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: August 31, 2022

RE: August 2022 Hydrologic Conditions Report

RAINFALL

- Districtwide average rainfall for the month was 7.92", which was about 4% higher than the 1932-2021 average of 7.61" (Table 1, Figure 1). The 12-month period ending August 31 reflected a Districtwide rainfall deficit of 1.25", which was a significant change from the 1.83" surplus at the end of July. Most District counties received between 6" and 9" of rainfall on average with portions of Lafayette, Taylor, Madison, Dixie, Columbia, Gilchrist, and Alachua counties receiving more than 12" (Figure 2).

- A 12-month rainfall deficit was present for four river basins, with the Waccasassa Basin showing a surplus of 0.9" (Figure 3). Portions of the Waccasassa Basin also showed a surplus greater than 10" by month's end. The Coastal Basin switched from a large surplus in July to a small deficit in August. Large areas within both the Aucilla and Suwannee basins experienced rainfall deficits of greater than 10" at the end of the month. Most river basins exhibited 3-month rainfall deficits, some of which were ameliorated from July to August (Figure 4). The Waccasassa Basin was the only basin to continue with a 3-month rainfall surplus, although the August surplus was 0.6" lower than in July.

SURFACE WATER

- **Rivers:** The river stations shown in Figure 5 finished the month in either the normal (25^{th} – 75^{th} percentile) or above normal (75^{th} – 100^{th} percentile) flow ranges. Both the Worthington Springs and the Steinhatchee River gages had below normal flows at some point during August. All river gages in North Florida and South Georgia were in either the high (>90^{th} percentile), above normal (75^{th} – 90^{th} percentile), or normal flow categories at the end of the month (Figure 6). Both the Fenholloway River and the New River began August in the below normal flow range but rebounded into the normal and high categories, respectively, due to an increase in rainfall in those basins in August.

- **Lakes**: Water levels increased at most of the monitored lakes in the District this month (Figure 7). The median increase in stage across all measured lakes was around 0.2'. Alligator Lake showed the largest overall increase in stage of around 1.2'. Governor Hill, Butler, Palestine, Crosby, Sampson, and Hampton lakes all ended August below their respective long-term averages.

- **Springs**: Flow measurements were made during August at 14 springs by the U.S. Geological Survey (USGS), District staff, and contractors. Blue Hole spent the entirety of August within the normal flow range (Figure 8). Madison Blue stayed in either the above normal or normal ranges for most of the month before falling into the low range at month's end due to high river levels (Figure 9).

GROUNDWATER

Upper Floridan Aquifer (UFA) levels across the District mostly exhibited either normal (25th – 75th percentile), high (75th – 90th percentile), or extremely high (> 90th percentile) ranges at the end of August (Figure 10). Only one area of Lafayette County showed low (10th – 25th percentile) levels at the end of the month. Overall, groundwater levels decreased by a median of about 0.1' since the end of July and ended August with a Districtwide average around the 63rd percentile.

Most county index wells remained higher than the historical monthly average levels at the end of August except for wells in Lafayette and Dixie counties (Figure 11). The index well in Hamilton County tied its historical monthly August average. The long-term District UFA well levels ended the month either within the 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, with the chances of La Niña gradually decreasing from 86% in the coming months to a 60% chance from December to February 2022-2023.

The NOAA three-month seasonal outlook favors above normal temperatures along with mainly above normal rainfall chances throughout the District from September through November. The U.S. Drought Monitor report released on September 8, 2022, showed no portions of the District with 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 13, 2022, to November 6, 2022) 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, 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, Pennie Flickinger, 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	August 2022	August Average*	Month % of Normal	Total Last 12 Months	Annual % of Normal
Alachua	8.20	7.52	109%	53.15	101%
Baker	8.89	7.17	124%	51.56	98%
Bradford	8.00	7.15	112%	51.49	99%
Columbia	9.05	7.01	129%	54.94	104%
Dixie	7.94	9.29	85%	54.14	93%
Gilchrist	6.79	7.98	85%	52.77	97%
Hamilton	6.75	6.30	107%	50.62	98%
Jefferson	6.92	6.76	102%	50.97	91%
Lafayette	8.46	7.90	107%	52.73	95%
Levy	7.60	9.09	84%	55.77	99%
Madison	9.61	6.47	148%	52.31	98%
Suwannee	7.18	6.94	104%	51.69	97%
Taylor	7.56	8.27	91%	54.65	96%
Union	8.02	7.18	112%	51.76	98%

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

August 2022 District Average	7.92
August Long-Term Average (1932-2021)	7.61
Historical 12-month Average (1932-2021)	54.73
Past 12-Month Total	53.48
12-Month Rainfall **Surplus**/Deficit	**-1.25**

Figure 1: Comparison of District-wide Monthly Rainfall

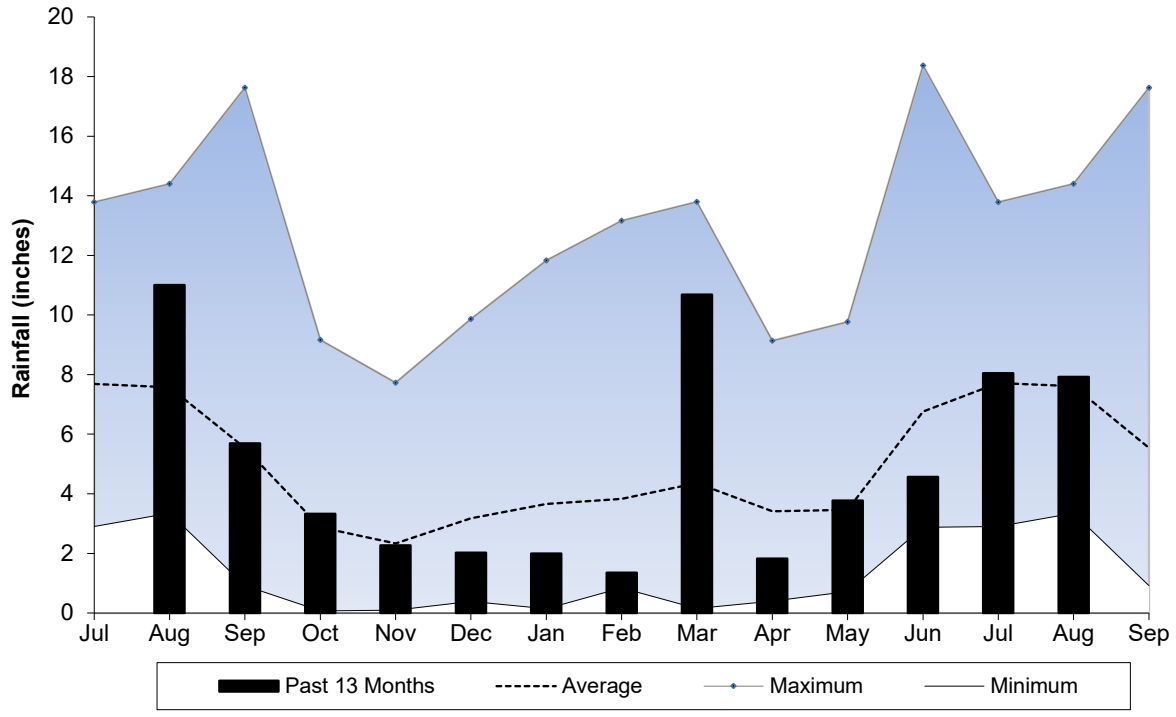


Figure 2: August 2022 SRWMD Gage-adjusted Radar Rainfall

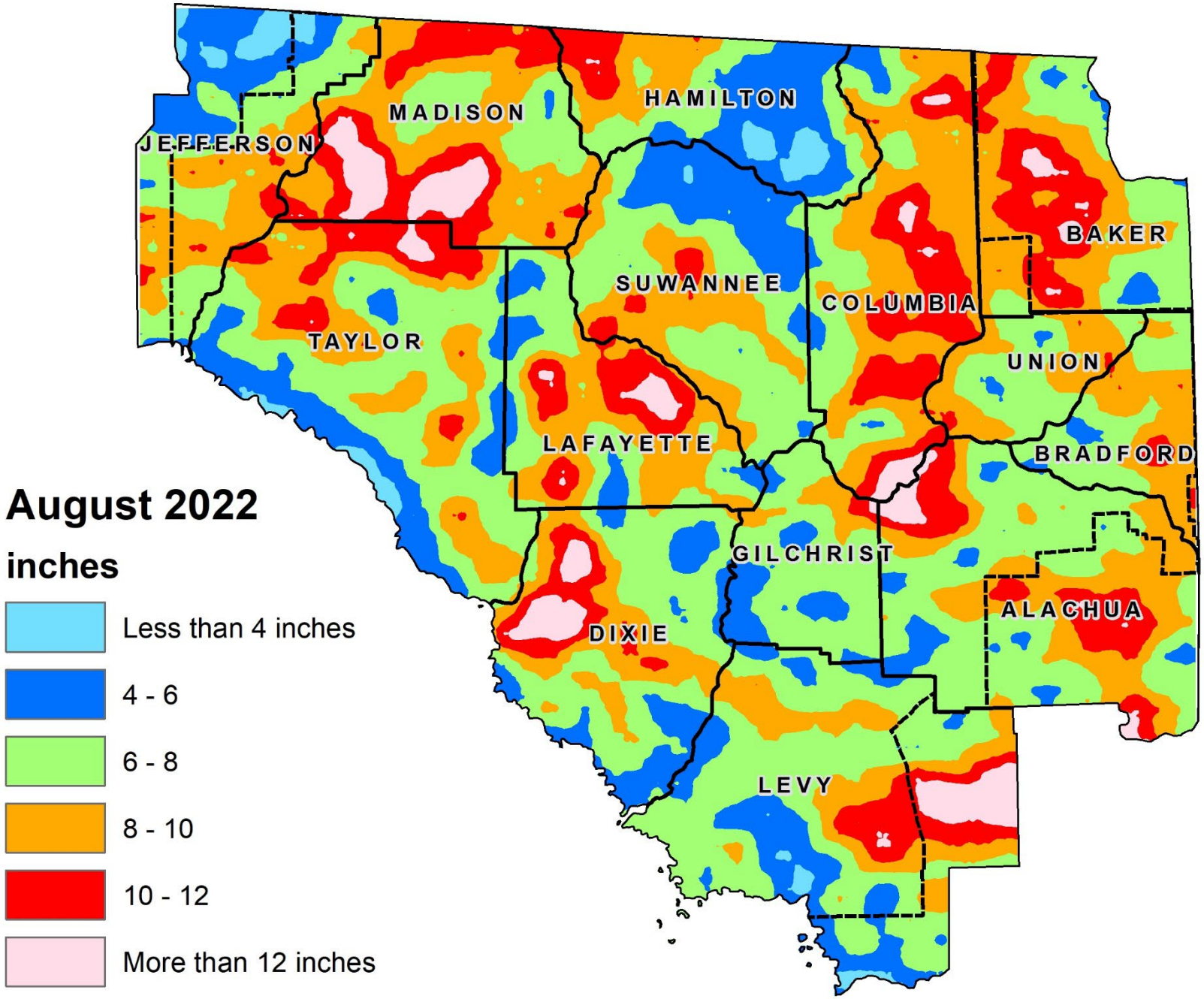


Figure 3: 12 - Month Rainfall Surplus/Deficit by River Basin through August 31, 2022

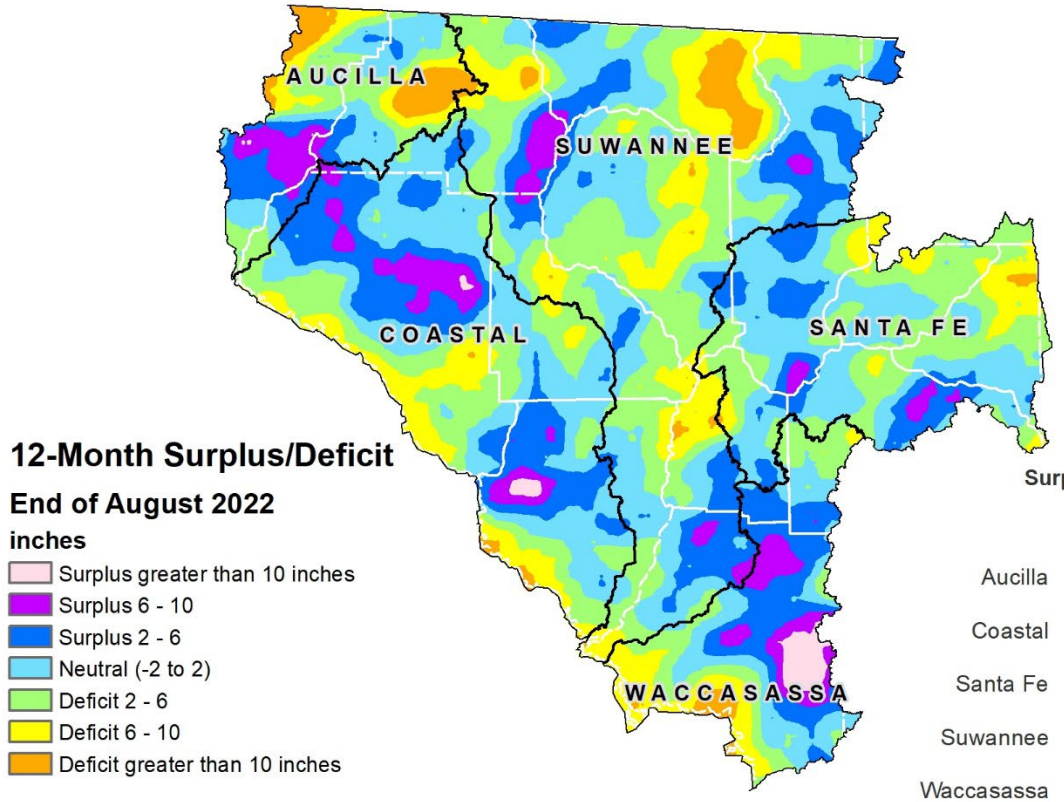


Figure 4: 3 - Month Rainfall Surplus/Deficit by River Basin through August 31, 2022

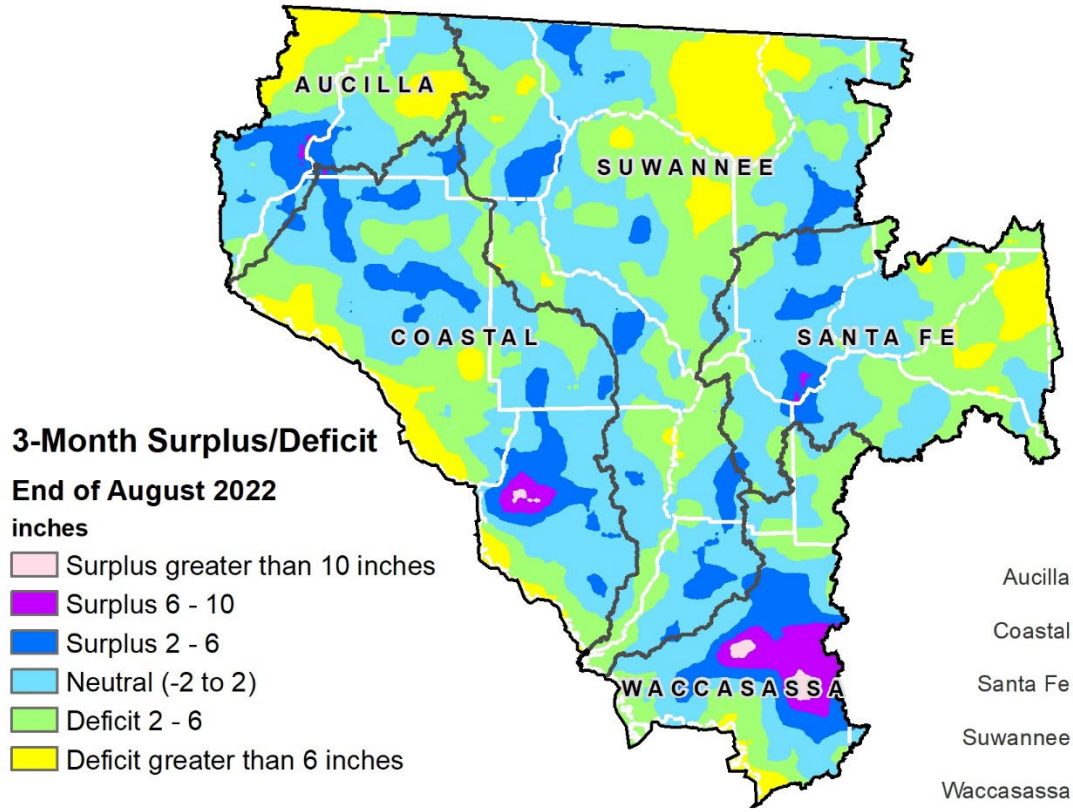
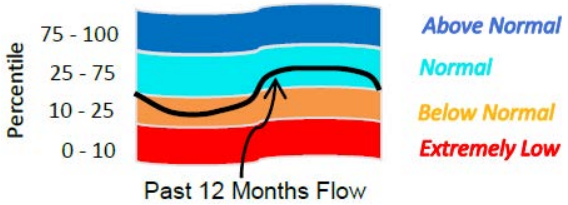
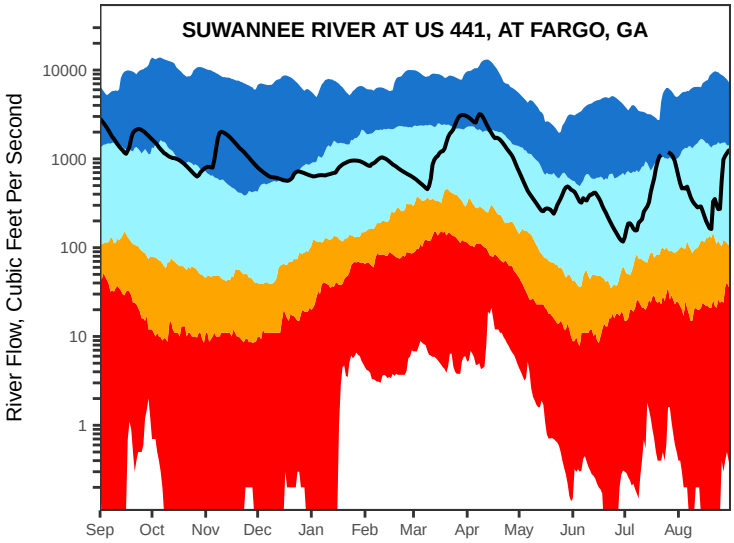
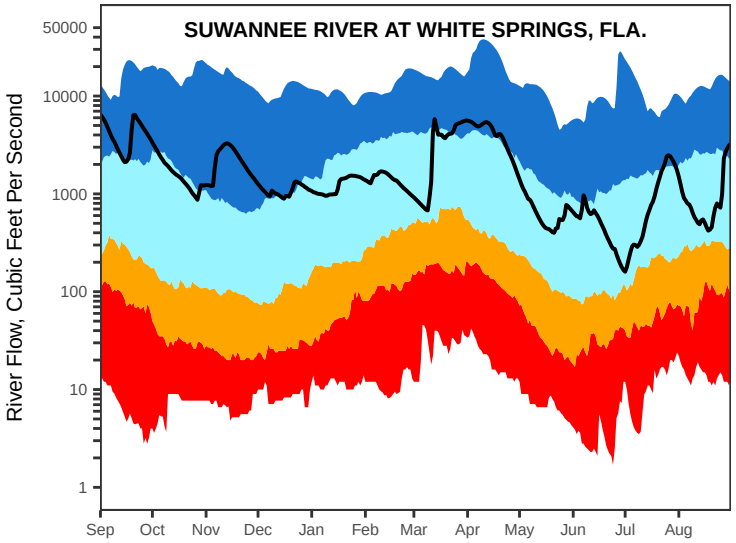


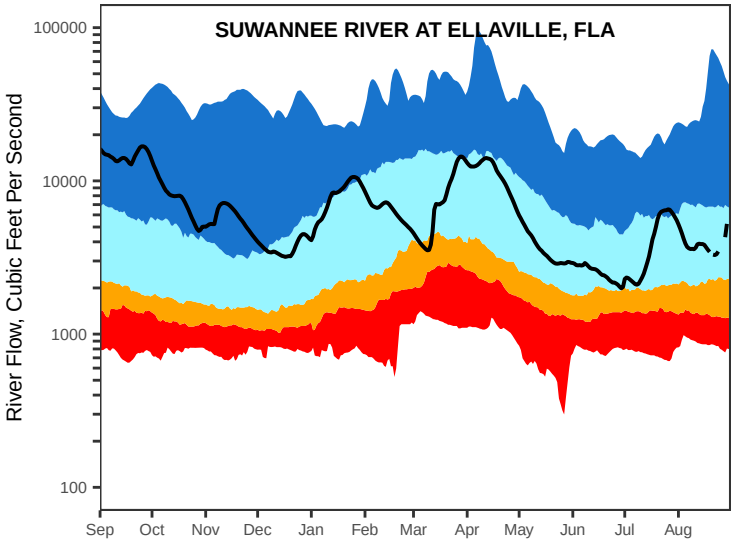
Figure 5: Daily River Flow Statistics

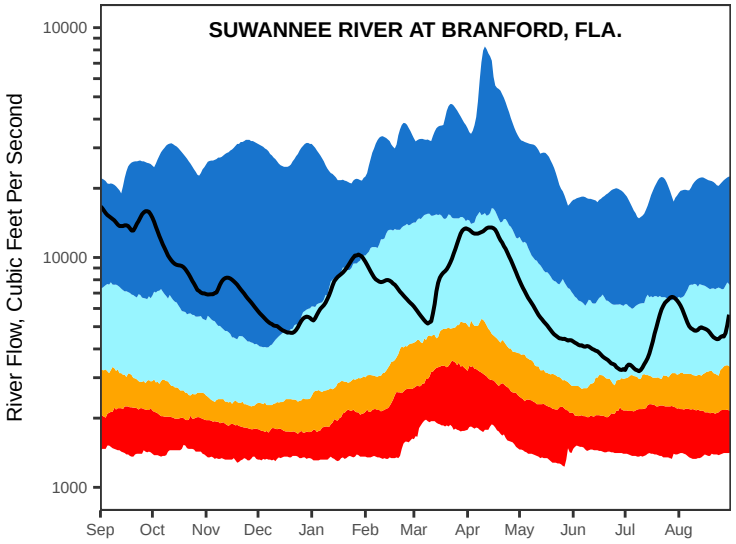
September 1, 2021 through August 31, 2022

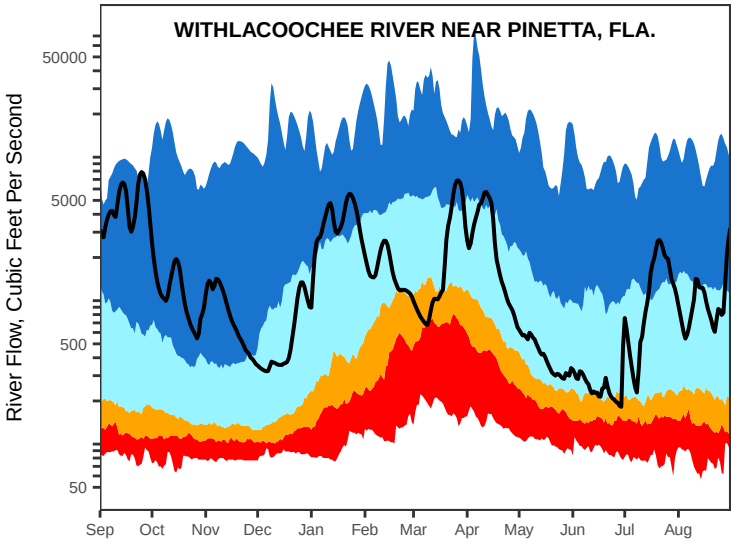












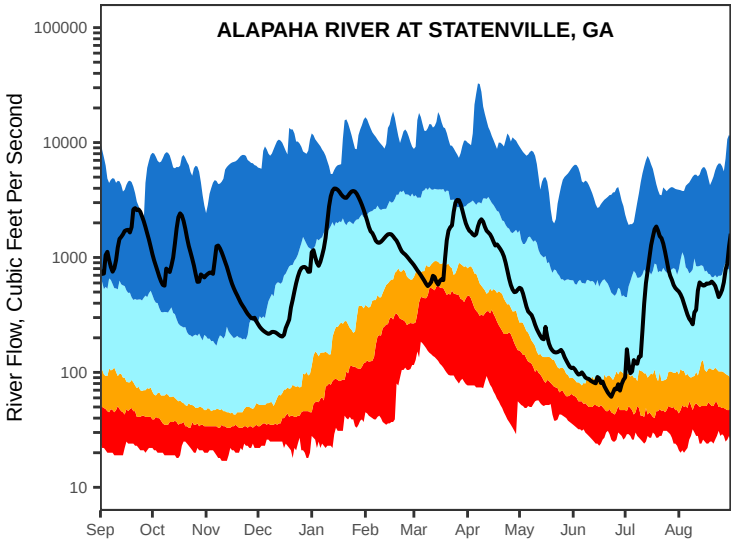
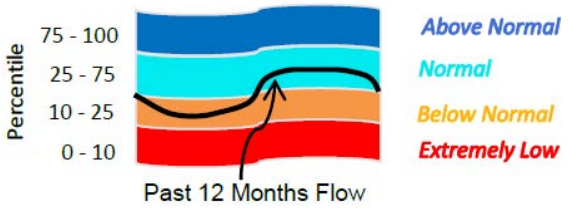
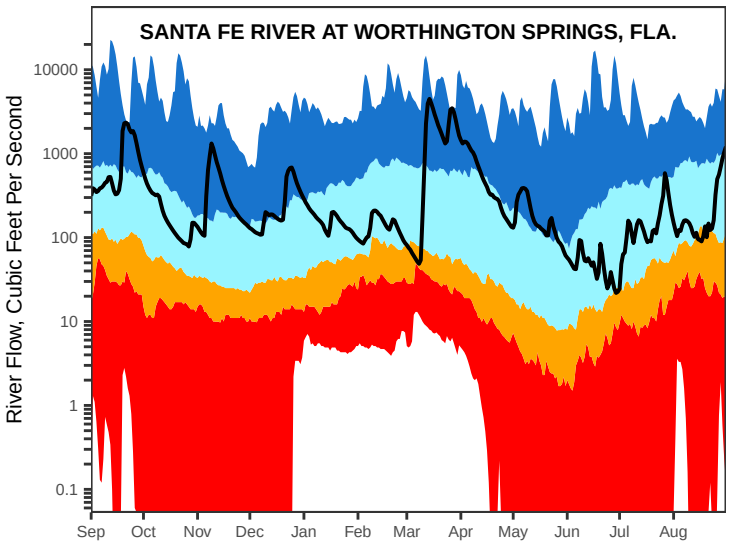
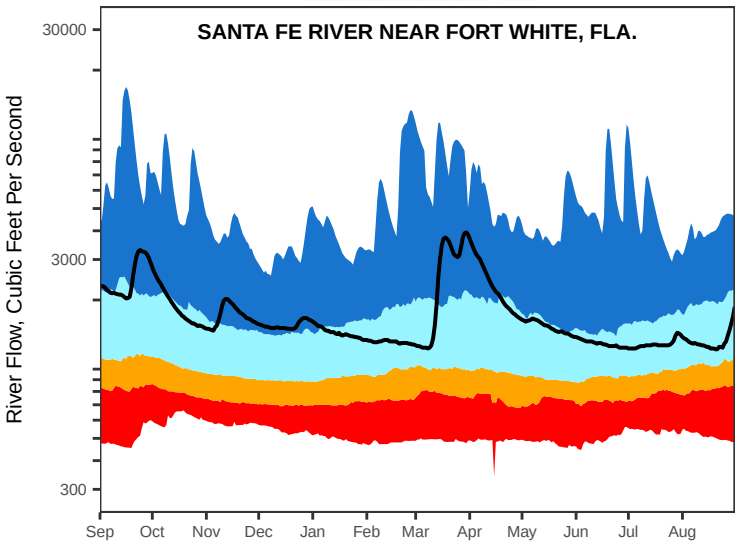


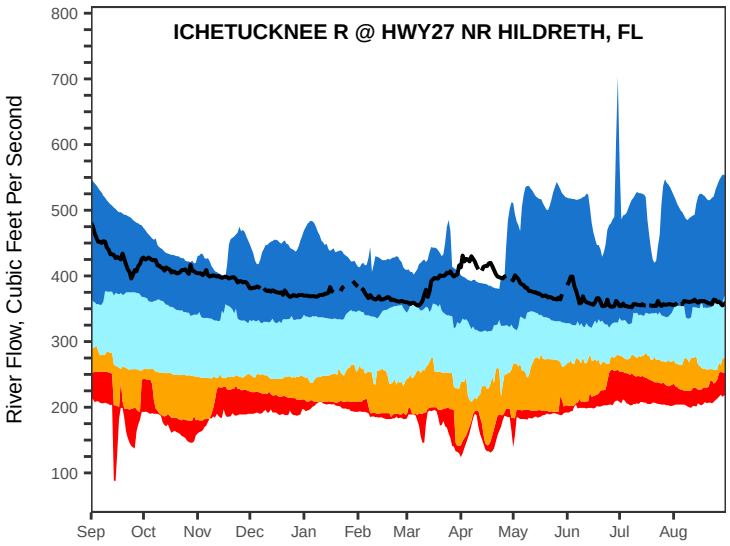
Figure 5, cont.: Daily River Flow Statistics

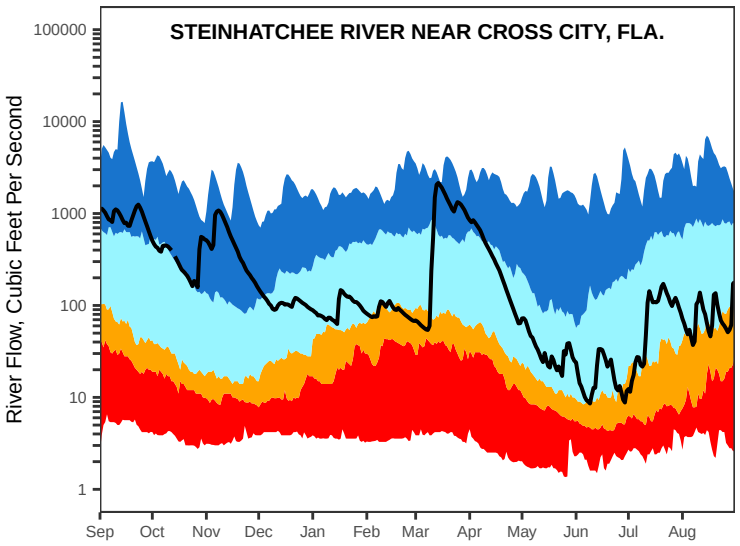
September 1, 2021 through August 31, 2022

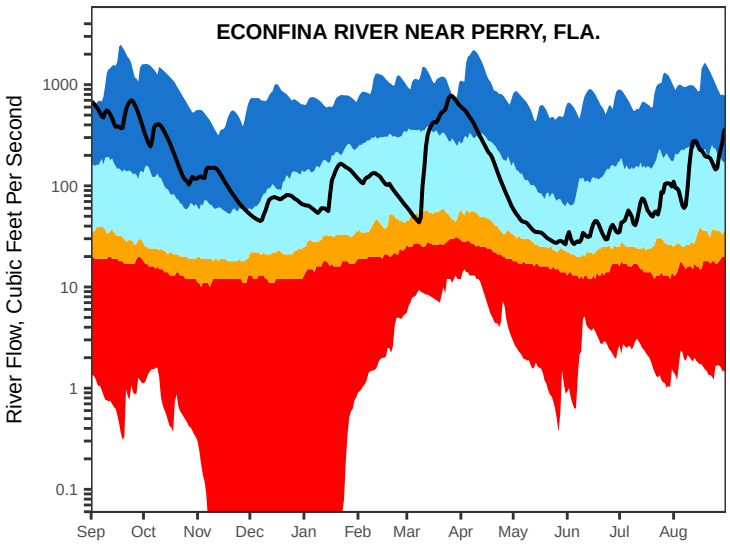


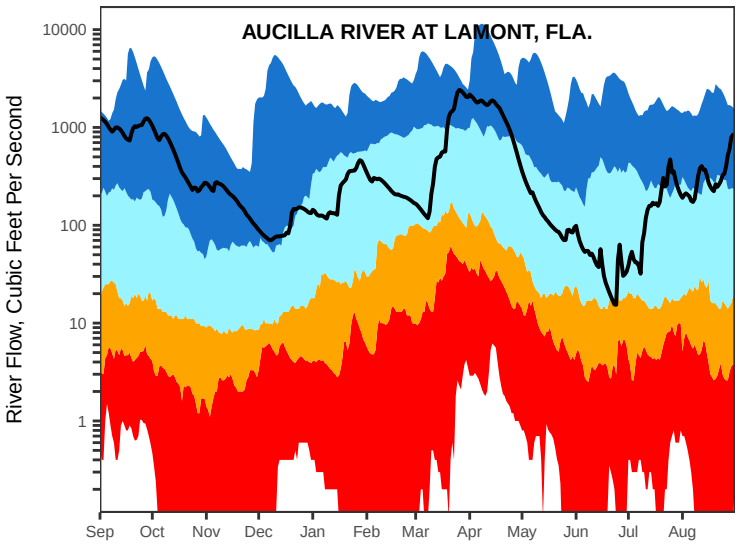












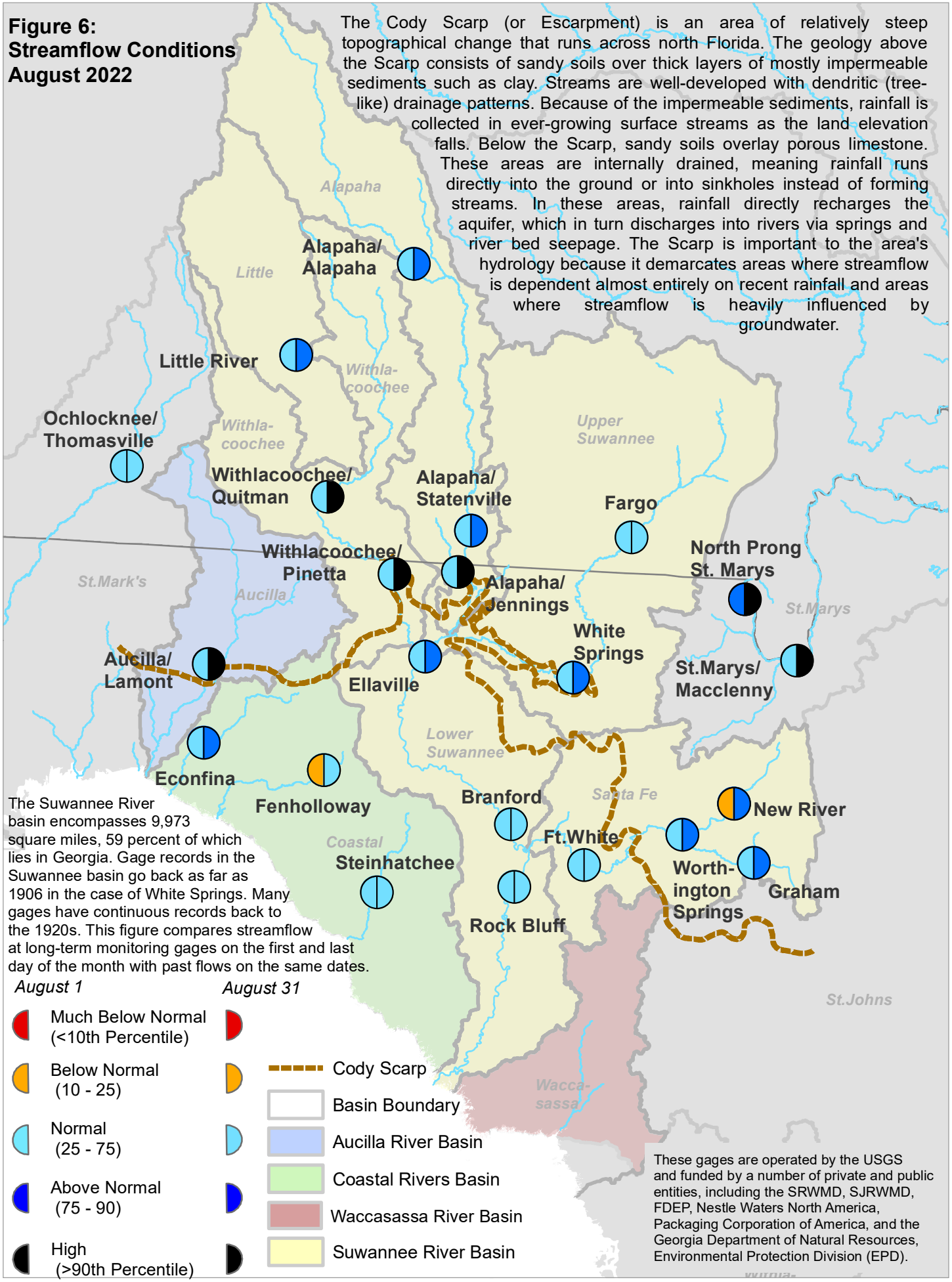
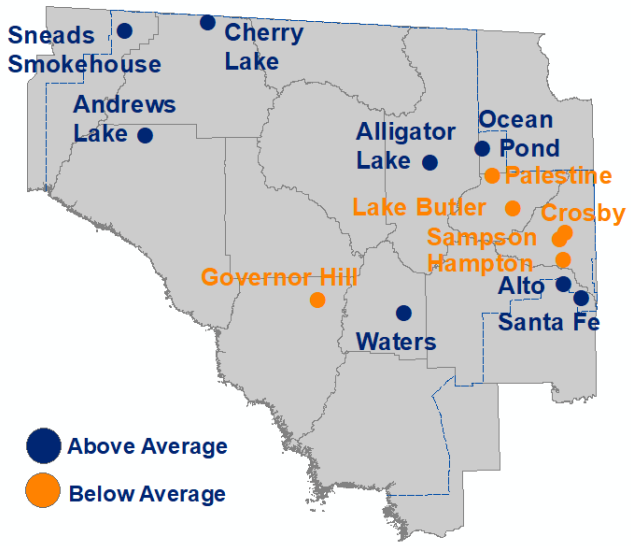


Figure 6:
Streamflow Conditions
August 2022
The Cody Scarp (or Escarpment) is an area of relatively steep topographical change that runs across north Florida. The geology above the Scarp consists of sandy soils over thick layers of mostly impermeable sediments such as clay. Streams are well-developed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

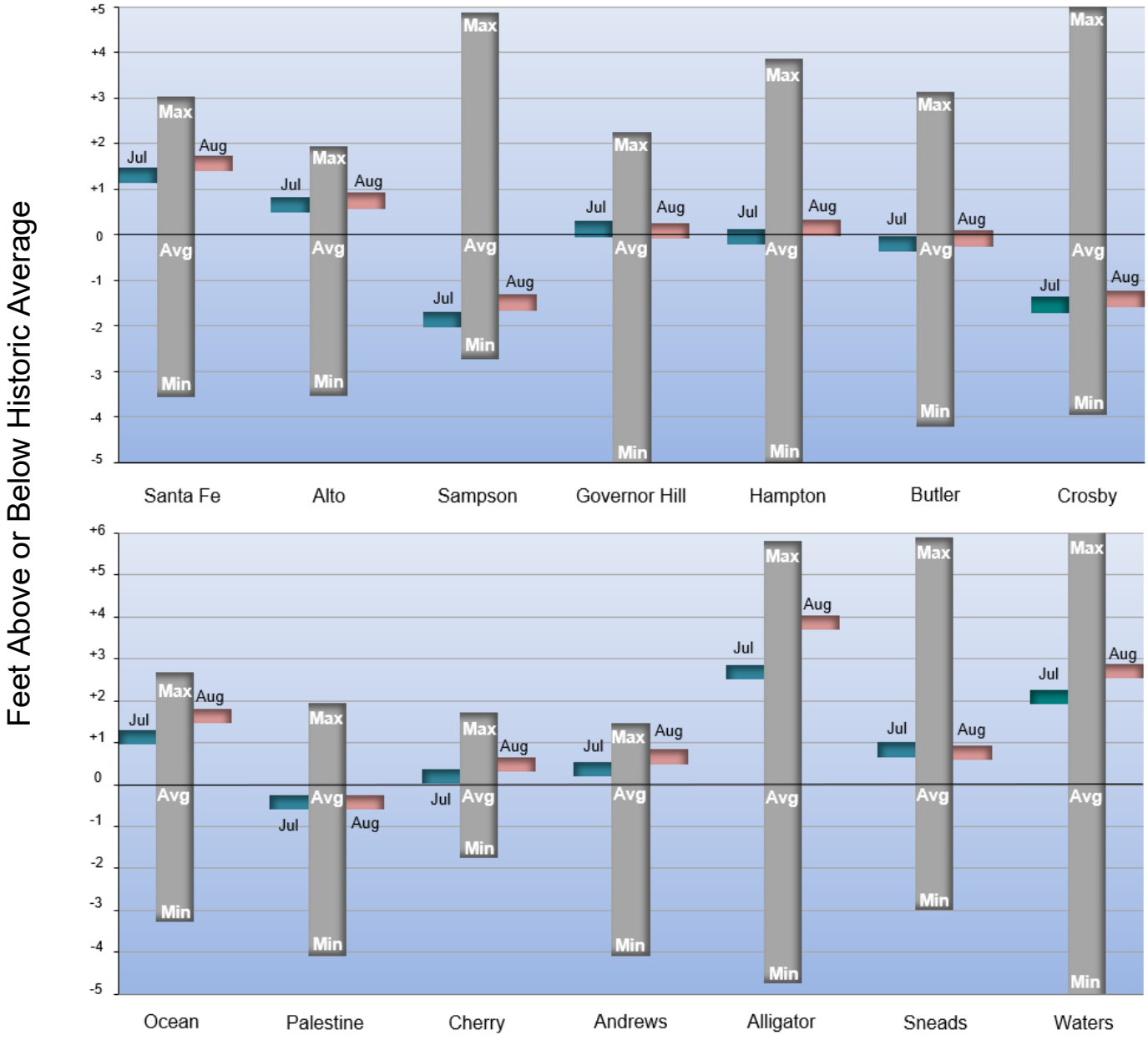


Figure 8: Flow Over the Past 12 Months, Blue Hole (cubic feet per second)

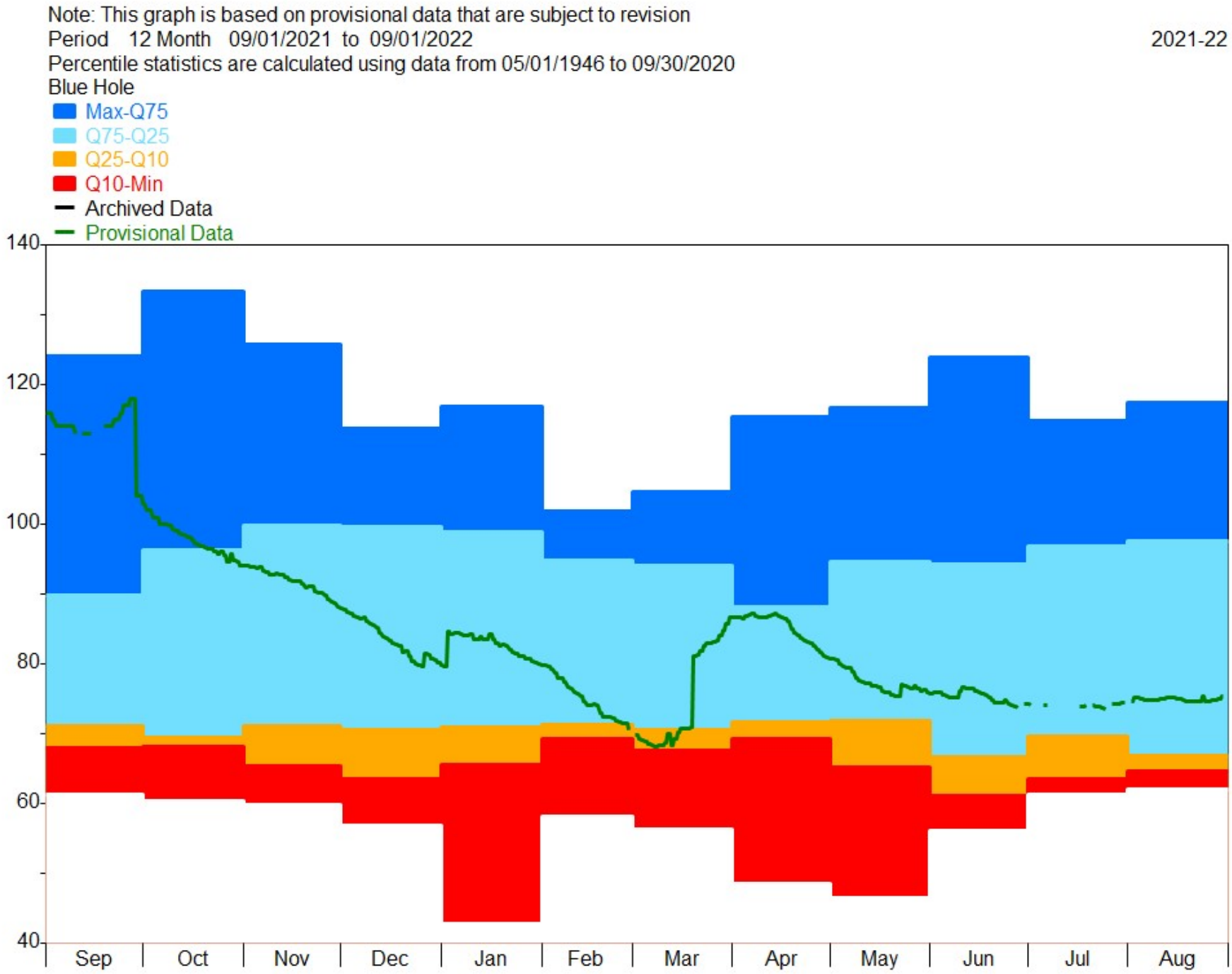
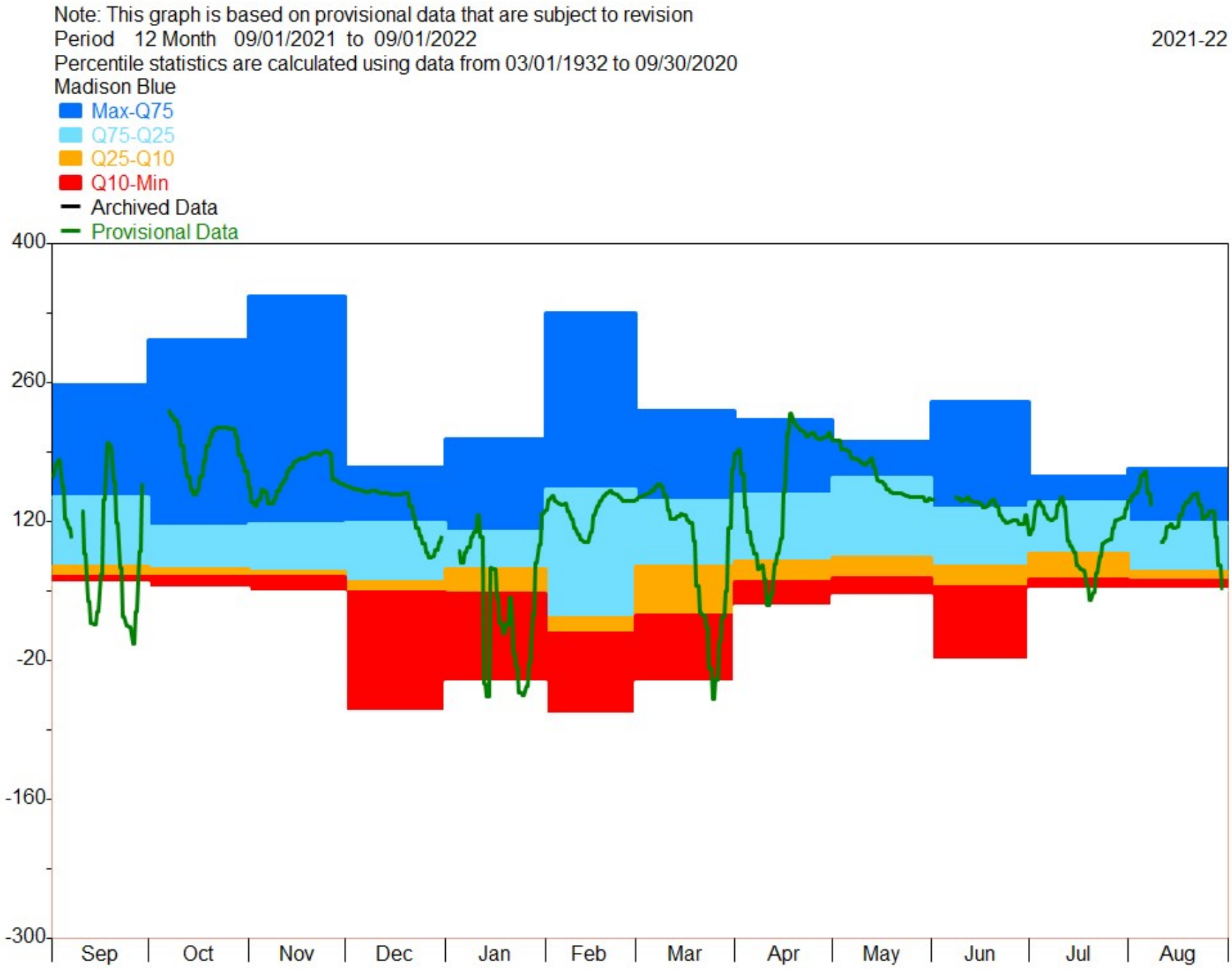


Figure 9: Flow Over the Past 12 Months, Madison Blue (cubic feet per second)



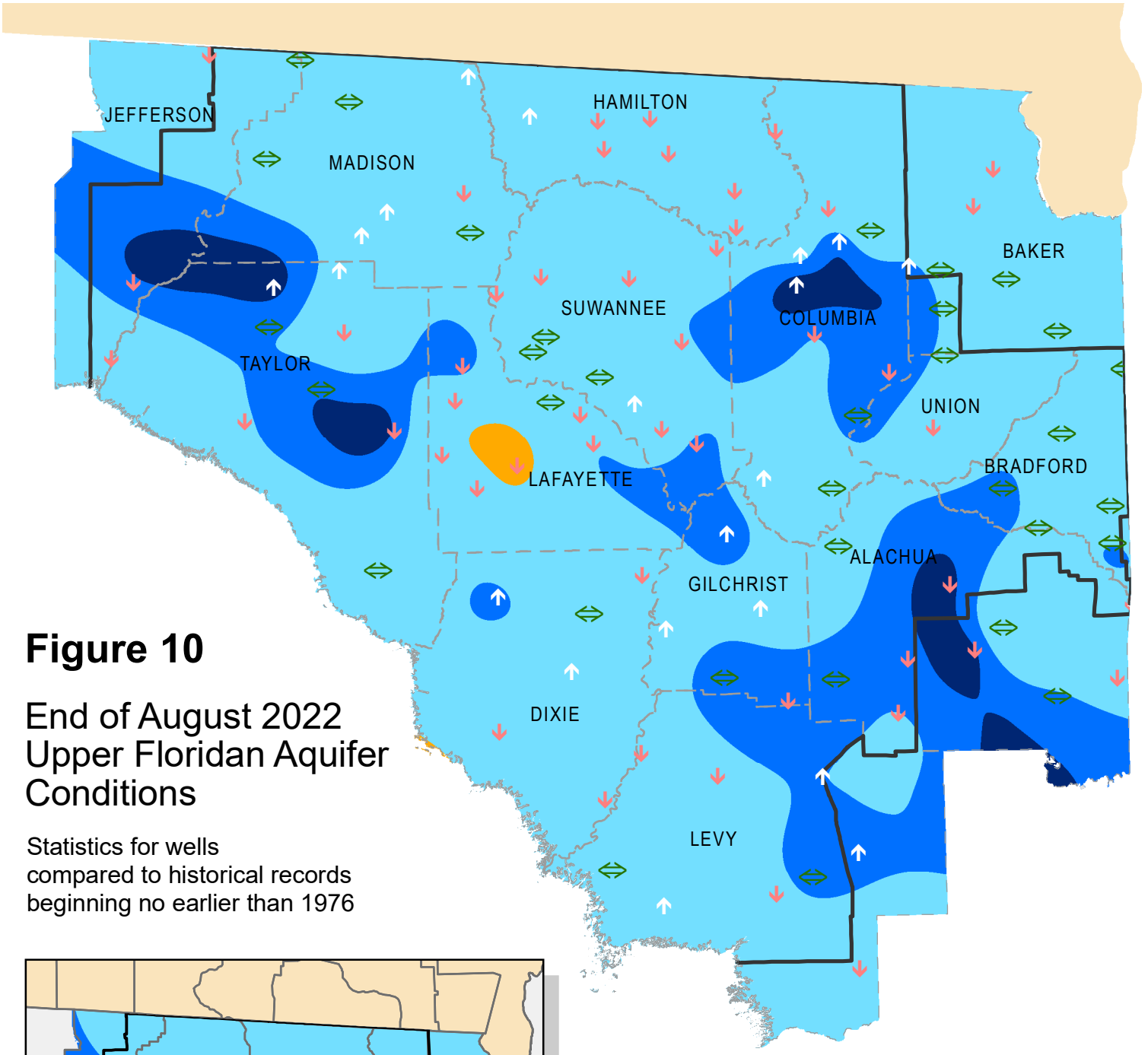
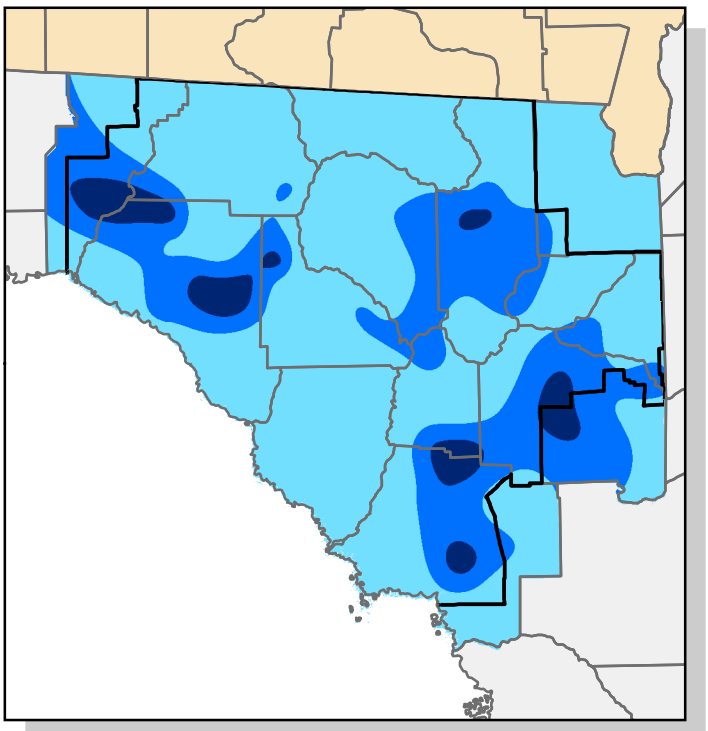


Figure 10

End of August 2022 Upper Floridan Aquifer Conditions

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



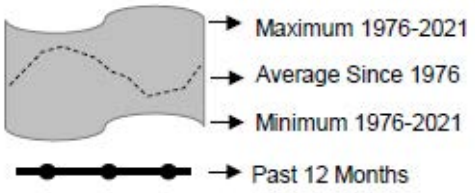
Inset: July Groundwater Percentiles

Additional wells courtesy of SJRWMD, SWFWMD and USGS

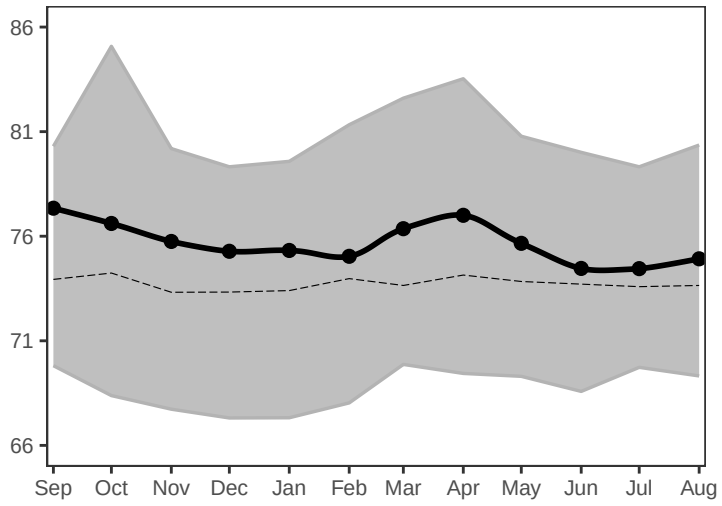
- Extremely High (Greater than 90th Percentile)
- High (75th to 90th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Extremely Low (Less than 10th Percentile)
- Increase/decrease in level since last month
- Increase/decrease since last month less than one percent of historic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

Figure 11: Monthly Groundwater Statistics

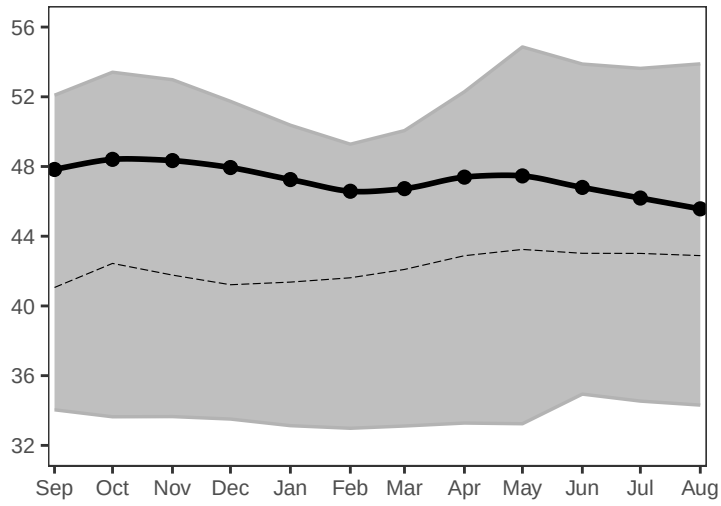
Levels September 2021 through August 2022
Period of Record Beginning 1976



Madison County N010719001
near Greenville

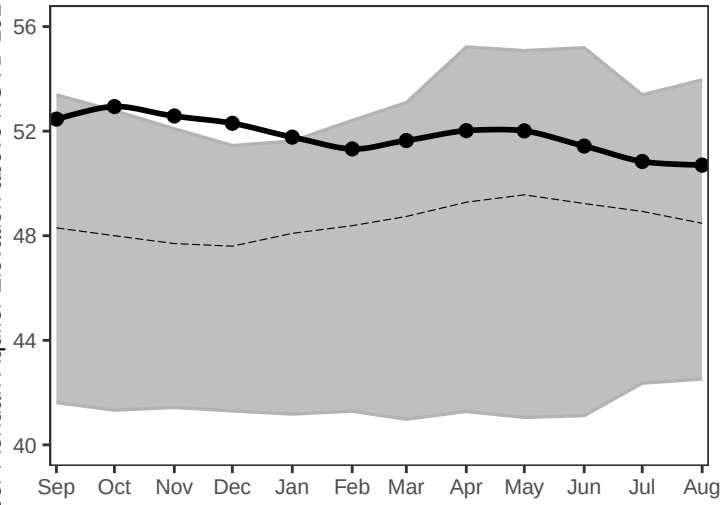


Suwannee County S021335001
near Live Oak

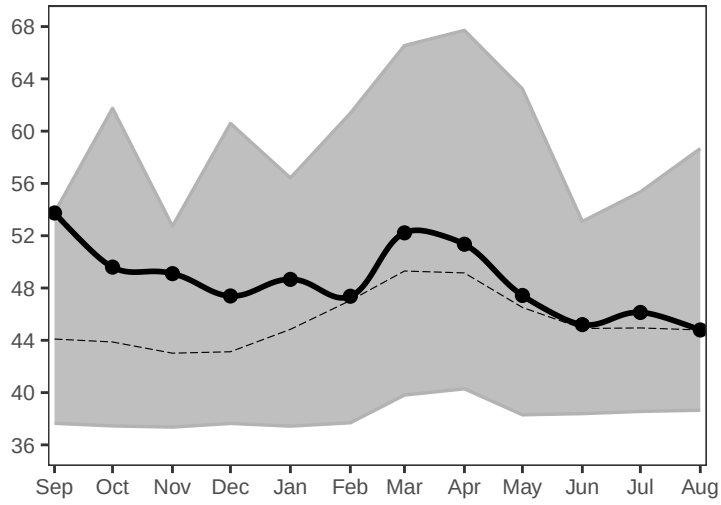


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

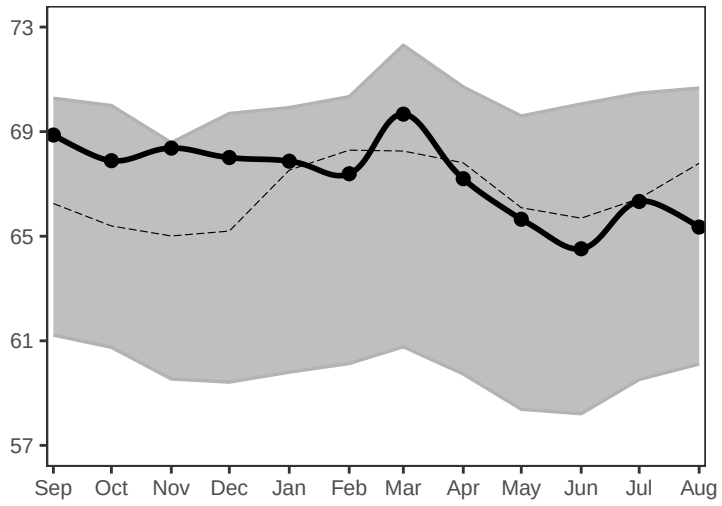
Columbia County S041705001
Lake City



Hamilton County N011422007
near Jasper



Lafayette County S061114001
near Mayo



Taylor County S040736005
Perry

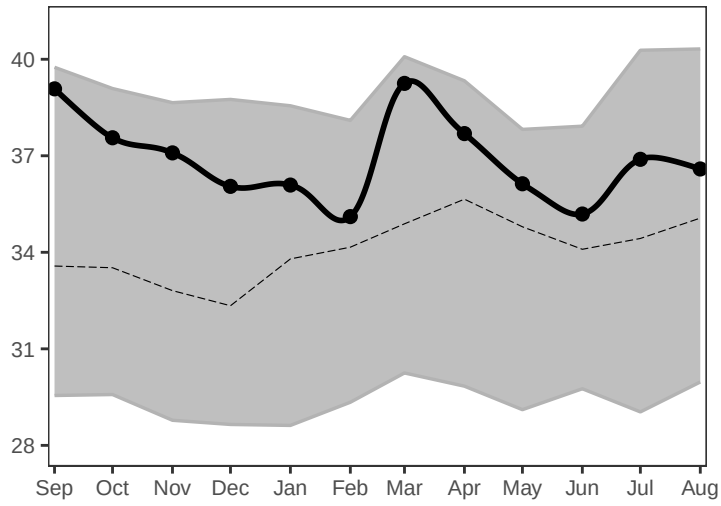
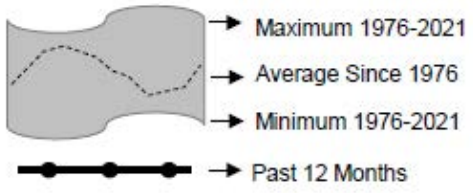
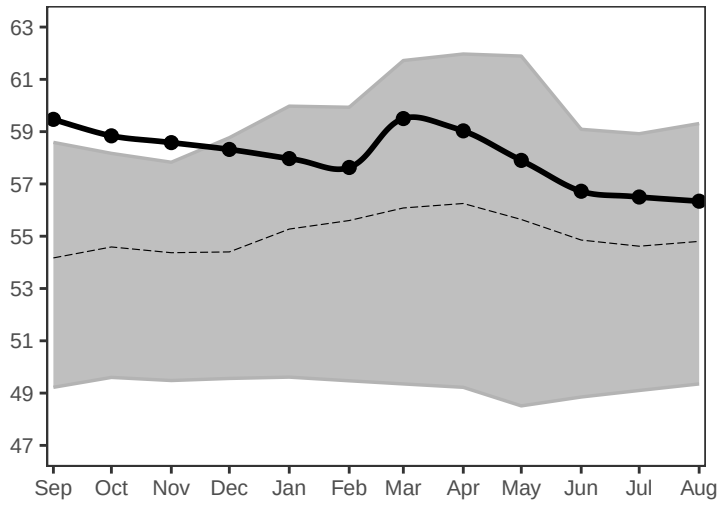


Figure 11, cont.: Monthly Groundwater Statistics

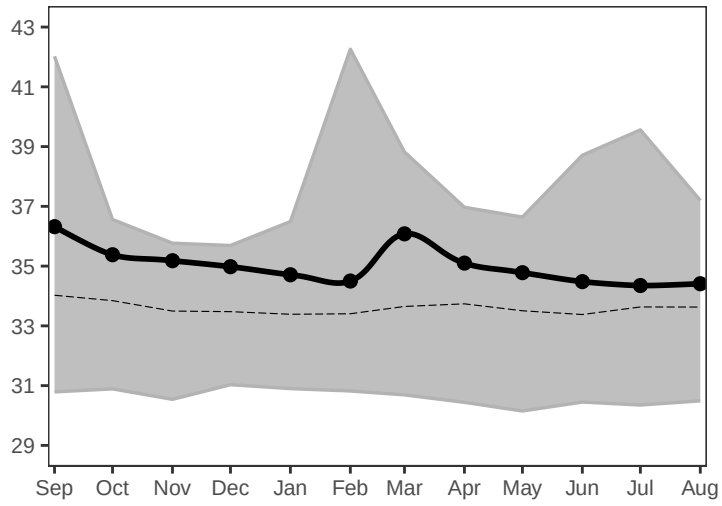
Levels September 2021 through August 2022
Period of Record Beginning 1976



Union County S051933001
near Lake Butler

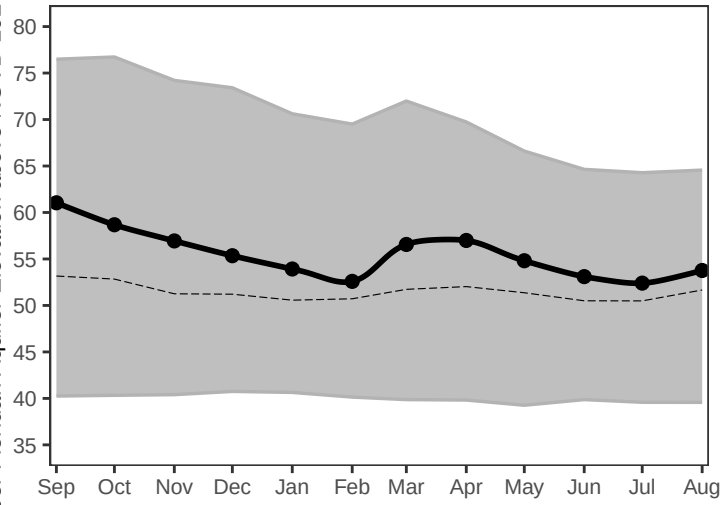


Alachua County S081703001
at High Springs

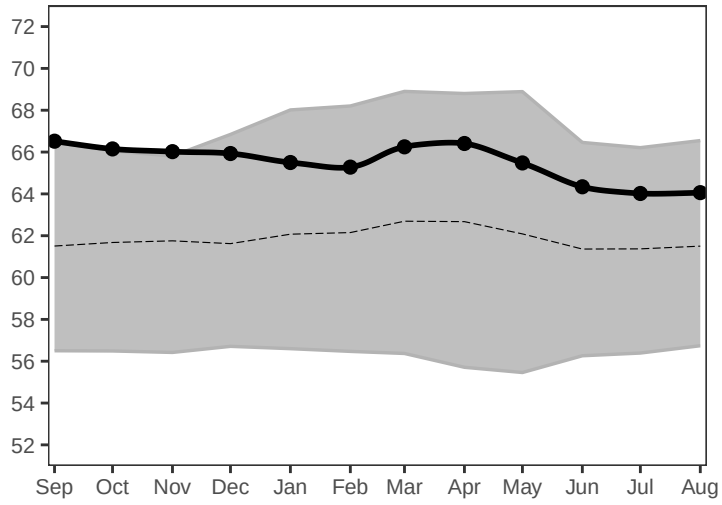


Upper Floridan Aquifer Elevation above NGVD 1929, Feet

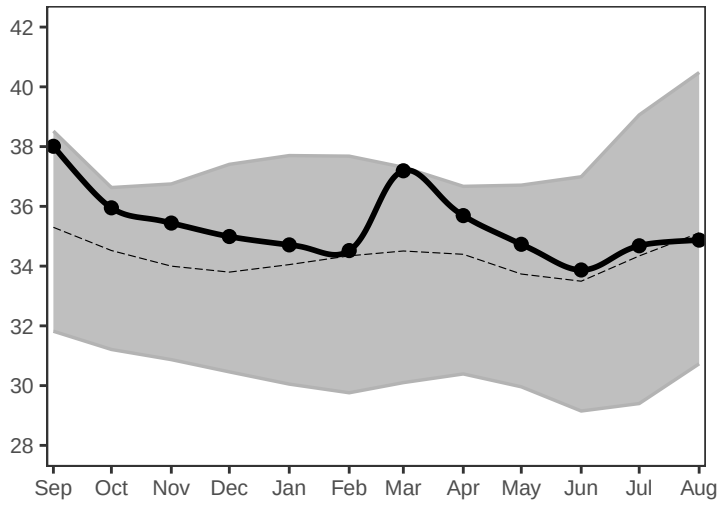
Gilchrist County S091607001
near Trenton



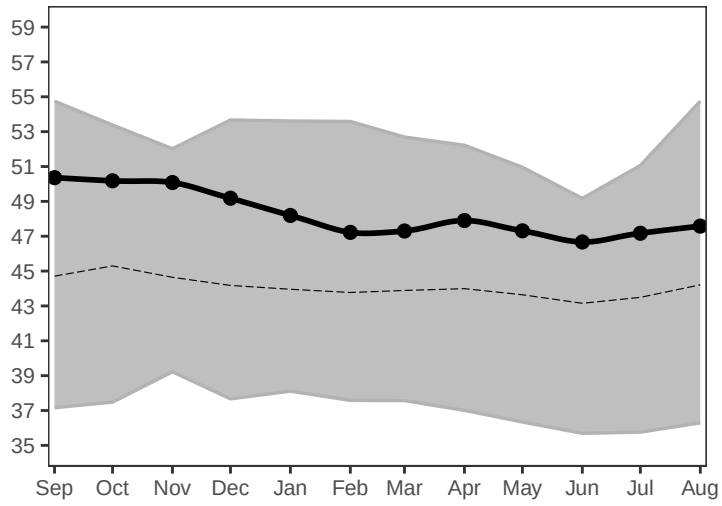
Bradford County S072132001
near Graham



Dixie County S101210001
at Cross City



Levy County S131736001
near Bronson



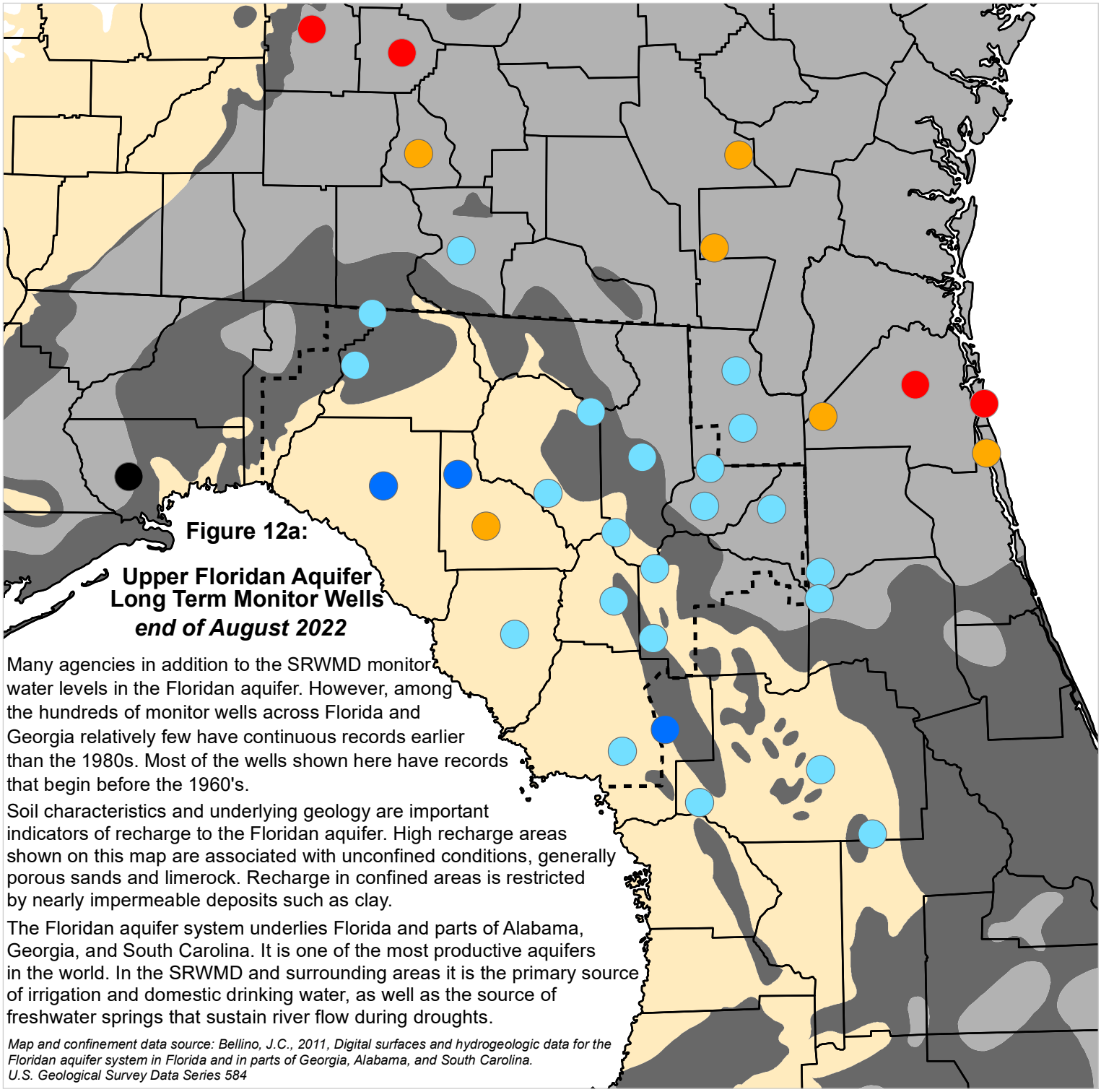


Figure 12a:

Upper Floridan Aquifer
Long Term Monitor Wells
end of August 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

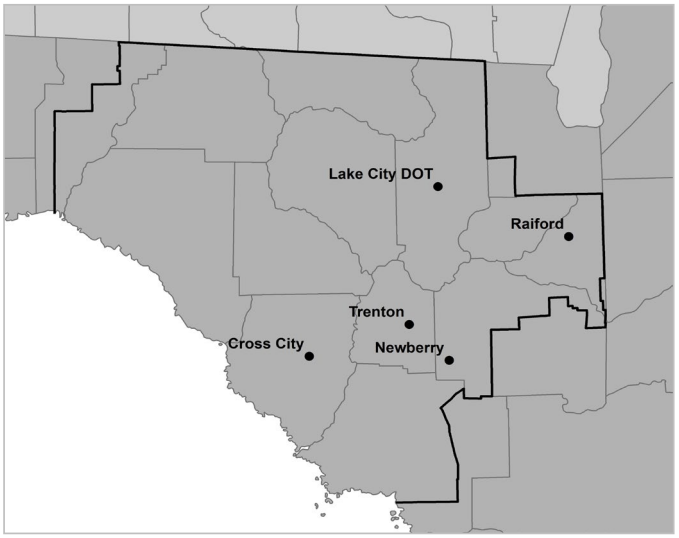
- Confined: Upper confining unit is generally greater than 100 feet thick and unbreached. Recharge is low.
- Semi-confined: Upper confining unit is generally less than 100 feet thick, breached, or both. Recharge is moderate.
- Unconfined: Upper confining unit is absent or very thin. Recharge is high.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

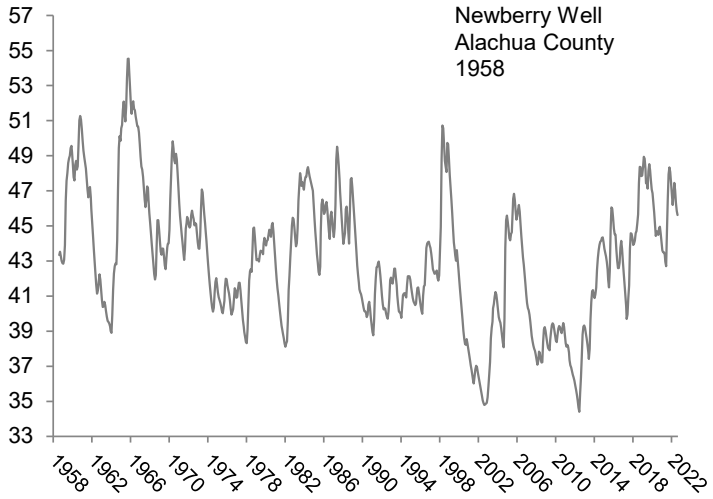
Percentile of Most Recent Water Level Relative to Entire Record

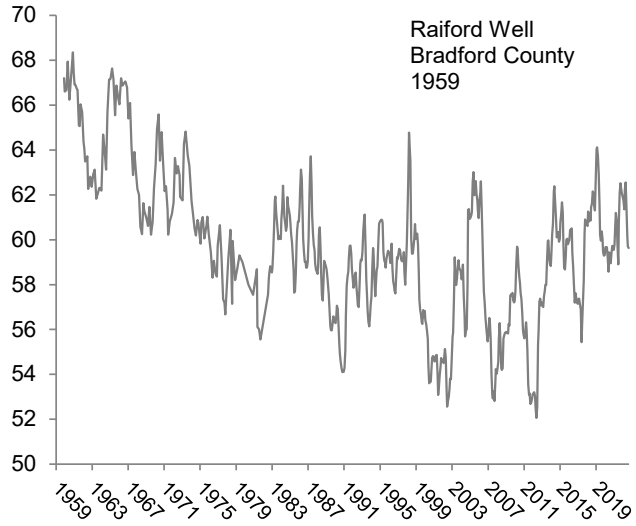
- Very High (Greater than 90th Percentile)
- High (75th to 90th Percentile)
- Normal (25th to 75th Percentile)
- Low (10th to 25th Percentile)
- Very Low (Less than 10th Percentile)
- Data Not Available

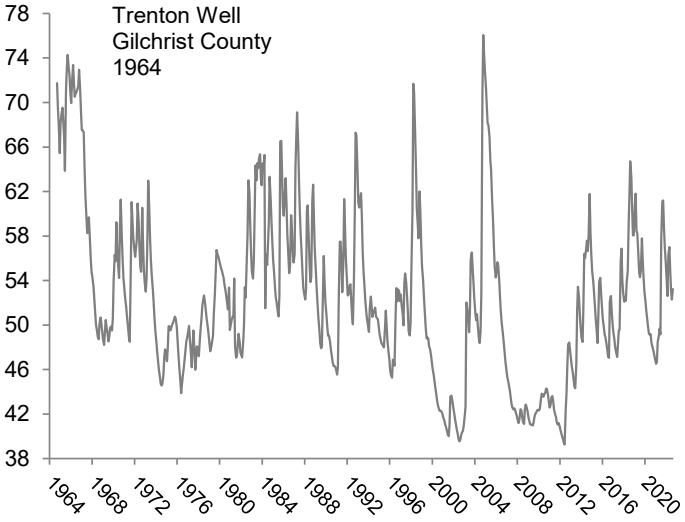
Figure 12b: Regional Long Term Upper Floridan Aquifer Levels

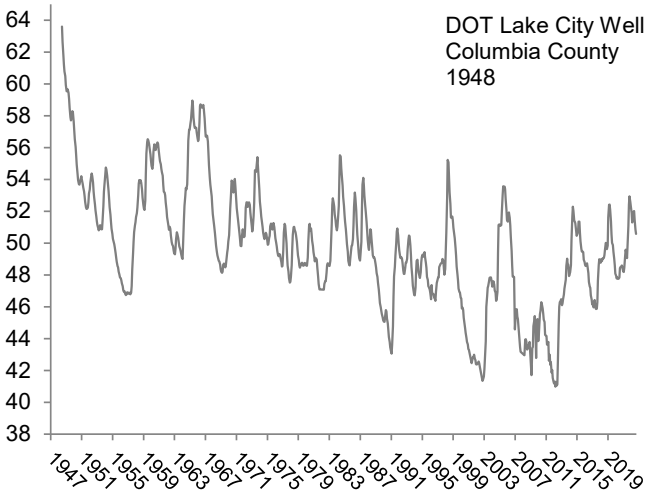
Data through August 2022

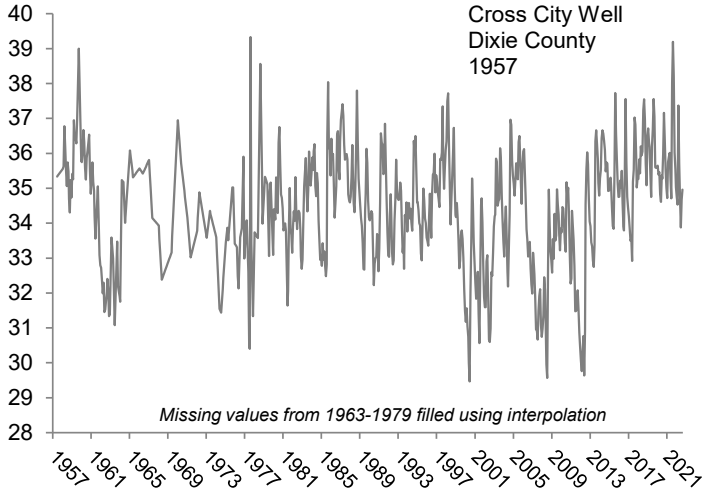












Upper Floridan Aquifer Elevation above NGVD 1929, Feet