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: November 30, 2022

RE: November 2022 Hydrologic Conditions Report

RAINFALL

- Districtwide average rainfall for the month was 3.00", which was about 29% higher than the 1932-2021 average of 2.33" (Table 1, Figure 1). The 12-month period ending November 30 reflected a Districtwide rainfall deficit of 5.62", which represented a decrease in the 6.35" deficit seen at the end of October. Most District counties received anywhere from 2.5" to 3.7" of rainfall on average with large areas of Madison, Taylor, Lafayette, Alachua, and Bradford counties receiving more than 4" of rainfall (Figure 2).

- A 12-month rainfall deficit was present for all river basins, with all but the Waccasassa Basin decreasing in deficit at the end of November. (Figure 3). However, a small portion of the Waccasassa Basin still showed a surplus greater than 6" by month's end. Areas within the Aucilla, Suwannee, Coastal and Waccasassa basins showed rainfall deficits of greater than 14" at the end of the month. All five of the river basins also exhibited 3-month rainfall deficits, which mostly decreased from October to the end of November (Figure 4). The Aucilla Basin deficit remained static, while the Coastal Basin rainfall deficit increased slightly at the end of the month.

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, the Steinhatchee River gage showed below normal flows (10^{th} – 25^{th} percentile) at the end of November, and the Ichetucknee River ended the month in the above normal (75^{th} – 100^{th} percentile) flow range. Most river gages in North Florida and South Georgia also ended November in the normal flow category (Figure 6). One exception to this was Santa Fe River near Graham, which showed above normal (75^{th} – 90^{th} percentile) flows at the end of the month.

- **Lakes**: Water decreased at most monitored lakes in the District this month (Figure 7). The median decrease in stage across all measured lakes was around 0.1'. Sneads Smokehouse had the highest stage decrease at around 0.8'. Seven lakes concluded the month below their respective long-term averages. As a note, Lake Alto is currently offline due to gage damage and is not included in the current report statistics.

- **Springs**: Flow measurements were made during November at 27 springs by the U.S. Geological Survey (USGS), District staff, and contractors. Madison Blue Spring (Figure 8) began the month in the high flow (75^{th} – 100^{th} percentile) category but fell into the normal range by the end of the month. Manatee Spring (Figure 9) saw flows mostly in the normal range in November.

GROUNDWATER

Upper Floridan Aquifer (UFA) levels across the District ranged anywhere from extremely high (>90th percentile) in the eastern portion to an extremely low (<10th percentile) area in Lafayette County at the end of November (Figure 10). Elsewhere, much of the District showed normal (25th – 75th percentile) groundwater conditions this month. Overall, groundwater levels decreased by a median of about 0.4' since the end of October and ended November with a Districtwide average around the 53rd percentile.

Many of the county index wells remained higher than the historical monthly average levels at the end of November except for wells in Lafayette, Gilchrist, and Dixie counties (Figure 11). The long-term District UFA well levels ended the month either within the very low, normal, or high categories (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 forecasts a continuation of La Niña conditions at 76% from December to February with a 57% chance for El Niño Southern Oscillation neutral conditions from February to April 2023.

The NOAA three-month seasonal outlook favors above normal temperatures along with below normal rainfall chances throughout the District from December through February. The U.S. Drought Monitor report released on December 8, 2022, showed most of the District with either Abnormally Dry (D0) or Moderate Drought (D1) conditions. Portions of Dixie, Lafayette, Taylor, and Jefferson are currently experiencing Severe Drought (D2) 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 Eastern Standard Time (November 6, 2022, to March 12, 2023) is limited to once 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 the District'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 Garcia, Susie Hetrick, Robbie McKinney, and Brandi Sistrunk
- Administrative Support/Document Preparation/IT: Paul Buchanan, Tyler Jordan, Andrew Neel, and Kelly Wooley

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	November 2022	November Average*	Month % of Normal	Total Last 12 Months	Annual % of Normal
Alachua	3.72	2.01	185%	49.84	95%
Baker	2.80	2.02	139%	48.79	92%
Bradford	3.53	2.00	176%	49.98	96%
Columbia	2.90	2.09	139%	48.99	93%
Dixie	2.78	2.24	124%	49.23	85%
Gilchrist	3.22	2.16	149%	47.96	88%
Hamilton	3.04	2.24	136%	47.16	91%
Jefferson	2.90	2.86	101%	47.58	85%
Lafayette	2.79	2.20	127%	46.90	85%
Levy	2.53	2.18	116%	50.18	89%
Madison	3.44	2.46	140%	50.67	95%
Suwannee	3.14	2.16	145%	46.82	88%
Taylor	2.85	2.43	117%	50.32	89%
Union	2.85	2.05	139%	48.86	93%

*Based on PRISM LT81 rainfall averages by county (1927-2020)

November 2022 District Average	3.00
November Long-Term Average (1932-2021)	2.33
Historical 12-month Average (1932-2021)	54.73
Past 12-Month Total	49.11
12-Month Rainfall **Surplus**/Deficit	**-5.62**

Figure 1: Comparison of District-wide Monthly Rainfall

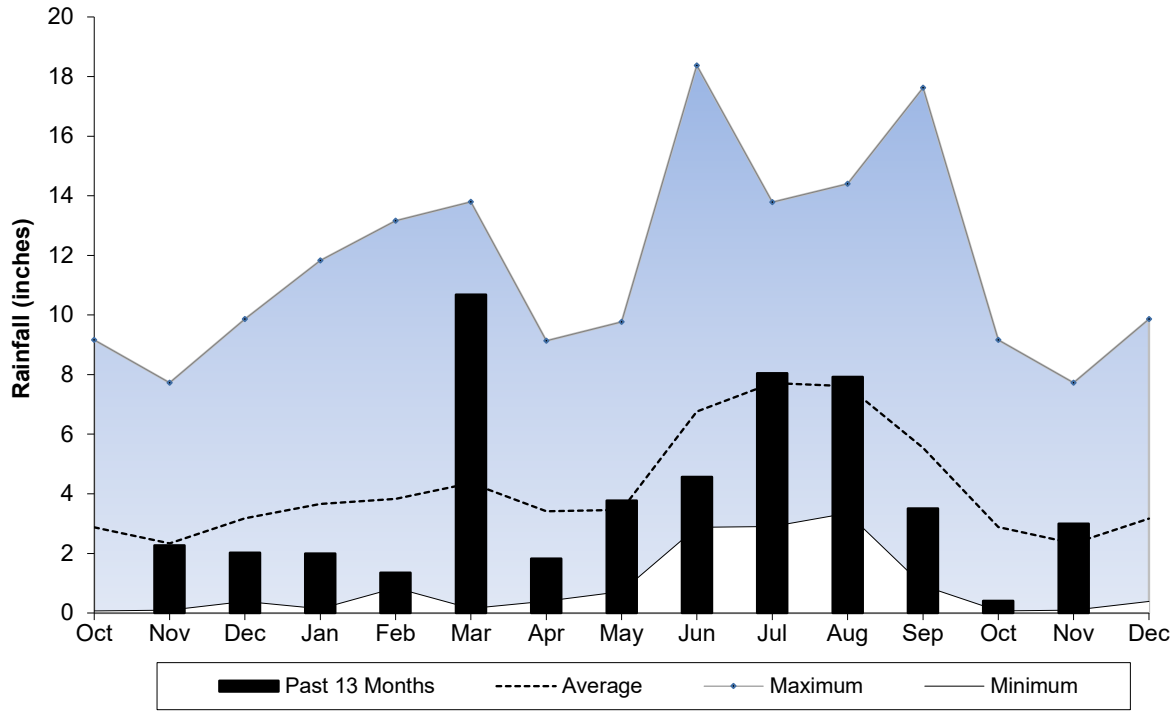


Figure 2: November 2022 SRWMD Gage-adjusted Radar Rainfall

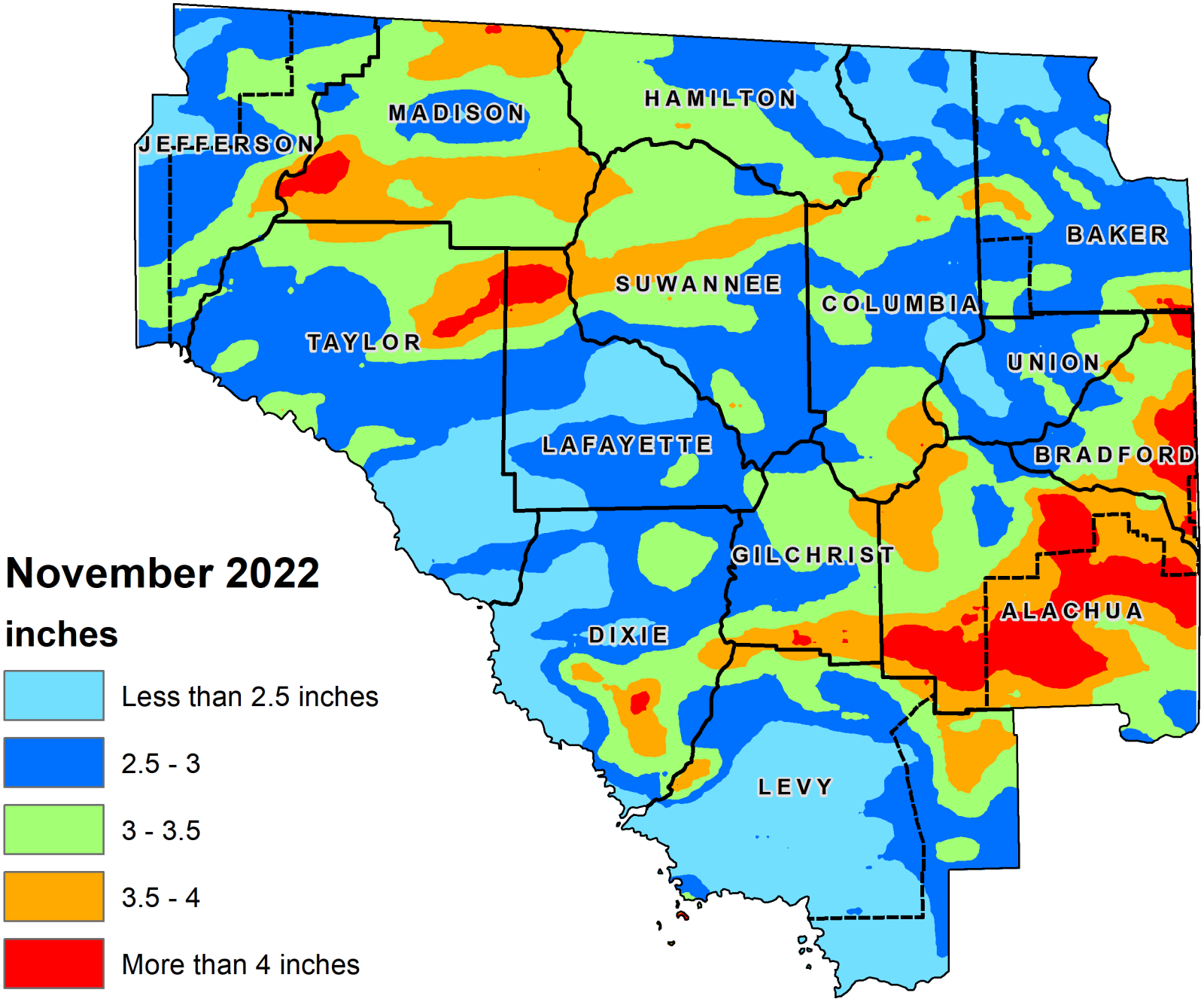
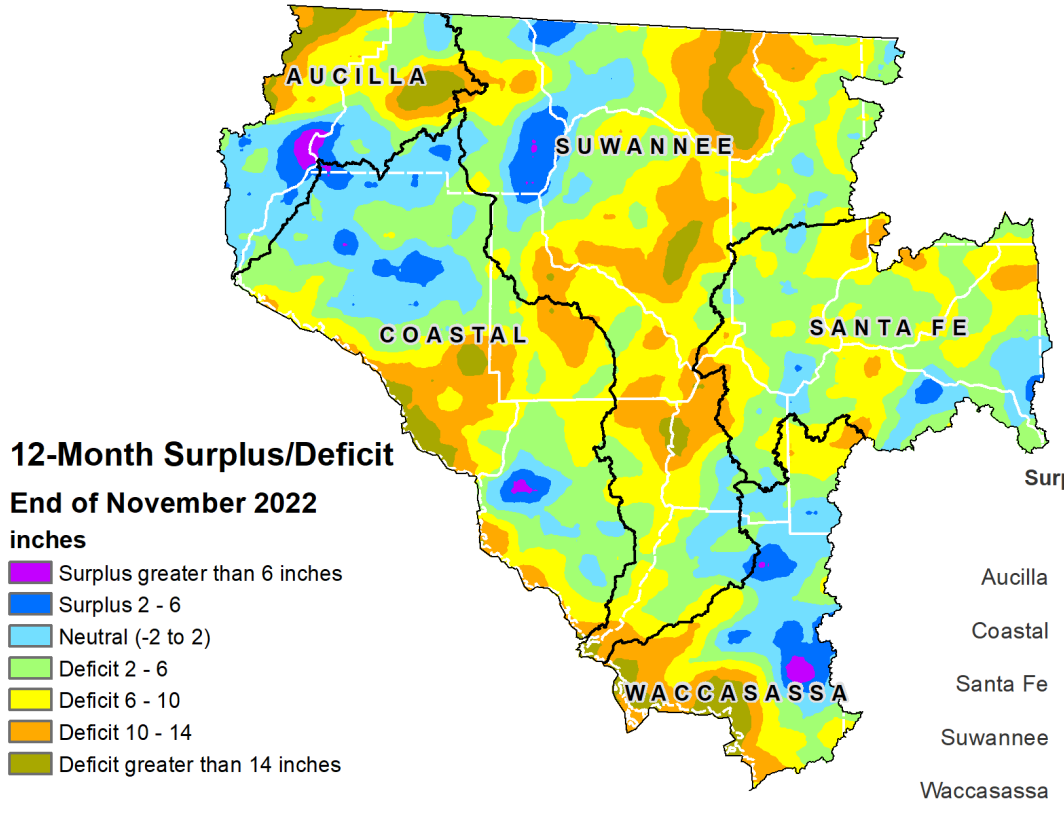


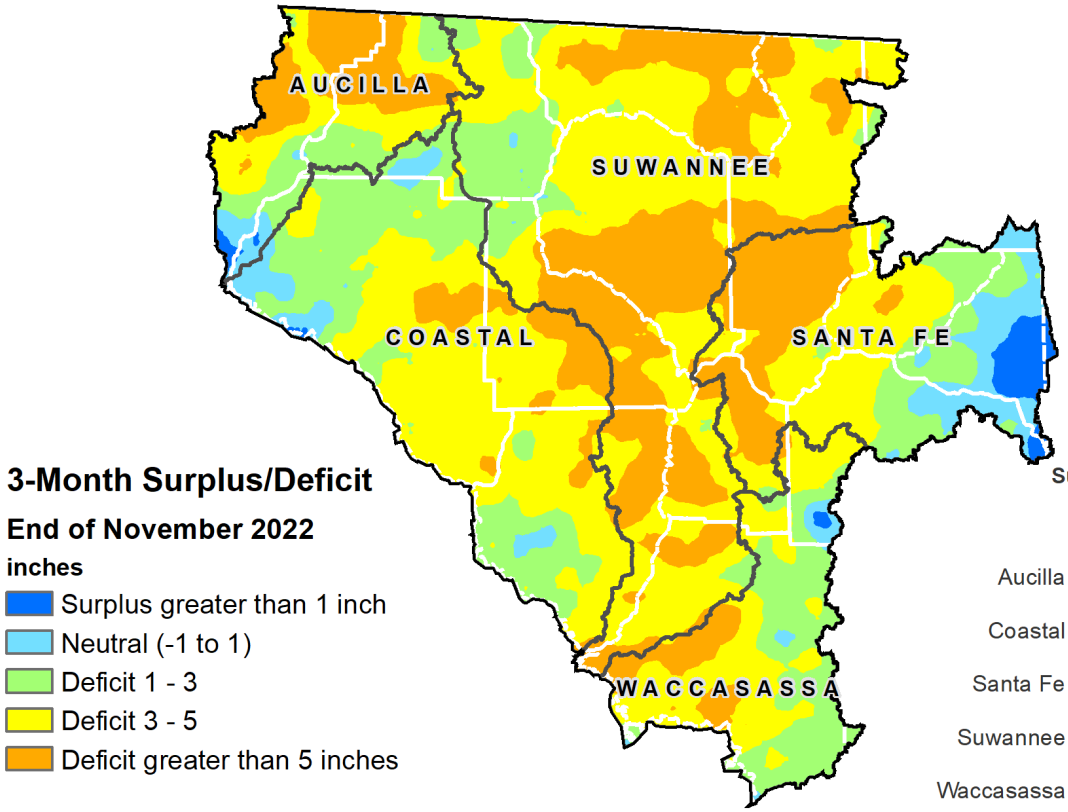
Figure 3: 12 - Month Rainfall Surplus/Deficit by River Basin through November 30, 2022



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

	Nov 2022	Oct 2022
Aucilla	**- 5.2**	- 7.0
Coastal	**- 4.9**	- 5.7
Santa Fe	**- 5.2**	- 5.6
Suwannee	**- 6.8**	- 7.5
Waccasassa	**- 4.8**	- 4.7

Figure 4: 3 - Month Rainfall Surplus/Deficit by River Basin through November 30, 2022

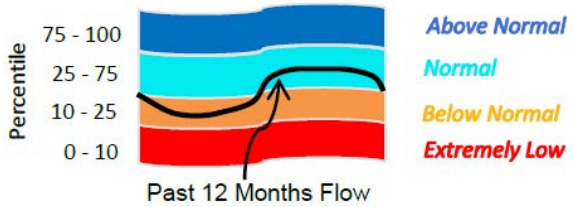


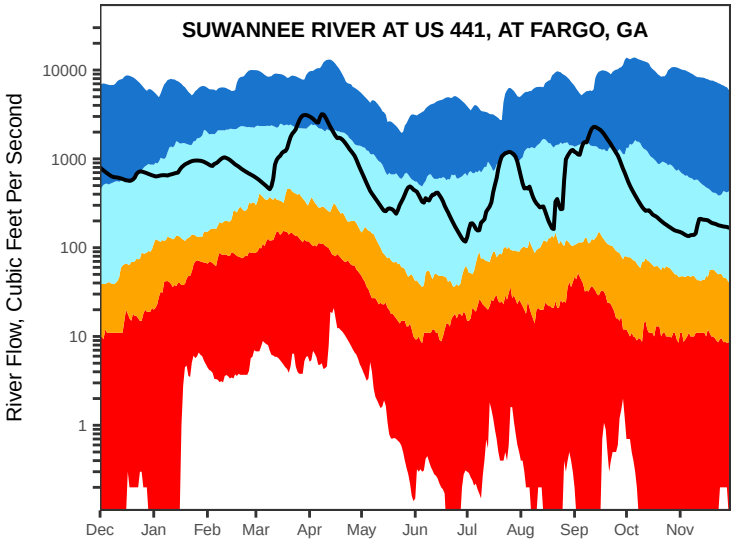
3-Month Surplus (+) or Deficit (-) By Basin

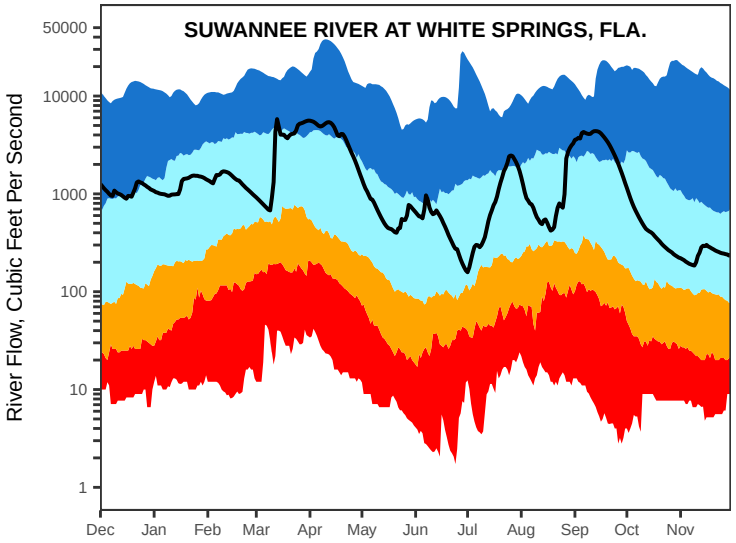
	Nov 2022	Oct 2022
Aucilla	- 3.9	- 3.9
Coastal	- 3.4	- 3.3
Santa Fe	- 3.1	- 3.2
Suwannee	- 4.6	- 5.3
Waccasassa	- 3.5	- 4.1

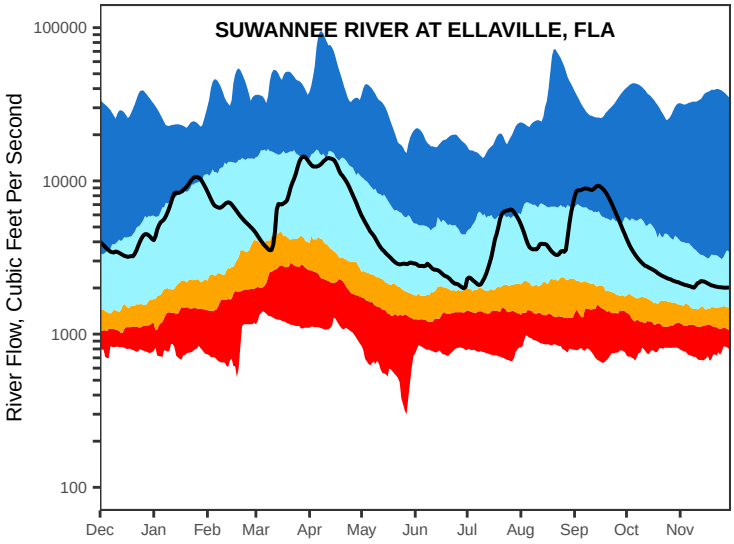
Figure 5: Daily River Flow Statistics

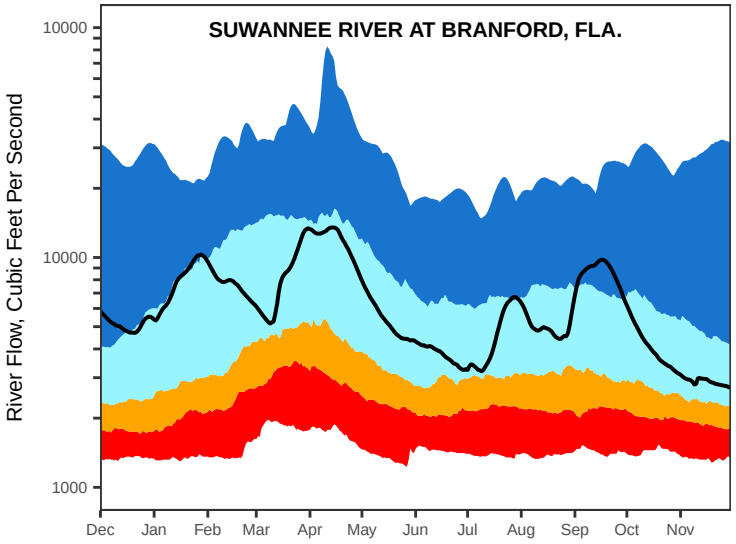
December 1, 2021 through November 30, 2022

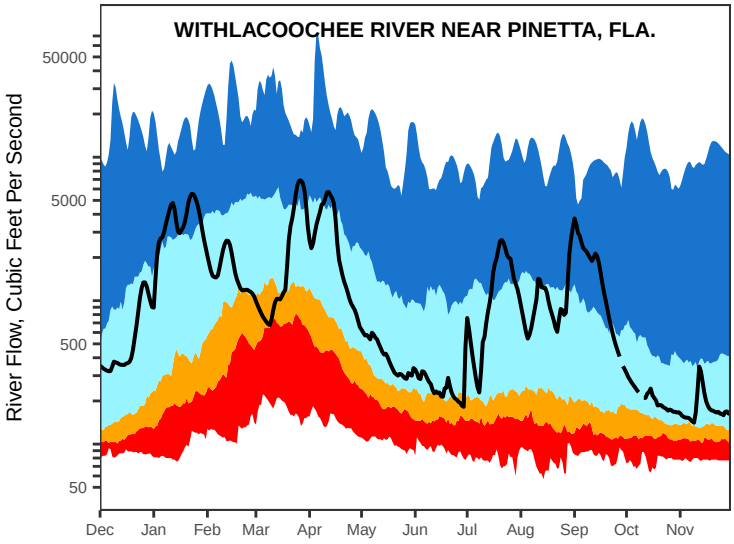












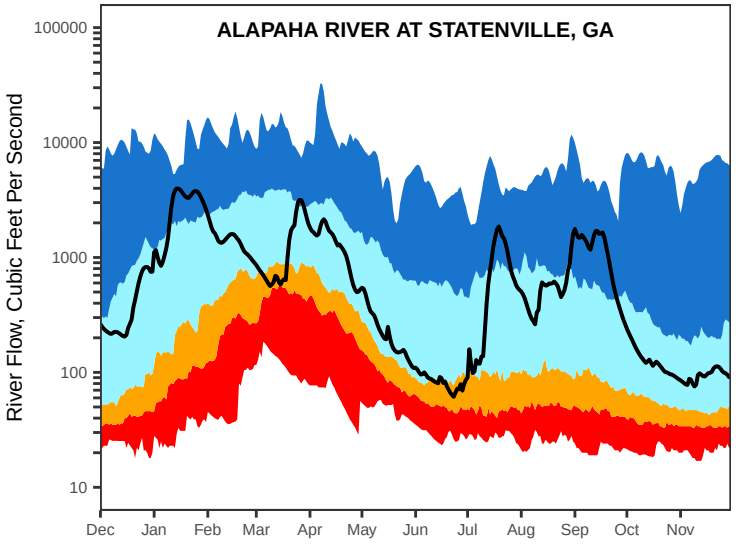
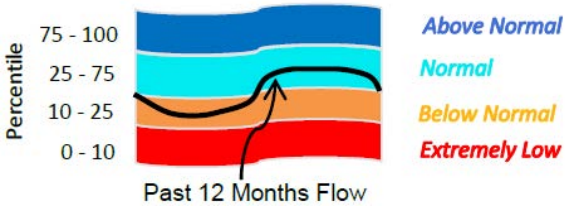
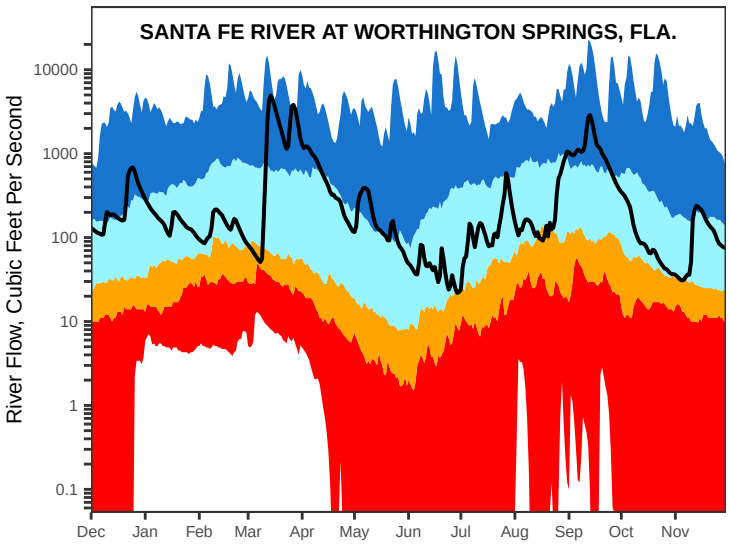
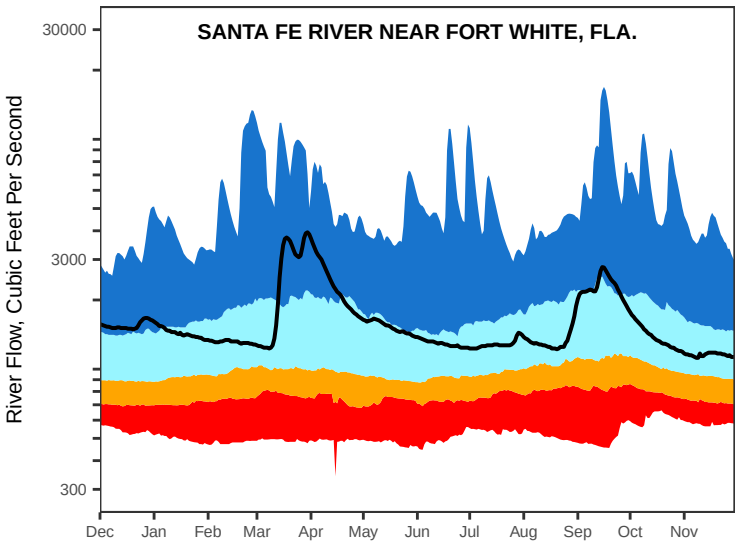


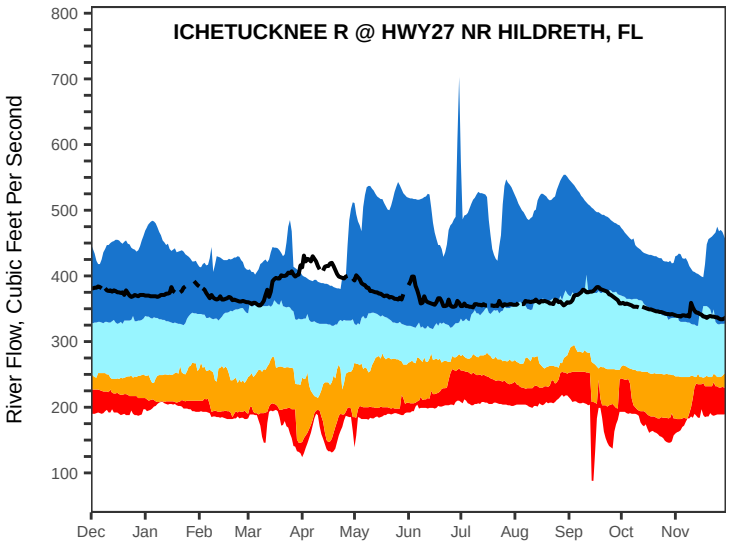
Figure 5, cont.: Daily River Flow Statistics

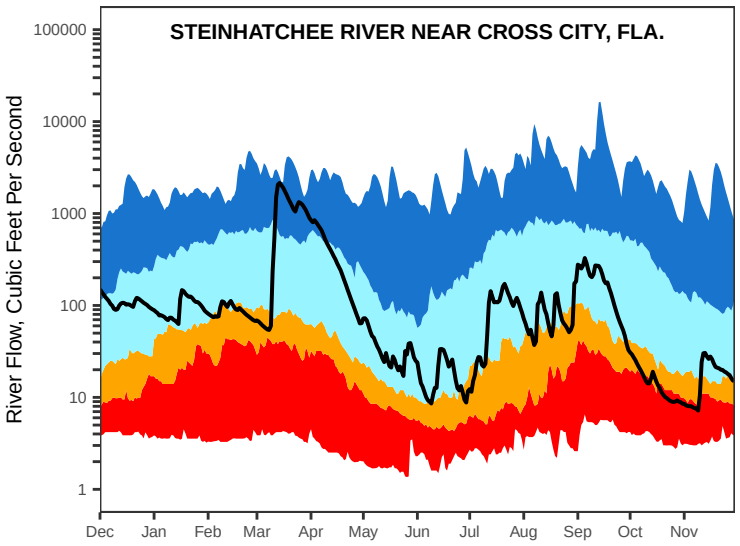
December 1, 2021 through November 30, 2022

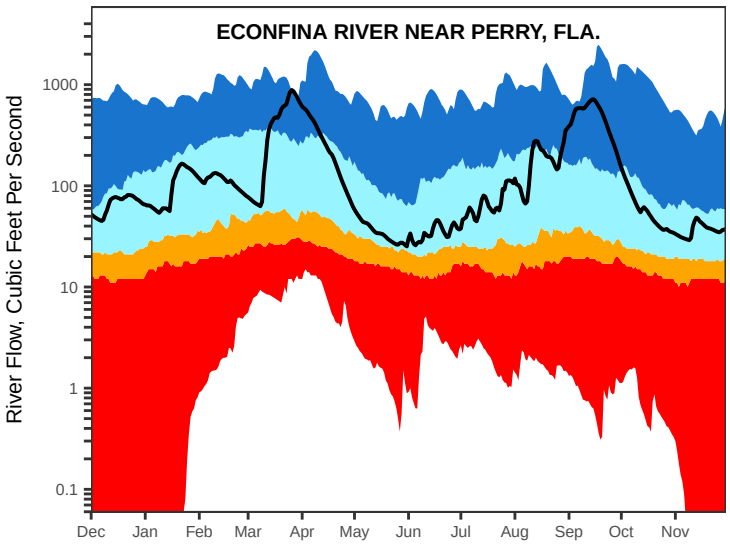












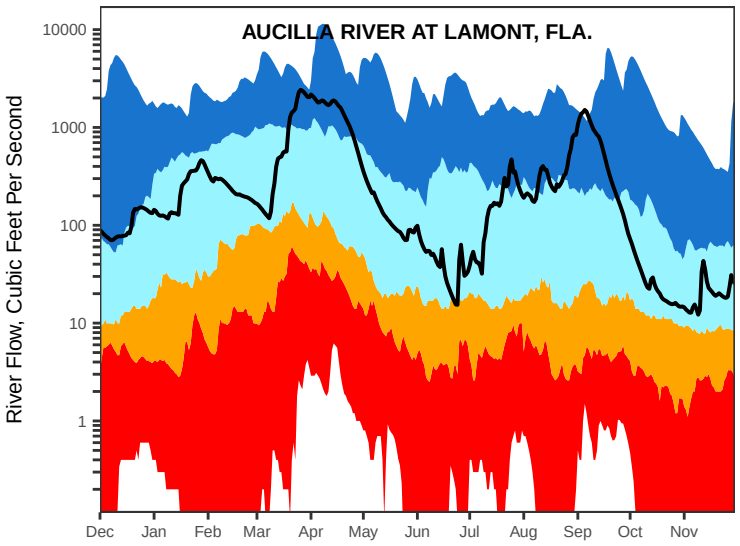
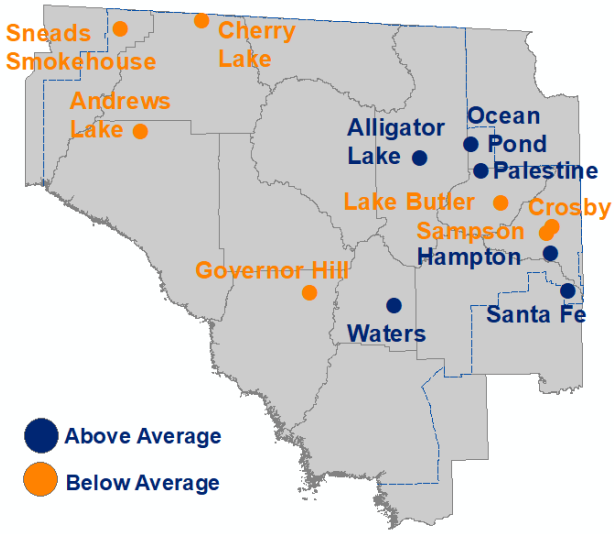



Figure 6:
Streamflow Conditions
November 2022
The Cody Scarp (or Escarpment) is an area of relatively steep topographical change that runs across north Florida. The geology above the Scarp consists of sandy soils over thick layers of mostly impermeable sediments such as clay. Streams are well-developed 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
Withlacoochee/
Quitman
Upper
Suwannee
Alapaha/
Statenville
Fargo
Withlacoochee/
Pinetta
North Prong
St. Marys
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.
November 1
November 30
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: November 2022 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.

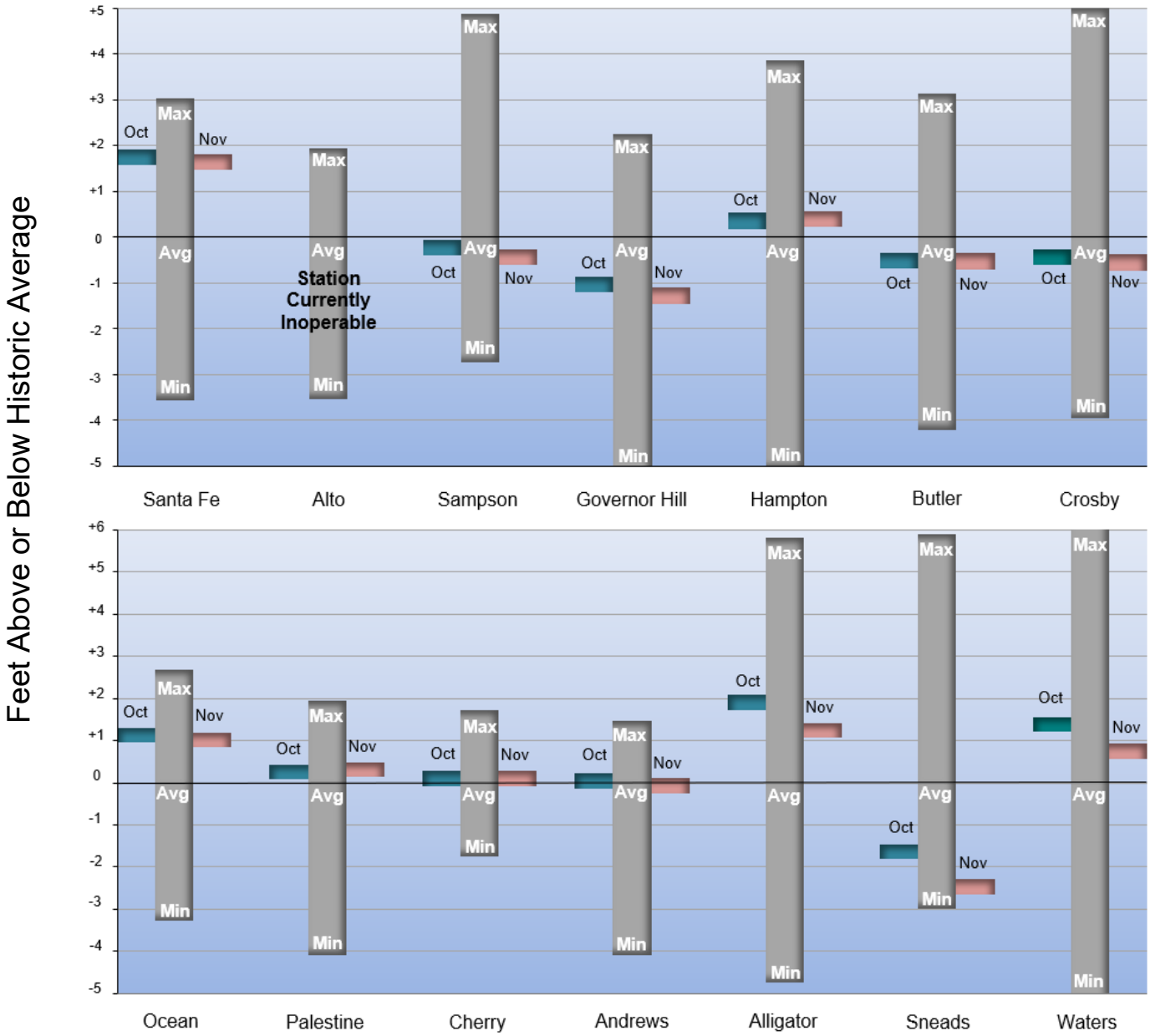


Figure 8: Flow Over the Past 12 Months, Madison Blue Spring (cubic feet per second)

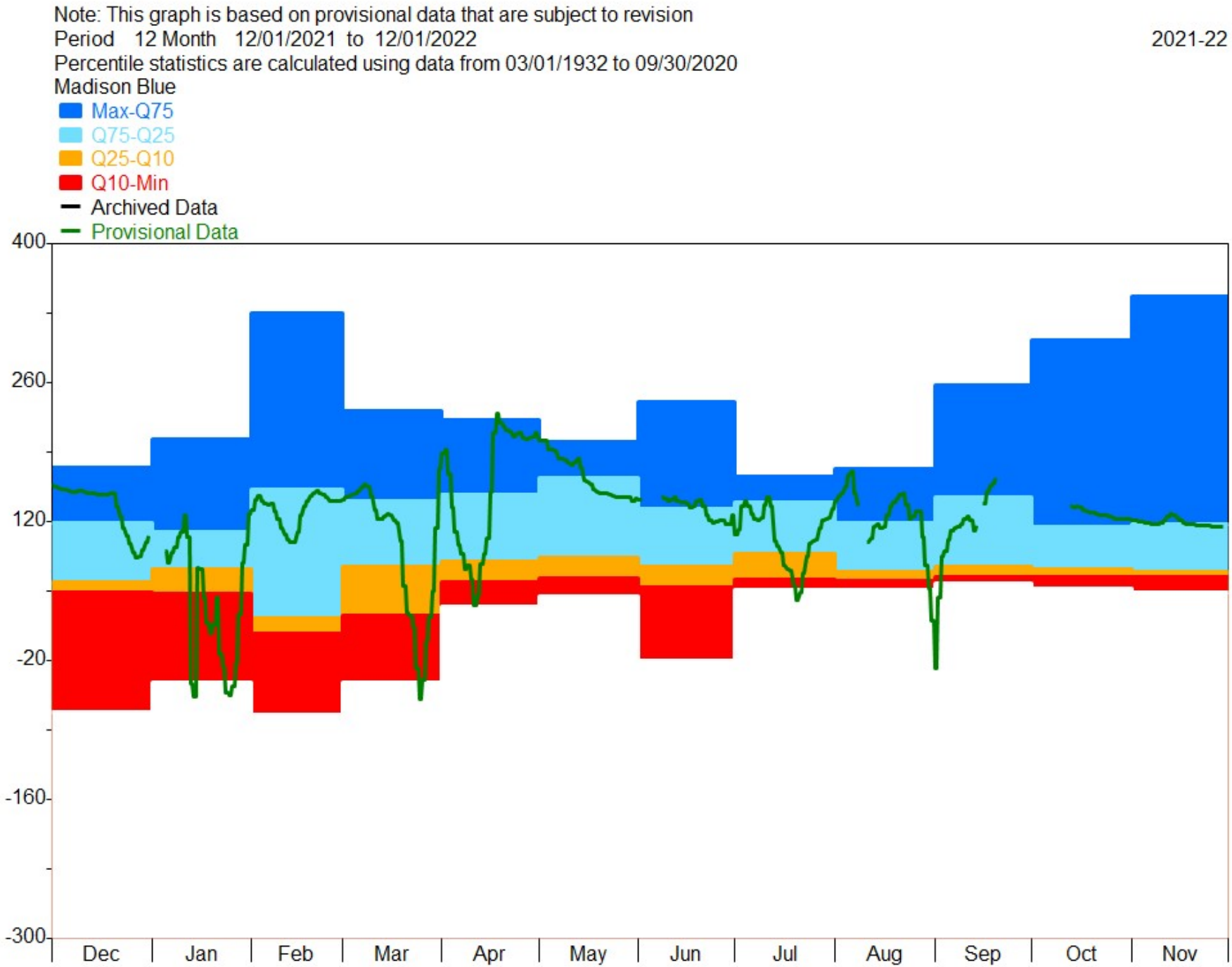
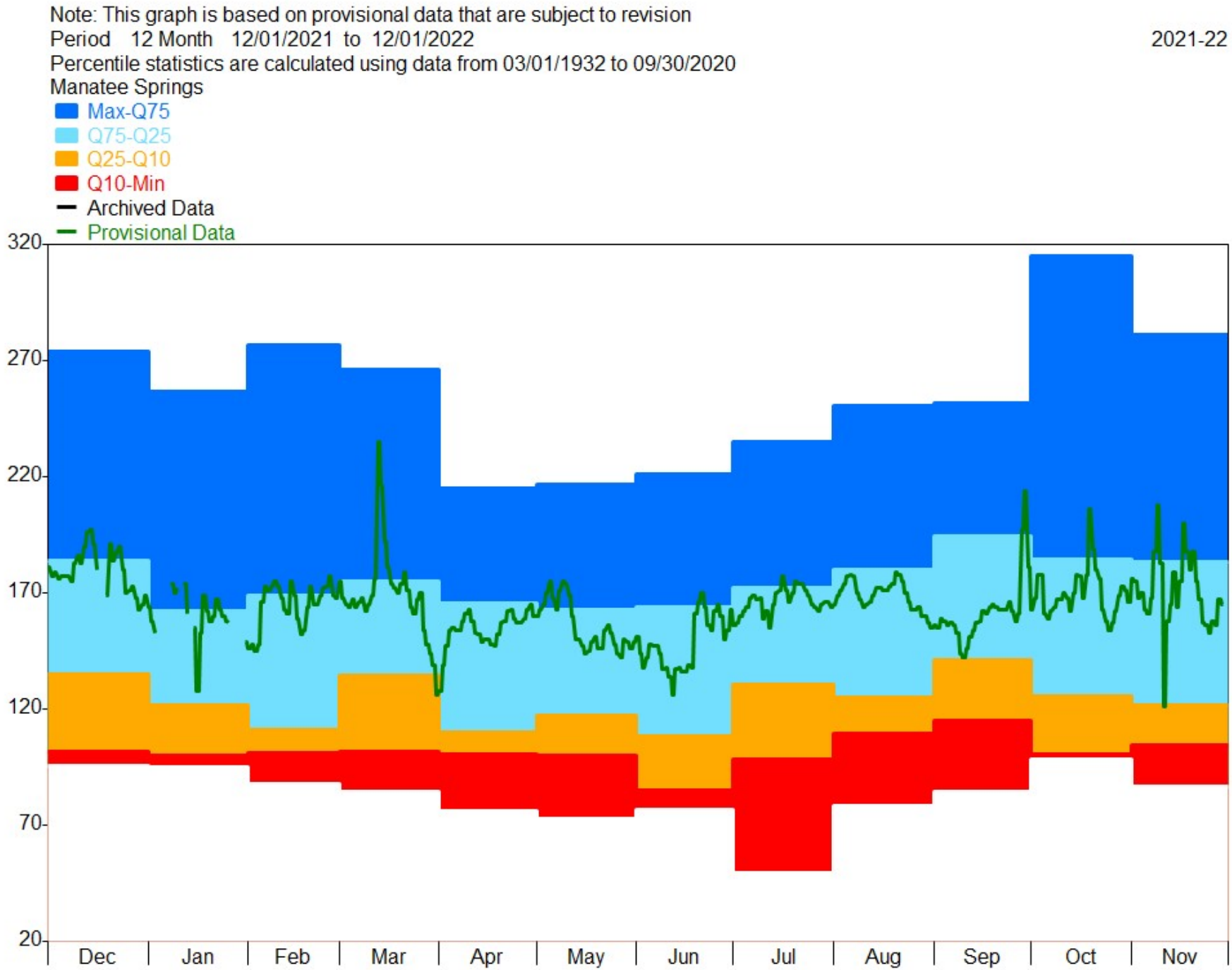


Figure 9: Flow Over the Past 12 Months, Manatee Spring (cubic feet per second)



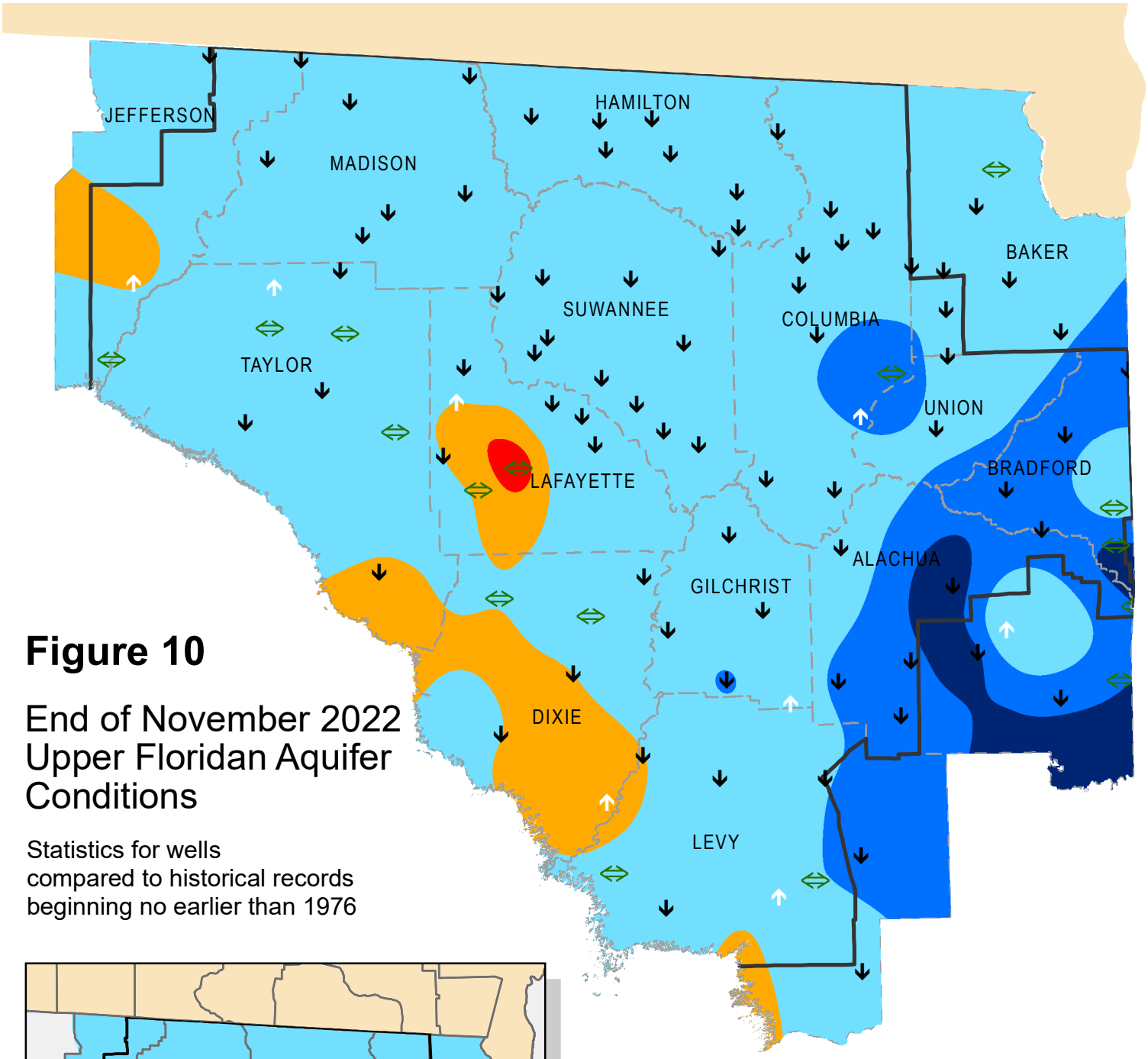
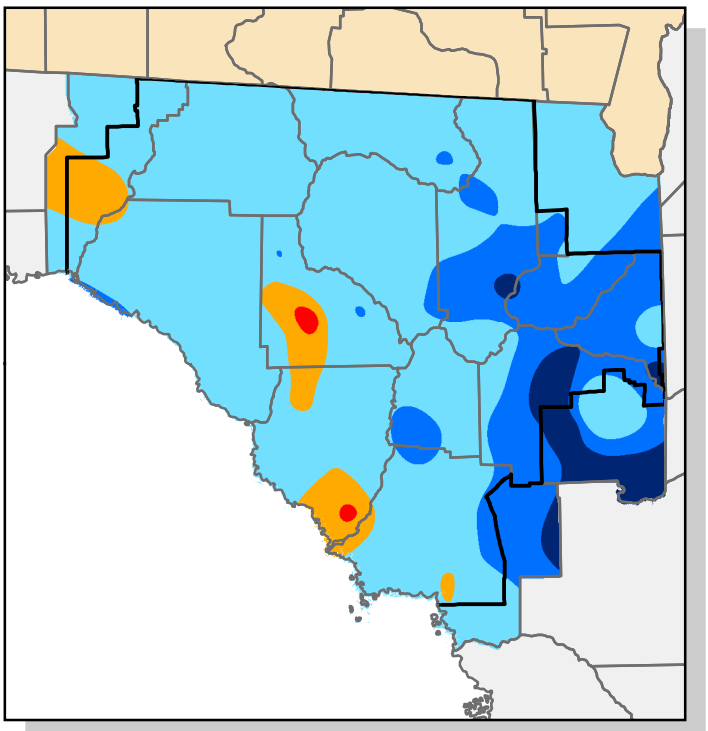


Figure 10

End of November 2022 Upper Floridan Aquifer Conditions

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



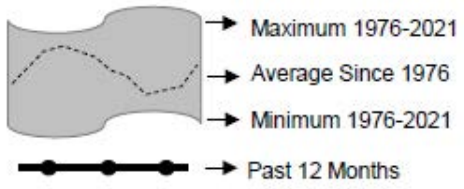
Inset: October Groundwater Percentiles

Additional wells courtesy of SJRWMD, SWFWMD and USGS

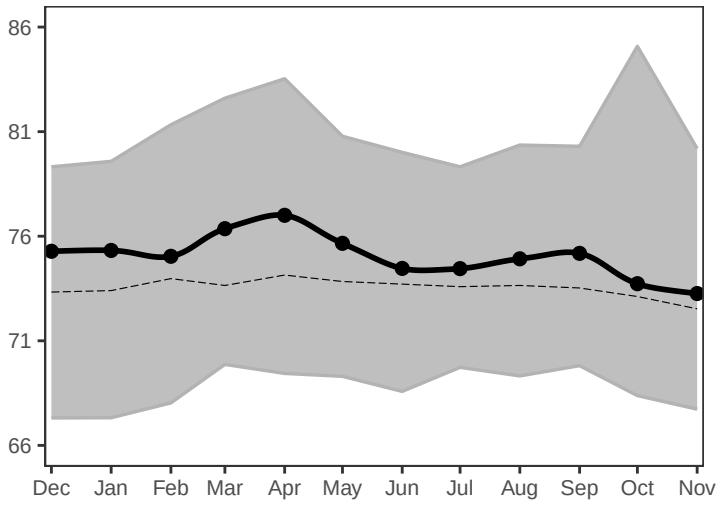
- Extremely High (Greater than 90th Percentile)
- High (75th to 90th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Increase/decrease in level since last month
- Increase/decrease since last month less than one percent of historic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

Figure 11: Monthly Groundwater Statistics

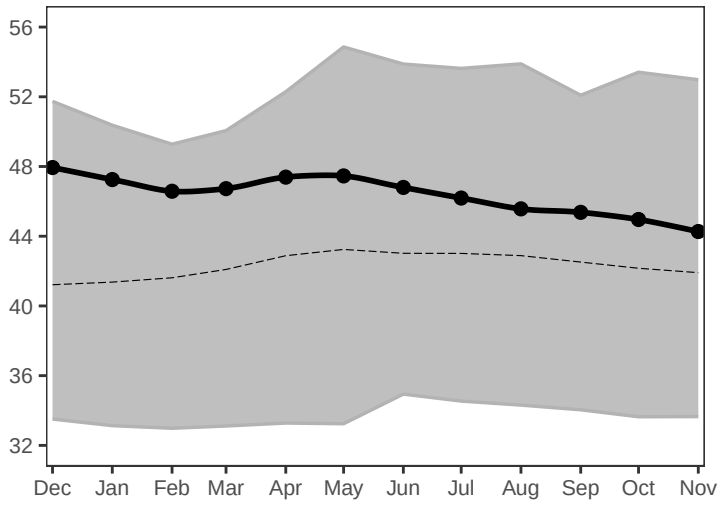
Levels December 2021 through November 2022
Period of Record Beginning 1976



Madison County N010719001
near Greenville

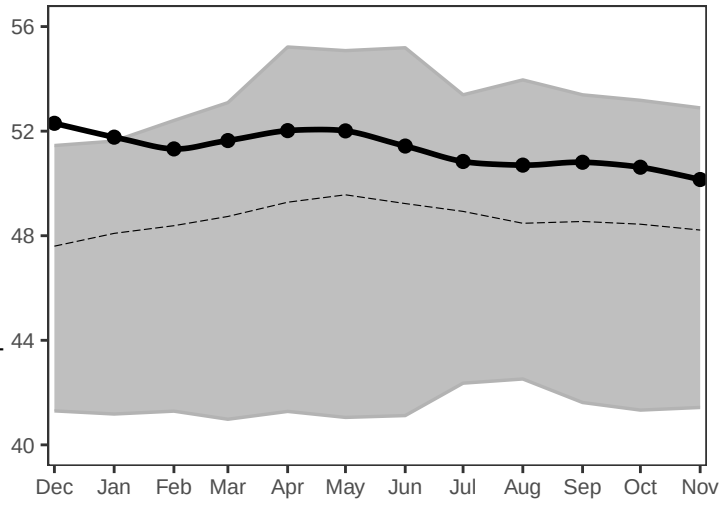


Suwannee County S021335001
near Live Oak

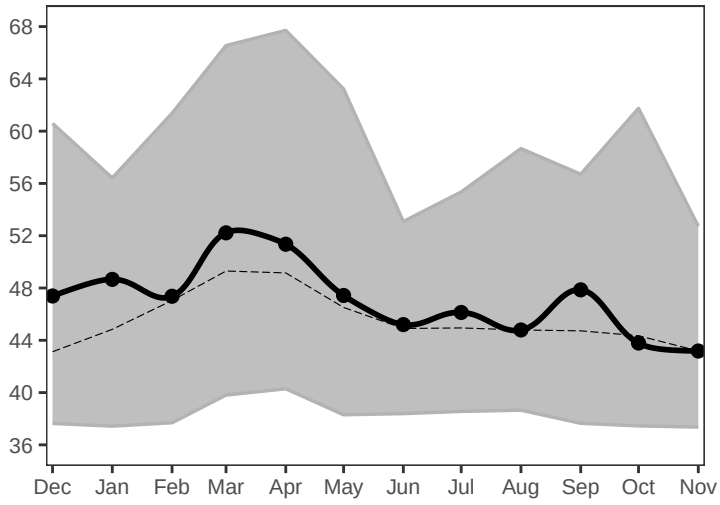


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

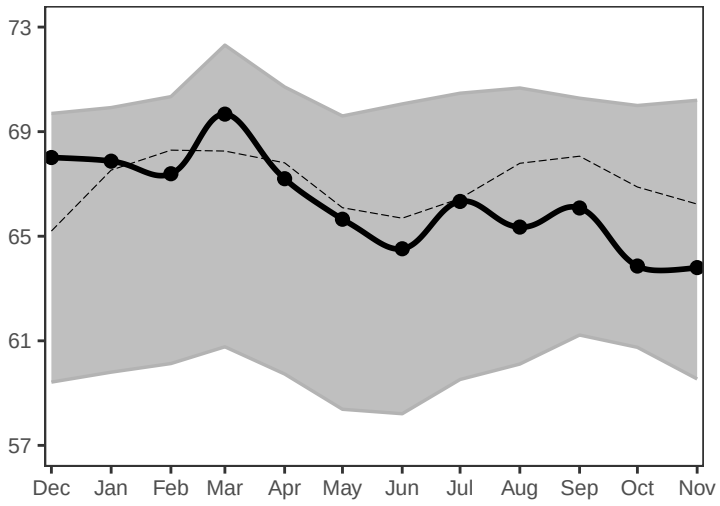
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S040736005
Perry

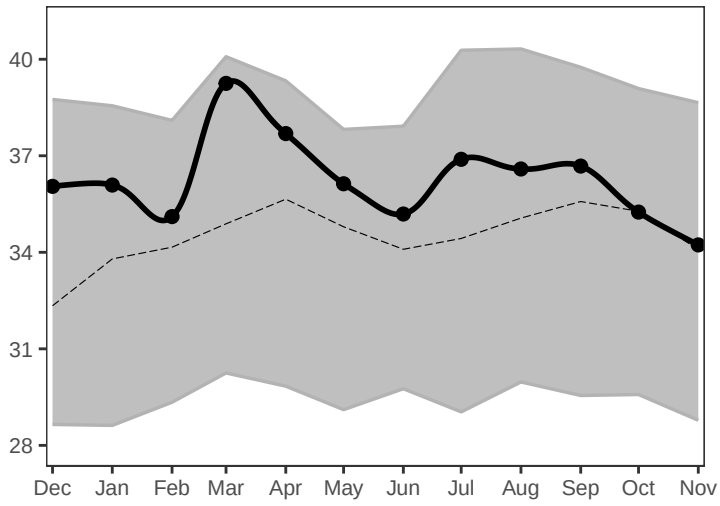
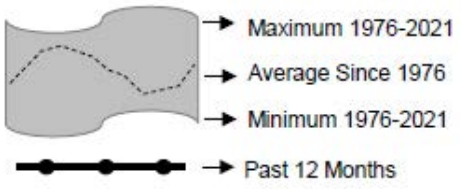
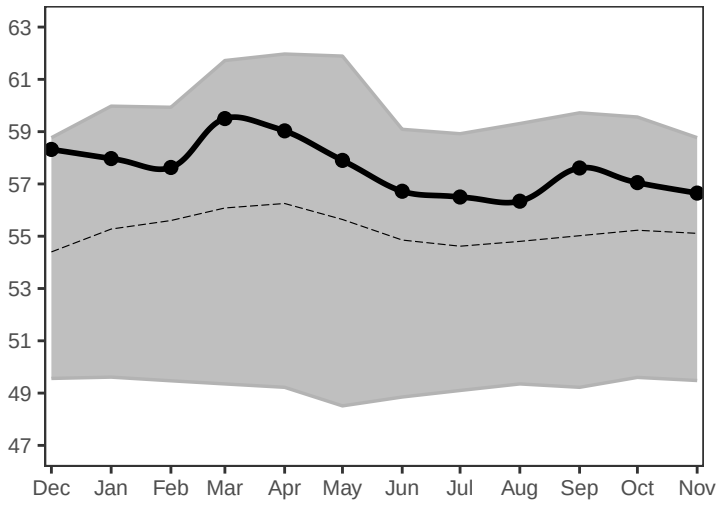


Figure 11, cont.: Monthly Groundwater Statistics

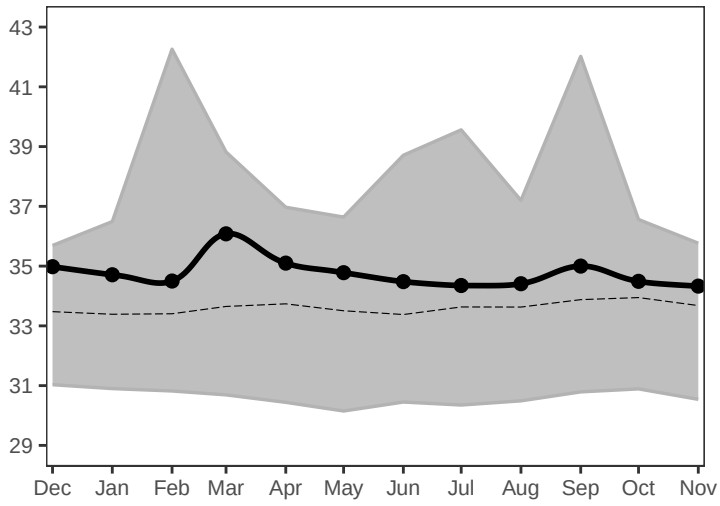
Levels December 2021 through November 2022
Period of Record Beginning 1976



Union County S051933001
near Lake Butler

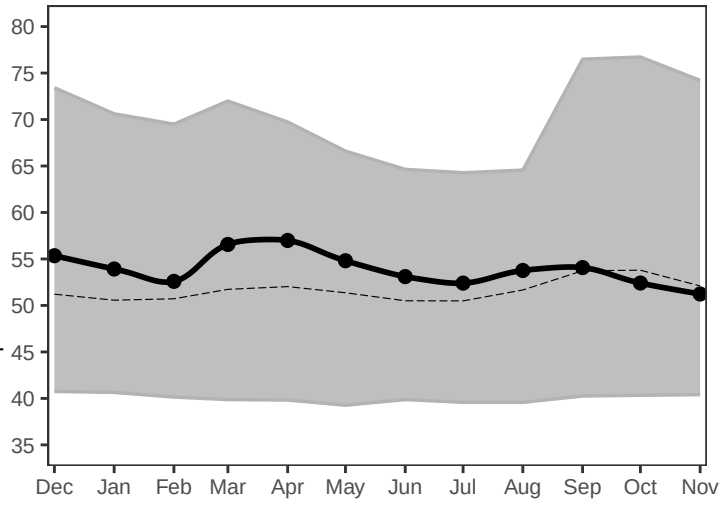


Alachua County S081703001
at High Springs

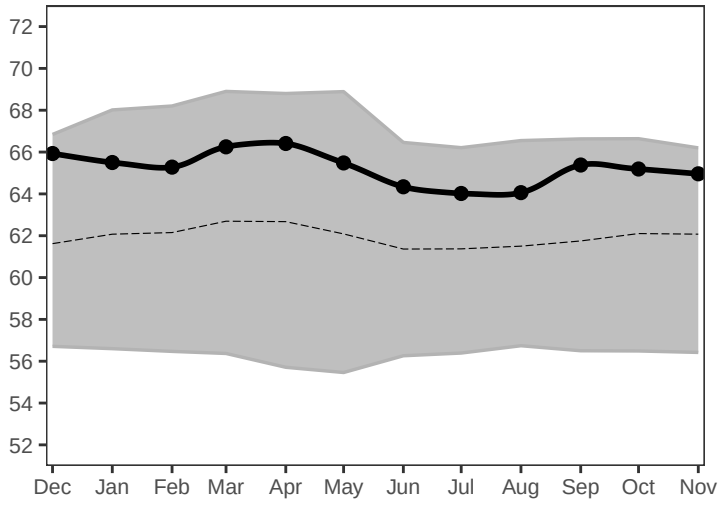


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

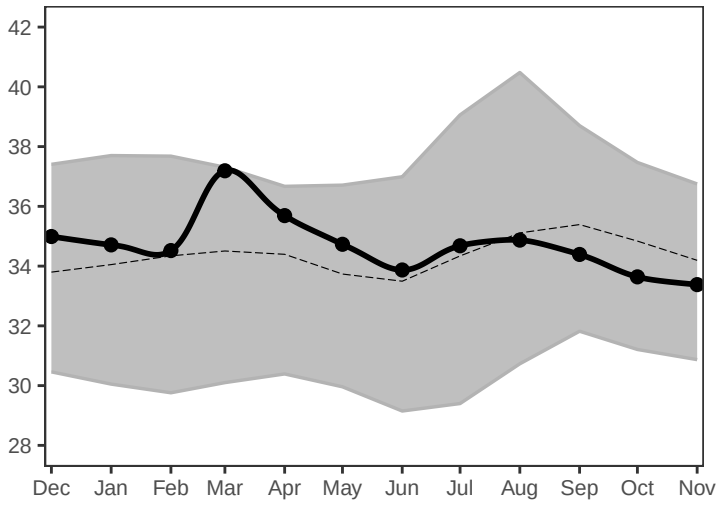
Gilchrist County S091607001
near Trenton



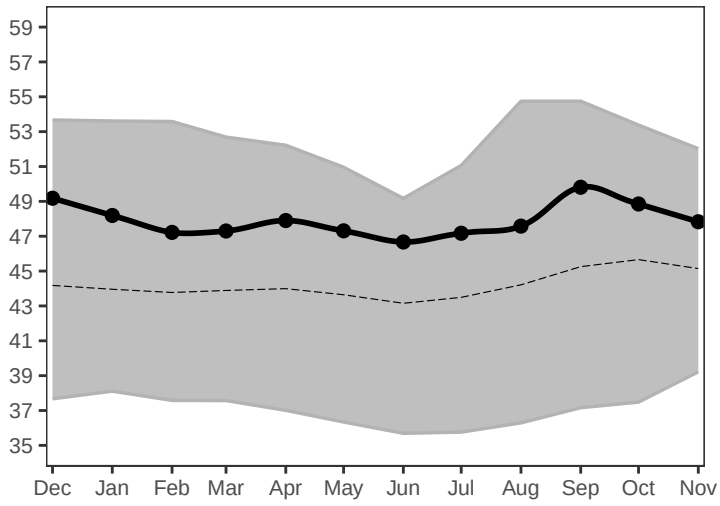
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



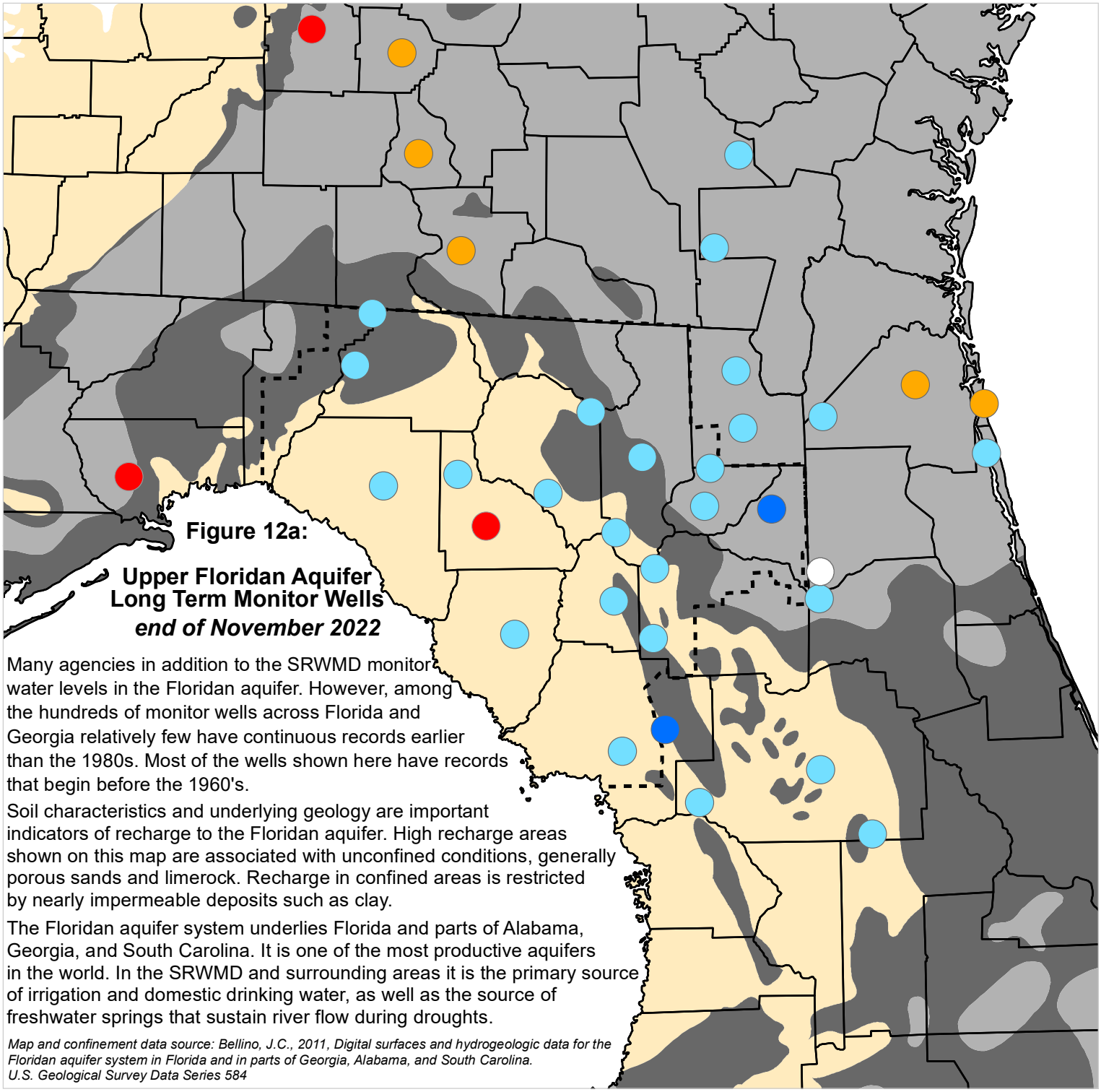


Figure 12a:

Upper Floridan Aquifer Long Term Monitor Wells

end of November 2022

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

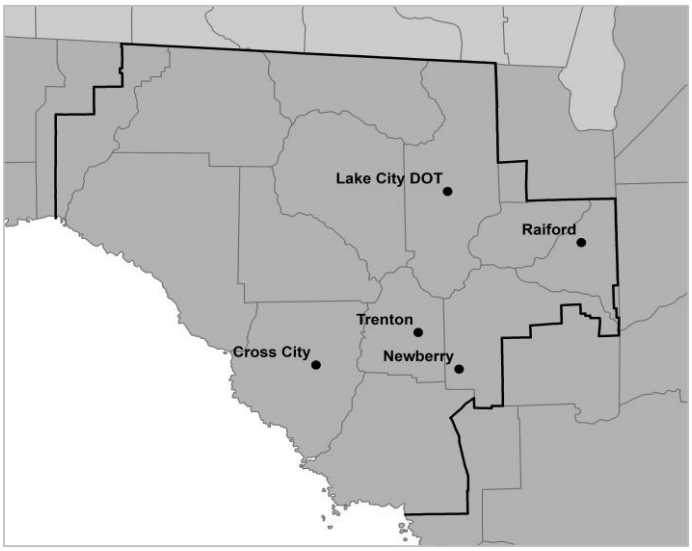
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.
- SRWMD Boundary

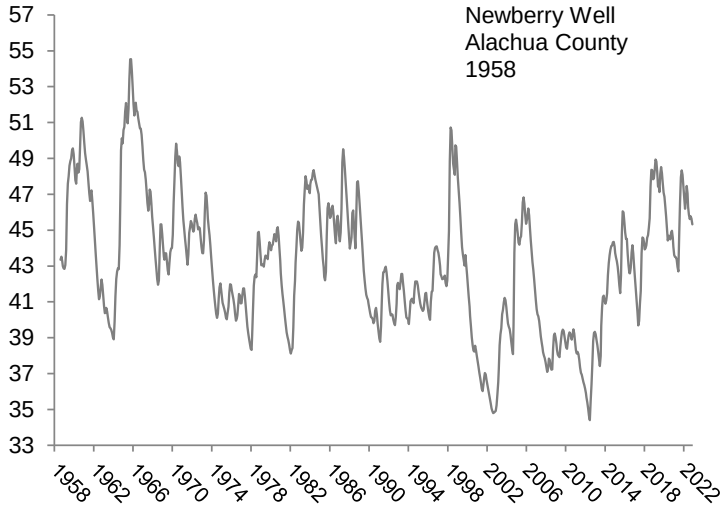
Percentile of Most Recent Water Level Relative to Entire Record

- 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 November 2022





Upper Floridan Aquifer Elevation above NGVD 1929, Feet