

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: January 5, 2011

RE: December 2010 Hydrologic Conditions Report

RAINFALL

- Average District-wide rainfall in December was 1.65", which is 52% of the long-term average of 3.17" (Table 1, Figure 1). Distribution ranged from over 2" in the western part of the District to less than an inch in the southeastern counties (Figure 2). December marked the fourth straight month of significantly low rainfall. The District average since September was the third lowest since 1932, and the average since October was the second lowest. Total rain since October at the long-term National Weather Service gage in Lake City was the third lowest since 1893 and the lowest since 1935.
- The 12-month rainfall total of 53.96" was near the long-term average of 54.68. The upper Santa Fe River basin had the highest deficit in the District, with localized areas more than 20" below average (Figure 4). Figure 5 shows the change in annual deficits beginning in 1998.

SURFACEWATER

- **Rivers:** Flows at all major Suwannee River and tributary gages ended the month at or below the 10th percentile of daily values, meaning more than 90% of daily mean flow records have been higher during this time of year. Seven-day and 8-week average streamflow compared to the period of record was at or below the 5th percentile for the Suwannee River at Ellaville and Branford, and for the Santa Fe River at Worthington Springs and Fort White. Eight-week average streamflows at the Suwannee River at White Springs were in the lowest 1% recorded. Discharge statistics for six river stations are presented in Figure 6 and streamflow conditions for major gages are shown in Figure 7.
- **Lakes:** Levels at monitored lakes continued to decline, with an average drop of over an inch. An historic low was observed at Low Lake in Suwannee County with records beginning in 1974. Levels at Alligator Lake, Waters Lake and Governor Hill Lake were below the minimum

measurable stage. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for six lakes.

- **Springs:** Average December flow relative to historical flows is shown for five spring systems in Figure 12.

GROUNDWATER

Levels dropped in 94% of monitored upper Floridan Aquifer wells, falling by an average of 6" (Figure 9). Conditions averaged across the District using monthly statistics fell to the 28th percentile from the 33th percentile in November, based on records beginning no earlier than 1978. Average conditions in the Suwannee and Santa Fe Basins fell to the 20th percentile of all observations. Record low levels for December were observed at one well in Hamilton County and two in Dixie County. Statistics for a representative sample of wells are shown in Figure 10. Figure 11 shows statistics for 5 wells in or near the District with continuous records that predate the mid-1970's.

HYDROLOGICAL/METEOROLOGICAL INFORMATION

- The Palmer Drought Severity Index (PDSI), a climatological tool produced by the National Weather Service, evaluates the scope, severity, and frequency of prolonged periods of abnormally dry or wet weather using precipitation, temperature, and soil moisture data. The PDSI indicated severe drought during the last week of December.
- The U.S. Geological Survey categorized the Suwannee River Basin as experiencing moderate hydrological drought.

CONSERVATION

Homeowners and others within the District are required to limit landscape irrigation to one day per week during the winter months, based on a year-round 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. The District offers a variety of free water conservation information to the public via its website and by request.

The hydrologic conditions report is compiled in compliance with Chapter 40B-21.211, Florida Administrative Code, using data collected from the following: rainfall (radar-derived estimate), groundwater levels (113 wells), surfacewater levels (6 lakes and 11 rivers), river flows (15 stations), spring flows (5 stations), and general information such as drought indices and forecasts. Data are provisional, and statistics are updated as revised data become available.

MW/dd

Table 1: Estimated Rainfall Totals

County	Dec-2010	Dec-2009	Last 12 Months	Dec. Average
Alachua	0.97	2.82	46.23	2.77
Baker	1.24	5.24	43.32	2.77
Bradford	0.70	3.27	40.28	2.95
Columbia	1.36	5.39	47.61	3.08
Dixie	1.52	3.82	63.25	3.17
Gilchrist	1.37	3.39	49.01	3.07
Hamilton	1.88	7.67	49.47	2.98
Jefferson	2.20	9.79	51.53	4.25
Lafayette	2.05	5.41	58.04	3.33
Levy	0.86	3.22	64.38	3.18
Madison	2.33	8.97	53.07	3.79
Suwannee	1.95	6.76	52.64	2.79
Taylor	2.25	7.34	59.11	3.39
Union	0.97	3.93	45.59	2.86

December 2010 Average: 1.65
 Historical December Average (since 1932): 3.17
 Historical 12-month Average (since 1932): 54.68
 Past 12-Month Total: 53.96
 12-month Rainfall Deficit: -0.72

(Rainfall reported in inches)

Figure 1: Comparison of District Monthly Rainfall

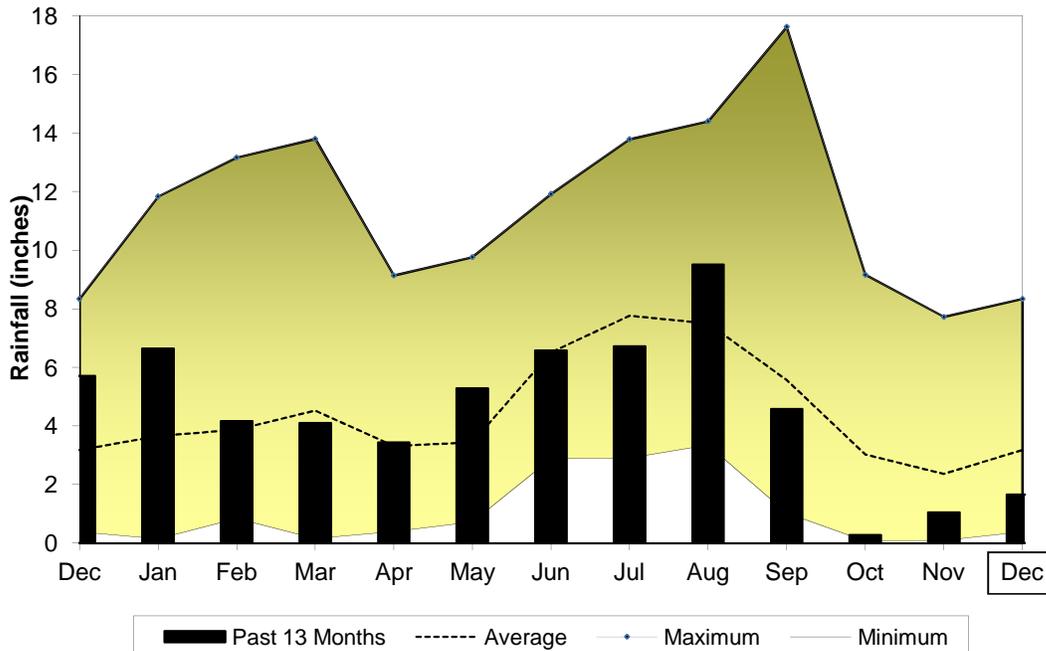


Figure 2: December 2010 Rainfall Estimate

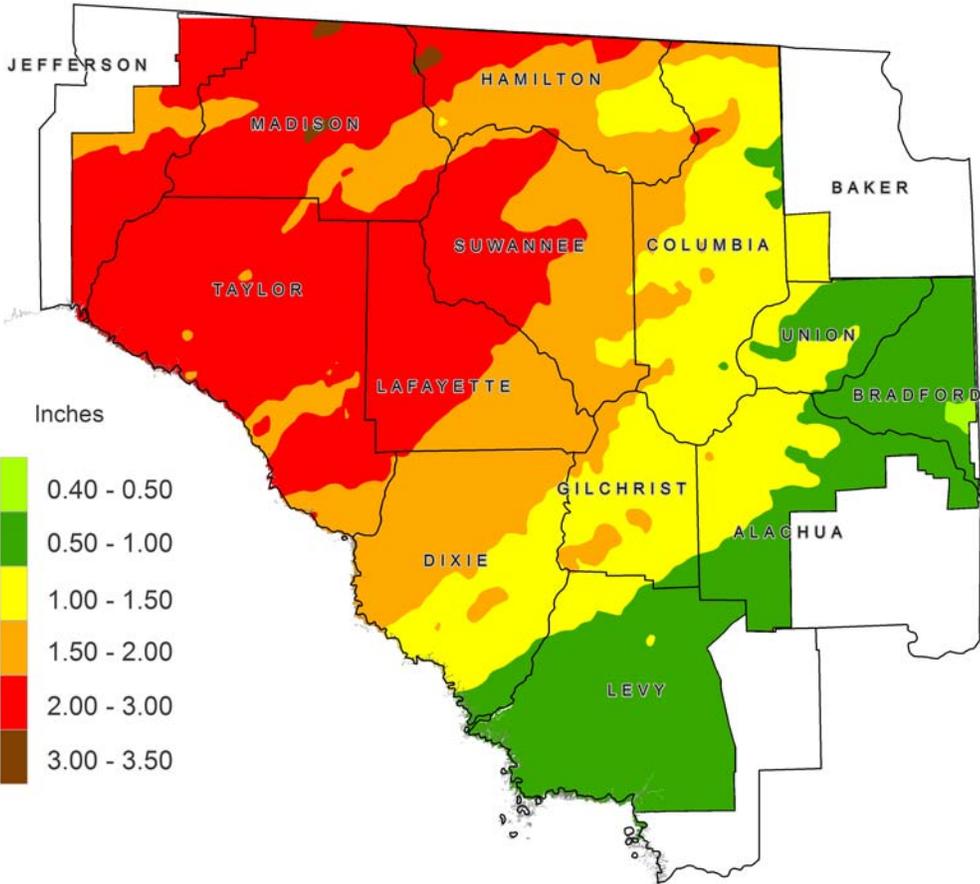


Figure 3: December 2010 Percent of Normal Rainfall

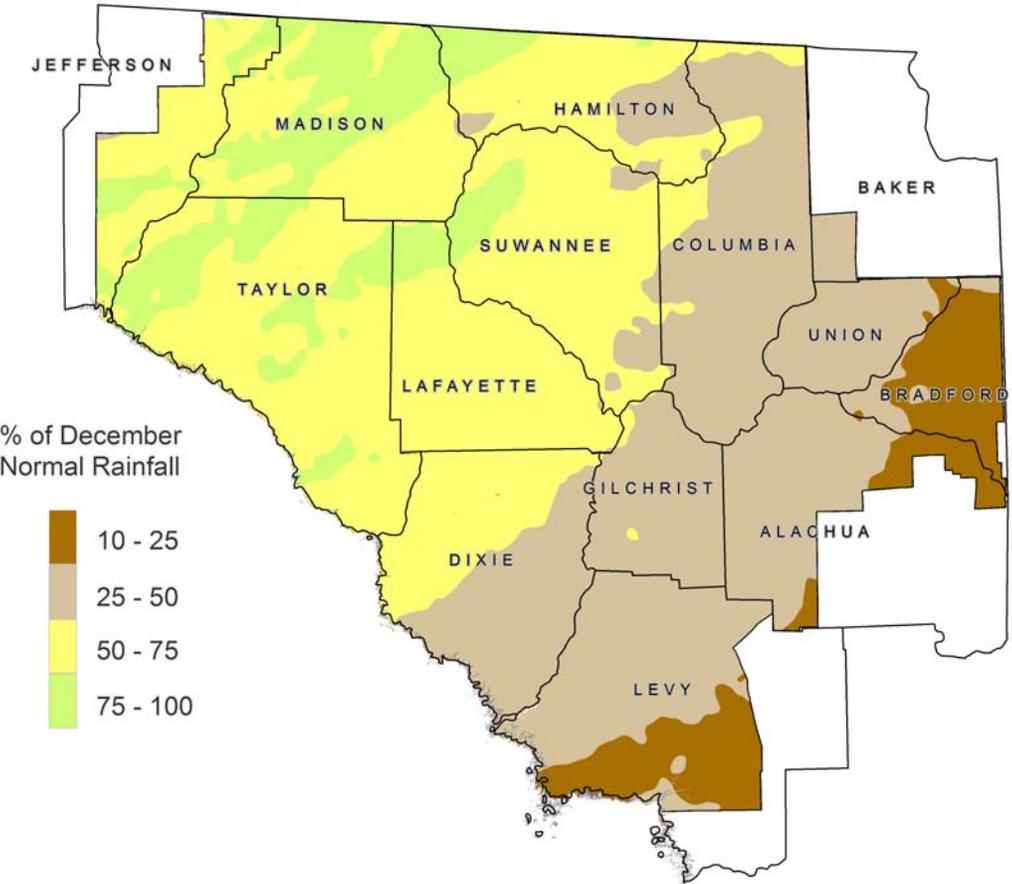


Figure 4: 12-Month Rainfall Surplus/Deficit by River Basin Ending December 2010

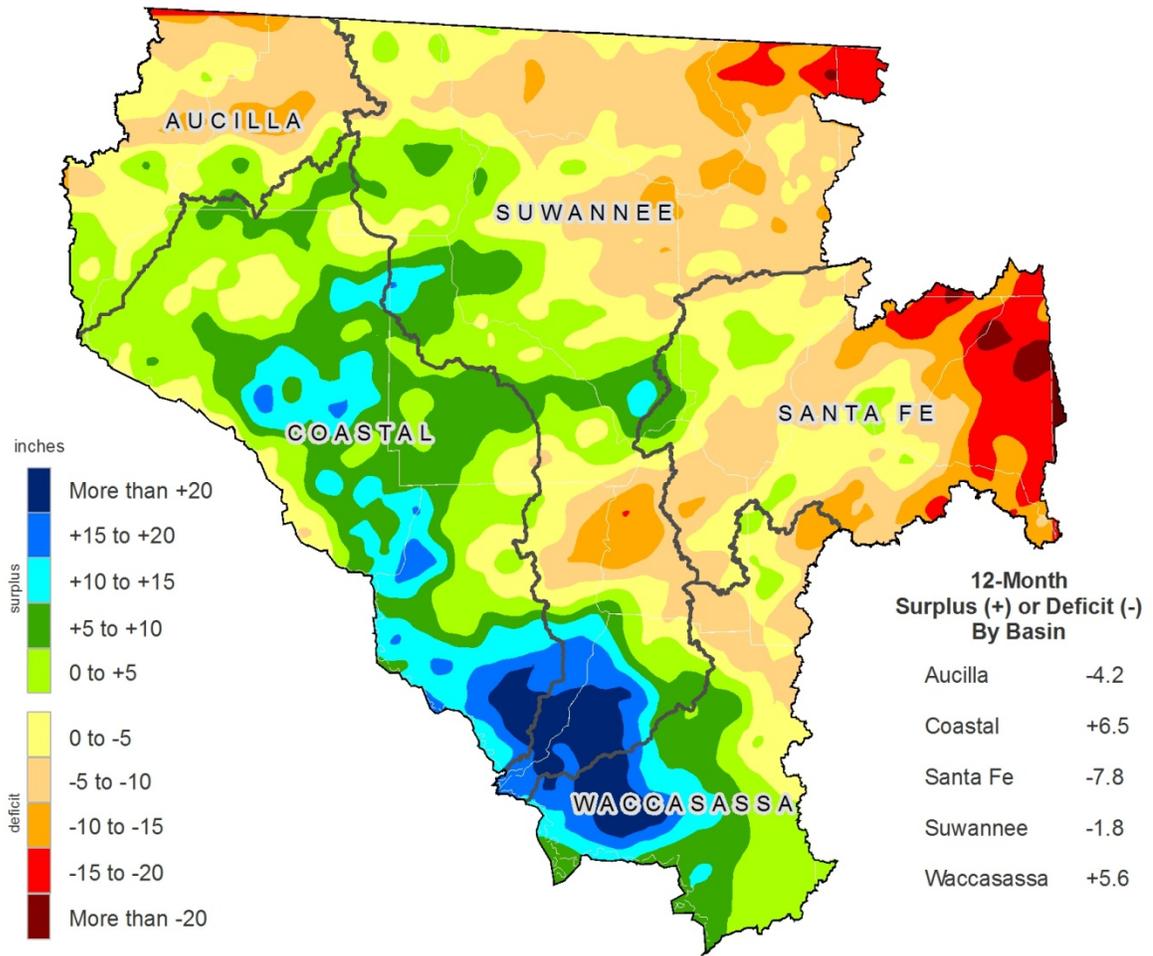


Figure 5: 12-month Rolling Rainfall Deficit Since 1998

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

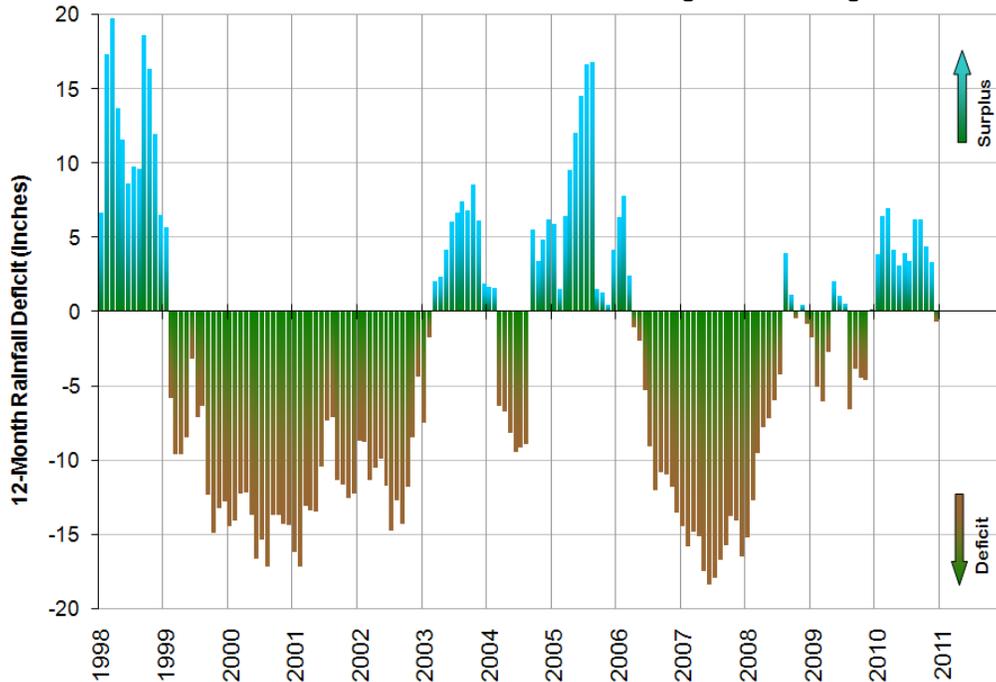
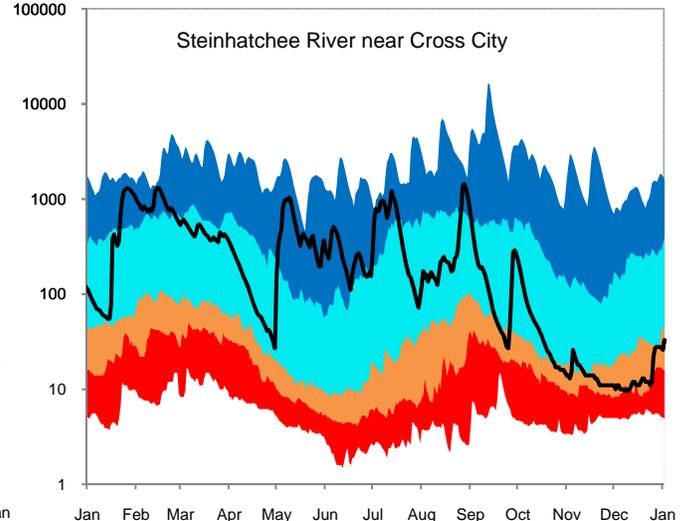
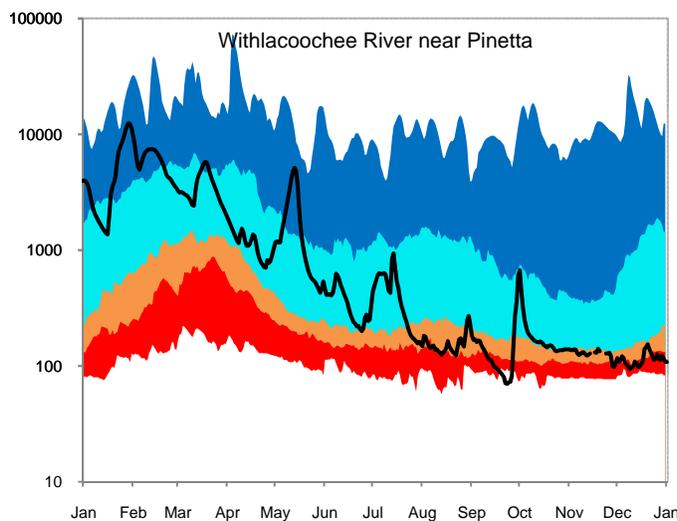
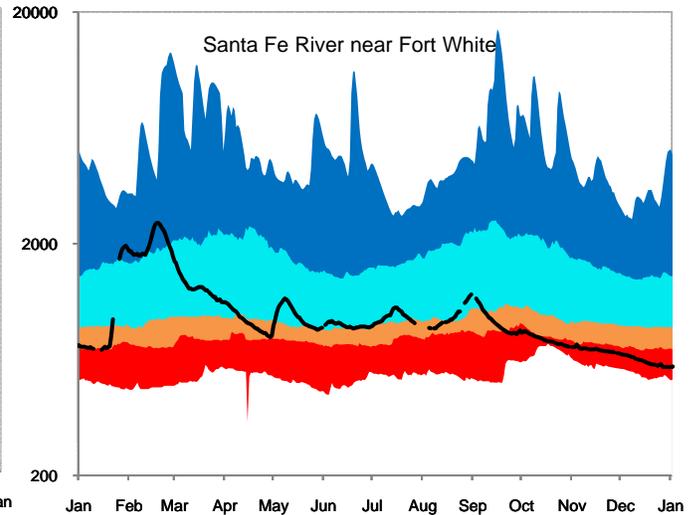
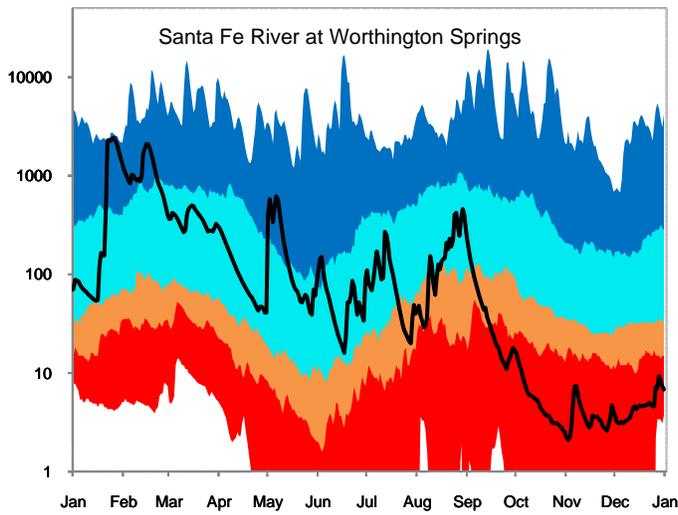
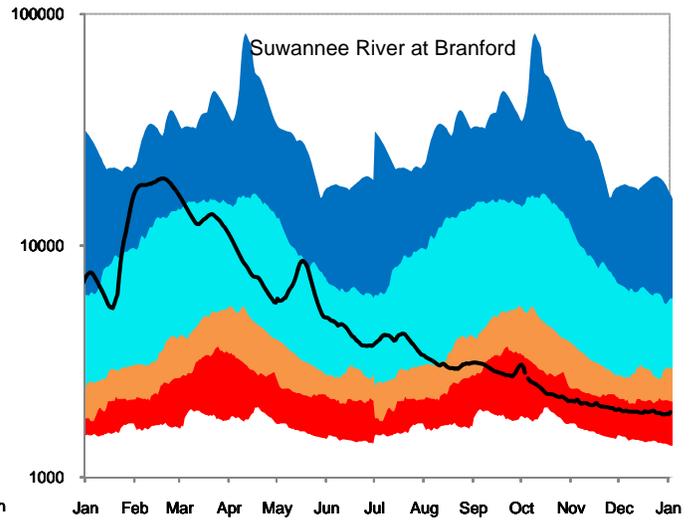
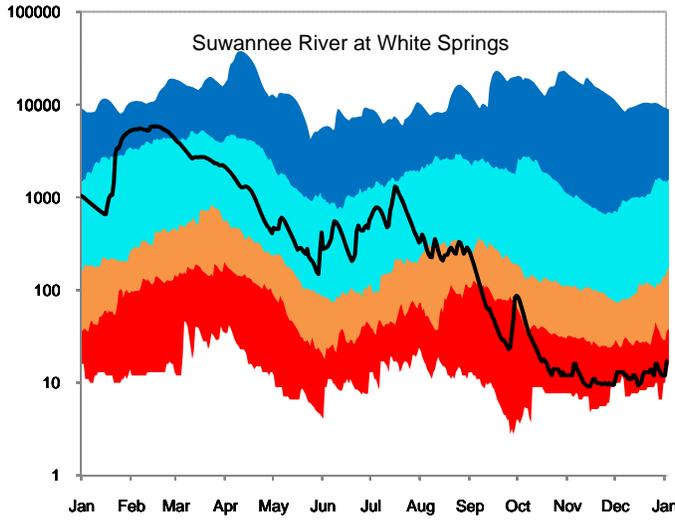
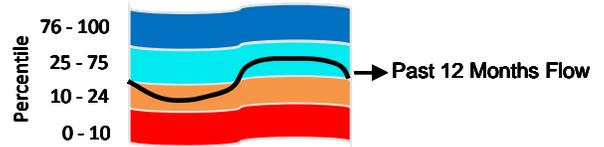


Figure 6: Daily River Flow Statistics

January 1, 2010 through December 31, 2010



RIVER FLOW, CUBIC FEET PER SECOND

Figure 7: December 2010 Streamflow Conditions

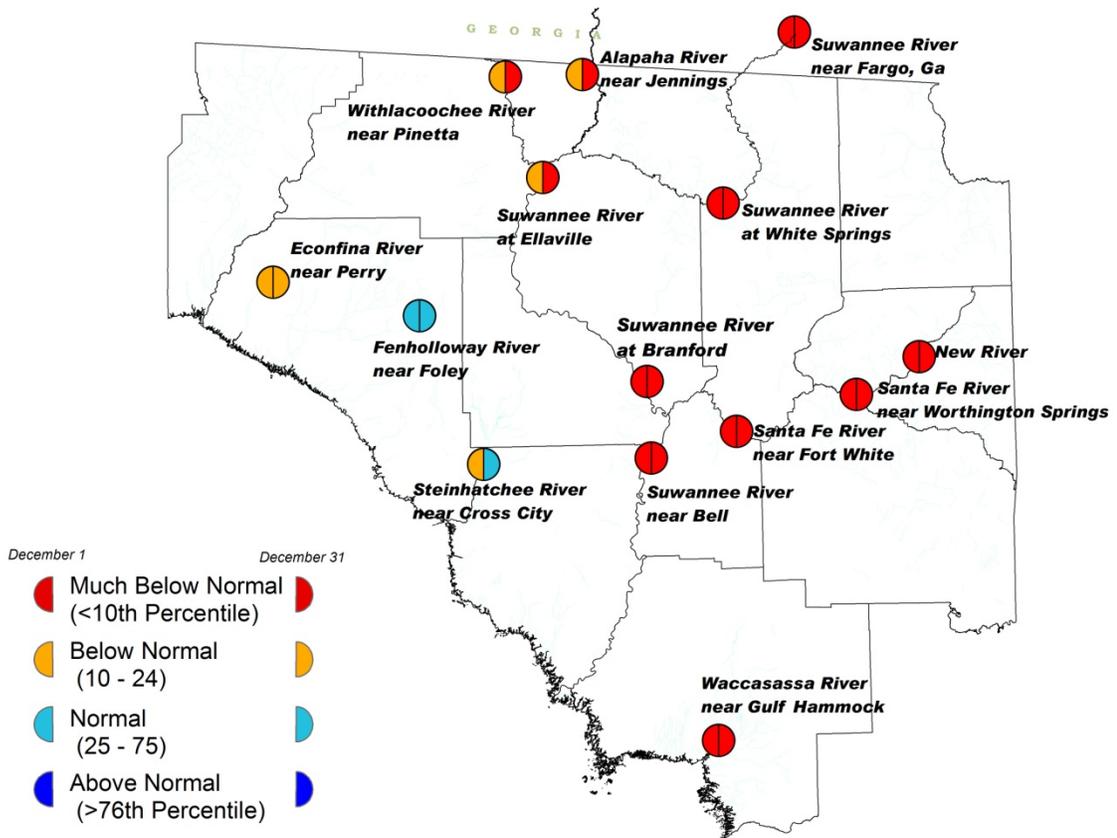
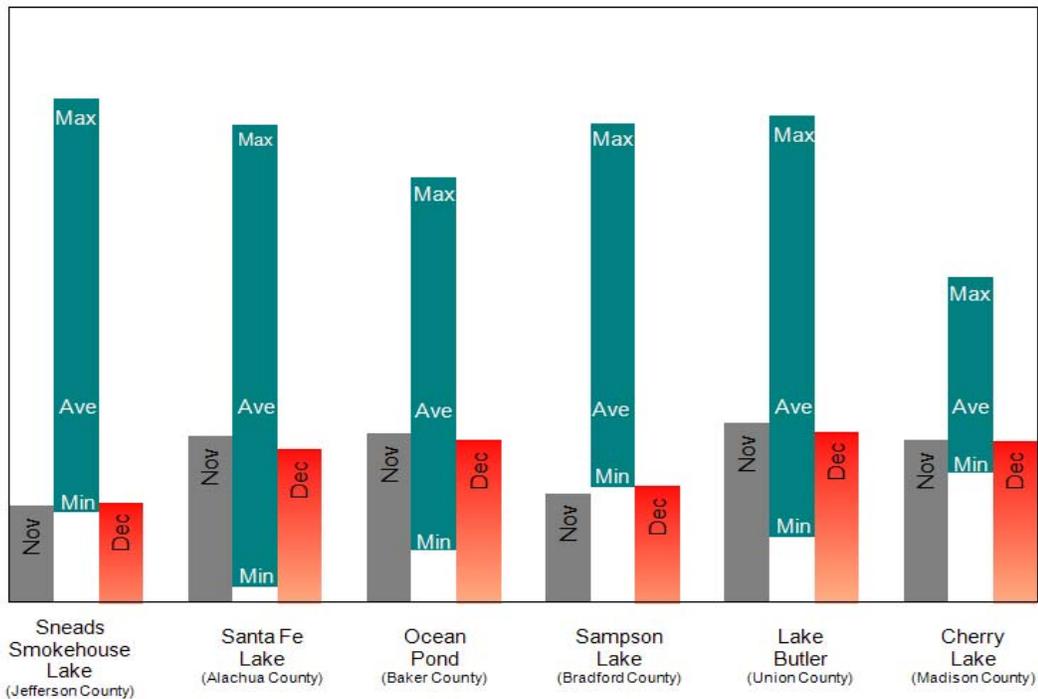


Figure 8: Lake levels, relative to historic maximum, minimum, and average levels.



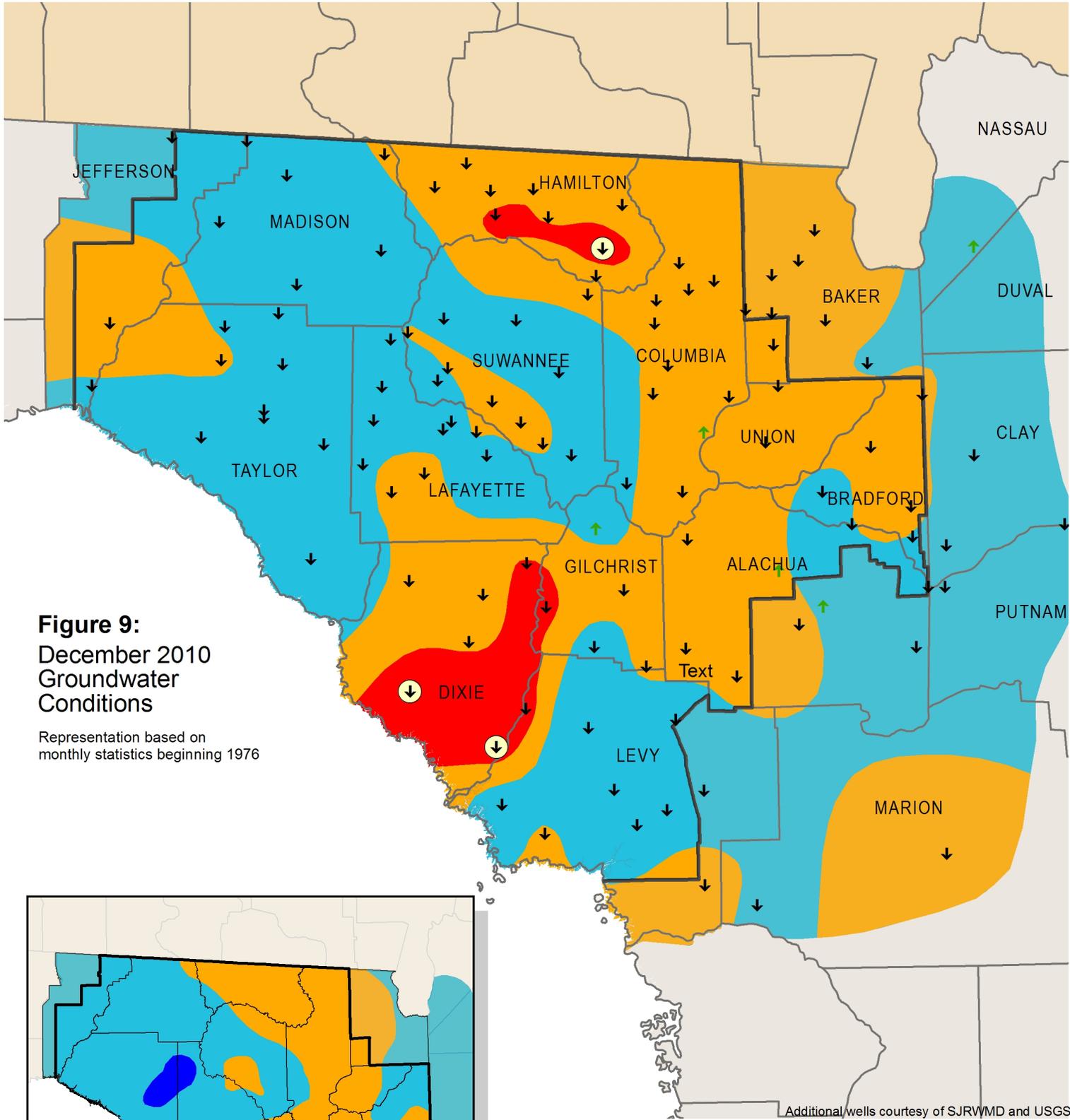
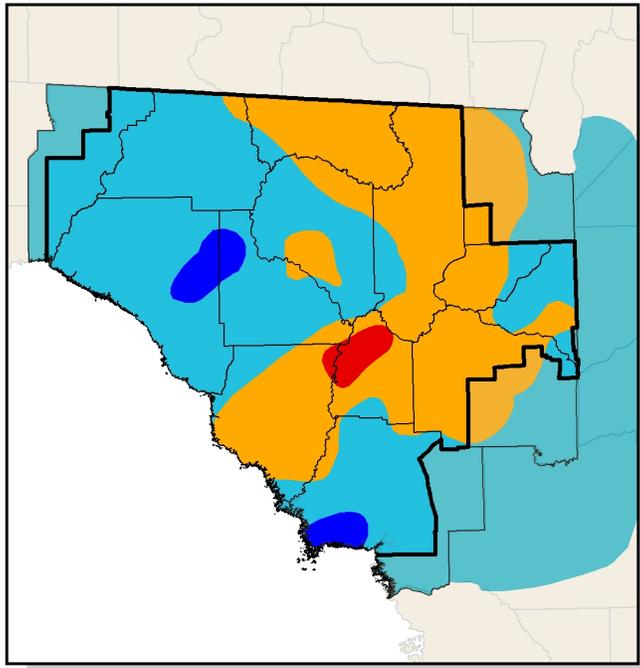


Figure 9:
December 2010
Groundwater
Conditions

Representation based on
monthly statistics beginning 1976



Inset: November 2010 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

Figure 10: Monthly Groundwater Level Statistics

Levels January 1, 2010 through December 31, 2010

Period of Record Beginning 1978

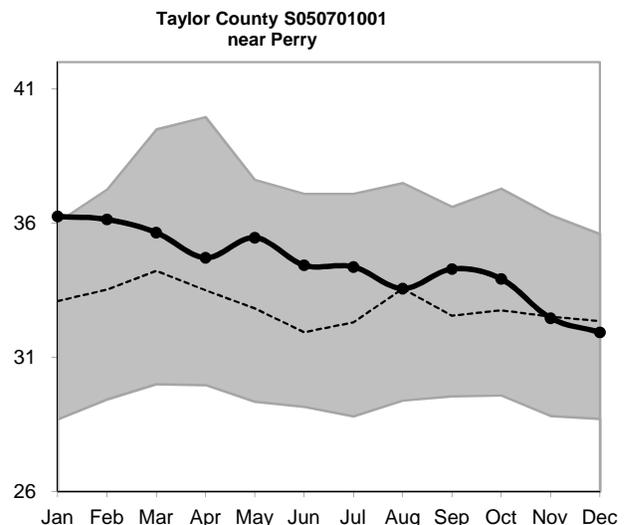
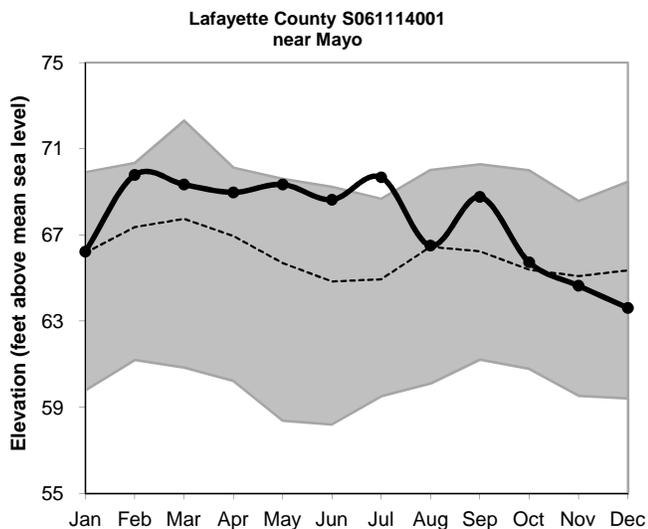
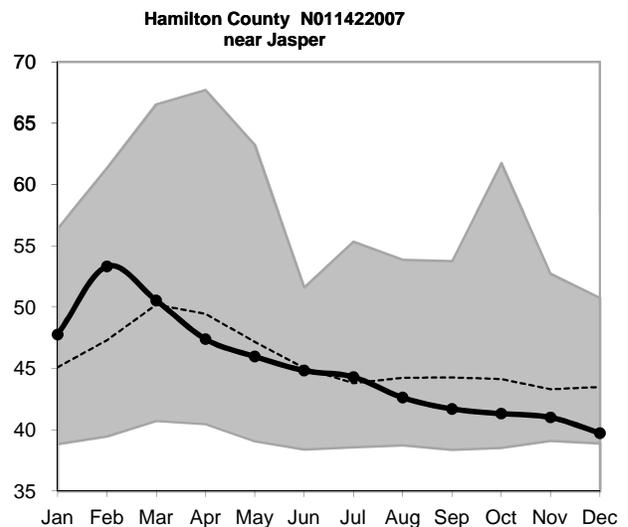
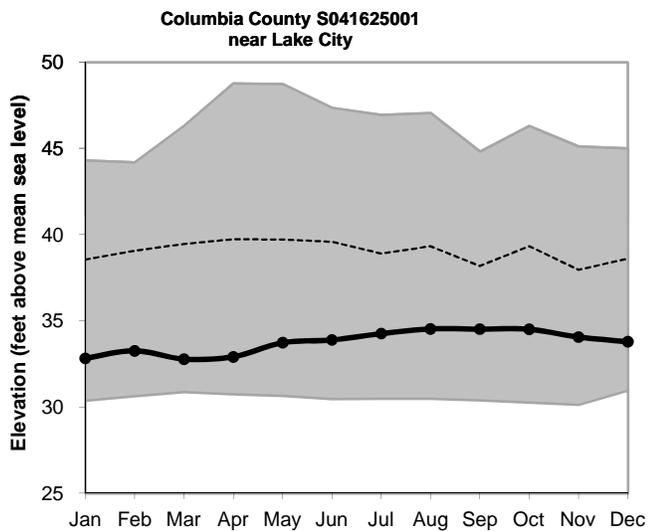
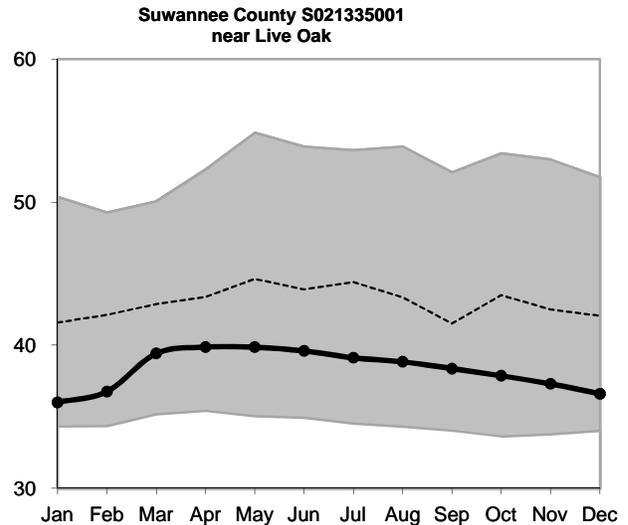
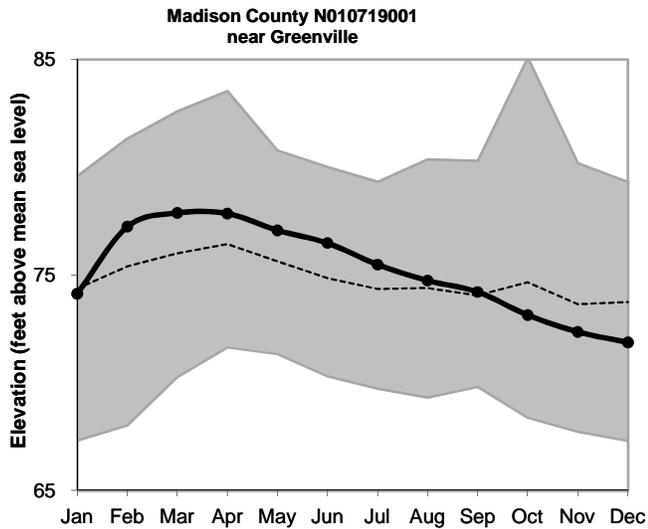
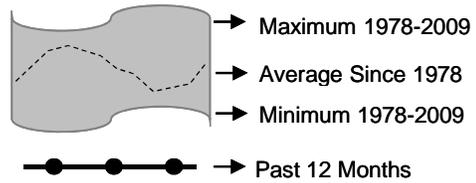


Figure 10, cont.: Monthly Groundwater Level Statistics
 Levels January 1, 2010 through December 31, 2010
 Period of Record Beginning 1978

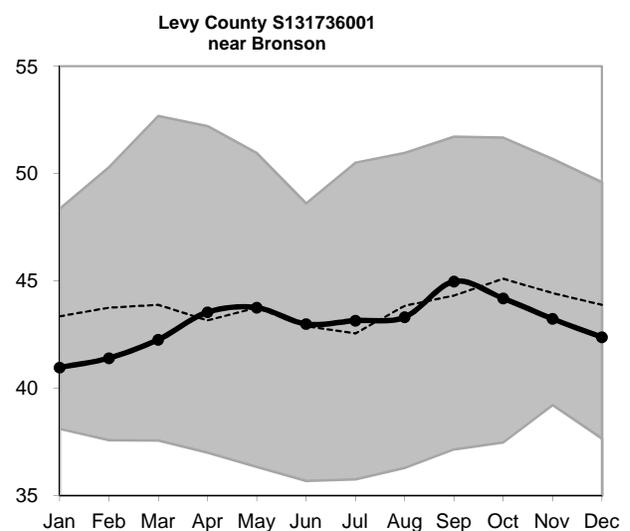
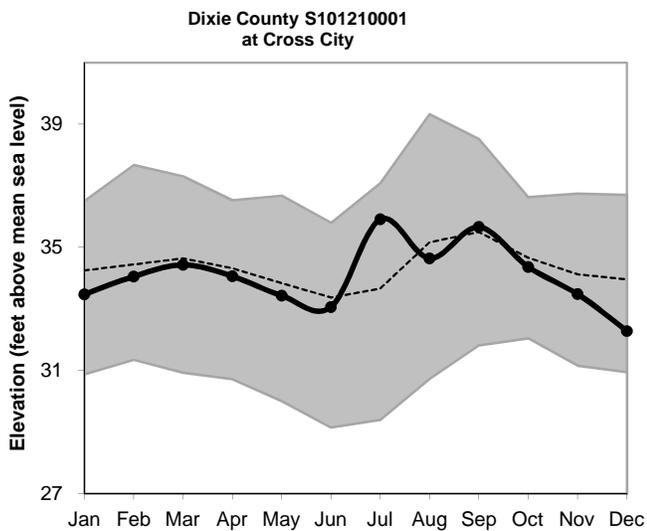
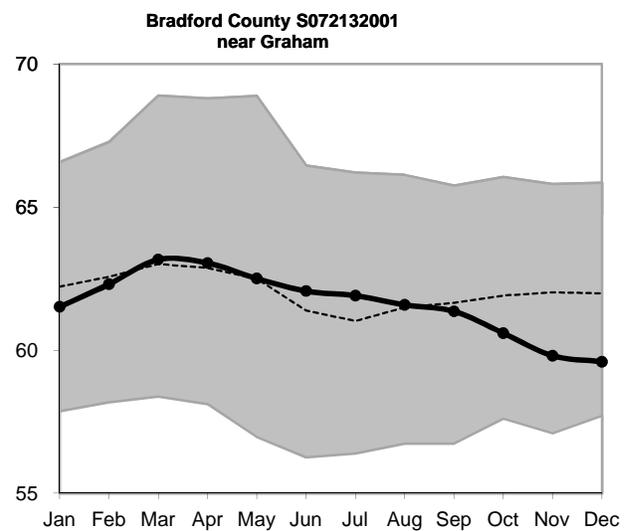
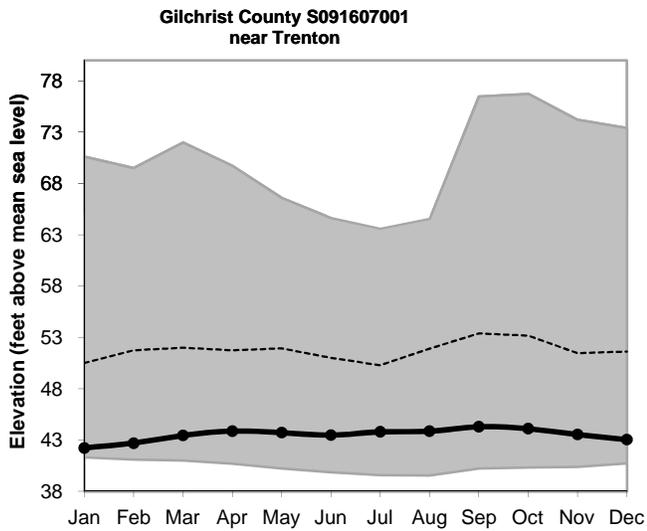
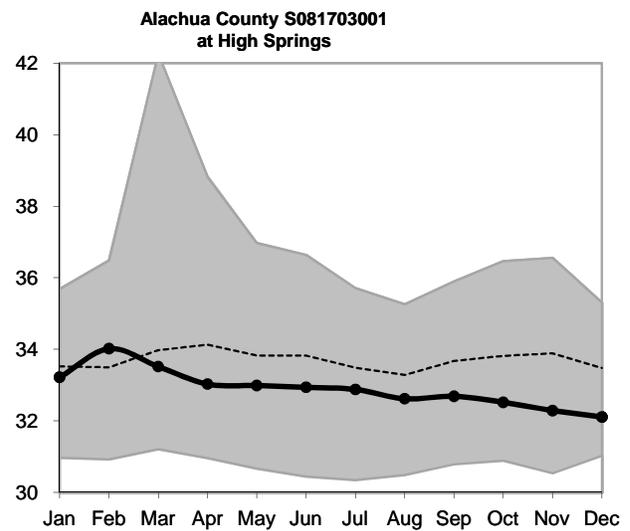
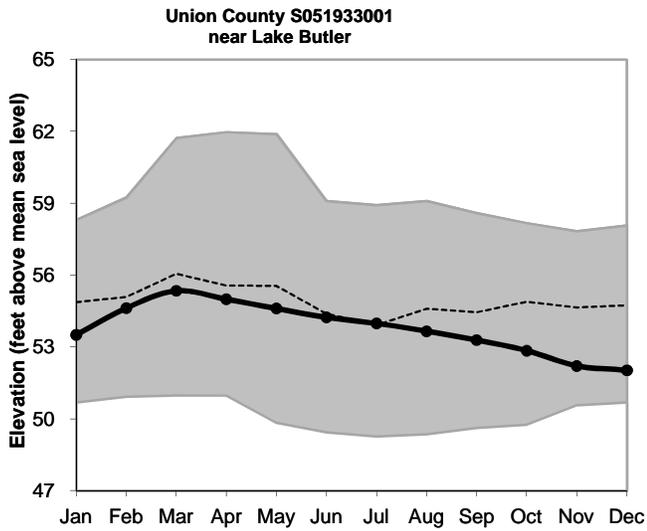
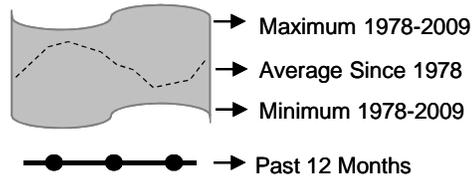


Figure 11: Long-Term Groundwater Levels

Ending December 2010

Levels in feet above mean sea level

— Observed data
- - - Observed data smoothed using LOESS (locally weighted polynomial regression)

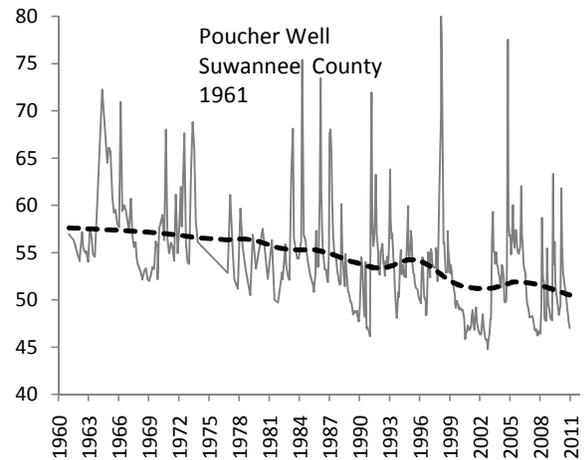
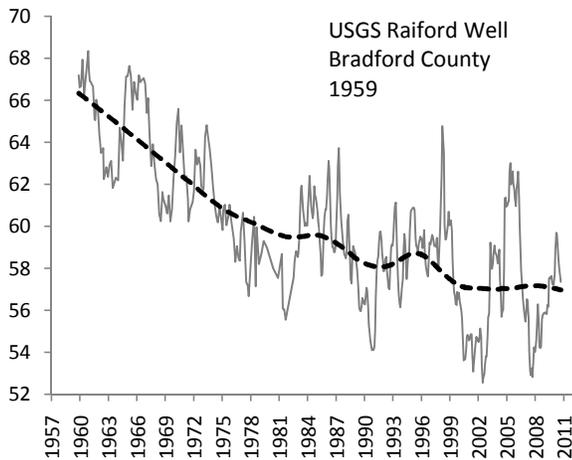
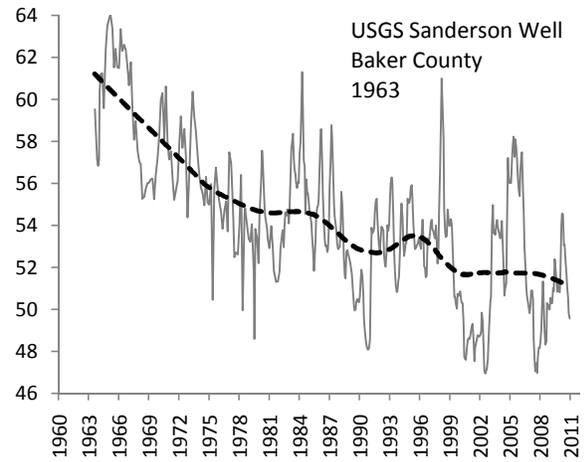
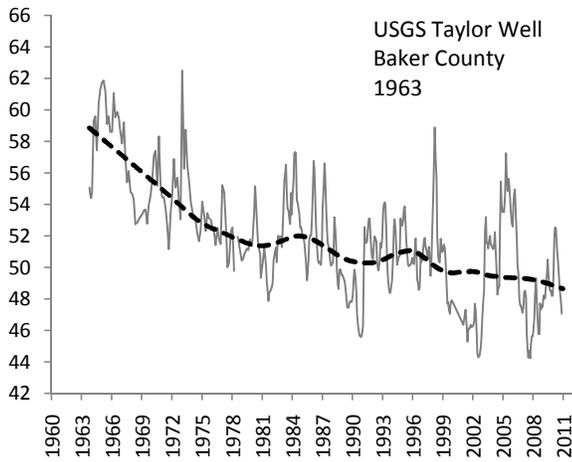
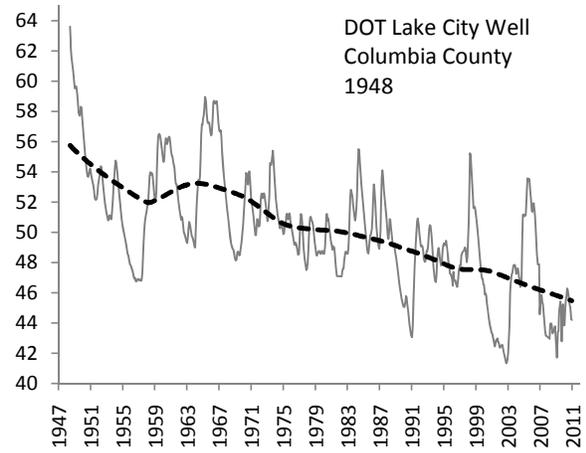
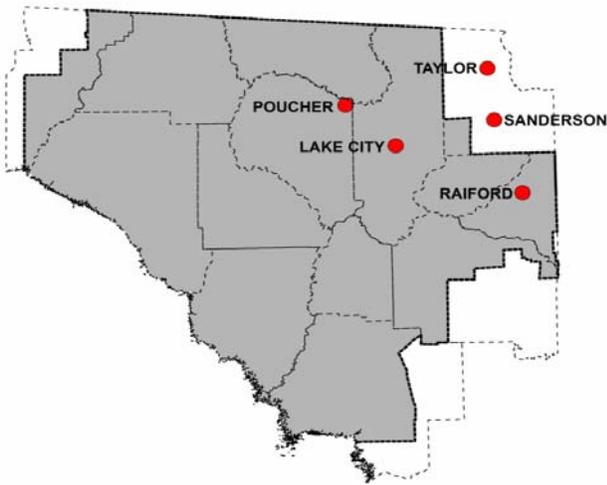
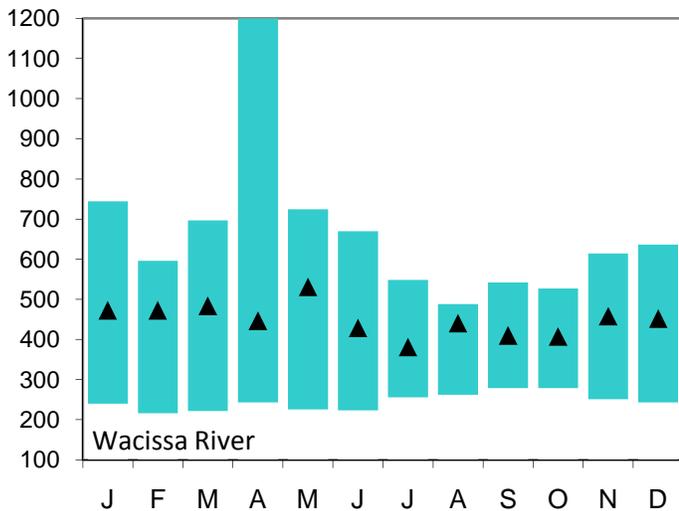
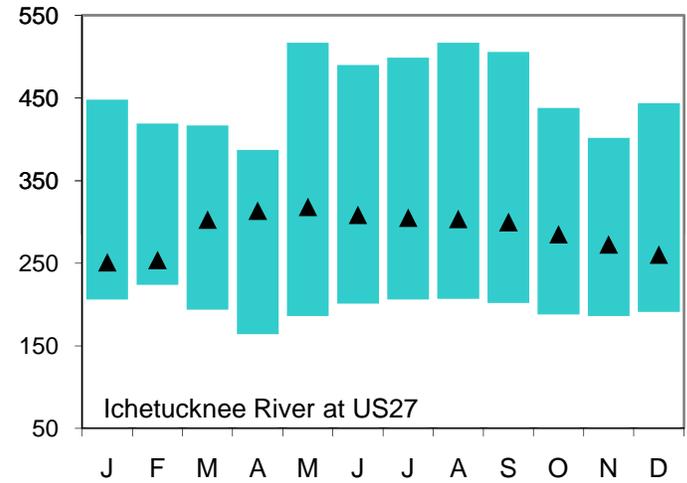
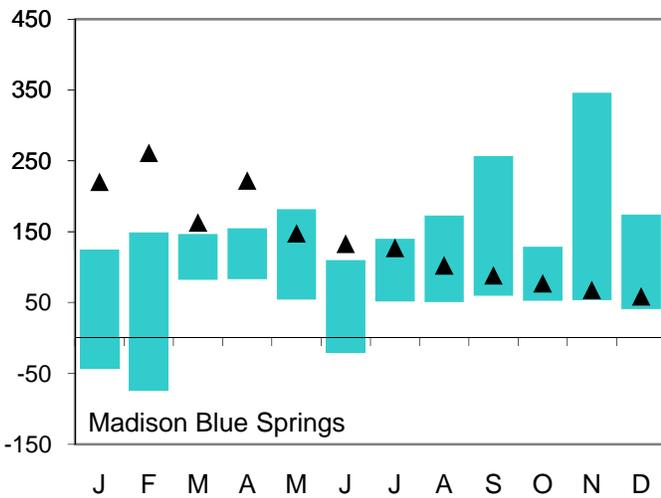
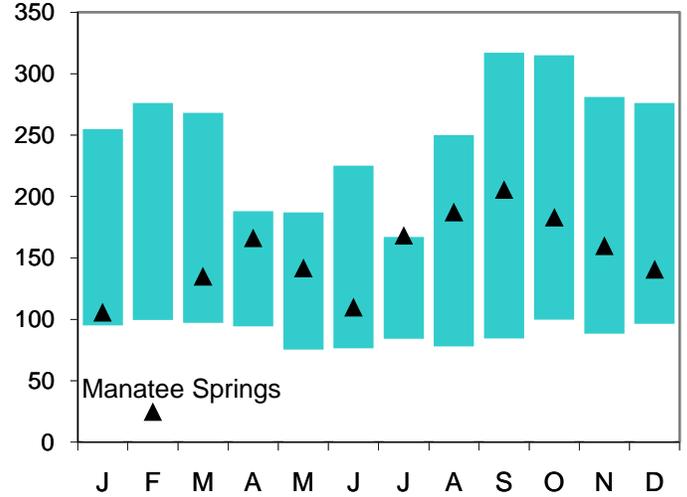
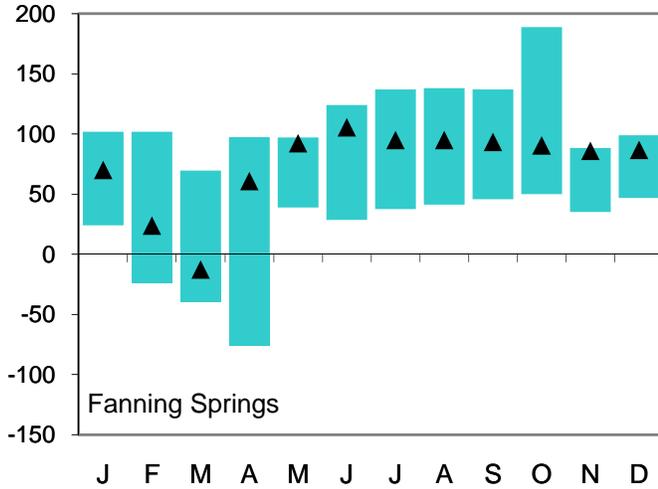


Figure 12: Monthly Springflow Statistics

Flows January 1, 2010 through December 31, 2010
 Springflow data are given in cubic feet per second.
 Period of record beginning 2002. Data are provisional.

-  Historical monthly max.
-  Observed average
-  Historical monthly min.



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

Springflow for months marked by an asterisk (*) was strongly affected by river conditions.

Data will be revised once approved and published by the U.S. Geological Survey.