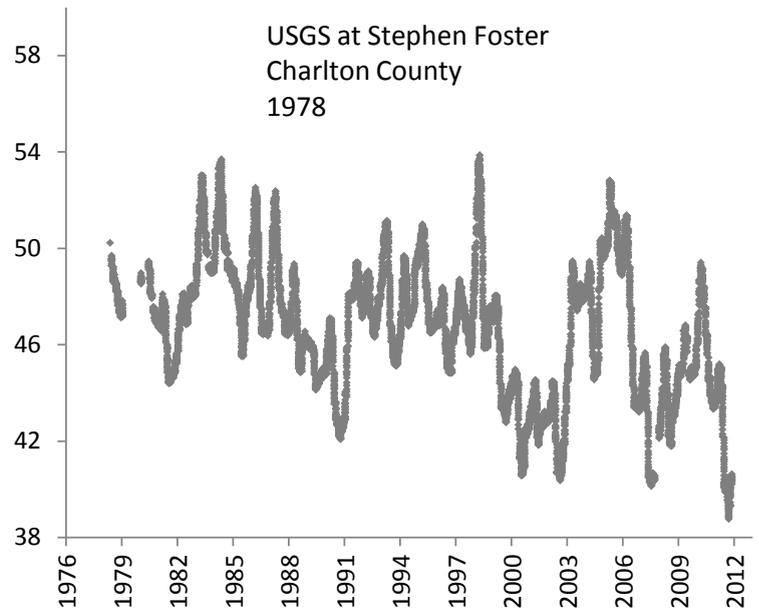
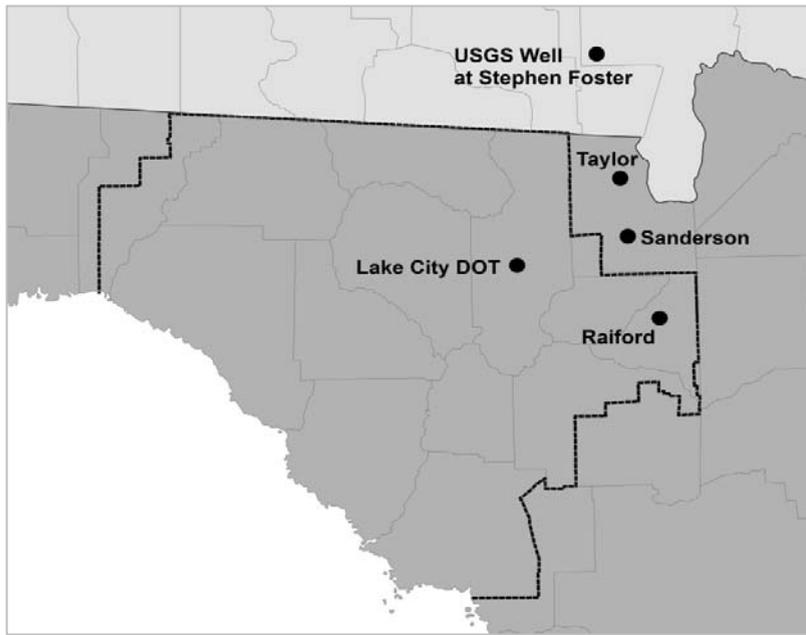


Figure 12d: Regional Long Term Upper Floridan Levels

Ending December 2011

Upper Floridan Aquifer levels in feet above mean sea level

Courtesy of SJRWMD

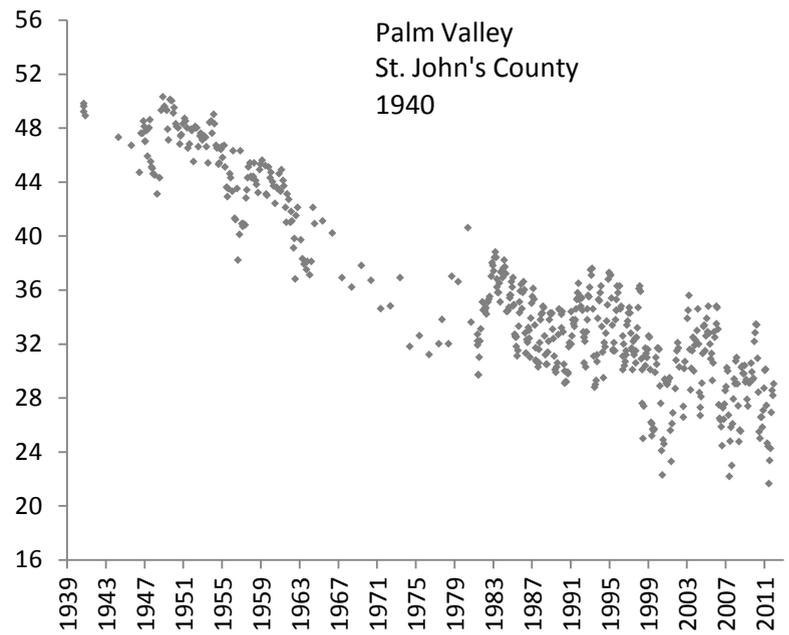
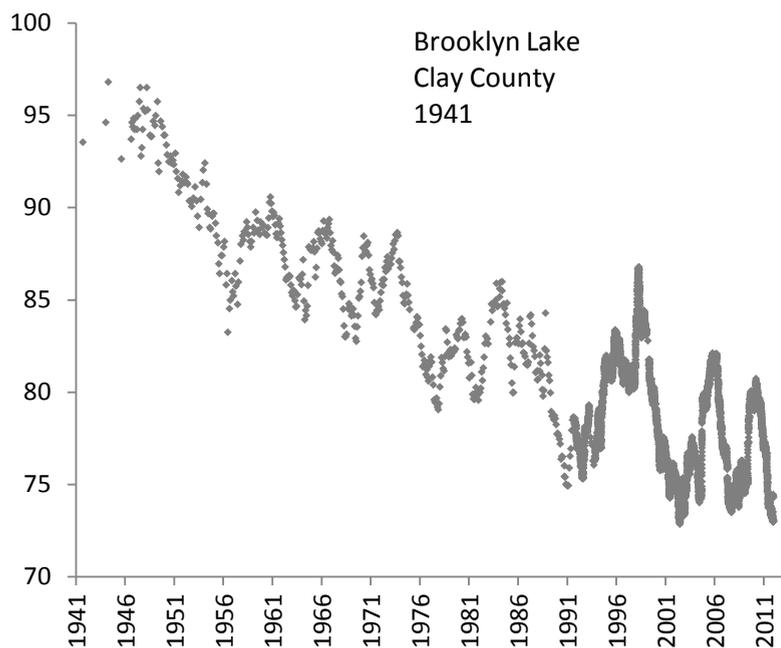
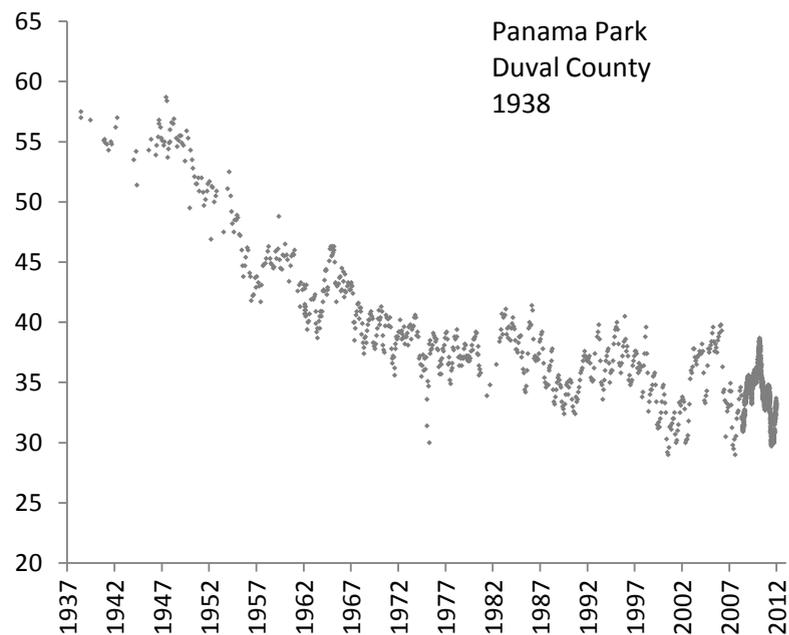
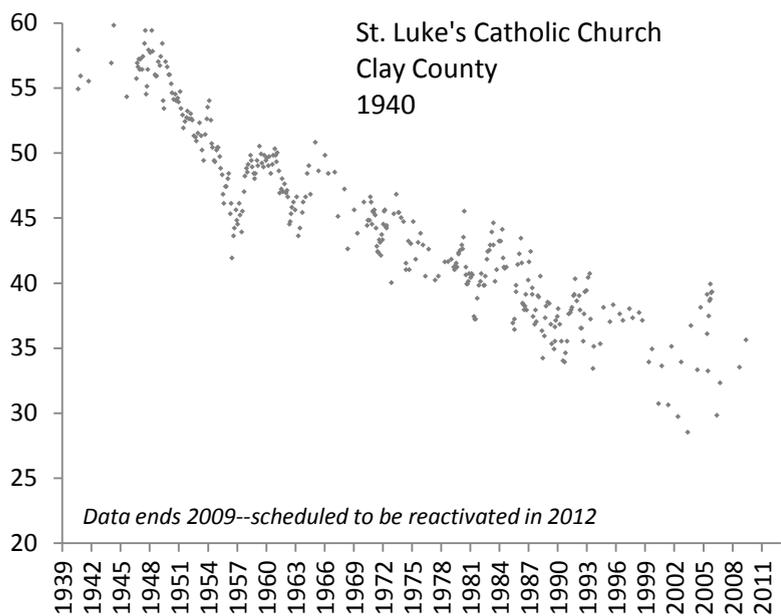
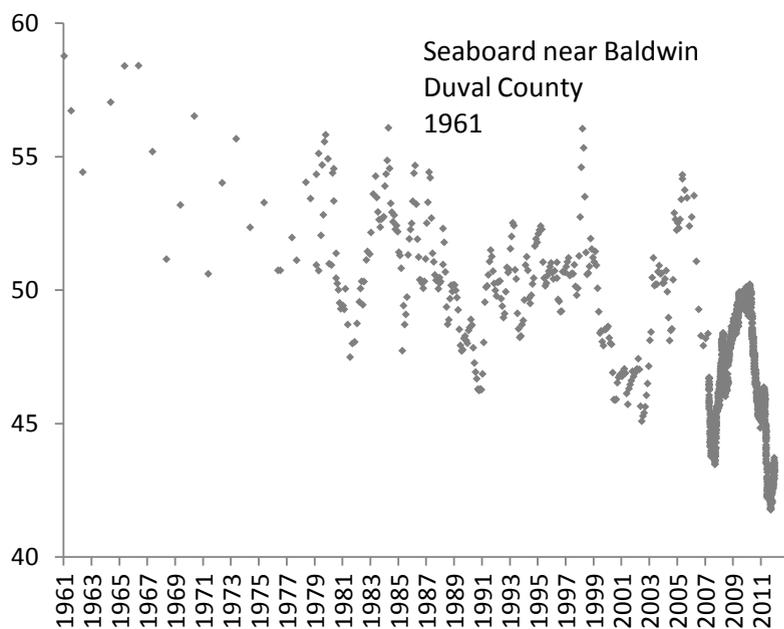
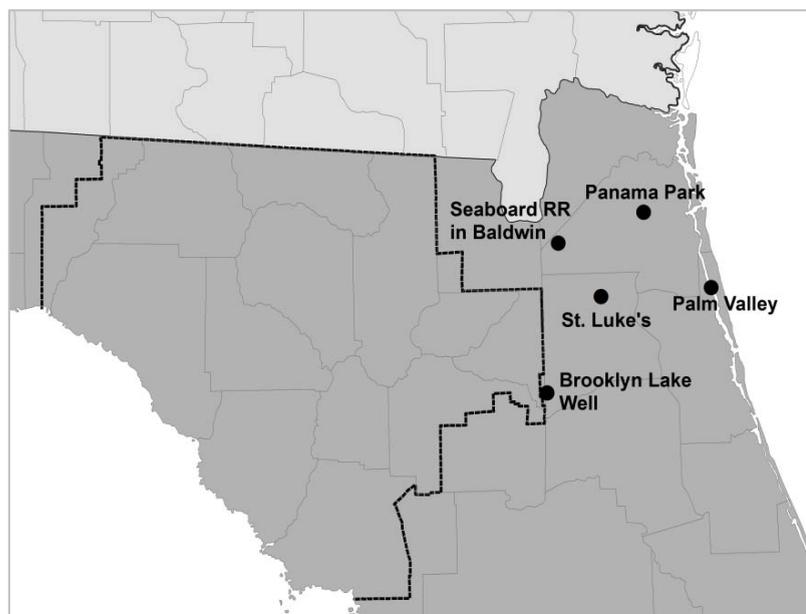


Figure 13: Agricultural Water Use

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.

