Hydrologic Conditions Quarterly Report: October 2023 to December 2023

Executive Summary

Cumulative average rainfall across the District from October through December 2023 was 16.0 percent higher than normal for the quarter. Normal rainfall is defined as average monthly rainfall for the 1991 to 2020 period of reference. Higher-than-normal rainfall in December contributed to an increase in streamflow and groundwater levels in many portions of the District. Much of the rainfall fell in the eastern portion of the District. The U.S. Drought Monitor indicated abnormally dry drought conditions were still present at the end of the quarter in Escambia, Santa Rosa, Okaloosa, Walton, Holmes, Washington, and the upper northwest corner of Jackson County.

Precipitation Summary

Rainfall totals from October through December, compared to current National Weather Service Climate Normals (1991 to 2020 reference period) were above normal across the District. The three-month-total rainfall was 14.25 inches. Normal cumulative rainfall for this period is 12.14 inches (Table 1).

Month	Normals (1991 to 2020)	2023	Percent Difference
October	3.62	2.07	-54.6%
November	3.89	3.58	-8.3%
December	4.63	8.60	60.0%
Totals	12.14	14.25	16.0%

Table 1. PRISM monthly rainfall totals and percent difference from 1991-2020 monthly precipitation normals

Below normal rainfall in October and November was followed by above normal rainfall in December. For the quarter, the District reported 2.11 inches (16.0 percent) more in quarterly rainfall compared to normal. The total cumulative rainfall average across the District for 2023 was 62.19 inches, 0.01 inches below the normal annual rainfall (62.20 inches).

Significant Events

Portions of Bay, Gulf, Liberty, Wakulla, and Leon Counties received more than 8 inches of rain in December compared to normal December rainfall (Figure 1). On December 2, rainfall exceeded 6 inches in Panama City, Wewahitchka, St. Marks, and Crawfordville. A second, less intense rainfall event occurred on December 17 when between 3 and 4 inches of rain fell in Wakulla and Leon Counties.



Figure 1. NOAA monthly departure from normal precipitation (1991-2020 precipitation normals); Source: <u>http://water.weather.gov/precip/</u>

Temperature

Average monthly temperatures were near to above average for each month of the quarter. El Niño conditions arrived later in the year than expected. El Niño events favor wetter and cooler than normal winters in Florida. NOAA notes there is a chance that this El Niño event may rank in the top five events on record. Temperatures in 2023 were much above average according to NOAA. Based on annual average temperatures in 2023, Escambia, Santa Rosa, and Okaloosa had the hottest year on record.

Surface Water Levels and Streamflow

Streamflow percentiles for the western portion of the District were low to below normal for the entire quarter. Streamflow percentiles for the central and eastern portion of the District trended up throughout the quarter (Figure 2). Figures 4 through Figure 9 depict average daily, daily median, and long-term average discharge for USGS monitored stations within the District. The selected USGS streamflow stations show daily discharge values were below median and average daily values for stations in the western panhandle. St. Marks River near Newport, FL USGS was at action stage for most of December (Figure 4).

Third Quarter Streamflow 2023 (NWFWMD)



December 2023

		Explar	nation - I	Percent	ile classe	s	
•				۲	•	•	0
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below	Normal	Above	Much above normal		

Figure 2. USGS monthly streamflow percentile classifications for the NWFWMD Source: <u>http://waterwatch.usgs.gov/index.php</u>



Figure 3. Lake Jackson in Leon County daily stage, December 2022 to December 2023



Figure 4. USGS St. Marks River near Newport streamflow, December 2022 to December 2023



Figure 5. USGS Ochlockonee River near Havana streamflow, December 2022 to December 2023



Figure 6. USGS Apalachicola River near Blountstown streamflow, December 2022 to December 2023



Figure 7. USGS Choctawhatchee River near Bruce streamflow, December 2022 to December 2023



Figure 8. USGS Blackwater River near Baker streamflow, December 2022 to December 2023



Figure 9. USGS Escambia River near Century streamflow, December 2022 to December 2023

Fourth Quarter 2023 Spring Flow Data

There was a decreasing trend in spring flow at Jackson Blue Spring in October and November. Spring flow increased slightly in December (Figure 10).



Figure 10. Daily average spring flow at Jackson Blue Spring, December 2022 to December 2023

Data for USGS station St. Marks River near Newport, Fla- 02326900 has been approved through October 13, 2022. The St. Marks River- Upper Discharge Before Swallet station (NWFID 12899) will be used in place the St. Marks River Natural Bridge Swallet station (NWFID 9257) to calculate spring discharge. The latest approved data is shown in Figure 11.



Figure 11. Daily average spring flow at St. Marks River Rise, October 2021 to October 2022

The meter installed in the Wakulla Spring vent (NWFID 749) was removed for repair on September 23, 2023. Manual discharge measurements were conducted each month of the quarter at Wakulla Spring (Table 2). The discharges were 712, 703, and 1270 cfs during October, November, and December 2023, respectively. Manual discharge measurements were conducted each month of the quarter at Sally Ward Spring (Table 3). The discharges were 22.8, 22.6, and 37.7 cfs during October, November, and December 2023, respectively. Above normal rainfall in the last month of the quarter contributed to an increase in discharge for both springs. The Sally Ward Spring run was in flood condition during the December 19th measurement.

Date of manual discharge	Wakulla Spring Discharge (cfs)
October 25, 2023	712
November 17, 2023	703
December 19, 2023	1270

Table 2. Quarterly manual discharge measurements at Wakulla Spring

Table 3. Quarterly manual discharge measurements at Sally Ward Spring

Date of manual discharge	Sally Ward Spring Discharge (cfs)
October 25, 2023	22.8
November 17, 2023	22.6
December 19, 2023	37.7

MFL Update

St. Marks River Rise MFL: Per the most current approved data which extends through October 13, 2022, the St. Marks River Rise MFL (long-term average of 432 cfs) is being met.

Wakulla and Sally Ward Spring System MFL: Per the most current approved data which extends through December 19, 2023, the MFL (long-term average of 612 cfs) is being met.

Groundwater Levels

Many groundwater levels in the District trended upward over the fourth quarter (Figure 13 through Figure 20). At the end of the fourth quarter of 2023, groundwater levels in the District were normal to much above normal (between 10th and greater than 90th percentiles for the period of record in Table 4). The NWFWMD Pittman Visa Floridan aquifer monitoring well (NWFID 5226) in central Jackson County remained categorized as below normal.



Figure 12. NWFWMD groundwater monitoring sites and percentile classes

NWFID	Total Depth (ft)	Cased Depth (ft)	Aquifer Monitored	Period of Record
1382	232	222	Sand-and-Gravel (main producing zone)	June 1984 to December 2023
697	345	326	Floridan Aquifer (undifferentiated)	March 1974 to October 2023
3216	150	110	Floridan Aquifer (undifferentiated)	September 1967 to December 2023
5266	158	100	Floridan Aquifer (undifferentiated)	January 1989 to December 2023
2624	303	202	Floridan Aquifer (undifferentiated)	June 1986 to December 2023
29	240	168	Upper Floridan Aquifer	June 1978 to December 2023
392	127	121	Floridan Aquifer (undifferentiated)	January 1967 to December 2023
3402	225	100	Floridan Aquifer (undifferentiated)	November 1946 to December 2023

Table 4. Monitor wells attributes for stations shown in Figure 11



Figure 13. NWFWMD Weller Ave Deep MPZ well groundwater elevation, December 2022 to December 2023



Figure 14. Fannin Airport S675 well groundwater elevation, December 2022 to December 2023.



Figure 15. USGS 422A Near Greenhead well groundwater elevation, December 2022 to December 2023.



Figure 16. NWFWMD Pittman Visa S661 well, groundwater elevation December 2022 to December 2023



Figure 17. NWFWMD Blountstown Floridan well groundwater elevation, December 2022 to December 2023



Figure 18. McCulloch #1/S756 well groundwater elevation, December 2022 to December 2023



Figure 19. USGS-Benchmark well groundwater elevation, December 2022 to December 2023



Figure 20. USGS-Lake Jackson Floridan well groundwater elevation, December 2022 to December 2023

Drought Conditions

Drought conditions were present in the first month of the quarter across most of the District (Figure 21). Drought conditions intensified through November, particularly in the western counties. Drought conditions lessened throughout the District in December due to higher-than- normal monthly rainfall. At the end of the quarter, only the western portions of the District were categorized as abnormally dry (Figure 22).



Figure 21. Florida Drought Conditions at the beginning of the quarter on October 3, 2023, compared to at the end of the quarter on January 2, 2024; *Source:* http://droughtmonitor.unl.edu/Maps/CompareTwoWeeks.aspx



Figure 22. Southeast Climate Region drought conditions at the end of the fourth quarter, January 2, 2024