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: December 9, 2011

RE: November 2011 Hydrologic Conditions Report for the District

RAINFALL

- November is typically the driest month of the year, with an average accumulation of 2.34" based on records starting in 1932. District-wide rainfall this November was 1.57" or 67% of the long-term average (Table 1, Figure 1). Localized areas in Taylor and Lafayette counties saw as much as 4", while parts of Madison and Jefferson received less than half an inch (Figure 2). A narrow band of up to 5" fell in the southern part of the Suwannee basin in Georgia, but most of the basin received less than normal rainfall (Figure 3). The highest 24-hour gaged total was 1.79" at Hopewell in Madison County.
- The average 12-month deficit fell slightly from 8.9" in October to 8.4". Deficits were highest in the upper Suwannee and Santa Fe Basins (Figure 4). Figure 5 shows the change in annual deficits beginning in 1998.

SURFACEWATER

- **Rivers**: Rainfall in the upper Suwannee basin and cooler temperatures kept lower Suwannee gages from falling below all-time low flows observed in October, but improvements were minimal. The Suwannee at Branford continued to set new November daily low flow records, with flows lower than any observed in November since gaging began in 1931. The Santa Fe River near Fort White also set new daily low records for November. The Aucilla River ceased flowing at the Lamont gage, and coastal rivers remained extremely low. 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 was at its lowest recorded level at the end of the month for the fourth consecutive month. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for six lakes.
- **Springs:** Average November flow relative to historical flows is shown for five spring systems in Figure 9.

GROUNDWATER

Record low levels for November occurred at 47 upper Floridan aquifer wells and all-time lows at 13 wells (Figure 10). Levels dropped in three-quarters of the monitored wells, but overall any increases or decreases were minor. Average conditions across the District compared to both historic November data and all data fell to the 5th percentile, making November the ninth consecutive month with conditions below the 25th percentile (based on records beginning no earlier than 1978). Eighty-three 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 November was 0.02". 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 November in the District, and moderate drought in the Suwannee basin in Georgia.
- The U.S. Geological Survey categorized all of the river basins in the District and the Suwannee basin in Georgia under severe hydrologic drought.

CONSERVATION

A Phase I 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 water conservation 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	Nov-2011	November Average	Last 3 Months	Last 12 Months
Alachua	1.49	2.35	9.91	43.97
Baker	1.66	2.22	9.67	43.08
Bradford	1.79	2.32	10.89	41.90
Columbia	1.85	2.44	10.46	44.87
Dixie	1.61	2.50	7.98	51.58
Gilchrist	1.53	2.72	11.08	48.89
Hamilton	1.65	2.72	7.73	41.14
Jefferson	0.56	3.44	6.66	40.86
Lafayette	2.36	2.78	9.27	46.86
Levy	0.92	2.55	8.83	48.55
Madison	1.23	3.12	8.67	45.91
Suwannee	1.76	2.53	9.71	49.22
Taylor	1.63	2.85	8.10	45.95
Union	2.10	2.55	14.12	46.06

November 2011 Average:	1.57
Historical November Average (since 1932):	2.34
Historical 12-month Average (since 1932):	54.68
Past 12-Month Total:	46.29
12-month Rainfall Deficit:	-8.39

(Rainfall reported in inches)

Figure 1: Comparison of District Monthly Rainfall

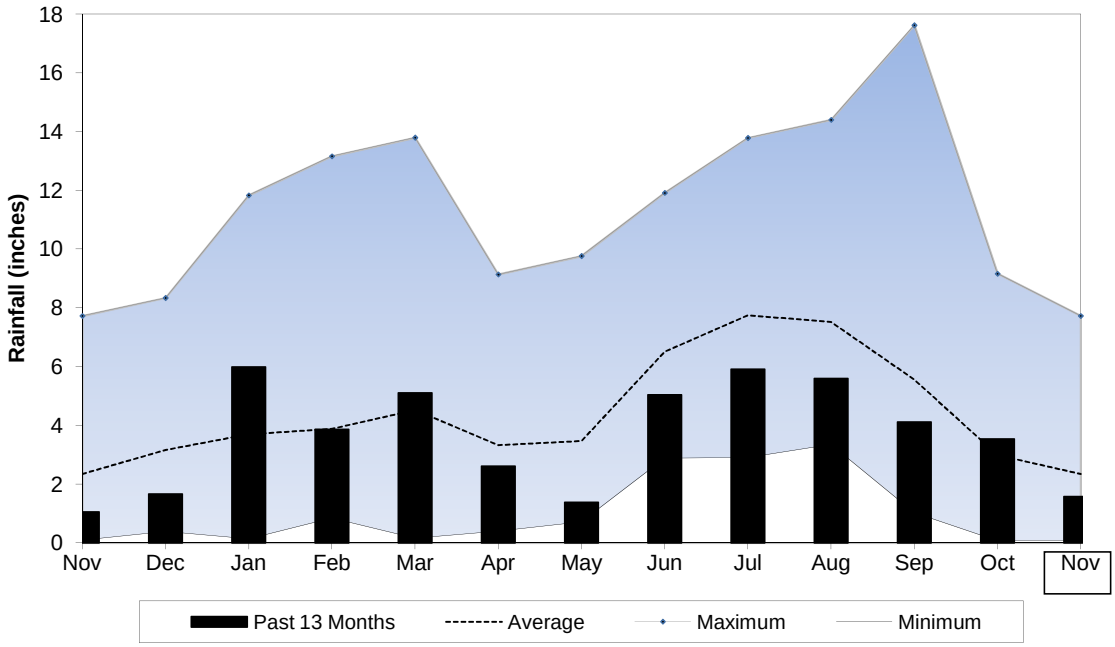


Figure 2: November 2011 Rainfall Estimate

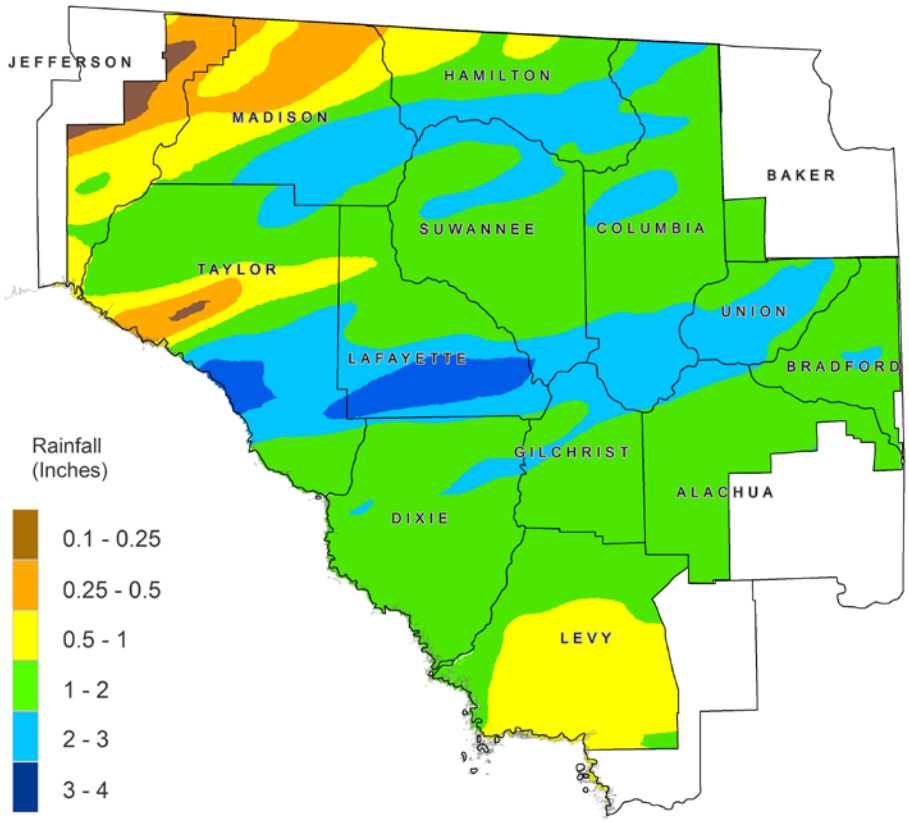


Figure 3: November 2011 Regional Percent of Normal Rainfall

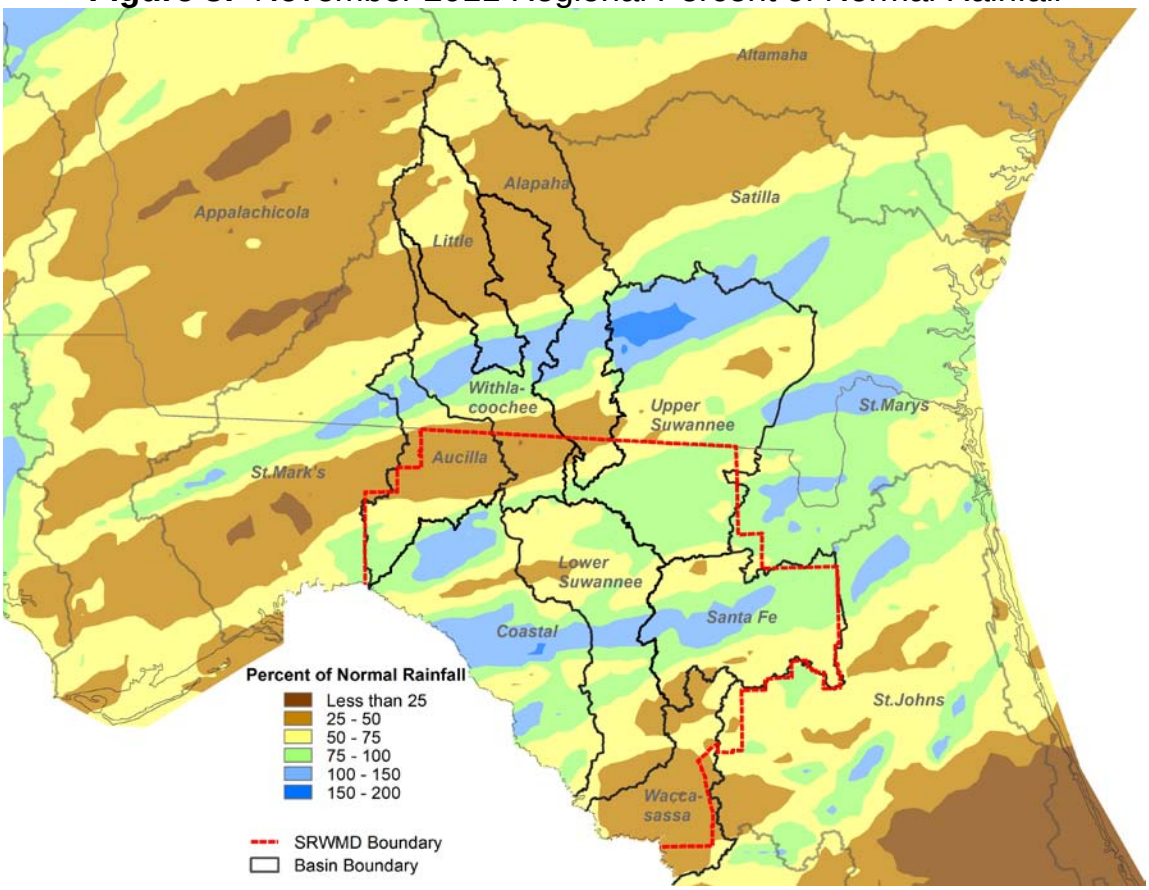


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin
Ending October 31, 2011

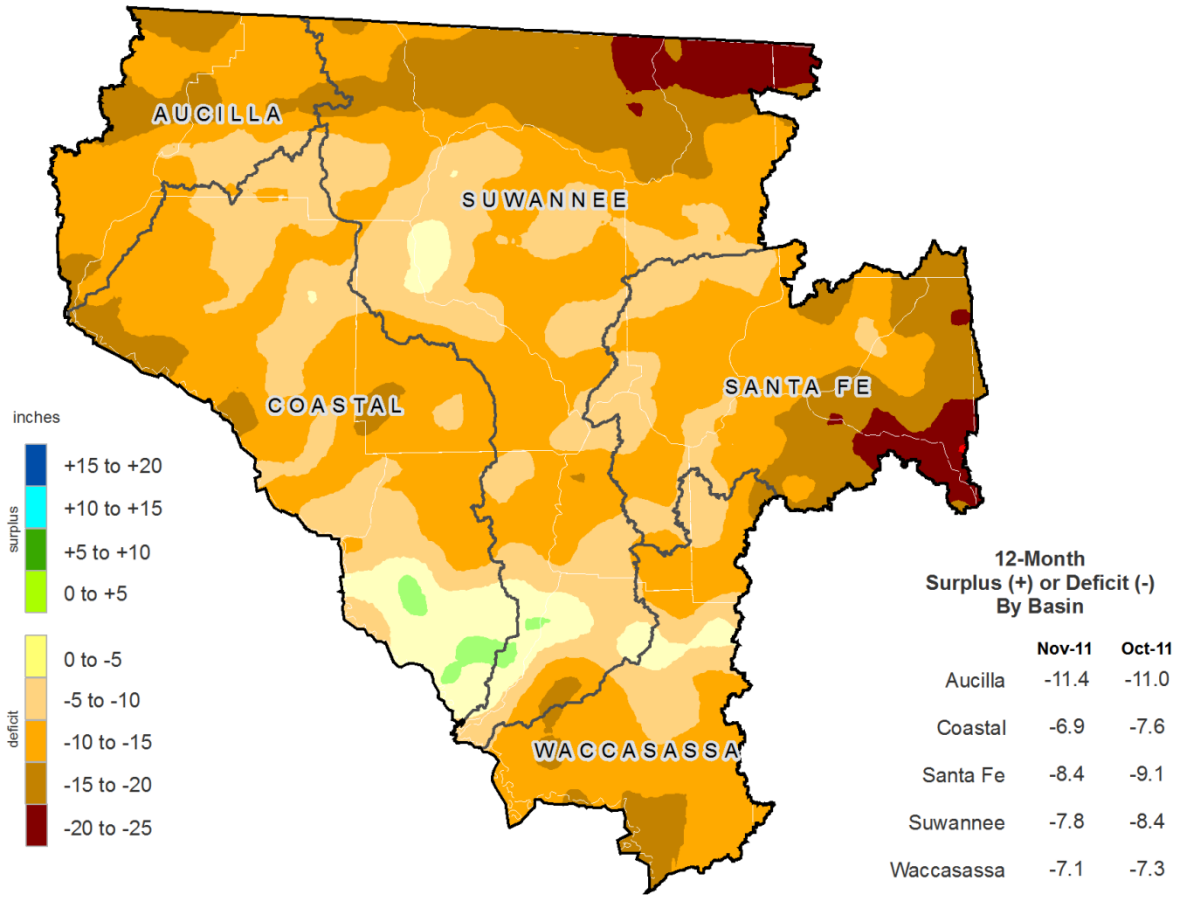


Figure 5: 12-Month Rolling Rainfall Deficit Since 1998
Difference between observed 12-month rainfall and the long-term average over the same period

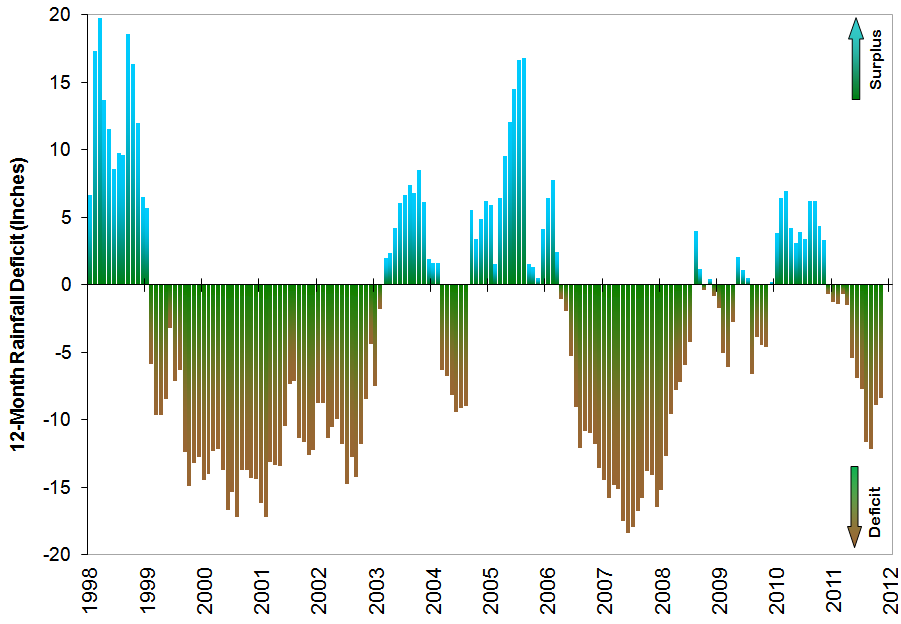
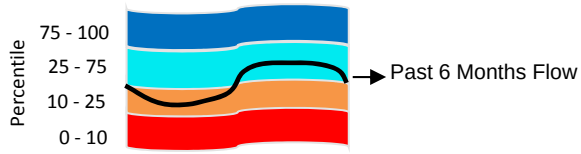
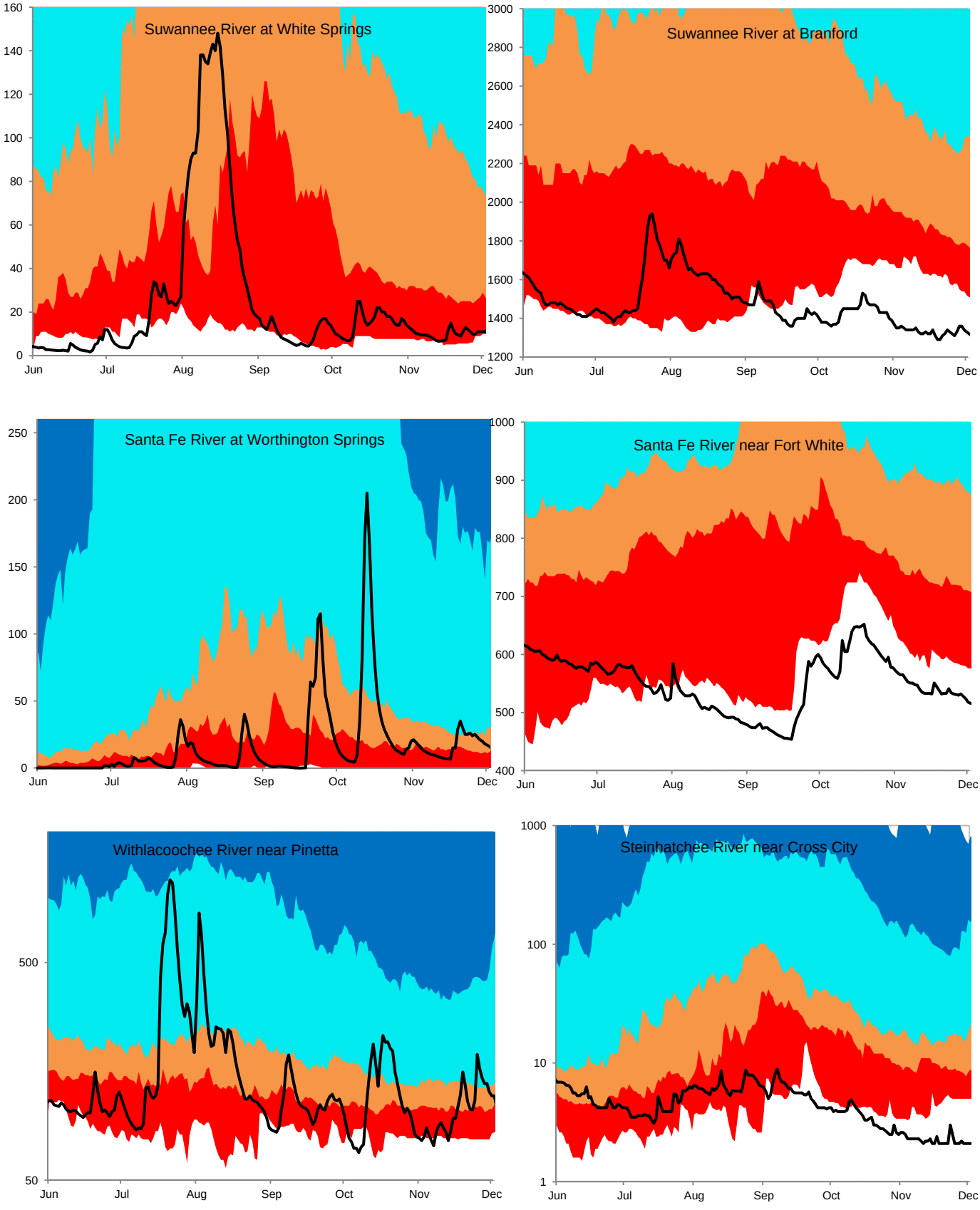


Figure 6: Daily River Flow Statistics

June 1, 2011 through November 30, 2011





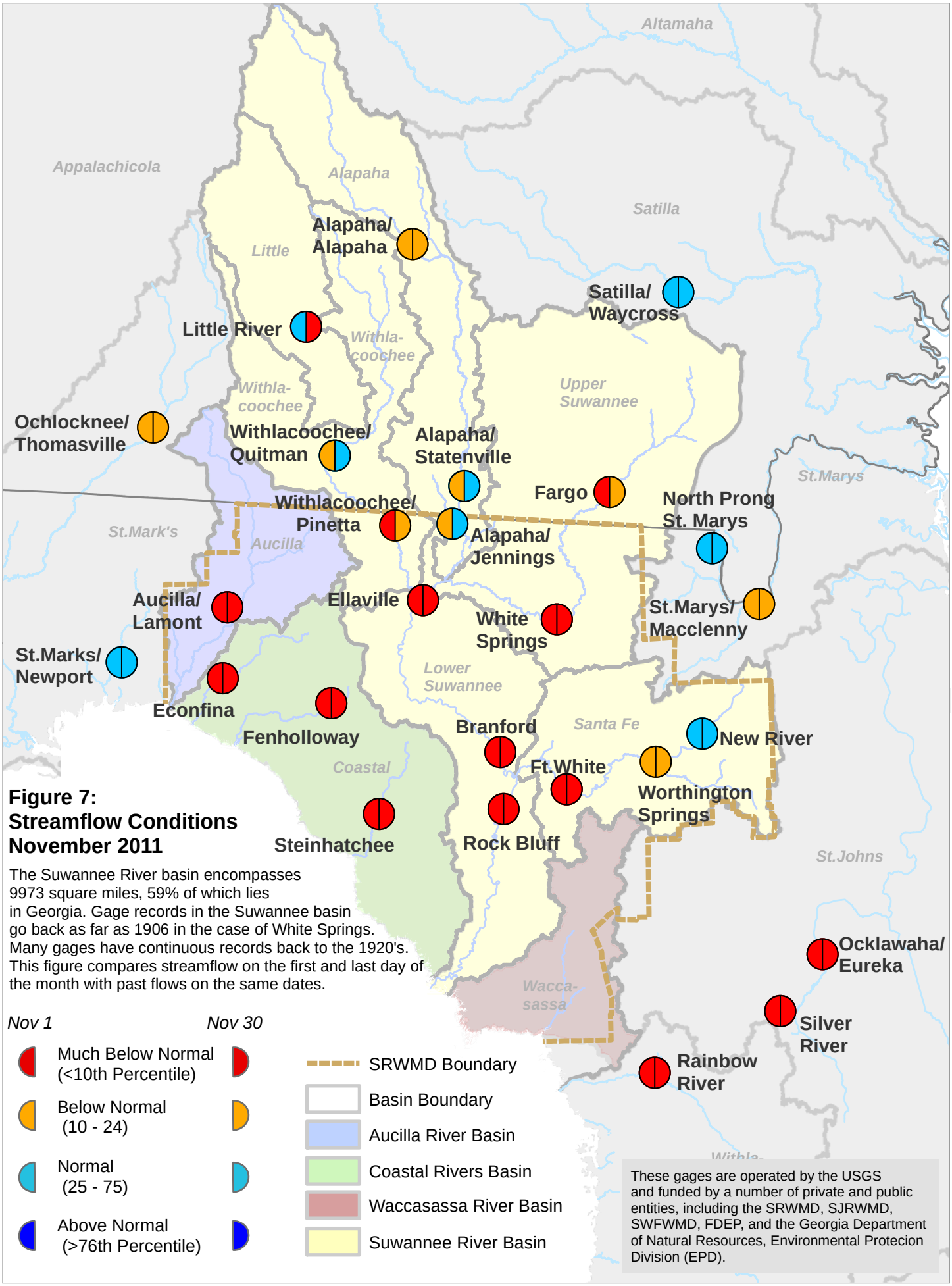
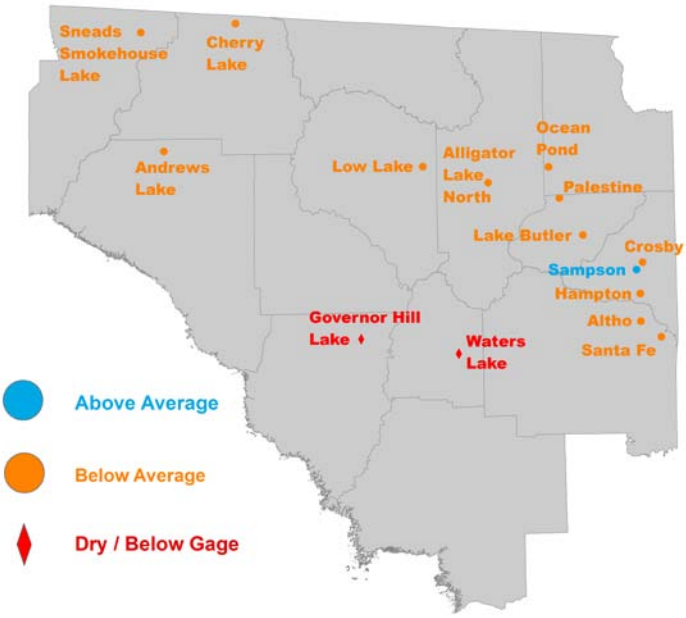
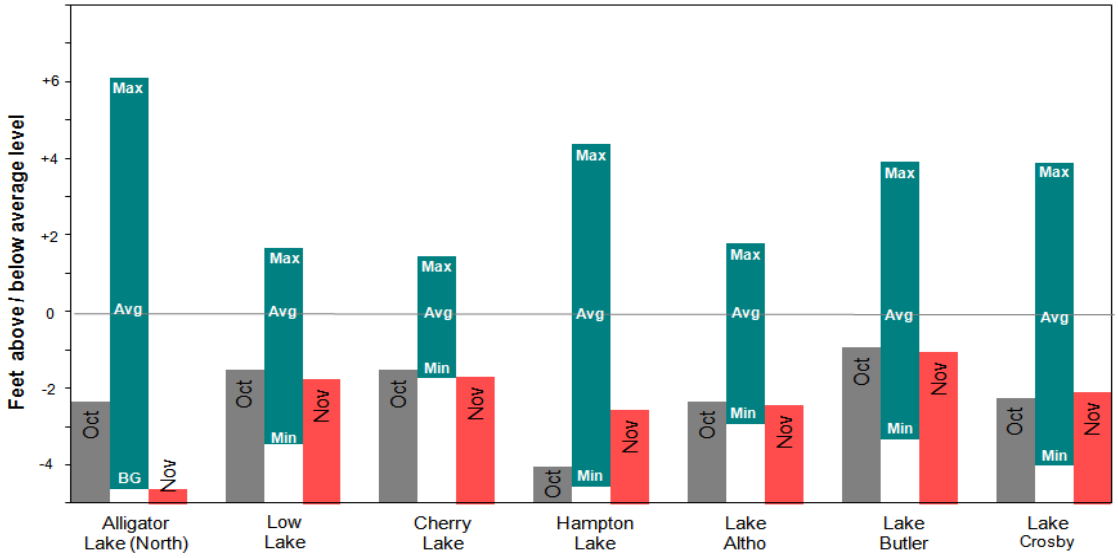

Altamaha
Appalachicola
Alapaha
Satilla
Little
Alapaha/
Alapaha
Satilla/
Waycross
Little River
Withla-
coochee
Withla-
coochee
Upper
Suwannee
Ochlocknee/
Thomasville
Withlacoochee/
Quitman
Alapaha/
Statenville
St.Marys
Fargo
North Prong
St. Marys
Withlacoochee/
Pinetta
St.Mark's
Aucilla
Alapaha/
Jennings
Aucilla/
Lamont
Ellaville
White
Springs
St.Marys/
Macclenny
St.Marks/
Newport
Lower
Suwannee
Econfina
Fenholloway
Branford
Santa Fe
New River
Coastal
Ft.White
Worthington
Springs
Steinhatchee
Rock Bluff
St.Johns
Ocklawaha/
Eureka
Wacca-
sassa
Silver
River
Rainbow
River
Withla
Figure 7:
Streamflow Conditions
November 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.
Nov 1
Nov 30
Much Below Normal (<10th Percentile)
Below Normal (10 - 24)
Normal (25 - 75)
Above Normal (>76th Percentile)
SRWMD Boundary
Basin Boundary
Aucilla River Basin
Coastal Rivers Basin
Waccasassa River Basin
Suwannee River Basin
These gages are operated by the USGS and funded by a number of private and public entities, including the SRWMD, SJRWMD, SWFWMD, FDEP, and the Georgia Department of Natural Resources, Environmental Protecion Division (EPD).

Figure 8: November 2011 Lake Levels

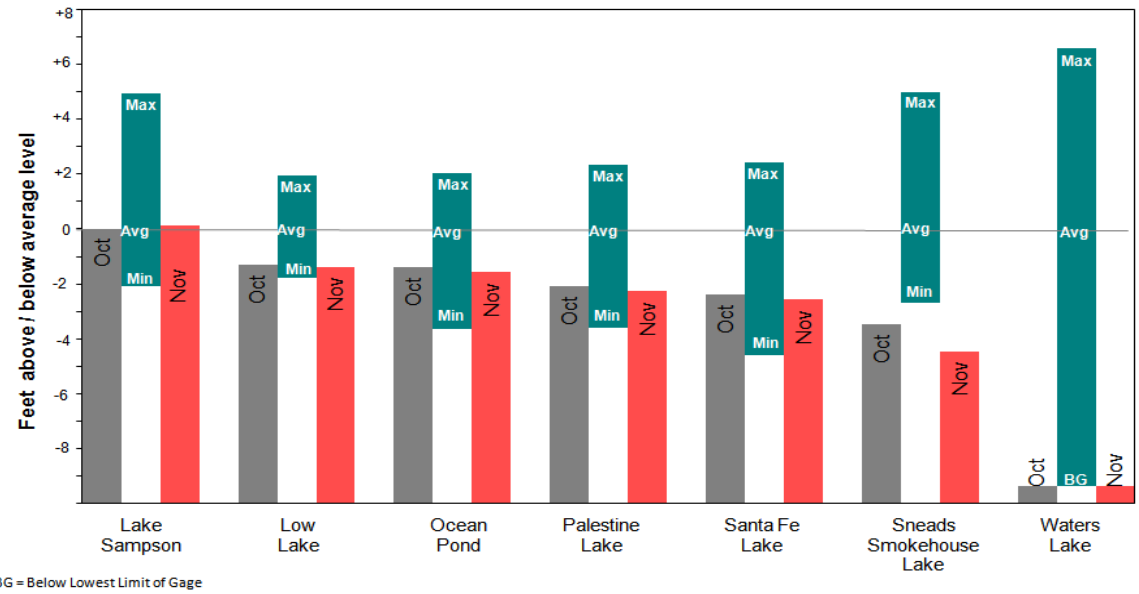


SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular ones in the eastern part of the District, are embedded in a surficial aquifer over relatively impermeable clay deposits. These lakes rise and fall according to local rainfall and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



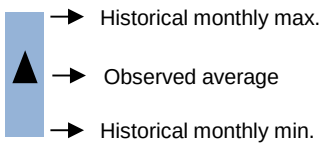
BG = Below Lowest Limit of Gage

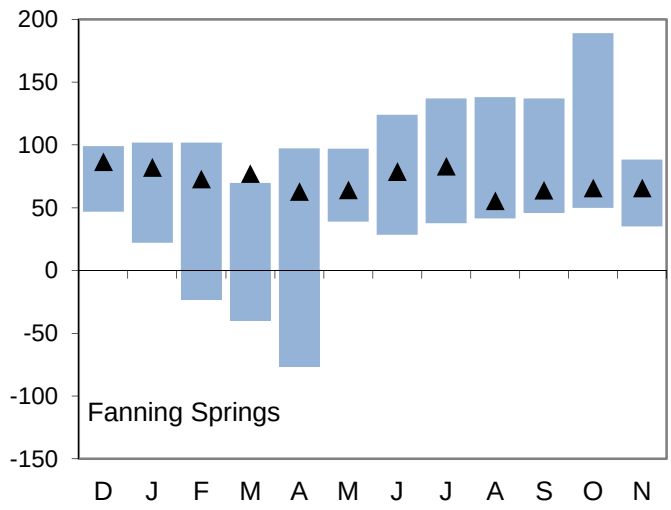


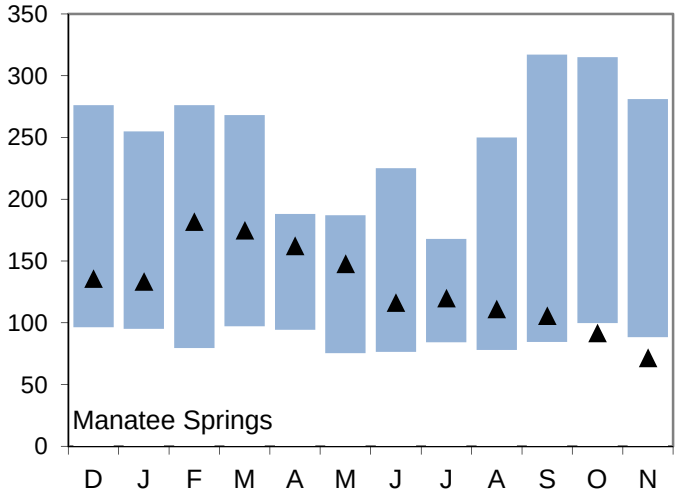
BG = Below Lowest Limit of Gage

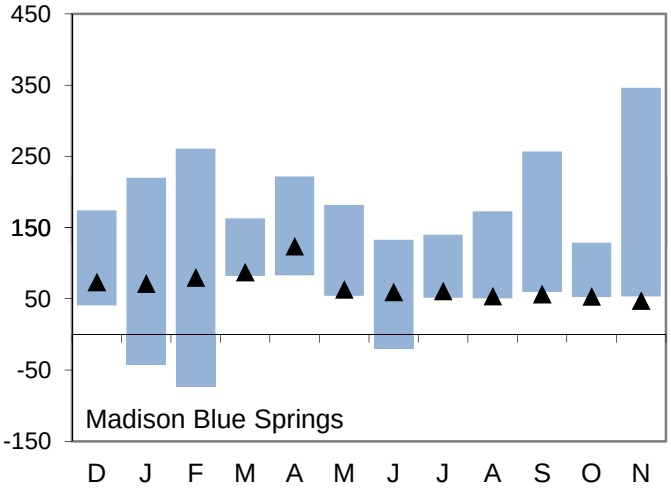
Figure 9: Monthly Springflow Statistics

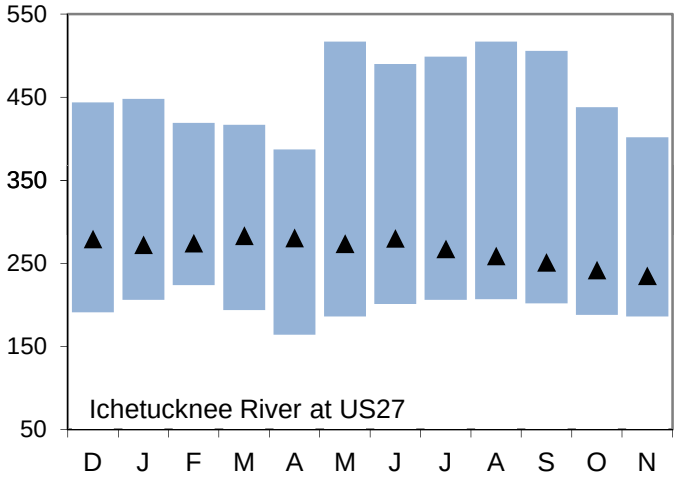
Flows December 1, 2010 through November 30, 2011
Springflow data are given in cubic feet per second.
Period of record beginning 2002. Data are provisional.

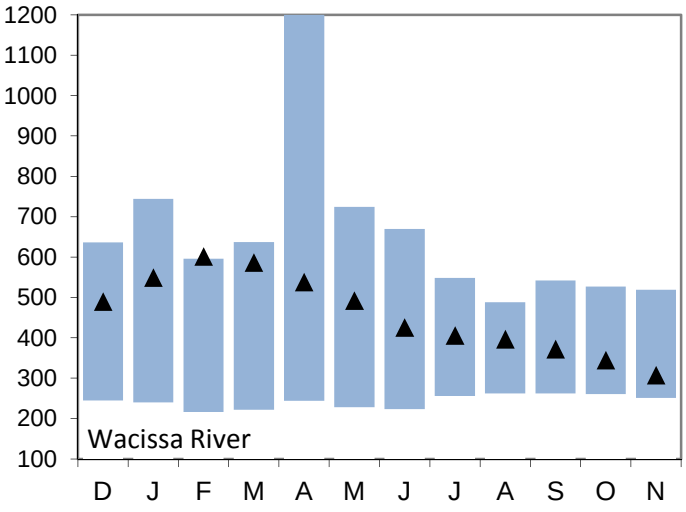












Note: Rising river levels caused by high tides or flooding can cause springflow to slow or reverse.

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.

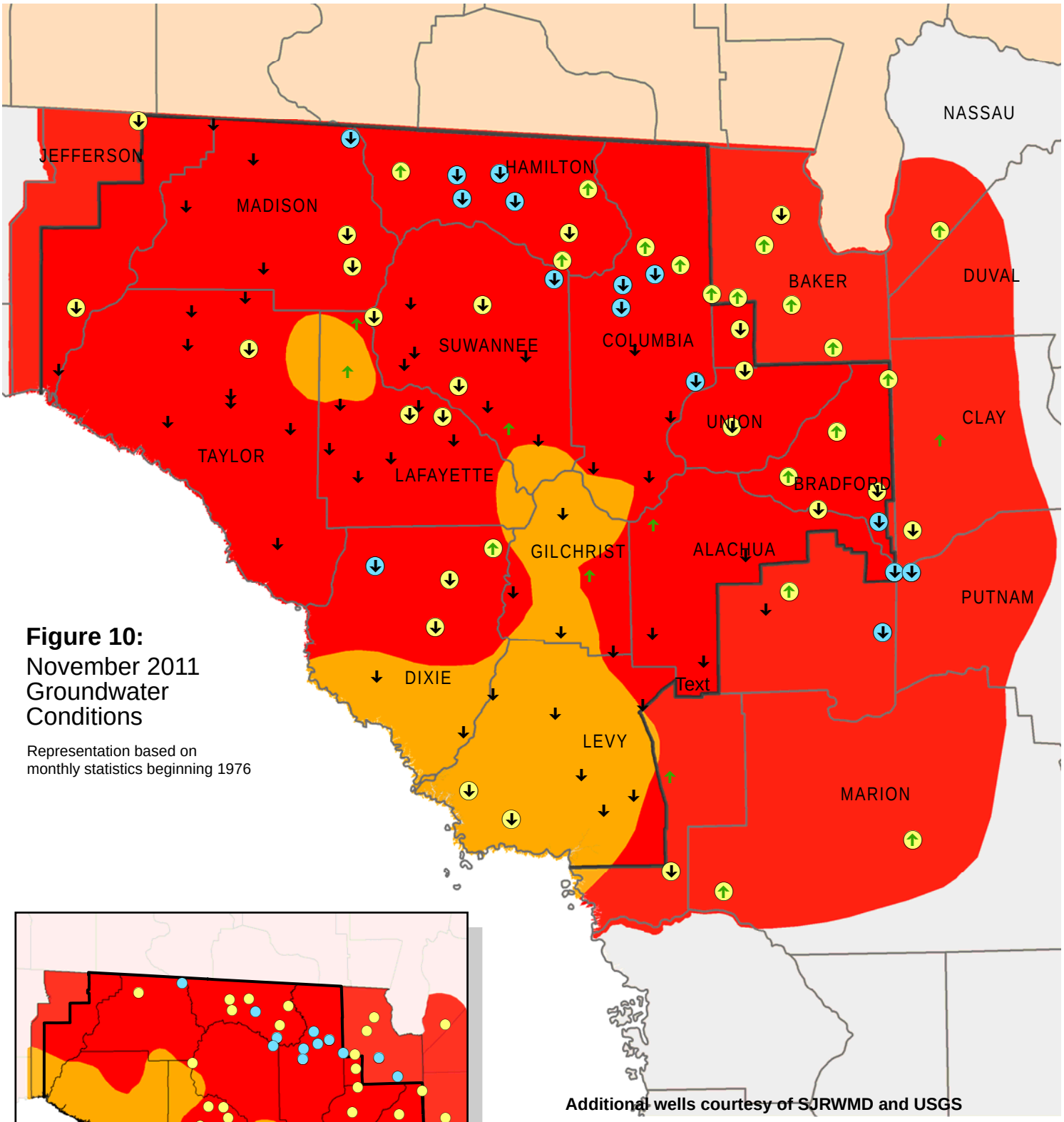
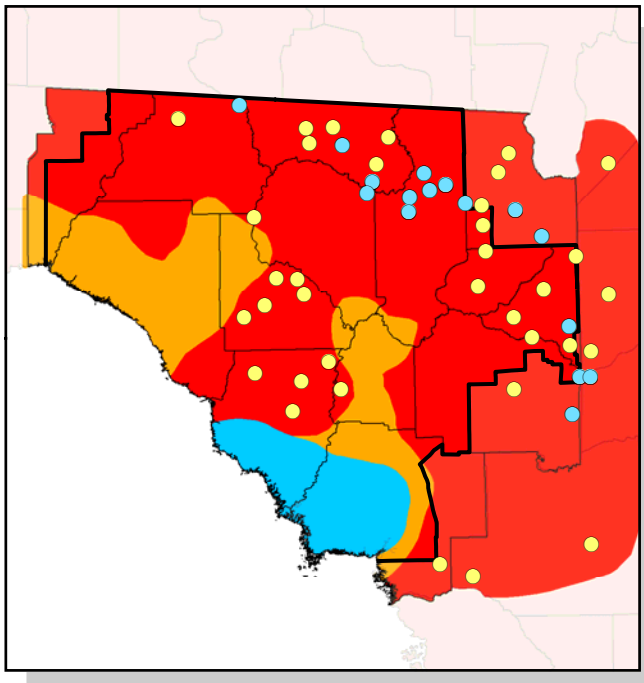


Figure 10:
November 2011
Groundwater
Conditions

Representation based on
monthly statistics beginning 1976



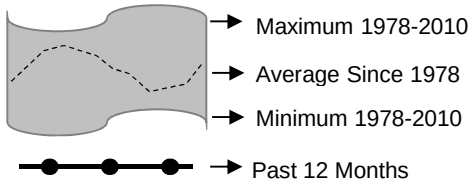
Inset: October 2011 Groundwater Levels

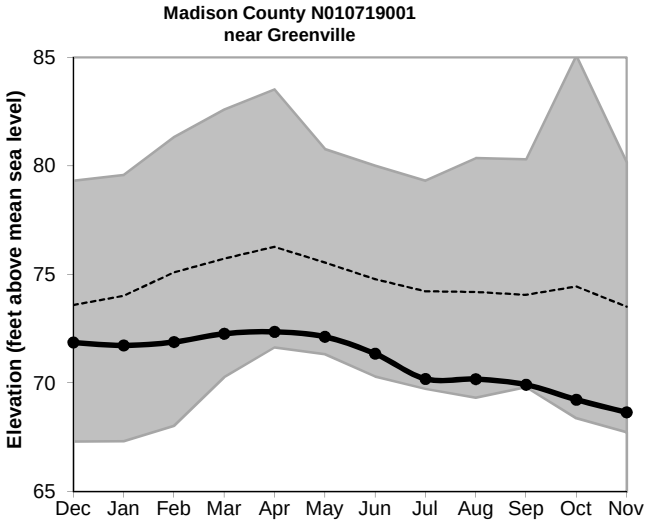
Additional wells courtesy of SJRWMD and USGS

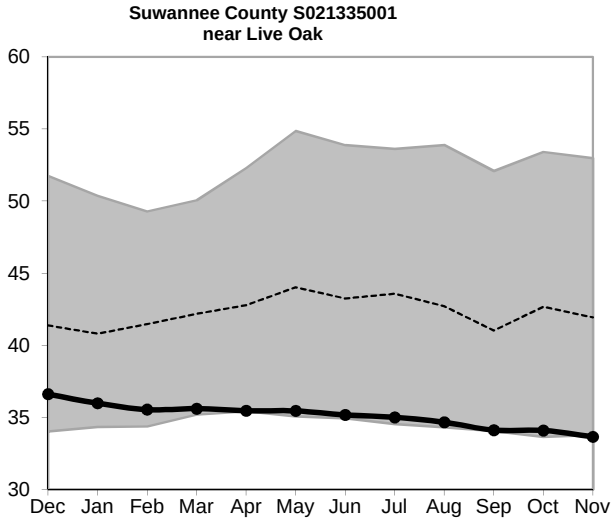
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Increase/decrease in level since last month
- District Boundary
- Record Low for Month
- Historic Low

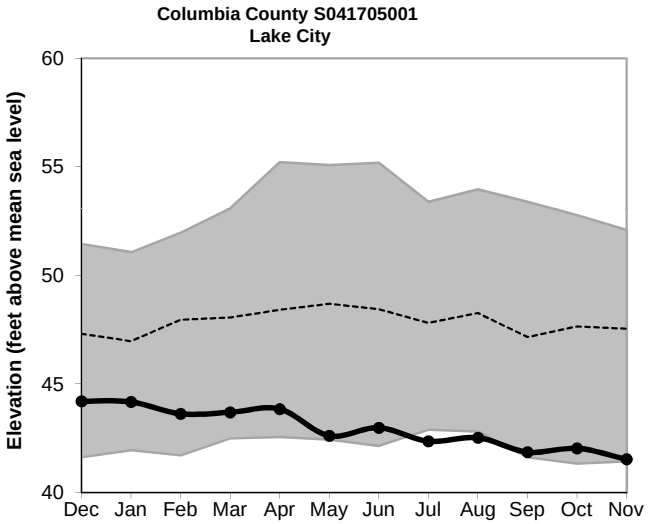
Figure 11: Monthly Groundwater Level Statistics

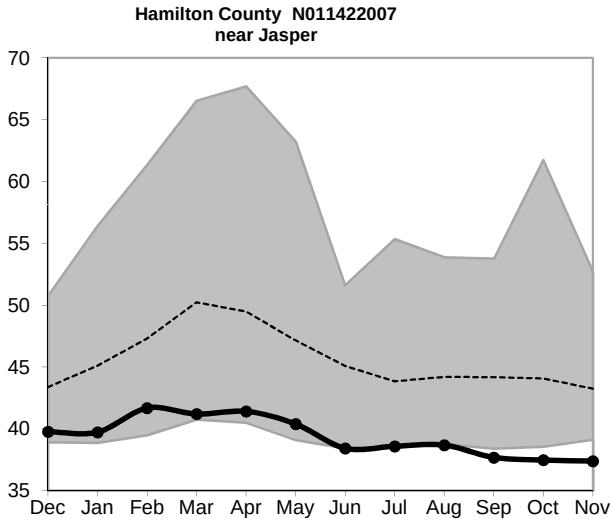
Levels December 1, 2010 through November 30, 2011
Period of Record Beginning 1978

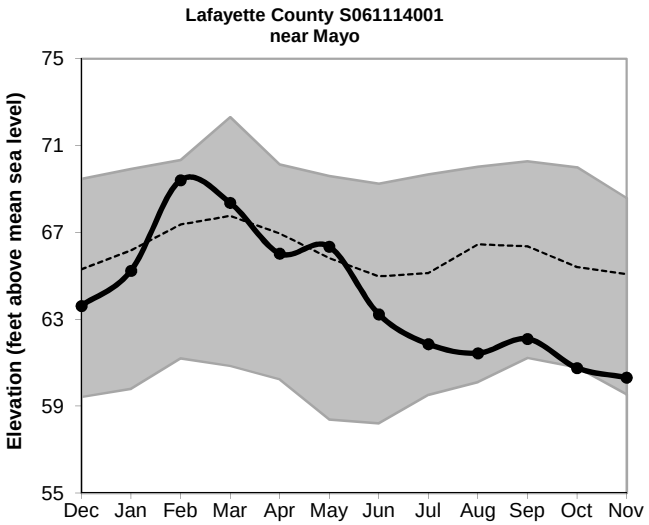












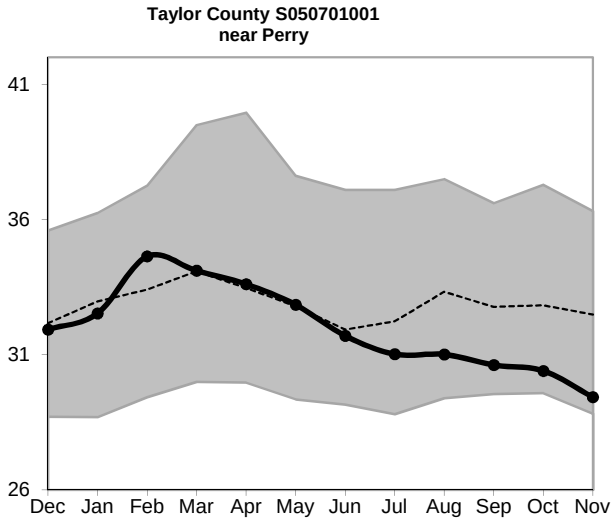
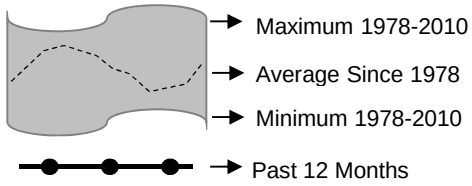
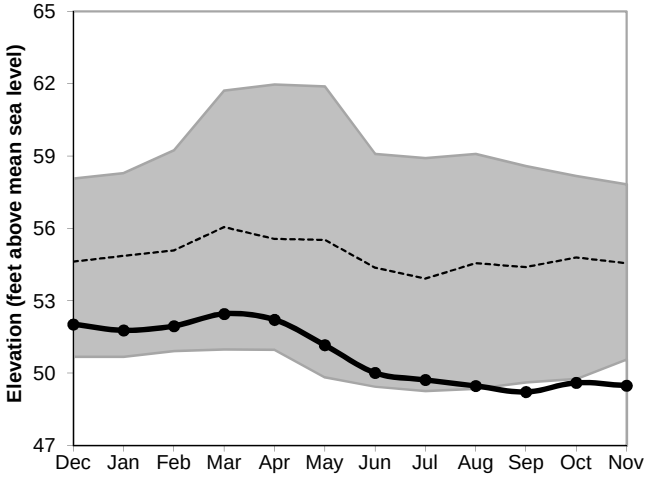


Figure 11, cont.: Groundwater Level Statistics

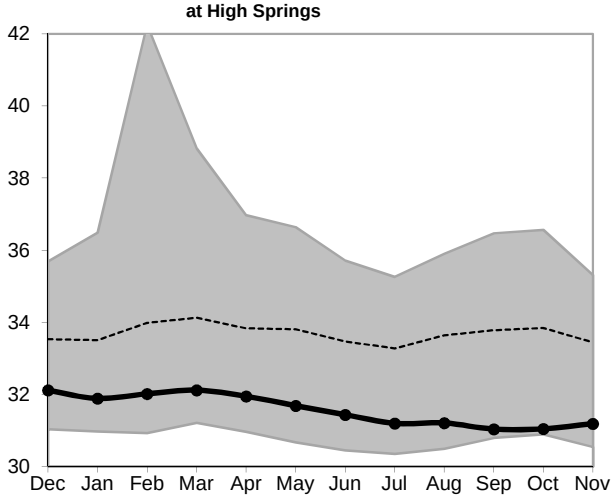
Levels December 1, 2010 through November 30, 2011
Period of Record Beginning 1978



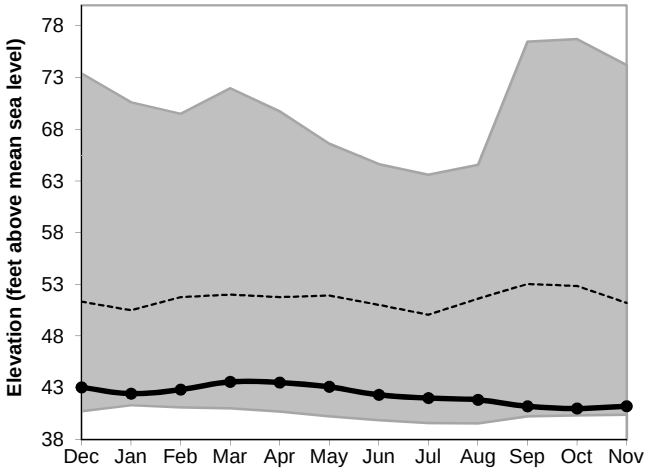
Union County S051933001
near Lake Butler



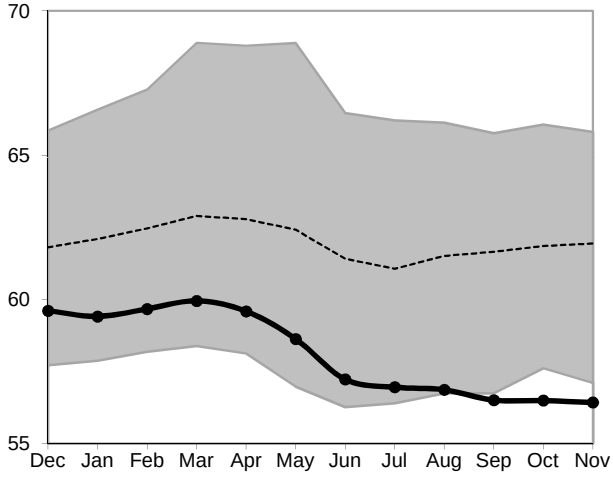
Alachua County S081703001
at High Springs



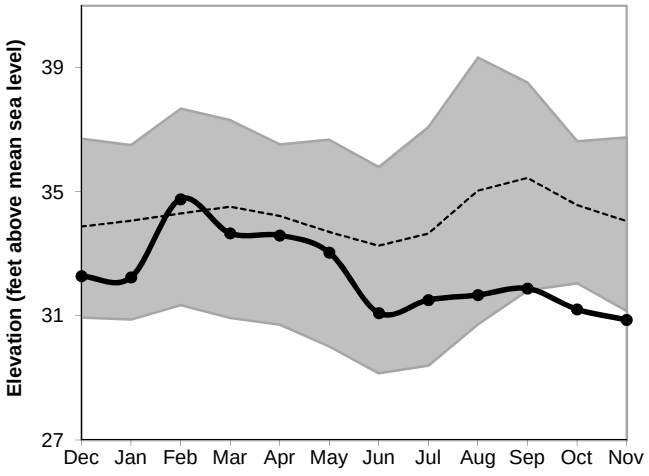
Gilchrist County S091607001
near Trenton



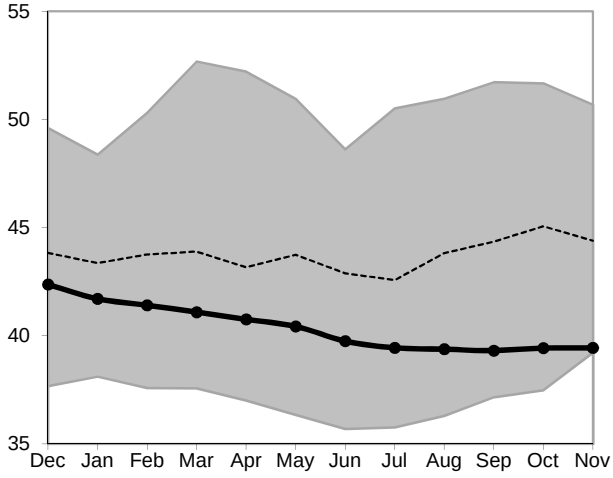
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



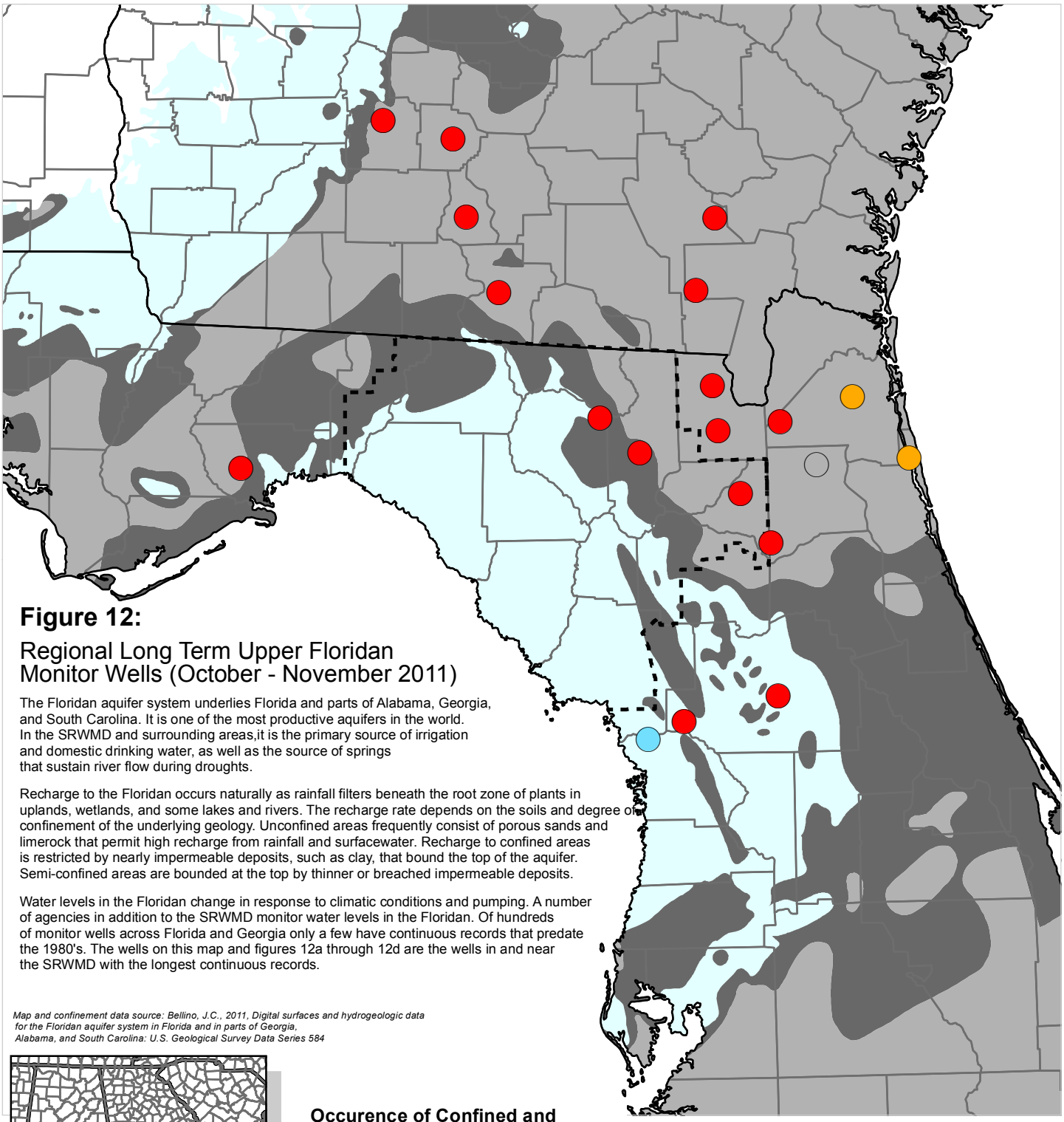


Figure 12:

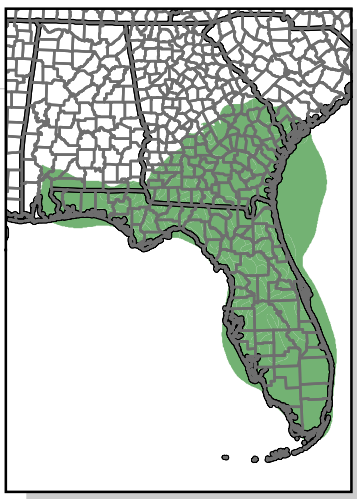
Regional Long Term Upper Floridan Monitor Wells (October - November 2011)

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

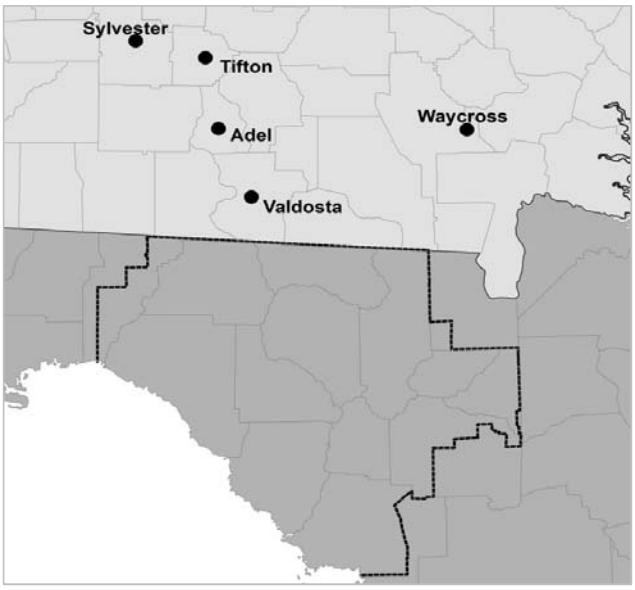
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally greater less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge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

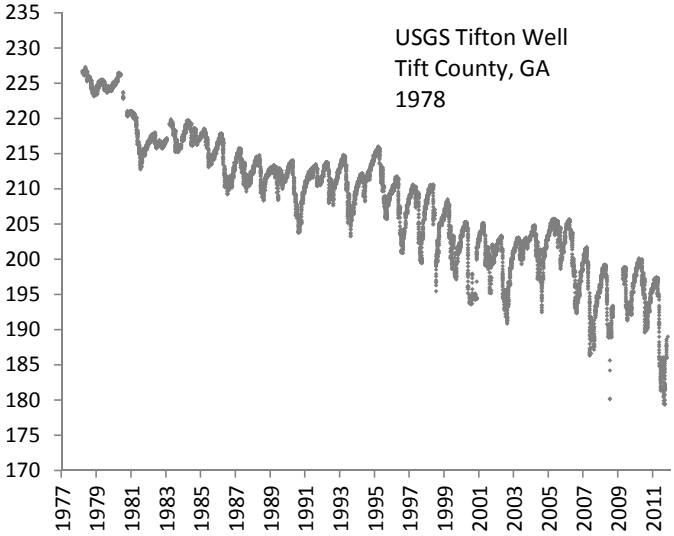
Percentile of Most Recent Water Level Relative to Entire Record

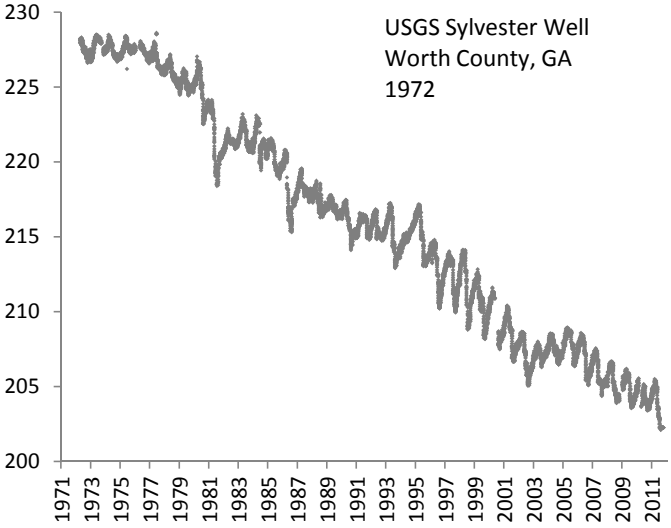
- High (Greater than 75th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Not Available
- SRWMD Boundary

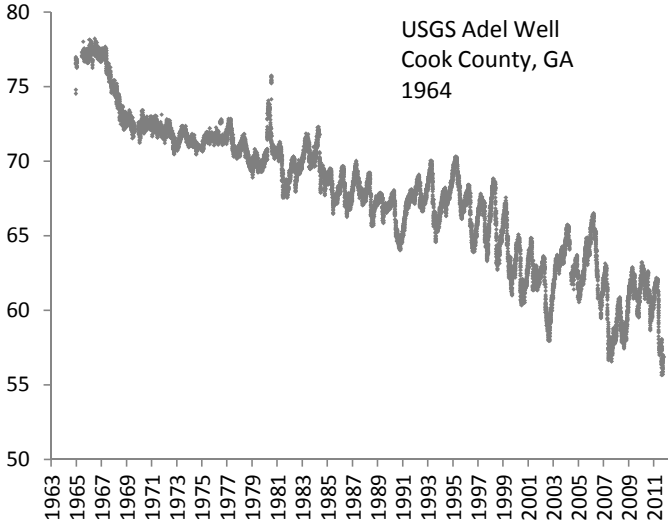
Figure 12a: Regional Long Term Upper Floridan Levels

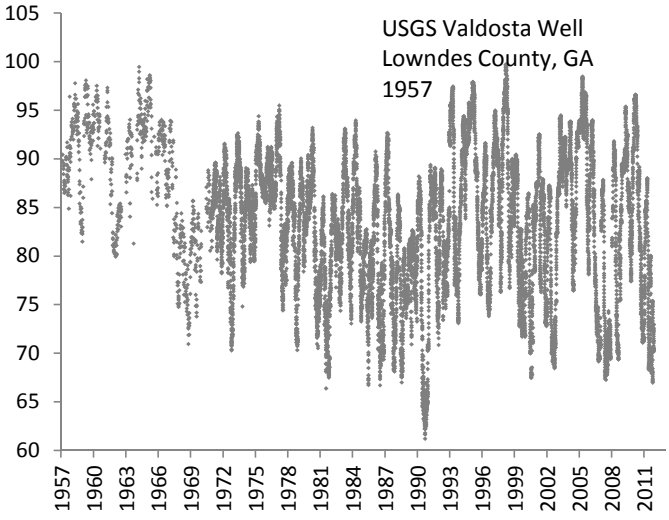
Ending October-November 2011
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS and Georgia EPD











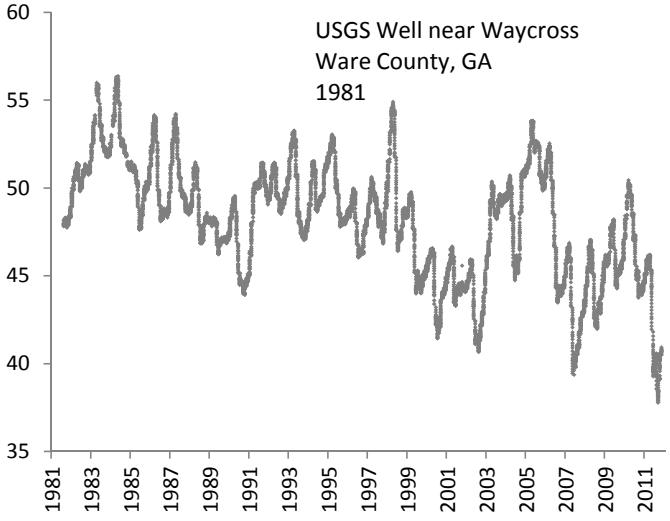
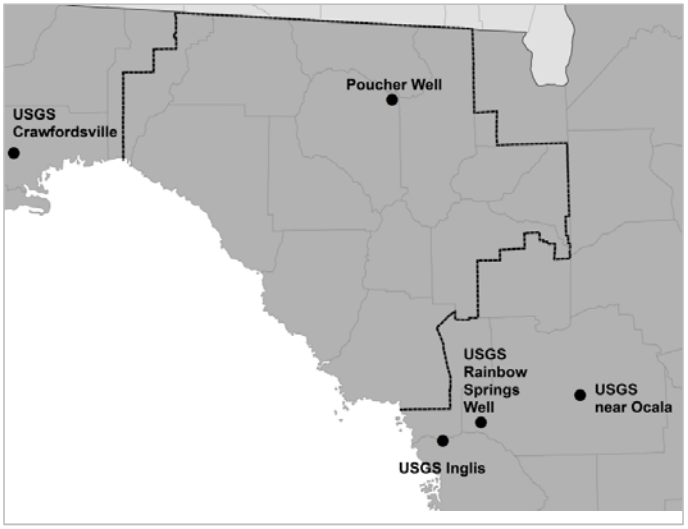


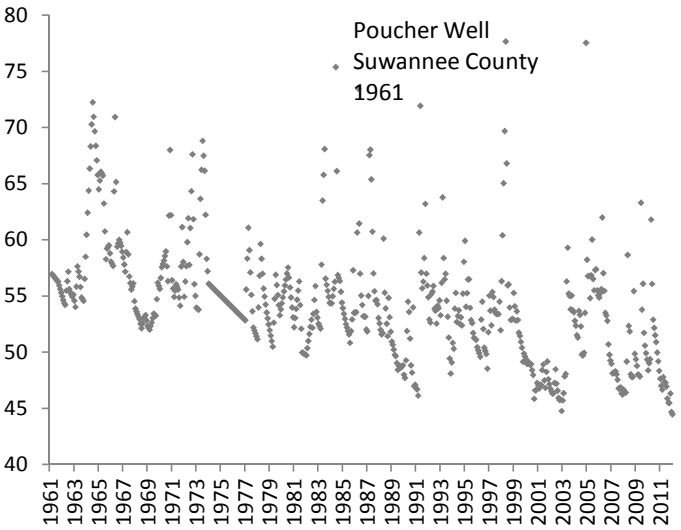
Figure 12b: Regional Long Term Upper Floridan Levels

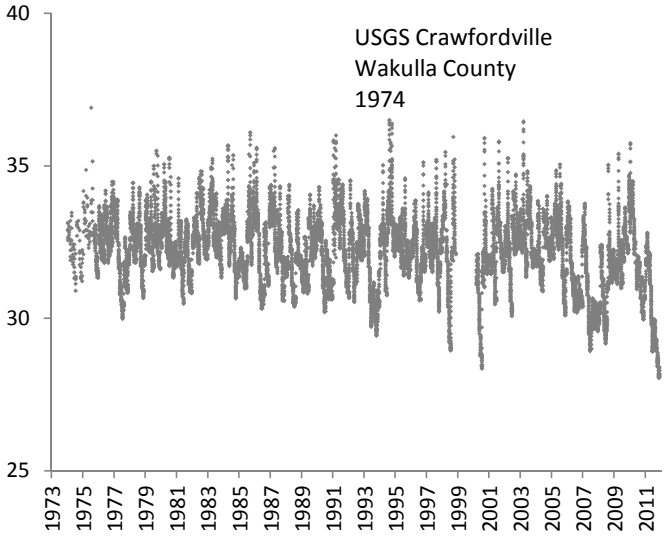
Ending October-November 2011

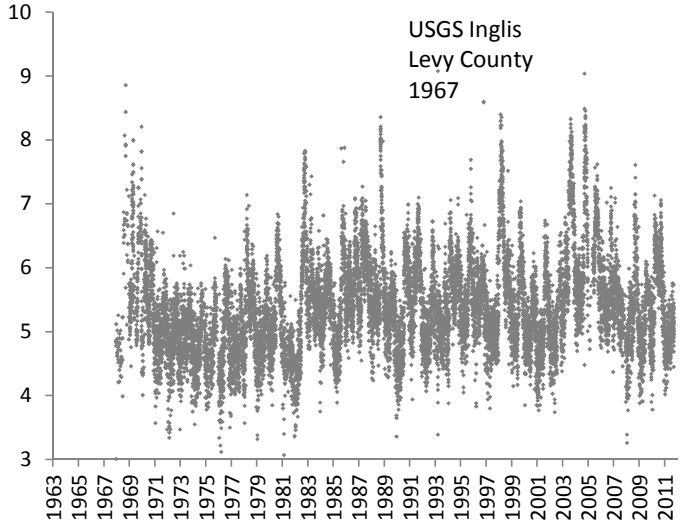
Upper Floridan Aquifer levels in feet above mean sea level

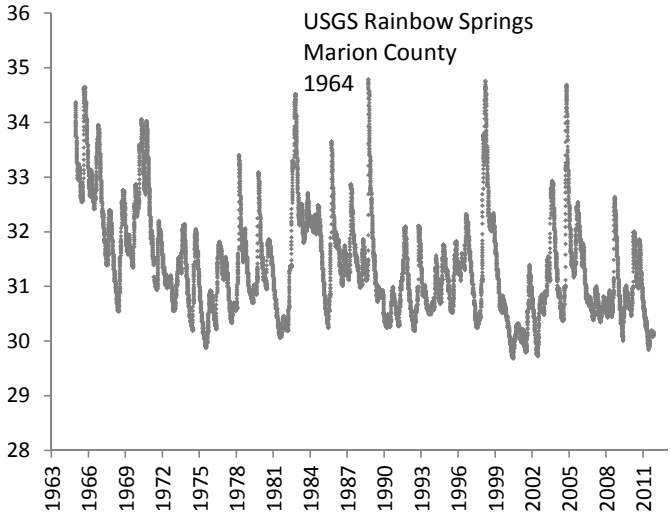
Courtesy of USGS, SWFWMD, and SJRWMD











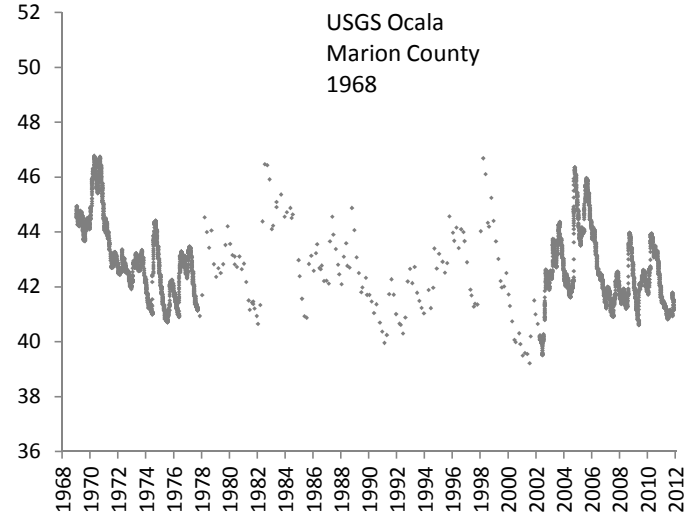
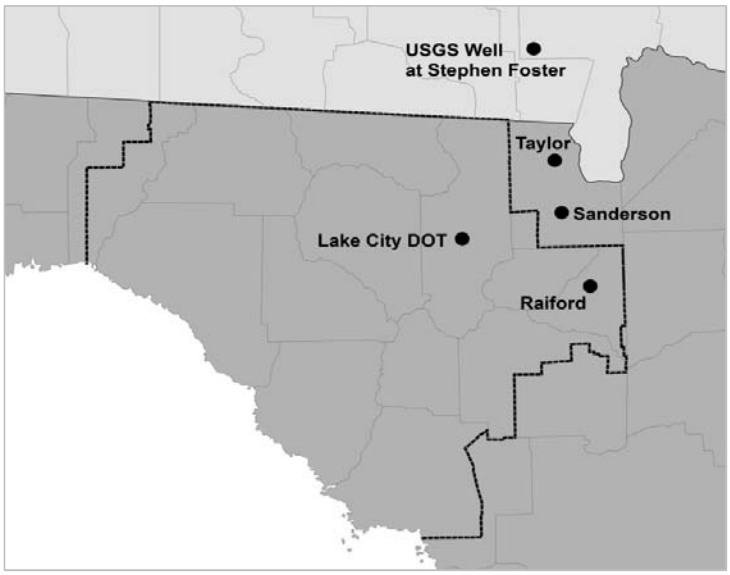
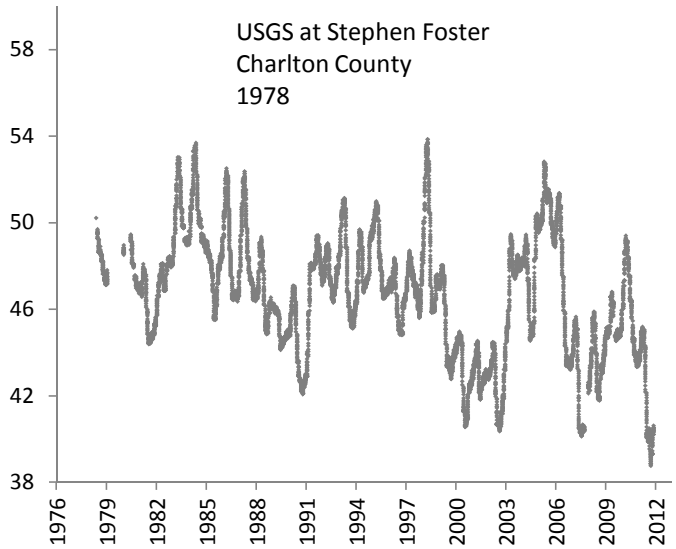
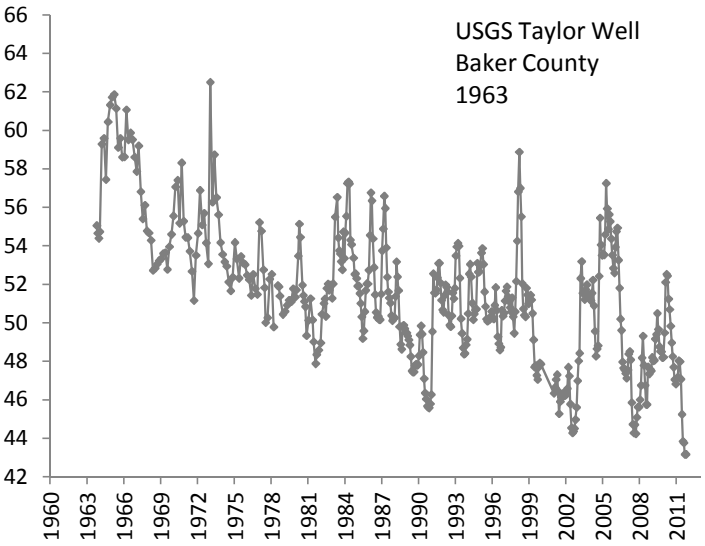


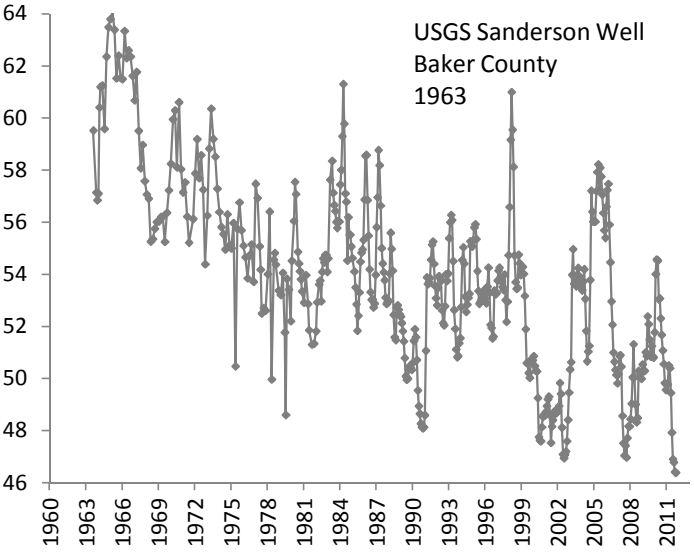
Figure 12c: Regional Long Term Upper Floridan Levels

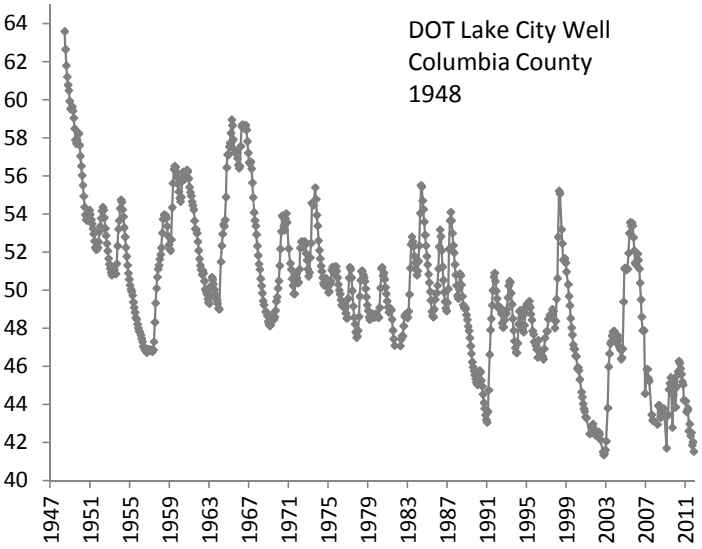
Ending October-November 2011
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of USGS and SJRWMD











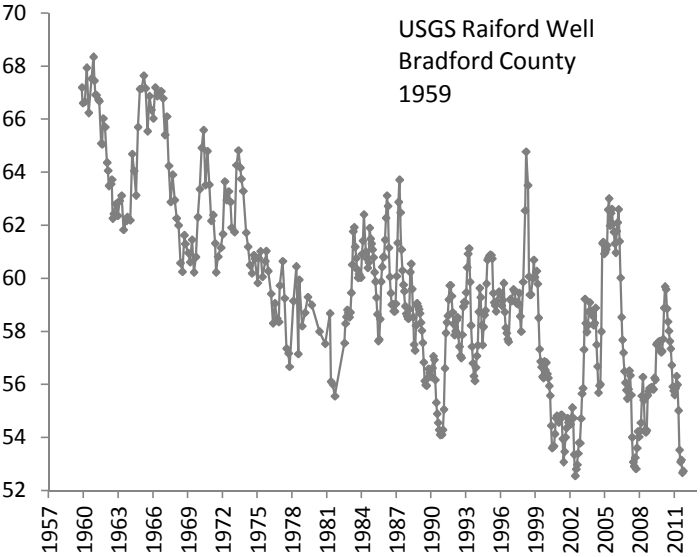
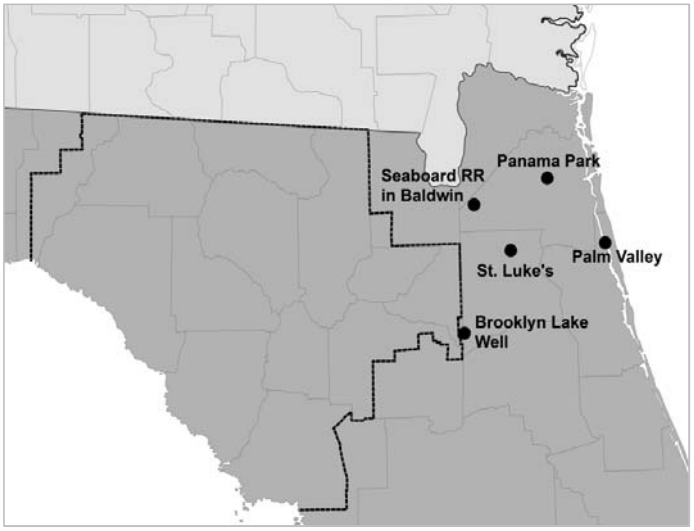
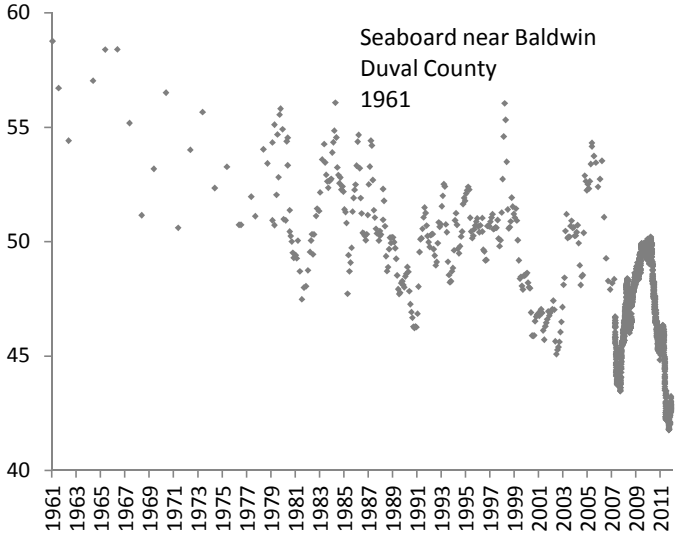
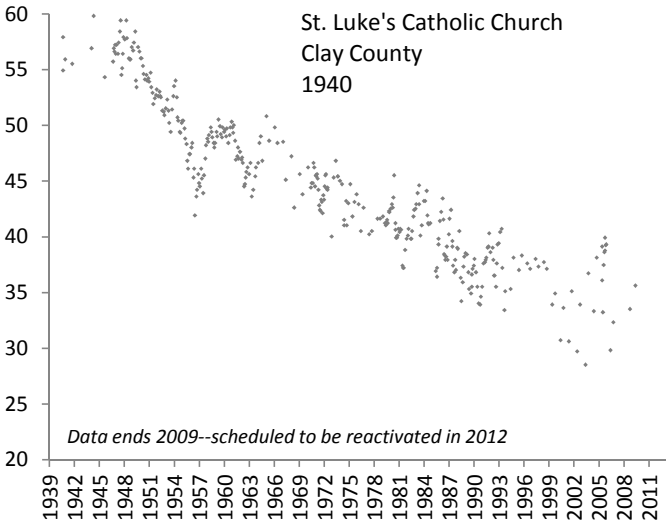


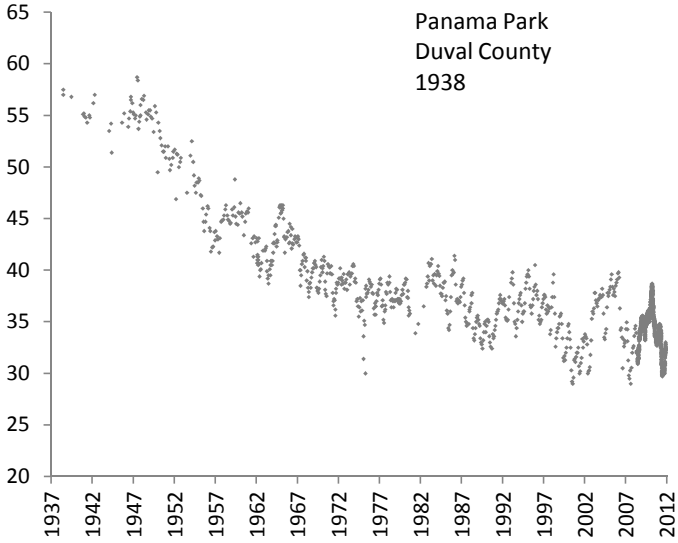
Figure 12d: Regional Long Term Upper Floridan Levels

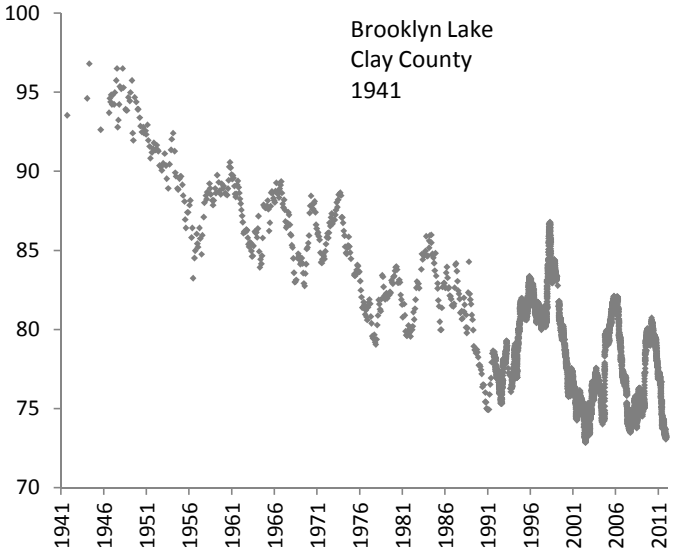
Ending October-November 2011
Upper Floridan Aquifer levels in feet above mean sea level
Courtesy of SJRWMD











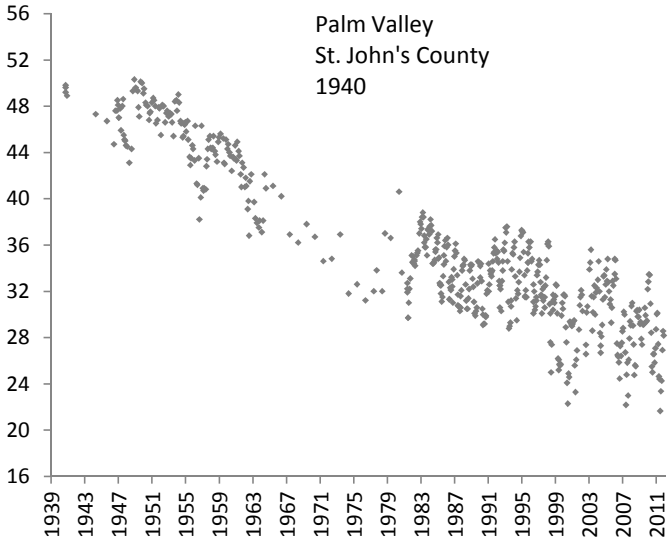


Figure 13: Agricultural Water Use

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.