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: March 31, 2023

RE: March 2023 Hydrologic Conditions Report

RAINFALL

- Districtwide average rainfall for the month was 4.05, which was about 9% lower than the 1932-2022 average of 4.43" (Table 1, Figure 1). The 12-month period ending March 31 reflected a Districtwide rainfall deficit of 10.11", which was a significant increase in the 3.48" deficit seen at the end of February. Most District counties received between 3" and 5" of rainfall on average with areas of Jefferson, Madison, Hamilton, Taylor, Lafayette, Suwannee, Columbia, and Union counties receiving more than 6" of rainfall (Figure 2).

- A 12-month rainfall deficit was still present for all river basins, with each showing large increases in deficit at the end of March. (Figure 3). Areas within each of the river basins had rainfall deficits of greater than 14" at the end of the month. Portions of the Suwannee Basin, however, showed surpluses greater than 6" by month's end. Four of the river basins also exhibited 3-month rainfall deficits, which mostly decreased from February to the end of March (Figure 4). The Aucilla Basin had a 3.2" surplus at the end of March due to increased rainfall in that 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. The Santa Fe River at Worthington Springs showed below normal flows (10^{th} – 25^{th} percentile) at the end of March. The Aucilla near Lamont gage ended with above normal (75^{th} – 90^{th} percentile) flows after beginning March in the normal range (Figure 6). In contrast, the Alapaha near Alapaha had below normal flows despite beginning March in the normal flow range. Elsewhere in the District, the New River, the Santa Fe near Ft. White, and the Steinhatchee River gages showed improvement in flows from below normal to normal flow ranges by month's end.

- **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 less than 0.1'. Alligator Lake had the highest stage increase of just over 0.8' this month. Waters Lake, on the other hand, had a stage decrease of just under 0.8'. Five 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 March at 19 springs by the U.S. Geological Survey (USGS), District staff, and contractors. Manatee Springs (Figure 8) had flows in the normal range throughout the month. Madison Blue Springs, however, saw flows range from the above normal to below normal flow categories throughout March (Figure 9).

GROUNDWATER

Upper Floridan Aquifer (UFA) levels across the District reflected mostly normal levels in March (Figure 10). Areas of Taylor, Madison, Hamilton, Alachua, and Bradford counties showed high (75^{th} – 90^{th} percentile) levels at the end of the month. Southern Levy County showed a monitored well in the low (10^{th} – 25^{th} percentile) level category. Overall, groundwater levels increased by a median of about 0.02' since the end of February and ended March with a Districtwide average around the 57^{th} percentile.

Many of the county index wells remained higher than the historical monthly average levels at the end of March except for wells in Hamilton, Lafayette, Taylor, Union, Gilchrist, and Dixie counties (Figure 11). Most of 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 equal chances of above or below normal rainfall throughout the District from April through June.

The U.S. Drought Monitor report released on April 6, 2023, shows most of the District in either Abnormally Dry (D0) or Moderate Drought (D1) categories. However, over half of Levy county is experiencing Severe Drought (D2) conditions, while both Madison and Jefferson counties are not currently experiencing any drought.

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	March 2023	March Average*	Month % of Normal	Total Last 12 Months	Annual % of Normal
Alachua	3.43	3.89	88%	41.96	80%
Baker	3.92	4.07	96%	43.28	82%
Bradford	3.88	3.81	102%	42.03	81%
Columbia	4.53	4.26	106%	45.09	85%
Dixie	3.13	4.17	75%	43.22	74%
Gilchrist	2.18	4.06	54%	40.73	75%
Hamilton	4.21	4.62	91%	43.68	84%
Jefferson	5.55	5.13	108%	45.70	82%
Lafayette	4.39	4.32	102%	43.69	79%
Levy	2.32	3.96	59%	44.30	79%
Madison	5.52	4.90	113%	50.11	94%
Suwannee	5.00	4.53	110%	43.78	82%
Taylor	4.09	4.55	90%	45.78	81%
Union	4.71	3.99	118%	42.53	81%

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

March 2022 District Average	4.05
March Long-Term Average (1932-2022)	4.43
Historical 12-month Average (1932-2022)	54.66
Past 12-Month Total	44.55
12-Month Rainfall **Surplus**/Deficit	**-10.11**

Figure 1: Comparison of District-wide Monthly Rainfall

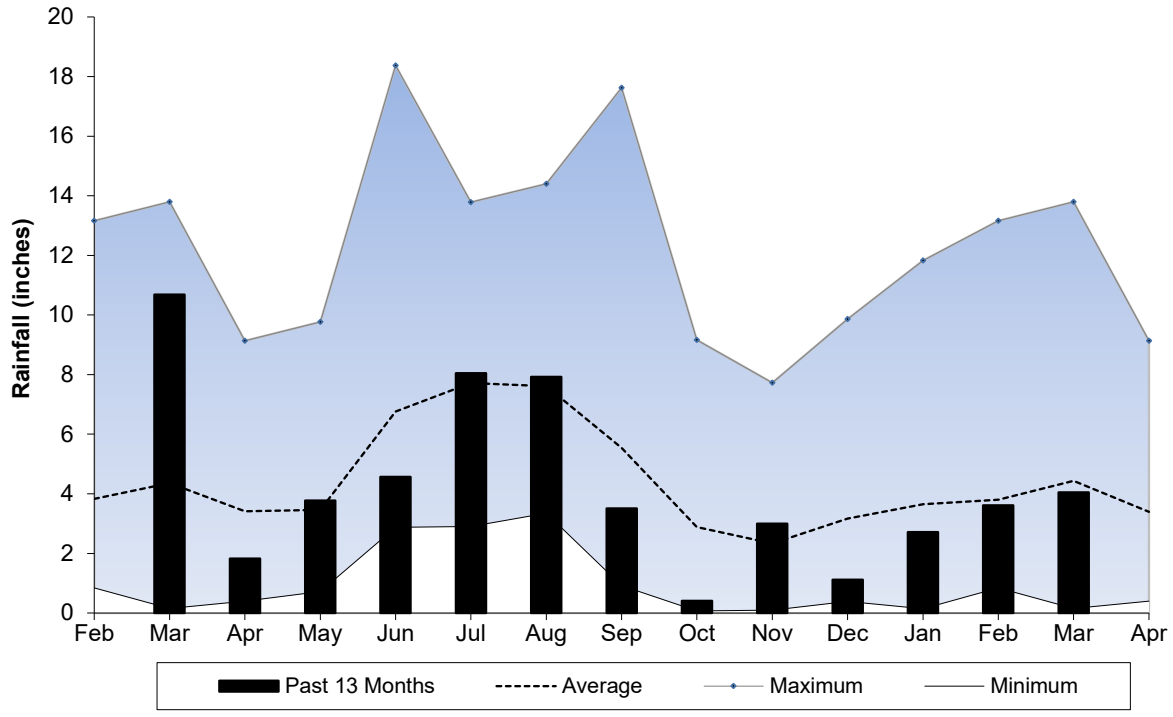


Figure 2: March 2023 SRWMD Gage-adjusted Radar Rainfall

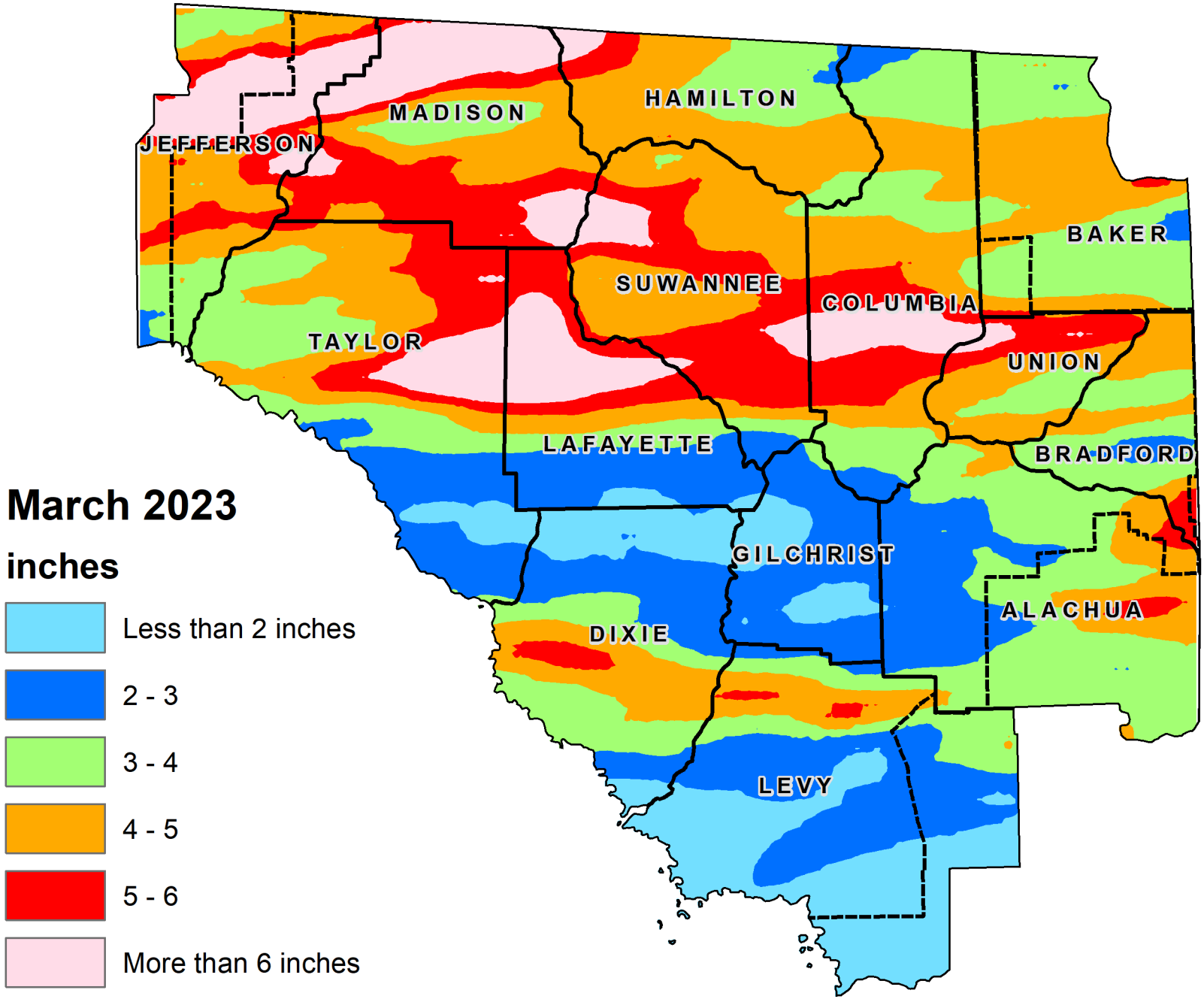
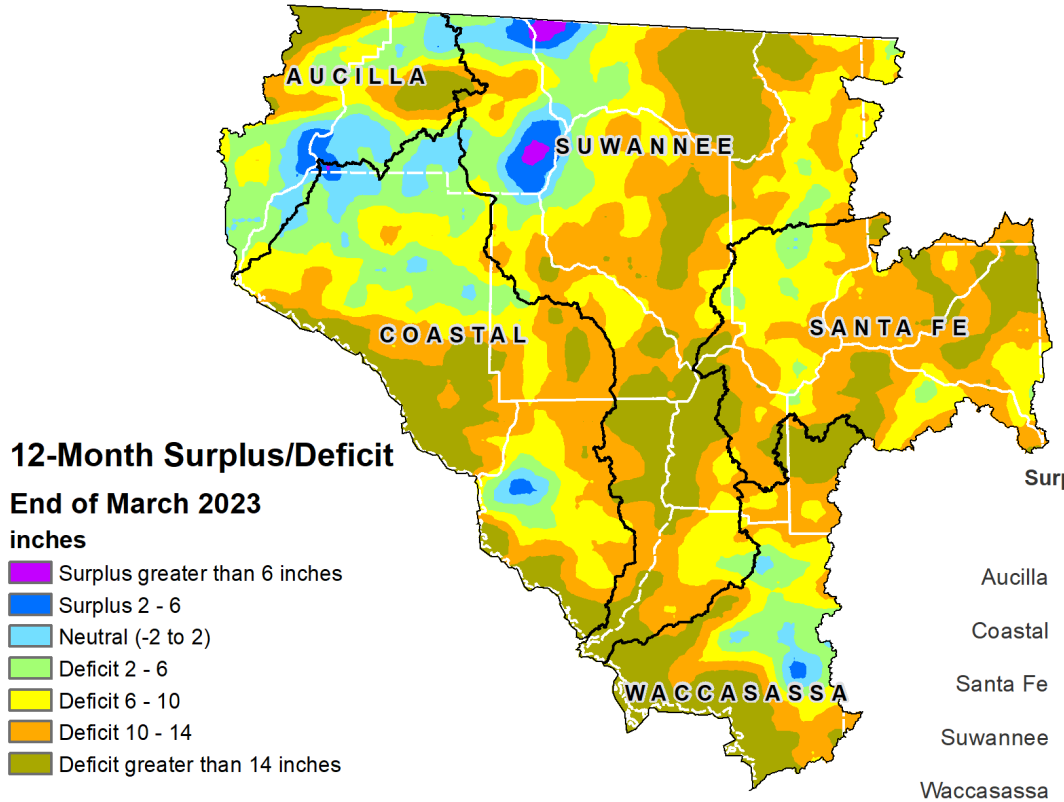


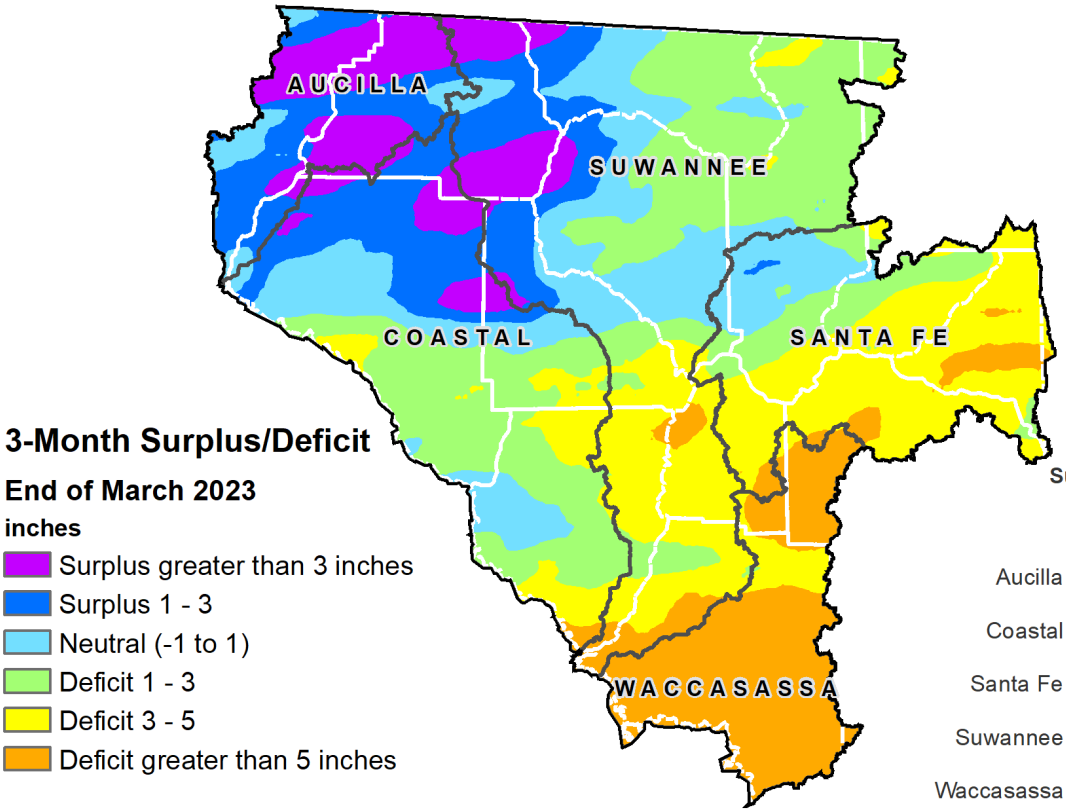
Figure 3: 12 - Month Rainfall Surplus/Deficit by River Basin through March 31, 2023



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

	Mar 2023	Feb 2023
Aucilla	**- 6.6**	- 1.3
Coastal	**- 9.4**	- 1.1
Santa Fe	**- 11.5**	- 5.3
Suwannee	**- 10.5**	- 4.8
Waccasassa	**- 11.0**	- 3.4

Figure 4: 3 - Month Rainfall Surplus/Deficit by River Basin through March 31, 2023

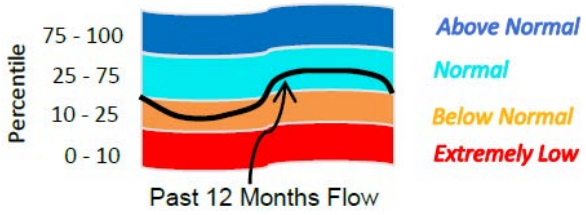


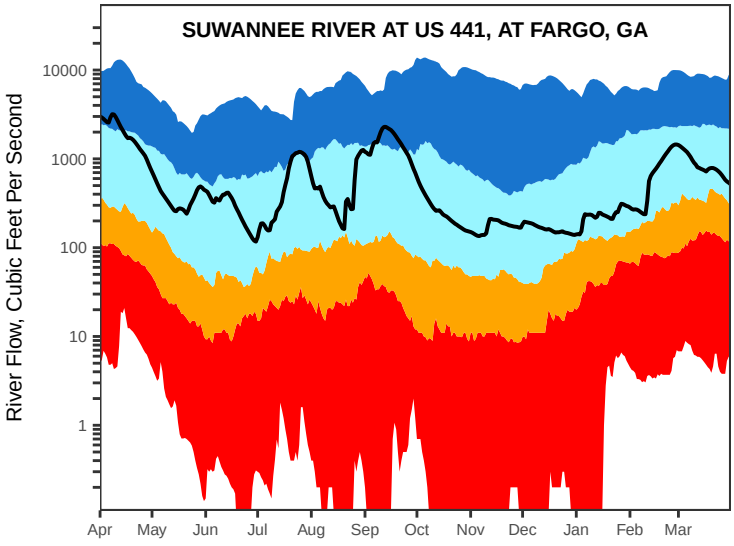
3-Month Surplus (+) or Deficit (-) By Basin

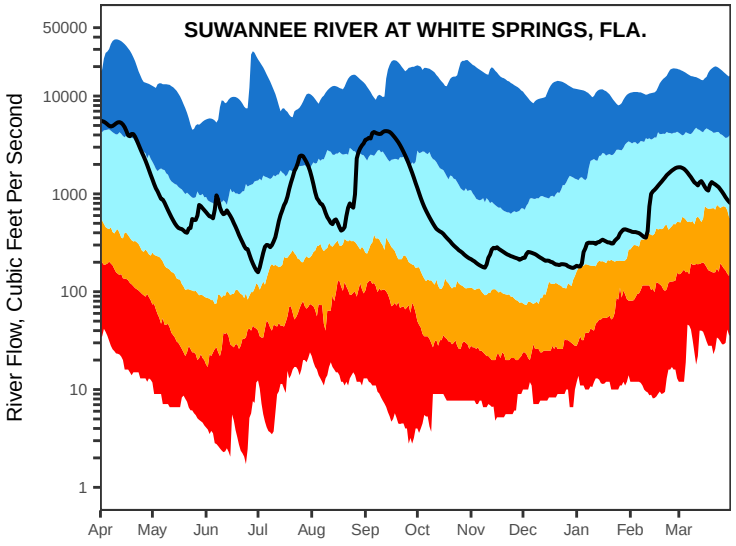
	Mar 2023	Feb 2023
Aucilla	+ 3.2	0
Coastal	- 0.5	- 1.8
Santa Fe	- 3.3	- 5.3
Suwannee	- 1.1	- 3.1
Waccasassa	- 6.0	- 5.5

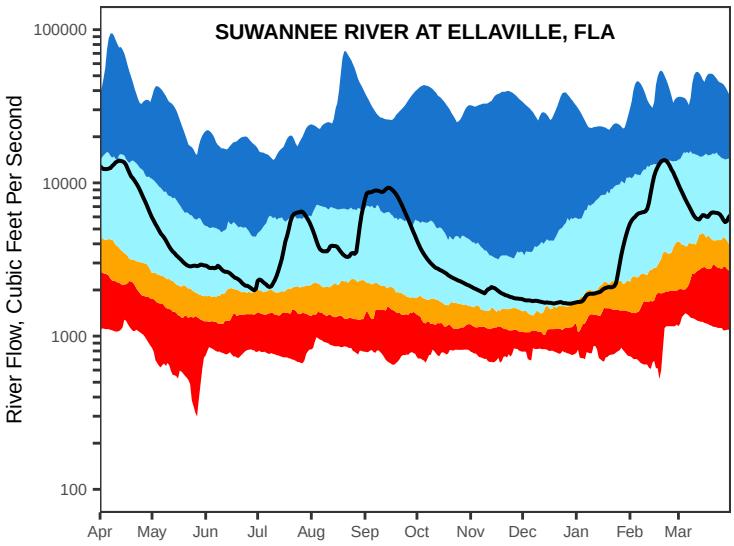
Figure 5: Daily River Flow Statistics

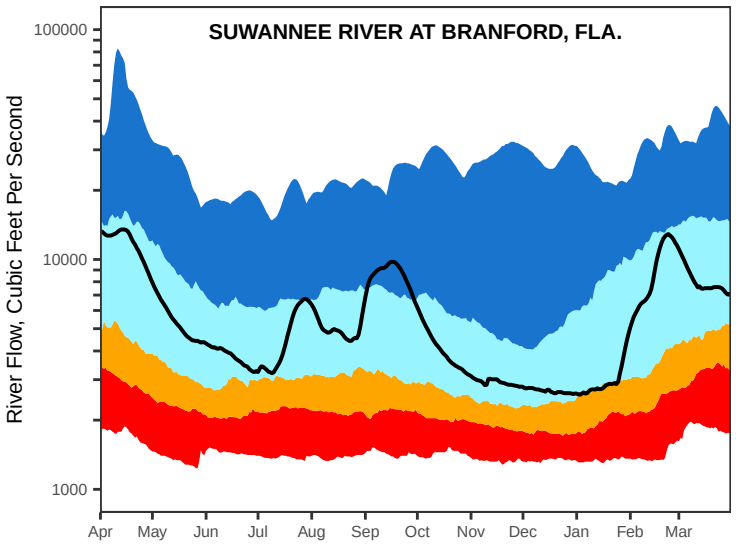
April 1, 2022 through March 31, 2023

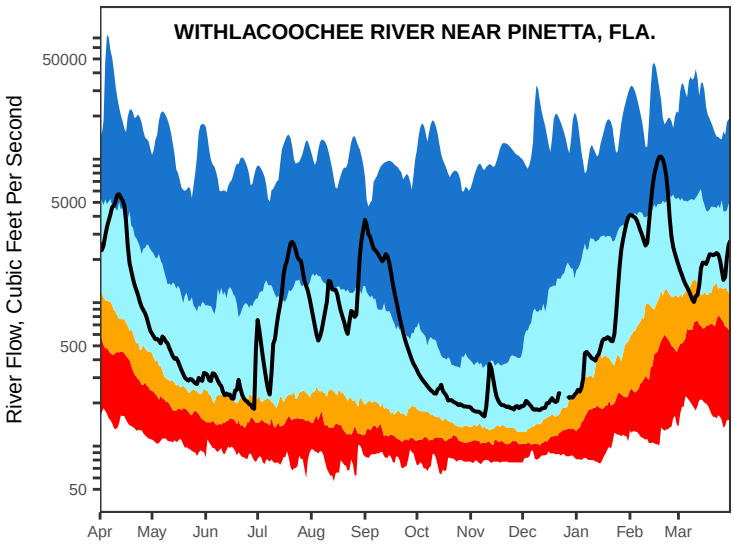












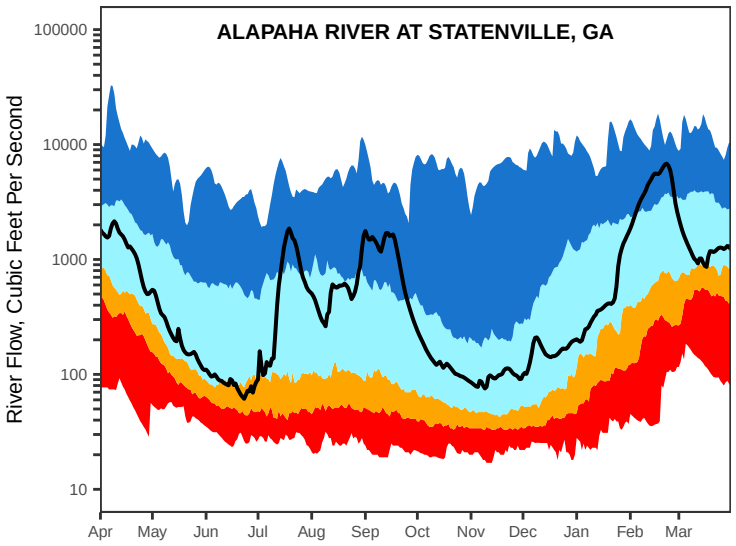
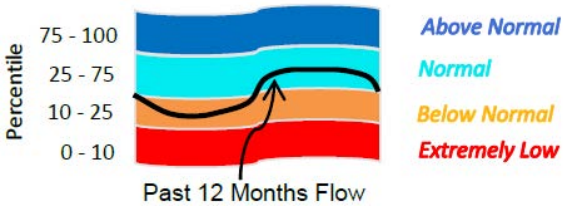
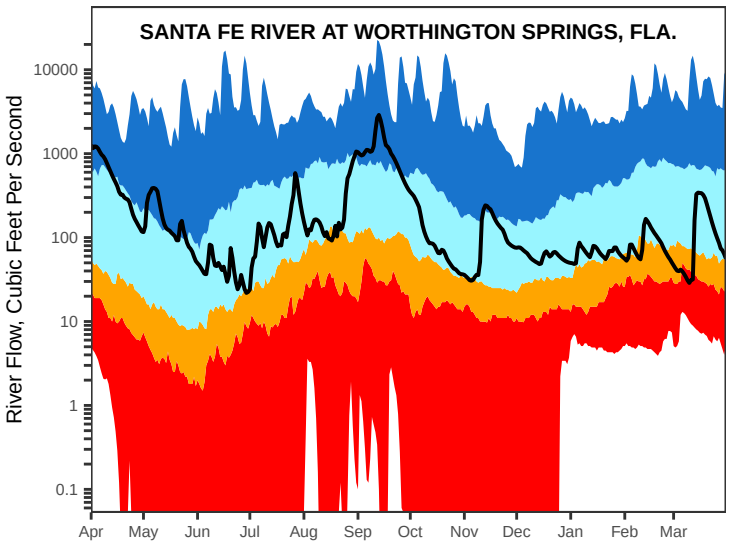
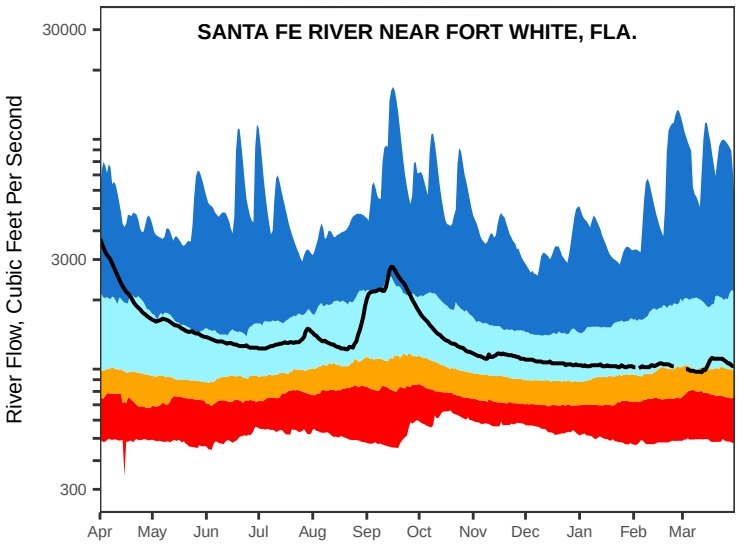


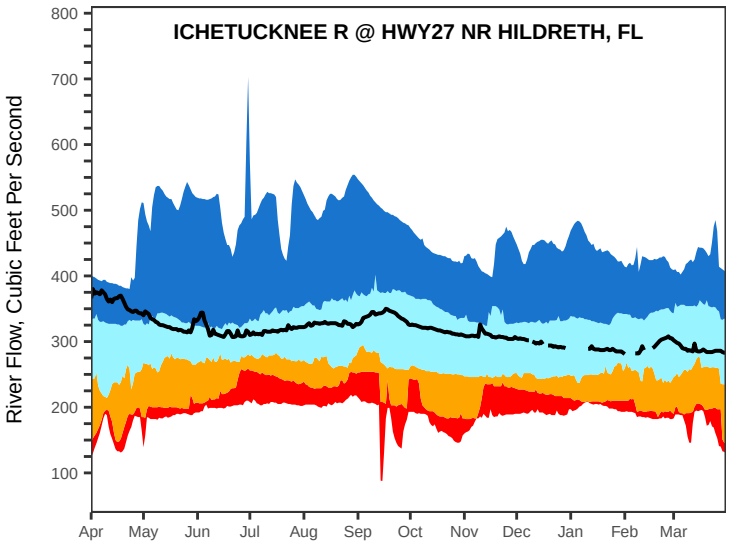
Figure 5, cont.: Daily River Flow Statistics

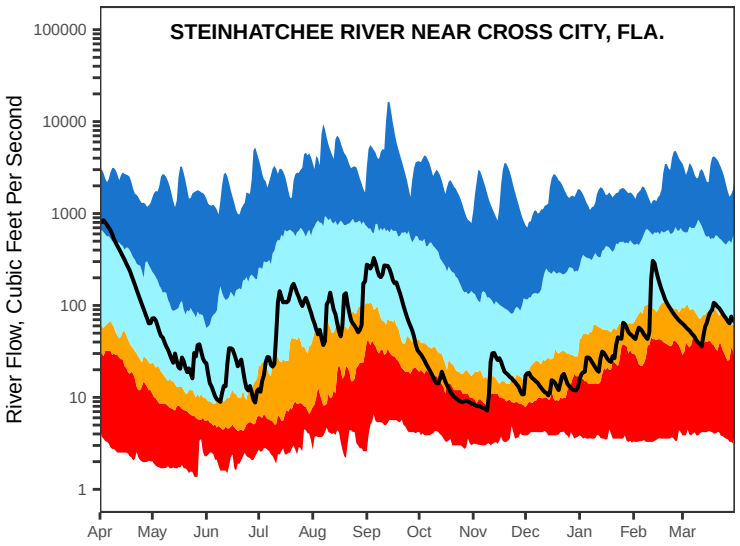
April 1, 2022 through March 31, 2023

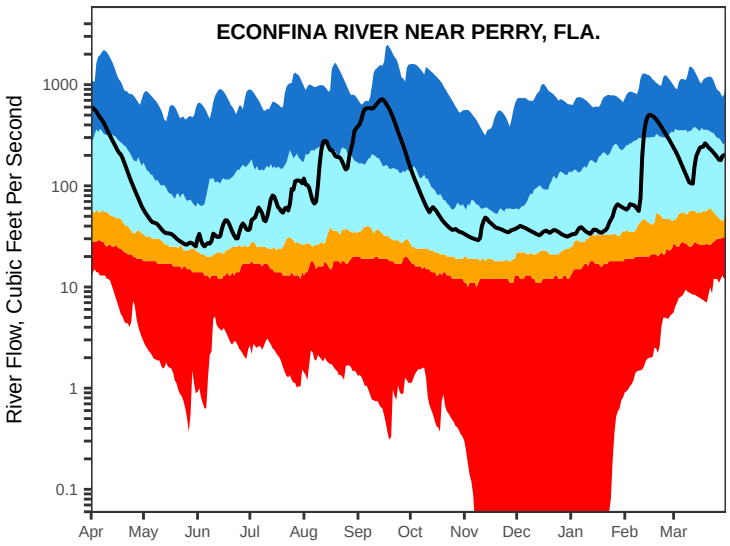


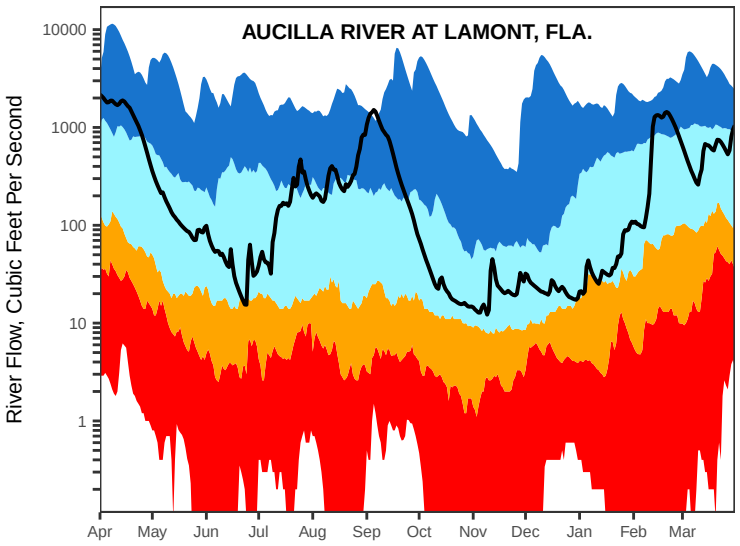












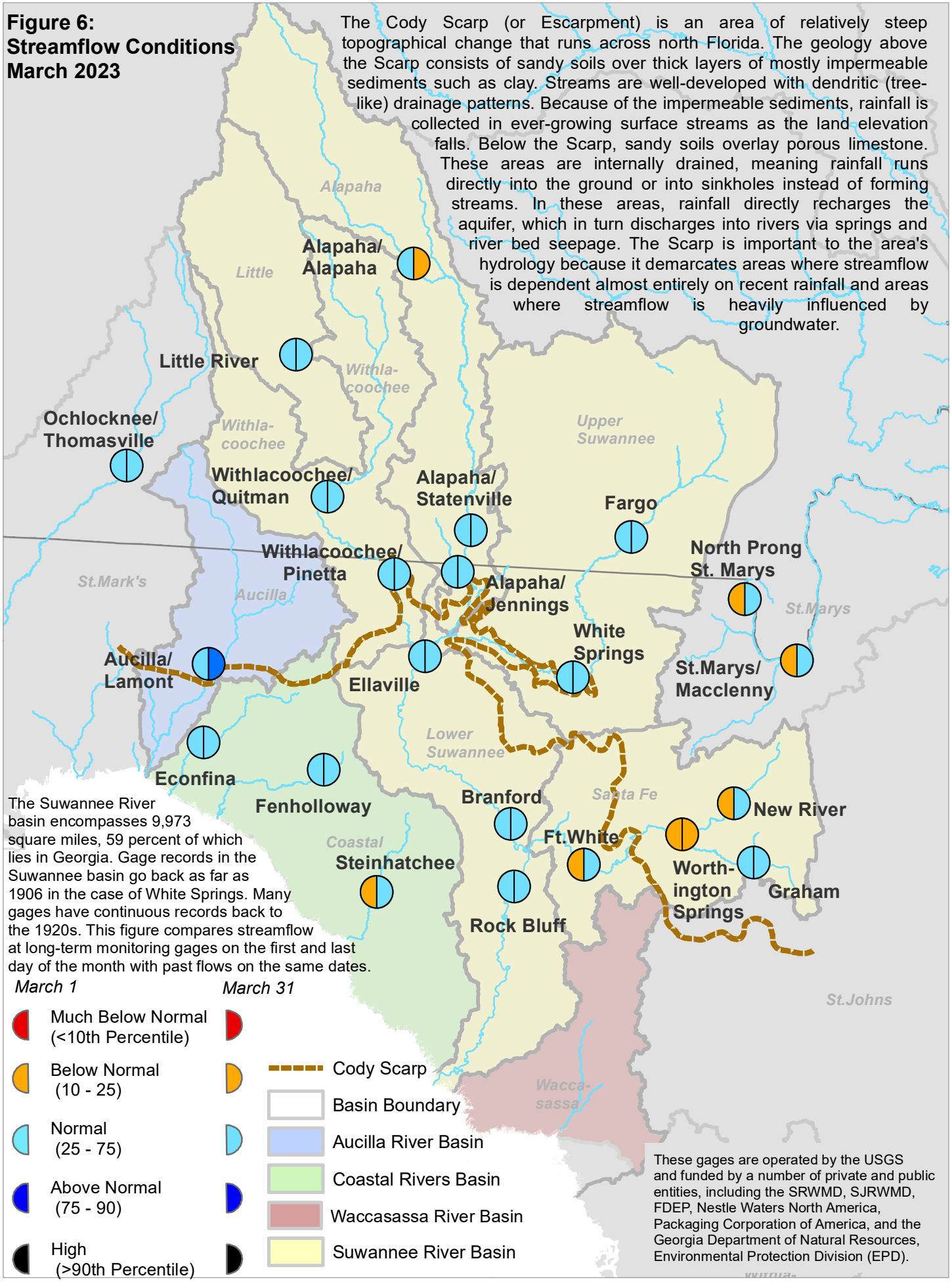
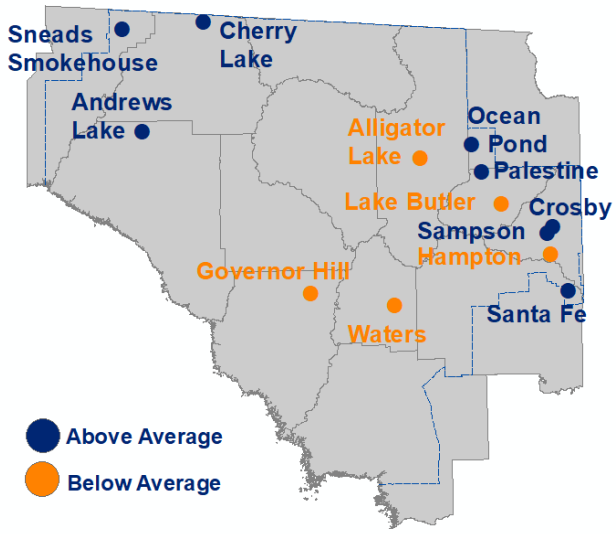


Figure 6:
Streamflow Conditions
March 2023
The Cody Scarp (or Escarpment) is an area of relatively steep topographical change that runs across north Florida. The geology above the Scarp consists of sandy soils over thick layers of mostly impermeable sediments such as clay. Streams are well-developed 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.
Alapaha
Alapaha/ Alapaha
Little
Little River
Withla-coochee
Ochlocknee/ Thomasville
Withla-coochee
Upper Suwannee
Withlacoochee/ Quitman
Alapaha/ Statenville
Fargo
North Prong St. Marys
Withlacoochee/ Pinetta
St.Mark's
Aucilla
Alapaha/ Jennings
St.Marys
White Springs
Aucilla/ Lamont
Ellaville
St.Marys/ Macclenny
Lower Suwannee
Econfina
Fenholloway
Branford
Santa Fe
New River
Ft.White
Coastal
Steinhatchee
Worth-ington Springs
Graham
Rock Bluff
St.Johns
Wacca-sassa
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.
March 1
March 31
Much Below Normal (<10th Percentile)
Below Normal (10 - 25)
Normal (25 - 75)
Above Normal (75 - 90)
High (>90th Percentile)
Cody Scarp
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, FDEP, Nestle Waters North America, Packaging Corporation of America, and the Georgia Department of Natural Resources, Environmental Protection Division (EPD).

Figure 7: March 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.

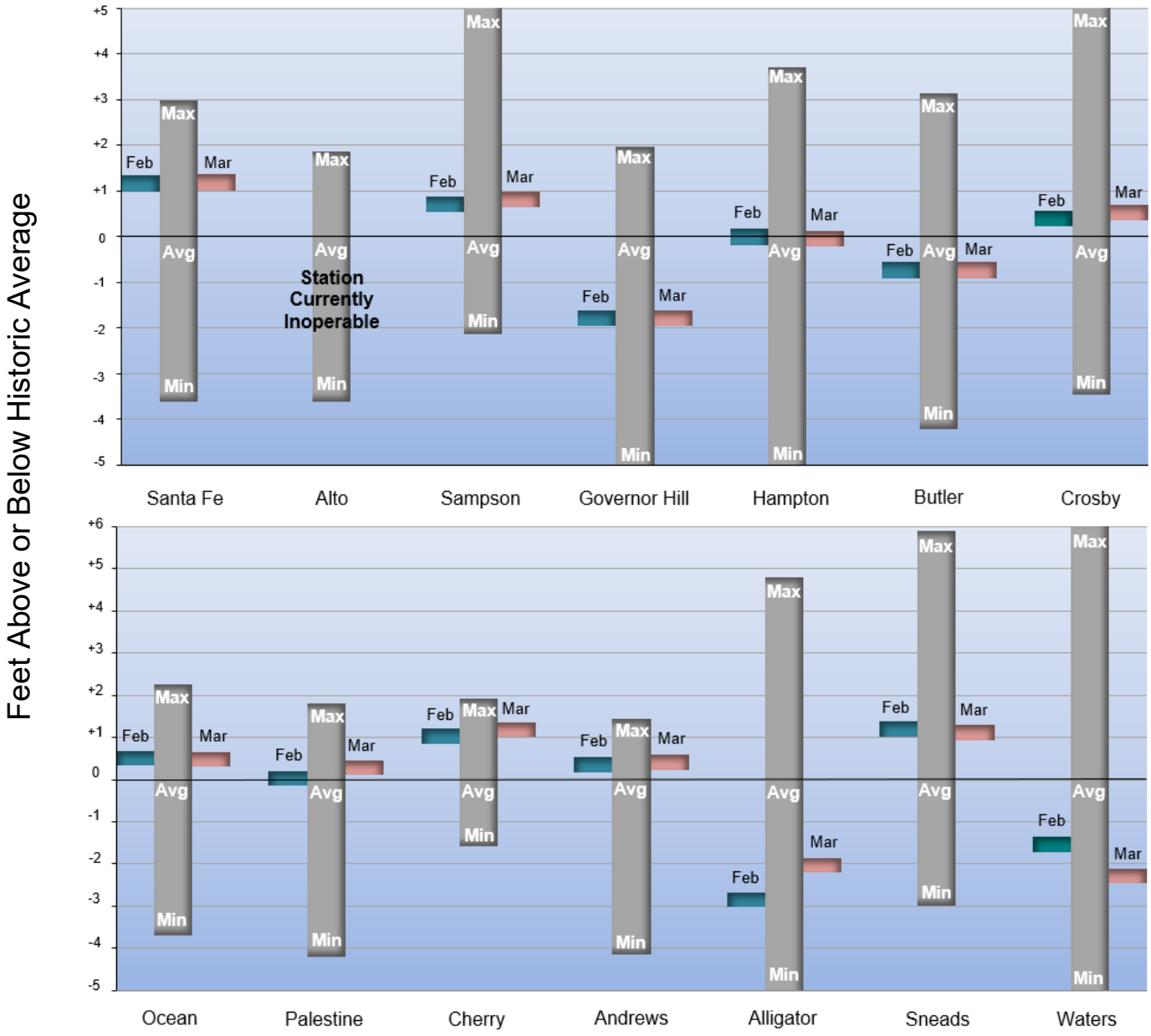


Figure 8: Flow Over the Past 12 Months, Manatee Springs (cubic feet per second)

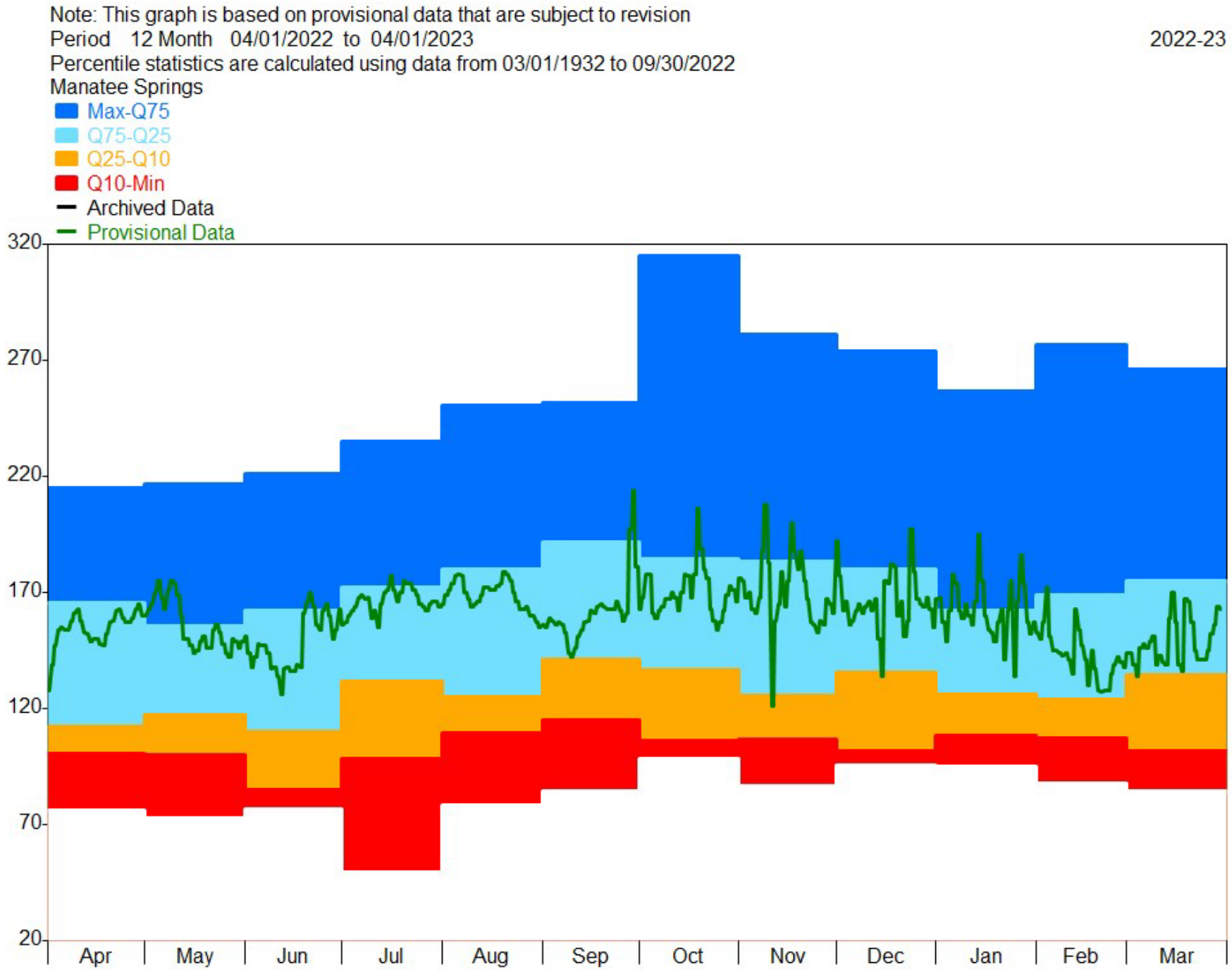
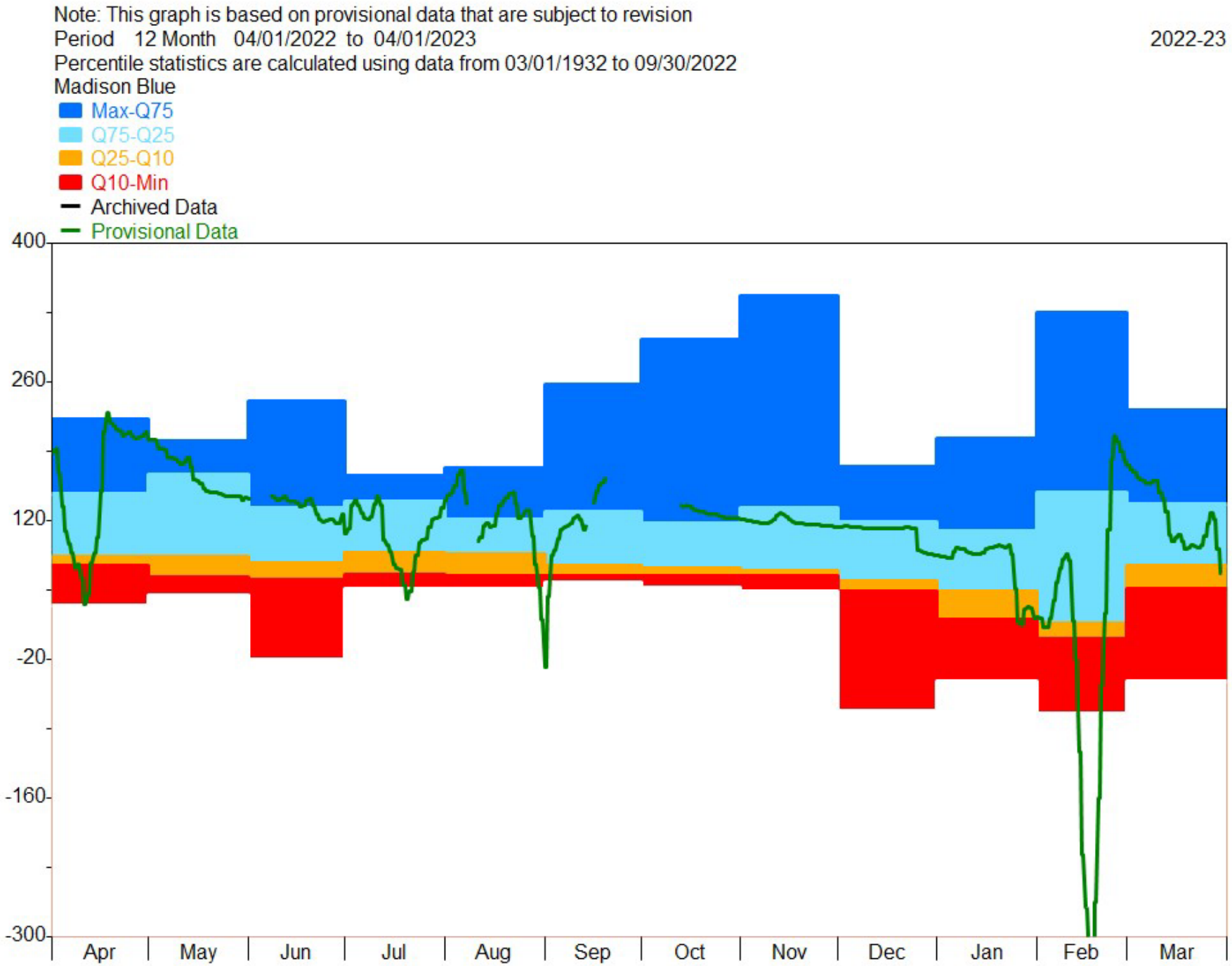


Figure 9: Flow Over the Past 12 Months, Madison Blue Springs (cubic feet per second)



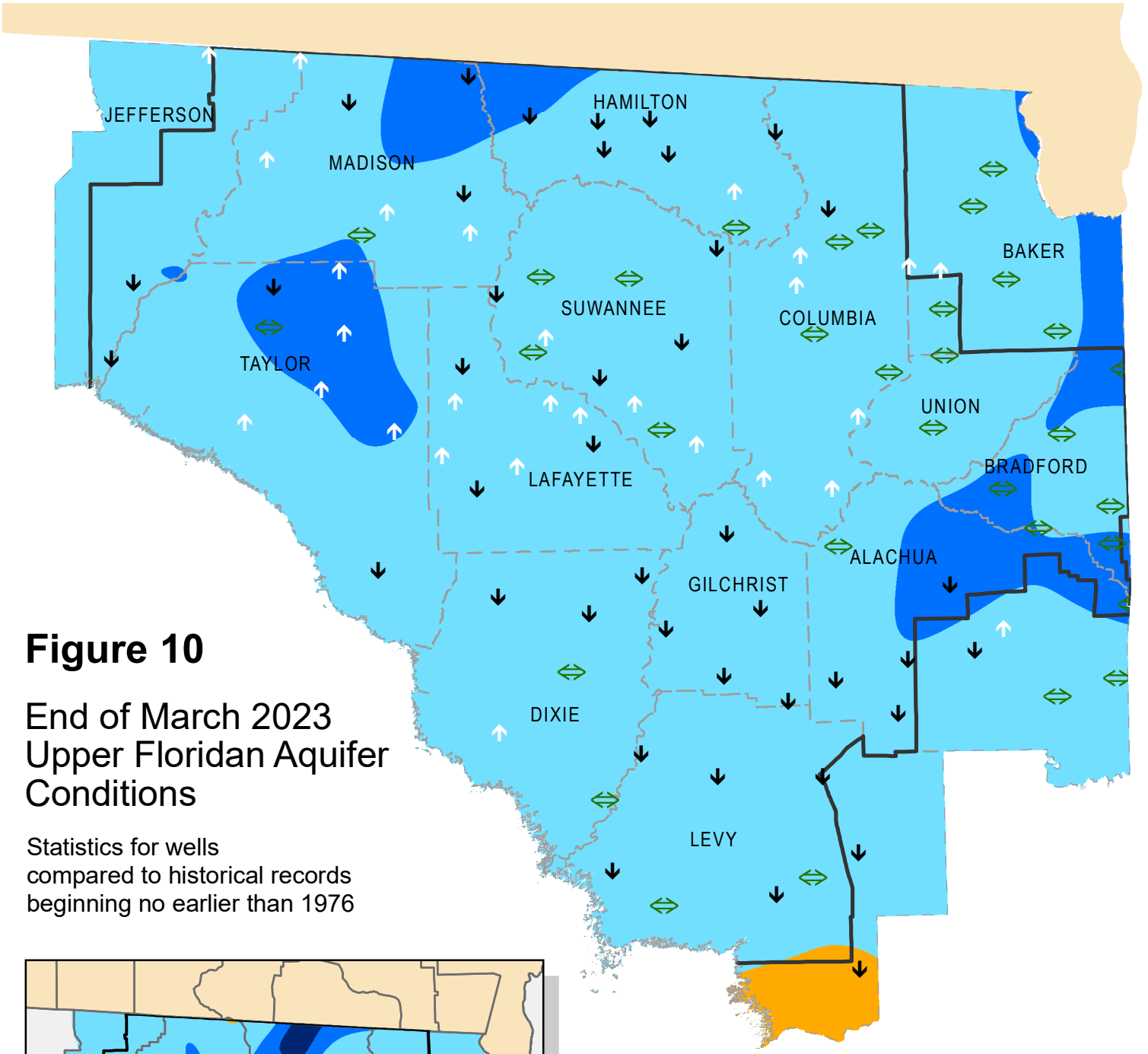
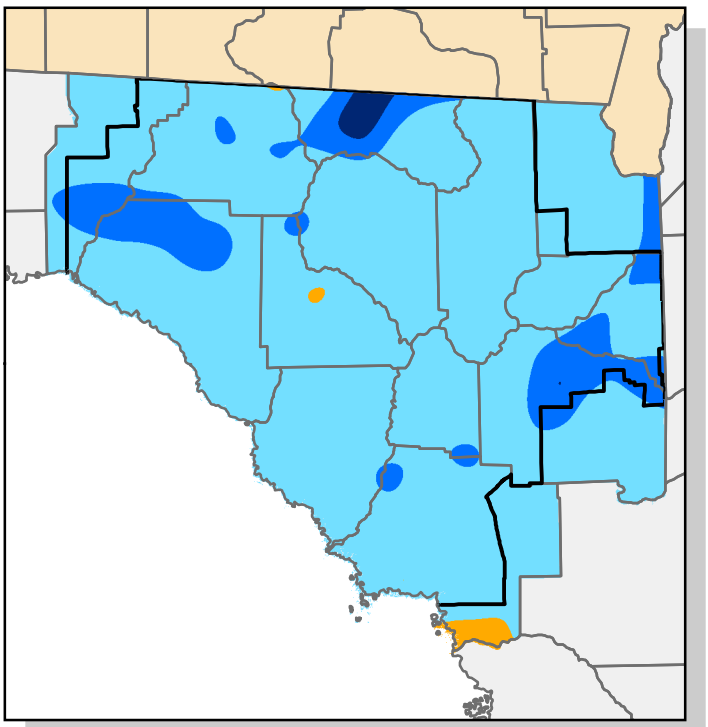


Figure 10

End of March 2023 Upper Floridan Aquifer Conditions

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



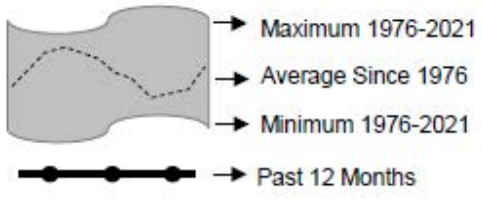
Inset: February Groundwater Percentiles

Additional wells courtesy of SJRWMD, SWFWMD and USGS

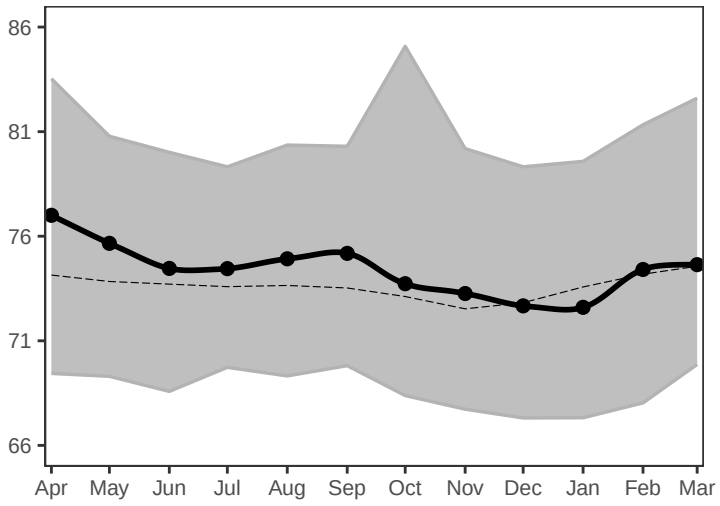
- Extremely High (Greater than 90th Percentile)
- High (75th to 90th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Increase/decrease in level since last month
- Increase/decrease since last month less than one percent of historic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

Figure 11: Monthly Groundwater Statistics

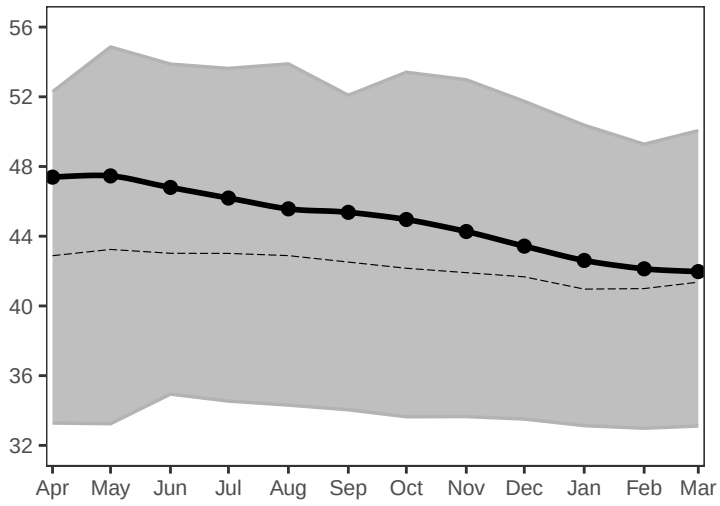
Levels April 2022 through March 2023
Period of Record Beginning 1976



Madison County N010719001
near Greenville

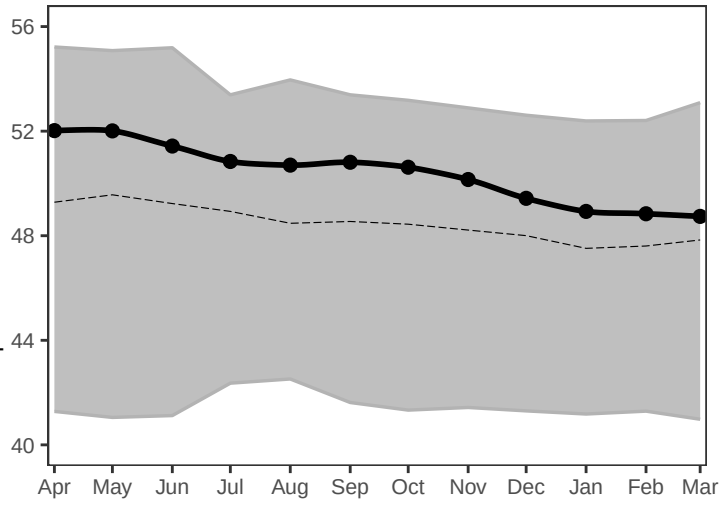


Suwannee County S021335001
near Live Oak

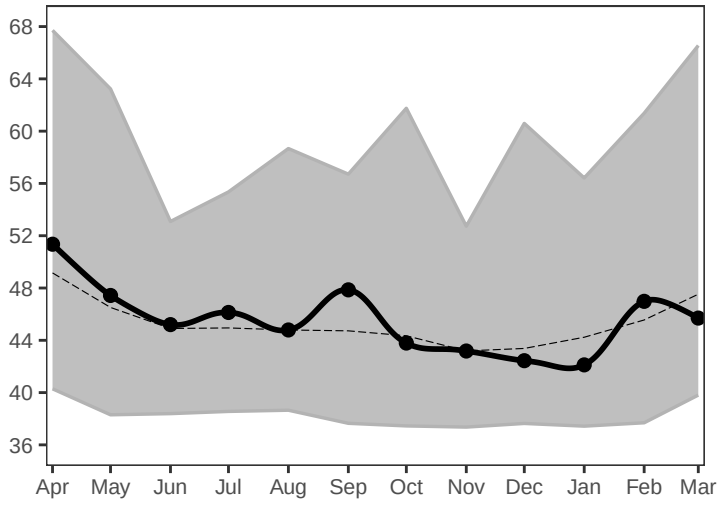


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

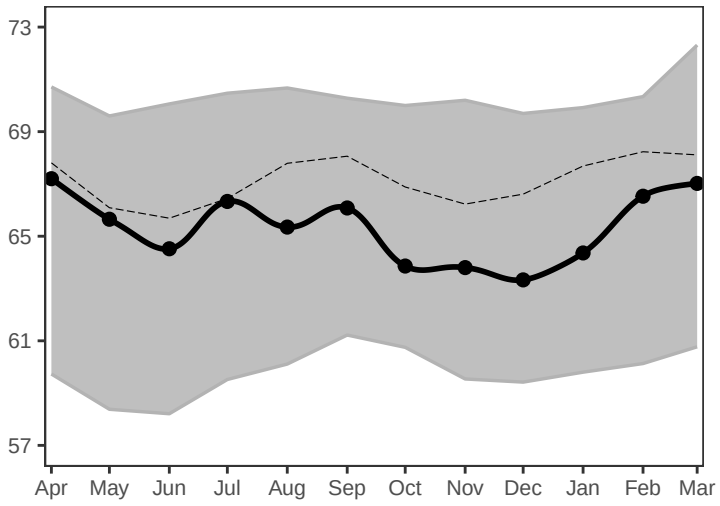
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S040736005
Perry

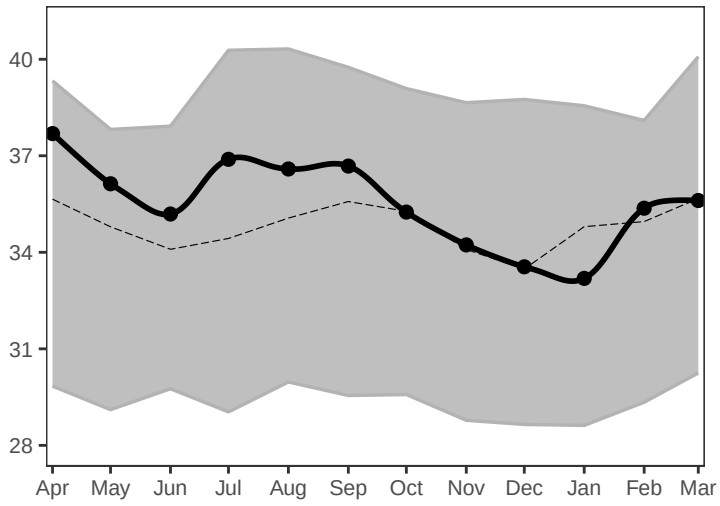
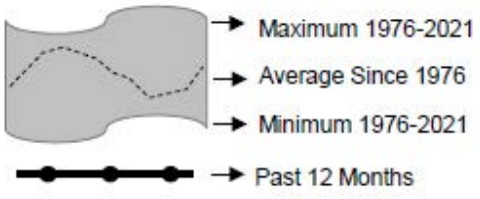
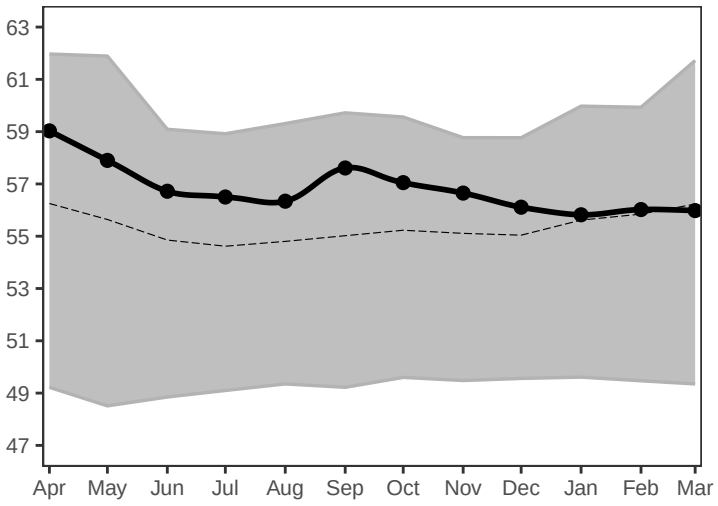


Figure 11, cont.: Monthly Groundwater Statistics

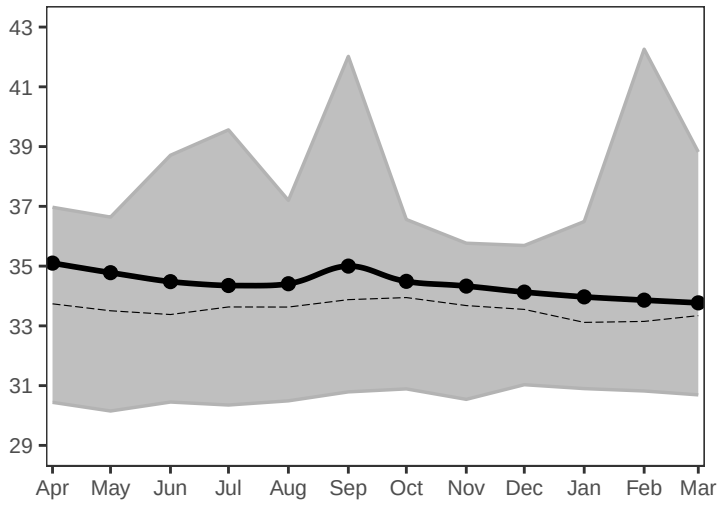
Levels April 2022 through March 2023
Period of Record Beginning 1976



Union County S051933001
near Lake Butler

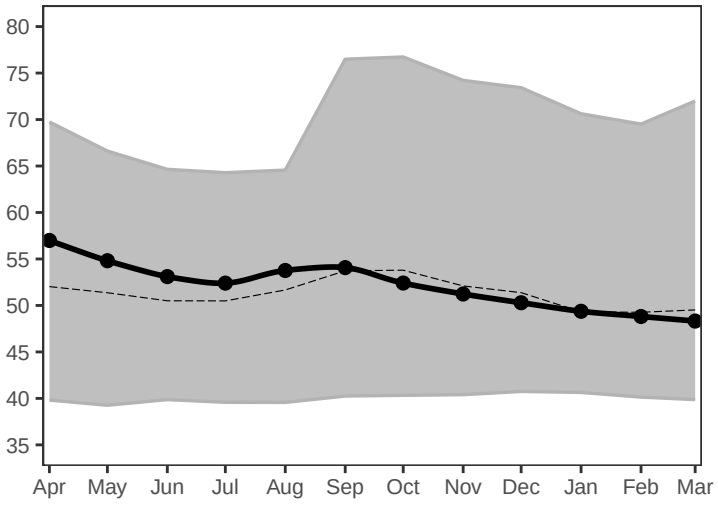


Alachua County S081703001
at High Springs

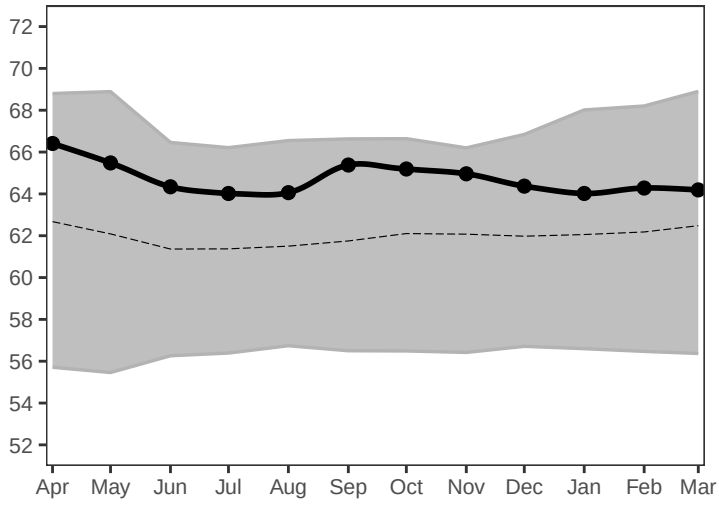


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

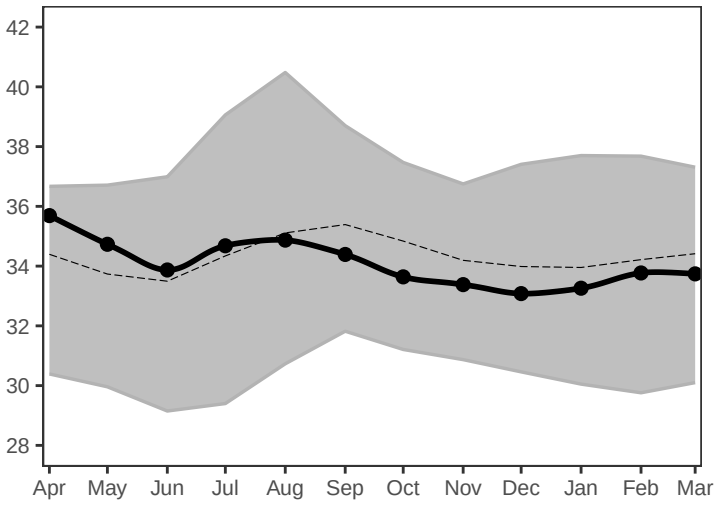
Gilchrist County S091607001
near Trenton



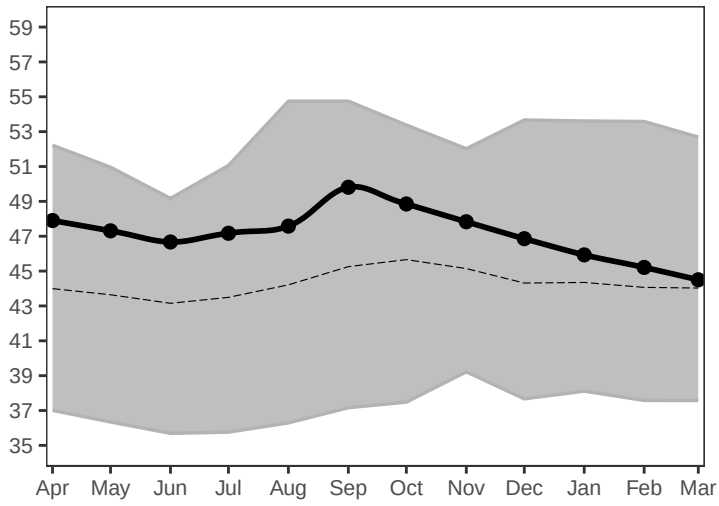
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



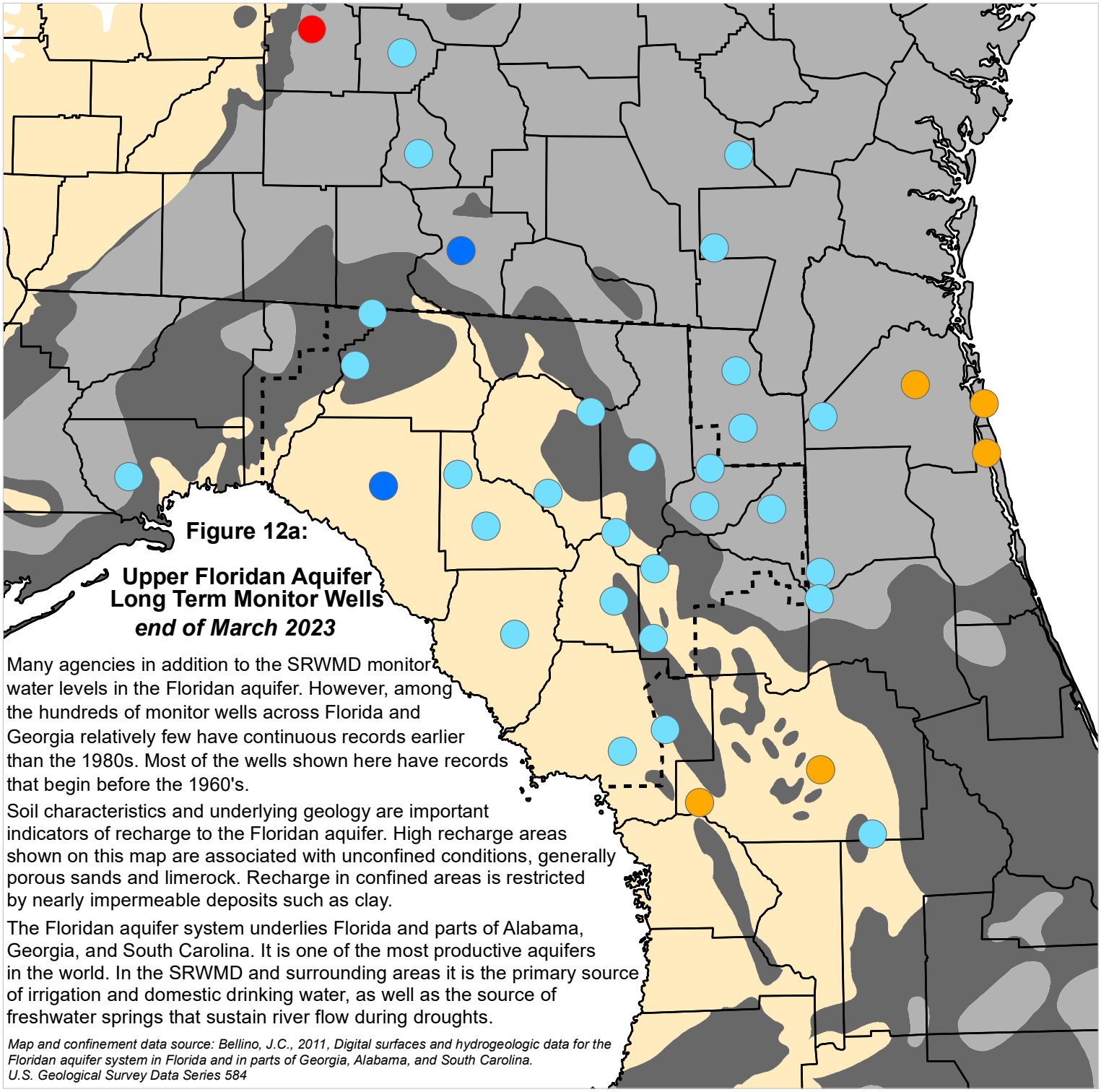


Figure 12a:

Upper Floridan Aquifer
Long Term Monitor Wells
end of March 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 March 2023