

## 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: December 31, 2022

RE: December 2022 Hydrologic Conditions Report

#### RAINFALL

- Districtwide average rainfall for the month was 1.12", which was about 65% lower than the 1932-2021 average of 3.17" (Table 1, Figure 1). The 12-month period ending December 31 reflected a Districtwide rainfall deficit of 6.52", which represented an increase in the 5.62" deficit seen at the end of November. Most District counties received anywhere from 0.6" to 1.5" of rainfall on average with areas of Taylor, Jefferson, Levy, and Alachua counties receiving more than 2" of rainfall (Figure 2).
- A 12-month rainfall deficit was present for all river basins, with all but the Waccasassa Basin increasing in deficit at the end of December. (Figure 3). However, small portions of the Waccasassa, Coastal, and Aucilla basins showed surpluses greater than 6" by month's end. Areas within each of the basins had 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 increased from November to the end of December (Figure 4). Only the Suwannee and Aucilla basins showed slight improvement in their respective rainfall deficits by month's end.

#### SURFACE WATER

- **Rivers:** Many of the river stations shown in Figure 5 finished the month in the normal (25<sup>th</sup> – 75<sup>th</sup> percentile) flow range. However, the Suwannee River at Ellaville, Steinhatchee near Cross City, and Aucilla at Lamont gages showed below normal flows (10<sup>th</sup> – 25<sup>th</sup> percentile) at the end of December. The Ichetucknee gage seemed to experience technical issues at the end of the month. In addition to those listed above, river gages outside of the District including the St. Marys near Macclenny, Withlacoochee near Quitman, and Little River near Adel ended December with below normal flows (Figure 6). Other river gages in North Florida and South Georgia ended in the normal flow category.
- **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 0.2'. Alligator Lake had the highest stage decrease at around 0.9'. Ten 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 December at 18 springs by the U.S. Geological Survey (USGS), District staff, and contractors. Fanning Spring (Figure 8) began the month in the high flow (75<sup>th</sup> – 100<sup>th</sup> percentile) category but fell into the normal range by the end of the month. Lafayette Blue Spring (Figure 9) saw flows mostly in the normal range in December.

## **GROUNDWATER**

Upper Floridan Aquifer (UFA) levels across the District ranged anywhere from extremely high (>90<sup>th</sup> percentile) in the eastern portion to extremely low (<10<sup>th</sup> percentile) in the western and southern parts of the District at the end of December (Figure 10). Elsewhere, much of the District showed normal groundwater conditions this month. Overall, groundwater levels decreased by a median of about 0.5' since the end of November and ended December with a Districtwide average around the 46<sup>th</sup> percentile.

Many of the county index wells remained higher than the historical monthly average levels at the end of December except for wells in Madison, Hamilton, Lafayette, Gilchrist, and Dixie counties (Figure 11). The long-term District UFA well levels ended the month either within the very low, low, or normal 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 into winter, with equal chances of La Niña and El Niño Southern Oscillation (ENSO) neutral conditions from January to March 2023. From February to April 2023, there is a 71% chance of ENSO-neutral conditions.

The NOAA three-month seasonal outlook favors above normal temperatures along with below normal rainfall chances throughout the District from January through March. The U.S. Drought Monitor report released on January 5, 2023, showed all District counties in at least one of the following drought categories: Abnormally Dry (D0), Moderate Drought (D1), or Severe Drought (D2).

## **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	December 2022	December Average*	Month % of Normal	Total Last 12 Months	Annual % of Normal
Alachua	1.18	2.80	42%	48.98	93%
Baker	0.61	2.96	21%	46.74	89%
Bradford	0.81	2.82	29%	47.74	92%
Columbia	0.80	3.03	26%	46.85	89%
Dixie	1.33	3.07	44%	49.59	85%
Gilchrist	1.07	2.98	36%	47.76	87%
Hamilton	0.72	3.26	22%	44.87	87%
Jefferson	1.19	3.78	32%	46.85	84%
Lafayette	1.16	3.19	36%	46.39	84%
Levy	1.42	2.88	49%	50.78	90%
Madison	0.95	3.60	26%	49.46	93%
Suwannee	0.95	3.15	30%	45.31	85%
Taylor	1.48	3.29	45%	49.88	88%
Union	0.59	2.92	20%	46.52	88%

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

December 2022 District Average	1.12
December Long-Term Average (1932-2021)	3.17
Historical 12-month Average (1932-2021)	54.73
Past 12-Month Total	48.21
12-Month Rainfall <b>Surplus/Deficit</b>	<b>-6.52</b>

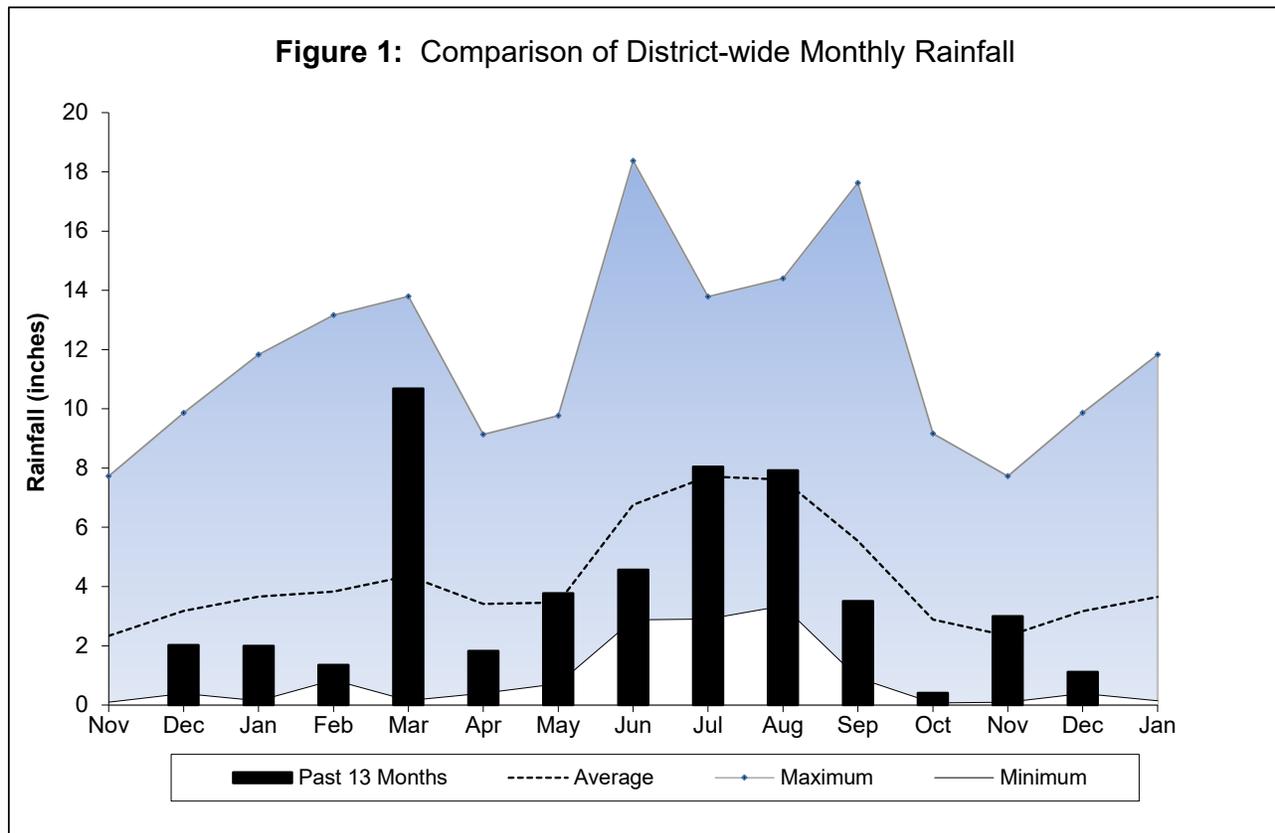
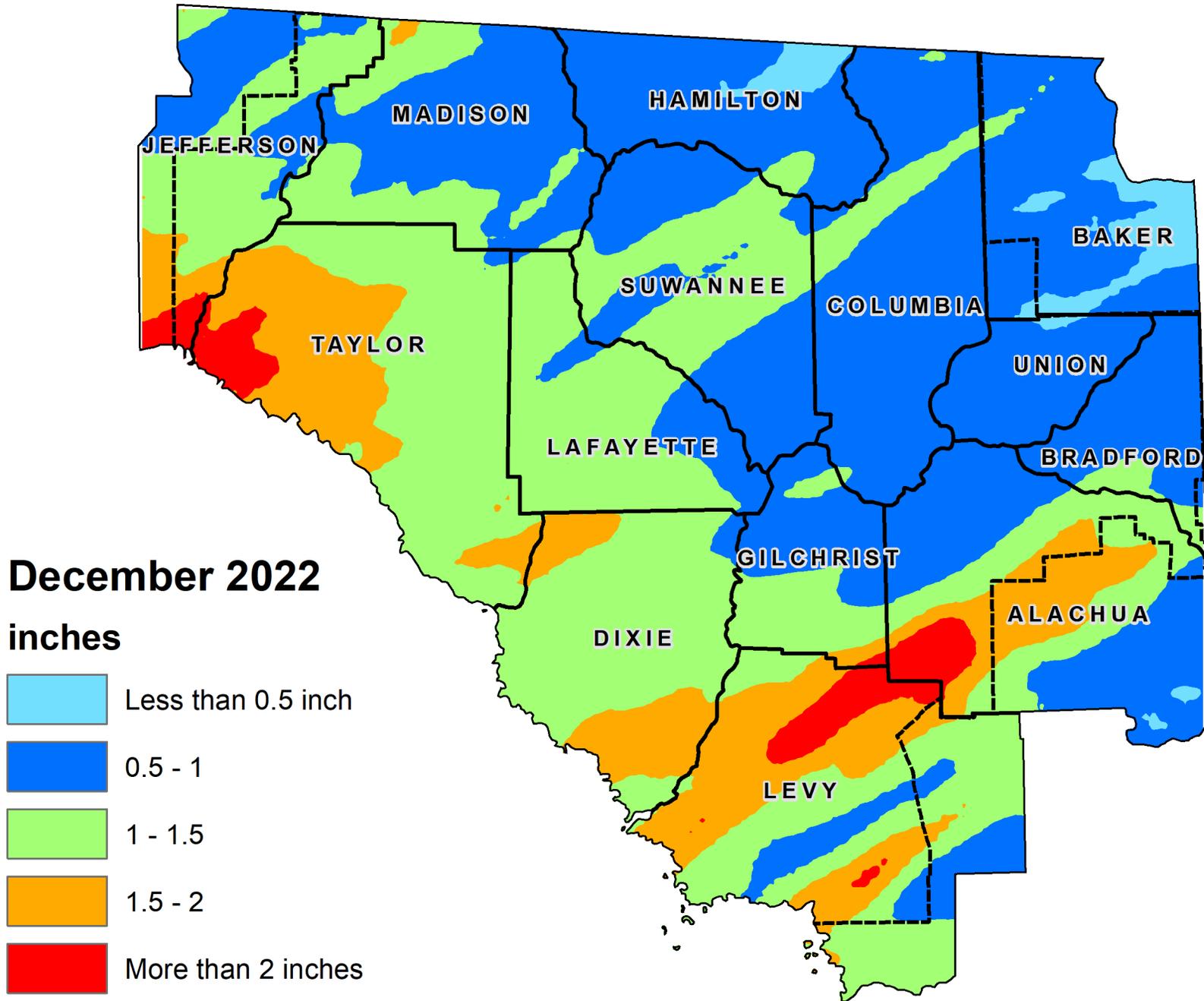
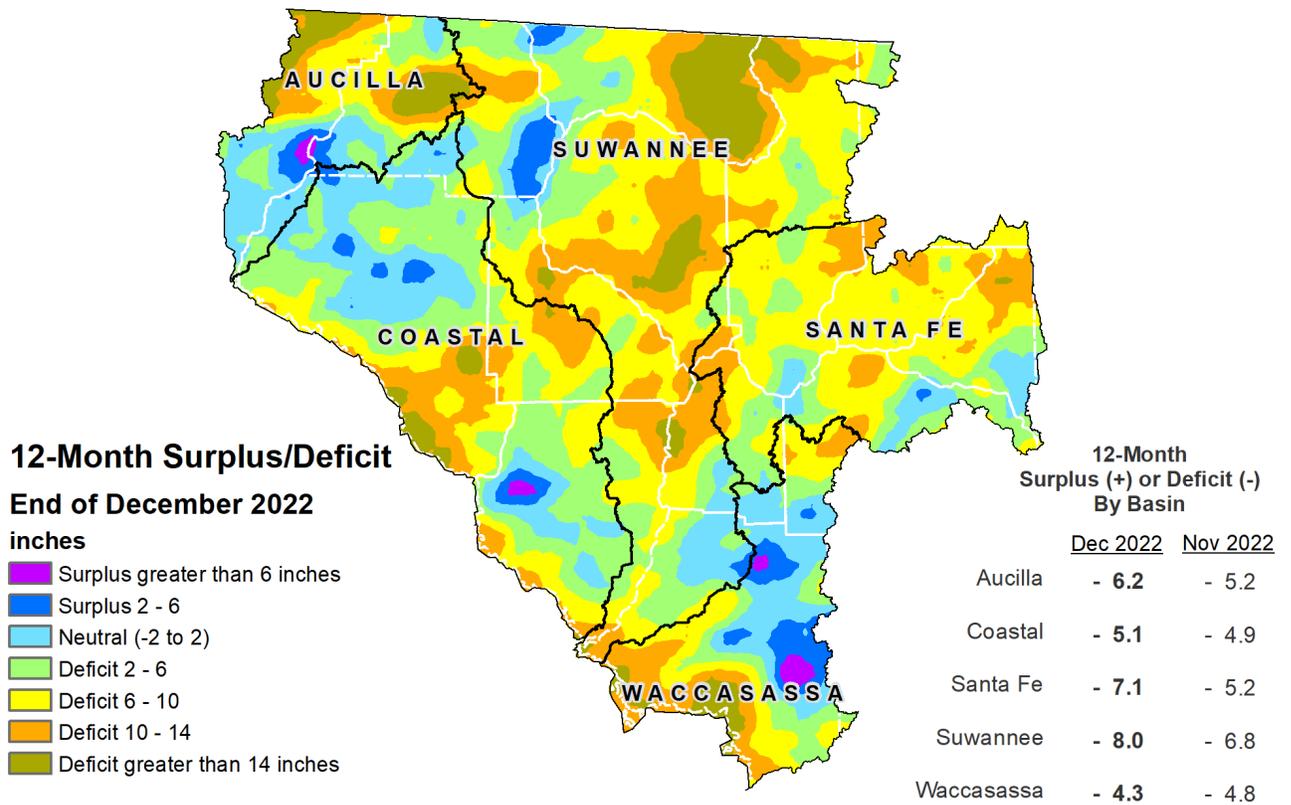


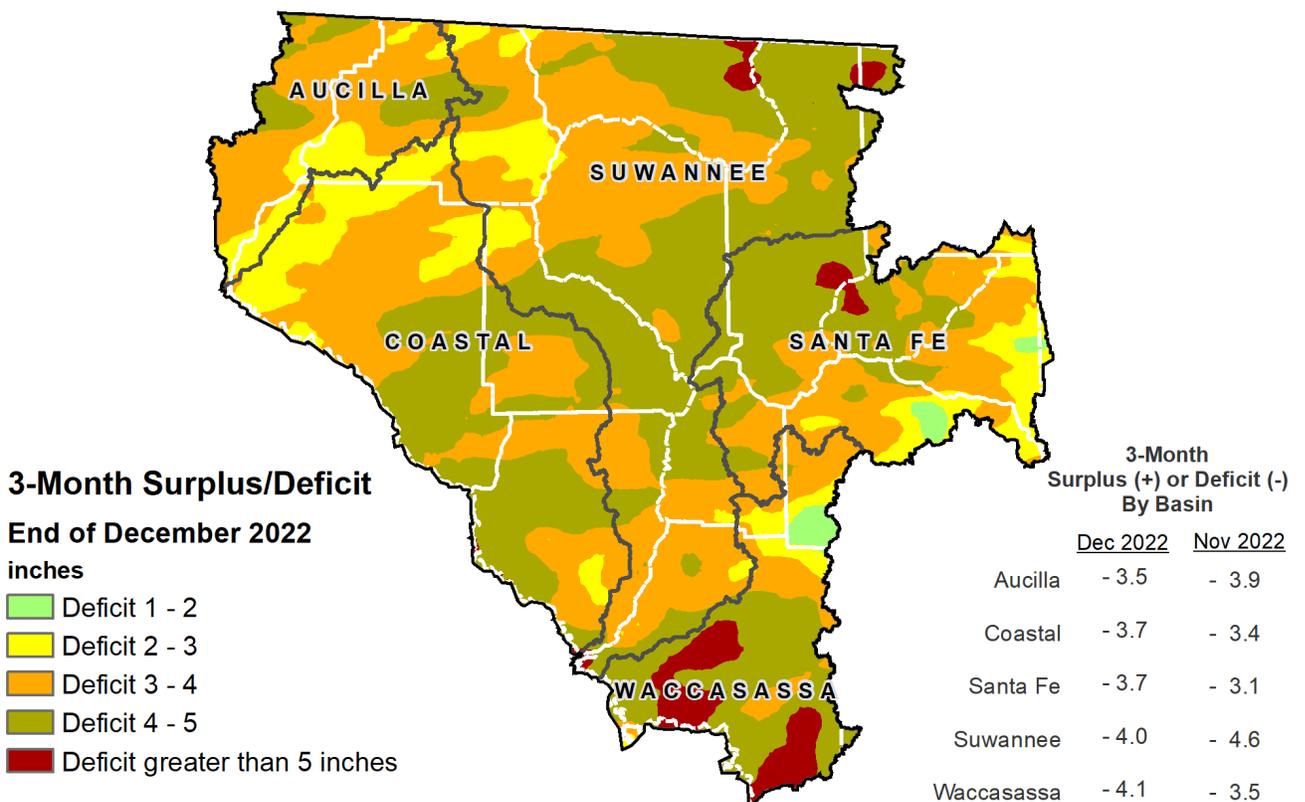
Figure 2: December 2022 SRWMD Gage-adjusted Radar Rainfall



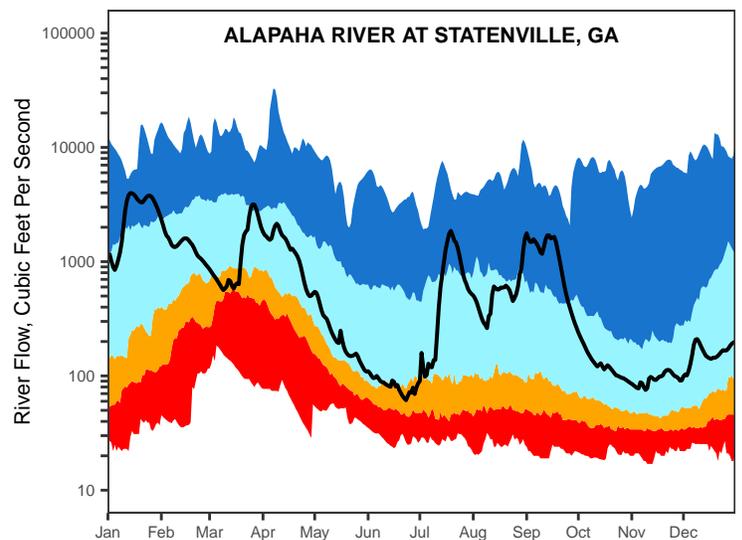
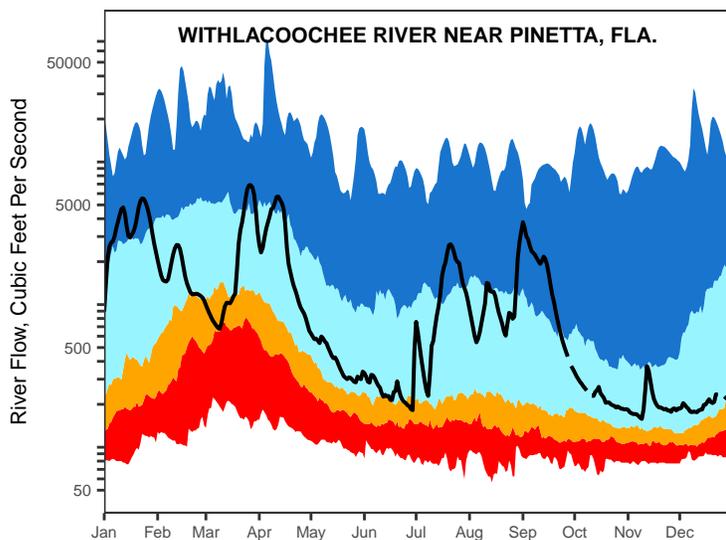
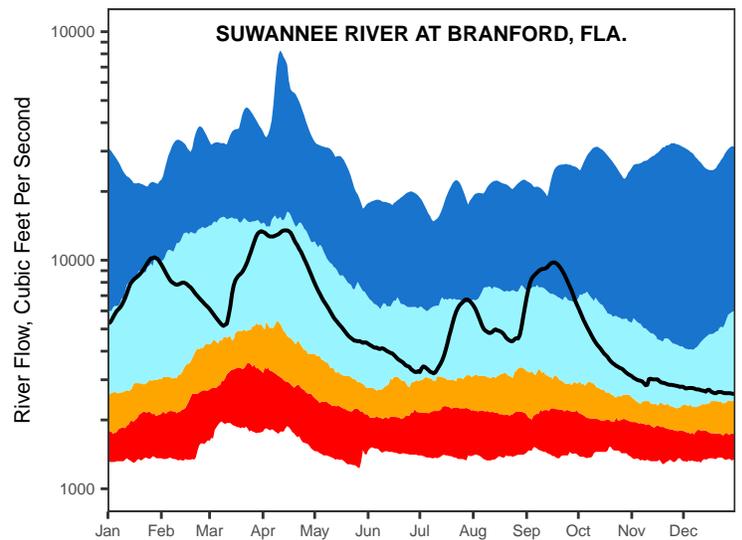
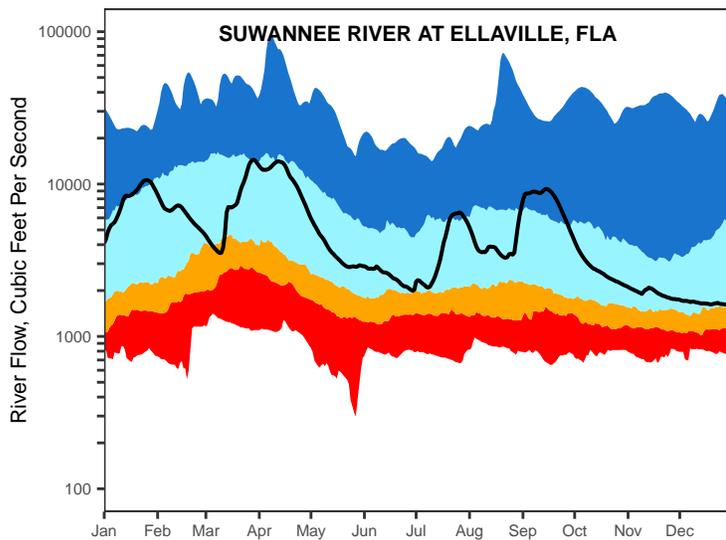
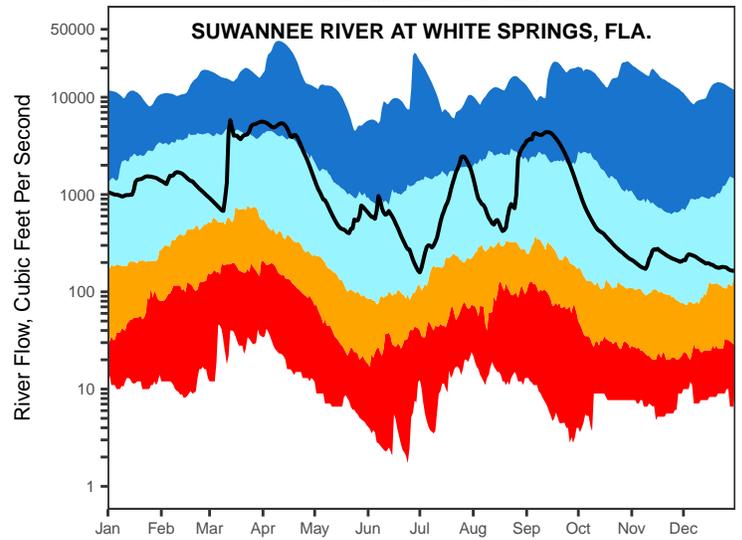
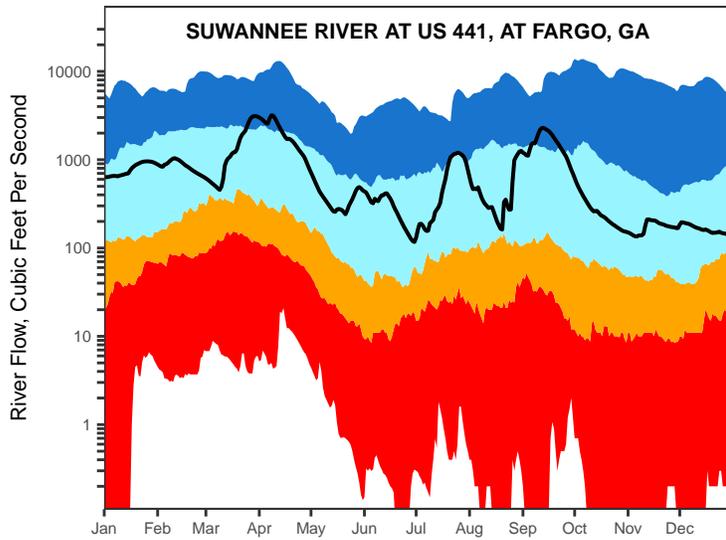
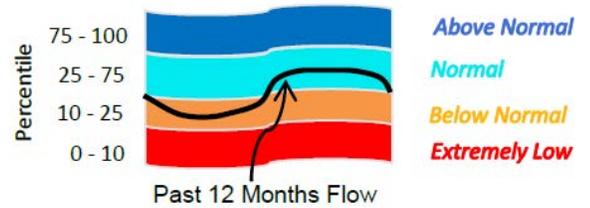
**Figure 3: 12 - Month Rainfall Surplus/Deficit by River Basin through December 31, 2022**



**Figure 4: 3 - Month Rainfall Surplus/Deficit by River Basin through December 31, 2022**

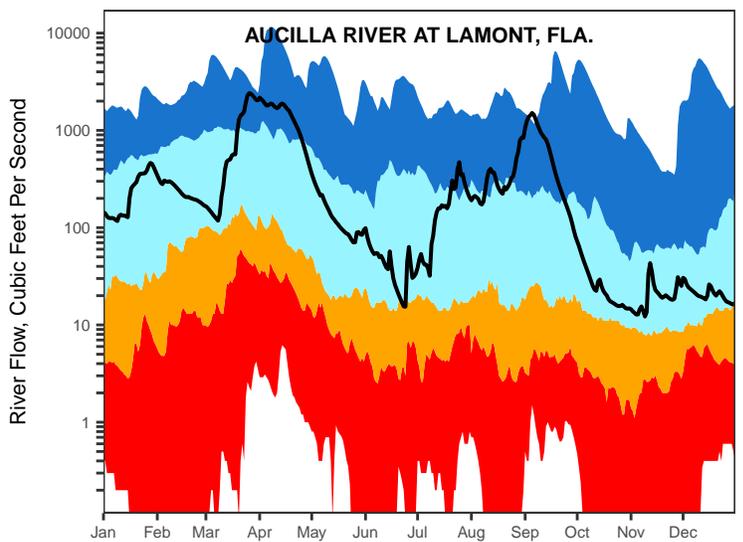
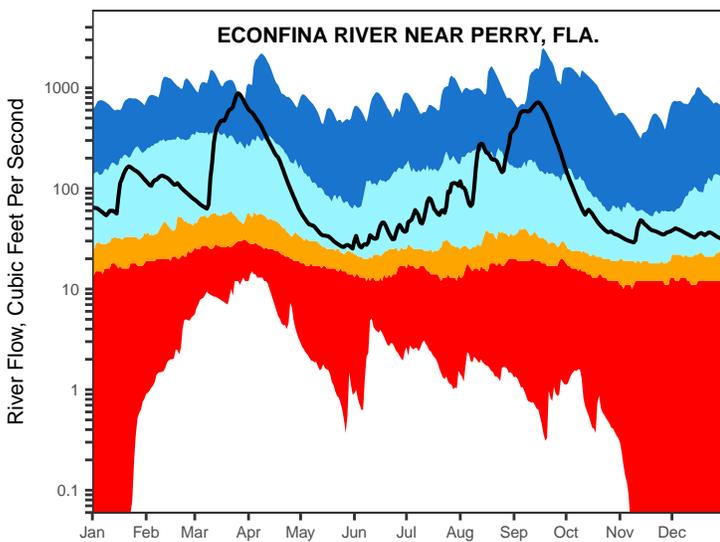
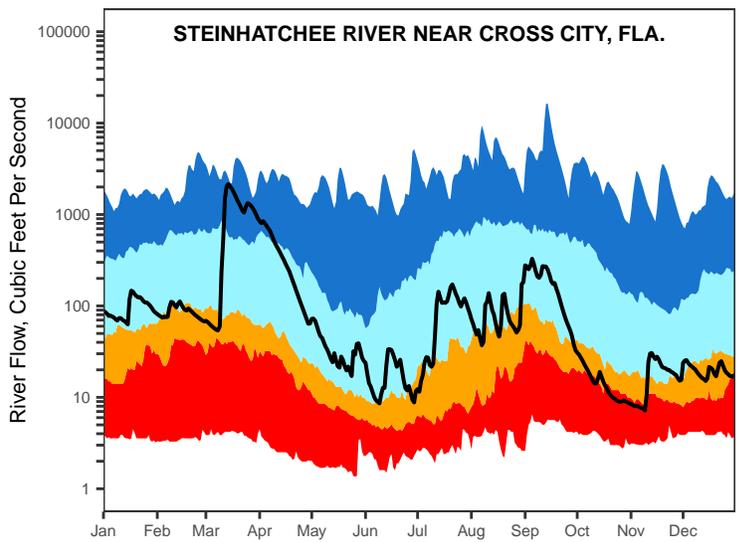
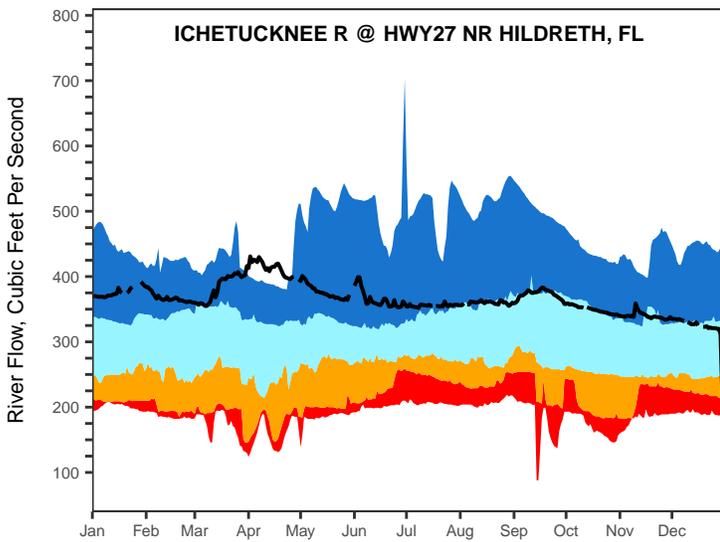
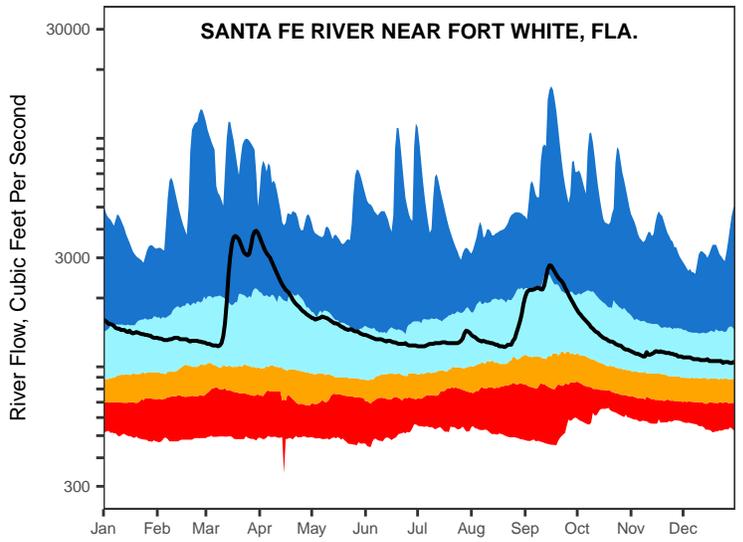
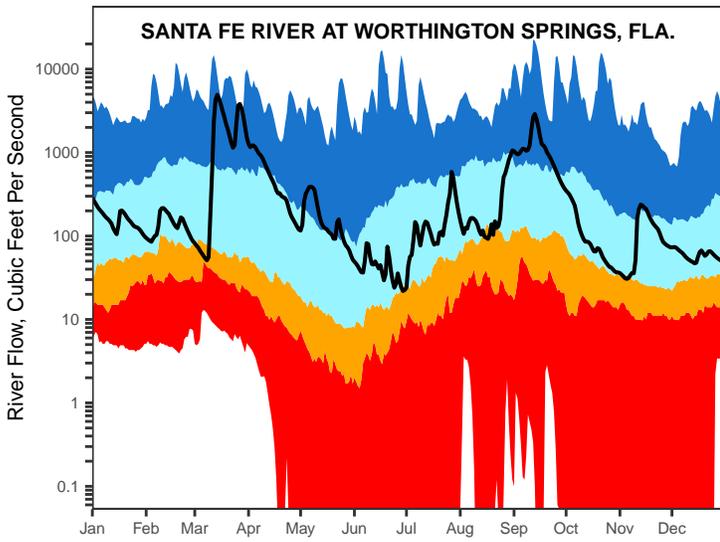
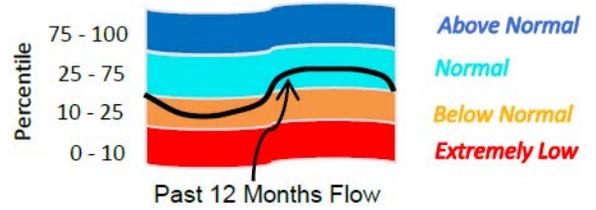


**Figure 5: Daily River Flow Statistics**  
 January 1, 2022 through December 31, 2022



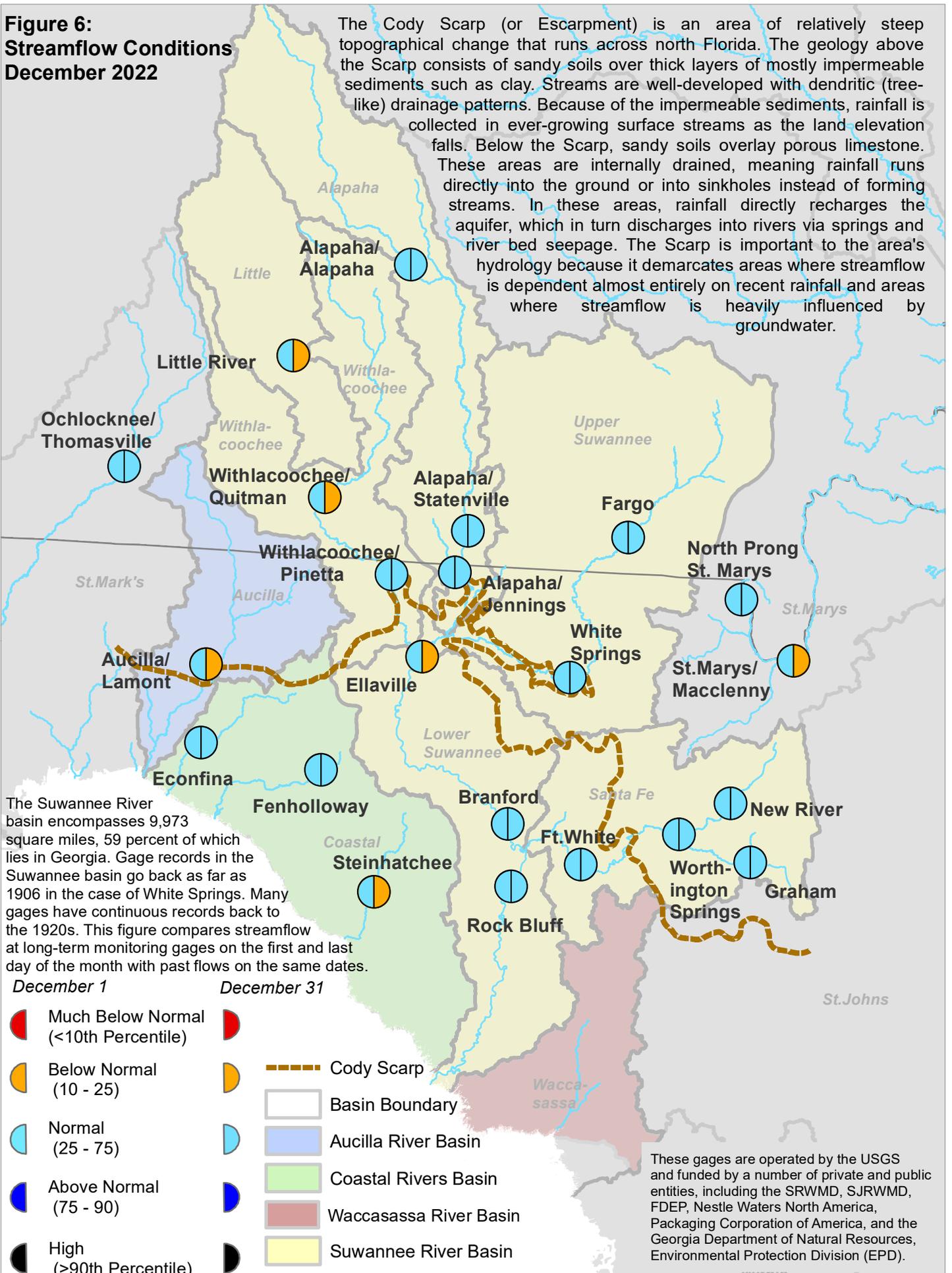
# Figure 5, cont.: Daily River Flow Statistics

January 1, 2022 through December 31, 2022



**Figure 6:  
Streamflow Conditions  
December 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.



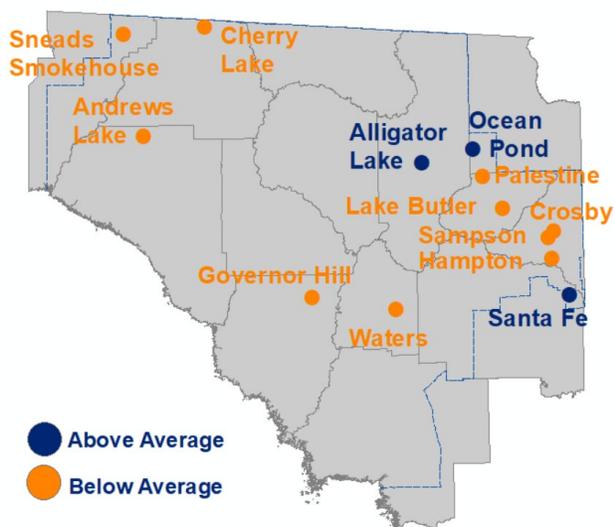
The Suwannee River basin encompasses 9,973 square miles, 59 percent of which lies in Georgia. Gage records in the Suwannee basin go back as far as 1906 in the case of White Springs. Many gages have continuous records back to the 1920s. This figure compares streamflow at long-term monitoring gages on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

- |                                      |                    |
|--------------------------------------|--------------------|
| <b>December 1</b>                    | <b>December 31</b> |
| 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).

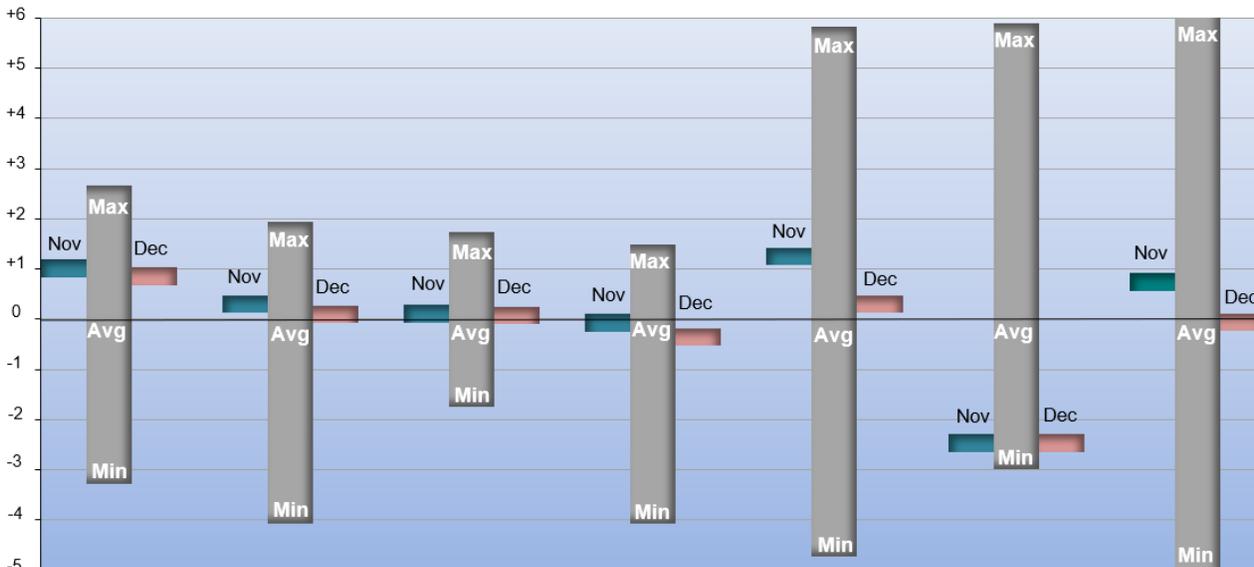
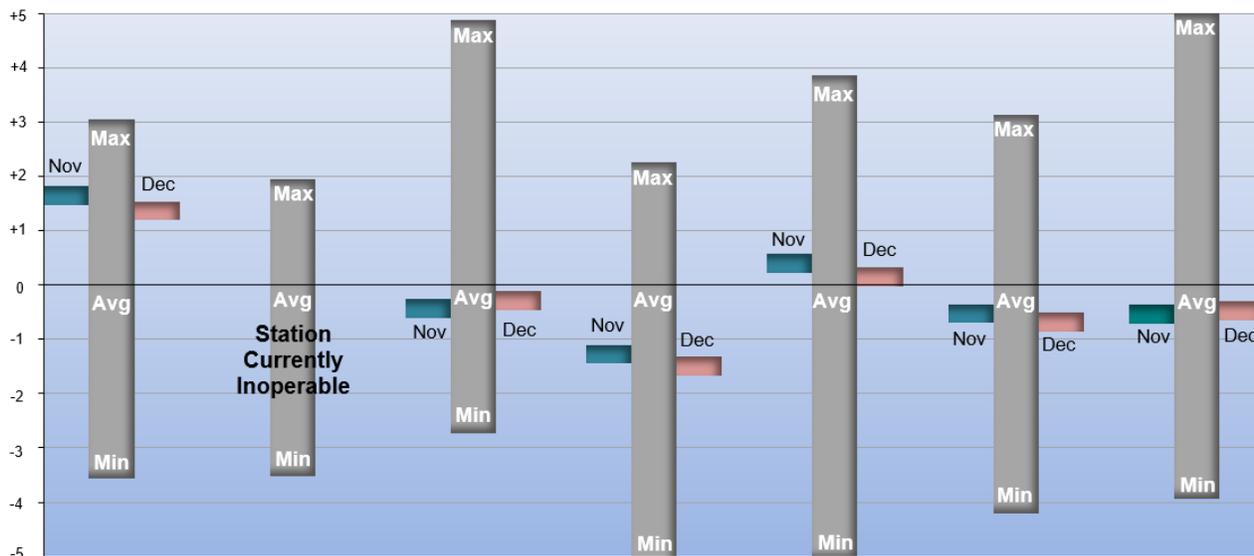
**Figure 7: December 2022 Lake Levels**



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.

Feet Above or Below Historic Average



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

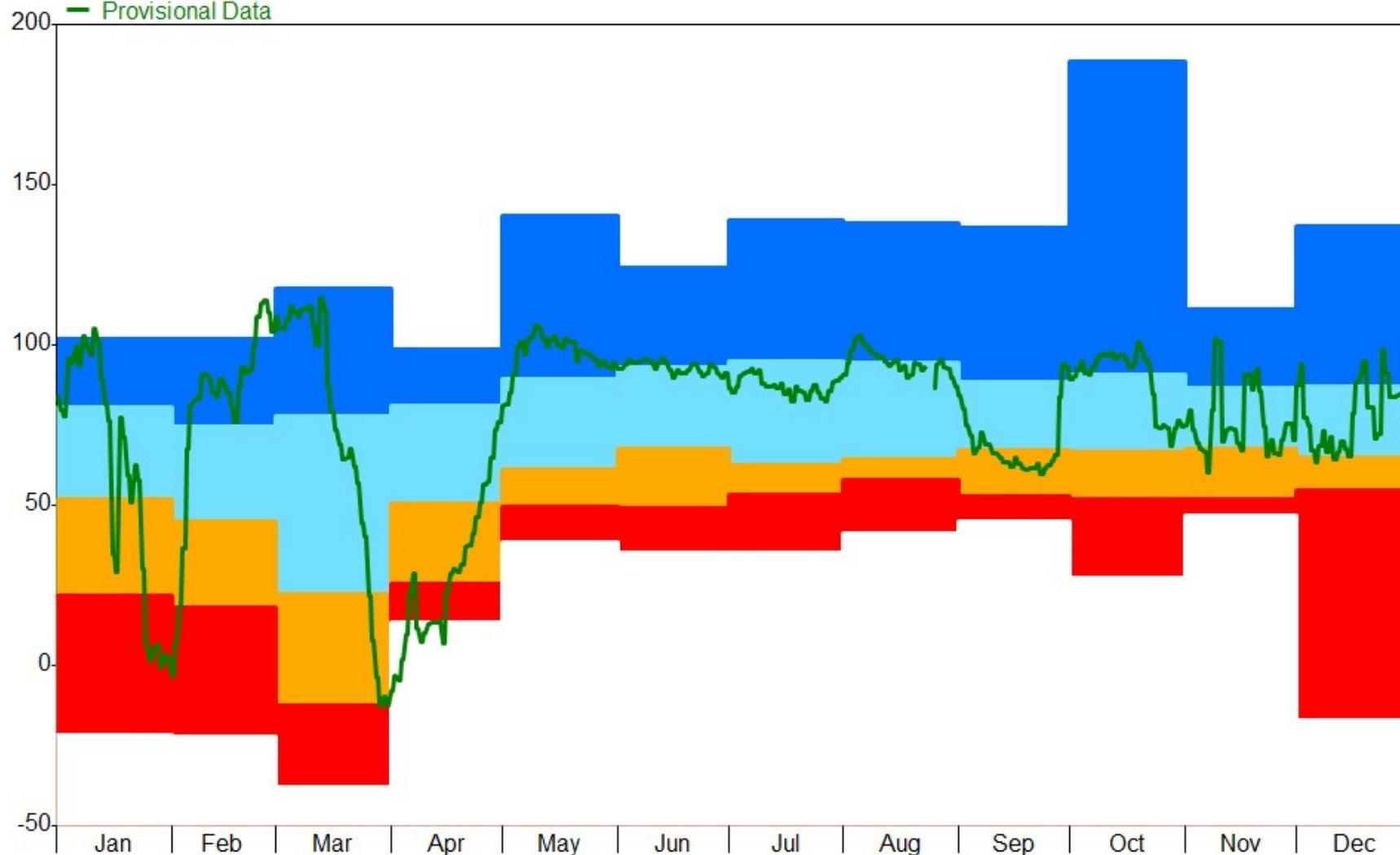
Note: This graph is based on provisional data that are subject to revision

Period 12 Month 01/01/2022 to 01/01/2023

Percentile statistics are calculated using data from 10/01/1930 to 09/30/2022

FANNING SPRINGS

- Max-Q75
- Q75-Q25
- Q25-Q10
- Q10-Min
- Archived Data
- Provisional Data



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

Note: This graph is based on provisional data that are subject to revision

Period 12 Month 01/01/2022 to 01/01/2023

Percentile statistics are calculated using data from 04/23/1985 to 09/30/2022

Lafayette\_Blue

■ Max-Q75

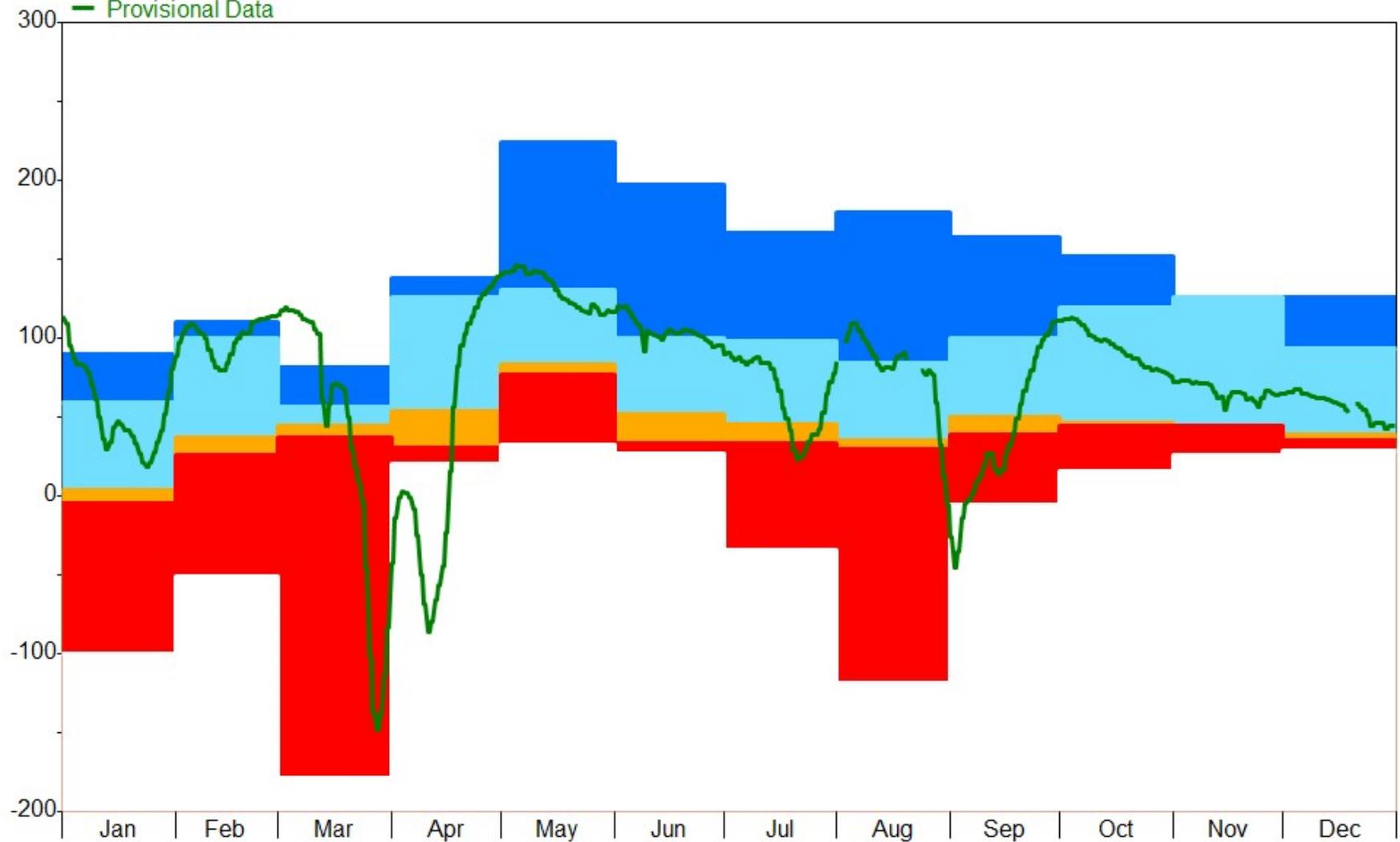
■ Q75-Q25

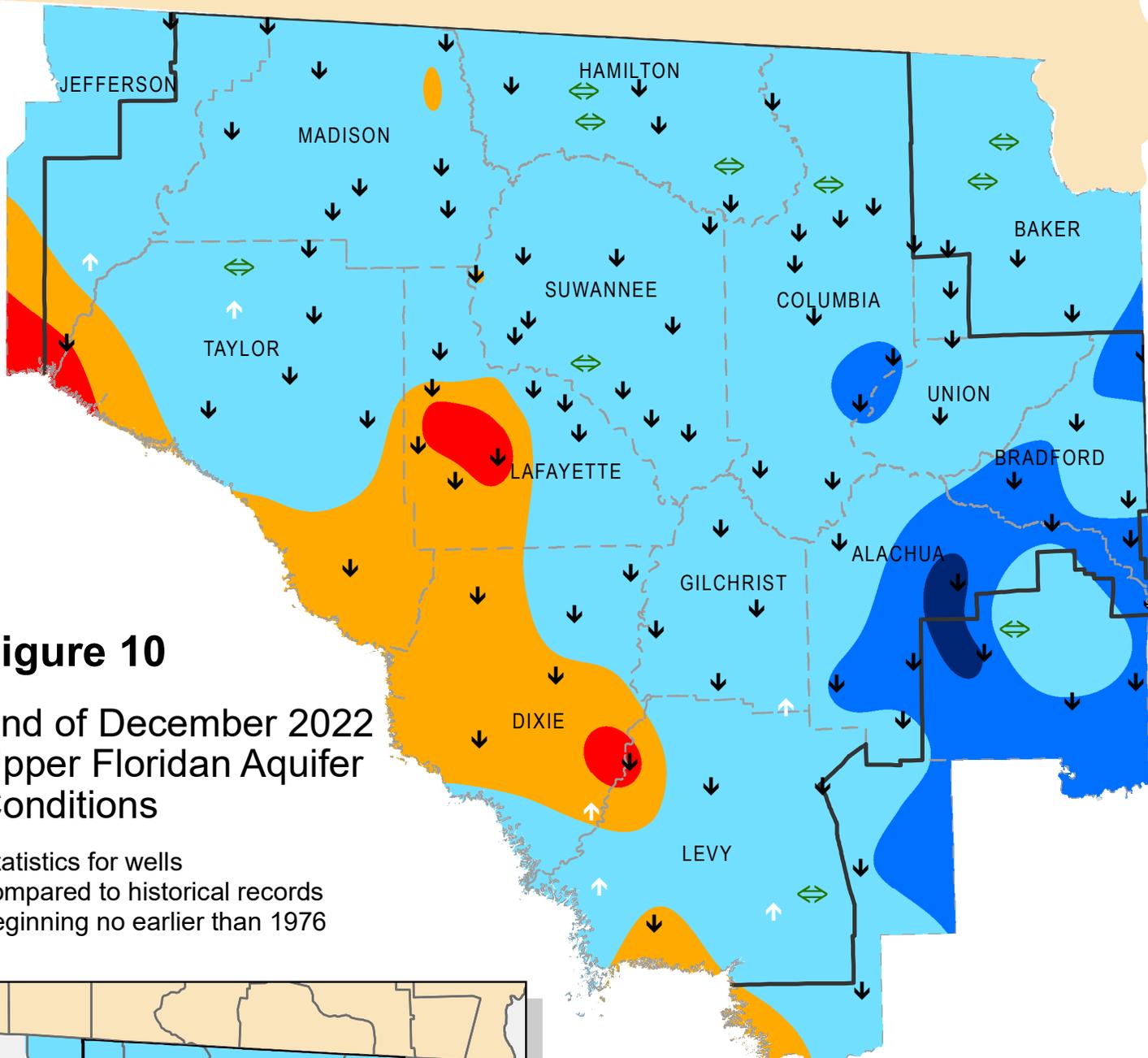
■ Q25-Q10

■ Q10-Min

— Archived Data

— Provisional Data

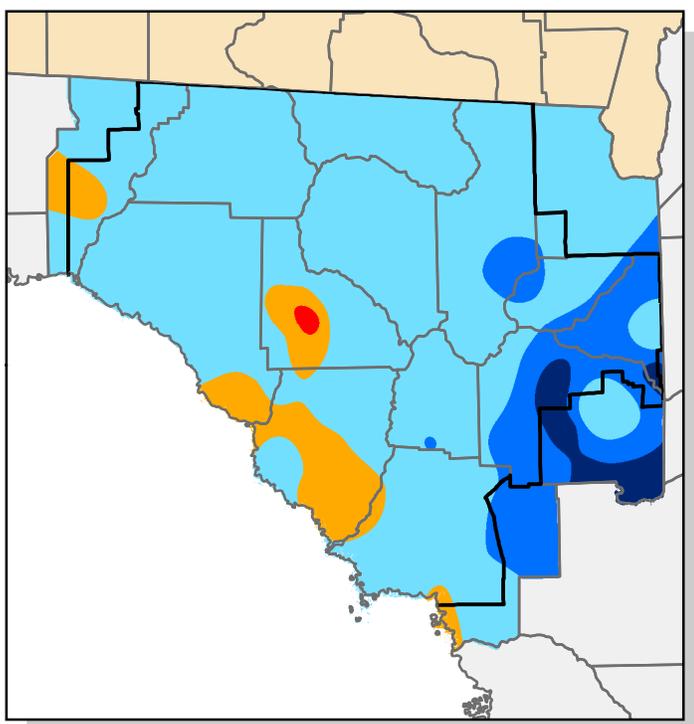




# Figure 10

## End of December 2022 Upper Floridan Aquifer Conditions

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



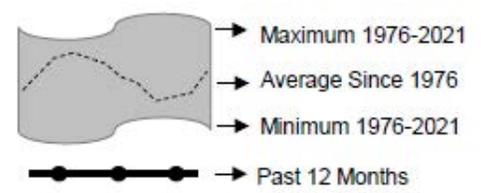
Inset: November Groundwater Percentiles

Additional wells courtesy of SJRWMD, SWFWMD and USGS

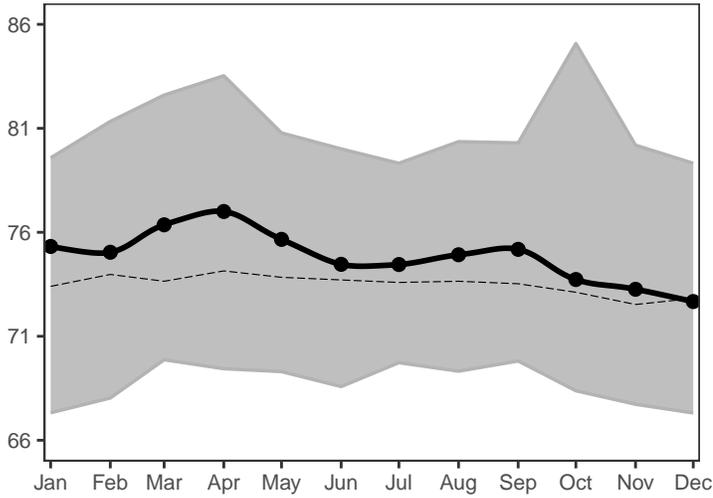
- Extremely High  
(Greater than 90th Percentile)
- High  
(75th to 90th Percentile)
- Normal  
(25th to 75th Percentile)
- Low  
(10th to 25th Percentile)
- Extremely Low  
(Less than 10th Percentile)
- Increase/decrease in level since last month
- Increase/decrease since last month less than one percent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

# Figure 11: Monthly Groundwater Statistics

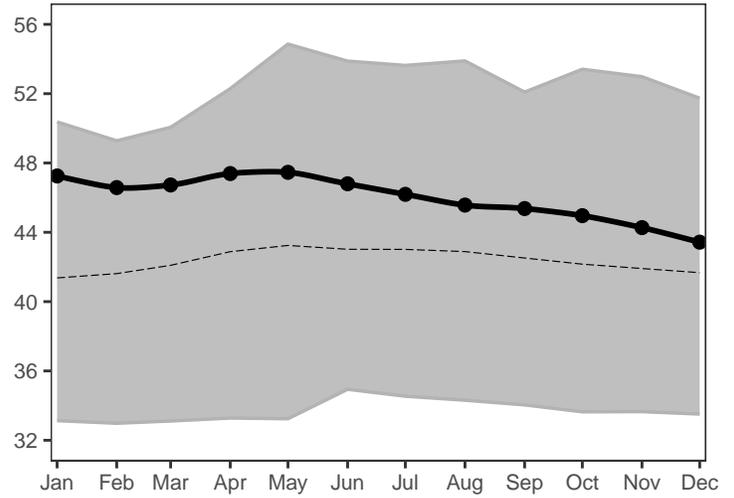
Levels January 2022 through December 2022  
 Period of Record Beginning 1976



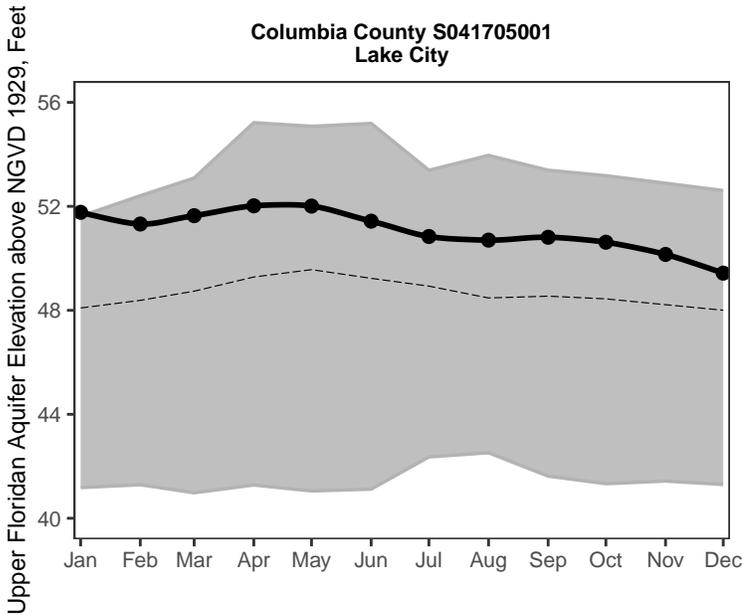
**Madison County N010719001**  
near Greenville



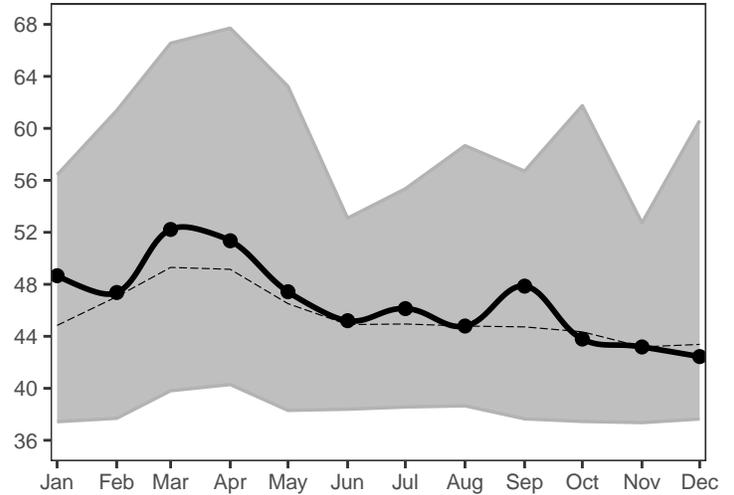
**Suwannee County S021335001**  
near Live Oak



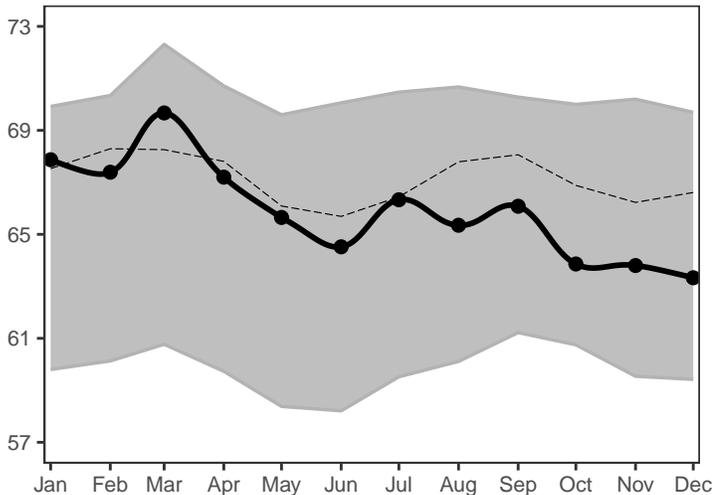
**Columbia County S041705001**  
Lake City



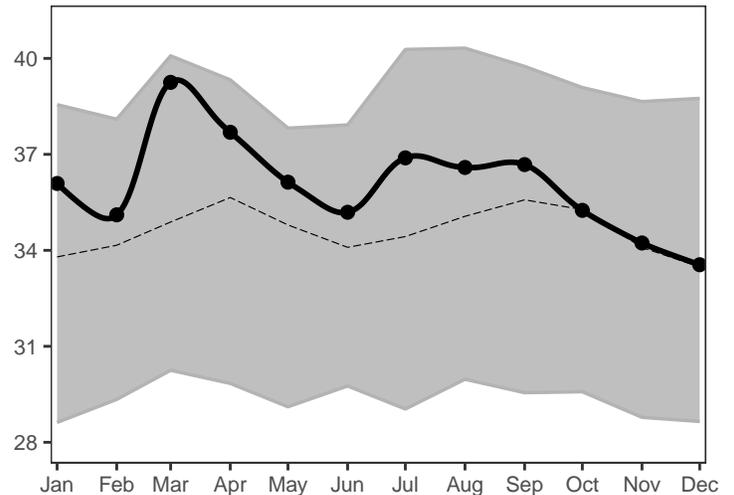
**Hamilton County N011422007**  
near Jasper



**Lafayette County S061114001**  
near Mayo

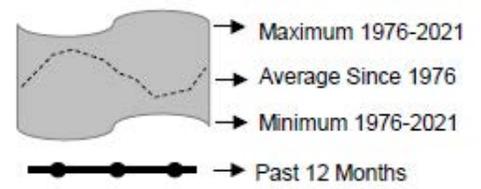


**Taylor County S040736005**  
Perry

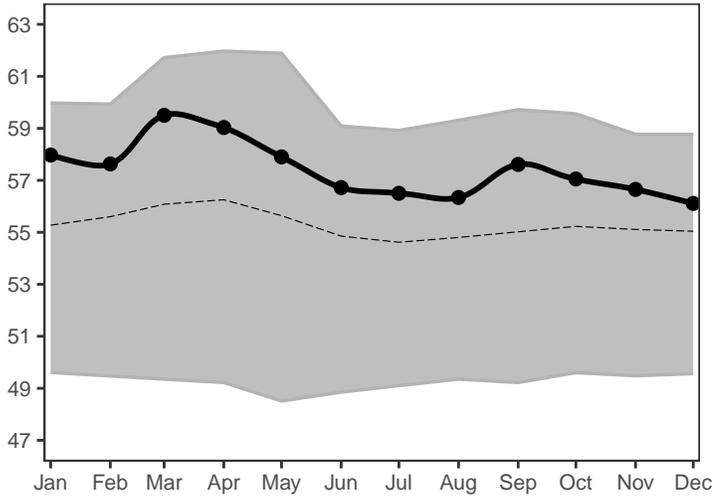


# Figure 11, cont.: Monthly Groundwater Statistics

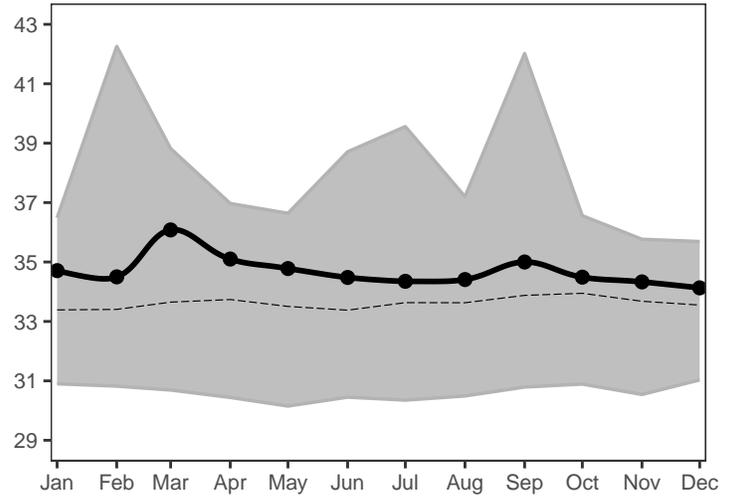
Levels January 2022 through December 2022  
 Period of Record Beginning 1976



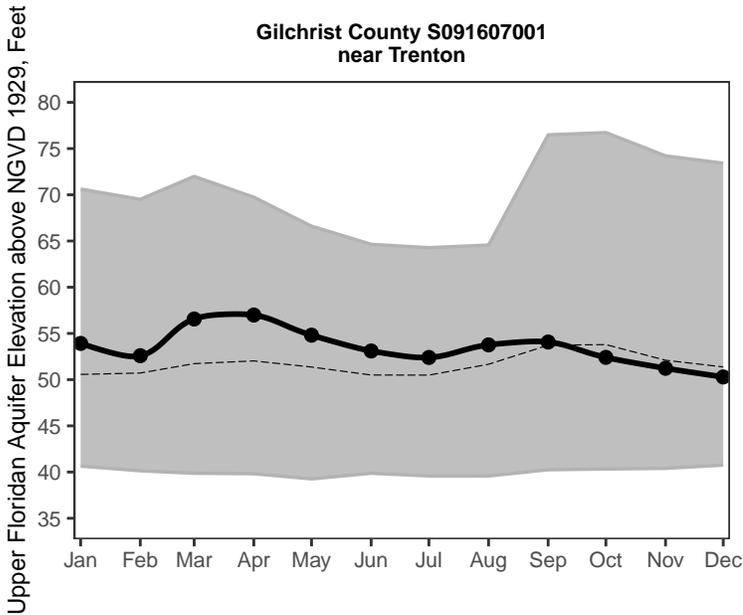
**Union County S051933001**  
 near Lake Butler



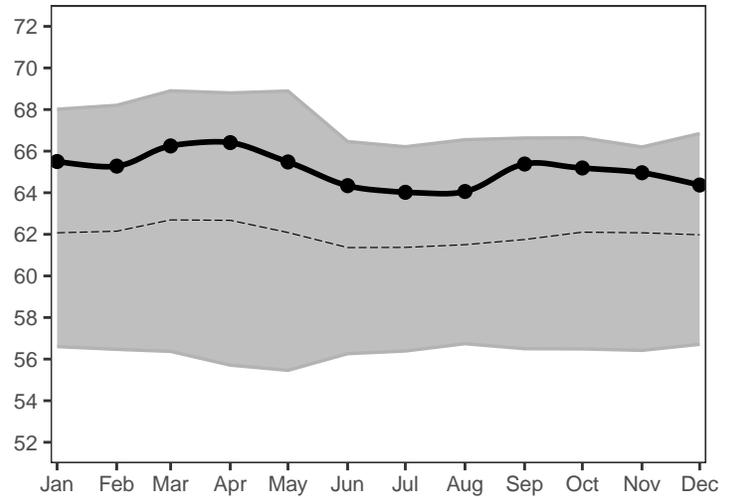
**Alachua County S081703001**  
 at High Springs



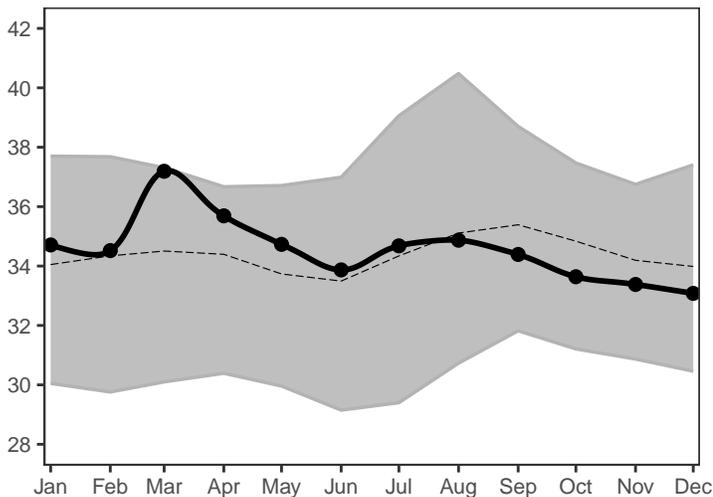
**Gilchrist County S091607001**  
 near Trenton



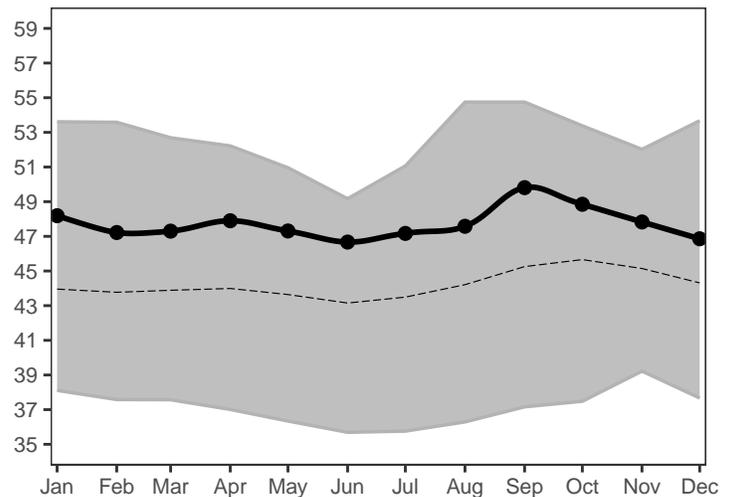
**Bradford County S072132001**  
 near Graham

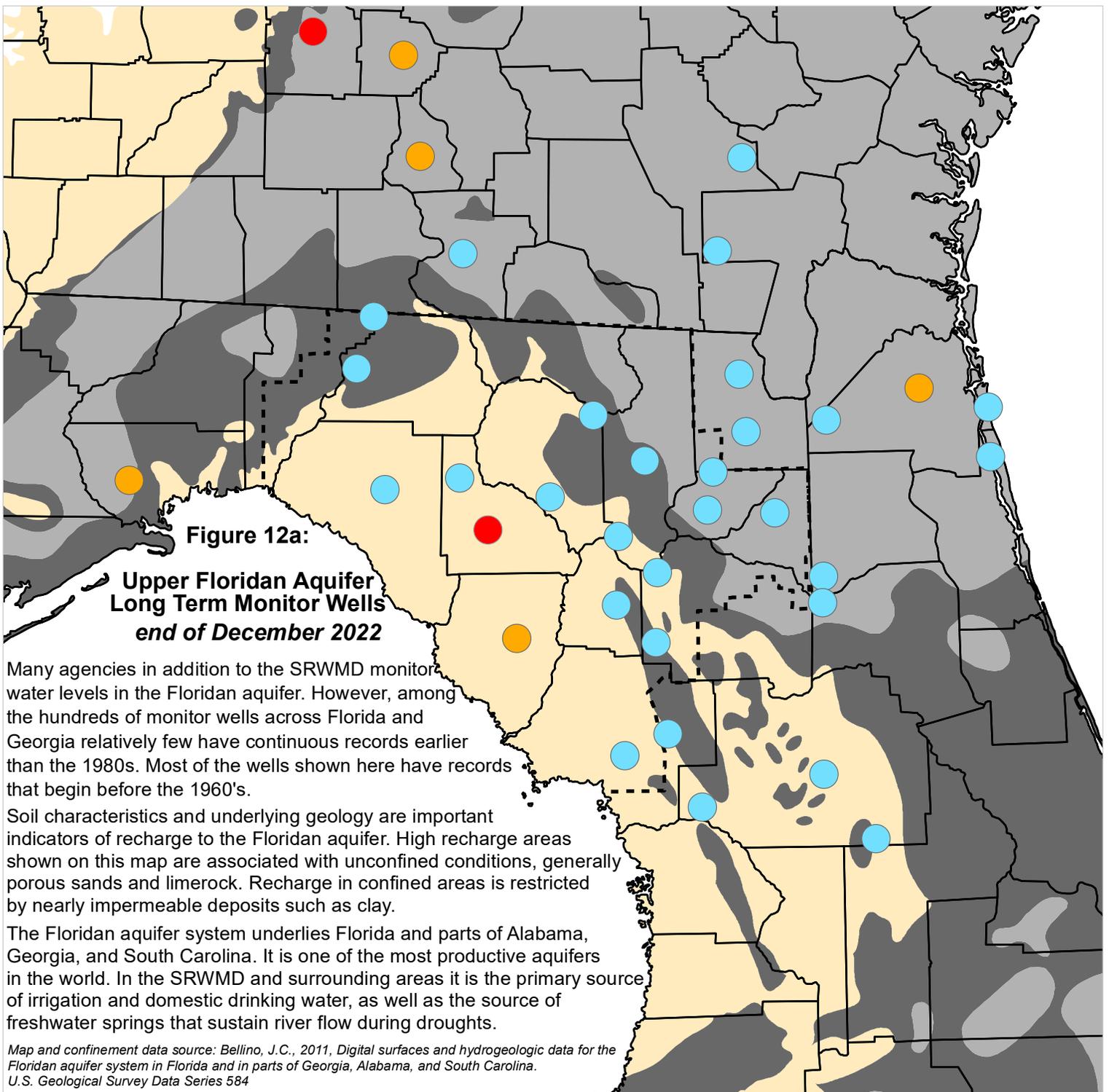


**Dixie County S101210001**  
 at Cross City



**Levy County S131736001**  
 near Bronson





**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 December 2022

