MEMORANDUM

TO: Governing Board

FROM: Megan Wetherington, P.E., Water Resources Engineer MW

THRU: David Still, Executive Director DS
Kirk B. Webster, Deputy Executive Director KBW/Glenn

DATE: May 8, 2009

RE: April 2009 Hydrologic Conditions Report for the District

The hydrologic conditions report is compiled in compliance with Chapter 40B-21.211, Florida Administrative Code, using water resource data collected from the following: rainfall (radar-derived estimate), groundwater levels (97 wells), surfacewater levels (16 lakes and 11 rivers), river flows (6 stations on 4 rivers), spring flows (5 stations, courtesy of the Florida Department of Environmental Protection and the U.S. Geological Survey (USGS)), and general hydrological and meteorological information (drought indices and weather forecasts). Data are provisional, and subject to revision. Statistics are updated as revised data become available.

RAINFALL

- Average District rainfall in April was 6.22", almost twice the long-term monthly average of 3.28" (Table 1, Figure 1). From 10 to 14 inches fell throughout Madison and Jefferson counties. Lesser but significant amounts fell in Hamilton, Taylor, Lafayette, Suwannee, and Columbia counties. Rainfall totals were near normal in the rest of the District, with the exception of Levy County. April ended seven consecutive months of below-average rainfall. Figure 2 shows the estimated rainfall accumulation across the District.
- The average 12-month deficit dropped from 5.8" in March to 2.5". Figure 3 depicts the 12-month surplus/deficit across the District. The 24-month deficit was 12.2", and the deficit since September 2008 was 7.5".
- Beginning March 26 and ending April 3, a series of fronts dropped from 9 to nearly 17 inches of rain across the Aucilla, Withlacoochee, Alapaha, and upper Suwannee River basins. The highest single event occurred on April 2, when 3 to 7 inches fell in these areas. Figure 4 shows 10-day rainfall extremes in the northern part of the District and in southern Georgia. The Alapaha and Withlacoochee basins shown in the figure make up 40% of the Suwannee River basin. At least 4 sites in the upper Withlacoochee basin received rainfall in excess of the 10-day, 100-year event.

SURFACEWATER

A summary of flood levels compared to past floods and FEMA regulatory flood levels is presented in Figures 5 and 6. End of month streamflow conditions are presented in Figure 7, and discharge statistics for 6 major river stations are presented in Figure 9.

- **Withlacoochee River:** The Withlacoochee River near Pinetta crested at 88.51 feet, 2.65 feet above the historical high of 85.85 feet observed in April 1948. This gage has been in continuous operation since 1931. The crest height at Pinetta was approximately equal to the 0.2% (500-year) event. The upstream gage at Quitman, in Georgia, exceeded the 1948 event by 2.8 feet. Overland flow occurred in northeastern Madison County from the vicinity of the SR145 Bridge to south of the CR150 Bridge, flooding areas and some homes outside of the 500-year floodplain. Following the crest, all three bridges between Madison and Hamilton counties were closed. The Withlacoochee at the SR6 Bridge near Madison Blue Springs crested above the 1% (100-year) flood.
- **Alapaha River:** The Alapaha River near Statenville in Georgia crested at 1.7 feet above the record stage observed in April 1948. The gage has been operating since 1931. According to the USGS, the 1948 stage was the highest stage observed since at least 1862, based on information taken from a local resident. The Alapaha near Jennings at the CR150 bridge crested at 94 feet, nearly at the level of the 0.2% (500-year) flood. Ten miles downstream at the US 41 Bridge, the river crested near the 1% (100-year) flood.
- **Suwannee River:** The Suwannee River at Ellaville, which is at the confluence of the Withlacoochee River and 7.5 miles below the confluence of the Alapaha River, crested near 63.8 feet. This level, near the 2% (50-year) flood, was the third highest since the record 1948 flood, and the fourth highest since the gage began operating in 1927.

  Although the Okefenokee Swamp (the headwaters of the Suwannee River) received over 10" of rain during the event, the Suwannee above the Alapaha confluence did not contribute significantly to the severity of the downstream flooding, as it did in previous major floods. In fact, the river immediately above the Alapaha confluence, at the CR751 Bridge (Noble's Ferry), was observed to stop flowing as it was cut off by flow from the Alapaha and Withlacoochee Rivers. The Suwannee River at White Springs crested at 2.5 feet below its flood stage of 79 feet, while the Suwannee River at the Noble's Ferry Bridge crested near the 2% (50-year) event.

Downstream of Ellaville, the flood wave diminished in severity due to available floodplain and groundwater storage caused by previous months of below-average precipitation. At Dowling Park and Luraville, the crests approximated the 1998 flood, exceeding the 10% (10-year) event, while the crest at Branford was 1.3 feet below the 1998 flood.

Severity diminished even further downstream of the Santa Fe confluence. Levels at Rock Bluff, Wilcox, Manatee Springs, and Fowler Bluff were near the 2004/2005 floods, with crests below the 10% (10-year) event.

- **Santa Fe River**: Rainfall in the Santa Fe basin ranged from normal to 200% of normal. The upper Santa Fe reacted well to the rainfall, with flows increasing from below the 10$^{th}$ percentile to above the 75$^{th}$ percentile in the first week of April. However, due to extremely low groundwater conditions, these flows did not translate significantly below the river rise at O'leno State Park. The Santa Fe River at the US441 Bridge rose less than a foot to a level almost 11 feet below the peak stage after Hurricane Frances in 2004.

  Extremely low flow conditions in the lower Santa Fe River caused it to behave like a slough as the Suwannee River crest approached and passed the confluence. The resulting backwater and contributory flow from the Suwannee caused flooding from the confluence upstream to the Fort White area. Both the Santa Fe near Hildreth (US129 Bridge) and the upstream gage at Three Rivers Estates crested near 26.8 feet, and the Santa Fe near Fort White crested near 26.6 feet. All three crests occurred at virtually the same time, although the Hildreth and Fort White gages are 16 miles apart.

  Though the flooding at Three Rivers was severe in terms of impacts, the flood crest was more than 3 feet below the 1998 flood, and more than a foot below the 10% (10-year) event.

- **Aucilla River:** The Aucilla River at Lamont crested at 0.3 feet below the 1998 flood, less than the 10% (10-year) event. More than 10" of rain fell in the Aucilla basin.

- **Coastal Rivers:** Rainfall in most of Levy County was less than normal, and Waccasassa River flows remained below the 10$^{th}$ percentile (extremely low) throughout the month. The Steinhatchee and Econfina Rivers rose from extremely low conditions to above the 75$^{th}$ percentile (above normal), although the Steinhatchee had fallen back to average conditions by the end of the month.

- **Lakes**: Levels at 14 of 16 monitored lakes improved in April, rising by an average of 0.44 feet. Waters Lake in Gilchrist County and Governor Hill Lake in Dixie County remained dry. Andrews, Francis, Sampson, Crosby, and Santa Fe lakes rose slightly above their long-term mean levels. Figure 8 shows levels relative to the long-term average, minimum, and maximum levels for six lakes.

- **Springs:** Springs on the Suwannee and Withlacoochee Rivers were flooded throughout most of the month. Real-time flow data are unreliable under these conditions, and will not be presented until reviewed by the USGS. Backflow was observed at Falmouth Springs and Manatee Springs. Backflow appeared to be continuous at White Springs. Major springs on the Santa Fe above SR47 flowed continuously, including Poe, Blue Springs, and Ginnie Springs.

GROUNDWATER

- Groundwater levels increased in 92% of the District's monitored wells (Figure 10). Significant increases were seen along river corridors and in areas of known high aquifer recharge. Boil-water notices were issued by local health departments in many areas where groundwater is influenced by river levels. Conditions generally improved in the eastern and southern parts of the District since March, but still remained below normal. Sixty-two percent of the levels were above the 25$^{th}$ percentile (normal range and above), compared to 7% last month. Only 5 wells were below the 10$^{th}$ percentile, considered extremely low, compared to 46 last month. One record monthly low, 7 monthly highs, and 2 historical highs were observed. Statistics for a representative sample of wells are shown in Figure 11.

HYDROLOGICAL/METEOROLOGICAL INFORMATION

- The 12-month Standardized Precipitation Index (SPI), based on long-term precipitation patterns that impact streams and groundwater, indicated near-normal conditions throughout the District. The 3-month SPI, which better describes soil moisture deficits, also indicated near-normal conditions.
- As characterized by the US Geological Survey based on seven-day average streamflow, none of the District's rivers are below normal or in hydrological drought.
- Long-range outlooks from the National Weather Service Climate Prediction Center show no increased probability of above-normal or below-normal precipitation.

WATER CONSERVATION

A Phase I Water Shortage Advisory requesting voluntary reductions in water use remains in effect. The District urges all water users to eliminate wasteful and inefficient water use. Water is conserved by using the minimum amount needed and by irrigating only when necessary and in the morning before 10 a.m. and in evening hours after 4 p.m., when lower temperature and wind velocity reduce the amount of water lost to evaporation. The District offers a variety of free water conservation information to the public via its website and by request.

/dd

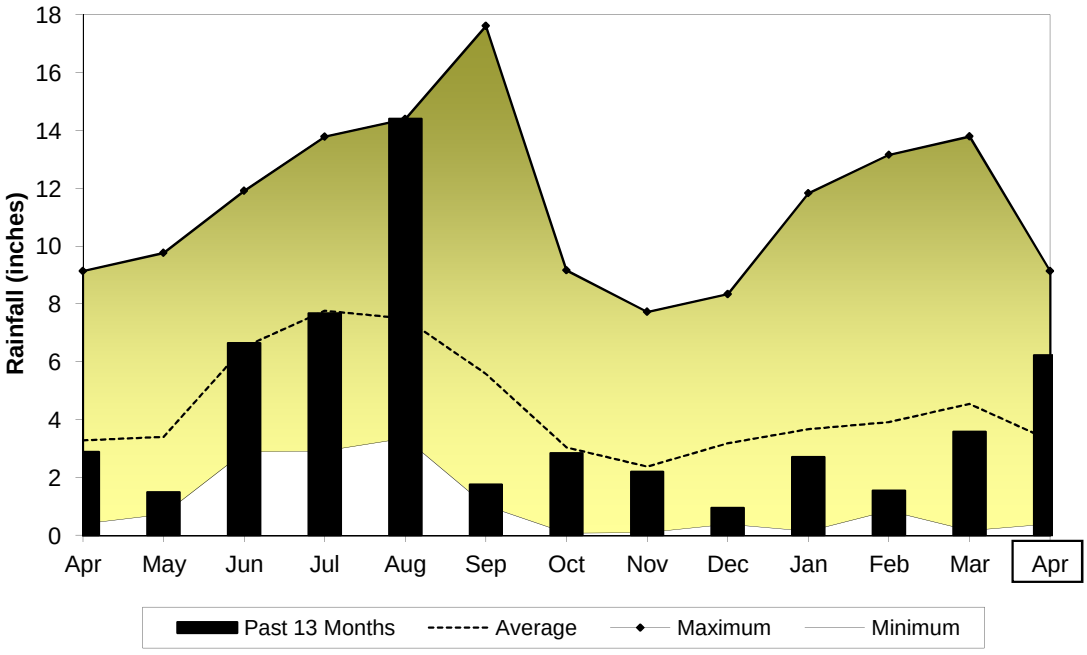
## Table 1. Estimated Rainfall Totals

| County | April-2009 | April-2008 | Last 12 Months | April Average |
|---|---|---|---|---|
| Alachua | 3.53 | 2.00 | 48.20 | 3.07 |
| Baker | 5.79 | 4.06 | 52.56 | 3.29 |
| Bradford | 4.05 | 2.53 | 49.25 | 3.16 |
| Columbia | 6.20 | 3.62 | 49.13 | 3.15 |
| Dixie | 3.81 | 1.40 | 56.25 | 3.48 |
| Gilchrist | 3.65 | 1.99 | 50.59 | 3.58 |
| Hamilton | 8.82 | 4.06 | 50.49 | 3.45 |
| Jefferson | 10.46 | 3.20 | 59.70 | 3.63 |
| Lafayette | 6.51 | 2.21 | 52.76 | 3.07 |
| Levy | 2.54 | 1.60 | 50.45 | 3.47 |
| Madison | 10.93 | 4.77 | 60.23 | 3.22 |
| Suwannee | 7.11 | 3.49 | 52.52 | 3.29 |
| Taylor | 7.23 | 2.53 | 54.54 | 3.23 |
| Union | 4.55 | 2.82 | 44.85 | 3.65 |

| | |
|---|---|
| April 2009 Average: | 6.22 |
| Historical April Average: | 3.28 |
| Historical 12-month Average: | 54.68 |
| Past 12-Month Total: | 52.20 |
| 12-month Rainfall Deficit: | -2.48 |

(Rainfall reported in inches)

## Figure 1: Comparison of District Monthly Rainfall



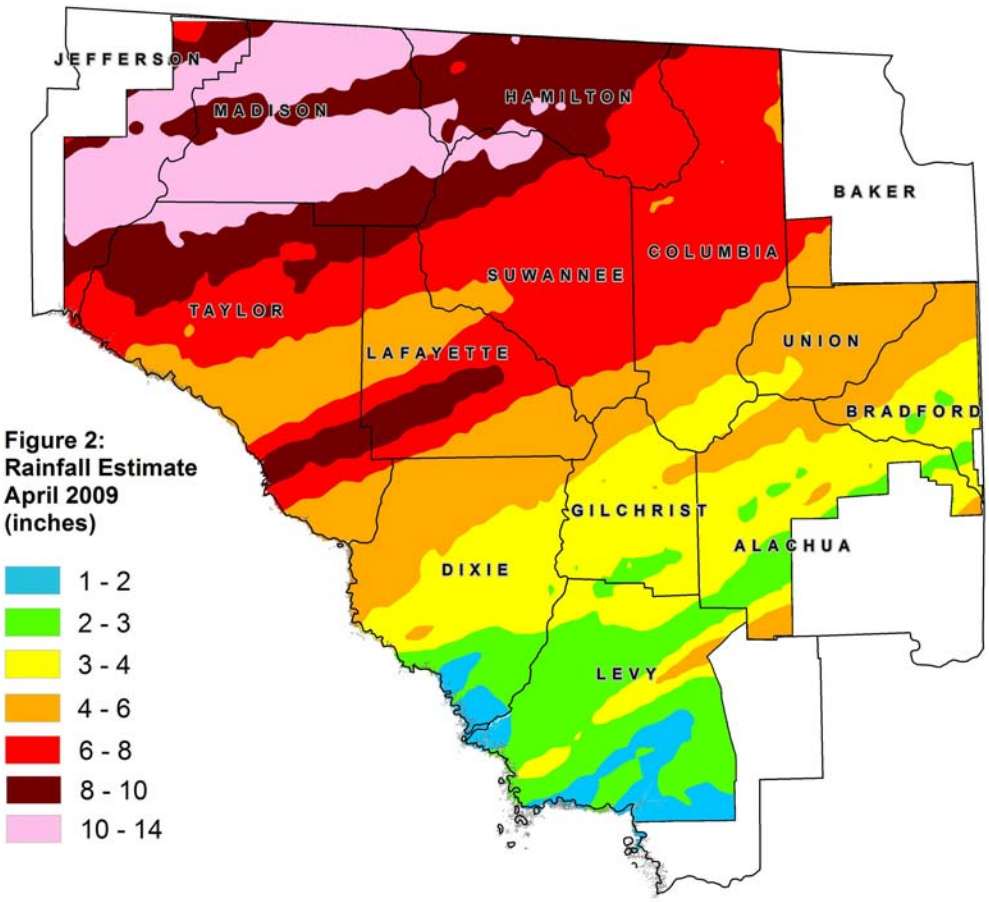



**Figure 2:**
**Rainfall Estimate**
**April 2009**
**(inches)**

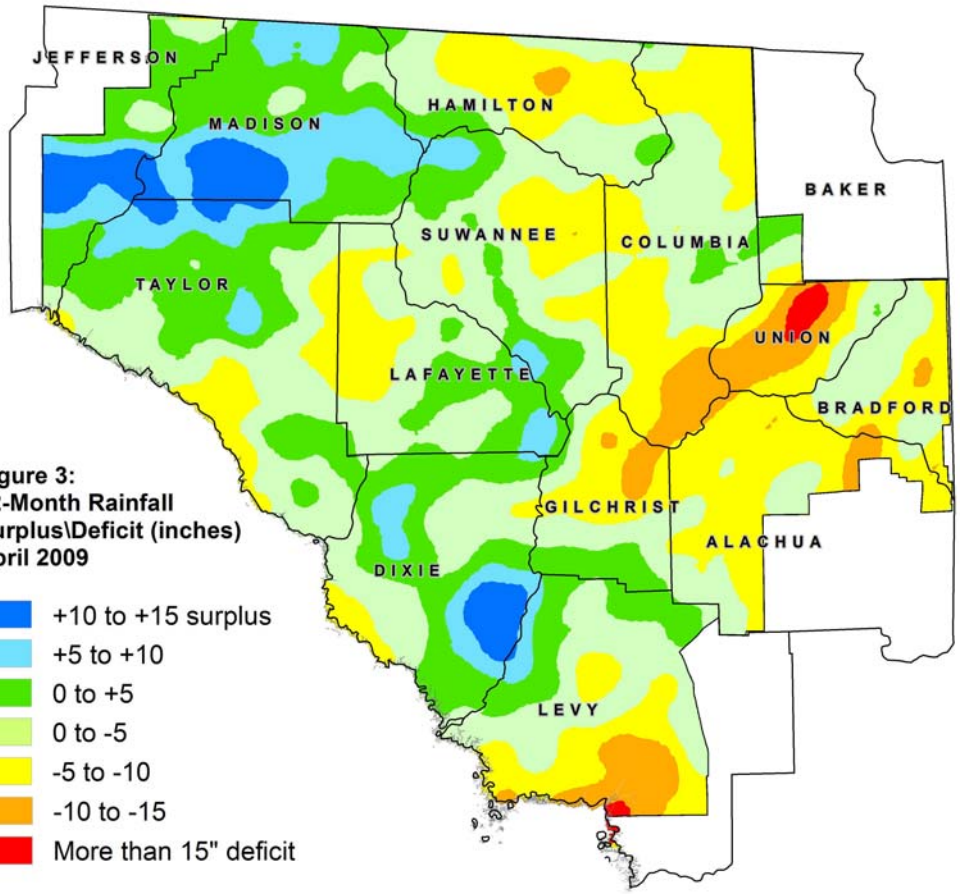



**Figure 3:**
**12-Month Rainfall**
**Surplus\Deficit (inches)**
**April 2009**

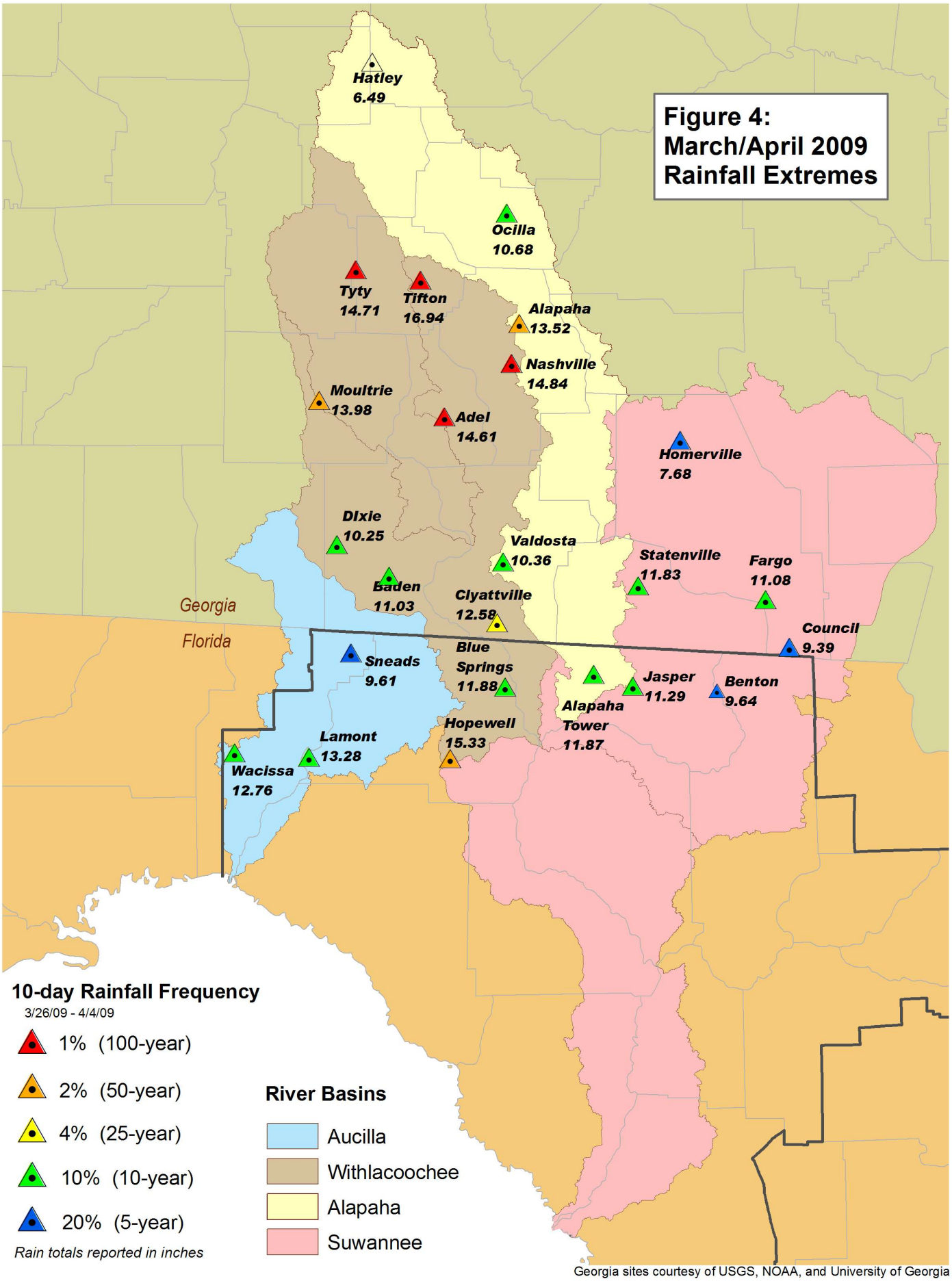


Figure 4:
March/April 2009
Rainfall Extremes
Hatley
6.49
Ocilla
10.68
Tyty
14.71
Tifton
16.94
Alapaha
13.52
Nashville
14.84
Moultrie
13.98
Adel
14.61
Homerville
7.68
Dixie
10.25
Valdosta
10.36
Statenville
11.83
Fargo
11.08
Baden
11.03
Clyattville
12.58
Council
9.39
Georgia
Florida
Sneads
9.61
Blue
Springs
11.88
Jasper
11.29
Benton
9.64
Alapaha
Tower
11.87
Hopewell
15.33
Lamont
13.28
Wacissa
12.76
10-day Rainfall Frequency
3/26/09 - 4/4/09
1% (100-year)
2% (50-year)
4% (25-year)
10% (10-year)
20% (5-year)
Rain totals reported in inches
River Basins
Aucilla
Withlacoochee
Alapaha
Suwannee
Georgia sites courtesy of USGS, NOAA, and University of Georgia

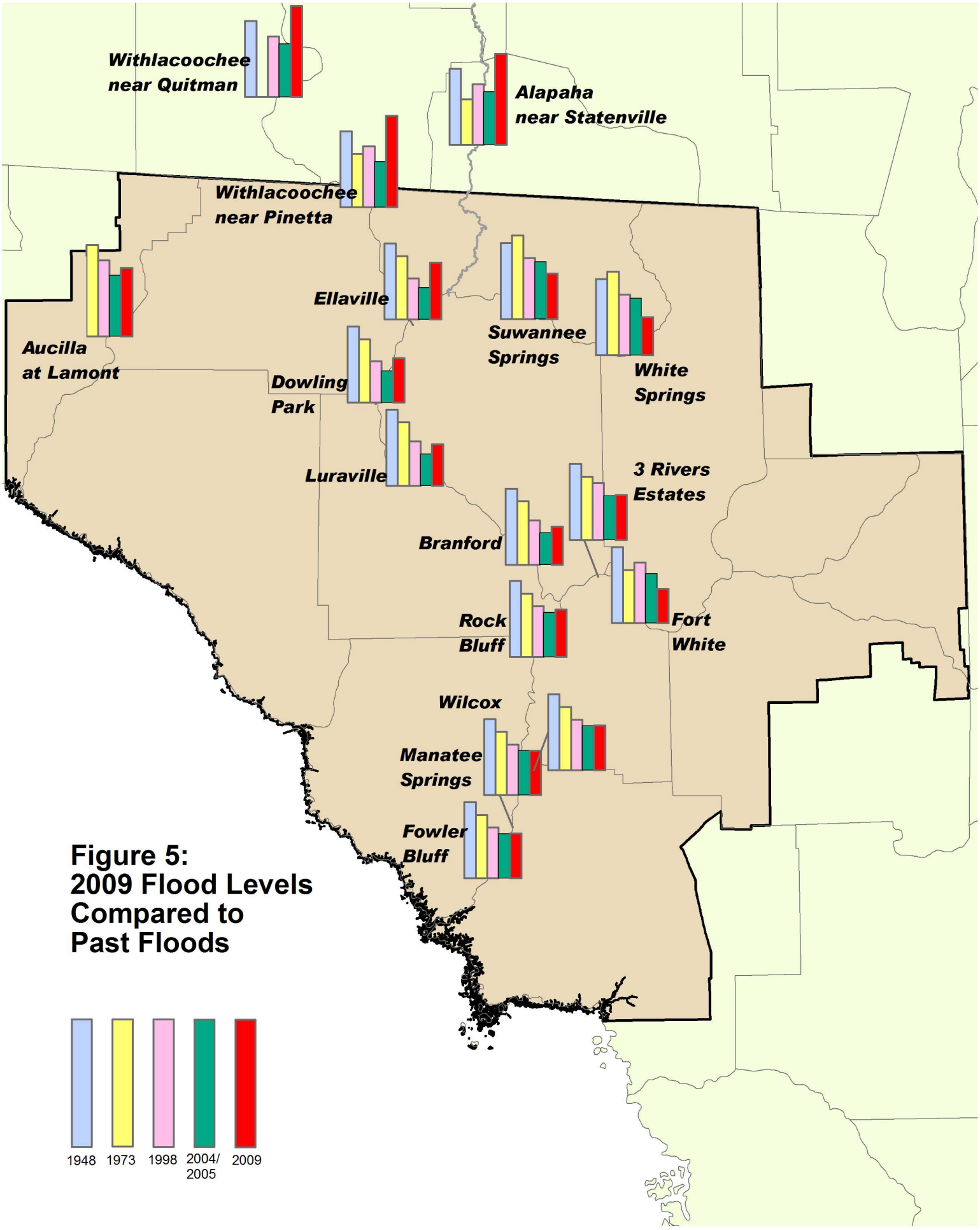
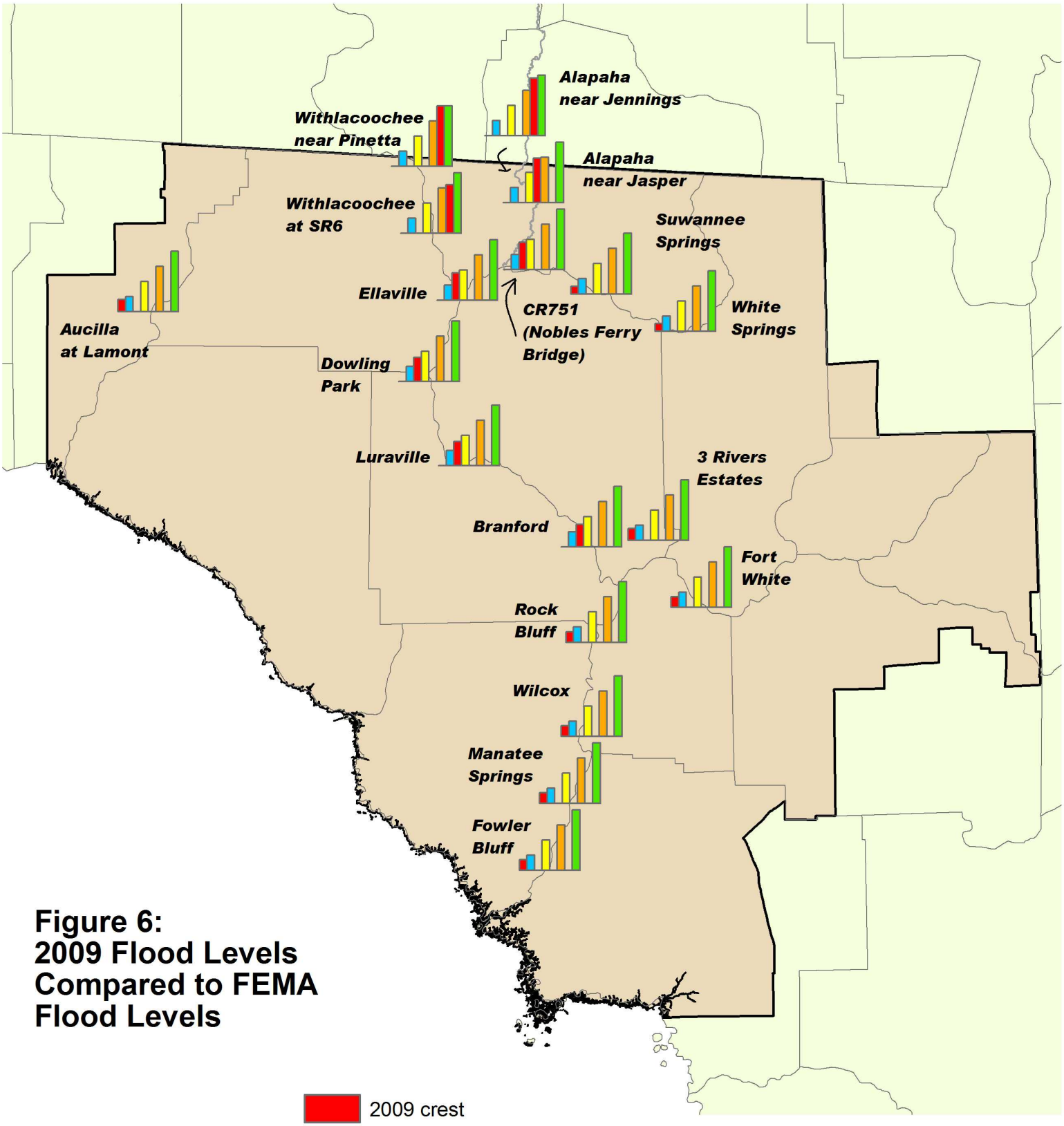
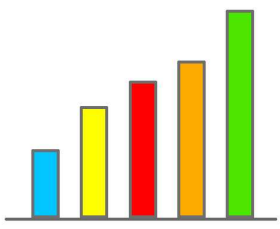



**Figure 5: 2009 Flood Levels Compared to Past Floods**




# Figure 6: 2009 Flood Levels Compared to FEMA Flood Levels



- 2009 crest
- 10% (10-year) flood
- 2% (50-year) flood
- 1% (100-year) flood
- 0.2% (500-year) flood

Note on terminology: Use of "1% flood" is preferred over the term "100-year flood". The latter term has been misunderstood to mean that such a flood occurs only once every hundred years. In fact, the 1% flood has a 1 in 100 chance of occurring in any year. Similarly, the 10% flood ("10-year") has a 1 in 10 chance, and the 0.2% flood ("500-year") has a 1 in 500 chance of occurring in any year.

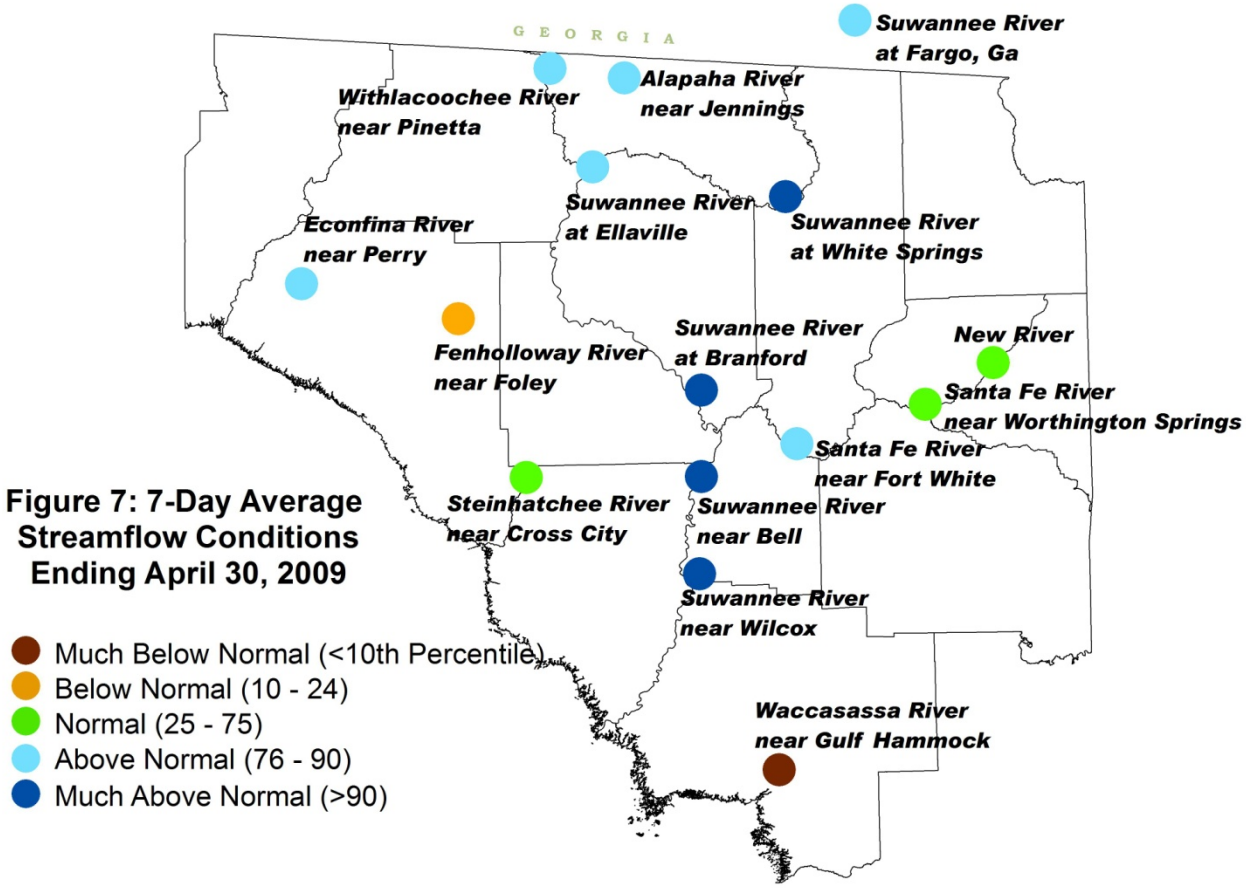



**Figure 7: 7-Day Average Streamflow Conditions Ending April 30, 2009**

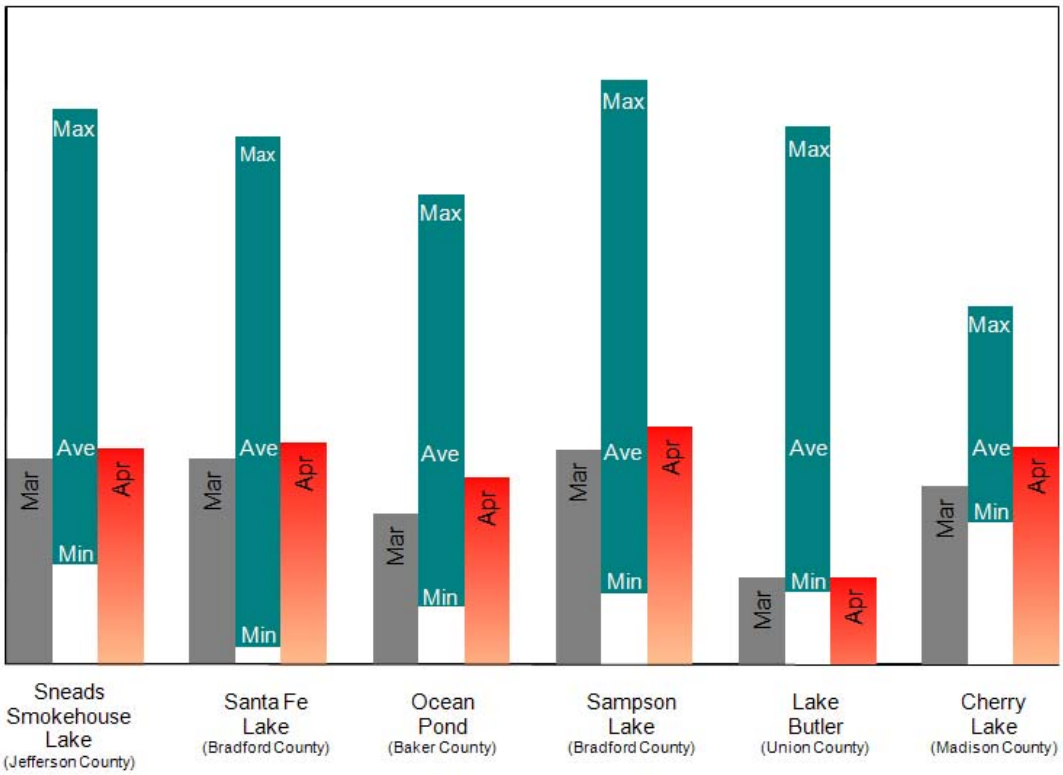
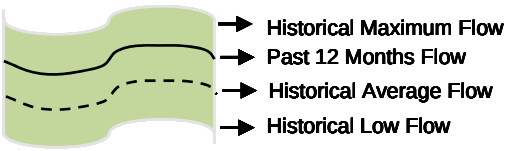


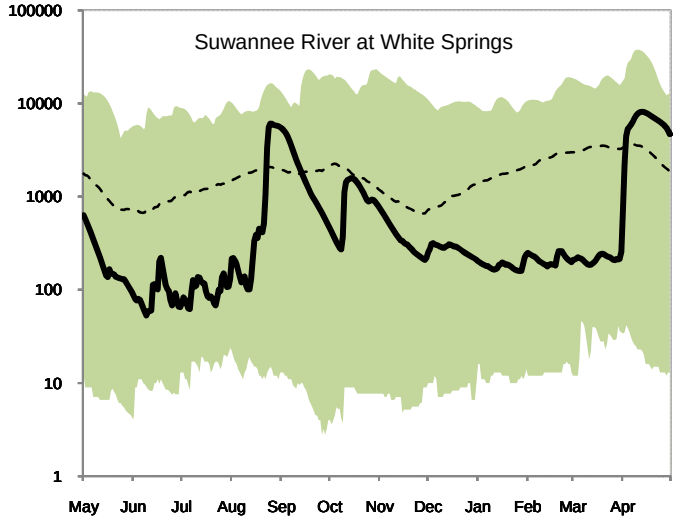

**Figure 8: Lake levels, relative to historic maximum, minimum, and average levels.**

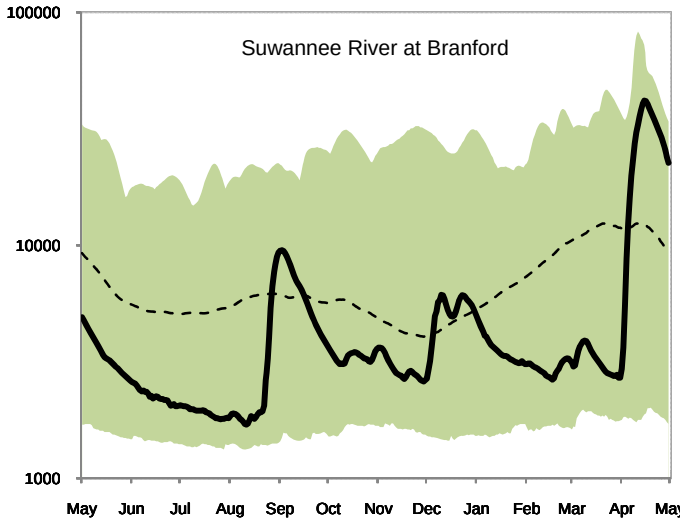
**Figure 9: Daily River Flow Statistics**

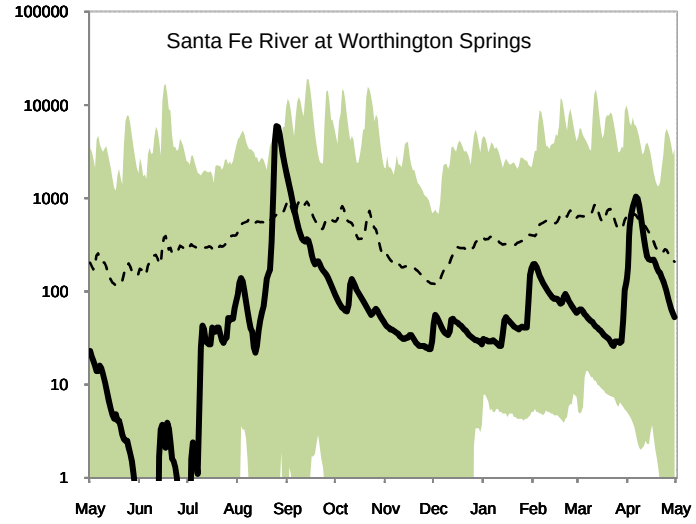
May 1, 2008 through April 30, 2009

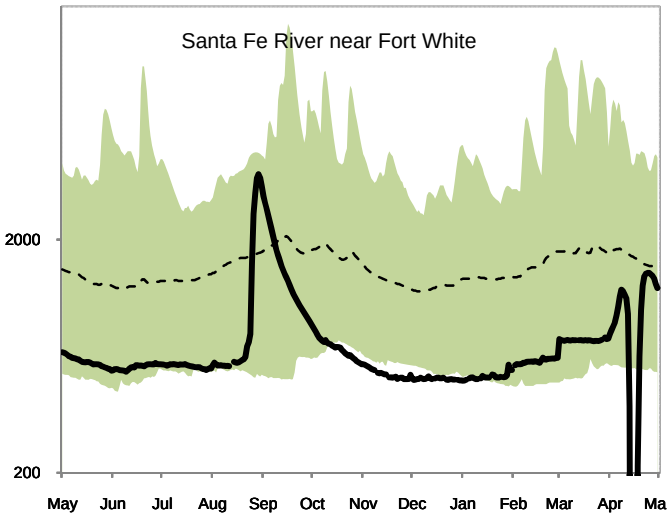


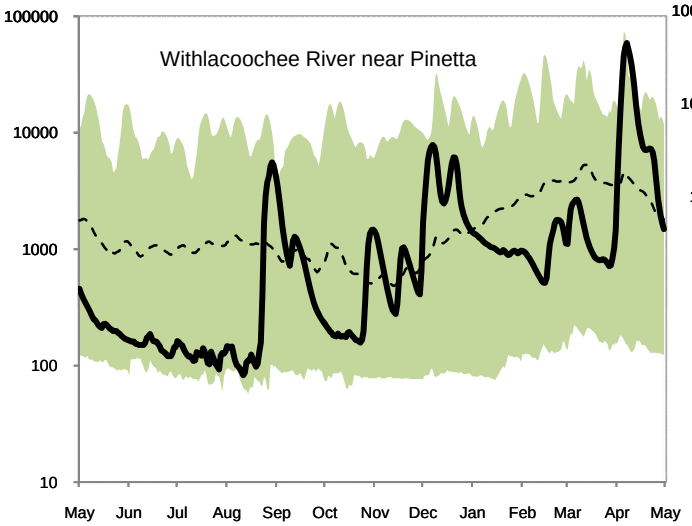

RIVER FLOW, CUBIC FEET PER SECOND

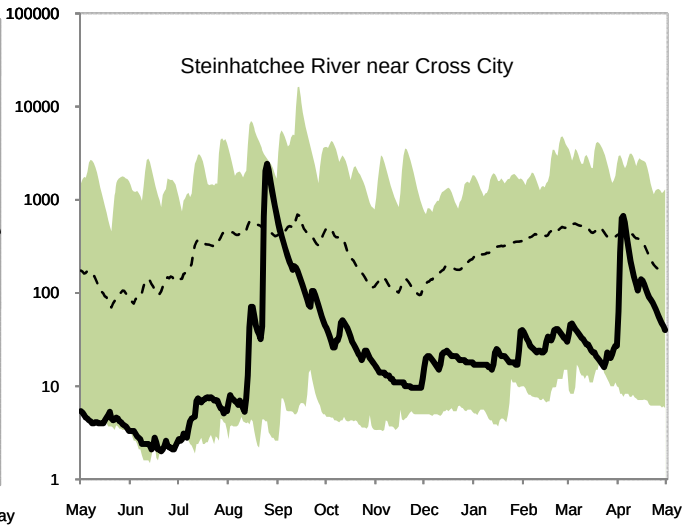


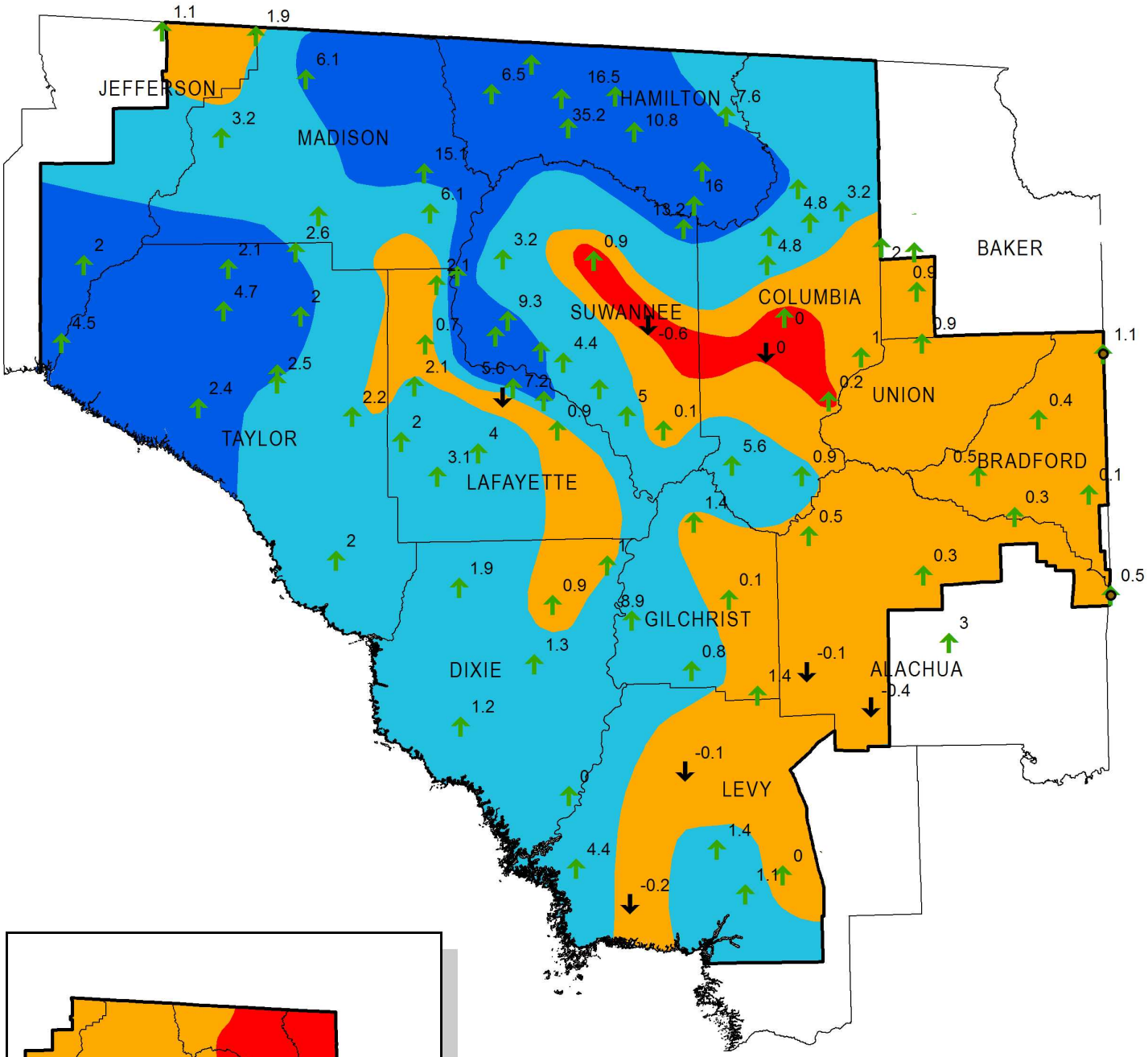



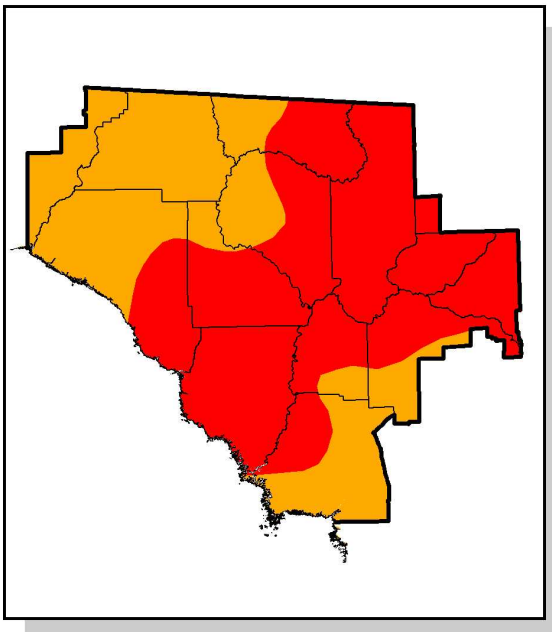



# Figure 10: April 2009 Groundwater Levels



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

Numbers indicate change, in feet, since last month

Inset: March 2009 Groundwater Levels

## Figure 11: Monthly Groundwater Level Statistics

Levels May 1, 2008 through April 30, 2009
Period of Record Beginning 1978