

**NWS FORM E-5 U.S. Department of Commerce**  
NOAA, NATIONAL WEATHER SERVICE

**HSA OFFICE:**  
**Grand Rapids, MI**

**MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS**

REPORT FOR (MONTH & YEAR):  
**February 2023**

TO: NATIONAL WEATHER SERVICE (W/OS31)  
HYDROMETEOROLOGICAL INFO CENTER  
1325 EAST-WEST HIGHWAY, RM 13468  
SILVER SPRING, MD 20910

DATE:  
March 15, 2023

SIGNATURE:  
Bruce Smith, MIC  
Andrew Dixon, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An **X** inside this box indicates that no flooding occurred within this hydrologic service area.

**Summary**

February 2023 was much warmer and much wetter than normal. Although we had a relatively dry fall, we've now had 3 months in a row with increasingly wet conditions. We started the month with snow on the ground across most of the Lower Peninsula, but it was a much smaller snowpack than normal for February. The first 3 weeks of the month saw steady melting conditions and regional rain events. By the start of the last week of February, all of the snow in the Grand and Kalamazoo River Basins had melted, and most of the snow in the Muskegon River basin had also melted.

Winter returned for the last week of February (and continued into March), with the active storm pattern turning cold enough to drop snow in most areas, and ironically the deepest snowpack of the winter so far developed in northern sections of the area (primarily the upper half of the Muskegon River Basin). However, even this "deeper" snowpack was below average for what we'd normally have on the ground at this time of year - with snow water content only about  $\frac{2}{3}$  of normal values even in the Muskegon River headwaters snow belts.

The wet conditions across the state led to steady improvement in the drought conditions that had persisted all winter over Southeast Lower Michigan, as soils moistened and absorbed the precipitation.

**Flood Conditions**

Predictably, the wet and warm pattern melted lots of snow and brought river levels up significantly. NO flooding occurred, but several rivers approached bankfull near the end

of the month. A flood watch was briefly issued for the Maple River at Maple Rapids, but heavy rain and snow melt didn't materialize, and the river never reached flood levels. All of the major river systems started the month well below normal for this time of year, but climbed to normal and then all the way to the 75th to 90th percentile values by mid-month as snowmelt and rainfall runoff all entered the river systems. For the Grand and Kalamazoo basins, this likely represented the spring snowmelt episode for this year, but that event is still looming for the Muskegon River basin (though, again, the snowpack up there remains below-average for this time of year, so flood risks are lower than normal).

### **Flood Stage Report**

No forecast points exceeded flood stage during the month. Thus, the NWS Form E-3 "Flood Stage Report" was not issued.

### **River Conditions**

The end of February percentage of normal flow for selected rivers is listed below:

<u>Location</u>	<u>River</u>	<u>% of Normal</u>
Scottville	Pere Marquette	115
Whitehall	White	162
Ewart	Muskegon	134
Mt. Pleasant	Chippewa	131
Lansing	Grand	181
Grand Rapids	Grand	190
East Lansing	Red Cedar	245
Hastings	Thornapple	266
Battle Creek	Battle Creek	178
Battle Creek	Kalamazoo	167

### **General Hydrologic Information**

February precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 4.10, 3.13, and 3.04 inches, respectively (Figure 1). Monthly departures were +1.98, +1.42, and +0.93 inches, respectively. Yearly departures were +2.00, +1.30, and +1.31 inches for Grand Rapids, Lansing and Muskegon, respectively. Percent of mean precipitation for February 2023 is shown in Figure 2.

Temperatures for the month of February at Grand Rapids, Lansing and Muskegon were much warmer than average. The monthly average temperature departures for these sites were +4.4, +6.3, and +4.6 degrees Fahrenheit, respectively.

Accumulated Precipitation (in)  
February 1, 2023 to February 28, 2023

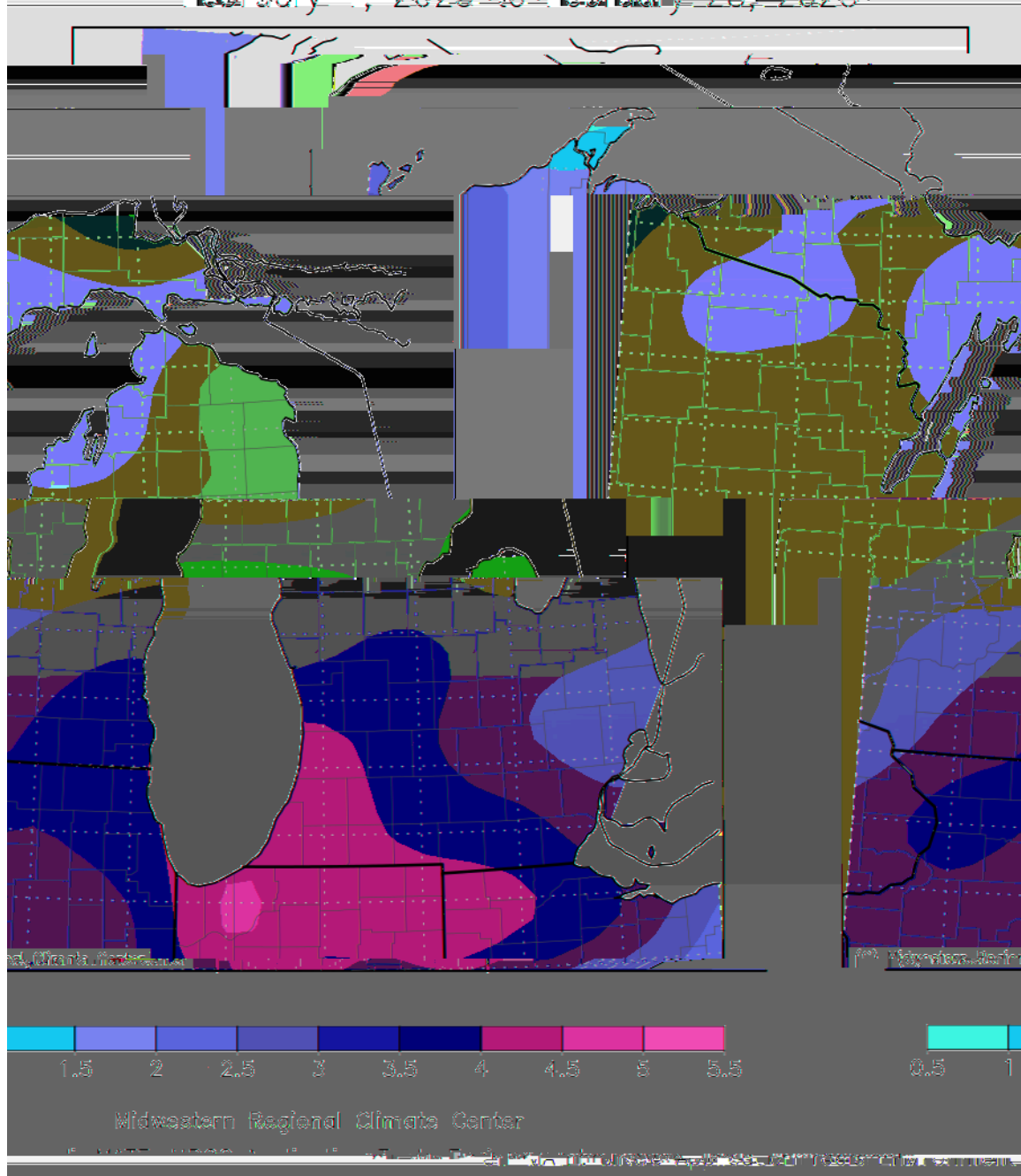


Figure 1. February 2023 Monthly Precipitation Totals.

Accumulated Precipitation: Percent of Mean  
February 1, 2023 to February 28, 2023

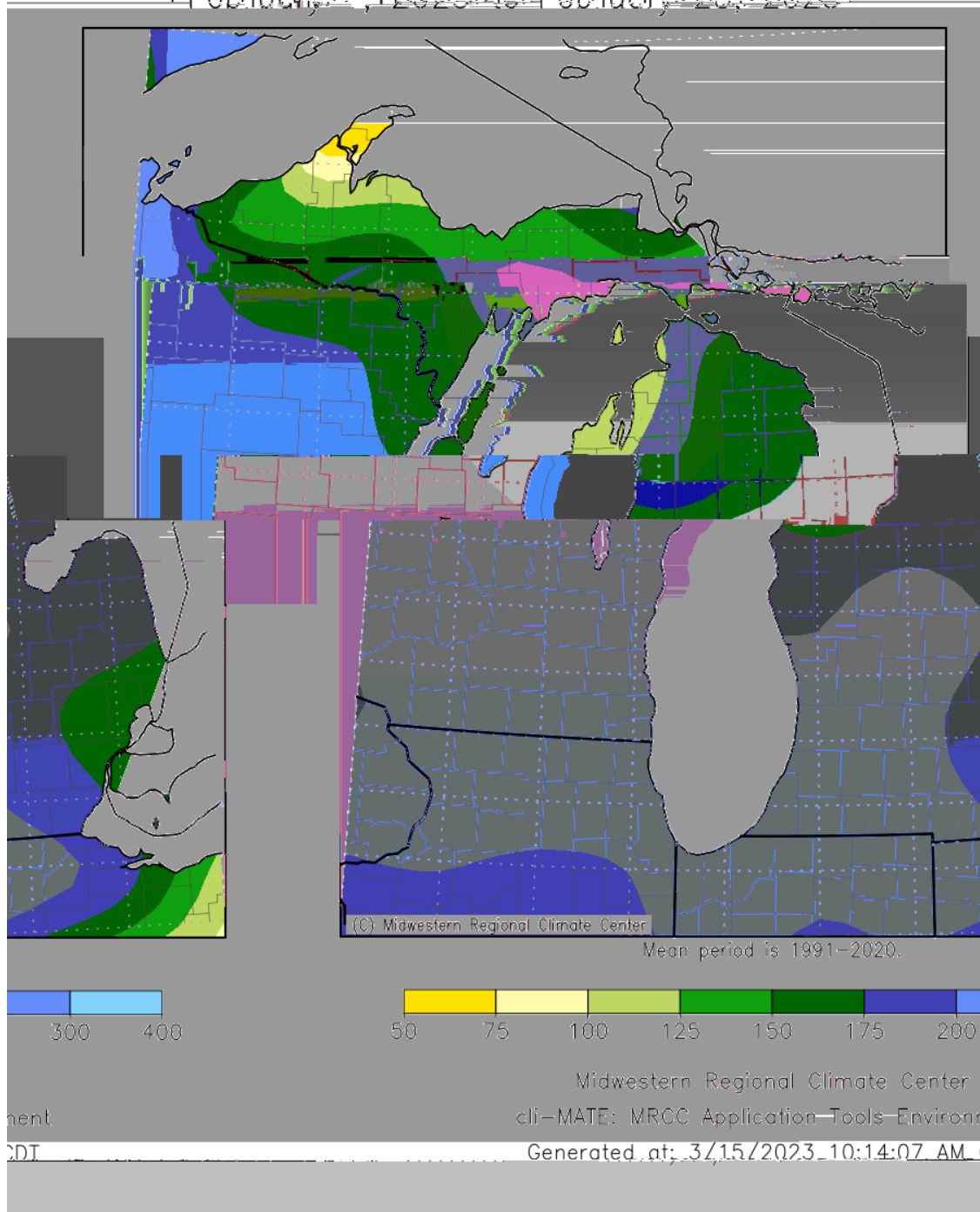
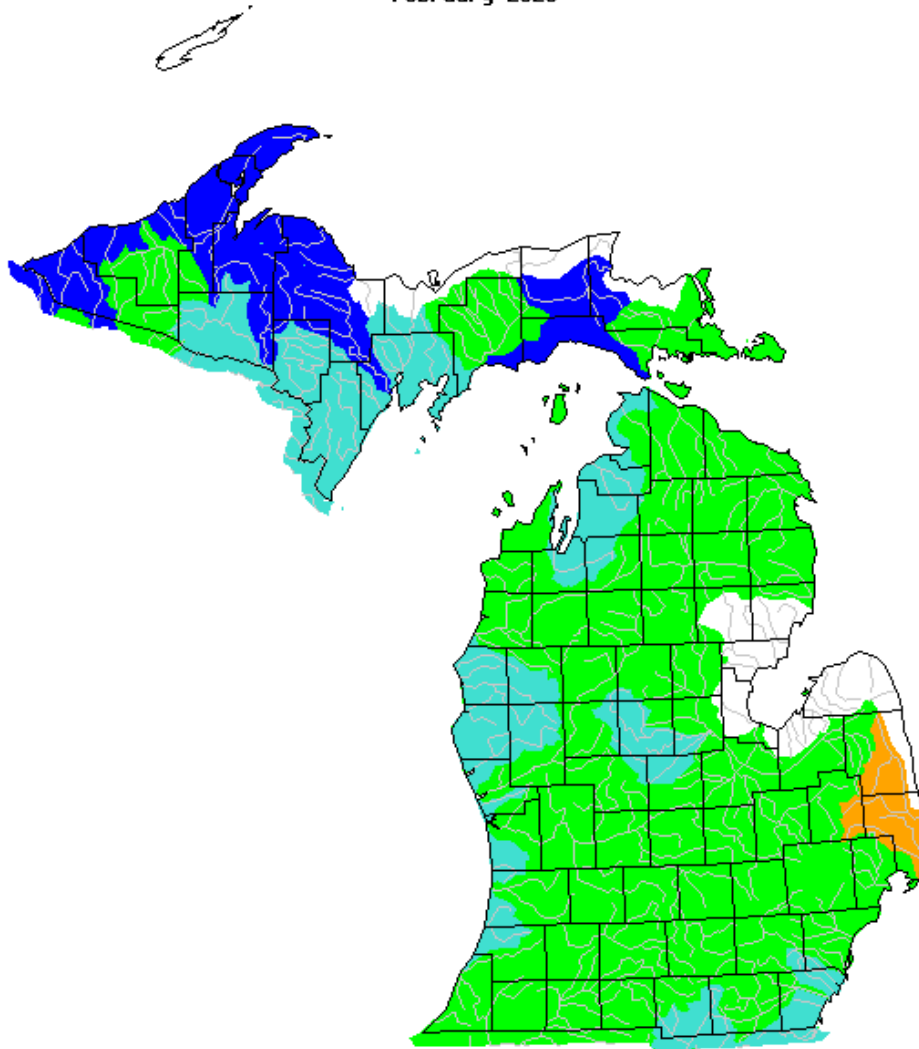


Figure 2. February 2023 Percent of Mean of Accumulated Precipitation.

February 2023



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	No Data
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Figure 3. USGS monthly streamflow for February, grouped by significant hydrologic units. Note streamflows near to slightly above average for this time of year, especially over West Michigan, due largely due to an earlier than normal snowpack melt across much of the area.

### Calculated Soil Moisture Ranking Percentile FEB, 2023

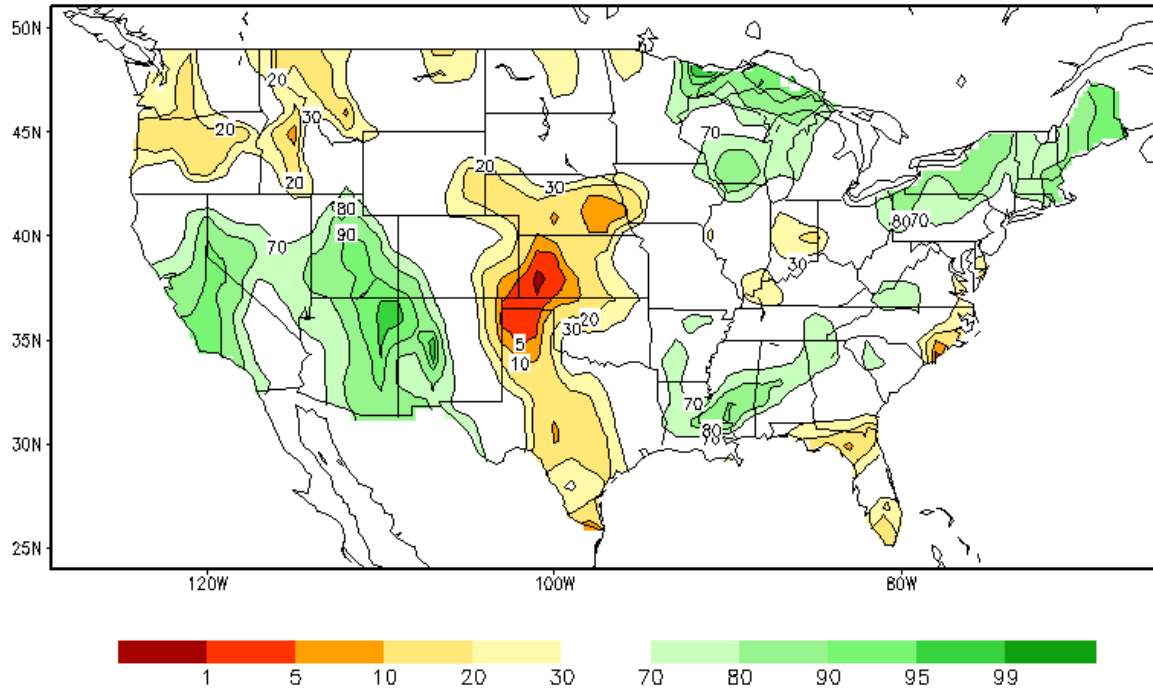


Figure 4. Chart of monthly values of soil moisture, by percentile ranking. This supports the idea that soil moisture levels are near normal for this time of year. Specifically, note the improvement of dry soil conditions over Southeast Lower Michigan, as drought slowly eases.

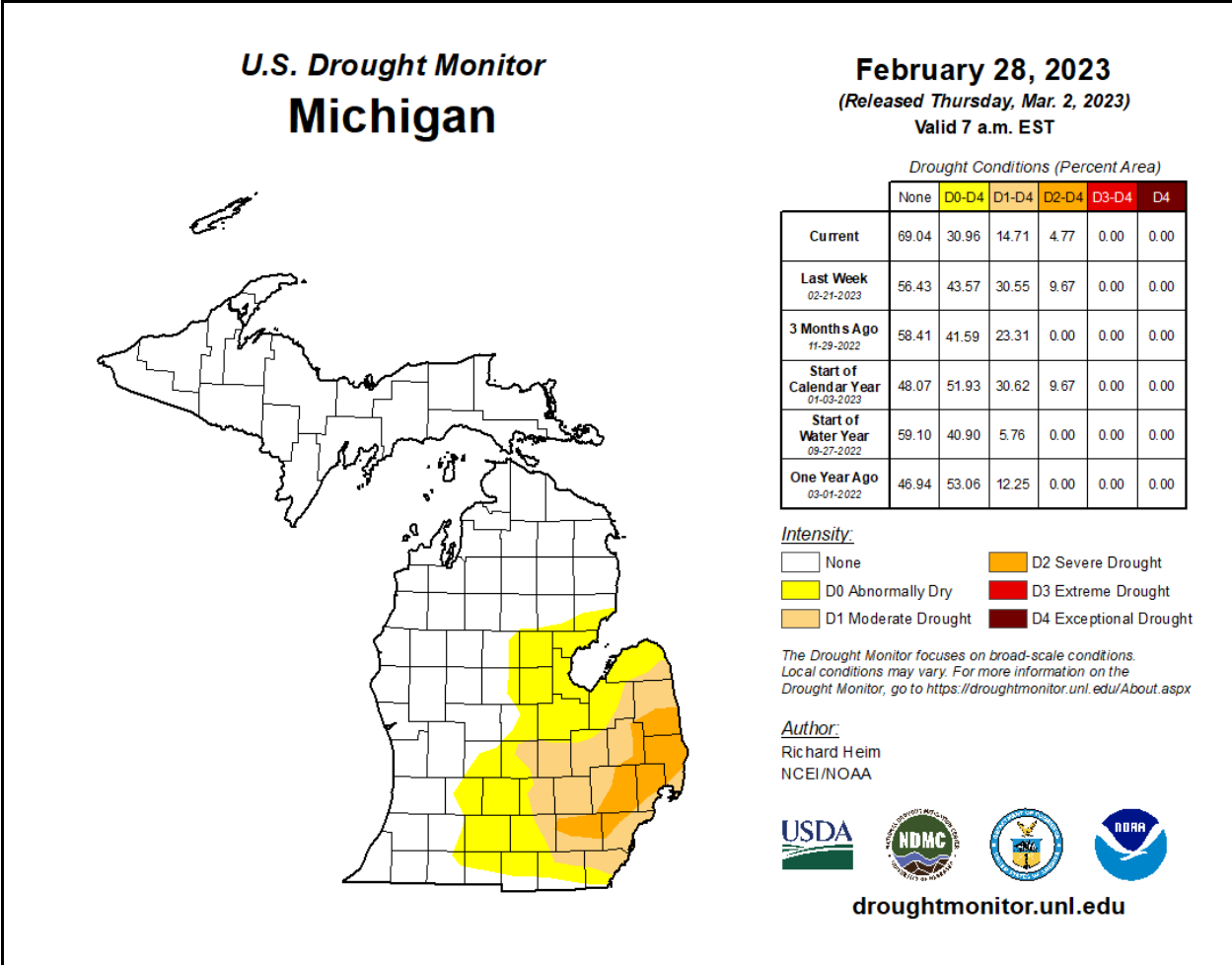


Figure 5. U.S. Drought Monitor showing drier than normal conditions over central Lower Michigan, but conditions are improving as we've now had 2 months of above-average precipitation.

**Hydrologic Products issued this month**

- 28 Hydrologic Summaries (ARBRVAGRR)
- 2 Probabilistic Hydrologic Outlook (ARBESFGRR)
- 0 Event-driven Hydrologic Outlook (ARBESFGRR)
- 0 Daily River Forecasts (ARBRVDGRR)
- 0 Areal Flood Advisory Statements (ARBFLSGRR)
- 0 Flood Warning Statements (ARBFLWGRR)
- 1 Flood Watch Statements (ARBFFAGRR)
- 0 River Statements (ARBRVSGRR)

**News Articles and Related Documentation**

None