MEMORANDUM

TO: Governing Board

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

THRU: David Still, Executive Director DS
Jon Dinges, Department Director JMD

DATE: February 8, 2012

RE: January 2012 Hydrologic Conditions Report for the District

RAINFALL

- Average rainfall in January was 1.61", which is 43% of the long-term January average based on records starting in 1932 (Table 1, Figure 1). January was the third consecutive month of low rainfall, and the third month with essentially the same average rainfall (November had 1.57", and December had 1.62"). Western counties had the highest accumulations from four frontal systems that crossed the District, but these systems dissipated in intensity as they reached the upper Santa Fe and Suwannee River Basins (Figure 2). Large area of the basins in Georgia that contribute to Suwannee River flow received less than 25% of normal rainfall, as did the upper Santa Fe (Figure 3). The highest monthly gaged total was 2.6" at Madison Blue Springs, and the lowest was 0.75" at Santa Fe Lake.
- The average 12-month deficit rose to 12.7" (Figure 4). The upper Suwannee basin and upper Santa Fe basin had deficits approaching 25". Figure 5 shows the change in annual deficits beginning in 1998. The average 3-month deficit was 4.3", based on a 3-month total of 9.2"

SURFACEWATER

- **Rivers**: Flows at all Suwannee and tributary gages remained well below the 10th percentile of daily January flows, a range considered extremely low. Flow at the Suwannee at Branford improved by 4% by the end of the month after setting new record low 7-day and 60-day average flows earlier, but the 6-month average flow at the gage remained the lowest since gaging began in 1931. The Santa Fe River at Fort White stayed in the lowest 1% of all records for daily, 7-day, and 60-day flows. The Aucilla, Econfina, and Steinhatchee rivers remained below the 5th 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. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for 14 lakes.
- **Springs:** Average January 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 25% higher than record drought-induced lows observed in 2002 and 2001, respectively.

GROUNDWATER

Floridan aquifer levels remained extremely low. Record low levels for January occurred at 65 upper Floridan aquifer wells and all-time lows at 18 wells (Figure 10). Levels dropped in nearly 70% of the monitored wells, with an average drop of about 2". Modest rises were seen in most wells in the northeast portion of the District, where the aquifer is confined, but for the most part these levels were still below the previous record lows seen in the 1998-2002 drought. Conditions averaged across the District compared to all historic levels fell to the 4th percentile from the 5th percentile last month (based on records beginning no earlier than 1978). Eighty-eight percent of the wells were in the bottom 10% of all recorded levels, and 73% 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 January was 0.02", the same rate observed in November and December. 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 January in the District and 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 is in effect from the National Weather Service Climate Prediction Center. A weak-to-moderate La Niña is expected through the spring, 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	Jan-2012	January Average	Last 3 Months	Last 12 Months
Alachua	0.97	3.39	3.40	40.32
Baker	0.92	3.48	3.72	37.78
Bradford	0.74	2.90	3.21	38.19
Columbia	1.14	3.43	4.32	39.78
Dixie	1.71	3.54	4.88	46.84
Gilchrist	1.29	4.58	4.24	44.55
Hamilton	1.95	4.31	5.51	37.02
Jefferson	1.95	4.35	4.74	37.80
Lafayette	1.87	4.09	6.27	42.00
Levy	1.47	3.99	3.25	44.23
Madison	2.35	3.93	5.93	42.85
Suwannee	2.10	4.20	5.77	44.48
Taylor	2.21	4.10	6.07	41.42
Union	0.98	4.00	4.10	41.78

January 2012 Average:	1.61
Historical January Average (1932-2011):	3.72
Historical 12-month Average (1932-2011):	54.56
Past 12-Month Total:	41.89
12-month Rainfall Deficit:	-12.67

(Rainfall reported in inches)

Figure 1: Comparison of District Monthly Rainfall

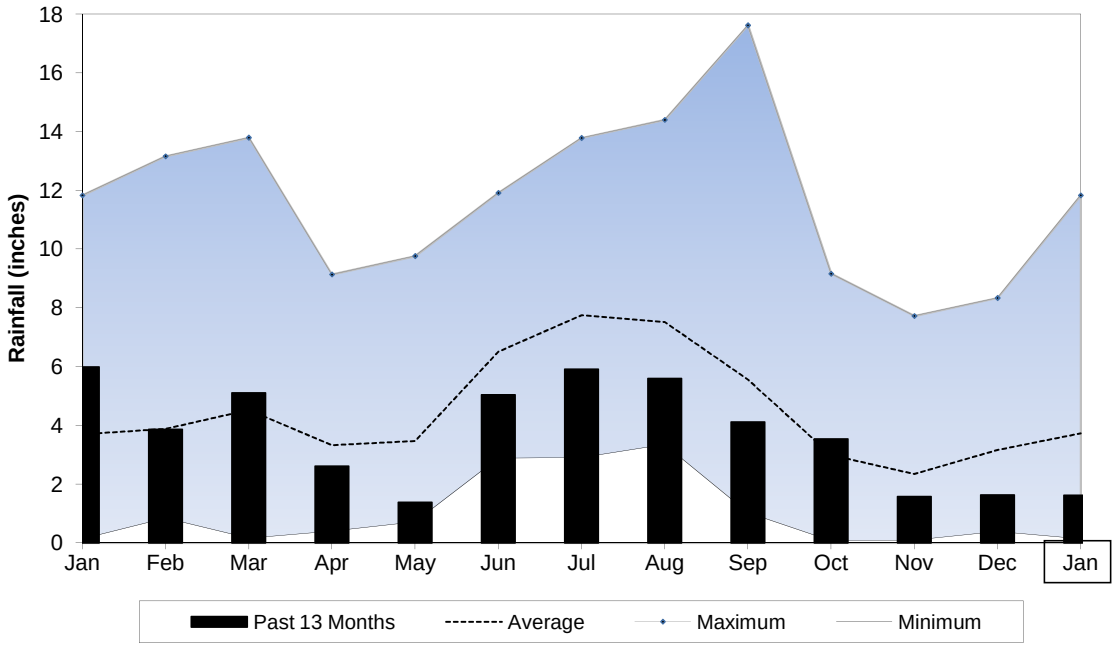


Figure 2: January 2012 Rainfall Estimate

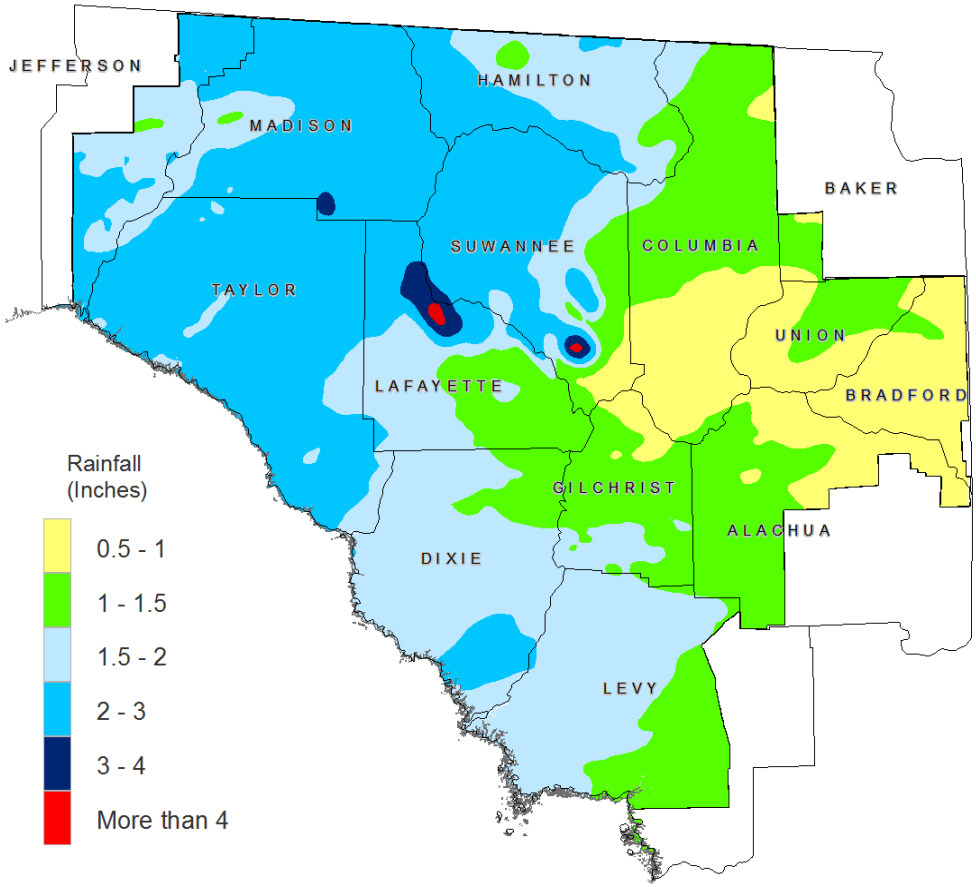


Figure 3: January 2012 Regional Percent of Normal Rainfall

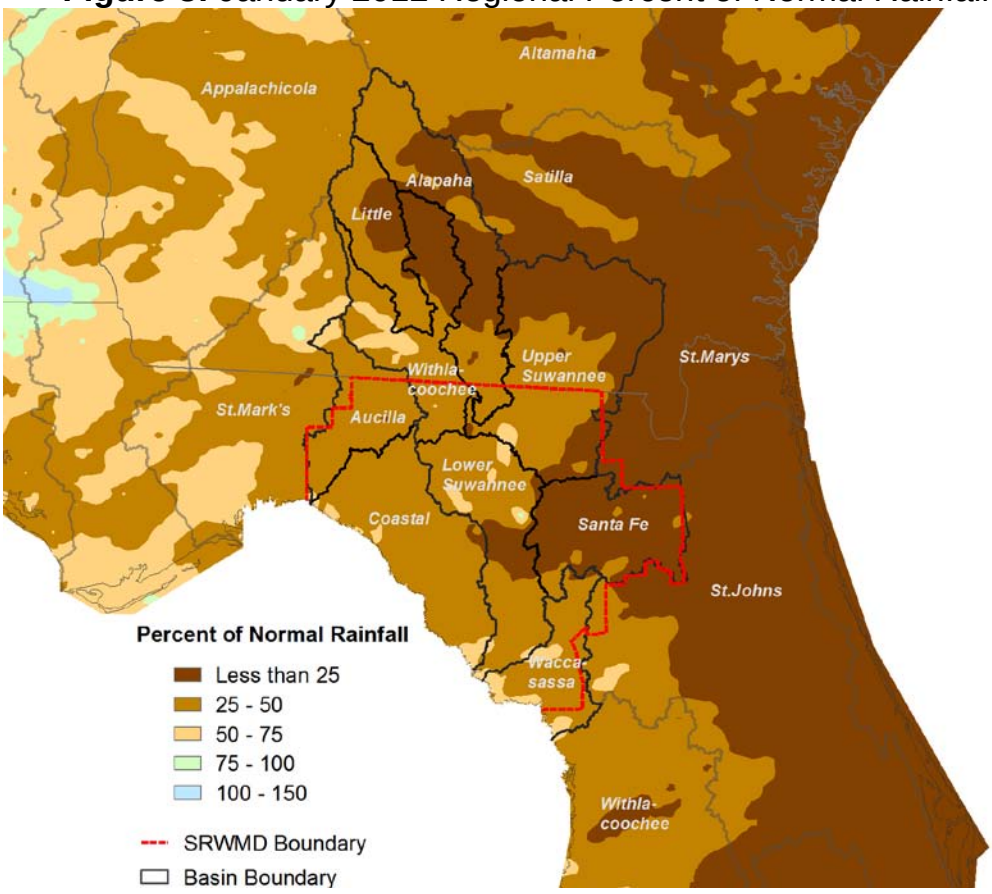


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Ending January 31, 2012

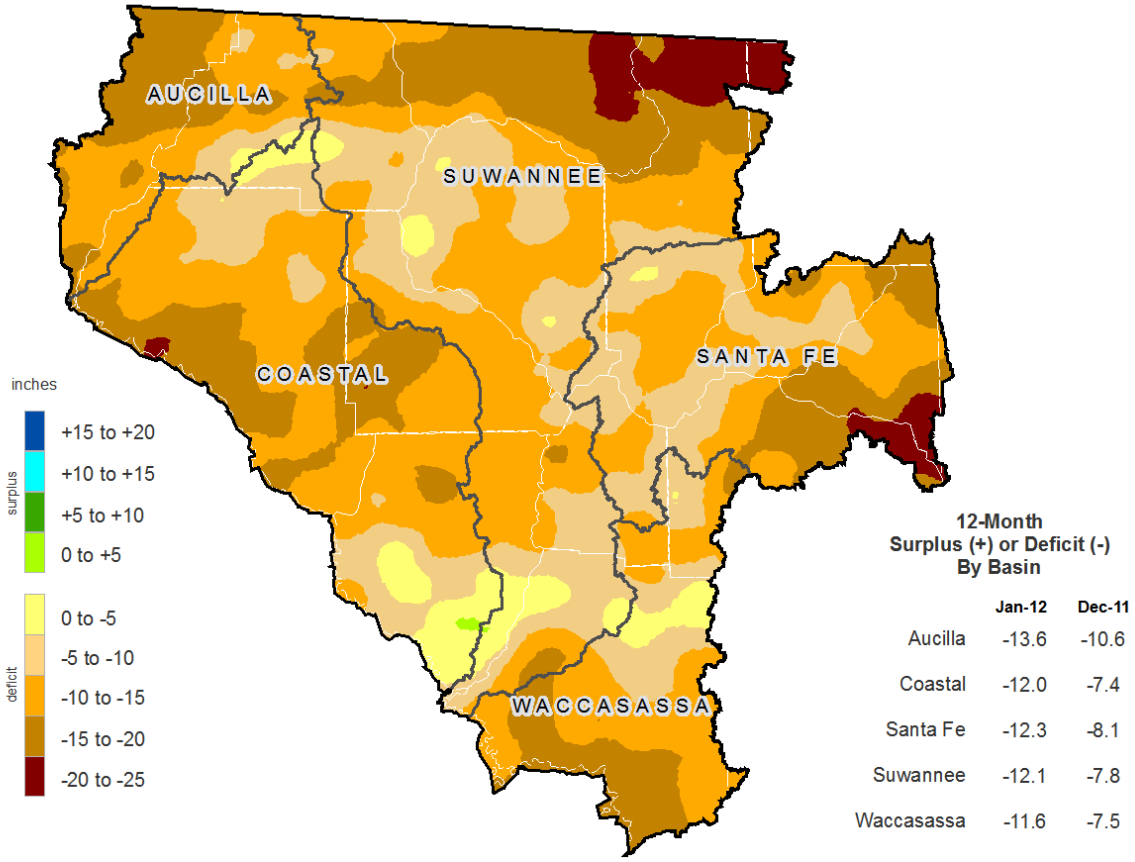


Figure 5: 12-Month Rolling Rainfall Deficit Since 1998
Difference between observed 12-month rainfall and the long-term average over the same period

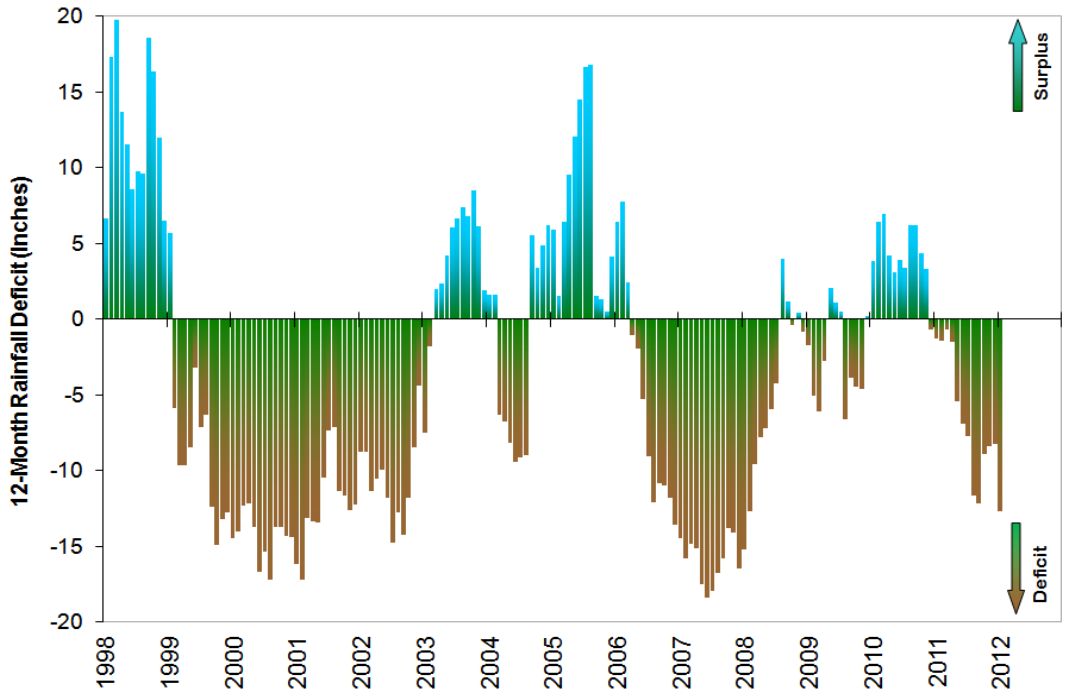
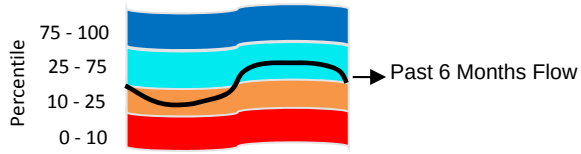
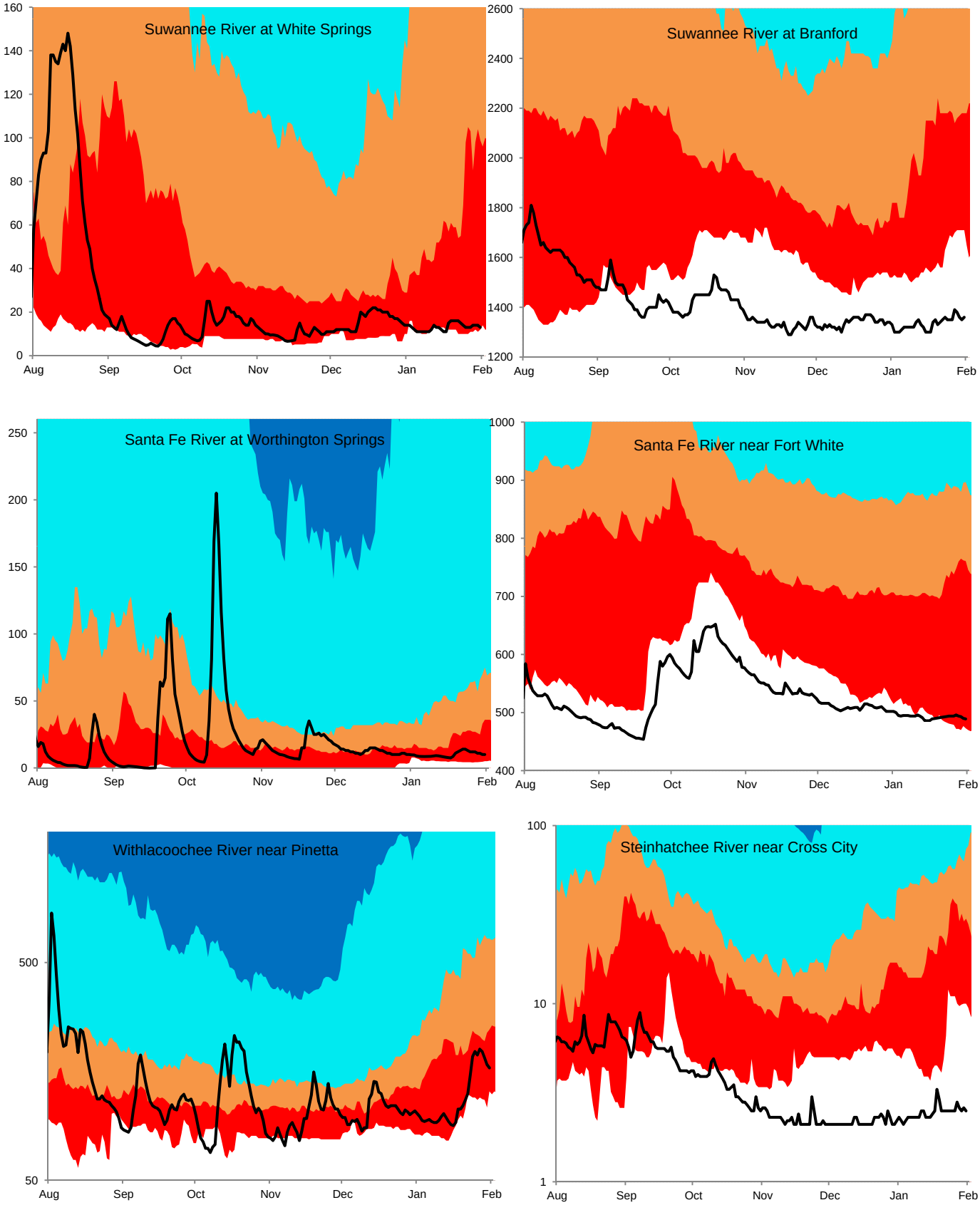


Figure 6: Daily River Flow Statistics

August 1, 2011 through January 31,2012





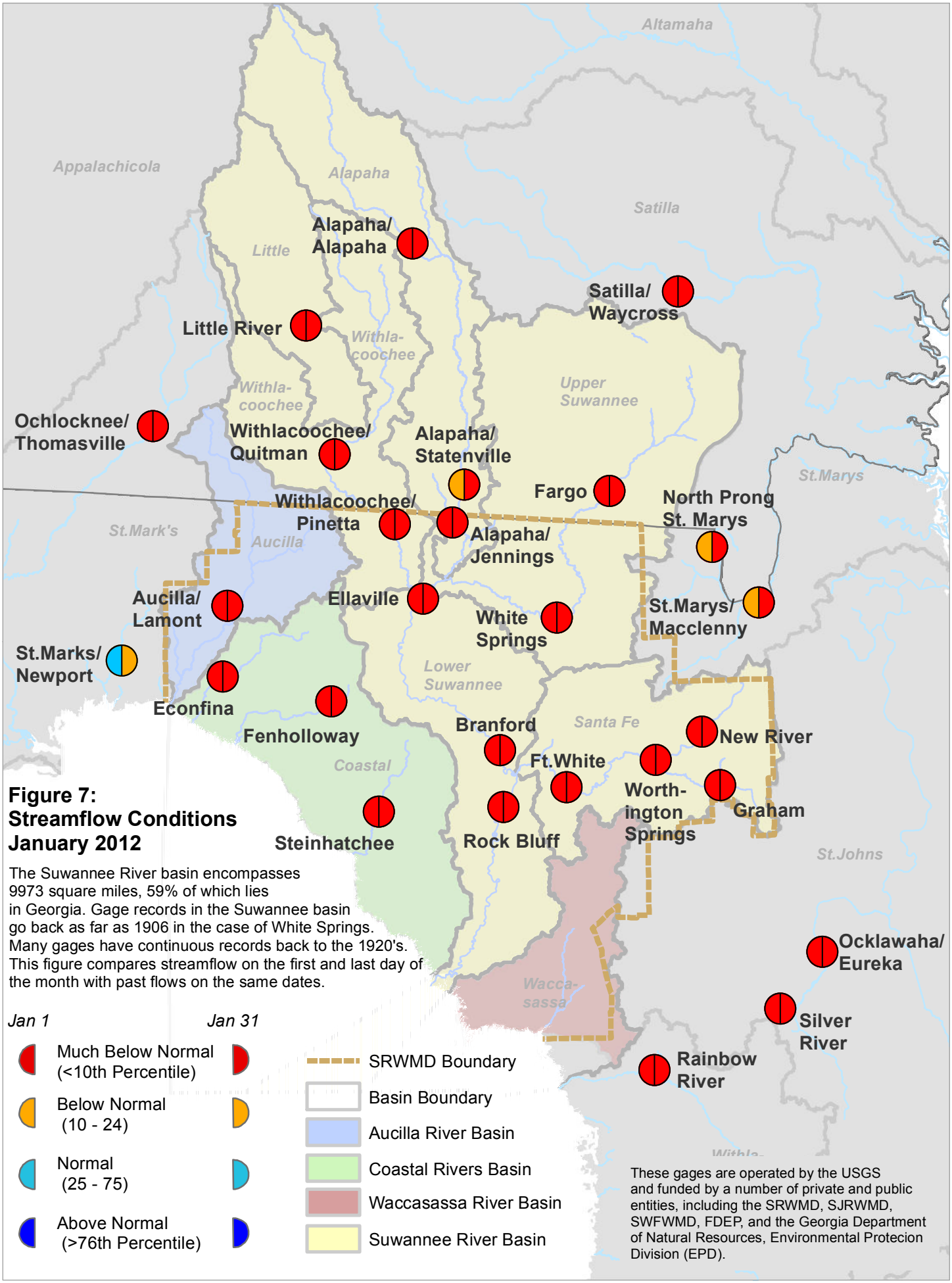
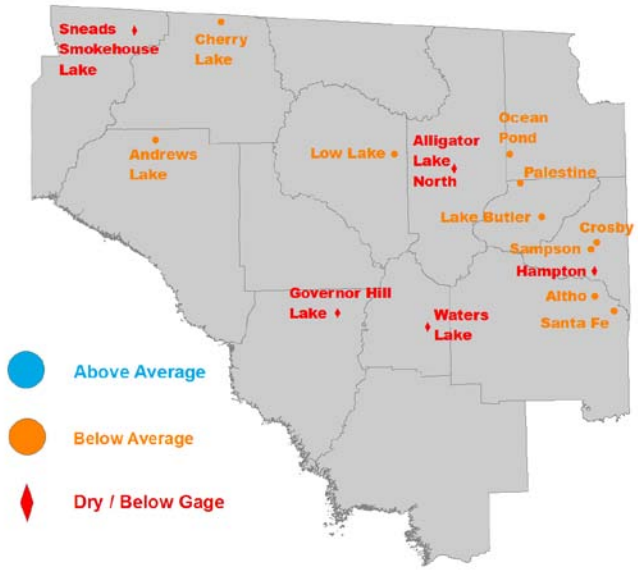
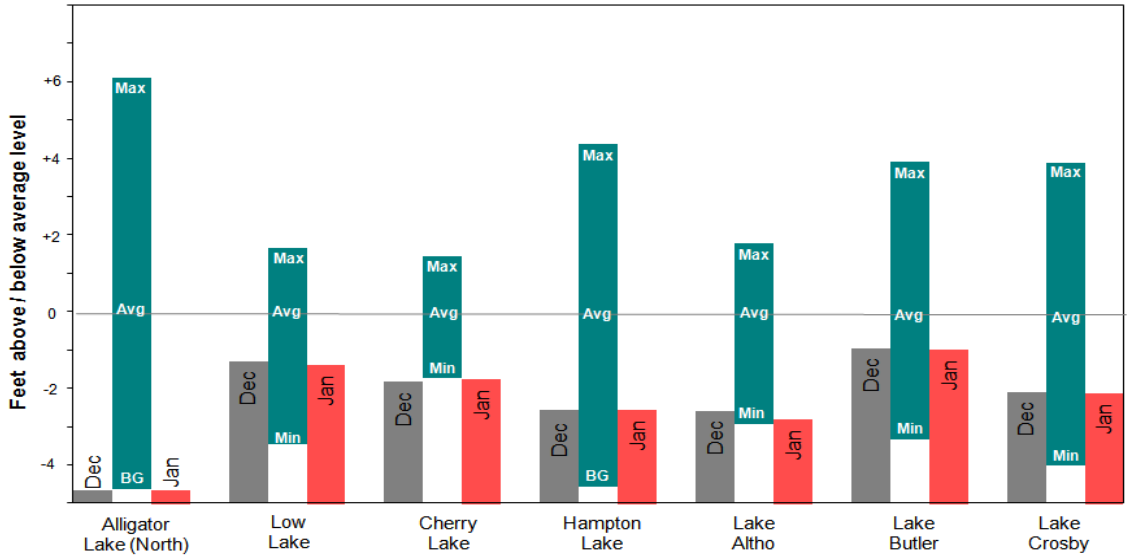

Altamaha
Appalachicola
Alapaha
Satilla
Little
Alapaha/
Alapaha
Satilla/
Waycross
Little River
Withla-
coochee
Withla-
coochee
Upper
Suwannee
Ochlocknee/
Thomasville
Withlacoochee/
Quitman
Alapaha/
Statenville
St.Marys
Fargo
North Prong
St. Marys
Withlacoochee/
Pinetta
St.Mark's
Aucilla
Alapaha/
Jennings
Aucilla/
Lamont
Ellaville
White
Springs
St.Marys/
Macclenny
St.Marks/
Newport
Lower
Suwannee
Econfina
Fenholloway
Branford
Santa Fe
New River
Coastal
Ft.White
Worth-
ington
Springs
Graham
Steinhatchee
Rock Bluff
St.Johns
Ocklawaha/
Eureka
Wacca-
sassa
Silver
River
Rainbow
River
Withla-
Figure 7:
Streamflow Conditions
January 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.
Jan 1
Jan 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 Protecion Division (EPD).

Figure 8: January 2012 Lake Levels

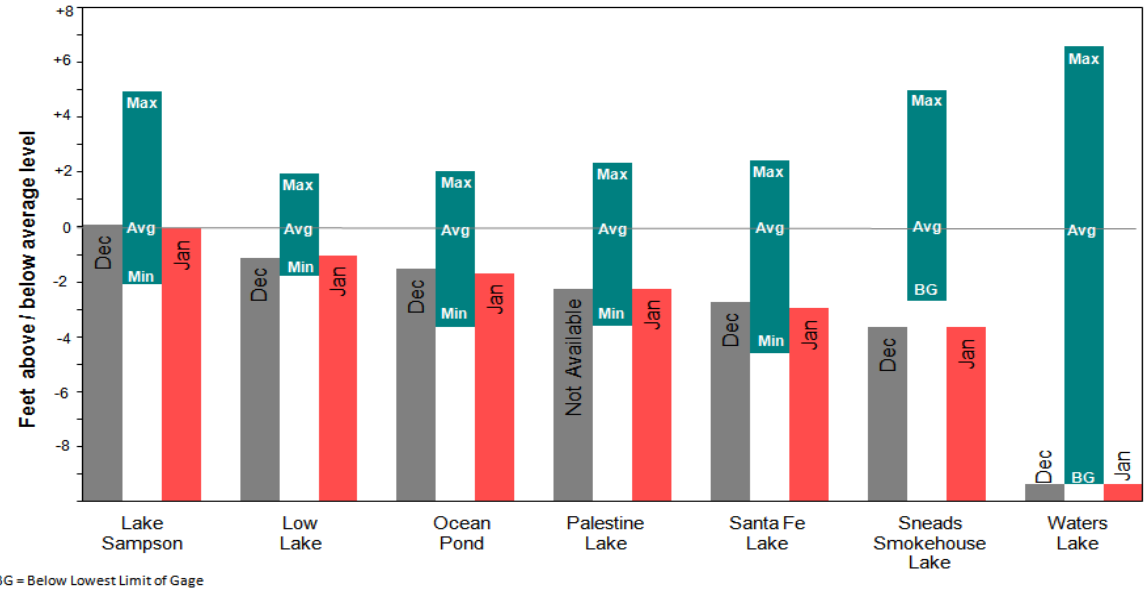


SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular ones in the eastern part of the District, are embedded in a surficial or intermediate aquifer over relatively impermeable clay deposits. These lakes rise and fall according to local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



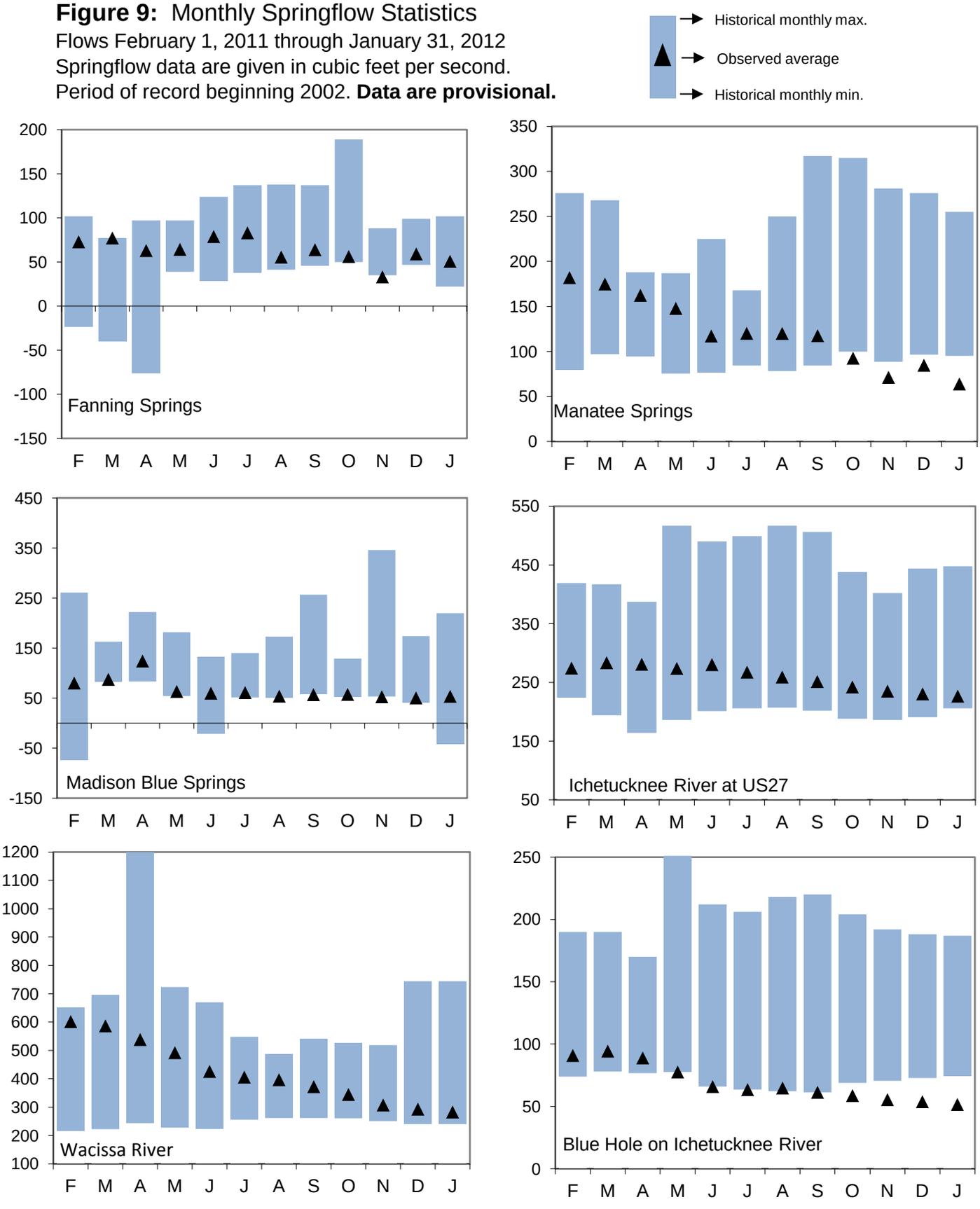
BG = Below Lowest Limit of Gage



BG = Below Lowest Limit of Gage

Figure 9: Monthly Springflow Statistics

Flows February 1, 2011 through January 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.

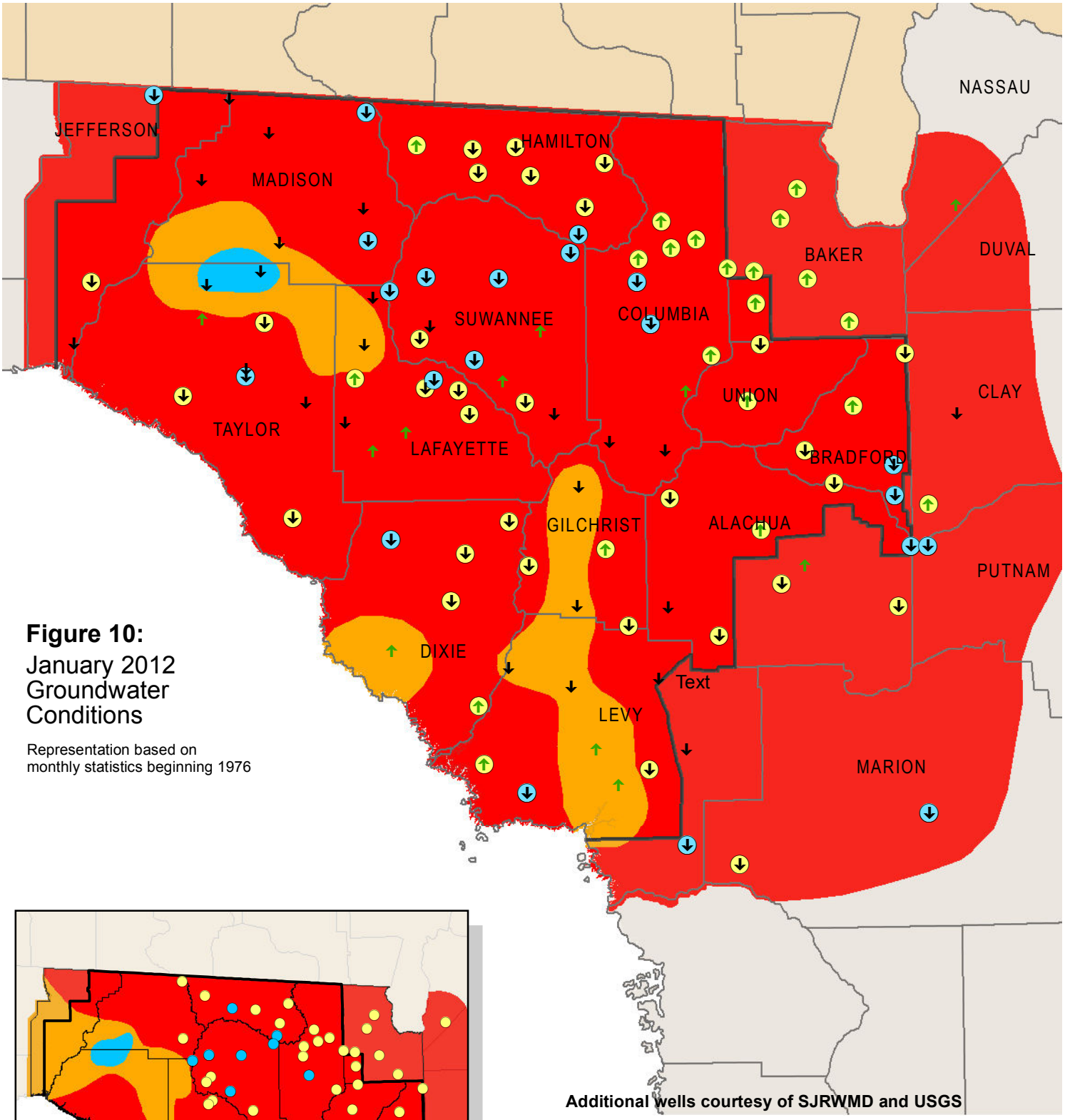
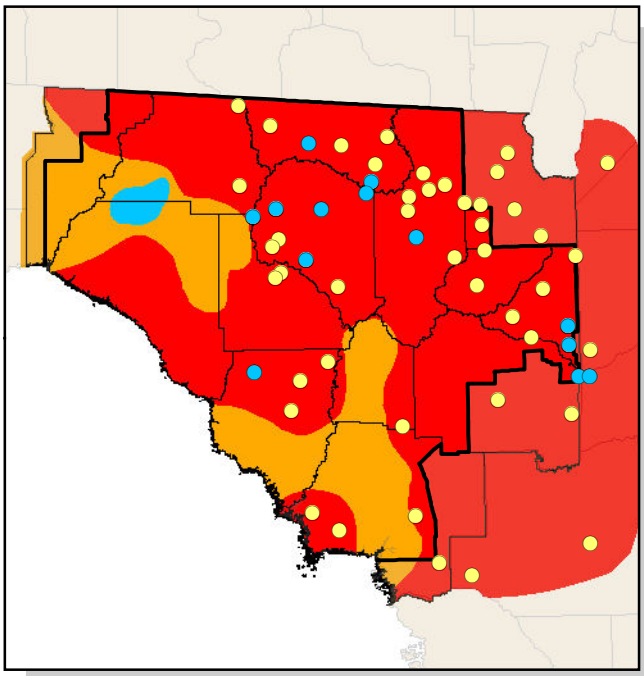


Figure 10:
January 2012
Groundwater
Conditions

Representation based on
monthly statistics beginning 1976

Additional wells courtesy of SJRWMD and USGS

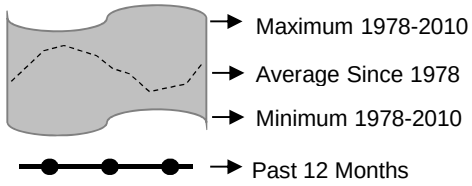


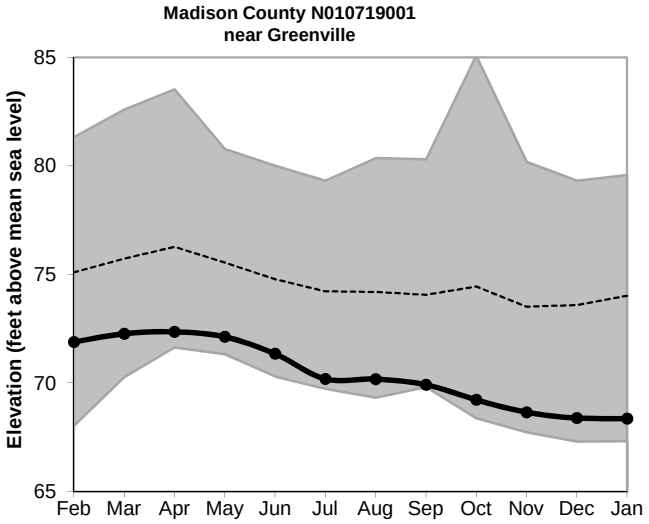
Inset: December 2011 Groundwater Levels

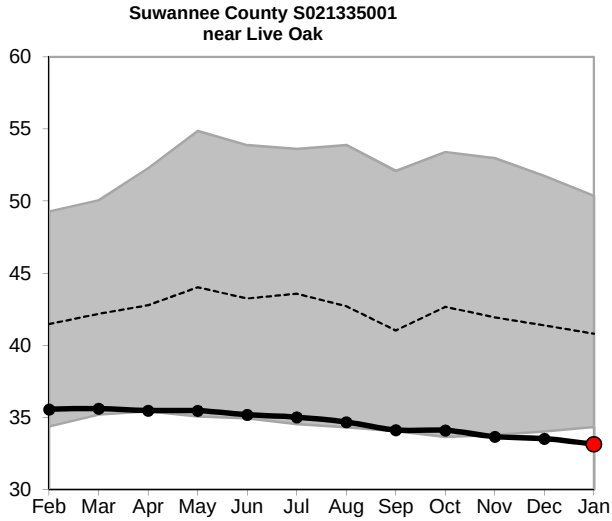
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Increase/decrease in level since last month
- District Boundary
- Record Low for Month
- Historic Low

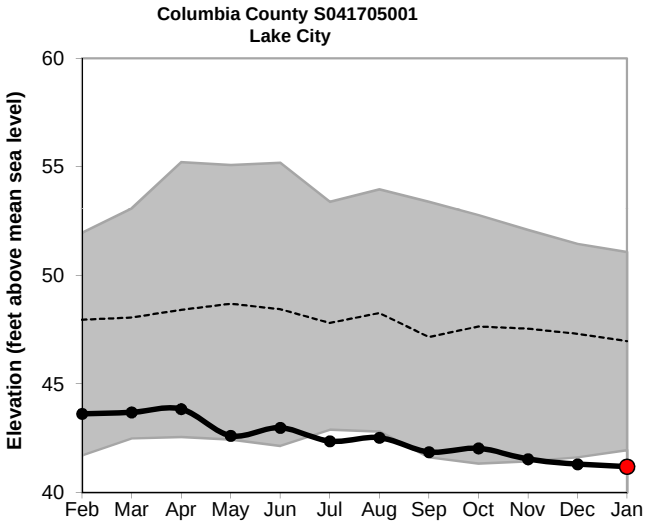
Figure 11: Monthly Groundwater Level Statistics

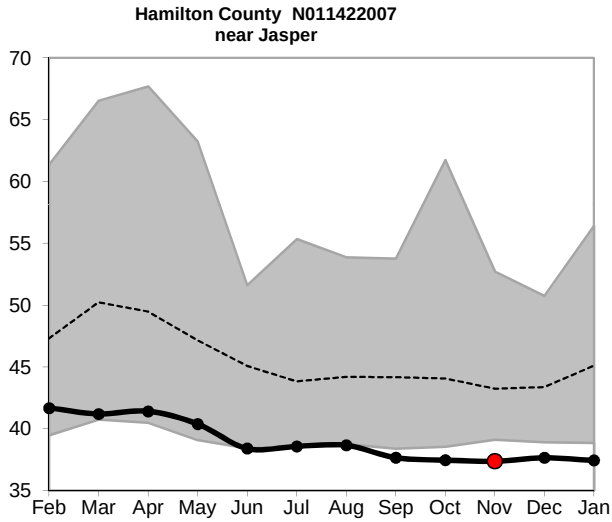
Levels February 1, 2011 through January 31, 2012
Period of Record Beginning 1978

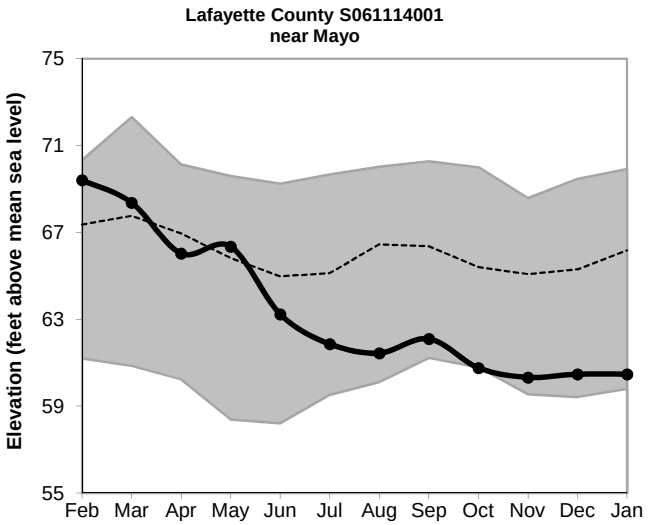












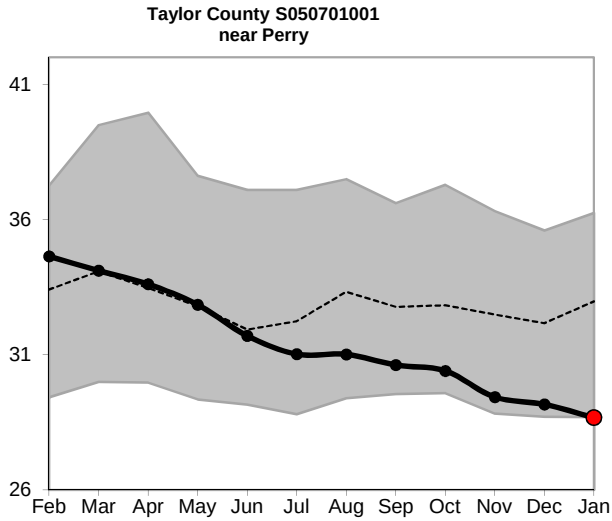
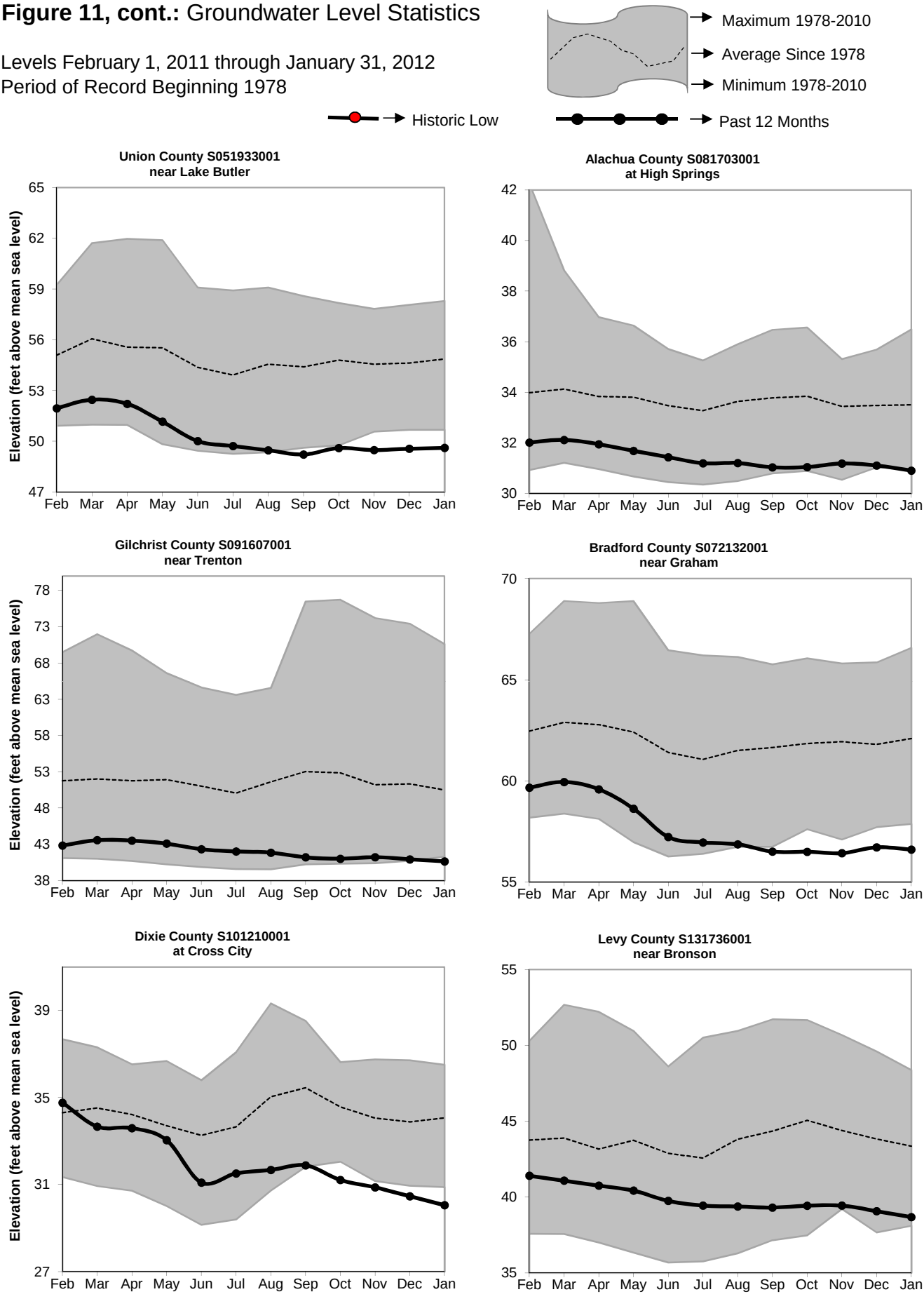


Figure 11, cont.: Groundwater Level Statistics

Levels February 1, 2011 through January 31, 2012
Period of Record Beginning 1978



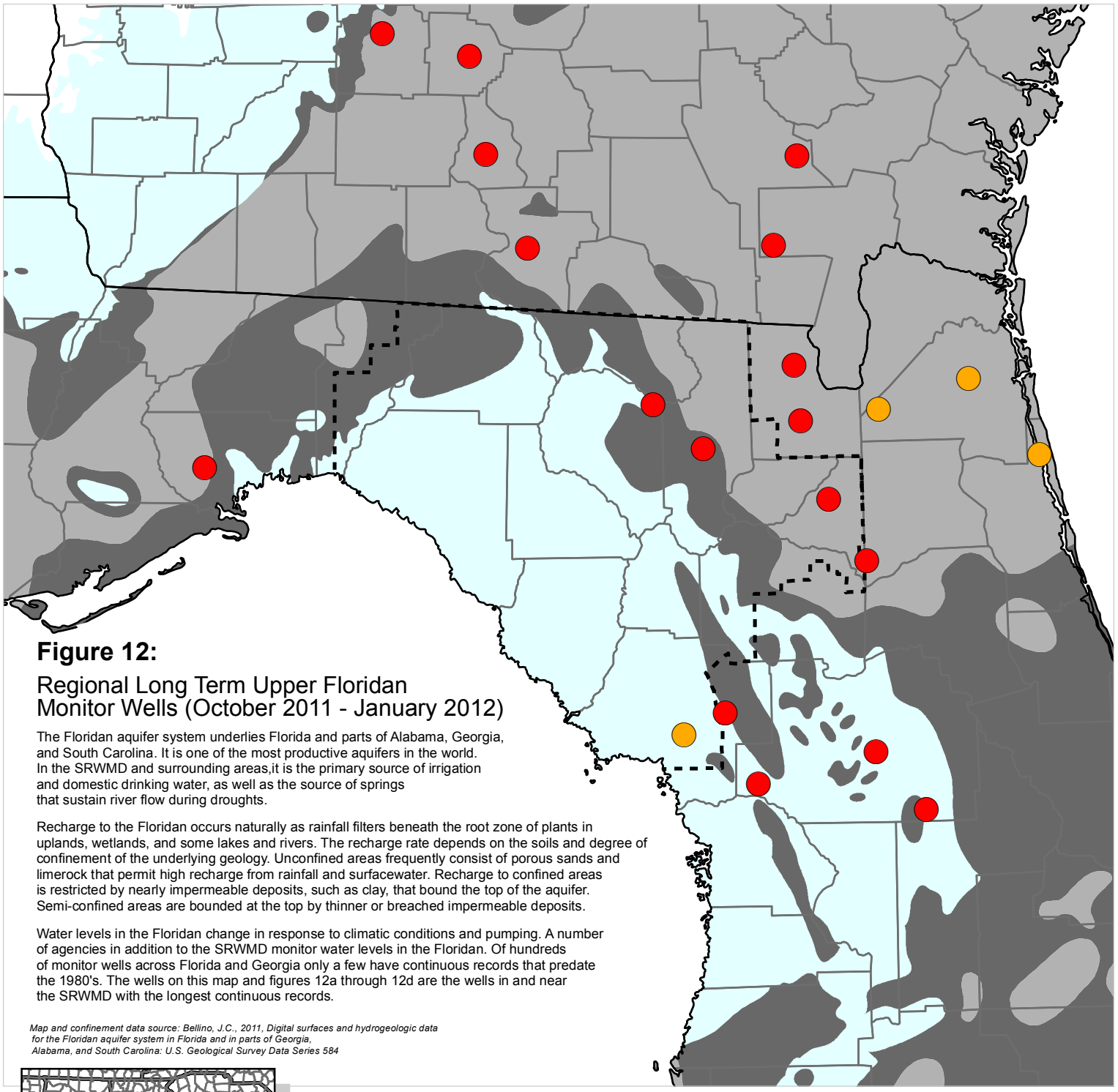


Figure 12:

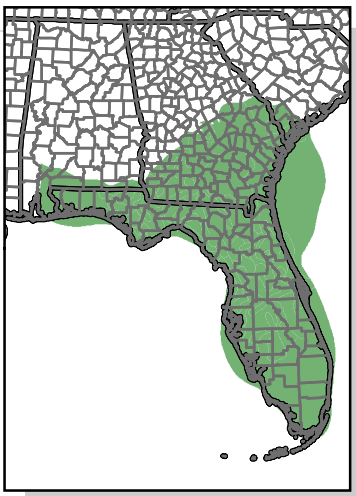
Regional Long Term Upper Floridan Monitor Wells (October 2011 - January 2012)

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

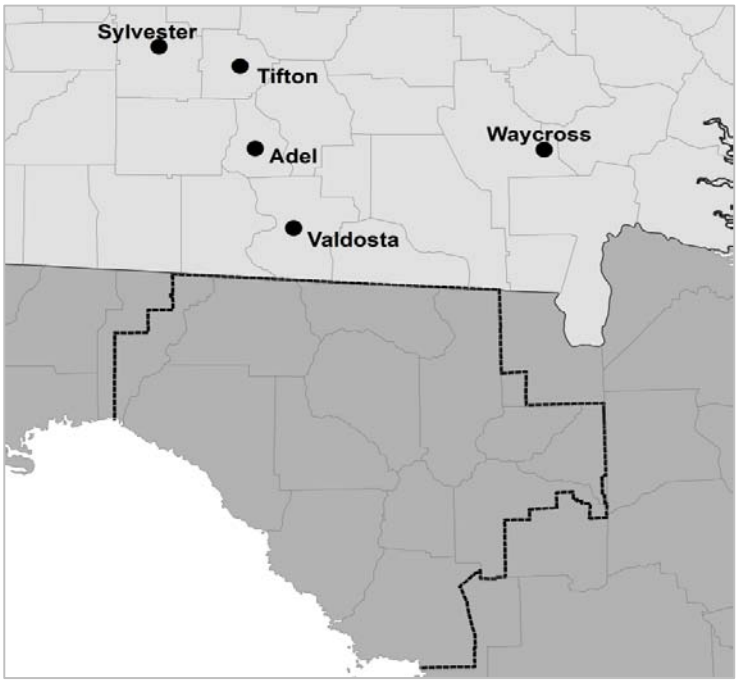
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.

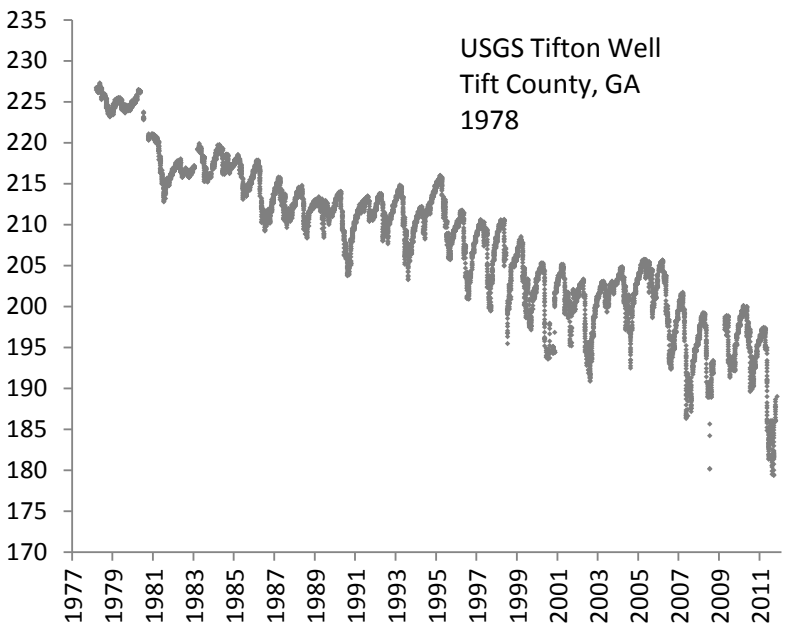
Percentile of Most Recent Water Level Relative to Entire Record

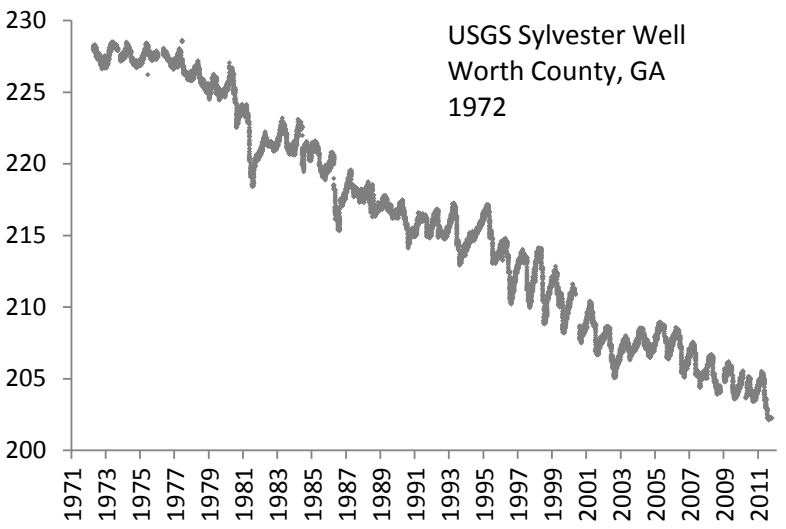
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

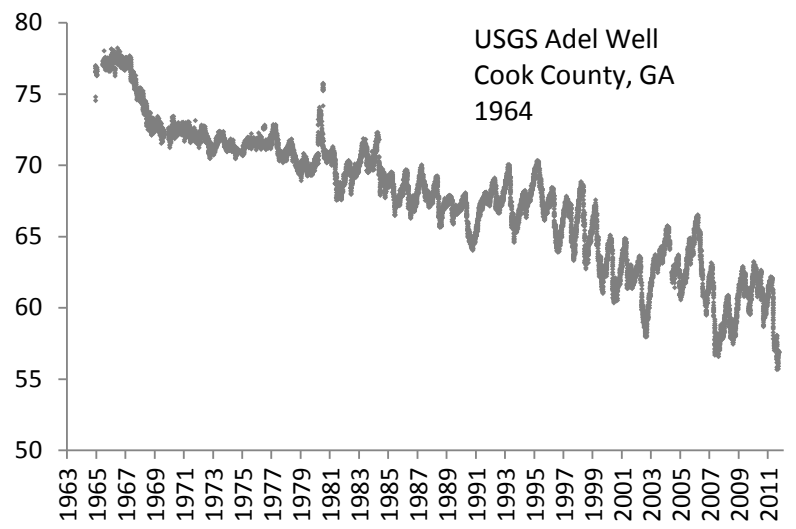
Figure 12a: Regional Long Term Upper Floridan Levels

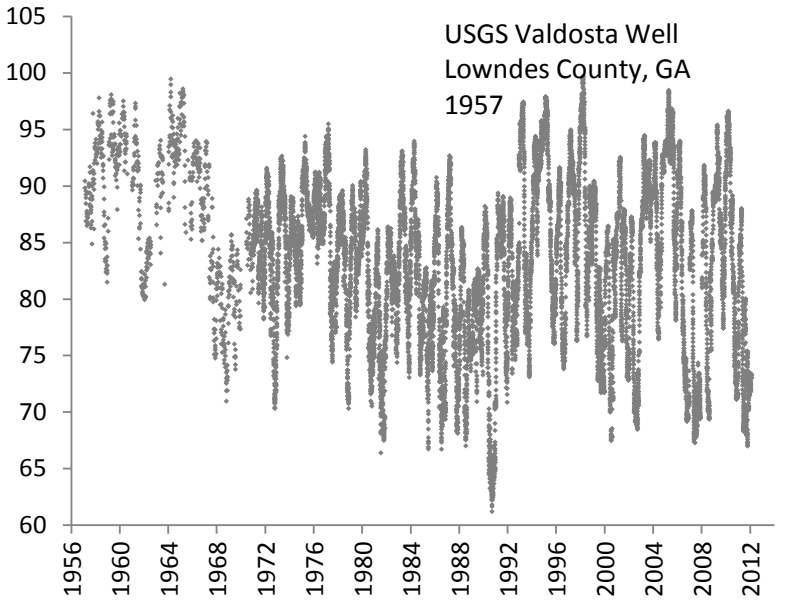
Ending October 2011-January 2012
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS and Georgia EPD











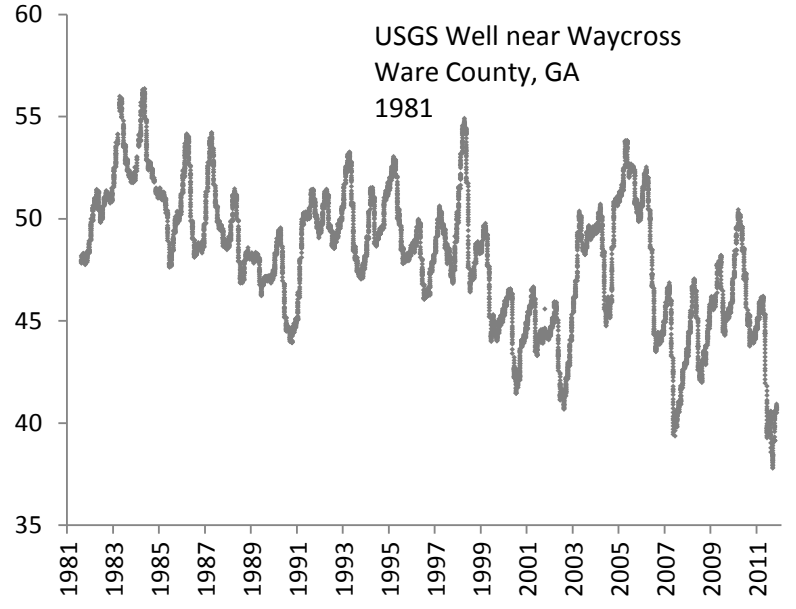
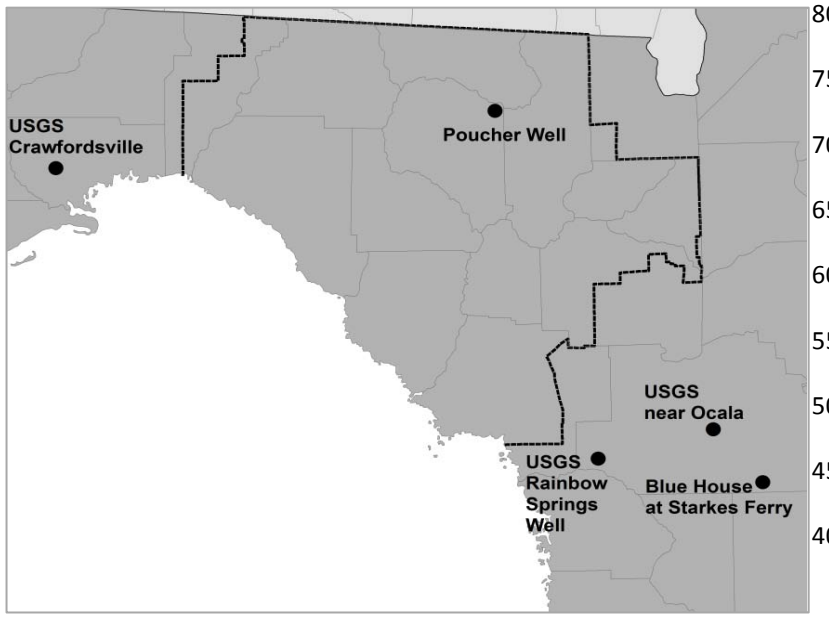
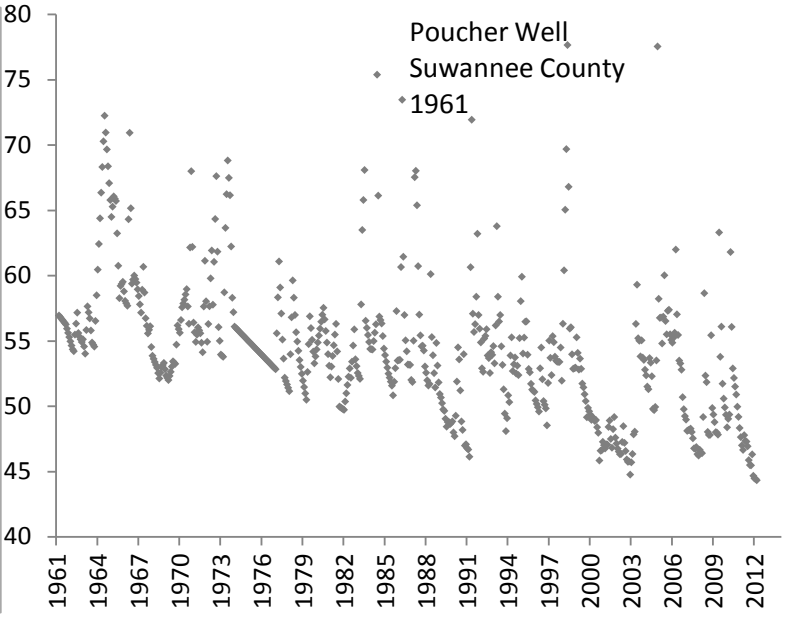
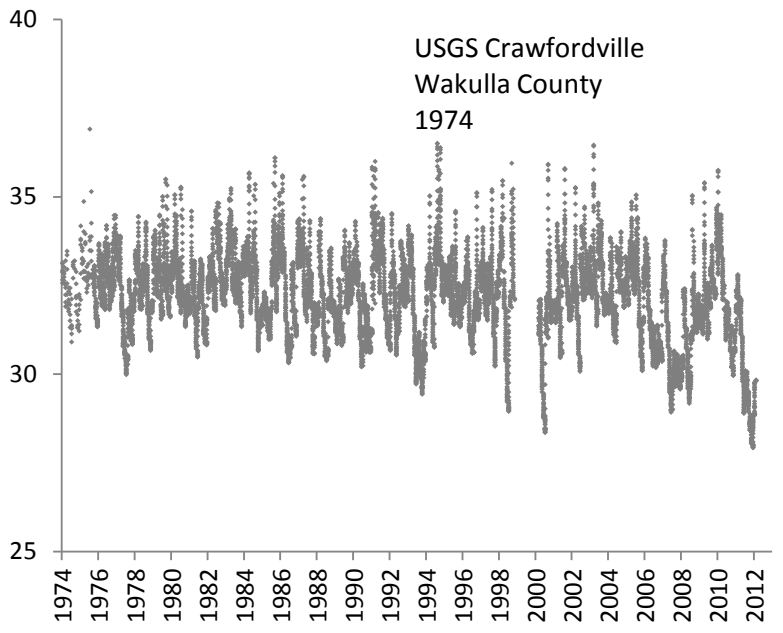


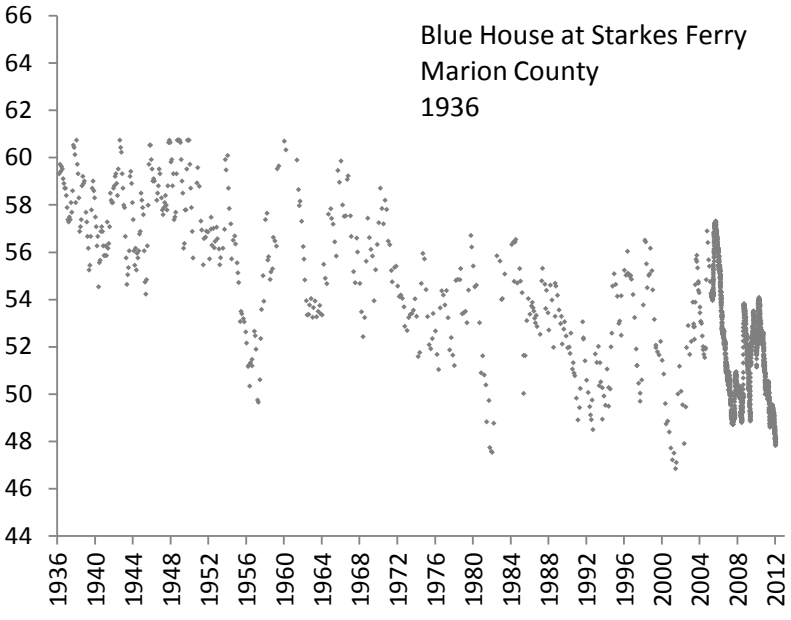
Figure 12b: Regional Long Term Upper Floridan Levels

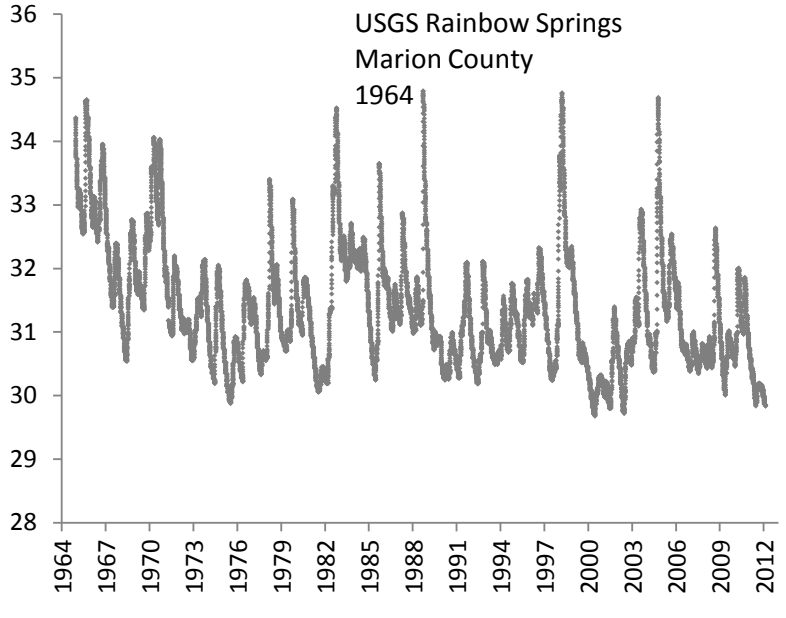
Ending January 2012
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS, SWFWMD, and SJRWMD











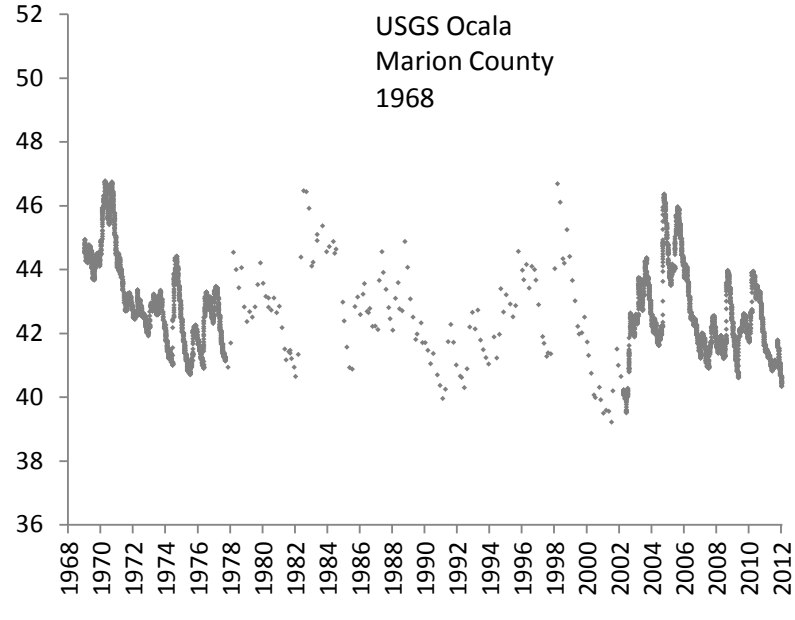
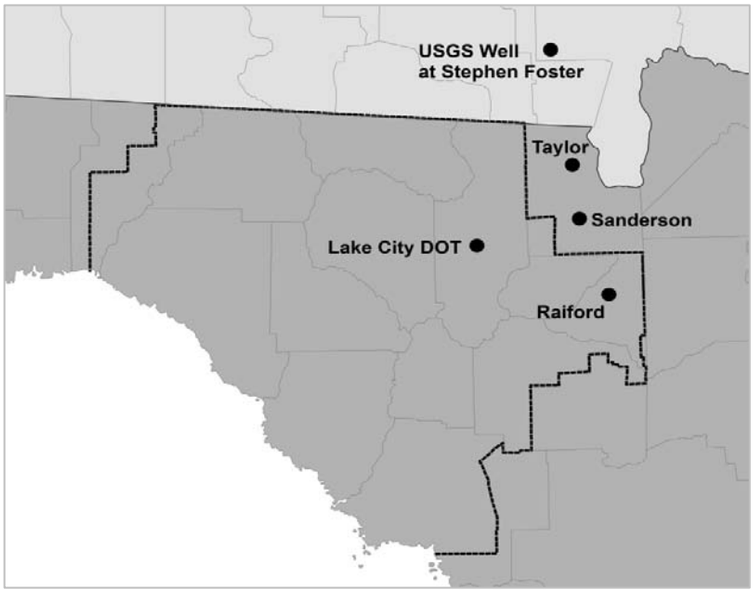
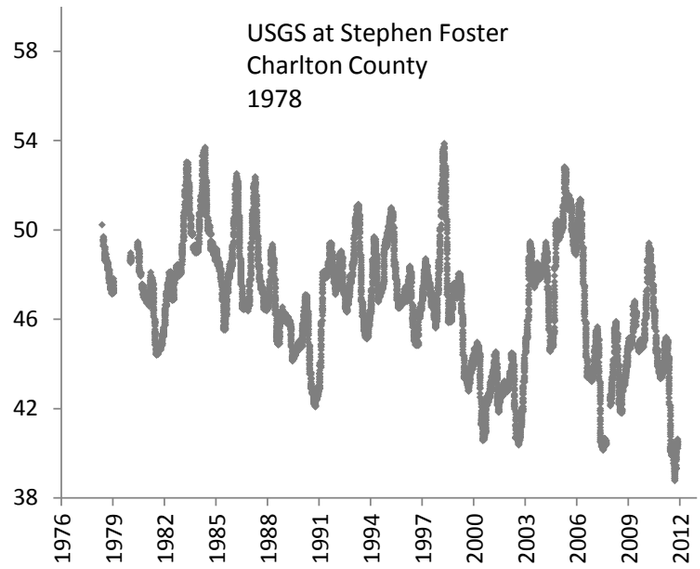
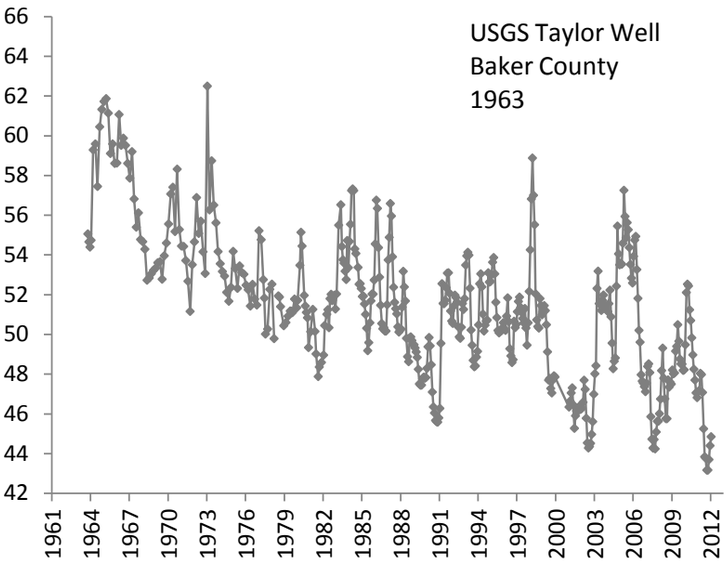


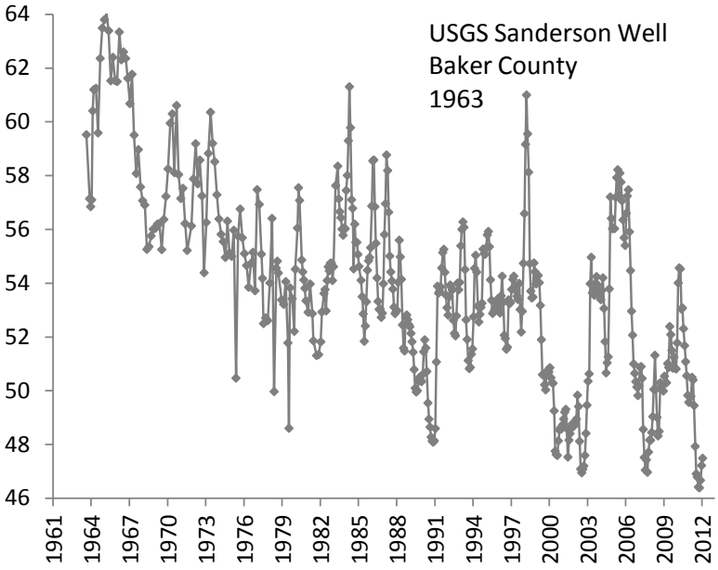
Figure 12c: Regional Long Term Upper Floridan Levels

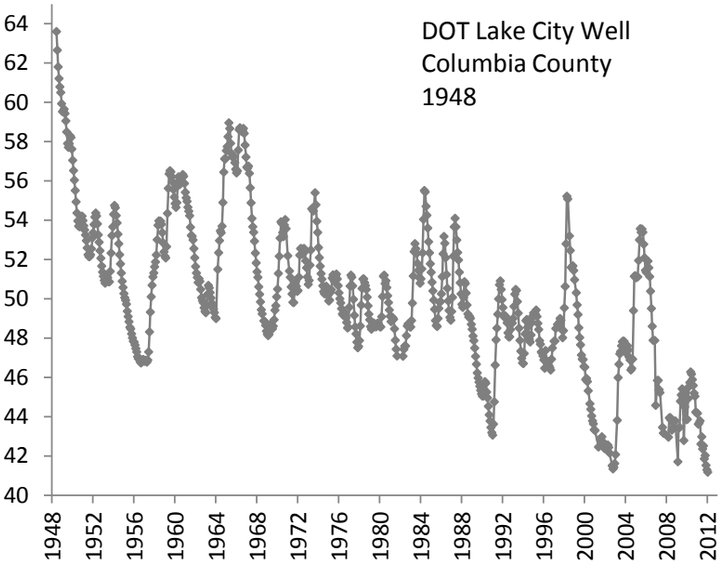
Ending November 2011-January 2012
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS and SJRWMD











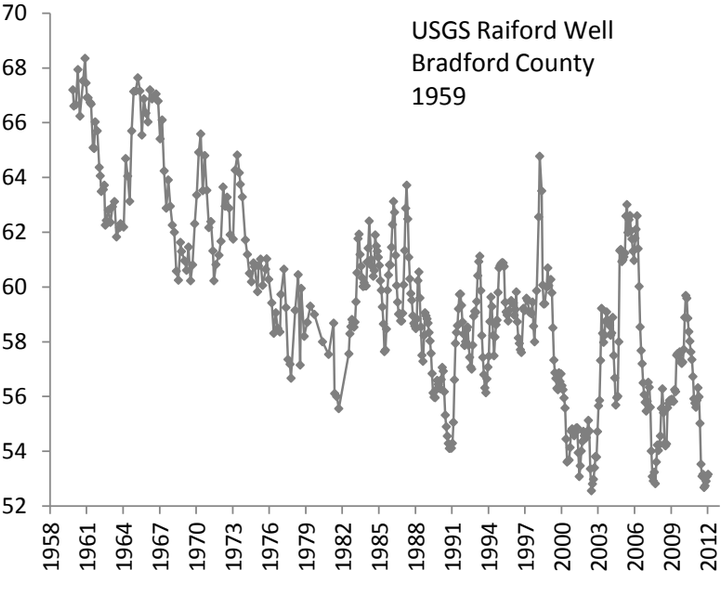
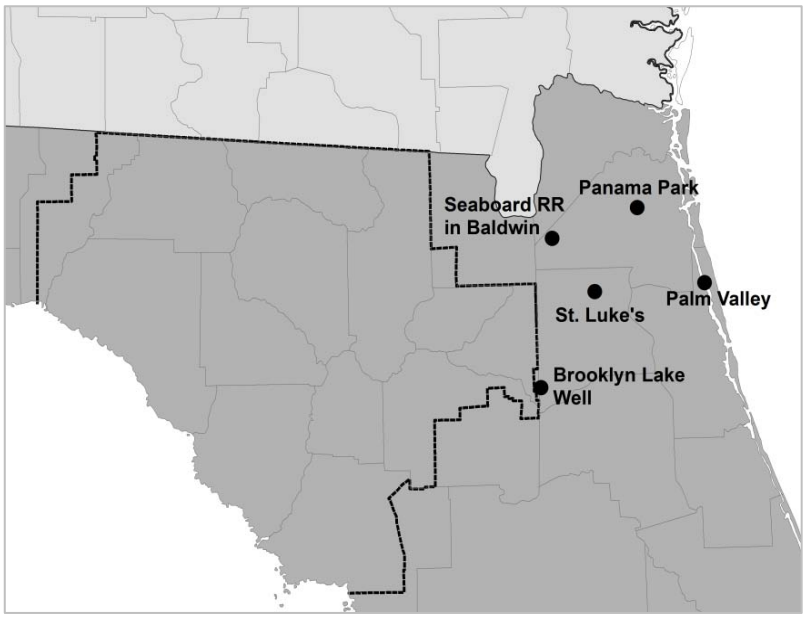
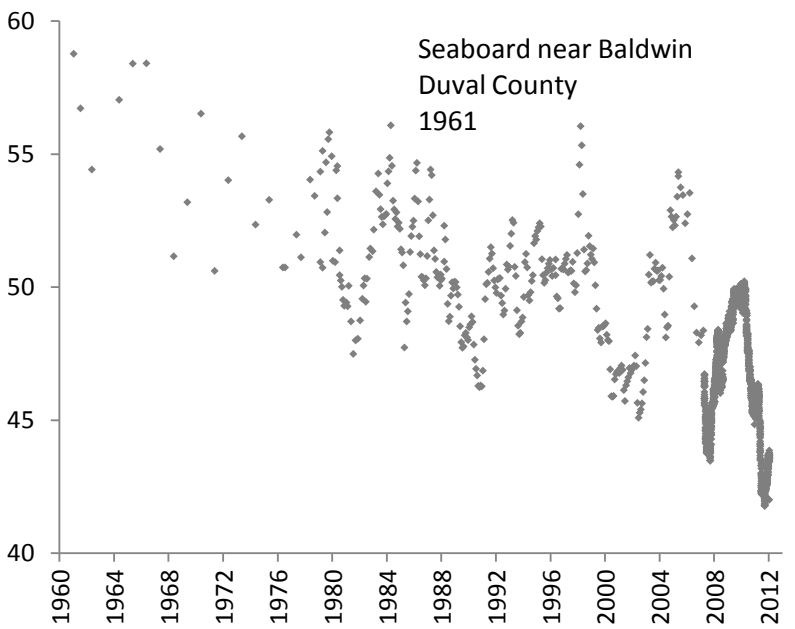
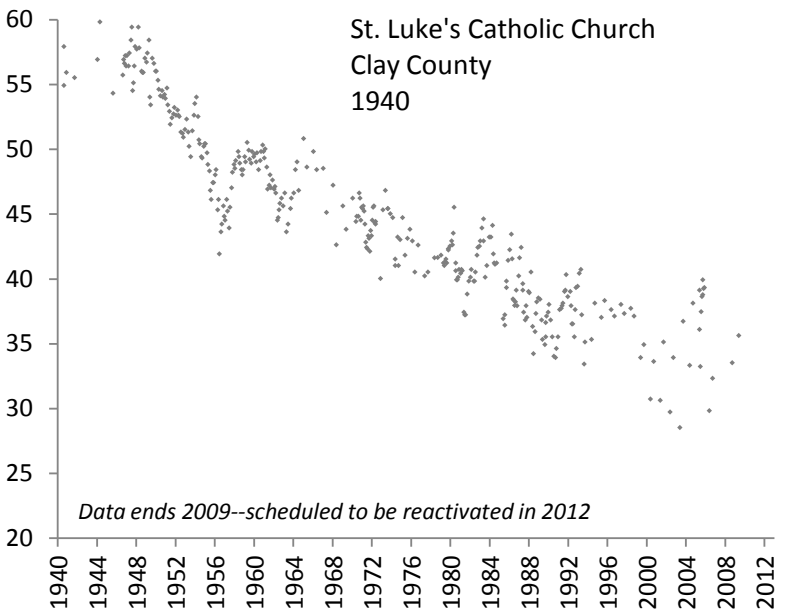


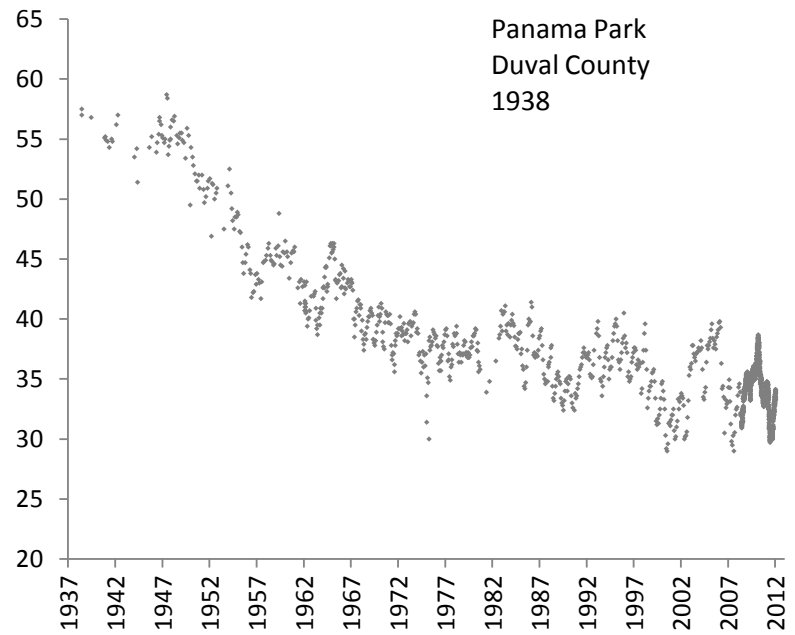
Figure 12d: Regional Long Term Upper Floridan Levels

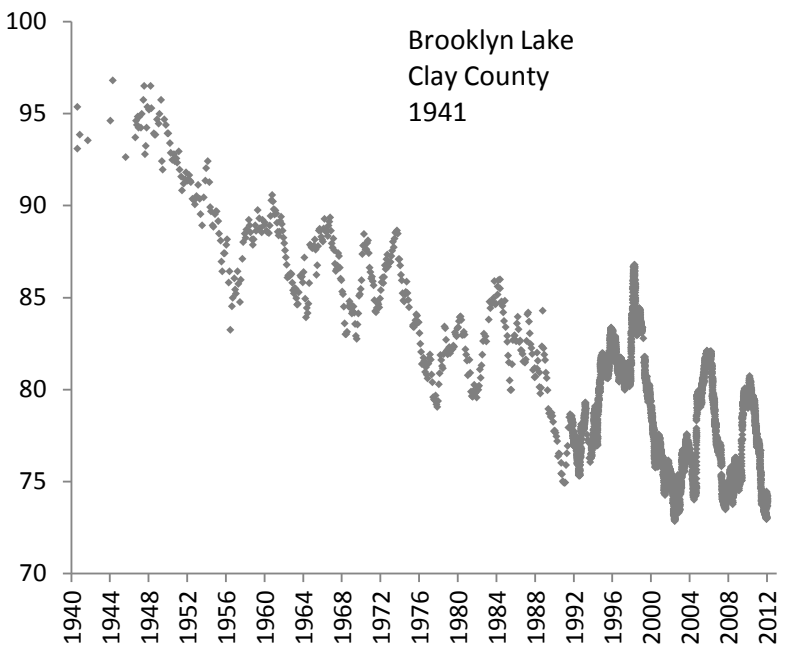
Ending December 2011 - January 2012
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of SJRWMD











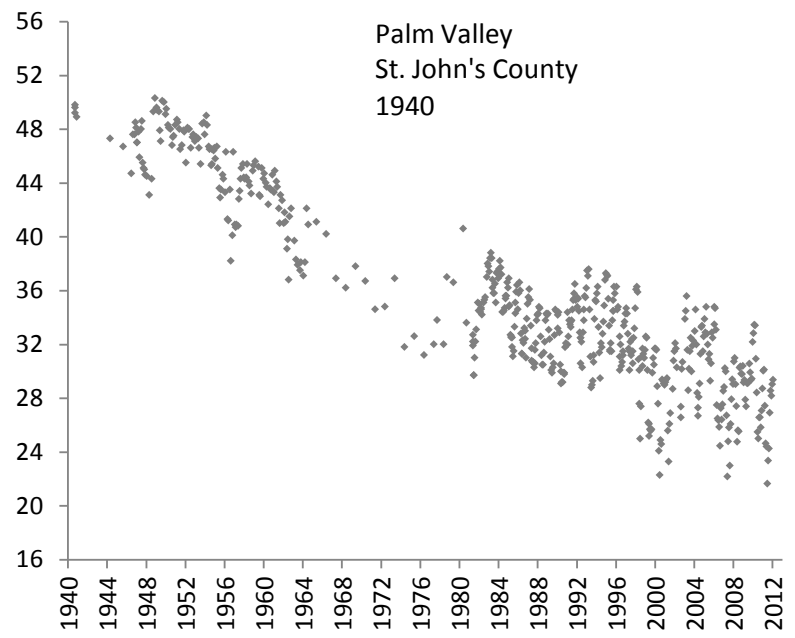


Figure 13: Agricultural Water Use

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.