SUWANNEE RIVER WATER MANAGEMENT DISTRICT

MEMORANDUM

TO: Governing Board

FROM: Robbie McKinney, Hydrologic Program Manager, Office of Water Resources

THRU: Hugh Thomas, Executive Director

DATE: February 28, 2023

RE: February 2023 Hydrologic Conditions Report

RAINFALL

- Districtwide average rainfall for the month was 3.61, which was about 5% lower than the 1932-2022 average of 3.80" (Table 1, Figure 1). The 12-month period ending February 28 reflected a Districtwide rainfall deficit of 3.48", which represented a decrease in the 5.74" deficit seen at the end of January. Most District counties received between 2" and 6" of rainfall on average with areas of Jefferson, Madison, Taylor, and Lafayette counties receiving more than 6" of rainfall (Figure 2).

- A 12-month rainfall deficit was still present for all river basins, with each decreasing in deficit at the end of February. (Figure 3). However, portions of the Waccasassa, Coastal, Suwannee, and Aucilla basins showed surpluses greater than 6" by month's end. Areas within most of the basins had rainfall deficits of greater than 14" at the end of the month. Four of the river basins also exhibited 3-month rainfall deficits, which mostly increased from January to the end of February (Figure 4). The Aucilla Basin had neither a deficit nor surplus this month due to increased rainfall in the area.

SURFACE WATER

- **Rivers:** Many of the river stations shown in Figure 5 finished the month in the normal (25^{th} – 75^{th} percentile) flow range. However, both the Santa Fe River at Worthington Springs gage and the Steinhatchee near Cross City gage showed below normal flows (10^{th} – 25^{th} percentile) at the end of February. In addition to those listed above, the New River gage and two St. Mary's Basin gages ended February with below normal flows (Figure 6). Some of the river gages in South Georgia ended the month in the normal flow category despite beginning February in either the above normal (75^{th} – 90^{th} percentile) or high (>90^{th} percentile) ranges due to increased rainfall in that region.

- **Lakes**: Water increased slightly at most monitored lakes in the District this month (Figure 7). The median increase in stage across all measured lakes was around 0.1'. Alligator Lake, however, had a stage decrease of just over 1'. Six lakes concluded the month below their respective long-term averages. As a note, Lake Alto is currently offline and is not included in the report statistics.

- **Springs**: Flow measurements were made during February at 27 springs by the U.S. Geological Survey (USGS), District staff, and contractors. Lafayette Blue Springs (Figure 8) began and ended the month in the much below normal flow category. Fanning Springs saw flows range from the normal to much below normal flow categories throughout February (Figure 9). Both springs experienced flow reversals due to high river stage during the month.

GROUNDWATER

Upper Floridan Aquifer (UFA) levels across the District reflected mostly normal levels in February (Figure 10). Large portions of Taylor, Jefferson, Alachua, and Bradford counties showed high (75th – 90th percentile) levels, while areas of Hamilton County had both high and extremely high (>90th percentile) aquifer levels at the end of the month. Overall, groundwater levels increased by a median of about 0.4' since the end of January and ended February with a Districtwide average around the 57th percentile.

Many of the county index wells remained higher than the historical monthly average levels at the end of February except for wells in Lafayette, Gilchrist, and Dixie counties (Figure 11). The long-term District UFA well levels ended the month in the normal level category (Figure 12a). Overall, water levels at long-term wells with records that extend back to at least 1964 mostly decreased this month (Figure 12b).

CLIMATE AND DROUGHT OUTLOOK

The Climate Prediction Center has indicated that La Niña has ended and El Niño Southern Oscillation (ENSO) neutral conditions are expected to continue through the spring and early summer of 2023.

The NOAA three-month seasonal outlook favors above normal temperatures along with below normal rainfall chances throughout the District from March through May.

The U.S. Drought Monitor report released on March 9, 2023, shows most of the District in the Moderate Drought (D1) category with portions of Taylor, Madison, and Hamilton listed as Abnormally Dry (D0). Jefferson County, however, is not currently experiencing any drought conditions.

CONSERVATION

Water conservation continues to be necessary to sustain healthy groundwater levels and flows in District springs and rivers. All users are urged to eliminate unnecessary uses. Landscape irrigation during Daylight Saving Time (March 12, 2023, to November 5, 2023) is limited to twice per week based on a District water conservation rule that applies to residential landscaping, public or commercial recreation areas, and businesses that are not regulated by a District-issued water use permit. Information about SRWMD's year-round conservation measures is available at http://www.srwmd.org/index.aspx?NID=337.

ACKNOWLEDGMENTS

The Hydrologic Conditions Report is a monthly combined effort between the Offices of Water Resources and Hydrologic Data Services data collection and review programs. Acknowledgment is made to the following staff for their contributions to the timely production of this report:

- Data Collection: Jamie Gaylord, Matthew Jordan, Dylan Mock, Gene Page, and Vince Robinson
- QA/QC and Reporting: Stephanie Armstrong, Alejandro Arteaga Garcia, Susie Hetrick, Robbie McKinney, and Brandi Sistrunk
- Administrative Support/Document Preparation/IT: Paul Buchanan, Tyler Jordan, Andrew Neel, and April Olive

This report is compiled in compliance with Chapter 40B-21.211, Florida Administrative Code, using rainfall (gage-adjusted radar-derived estimates), groundwater (121 wells), surface water (35 stations), and general information such as drought indices and forecasts. Data are provisional and updated as revised data become available. Data are available at http://www.mysuwanneeriver.com/507/Water-Data-Portal or upon request.

Table 1: Nexrad Monthly Rainfall Totals by County (inches)

County	February 2023	February Average*	Month % of Normal	Total Last 12 Months	Annual % of Normal
Alachua	1.97	3.45	57%	50.19	95%
Baker	2.23	3.53	63%	47.95	91%
Bradford	1.91	3.41	56%	48.58	94%
Columbia	3.03	3.65	83%	49.50	94%
Dixie	3.43	3.60	95%	52.97	91%
Gilchrist	2.62	3.56	73%	50.15	92%
Hamilton	3.73	4.03	93%	48.17	93%
Jefferson	4.39	4.38	100%	50.60	90%
Lafayette	4.02	3.70	109%	49.97	90%
Levy	1.71	3.44	50%	51.74	92%
Madison	5.99	4.19	143%	54.79	103%
Suwannee	3.55	3.83	92%	48.68	92%
Taylor	5.16	3.89	133%	53.92	95%
Union	2.16	3.49	62%	47.68	90%

*Based on PRISM LT81 rainfall averages by county (1927-2021)

February 2022 District Average	3.61
February Long-Term Average (1932-2022)	3.80
Historical 12-month Average (1932-2022)	54.66
Past 12-Month Total	51.18
12-Month Rainfall **Surplus**/Deficit	**-3.48**

Figure 1: Comparison of District-wide Monthly Rainfall

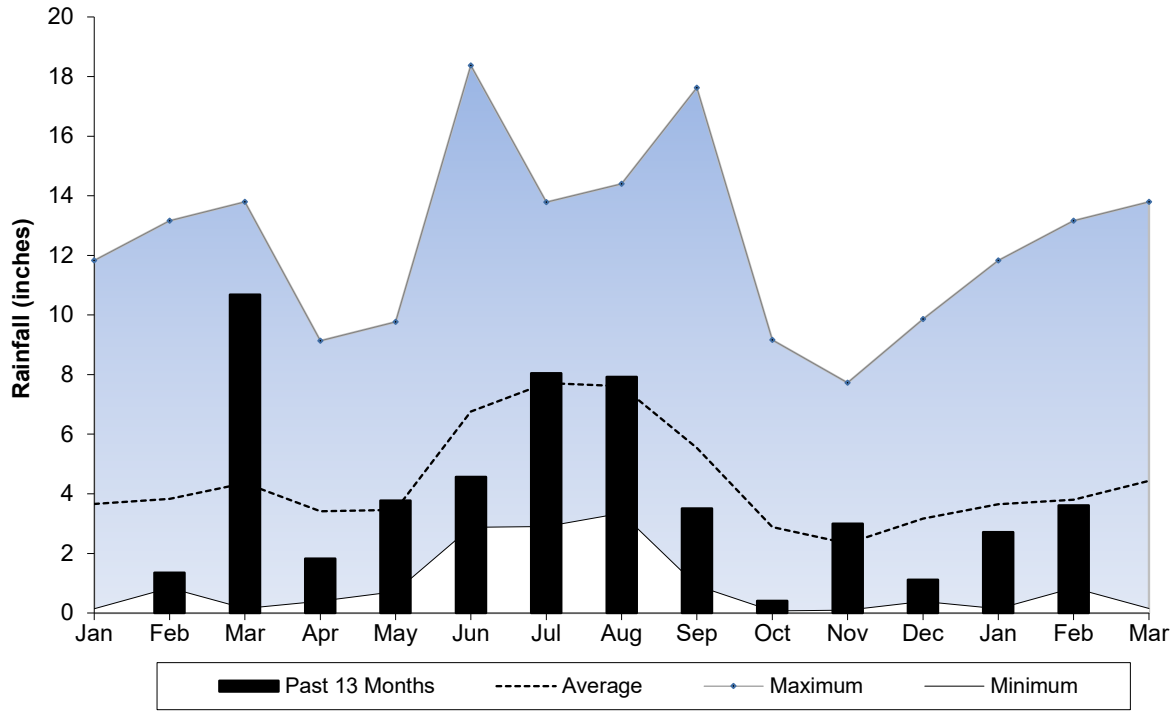


Figure 2: February 2023 SRWMD Gage-adjusted Radar Rainfall

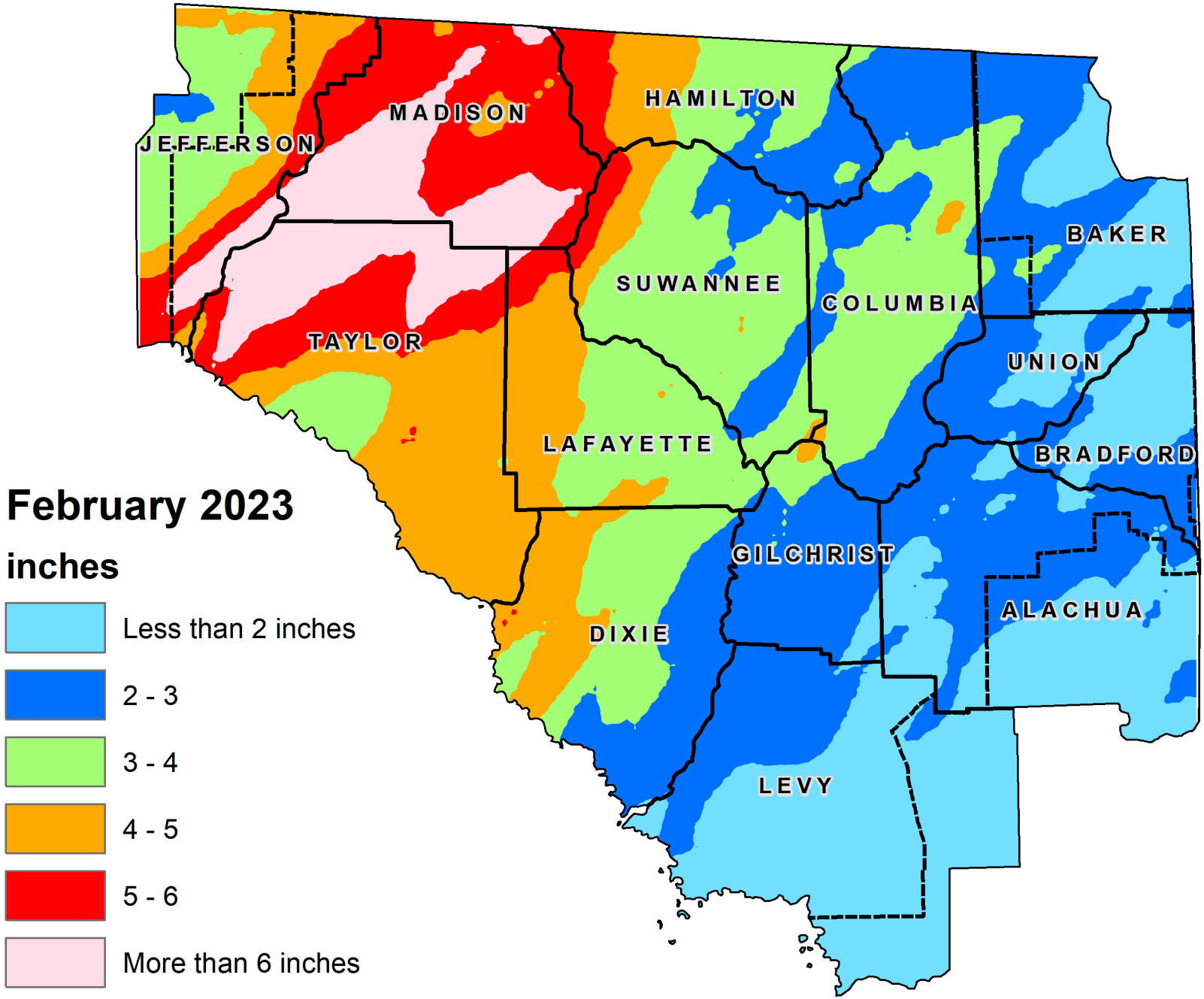
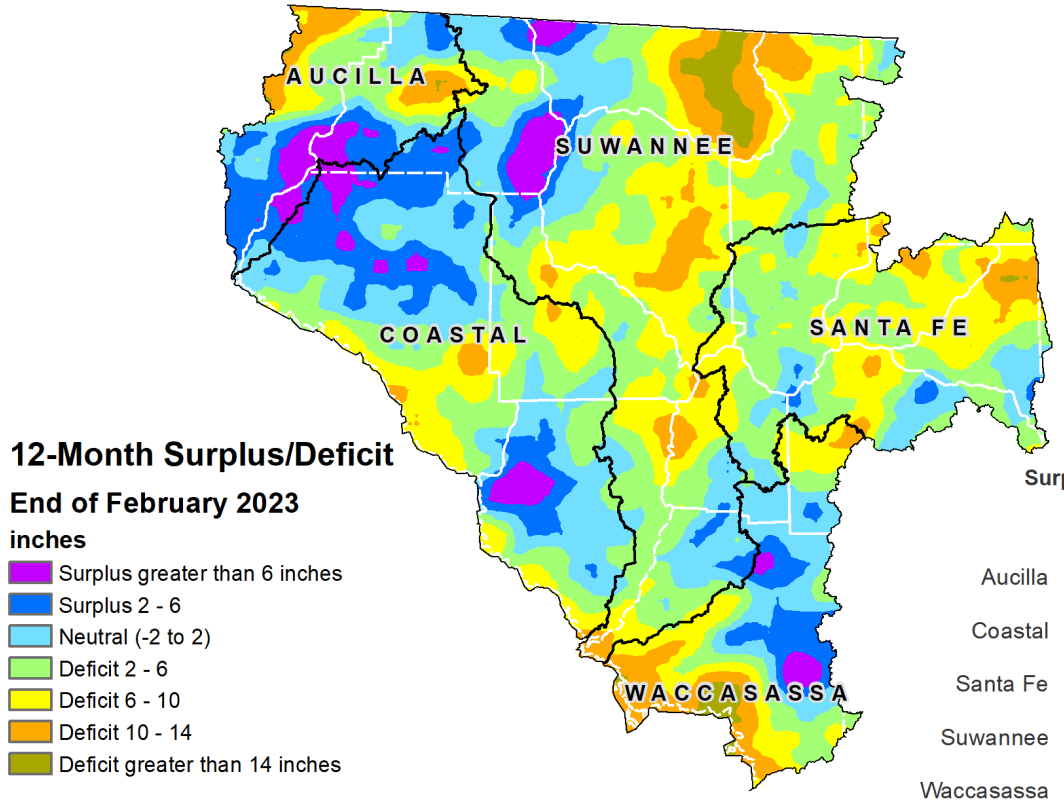


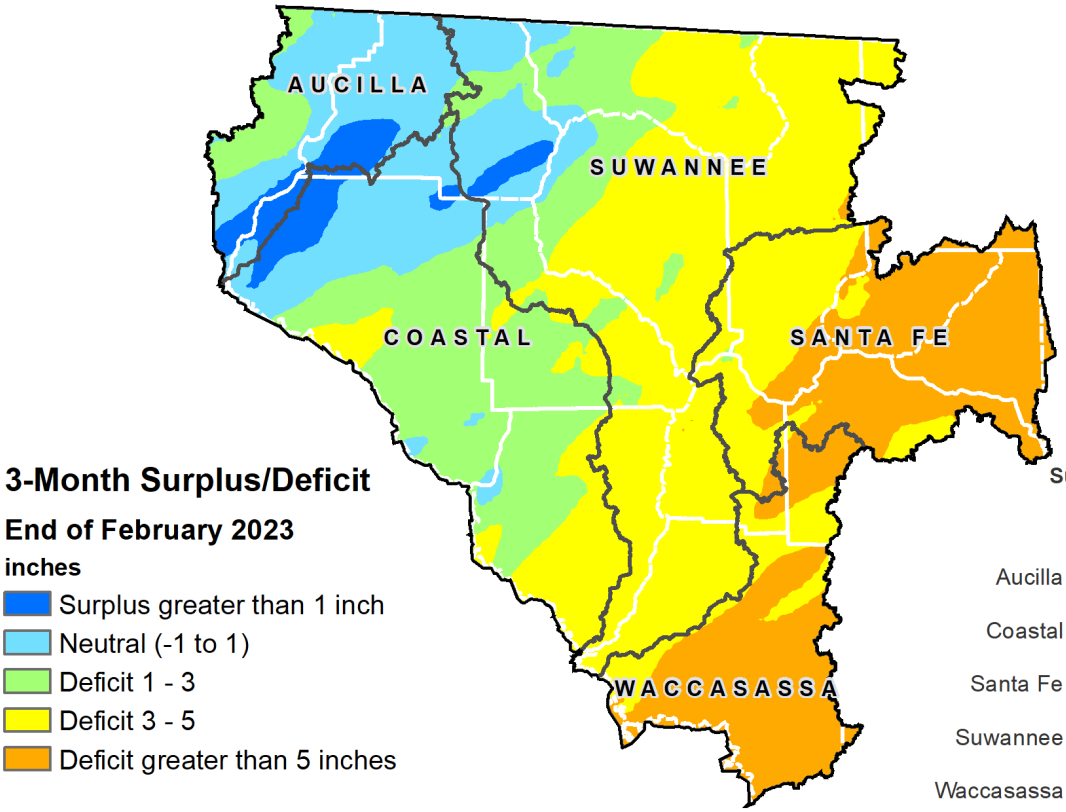
Figure 3: 12 - Month Rainfall Surplus/Deficit by River Basin through February 28, 2023



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

	Feb 2023	Jan 2023
Aucilla	**- 1.3**	- 5.6
Coastal	**- 1.1**	- 4.5
Santa Fe	**- 5.3**	- 6.1
Suwannee	**- 4.8**	- 6.9
Waccasassa	**- 3.4**	- 4.0

Figure 4: 3 - Month Rainfall Surplus/Deficit by River Basin through February 28, 2023

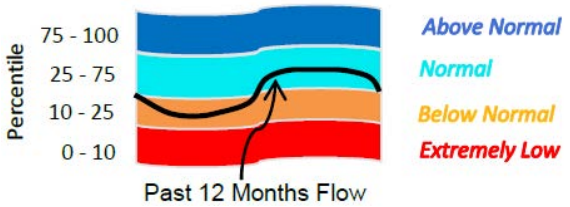


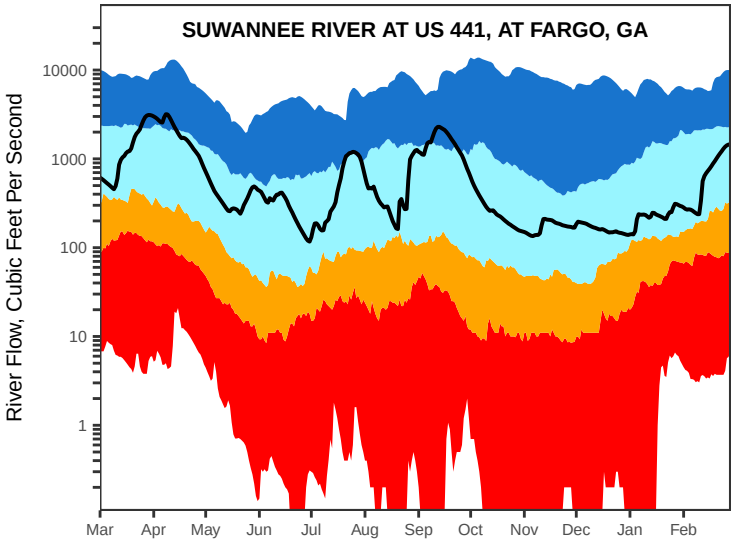
3-Month Surplus (+) or Deficit (-) By Basin

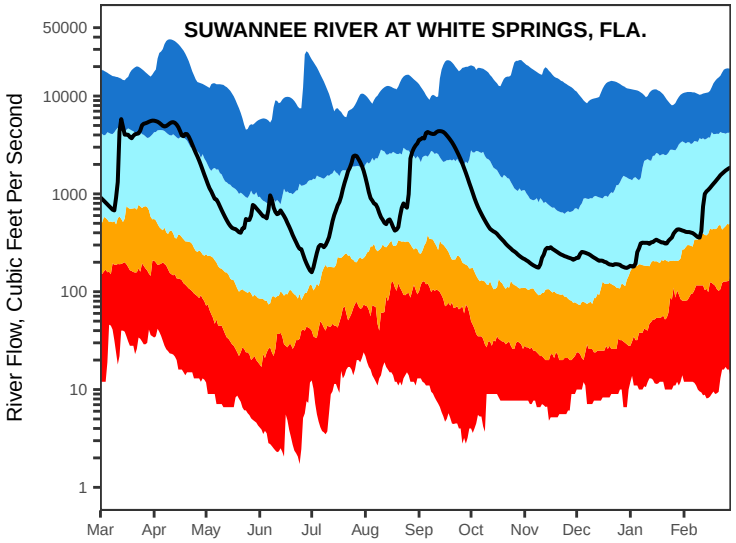
	Feb 2023	Jan 2023
Aucilla	0	- 0.9
Coastal	- 1.8	- 2.1
Santa Fe	- 5.3	- 3.0
Suwannee	- 3.1	- 2.2
Waccasassa	- 5.5	- 3.2

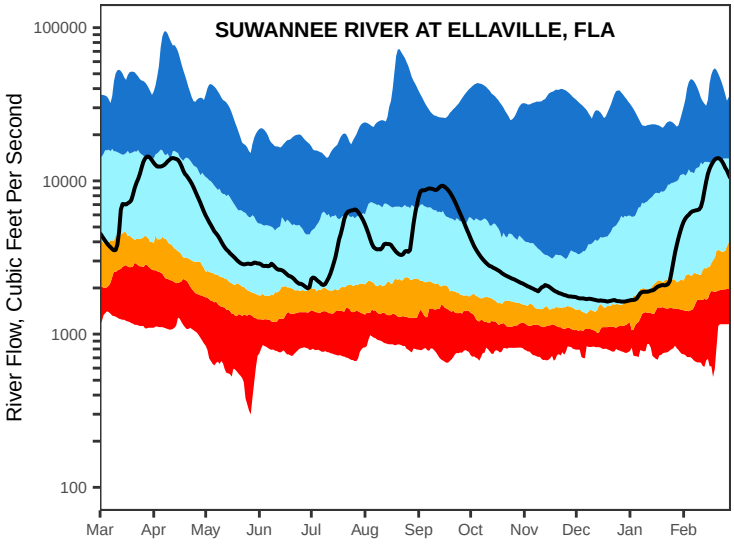
Figure 5: Daily River Flow Statistics

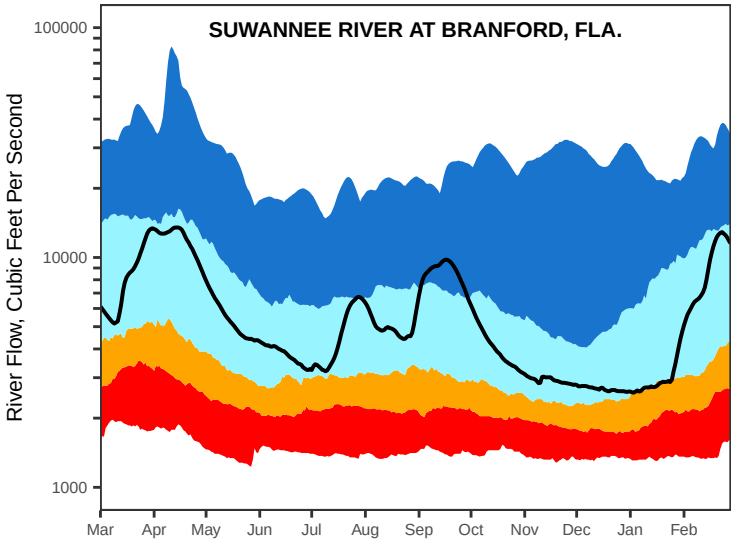
March 1, 2022 through February 28, 2023

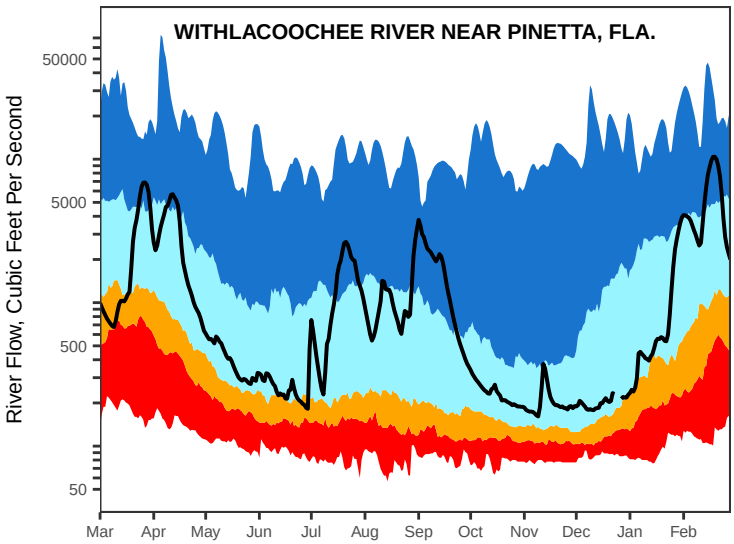












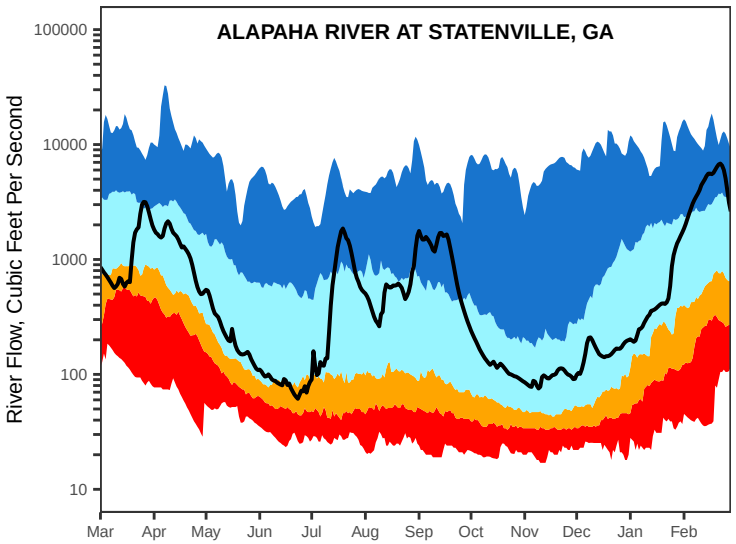
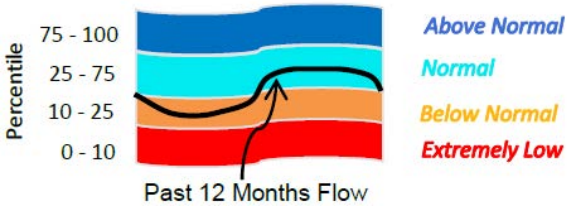
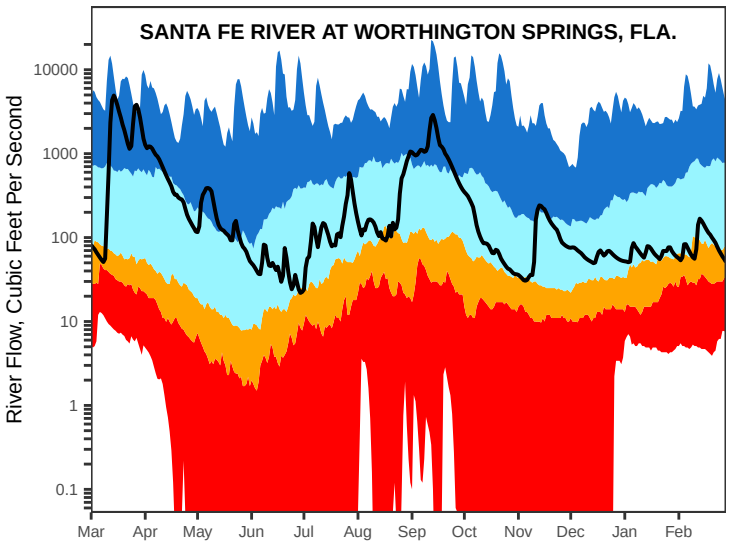
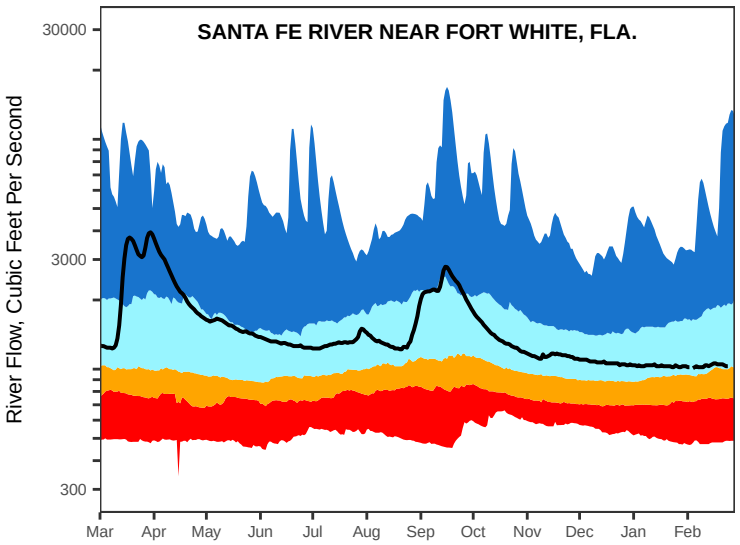


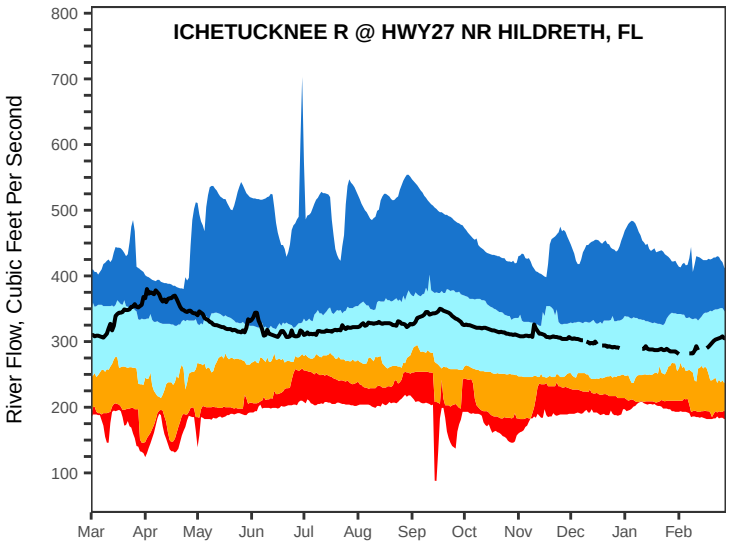
Figure 5, cont.: Daily River Flow Statistics

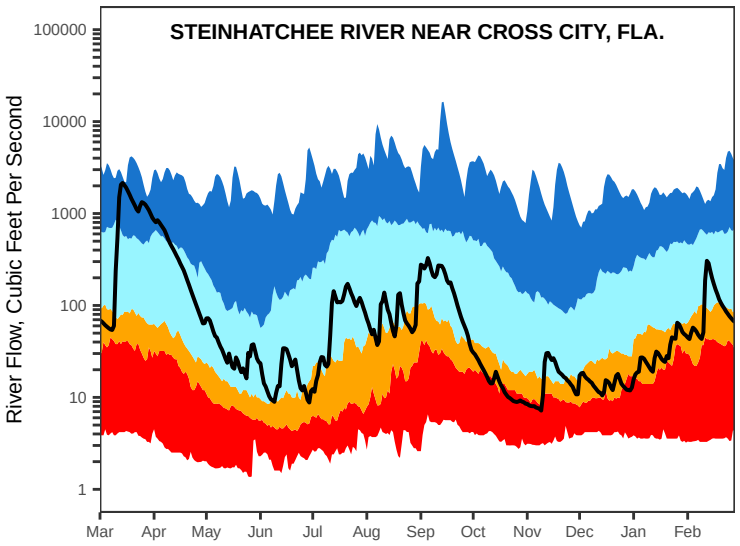
March 1, 2022 through February 28, 2023

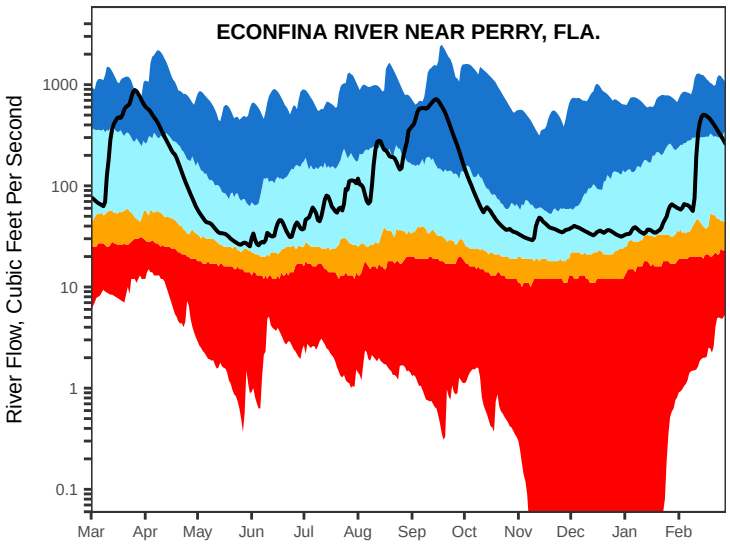












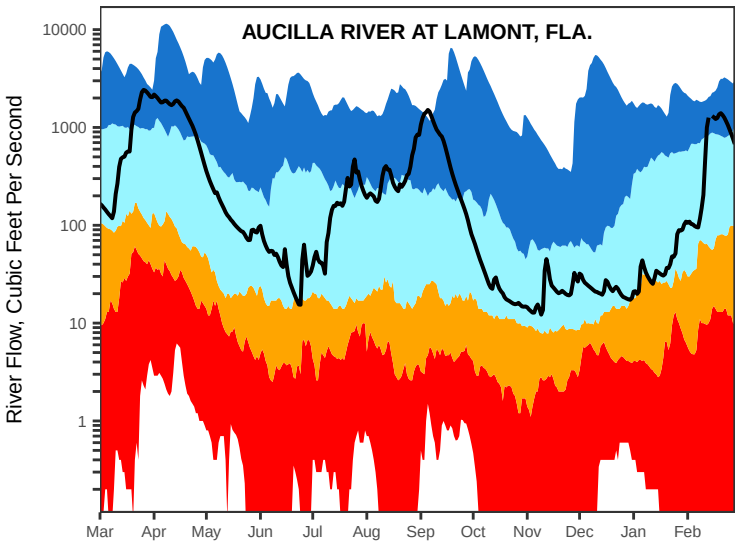
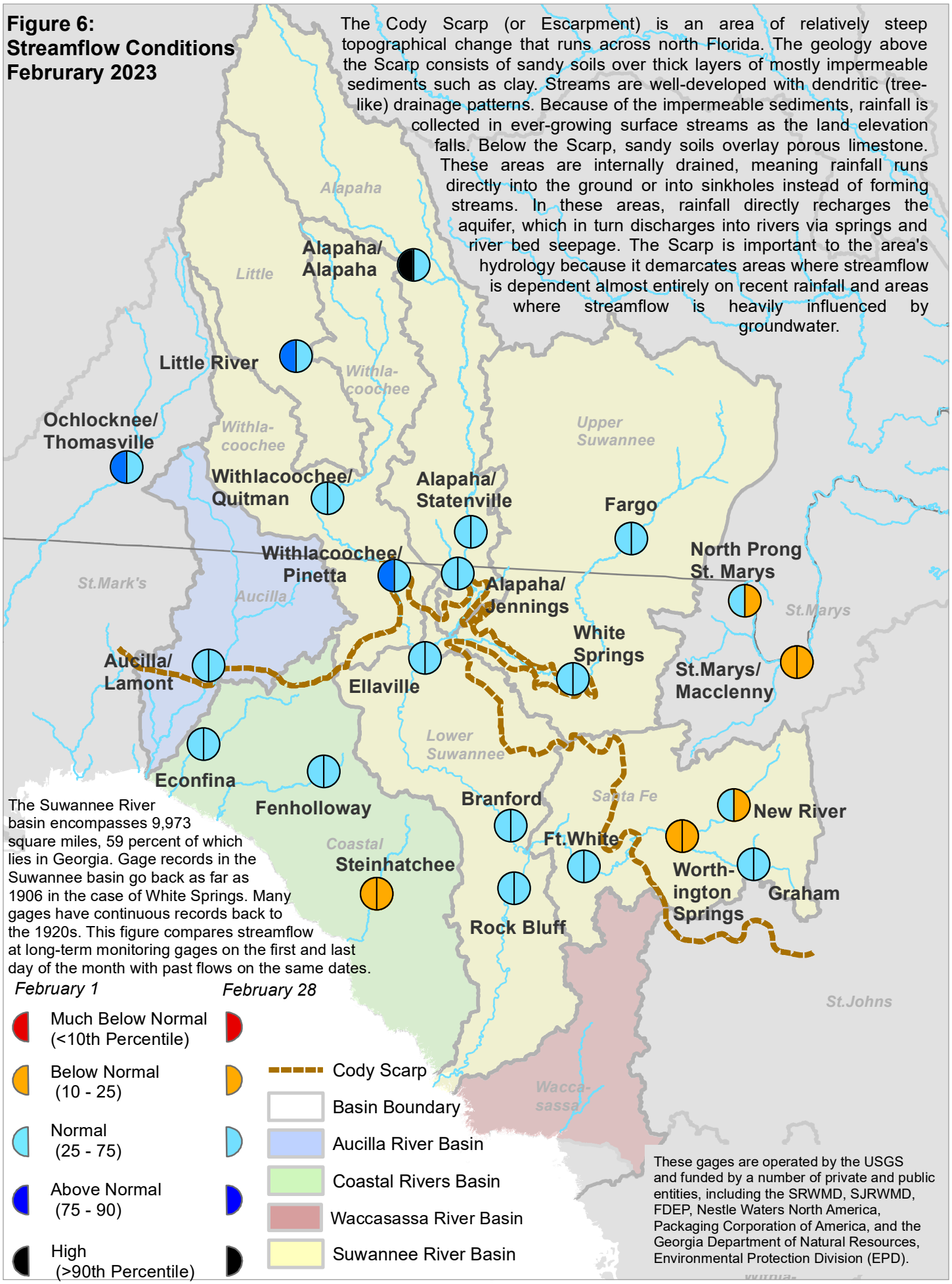


Figure 6:
Streamflow Conditions
Februrary 2023

The Cody Scarp (or Escarpment) is an area of relatively steep topographical change that runs across north Florida. The geology above the Scarp consists of sandy soils over thick layers of mostly impermeable sediments such as clay. Streams are well-developed with dendritic (tree-like) drainage patterns. Because of the impermeable sediments, rainfall is collected in ever-growing surface streams as the land elevation falls. Below the Scarp, sandy soils overlay porous limestone. These areas are internally drained, meaning rainfall runs directly into the ground or into sinkholes instead of forming streams. In these areas, rainfall directly recharges the aquifer, which in turn discharges into rivers via springs and river bed seepage. The Scarp is important to the area's hydrology because it demarcates areas where streamflow is dependent almost entirely on recent rainfall and areas where streamflow is heavily influenced by groundwater.

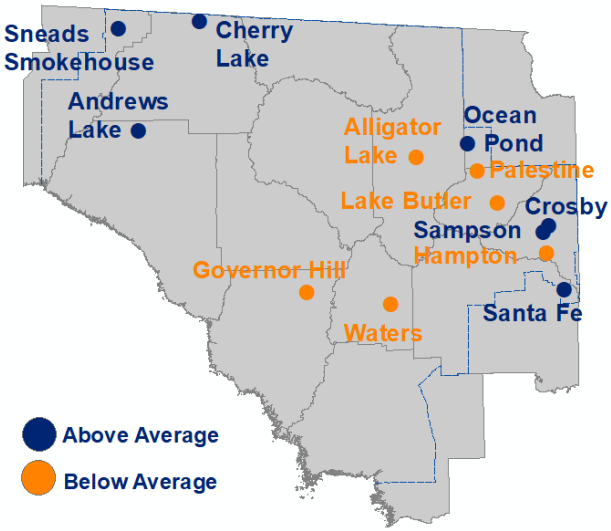


The Suwannee River basin encompasses 9,973 square miles, 59 percent of which lies in Georgia. Gage records in the Suwannee basin go back as far as 1906 in the case of White Springs. Many gages have continuous records back to the 1920s. This figure compares streamflow at long-term monitoring gages on the first and last day of the month with past flows on the same dates.

February 1	*February 28*	
Much Below Normal (<10th Percentile)		
Below Normal (10 - 25)		Cody Scarp
Normal (25 - 75)		Basin Boundary
Above Normal (75 - 90)		Aucilla River Basin
High (>90th Percentile)		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, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protection Division (EPD).

Figure 7: February 2023 Lake Levels



SRWMD lakes react differently to climatic changes depending on their location in the landscape. Some lakes, in particular 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 currently monitors 14 lakes on a long-term basis; much of the data was originally provided by volunteer observers. Monitoring records began in the 1970s, except for Lakes Butler, Sampson, and Santa Fe, which started in 1957.

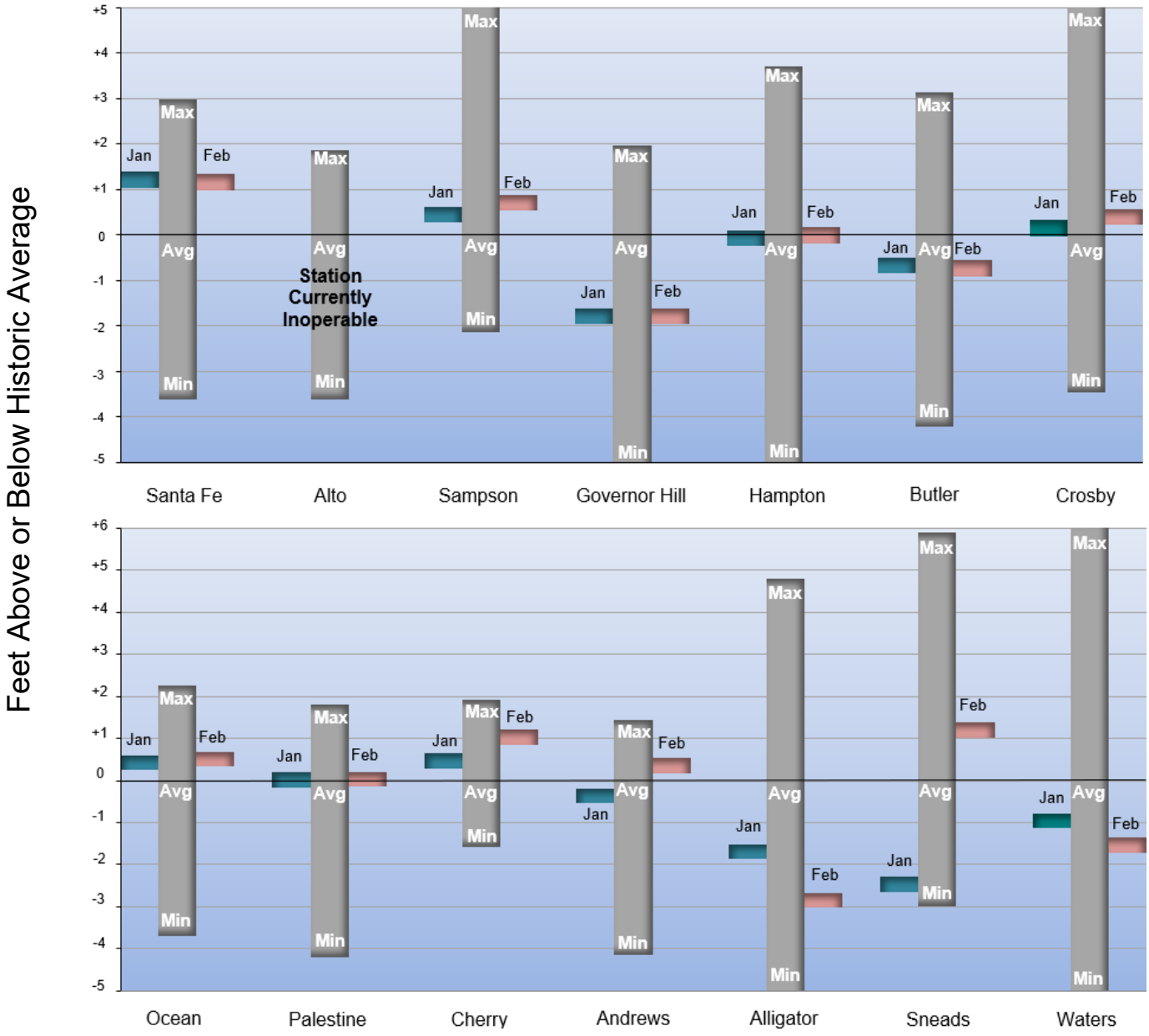


Figure 8: Flow Over the Past 12 Months, Lafayette Blue Springs (cubic feet per second)

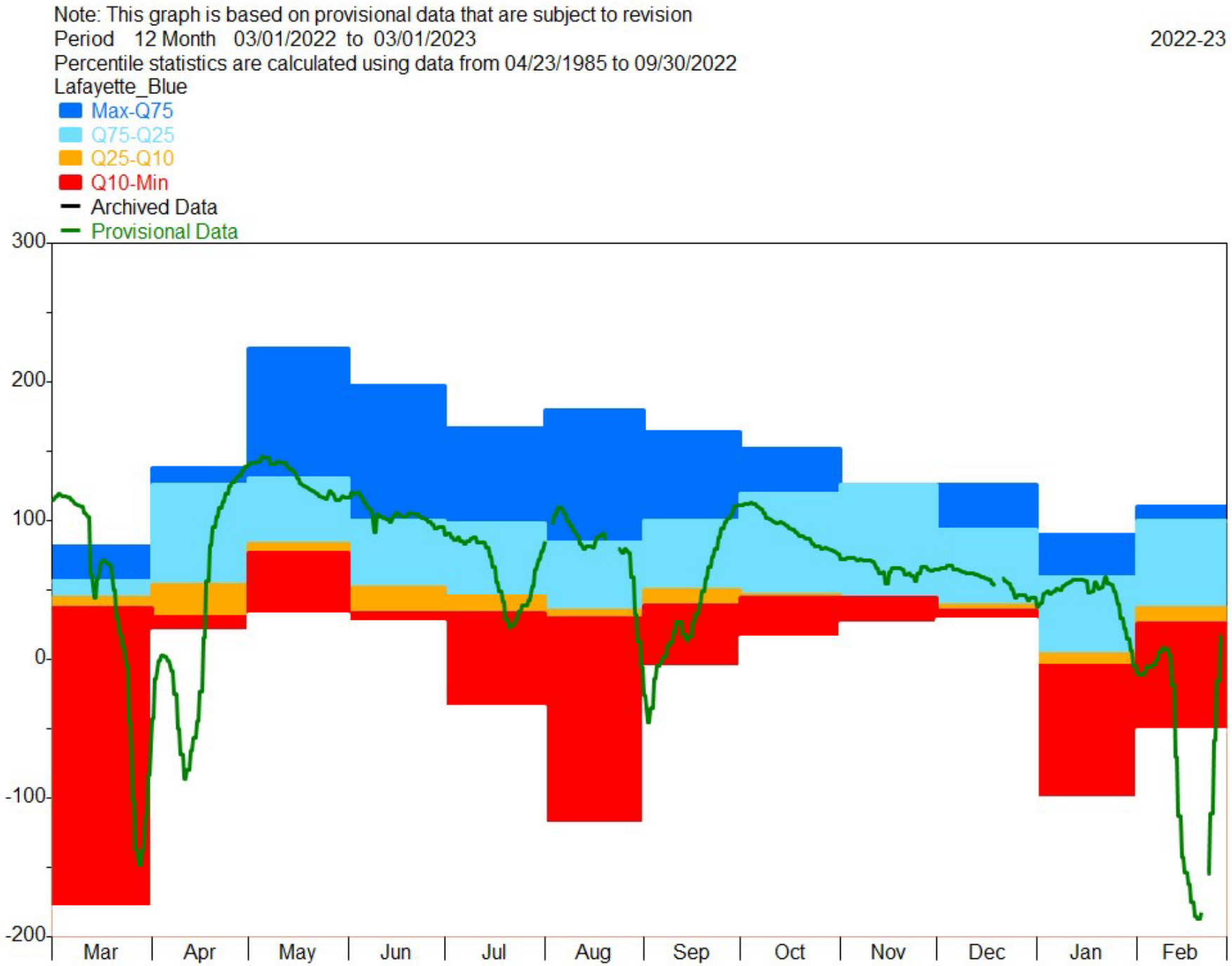
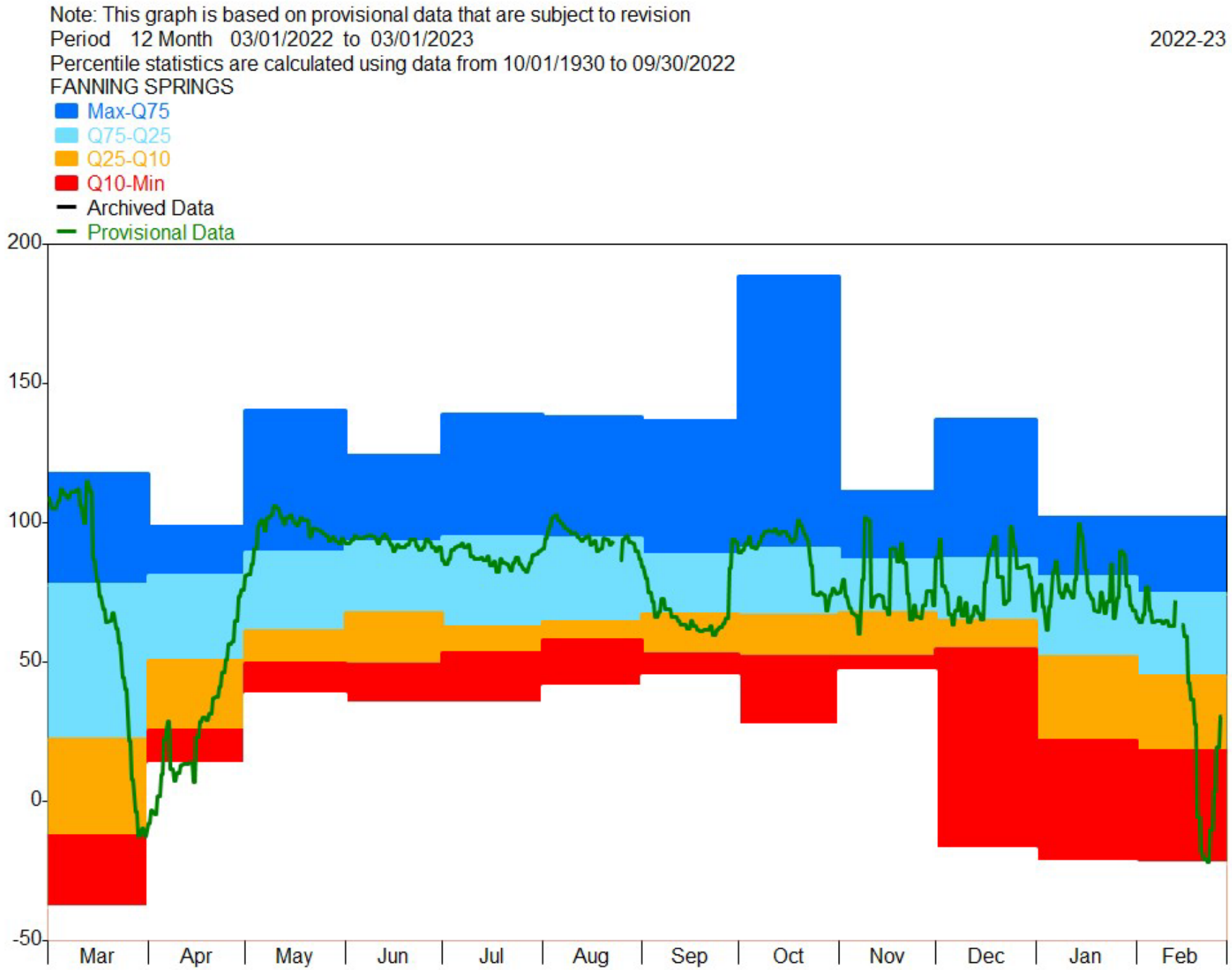


Figure 9: Flow Over the Past 12 Months, Fanning Springs (cubic feet per second)



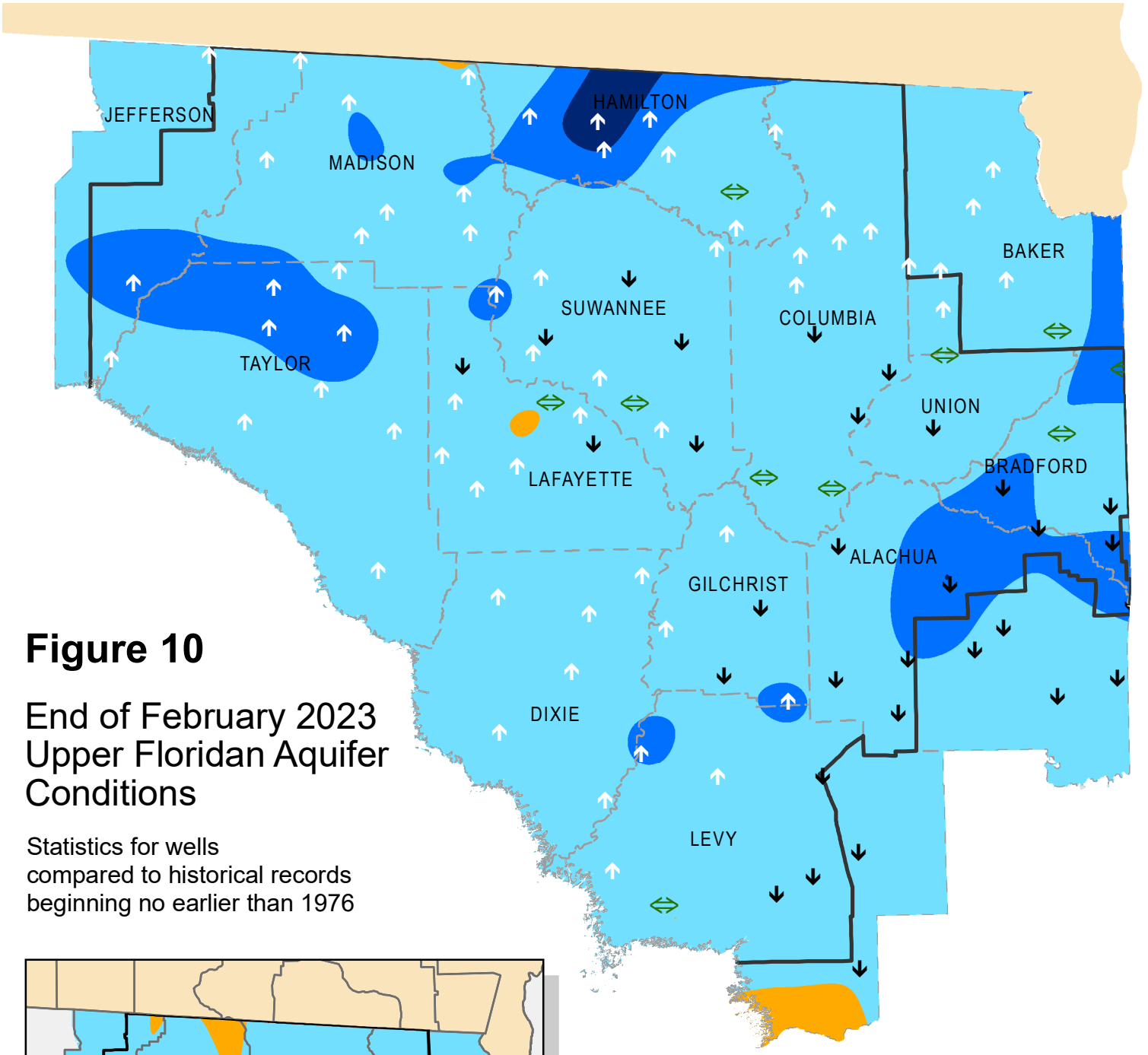
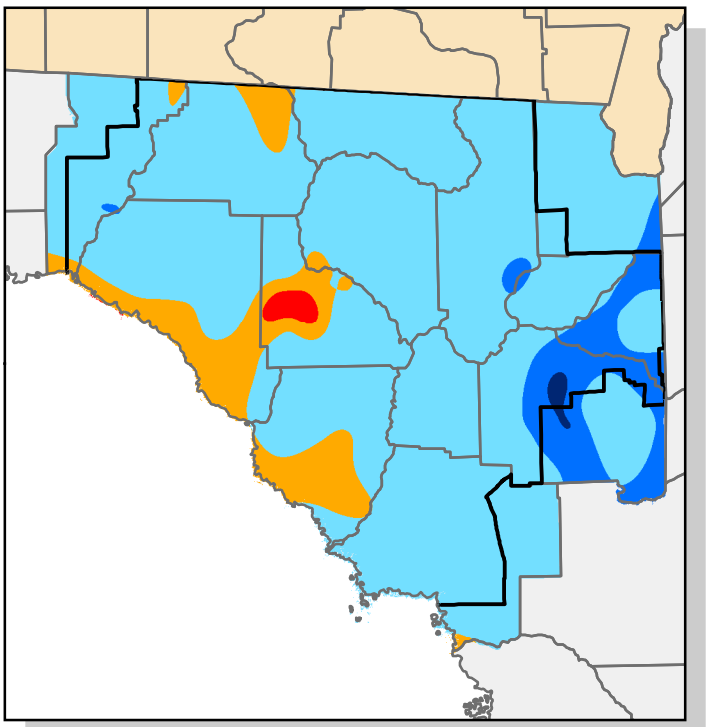


Figure 10

End of February 2023 Upper Floridan Aquifer Conditions

Statistics for wells compared to historical records beginning no earlier than 1976



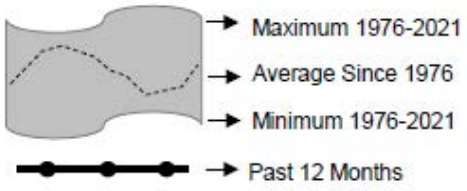
Inset: January Groundwater Percentiles

Additional wells courtesy of SJRWMD, SWFWMD and USGS

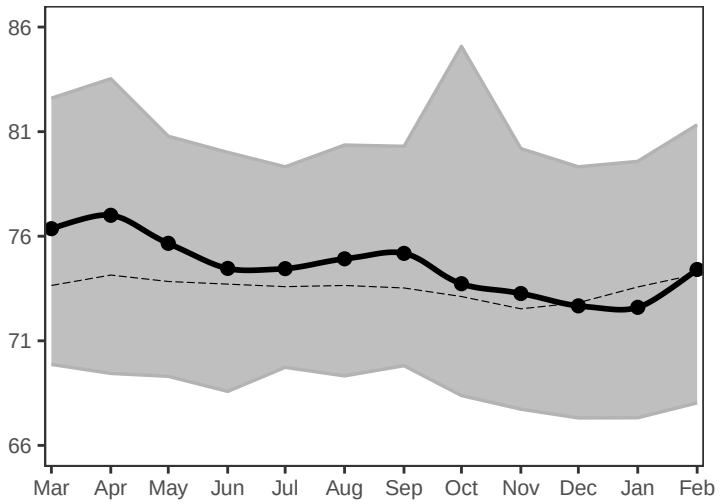
- Extremely High (Greater than 90th Percentile)
- High (75th to 90th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Increase/decrease in level since last month
- Increase/decrease since last month less than one percent of historic range
- District Boundary

Figure 11: Monthly Groundwater Statistics

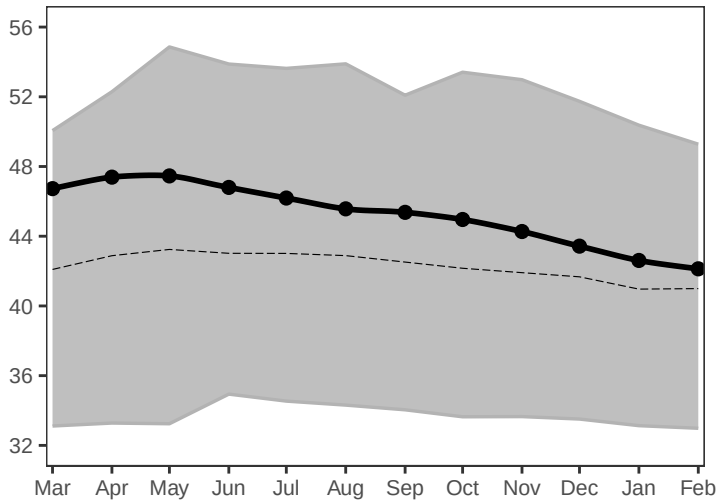
Levels March 2022 through February 2023
Period of Record Beginning 1976



Madison County N010719001
near Greenville

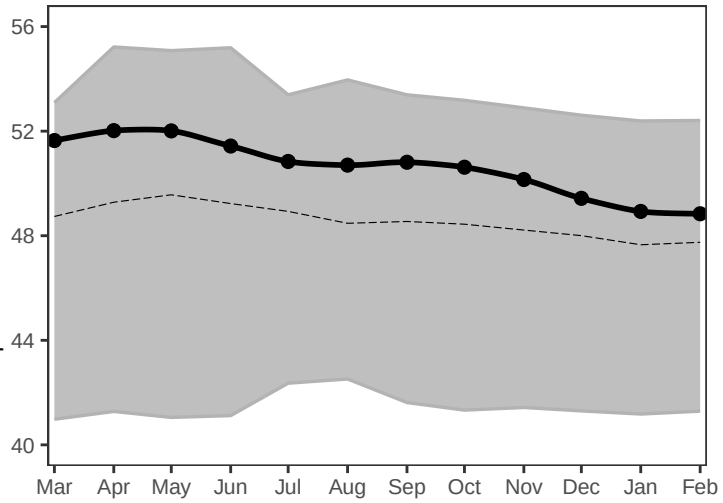


Suwannee County S021335001
near Live Oak

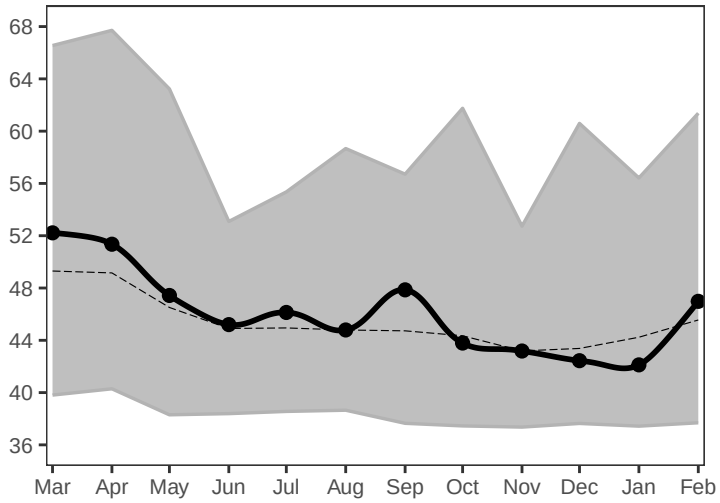


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

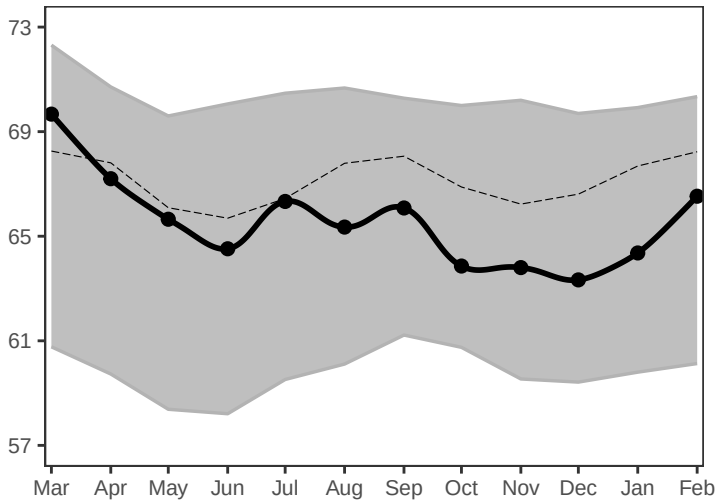
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S040736005
Perry

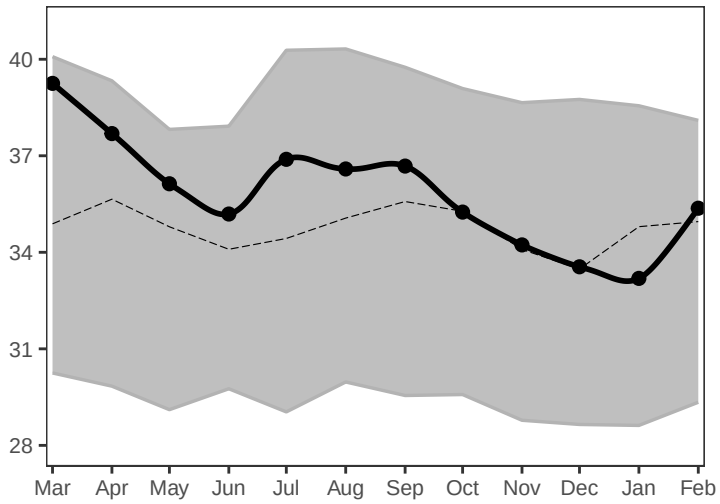
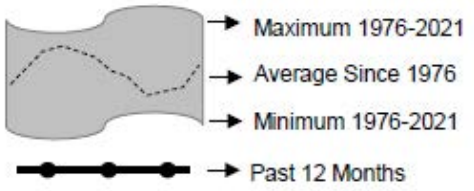
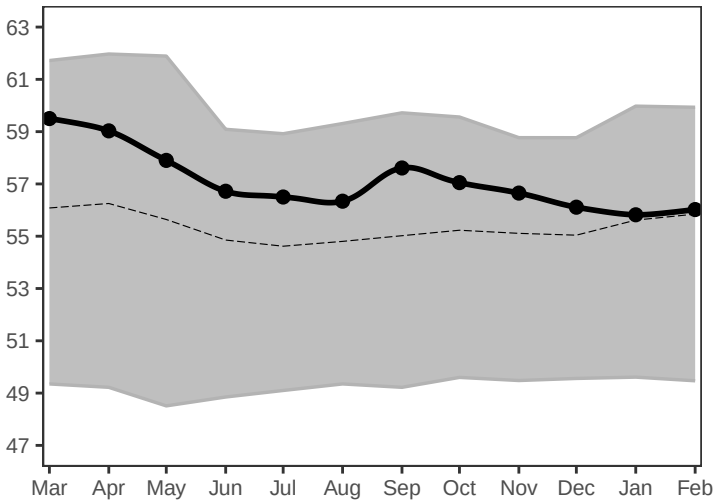


Figure 11, cont.: Monthly Groundwater Statistics

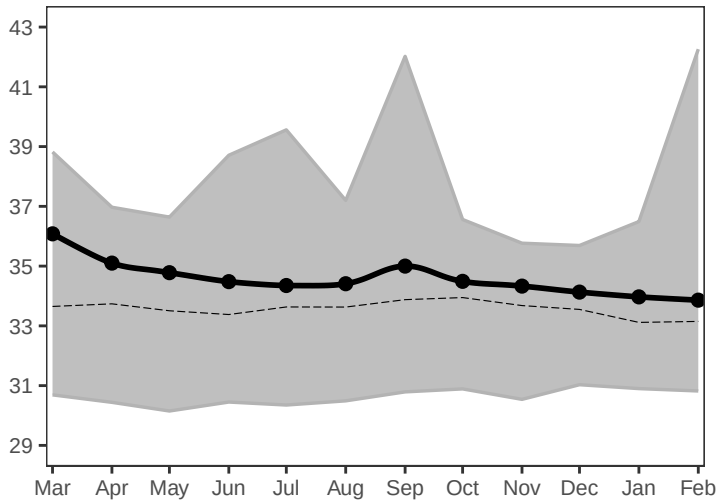
Levels March 2022 through February 2023
Period of Record Beginning 1976



Union County S051933001
near Lake Butler

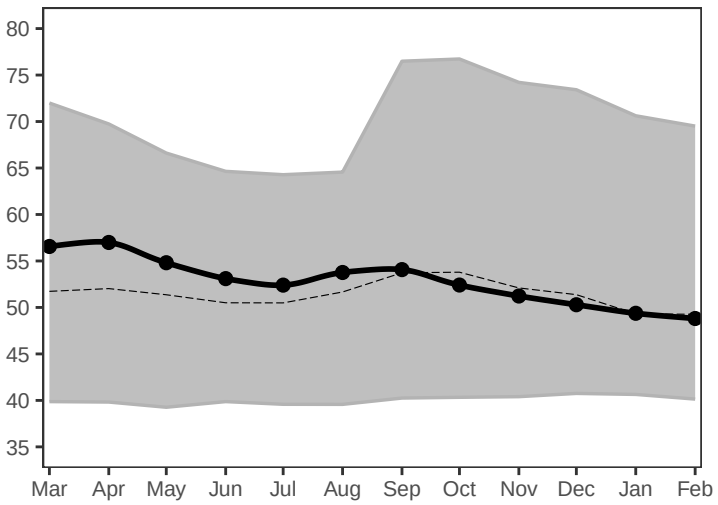


Alachua County S081703001
at High Springs

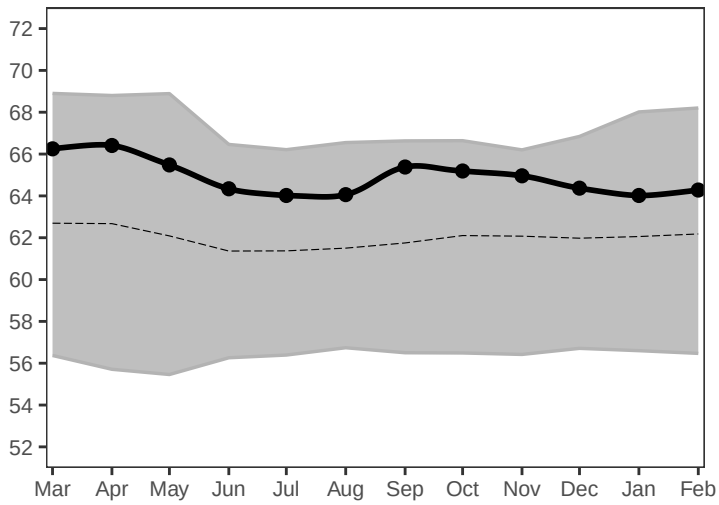


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

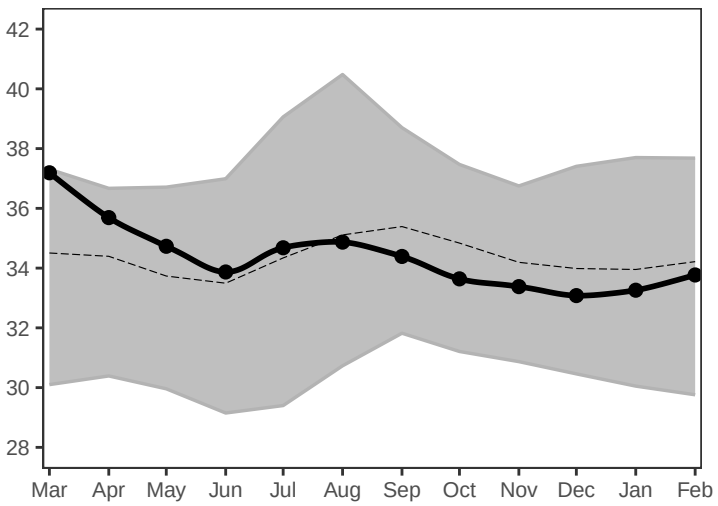
Gilchrist County S091607001
near Trenton



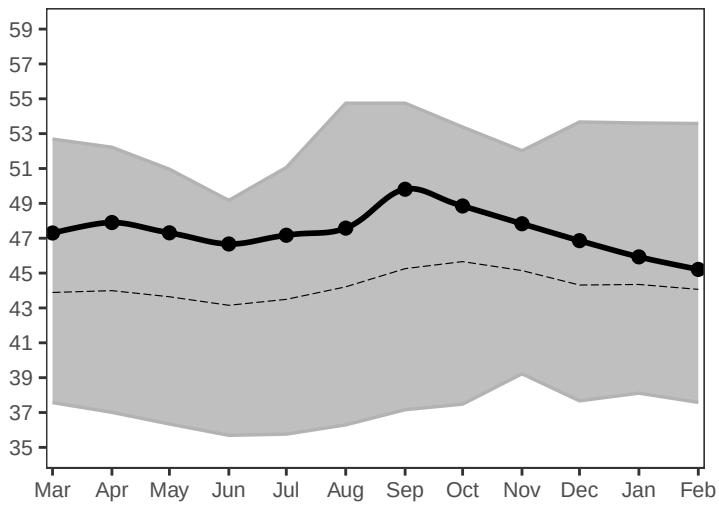
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



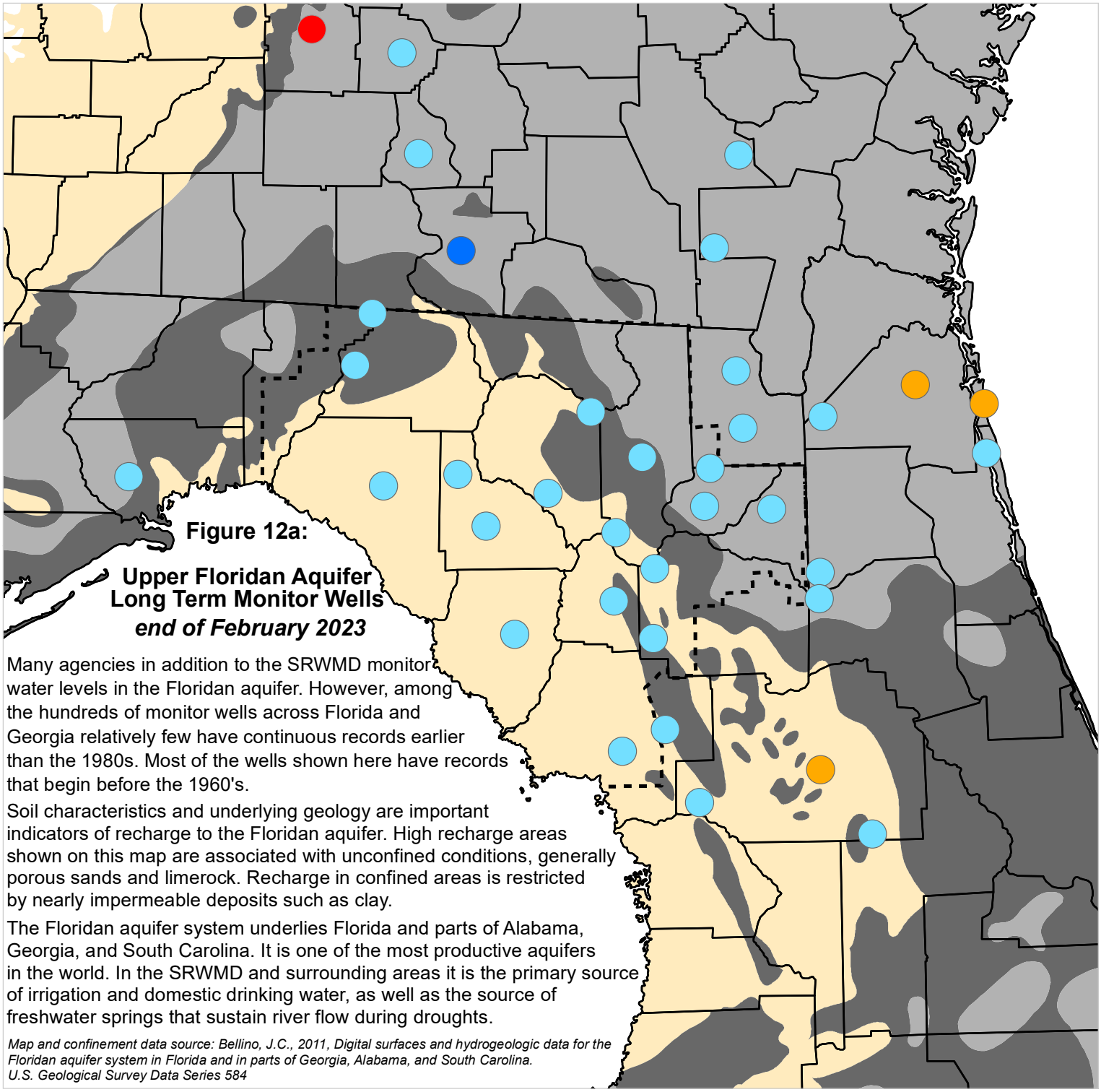


Figure 12a:

Upper Floridan Aquifer Long Term Monitor Wells

end of February 2023

Many agencies in addition to the SRWMD monitor water levels in the Floridan aquifer. However, among the hundreds of monitor wells across Florida and Georgia relatively few have continuous records earlier than the 1980s. Most of the wells shown here have records that begin before the 1960's.

Soil characteristics and underlying geology are important indicators of recharge to the Floridan aquifer. High recharge areas shown on this map are associated with unconfined conditions, generally porous sands and limerock. Recharge in confined areas is restricted by nearly impermeable deposits such as clay.

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 freshwater springs that sustain river flow during droughts.

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

Occurrence 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.
- SRWMD Boundary

Percentile of Most Recent Water Level Relative to Entire Record

- Very High (Greater than 90th Percentile)
- High (75th to 90th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Very Low (Less than 10th Percentile)
- Data Not Available

Figure 12b: Regional Long Term Upper Floridan Aquifer Levels

Data through February 2023