



Monthly Report of River and Flood Conditions

Report for December 2021

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE NOAA, NATIONAL WEATHER SERVICE MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS TO: NATIONAL WEATHER SERVICE (W/OH12x1) HYDROMETEOROLOGICAL INFO CENTER 1325 EAST-WEST HIGHWAY, RM 7116 SILVER SPRING, MD 20910	HSA OFFICE: Marquette, MI
	REPORT FOR (MONTH / YEAR): December 2021
	DATE: Jan 13th, 2022
	SIGNATURE: Joe Phillips, Asst. Hydro Program Manager Robin J. Turner, MIC
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 no flooding occurred within this Hydrologic Service Area.

Summary

Upper Michigan saw above average precipitation in December, save for areas in the Keweenaw Peninsula, which saw below normal precipitation (Figure 5). The highest precipitation amounts were observed in eastern Upper Michigan (Figure 4). Early season drought conditions persisted through December (Figure 3) despite above normal precipitation being observed across Upper Michigan in December.

Location	Precipitation	% of Normal	Snowfall
WFO Marquette	3.77	145%	43.4
Marquette City	1.37	69%	18.8
Quincy Hill	3.91	M	48.0
Ironwood	2.78	117%	38.1
Iron Mountain	2.97	169%	29.0
Manistique	3.67	152%	33.5
Munising	4.12	120%	45.4
Stambaugh	2.39	164%	23.0

NOTE: Precipitation after 8 AM EST November 30th was counted in December's stats for all but the WFO Marquette site due to the reporting structure of our cooperative observers.



Flooding Conditions

There were no flooding concerns during the month of December.

River Conditions

Most of the western half of Upper Michigan experienced normal stream flows in December. The exception was observed across the Michigamme River basin in west-central Upper Michigan. Basins in the east experienced above normal stream flows.

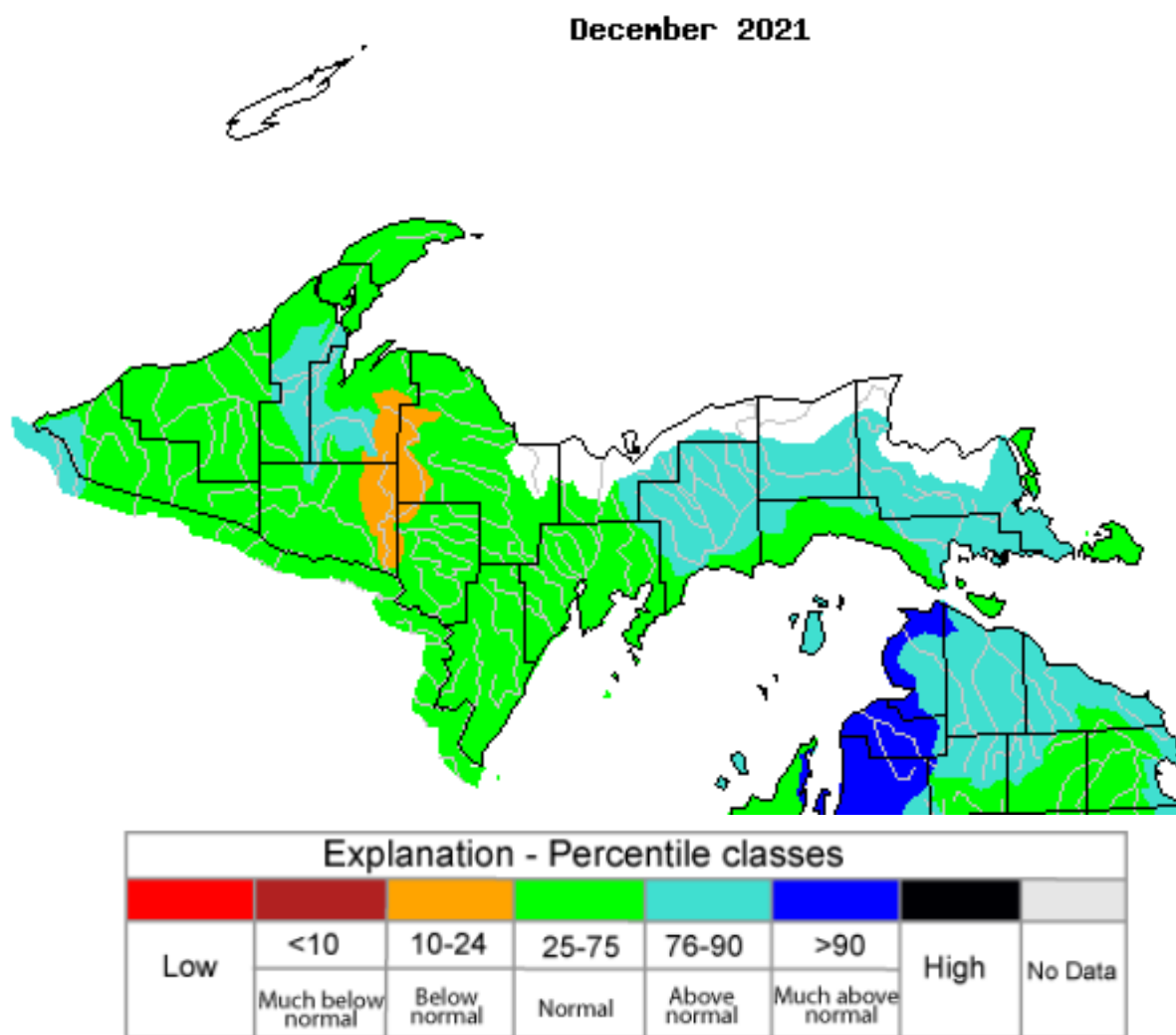


Figure 1: USGS monthly average streamflow in Dec 2021 across Upper Michigan



Snowpack Conditions

Above average precipitation in a number of places have resulted in a solid foundational snow pack for the remainder of the winter. Higher snow water equivalent values have been observed across the higher terrain of the Keweenaw Peninsula and southeast of Munising.

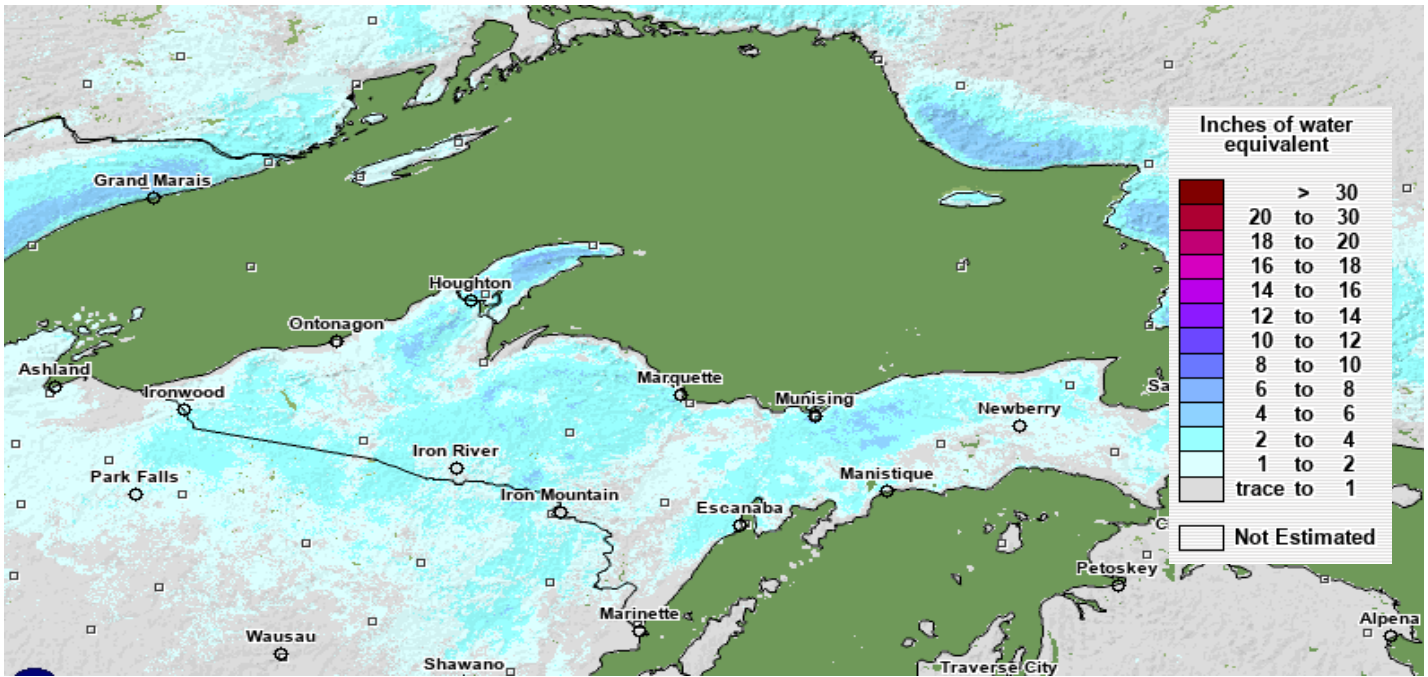
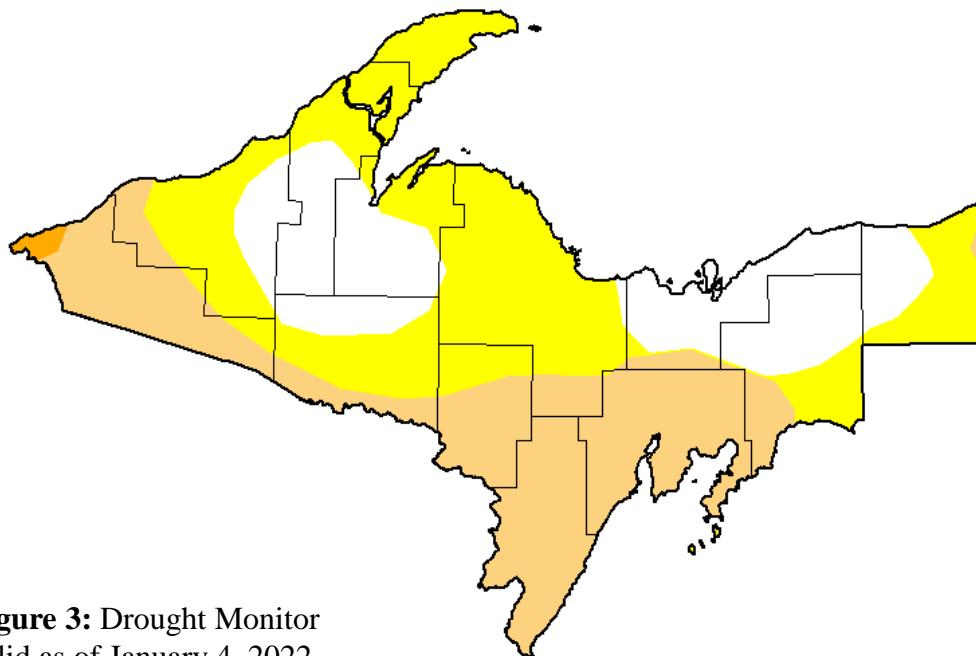


Figure 2: Snow water equivalent as of January 1st.

Drought Discussion

Due to the prolonged drought conditions experienced earlier in the year, the above normal precipitation across Upper Michigan wasn't enough to most of the region to escape D0 and D1 drought conditions. For the latest drought status, please visit <http://www.drought.gov>.

January 4, 2022
 (Released Thursday, Jan. 6, 2022)
 Valid 7 a.m. EST



	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	26.00	74.00	35.44	0.51	0.00	0.00
Last Week 12-28-2021	25.93	74.07	36.04	0.51	0.00	0.00
3 Months Ago 10-05-2021	30.73	69.27	6.78	0.49	0.00	0.00
Start of Calendar Year 01-04-2022	26.00	74.00	35.44	0.51	0.00	0.00
Start of Water Year 09-28-2021	51.73	48.27	6.70	0.49	0.00	0.00
One Year Ago 01-05-2021	100.00	0.00	0.00	0.00	0.00	0.00

Intensity:
 None (White)
 D0 Abnormally Dry (Yellow)
 D1 Moderate Drought (Light Orange)
 D2 Severe Drought (Orange)
 D3 Extreme Drought (Red)
 D4 Exceptional Drought (Dark Red)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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Figure 3: Drought Monitor valid as of January 4, 2022.



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Media Links

None.

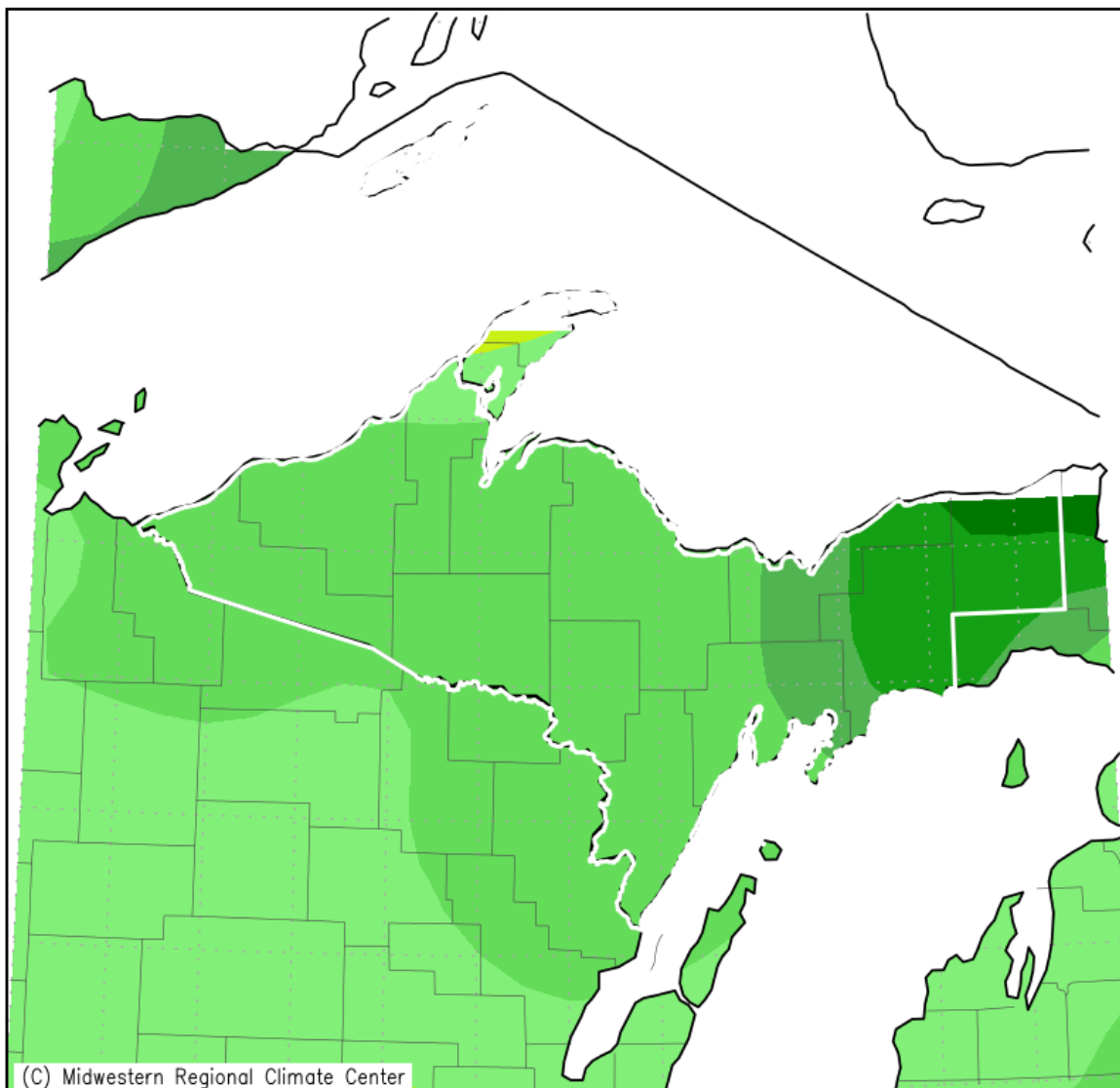
Hydro Products Issued

Product	Number
Hydrologic Outlook (ESF)	0
Flood Watch (FFA)	0
Flood Warning (FLW)	0
Flood Advisories and Statements (FLS)	0
Flash Flood Warning (FFW)	0
Flash Flood Statement (FFS)	0
Hydrologic Summary (RVA)	31
Daily River Forecasts (RVD)	0



Precipitation Summary

Accumulated Precipitation (in)
December 1, 2021 to December 31, 2021



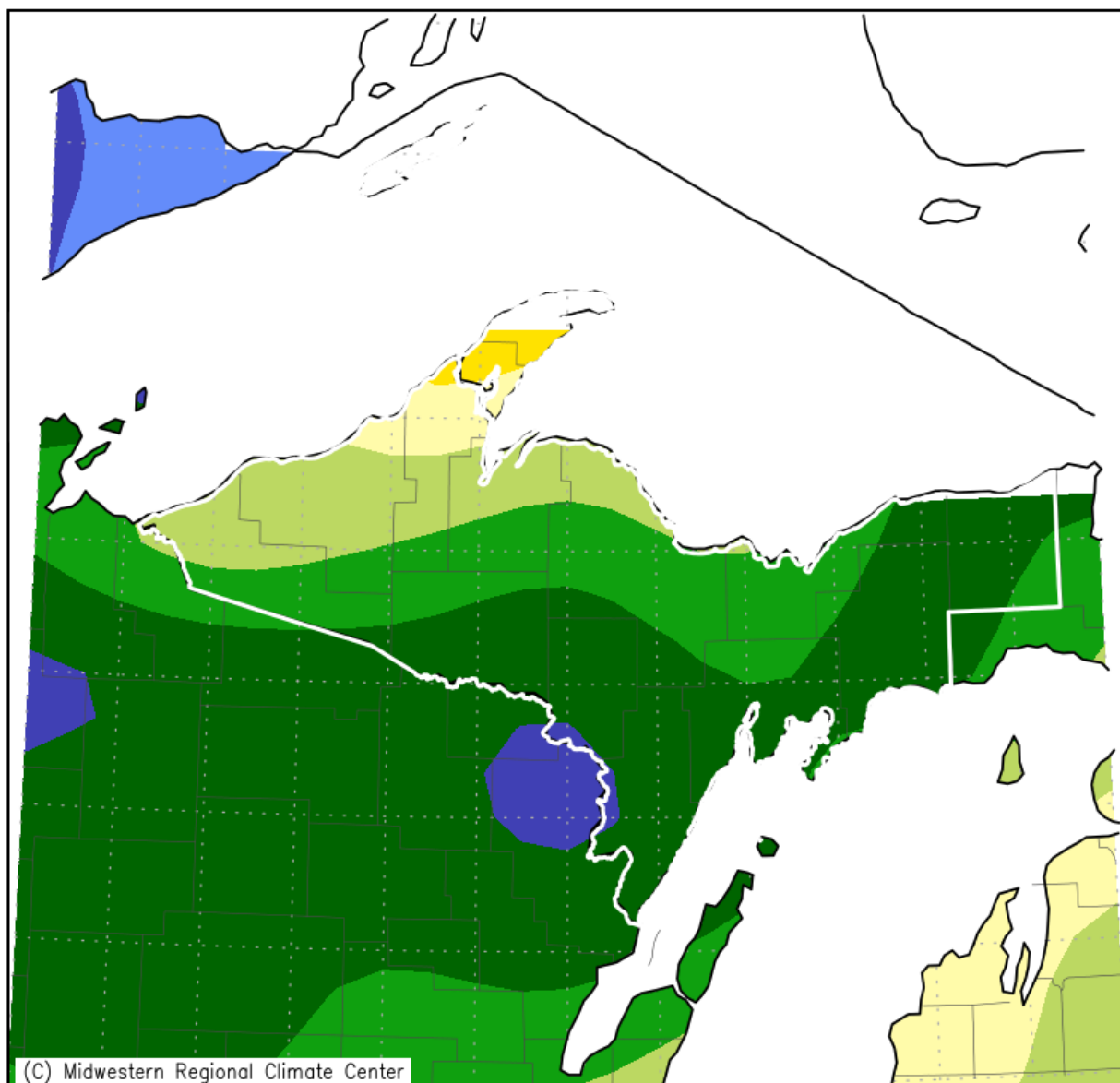
Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 1/10/2022 3:40:59 AM CST

Figure 4: December 2021 Monthly Precipitation Totals.



Precipitation Summary Continued

Accumulated Precipitation: Percent of Mean
December 1, 2021 to December 31, 2021



Mean period is 1991–2020.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 1/10/2022 3:42:03 AM CST

Figure 5: December 2021 Percent of Normal of Accumulated Precipitation.



Soil Moisture Anomaly

Calculated Soil Moisture Anomaly (mm)
DEC, 2021

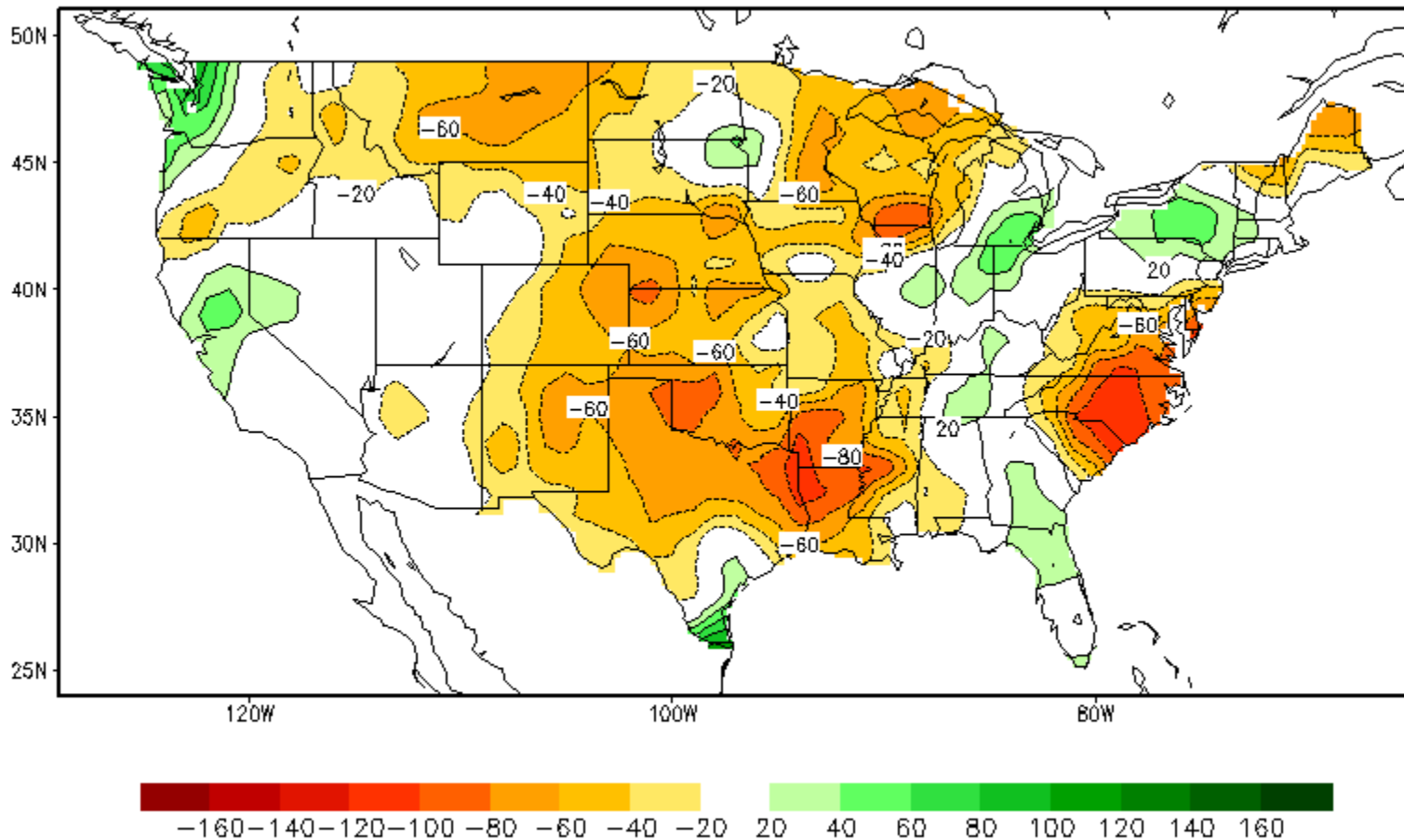


Figure 6: Climate Prediction Center's monthly average soil moisture anomaly for December 2021.