MEMORANDUM

TO: Governing Board

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

THRU: Ann B. Shortelle, Ph.D., Executive Director
Erich Marzolf, Ph.D., Water Resources Division Director

DATE: January 3, 2013

RE: December 2012 Hydrologic Conditions Report for the District

RAINFALL

- Rainfall accumulations improved significantly in parts of the District after an exceptionally dry November. Average rainfall was 2.87”, which is 92% of the long-term December average of 3.13”. Bradford, Alachua, and Levy counties had the highest monthly totals, with part of Alachua County receiving almost double normal rainfall (Table 1, Figure 1). Localized areas in these counties received over 6” (Figure 2). Gilchrist County was near normal. Other counties had below-normal rainfall, including Madison with 59% of normal. The lowest gaged monthly total was 1.72” at Alligator Lake in Lake City, and the highest was 5.82” at Santa Fe Lake, which also had the highest 24-hour total of 3.60”. The upper Withlacoochee and Alapaha basins in Georgia had above-normal rainfall (Figure 3).
- Average rainfall for the 12 months ending December 31 was 4.66” higher than the long-term average of 54.61''. This surplus is the result of a wide range of accumulation, with areas in the central part of the District seeing 30”-40” more than the northern and southern areas in the last year (Figure 4). Figure 5 shows the history of rainfall deficits beginning in 1998. The last three months’ precipitation was 60% of the long-term average, based on records beginning in 1932.

SURFACEWATER

- **Rivers:** Gages on the upper reaches of the Withlacoochee, Alapaha, and Suwannee Rivers fell to their lowest levels since June before starting to climb mid-month. Stages on the mid- and lower-Suwannee fell slowly, then stabilized or rose by the end of the month. After falling to below-normal conditions in early December, upper Santa Fe gages began to improve, ending the month with flows typical of this time of year. The Econfina, Fenholloway, and Steinhatchee rivers also ended the month with normal flows. Statistics for a number of rivers are presented graphically in Figure 6 and conditions relative to historic conditions for the time of year in Figure 7.
- **Lakes**: Levels at most monitored lakes remained stable with an average rise of only an inch. Santa Fe Lake rose nearly 5”. Eight of 14 lakes were lower than average. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for 14 lakes.

SPRINGS

Flows at monitored springs generally fell in December. The Ichetucknee River remained near its median flow, based on records beginning in 1917. Wacissa River flows were the lowest in 4 years. Statistics for a representative sample of springs are shown in Figures 9a and 9b.

GROUNDWATER

Upper Floridan aquifer response was varied across the District, but typically levels remained stable or fell slightly. In the upper Santa Fe Basin where the aquifer is confined, levels fluctuated by only a few hundredths of a foot. Levels district-wide remained near the 40th percentile (based on records beginning no earlier than 1978). Seventy-one percent of monitored levels were below median, with 11% lower than the 25th percentile. Statistics for a representative sample of wells are shown in Figure 11. Statistics for a number of regional long-term wells are shown in Figure 12 along with a description of aquifer characteristics.

HYDROLOGICAL/METEOROLOGICAL/WATER USE INFORMATION

- The Palmer Drought Severity Index (PDSI), a climatological tool produced by the National Climatic Data Center, evaluates the severity and frequency of abnormally dry or wet weather using precipitation, temperature, and soil moisture data. The PDSI value for the week ending December 29 indicated normal conditions in north Florida and south central Georgia.
- The National Weather Service Climate Prediction Center (CPC) three-month outlook showed equal chances of above-normal, below-normal, or normal precipitation through March.
- Figure 13 shows overhead irrigation application at a number of farms in the District during November. The average daily application rate was 0.02”, typical of December rates since 2008.

CONSERVATION

A Phase I Water Shortage Advisory remains in effect. Users are urged to eliminate unnecessary uses. Landscape irrigation is limited to once 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 (105 wells), surfacewater (35 stations), agricultural water use (up to 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 2012	December Average	Month % of Normal	Last 12 Months	Annual % of Normal
Alachua	5.05	2.77	182%	59.32	116%
Baker	1.90	2.77	69%	58.96	118%
Bradford	4.36	2.95	148%	59.49	117%
Columbia	2.05	3.08	67%	63.20	123%
Dixie	2.71	3.17	86%	57.03	97%
Gilchrist	3.37	3.07	110%	57.76	101%
Hamilton	2.31	2.98	77%	54.16	104%
Jefferson	2.49	4.25	59%	50.15	83%
Lafayette	1.96	3.33	59%	70.18	124%
Levy	4.15	3.18	130%	56.26	94%
Madison	2.50	3.79	66%	55.64	99%
Suwannee	2.04	2.79	73%	69.02	130%
Taylor	2.11	3.39	62%	60.48	102%
Union	2.39	2.86	83%	56.95	105%

December 2012 Average:	2.87
December Average (1932-2012):	3.13
Historical 12-month Average (1932-2012):	54.61
Past 12-Month Total:	59.27
12-Month Rainfall Surplus:	4.66

Figure 1: Comparison of District Monthly Rainfall

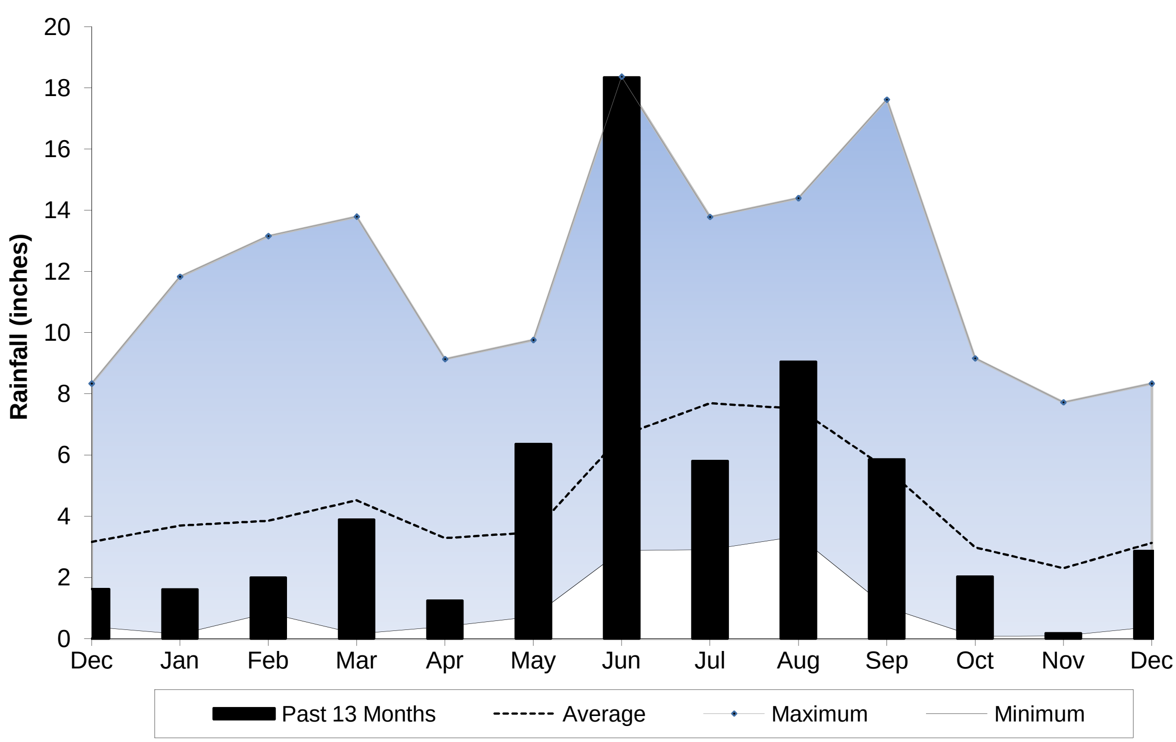


Figure 2: December 2012 Rainfall Estimate

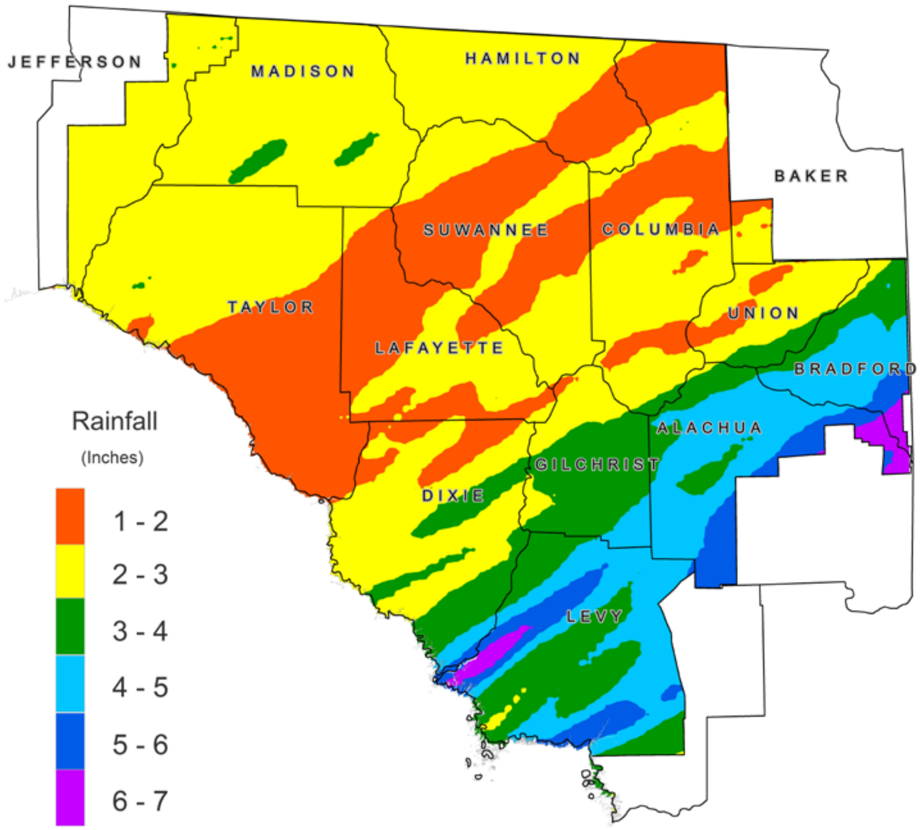


Figure 3: December 2012 Percent of Normal Rainfall

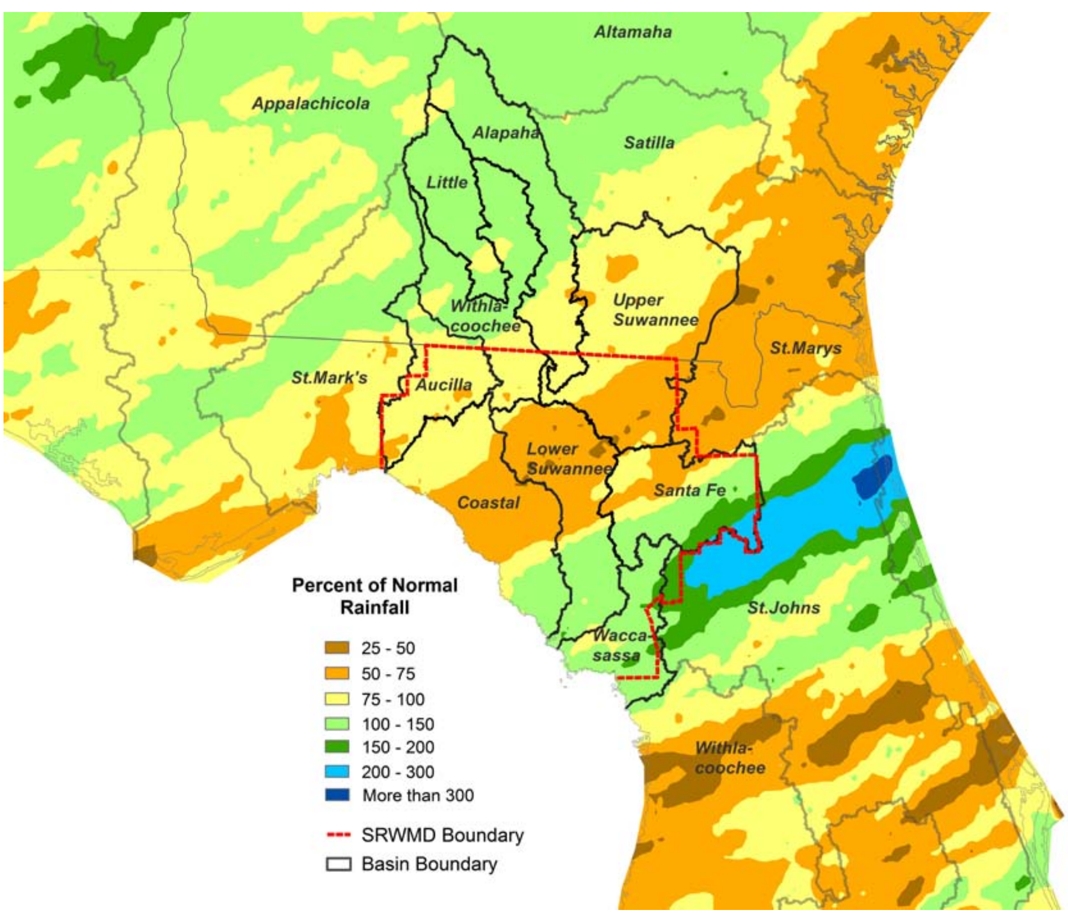
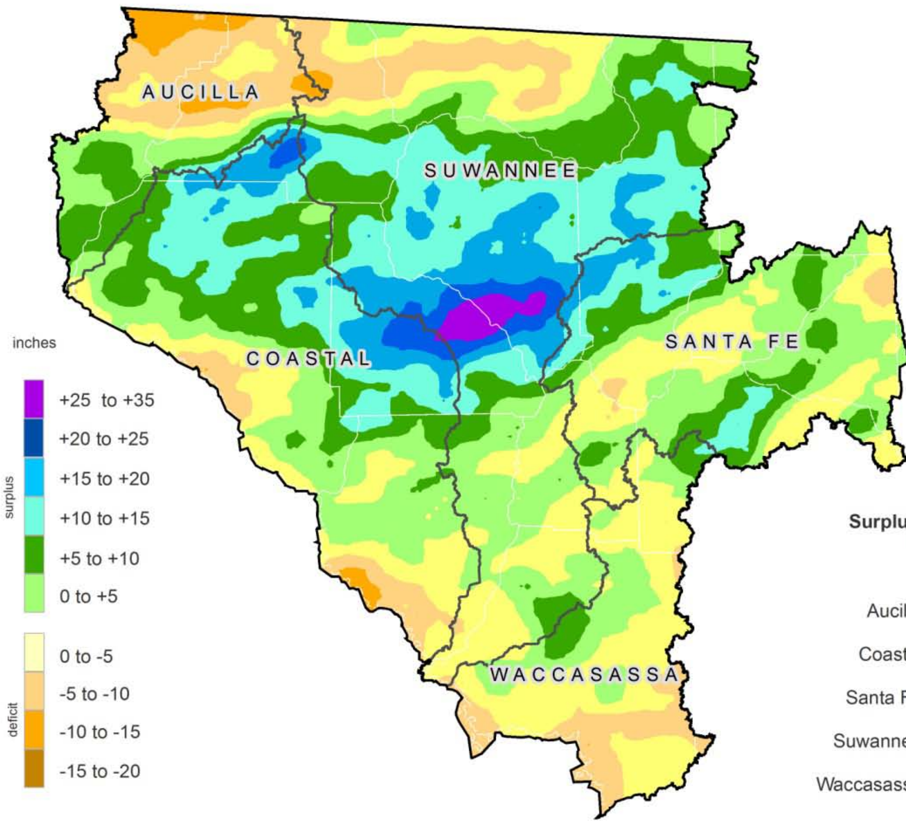


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin Through December 31, 2012



12-Month Surplus (+) or Deficit (-) By Basin

	Dec -12	Nov -12
Aucilla	-2.4	-2.0
Coastal	+6.5	+5.8
Santa Fe	+5.3	+3.3
Suwannee	+7.6	+6.9
Waccasassa	+2.2	-1.4

Figure 5: 12-Month Rolling Rainfall Deficit Since 1998

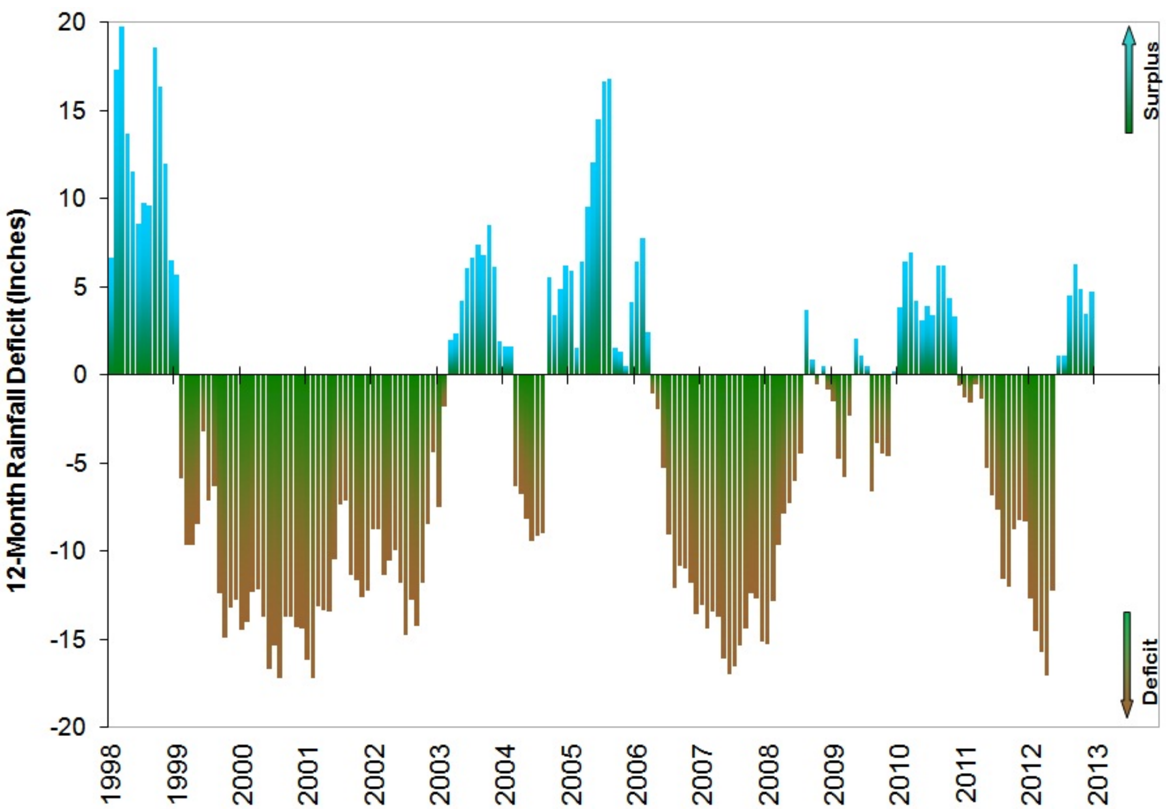
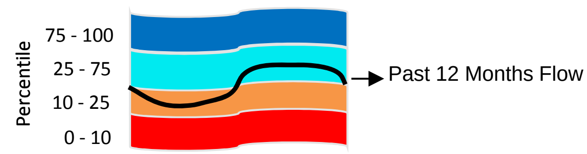


Figure 6: Daily River Flow Statistics

January 1, 2012 through December 31, 2012



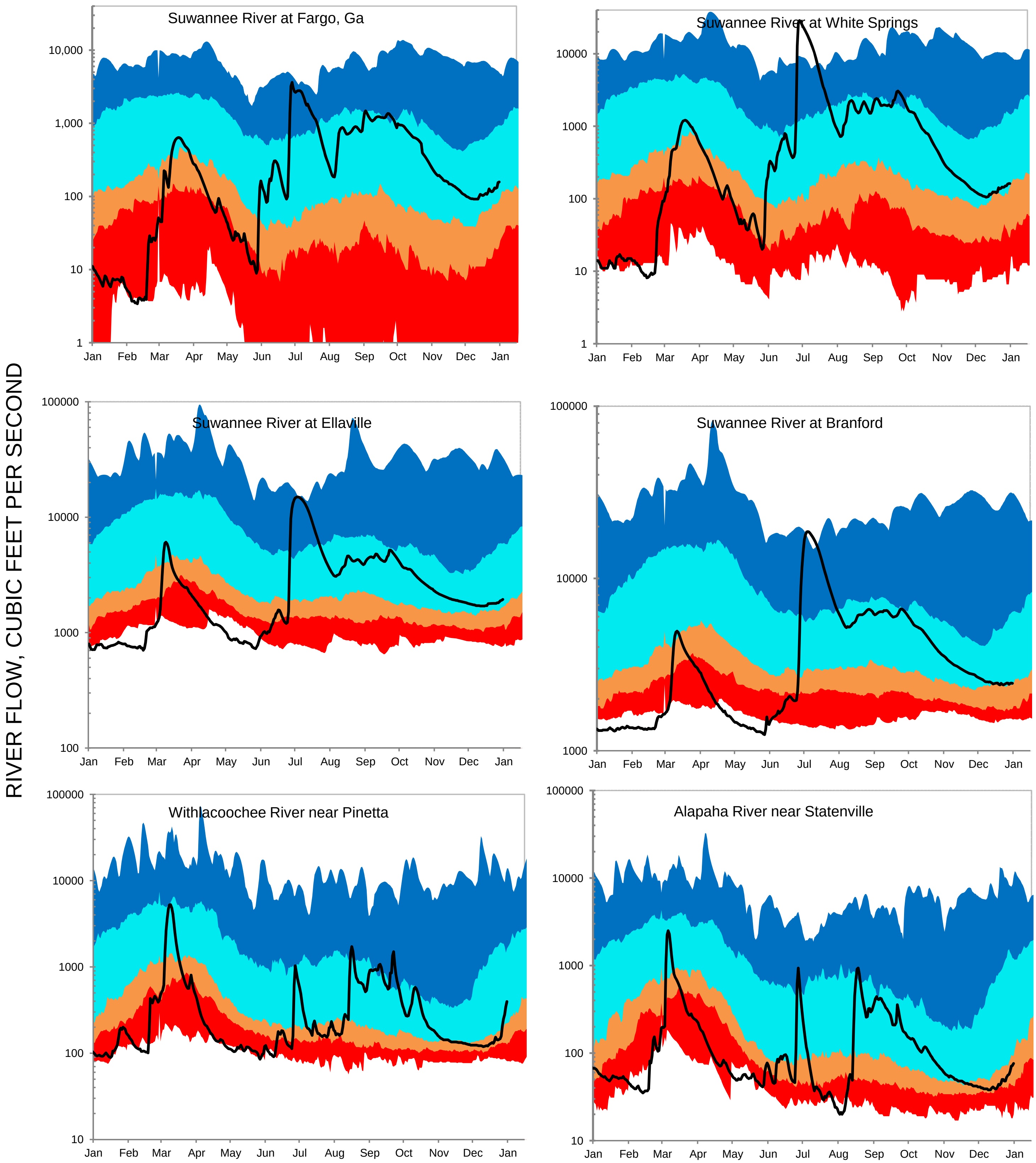
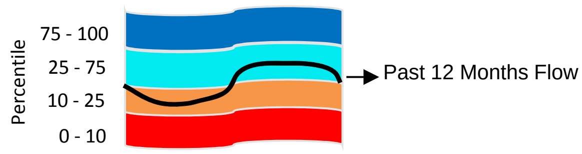


Figure 6, cont: Daily River Flow Statistics

January 1, 2012 through December 31, 2012



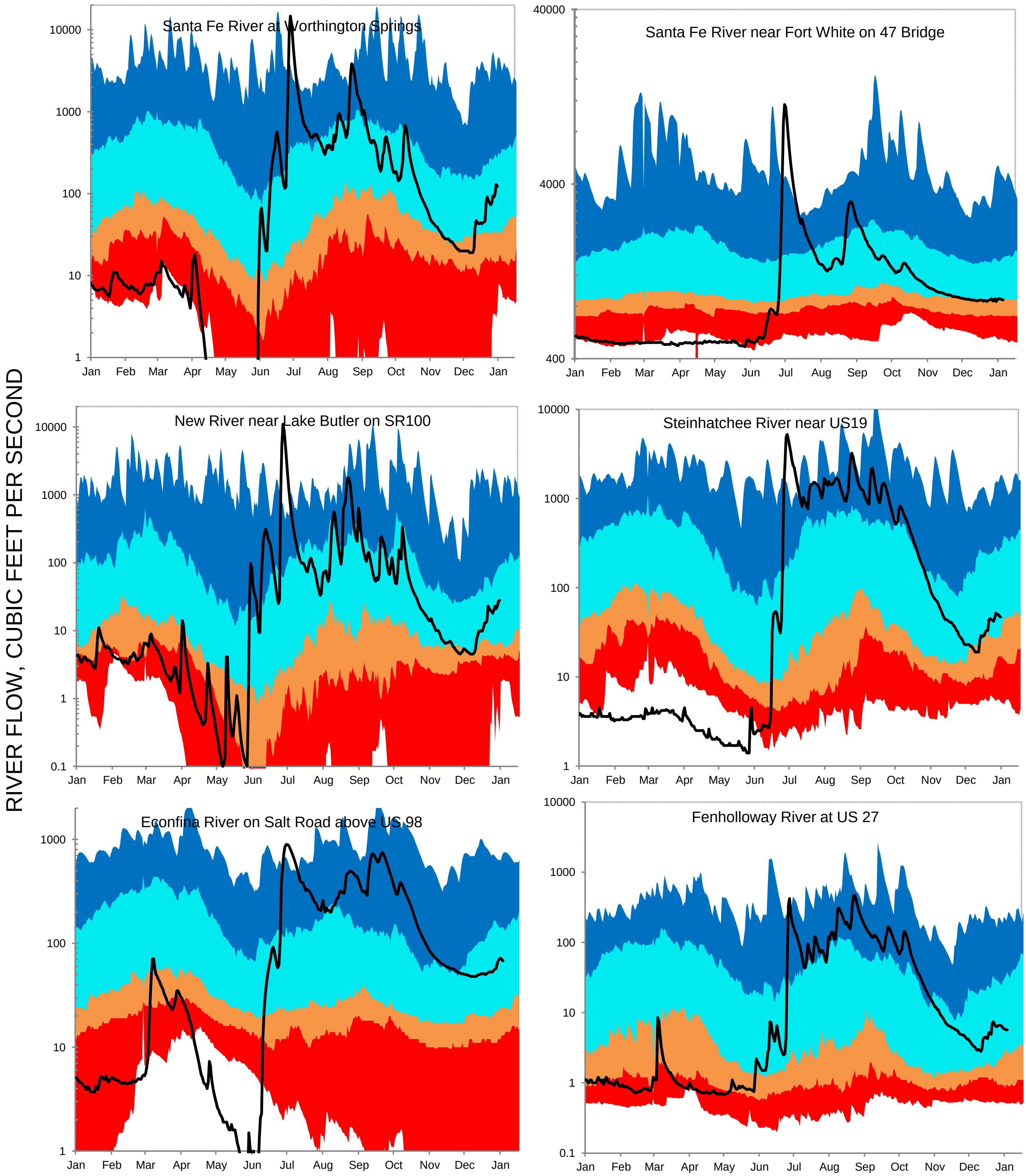
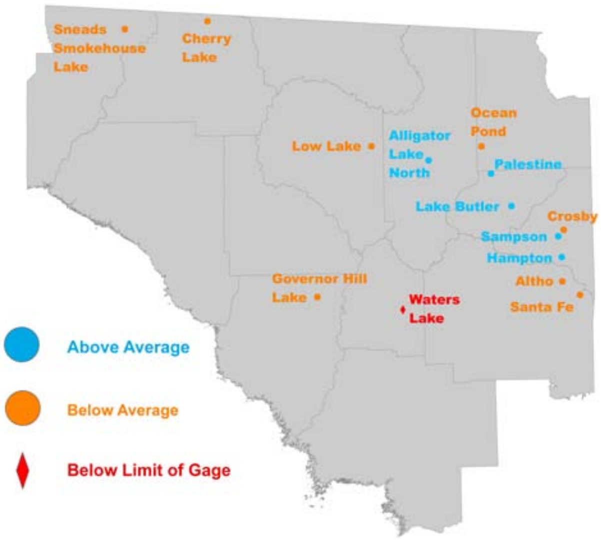


Figure 7:
Streamflow Conditions
December 2012

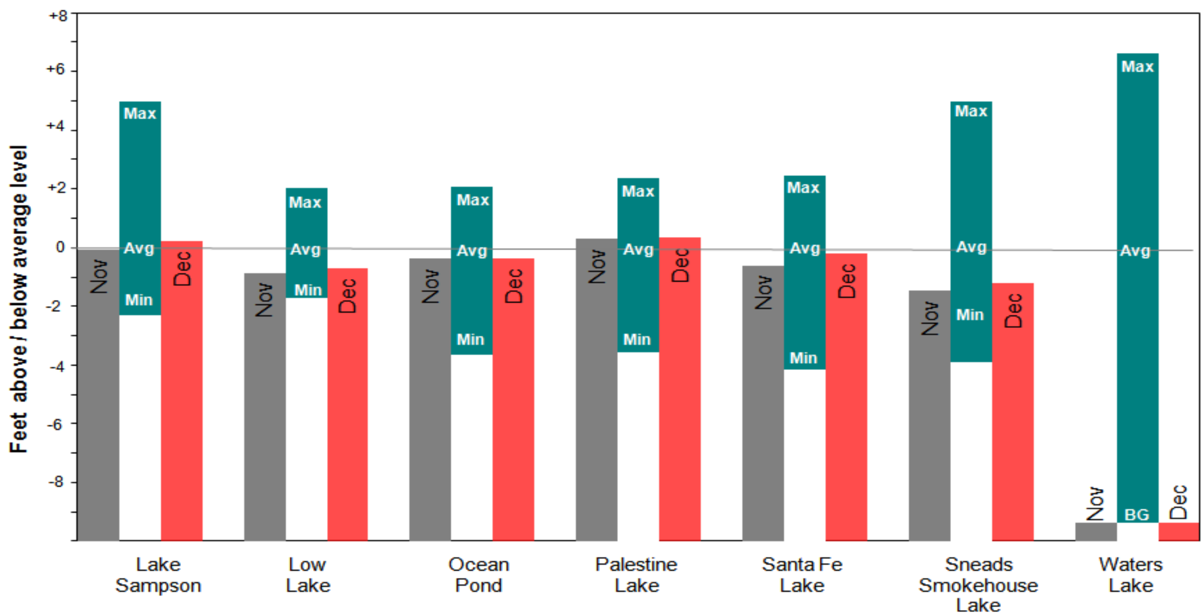
The Suwannee River basin encompasses 9973 square miles, 59% of which lies in Georgia. Gage records in the Suwannee basin go back as far as 1906 in the case of White Springs. Many gages have continuous records back to the 1920's. This figure compares streamflow on the first and last day of the month with past flows on the same dates.

Figure 8: December 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 high. 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 1970s, although the Sampson Lake record starts in 1957.



BG = Below Lowest Limit of Gage

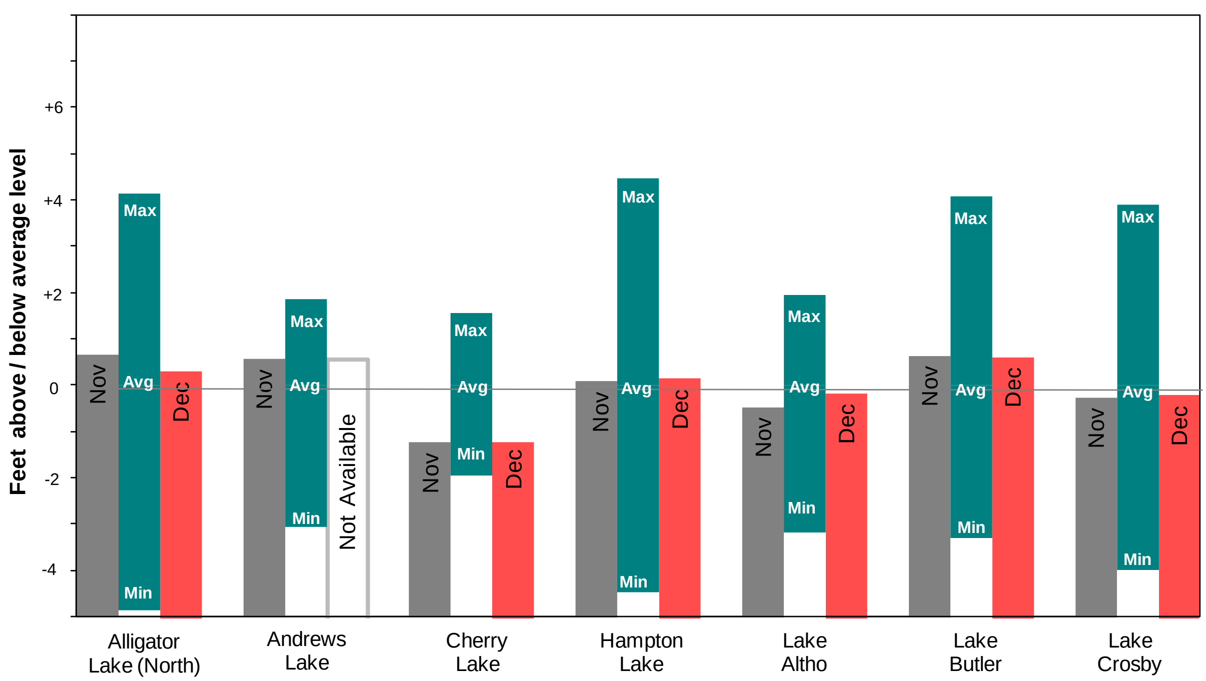
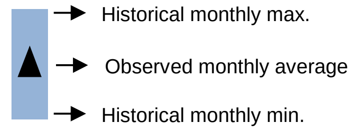
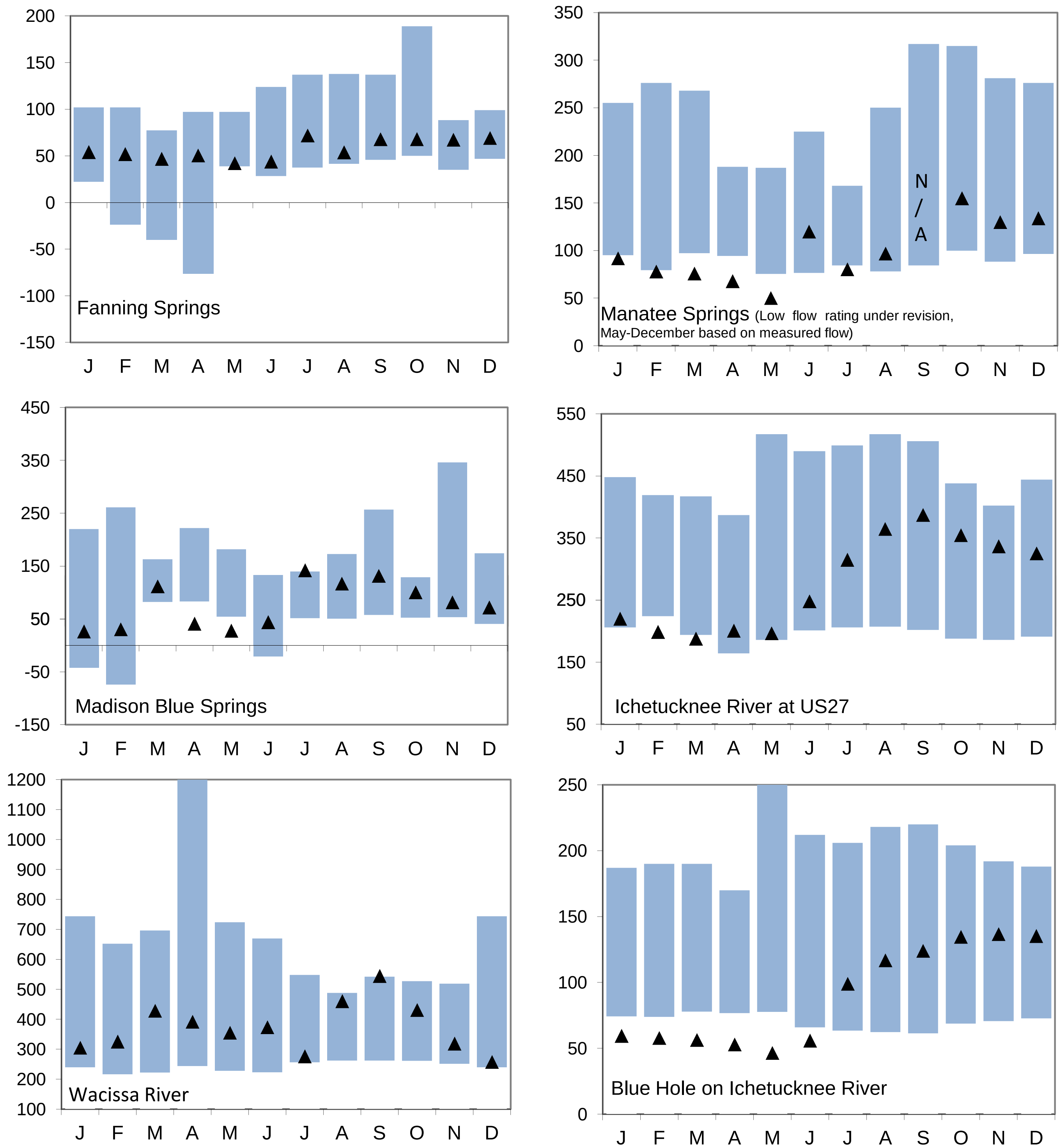


Figure 9a: Monthly Springflow Statistics
Flows January 1, 2012 through December 31, 2012
Springflow data are given in cubic feet per second.
Statistics based on 2002-2011 data.
Data are provisional.





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 9b: Quarterly Springflow Measurements

The SRWMD monitors water quality at 30 springs. Flow is measured at the time of the sampling. The springs below were sampled in December 2012. Flow is given in cubic feet per second.

Spring flow is greatly affected by river levels. Rising river levels or high tides can slow spring flow or even reverse it. Some low flows in this data may not be representative of drought conditions.

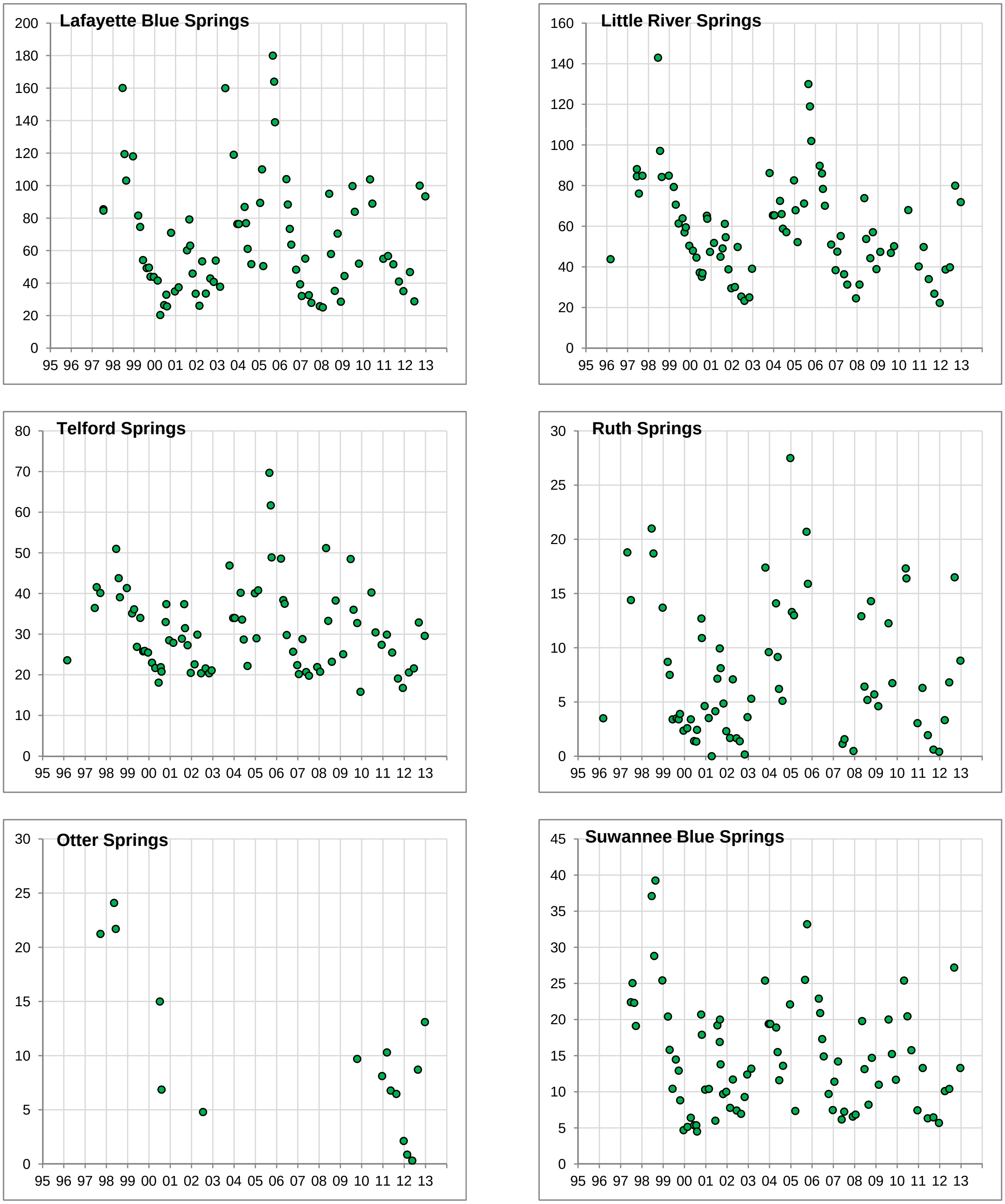
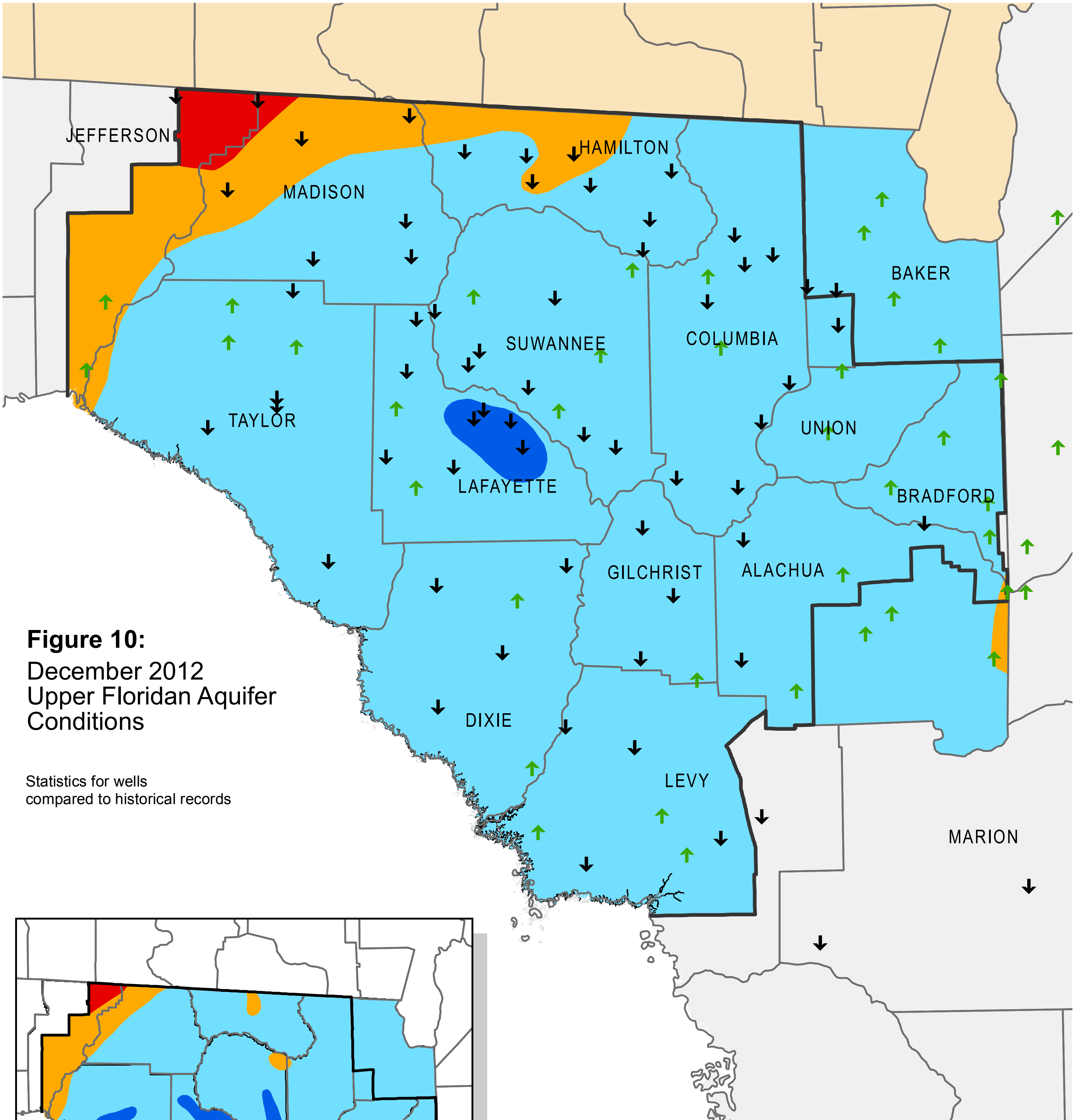
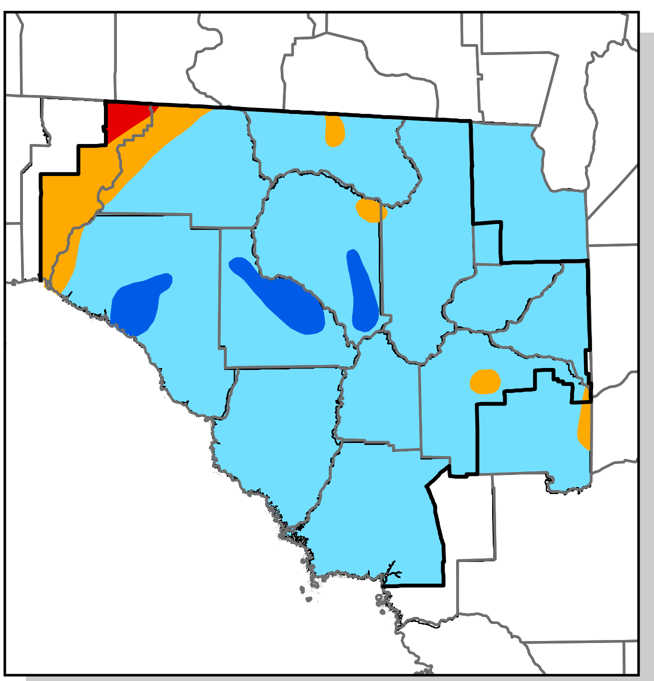


Figure 10:
December 2012
Upper Floridan Aquifer
Conditions

Statistics for wells
compared to historical records





Inset: November 2012 Groundwater Levels

High (Greater than 75th Percentile)

Normal (25th to 75th Percentile)

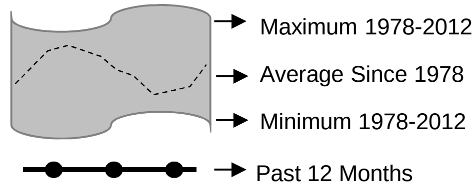
Low (10th to 25th Percentile)

Extremely Low (Less than 10th Percentile)

Increase/decrease in level since last month

District Boundary

Figure 11: Monthly Groundwater Level Statistics
Levels January 1, 2012 through December 31, 2012
Period of Record Beginning 1978
Datum is NGVD 1929



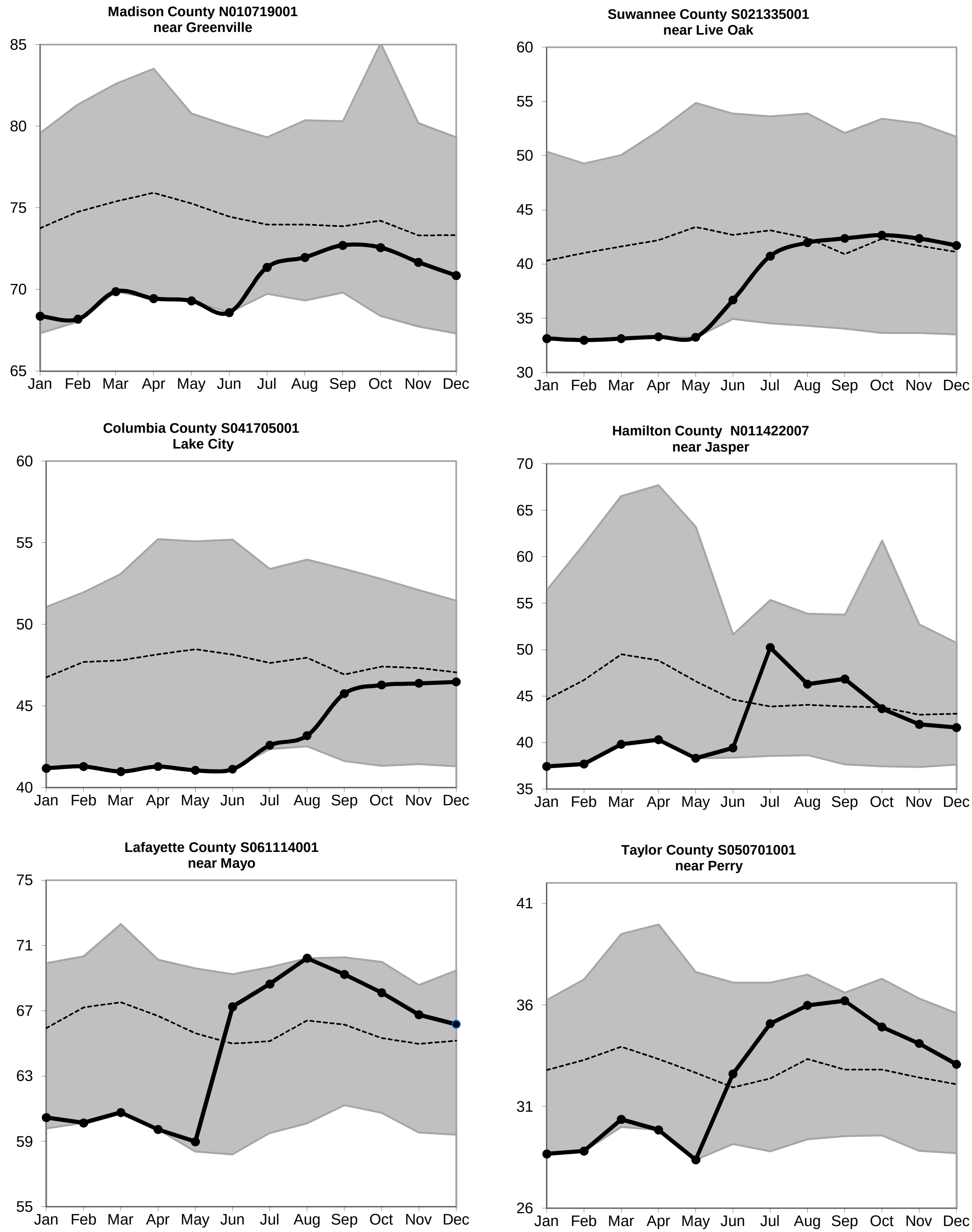


Figure 11, cont.: Groundwater Level Statistics
Levels January 1, 2012 through December 31, 2012
Period of Record Beginning 1978
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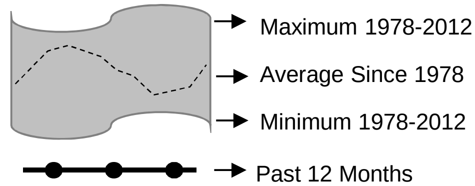
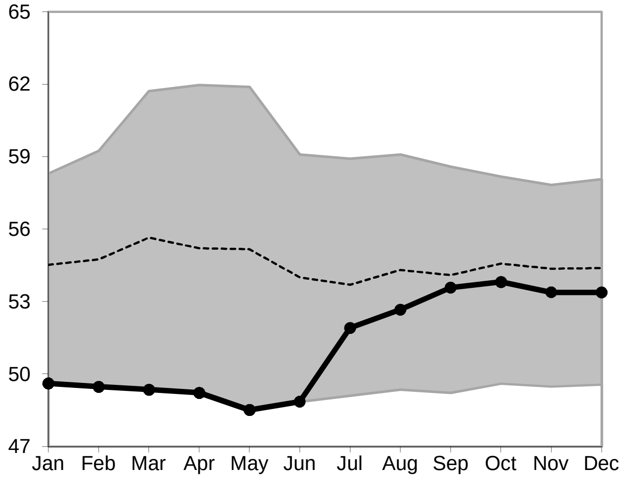
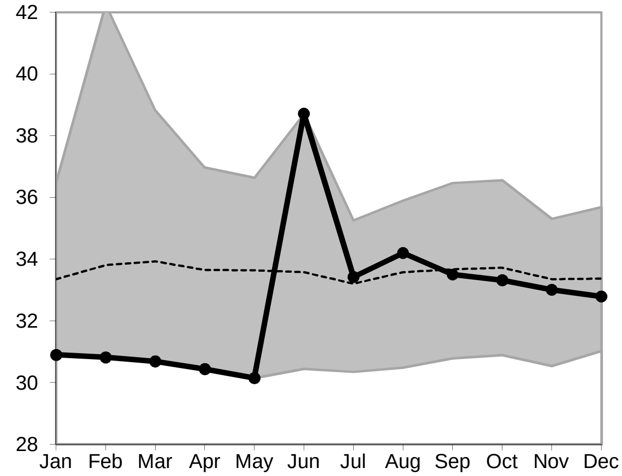


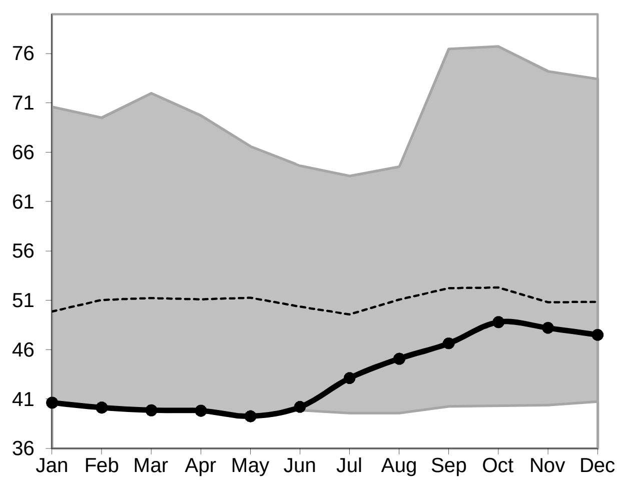
Union County S051933001
near Lake Butler



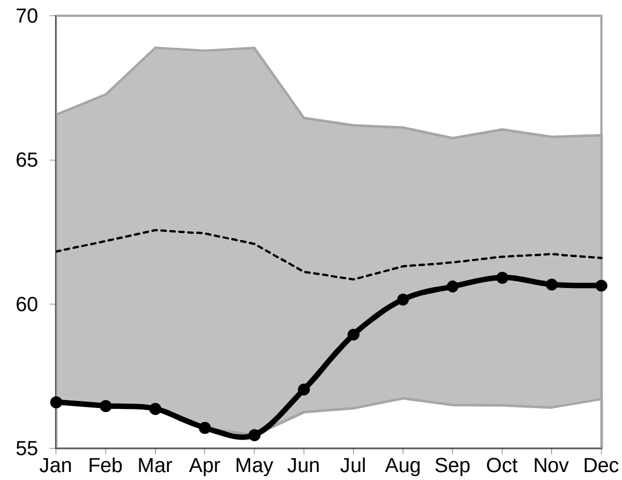
Alachua County S081703001
at High Springs



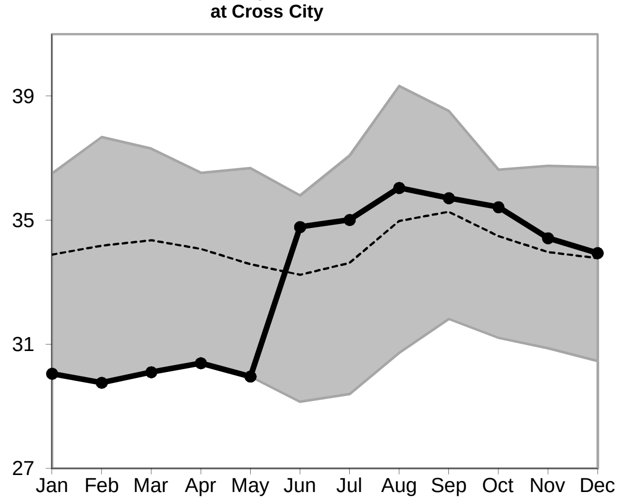
Gilchrist County S091607001
near Trenton



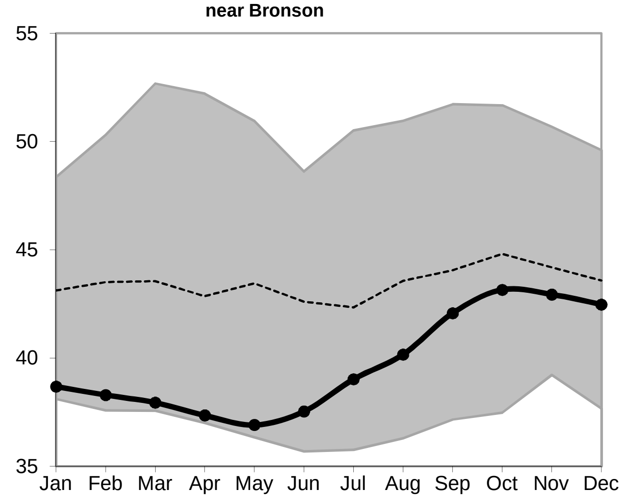
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



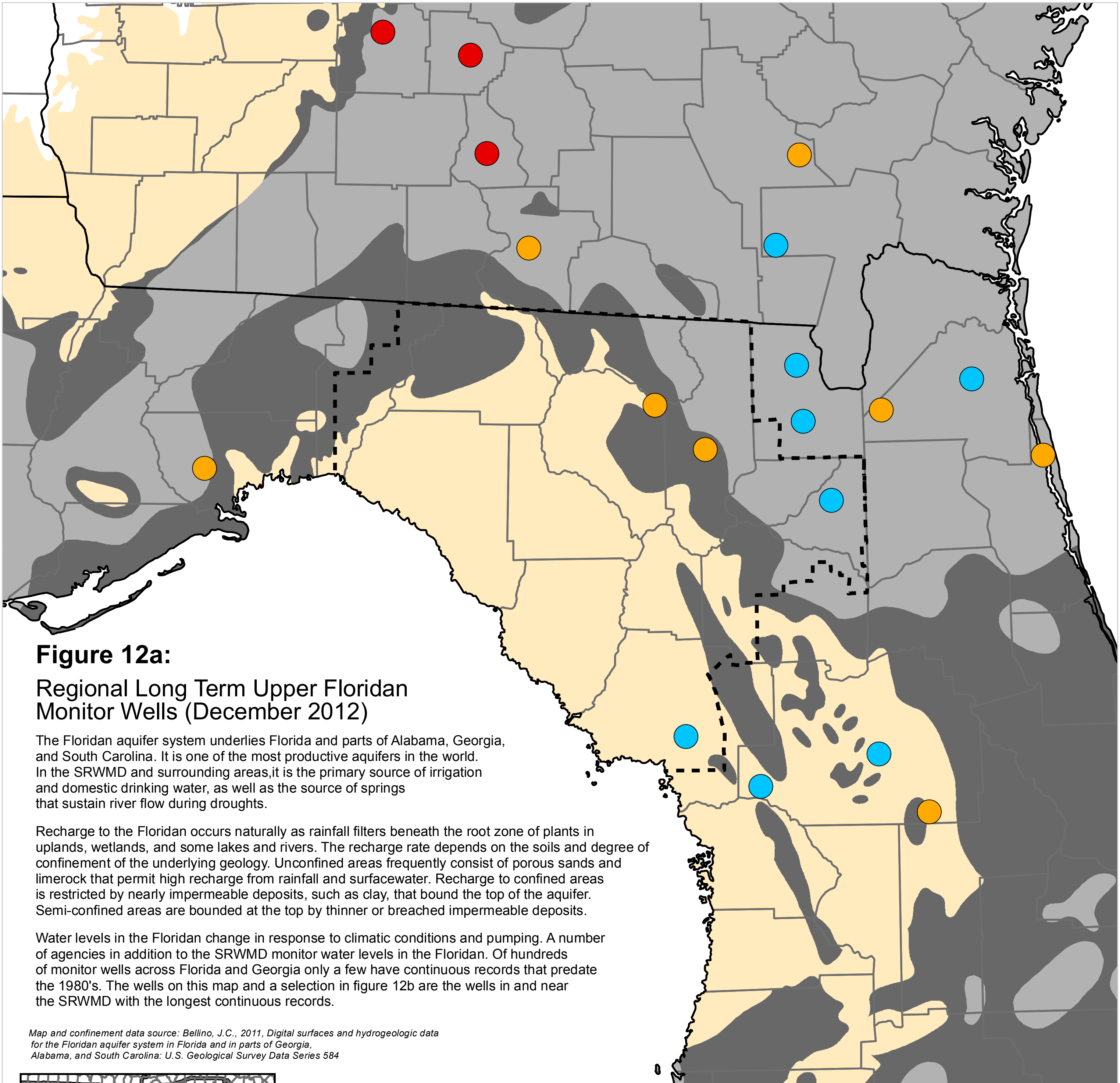


Figure 12a:

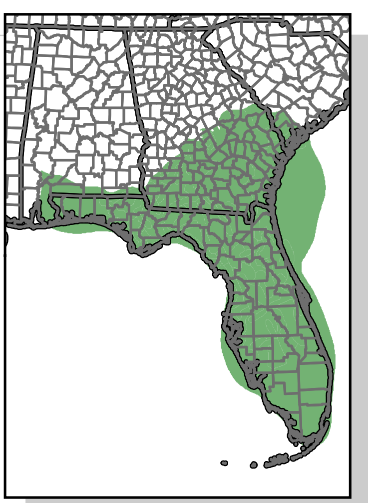
Regional Long Term Upper Floridan Monitor Wells (December 2012)

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 a selection in figure 12b 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 12b: Regional Long Term Upper Floridan Levels

December 2012

Upper Floridan Aquifer levels in feet above mean sea level

Taylor and Sanderson wells courtesy of SJRWMD

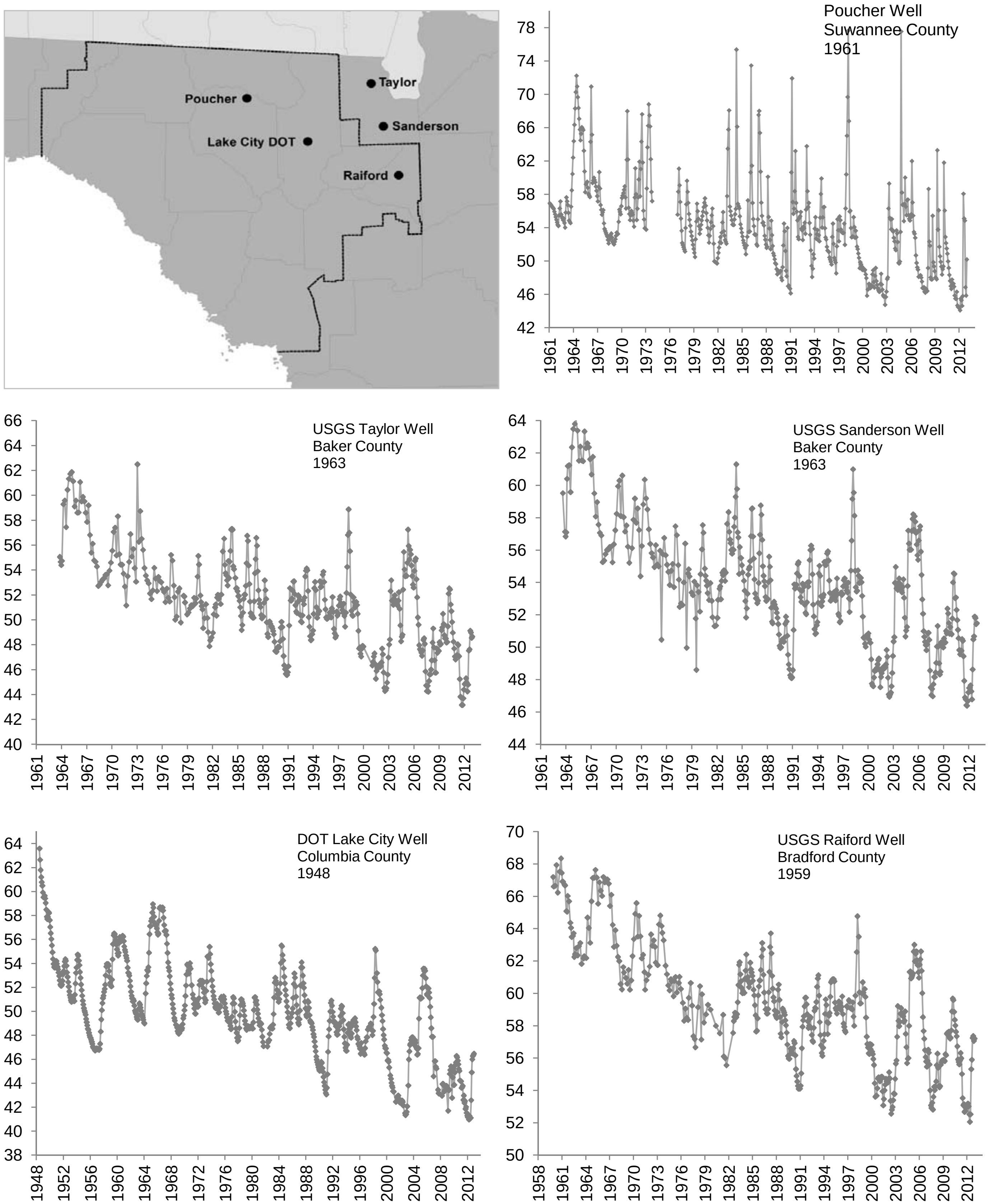


Figure 13: Agricultural Water Use

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