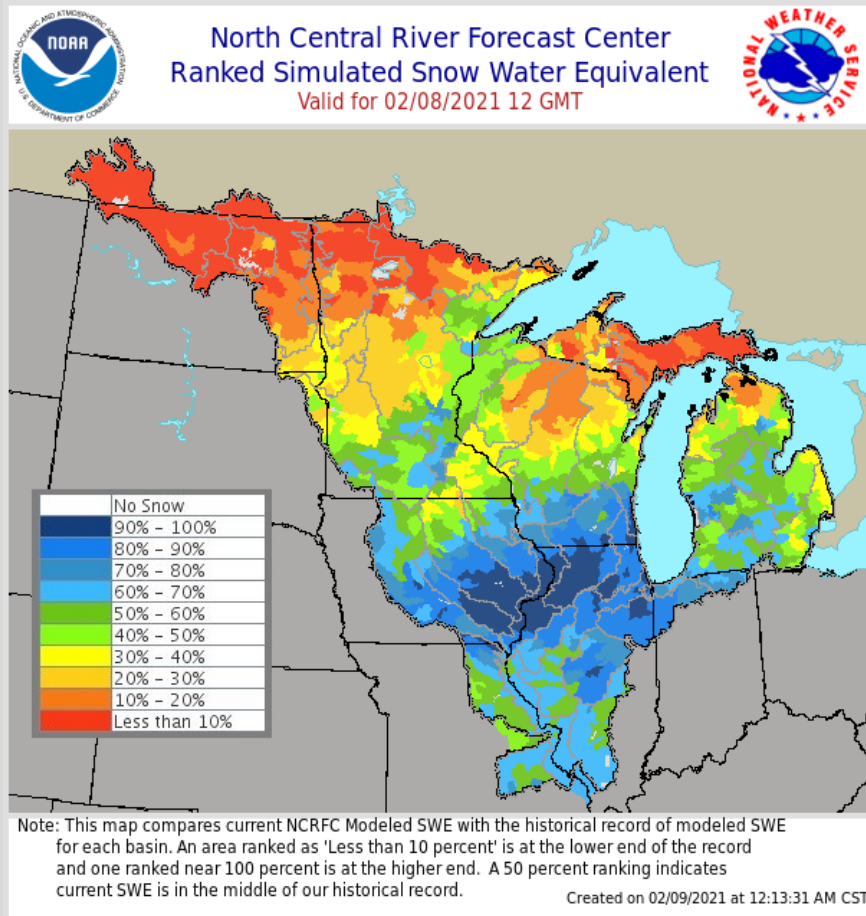


2021 Spring Flood Outlook

National Weather Service – WFO Quad Cities

February 11, 2021



Factors to Consider for Spring Flooding

- Antecedent Conditions
- Snow Cover (Snowpack) / Liquid Water Equivalent
- Frozen Ground
- Soil Moisture
- Streamflows
- Weather Forecasts/
Climate Outlooks

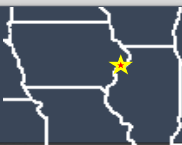


Main Takeaways:

Flood Risk for the Mississippi River is generally near normal, but slightly above normal for minor flooding downstream of the Quad Cities

**Flood Risk for Local Rivers is near to above normal.
Highest risk for flooding is currently on the lower rock River.**

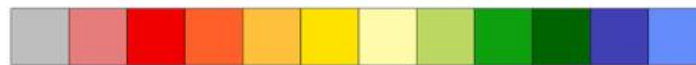
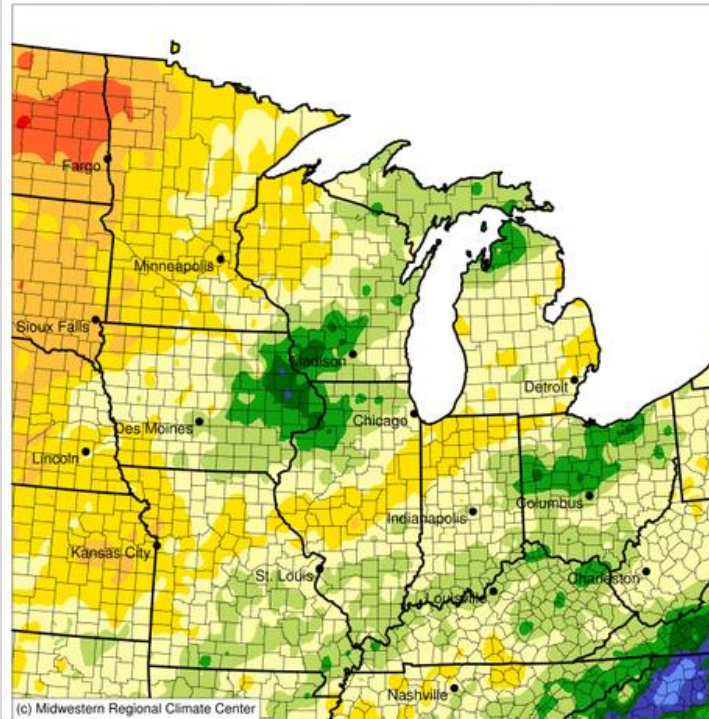
- Snowpack and water equivalent in the snowpack is well above normal across portions of Iowa into northern Illinois, while areas upstream through the rest of the Upper Mississippi River watershed are averaging below normal
- Warm temperatures through January combined with a deep snowpack to insulate the ground has kept frost depths shallow.
- Near to below normal soil moisture regionally will reduce the flood risk as well as reduce the risk for long term flooding
- While watersheds in the area with a deep snowpack will see an increased risk for flooding, the degree of flooding will depend on the rate of snowmelt, in combination with additional spring precipitation.



Antecedent Conditions: 2020 Fall Moisture

Accumulated Precipitation (in): Percent of 1981-2010 Normals

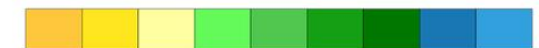
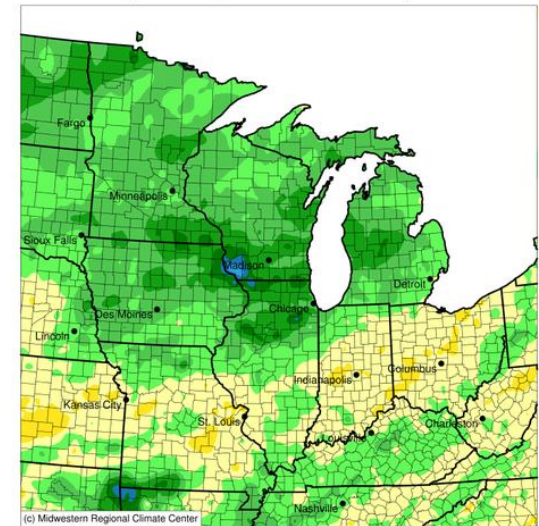
September 01, 2020 to November 30, 2020



Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwest Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 2/8/2021 10:53:10 PM CST

Accumulated Precipitation (in): Departure from 1981-2010 Normals

September 01, 2019 to November 30, 2019



Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwest Regional Climate Center
cli-MATE: MRCC Application Tools Environment
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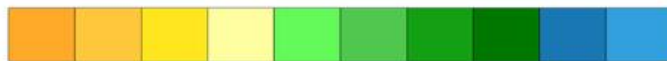
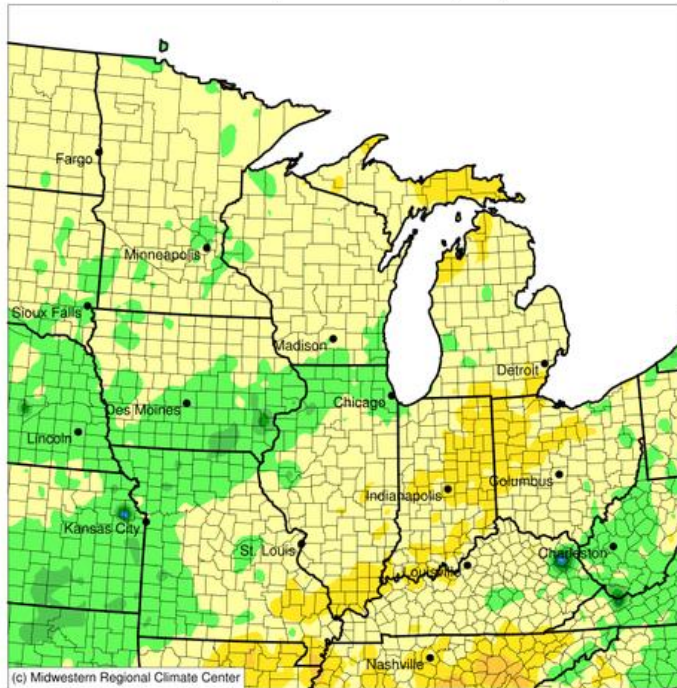


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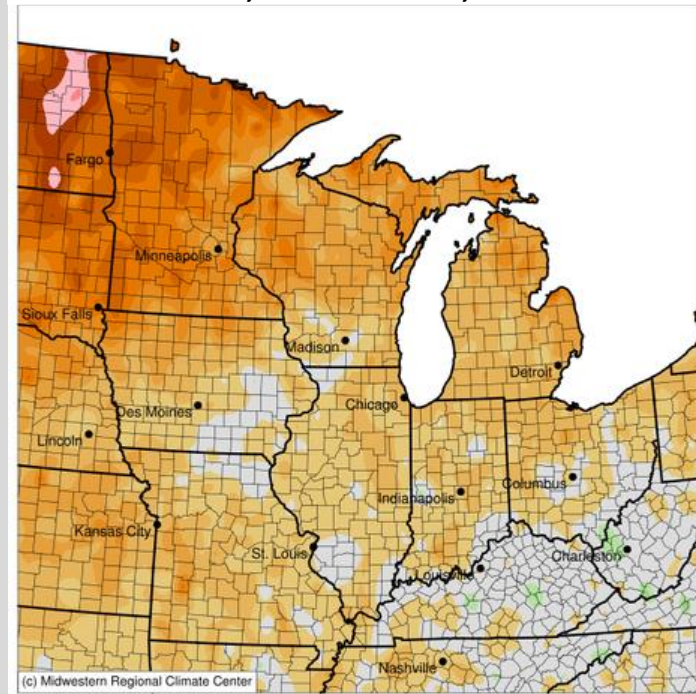
Winter Temperatures/Precipitation

Accumulated Precipitation Departure from Normal Dec 1, 2020 – Feb 10, 2021



-6 -4 -2 0 2 4 6 8 10
Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwest Regional Climate Center
cli-MATE: MRCC Application Tools Environment
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Average Temperature Departure from Normal Dec 1, 2020 – Feb 10, 2021

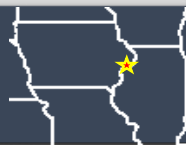


-4 1 6 11
Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwest Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 2/11/2021 9:29:14 AM CST

Images courtesy of Midwest Regional Climate Center (MRCC)



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Seasonal Snowfall

National Snowfall Analysis: accumulation from 2020-09-30 to 2021-02-11

Issued 2021-02-11 15:16:00 UTC

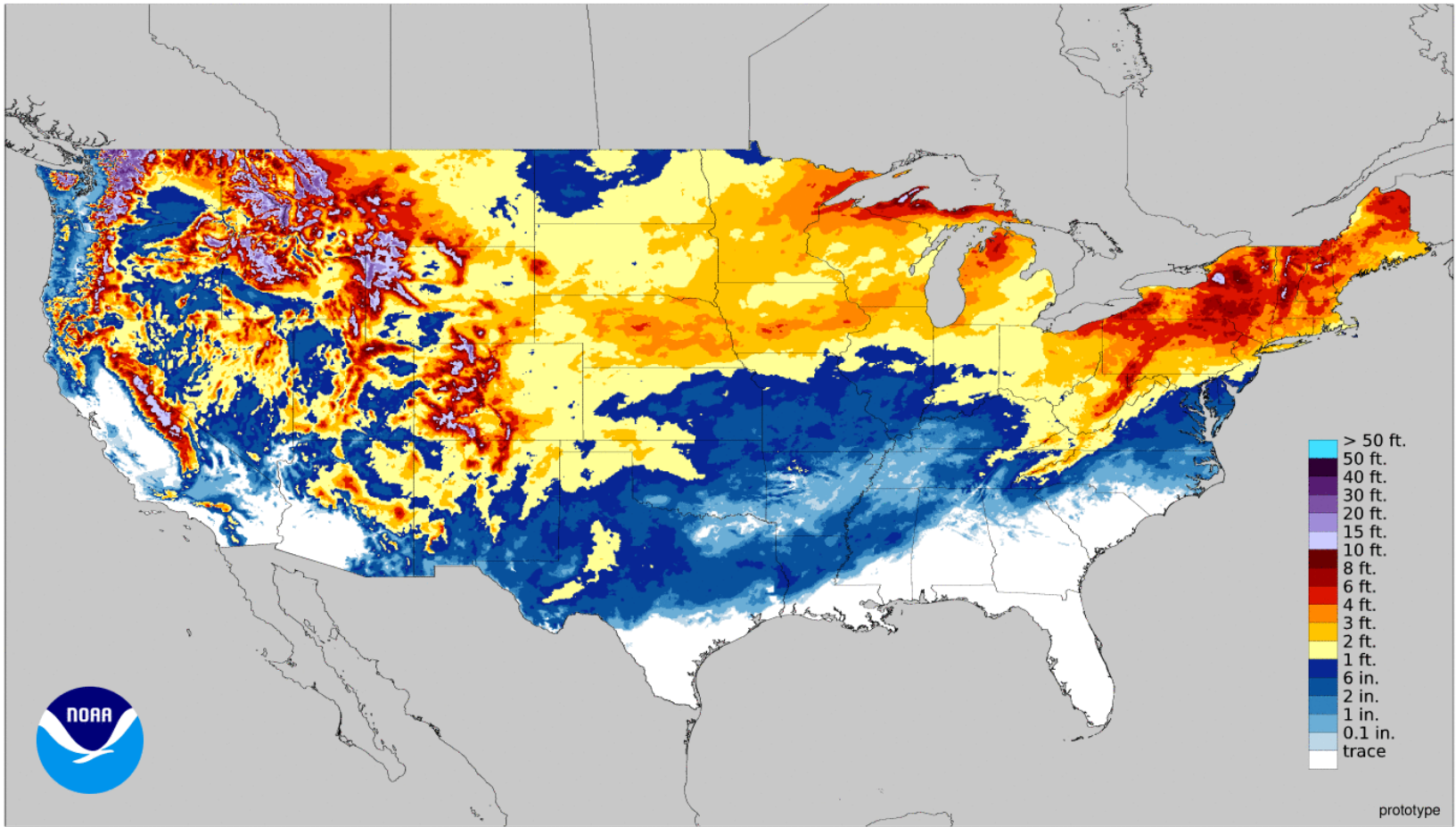


Image courtesy of NOHRSC (NWS)

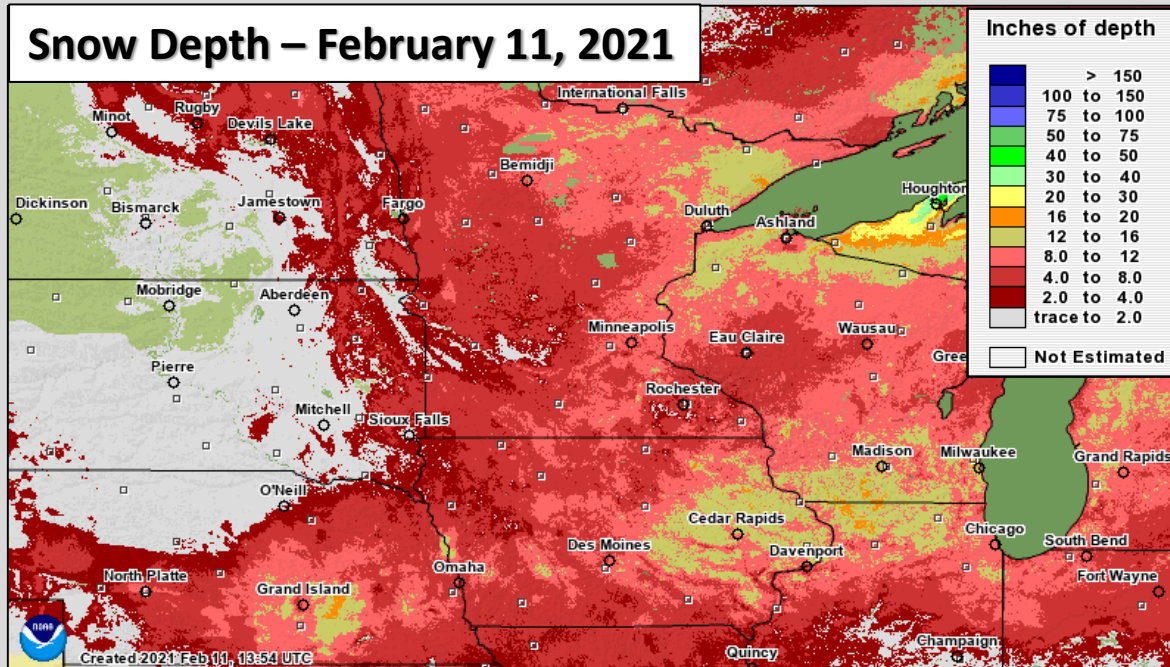


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Snow Depth

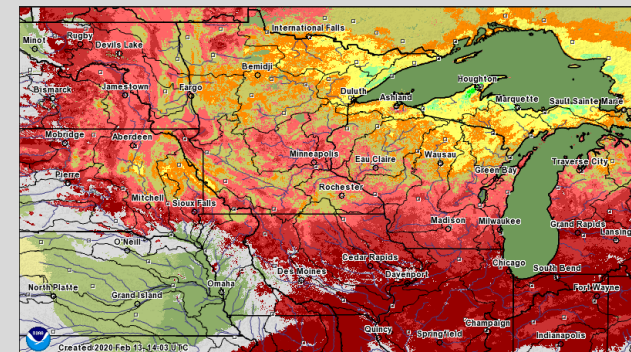
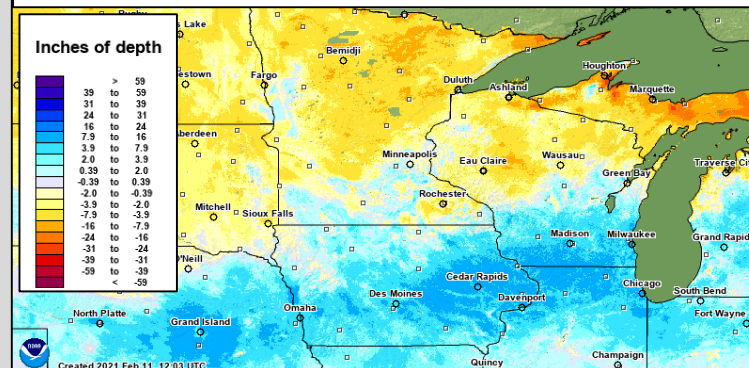
Snow Depth – February 11, 2021



Snow being observed across the entire region

- Iowa, northern Illinois and southern Wisconsin have well above normal snow depth, while the remainder of the watershed is below normal for snowpack
- Well lower snowpack region-wide than 2020

Snow Depth Departure from Normal: Feb 11, 2021



Snow Depth – February 13, 2020



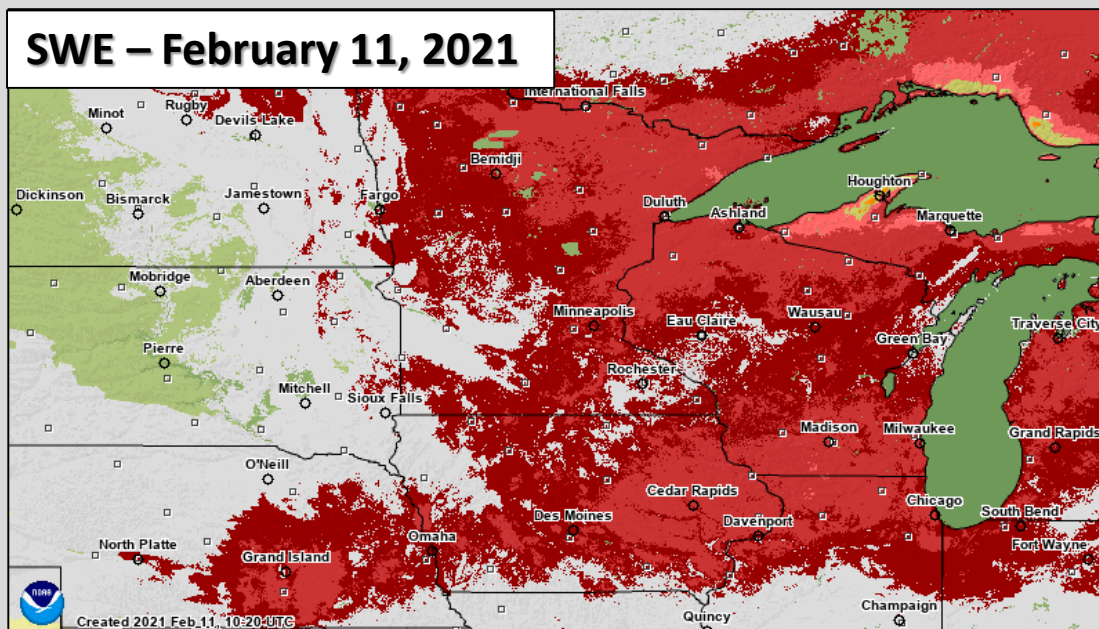
Images courtesy of NOHRSC



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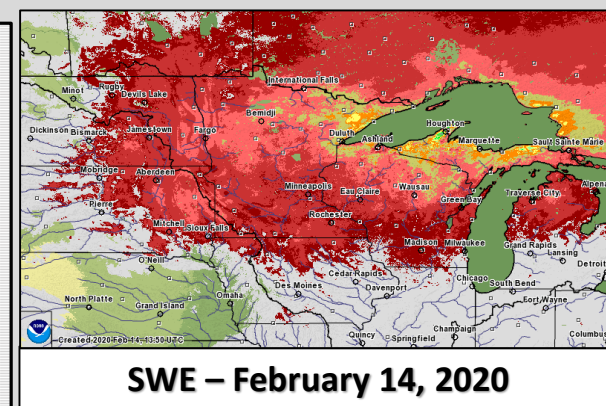
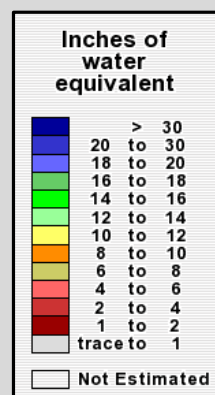


Snow Water Equivalent (Liquid Water Content)



Liquid Water in the snowpack:

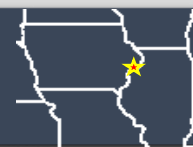
- Locally – high SWE 2" to 4"
- Regionally – SWE well lower than the past few years.
- Yields more concern for flooding at the current time for local rivers.



Images courtesy of NOHRSC

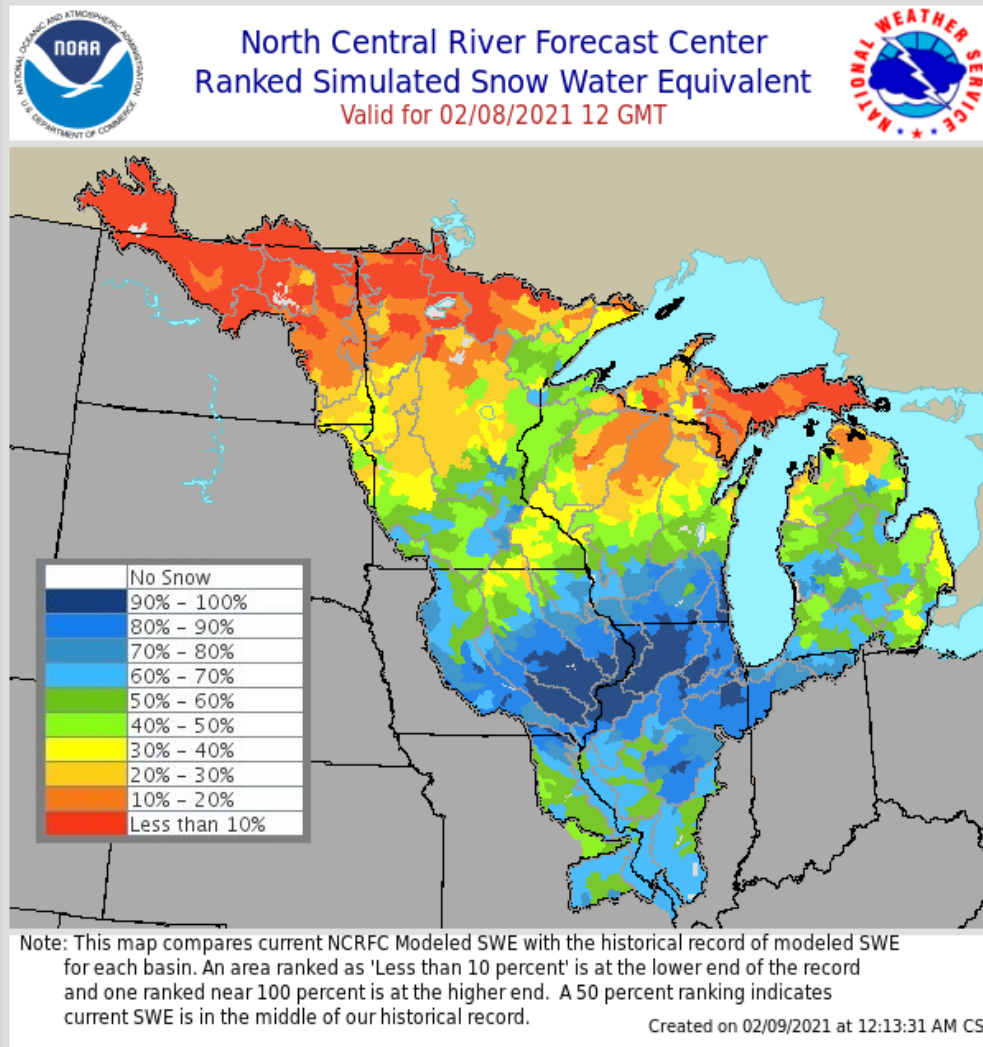


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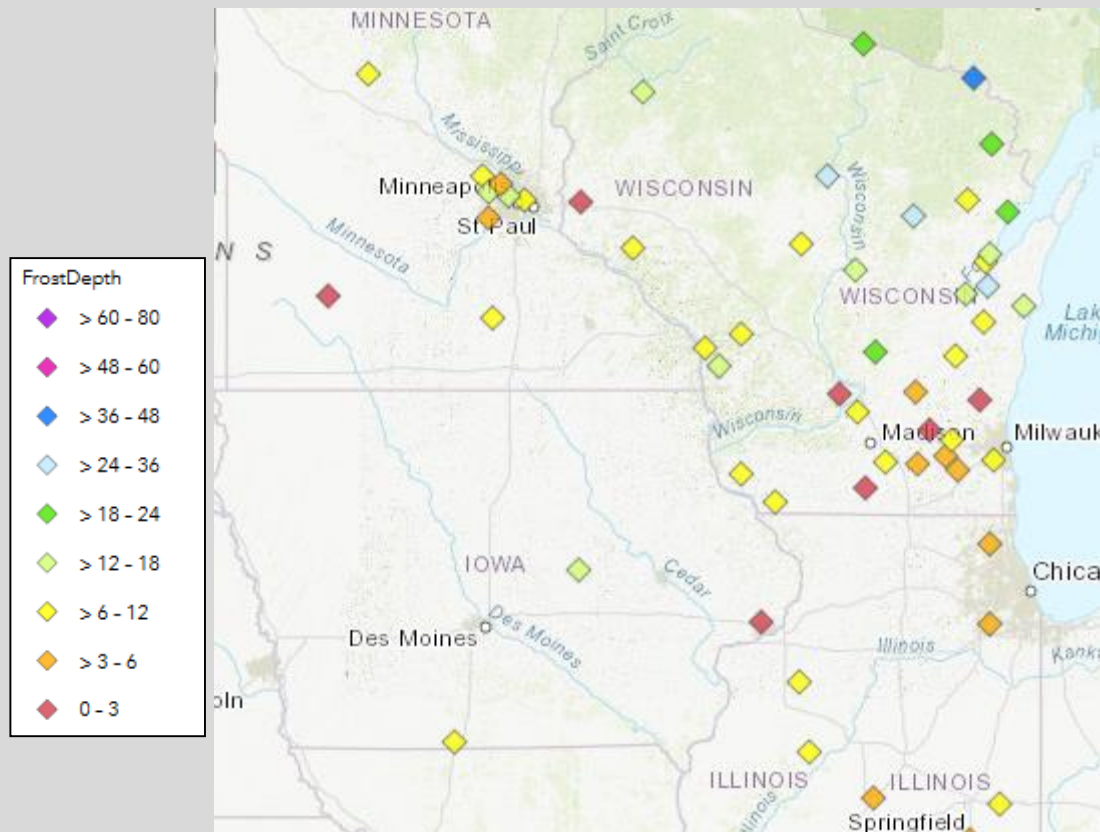


Snow Water Equivalent

(Liquid Water Content) – Comparison to Historical Records



Frozen Ground: Current Frost Depth



https://www.weather.gov/ncrfc/LMI_FrostDepthMap

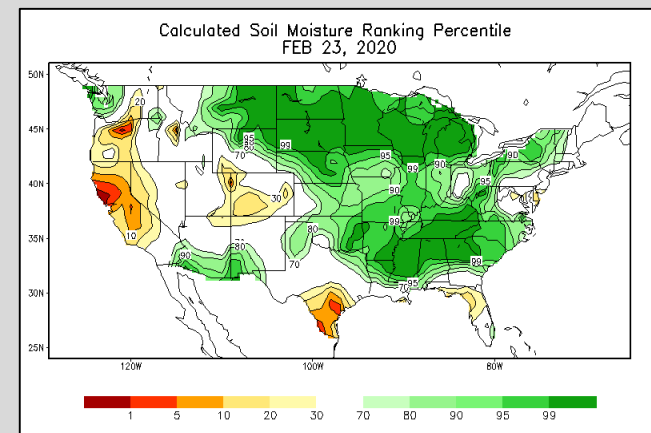
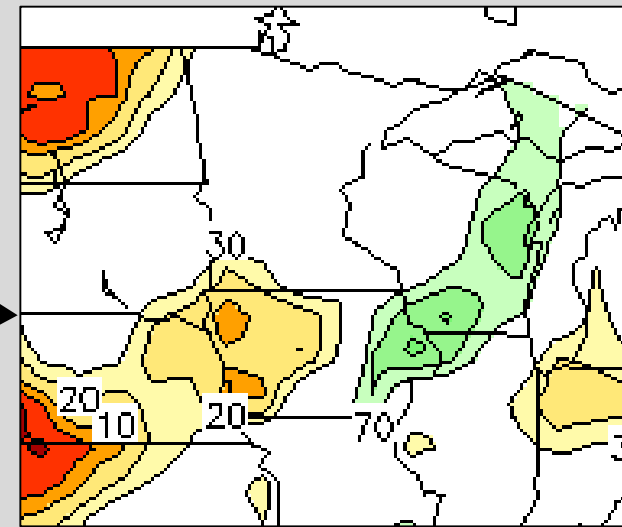
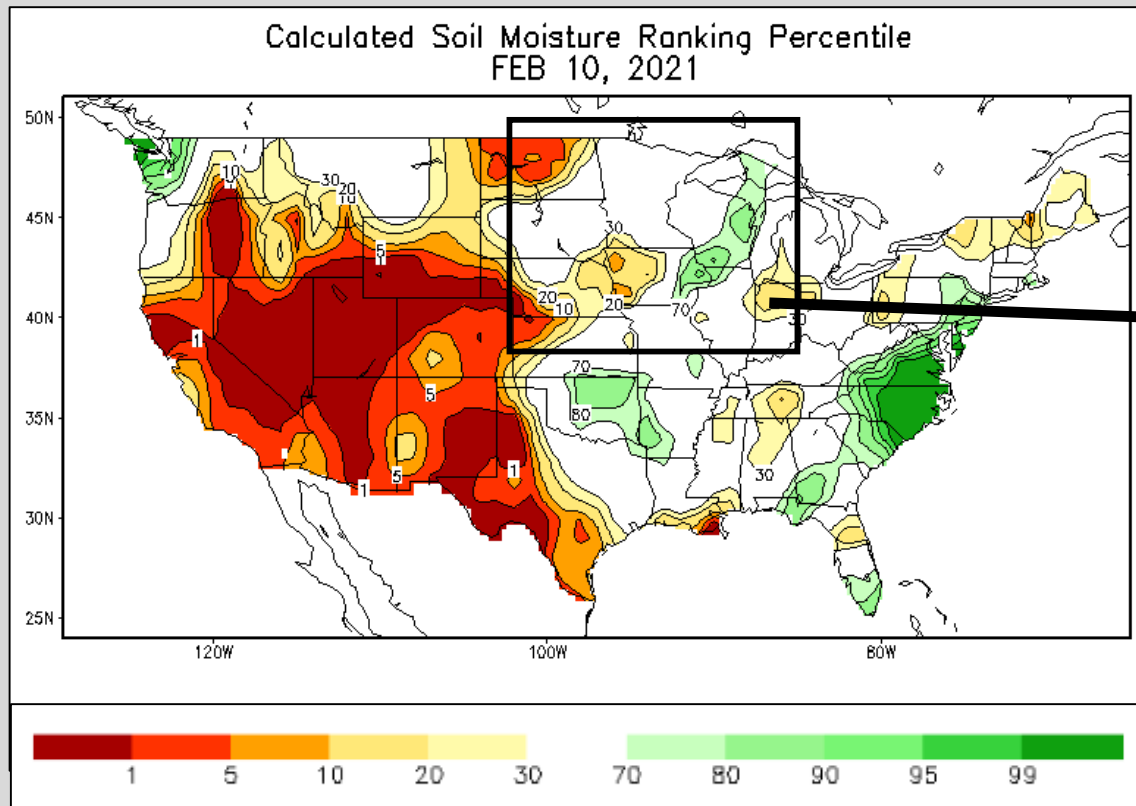
* Can overlay current snow analysis from NOHRSC and precipitation forecast from WPC



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Soil Moisture



- Soil moisture across the Upper Mississippi River basin is near to below normal, with the exception of a swath from eastern Iowa into northeast Wisconsin.
- Means there is capacity for snowmelt or new rainfall to infiltrate into the soils, producing less runoff.

Soil Moisture – February 2020

Images courtesy of NWS Climate Prediction Center

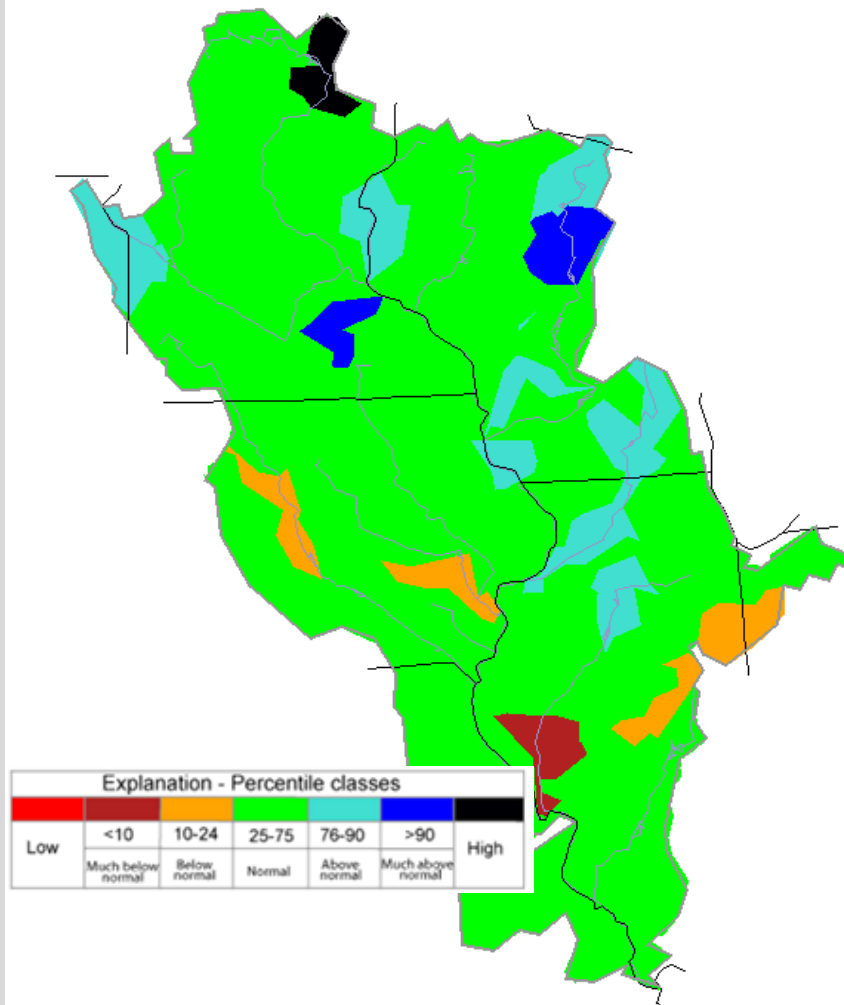


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Streamflows

Wednesday, February 10, 2021

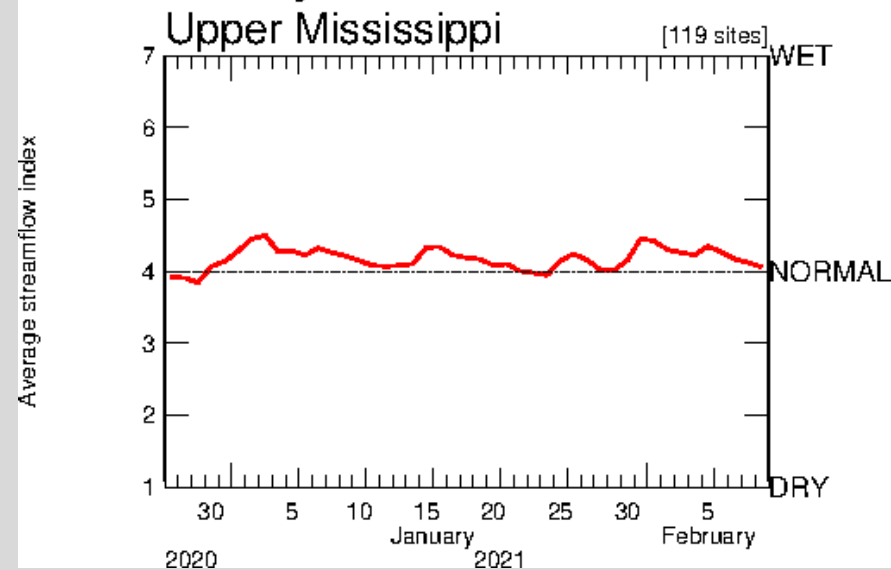


Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	



- In general, near normal streamflows across the region.
- Current streamflows indicate there is room in rivers for runoff from snowmelt or spring rains

Last 45 Days



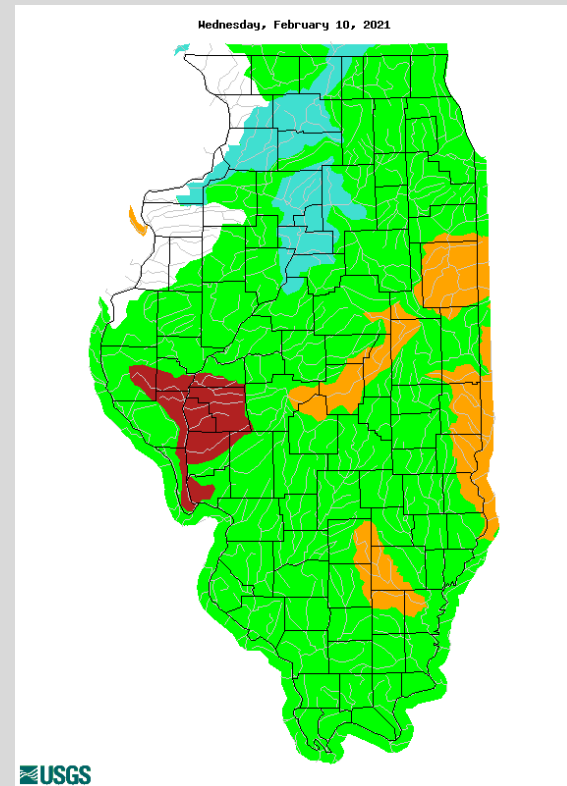
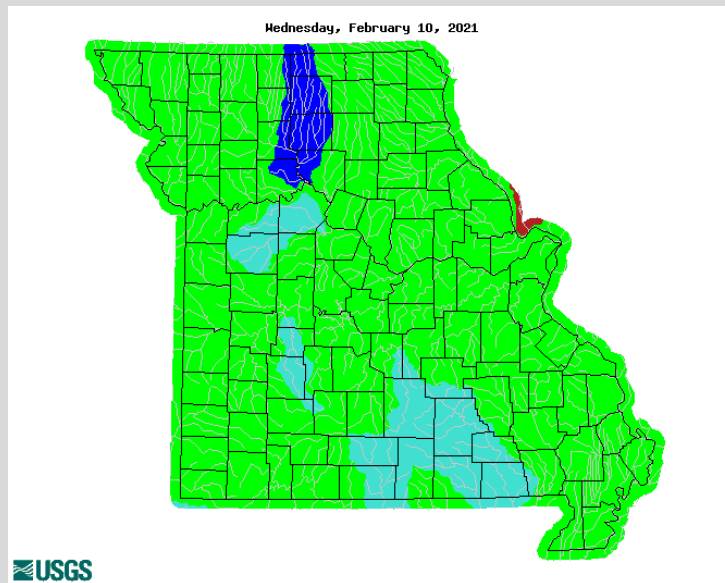
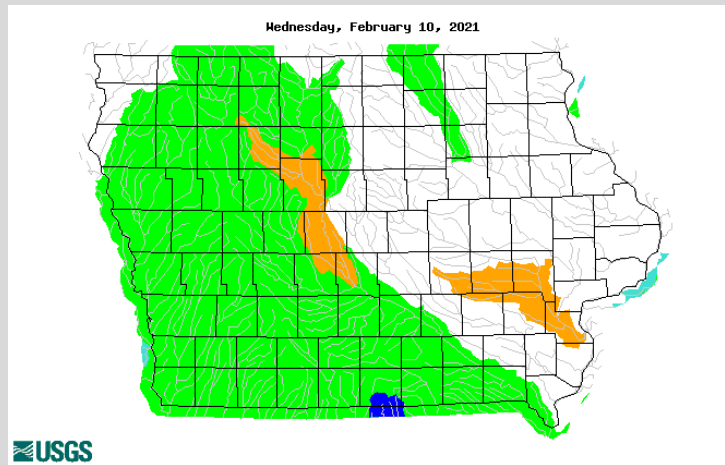
Images courtesy of US Geological Survey



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Streamflows by State



Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

Images courtesy of US Geological Survey



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Ice Jam Potential

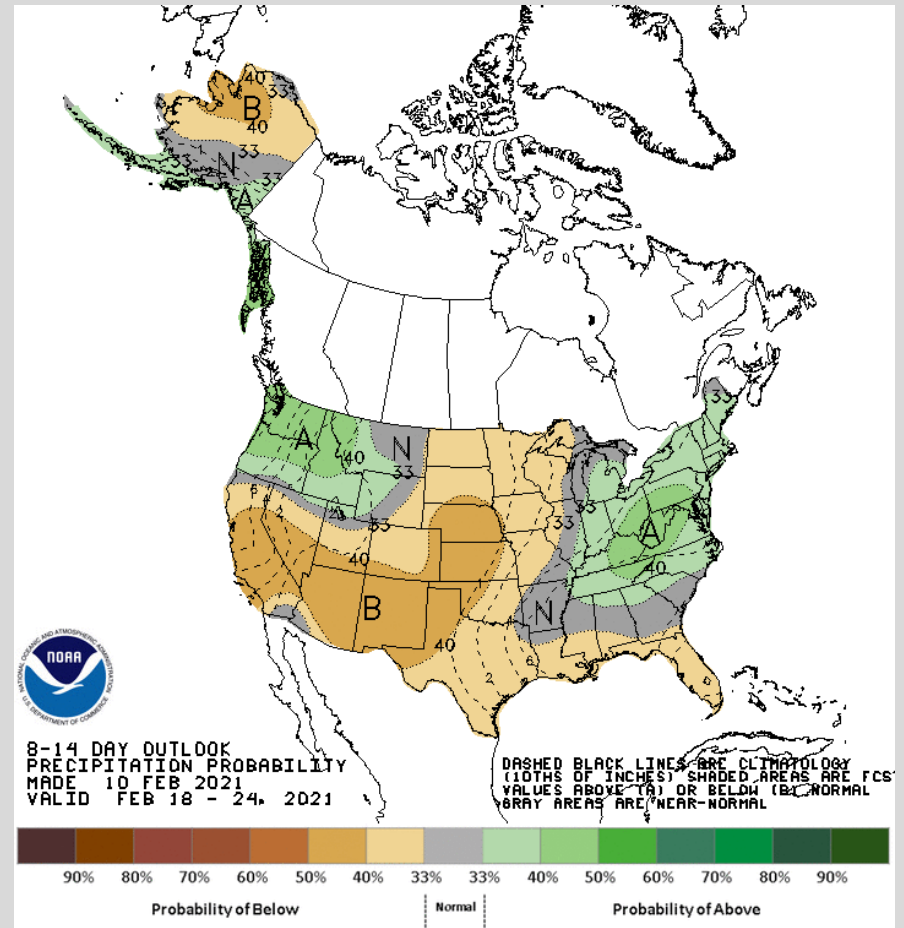
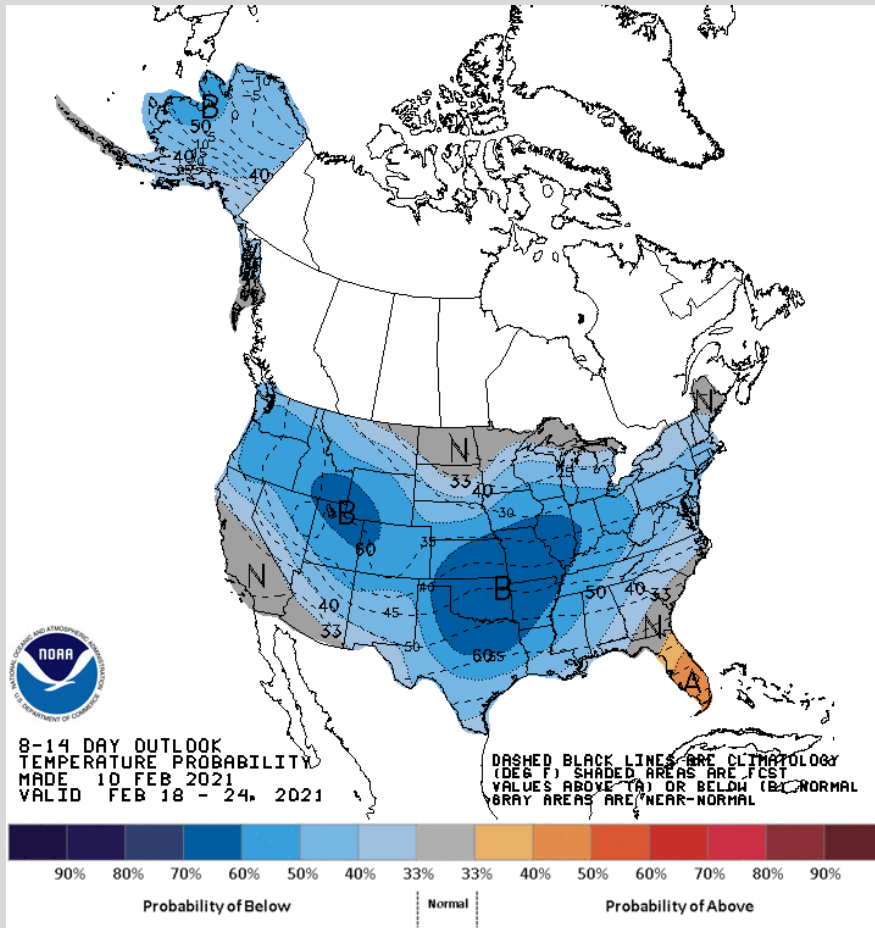


- Ice Jam action has been quiet so far this season
- Recent cold air has allowed ice to develop in area rivers
- Continuing cold in the next few weeks will continue ice development and thickening of the ice
- Concern for ice jams will be focused on break-up.



Week 2 Climate Outlook

February 18th – 24th

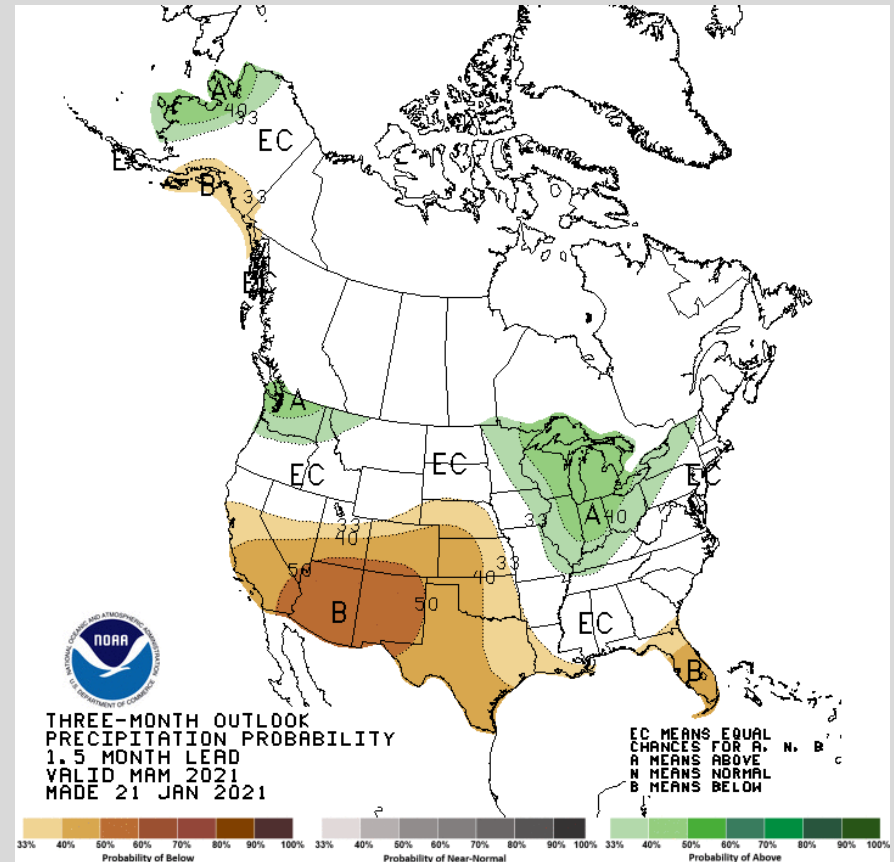
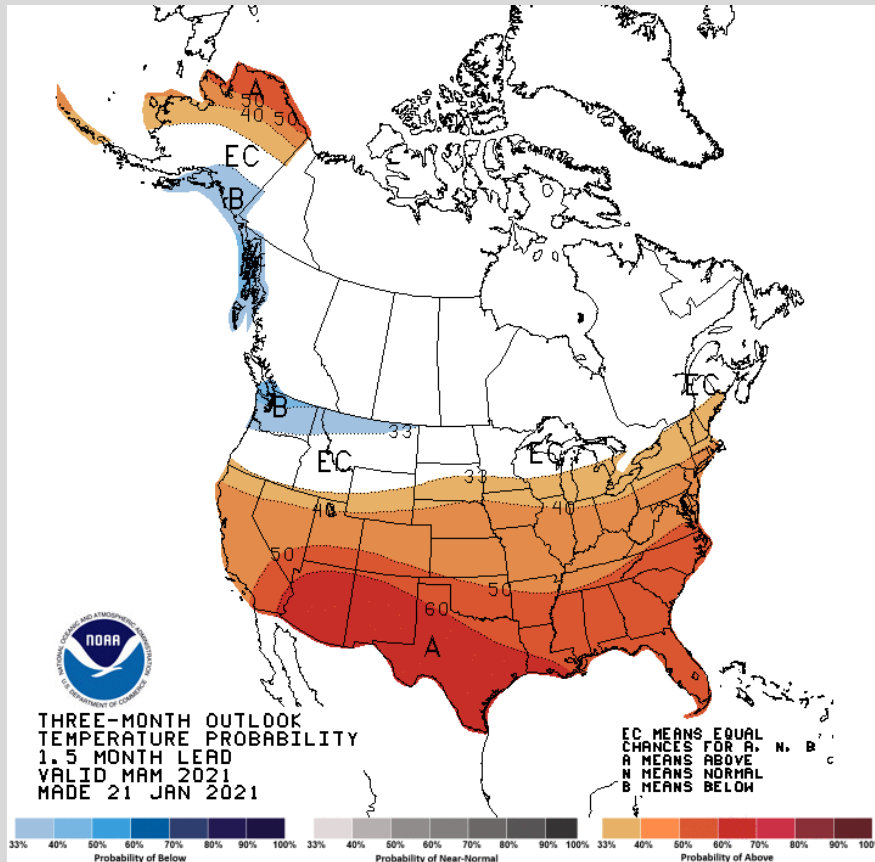


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3 Month Climate Outlook

March/April/May



NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov



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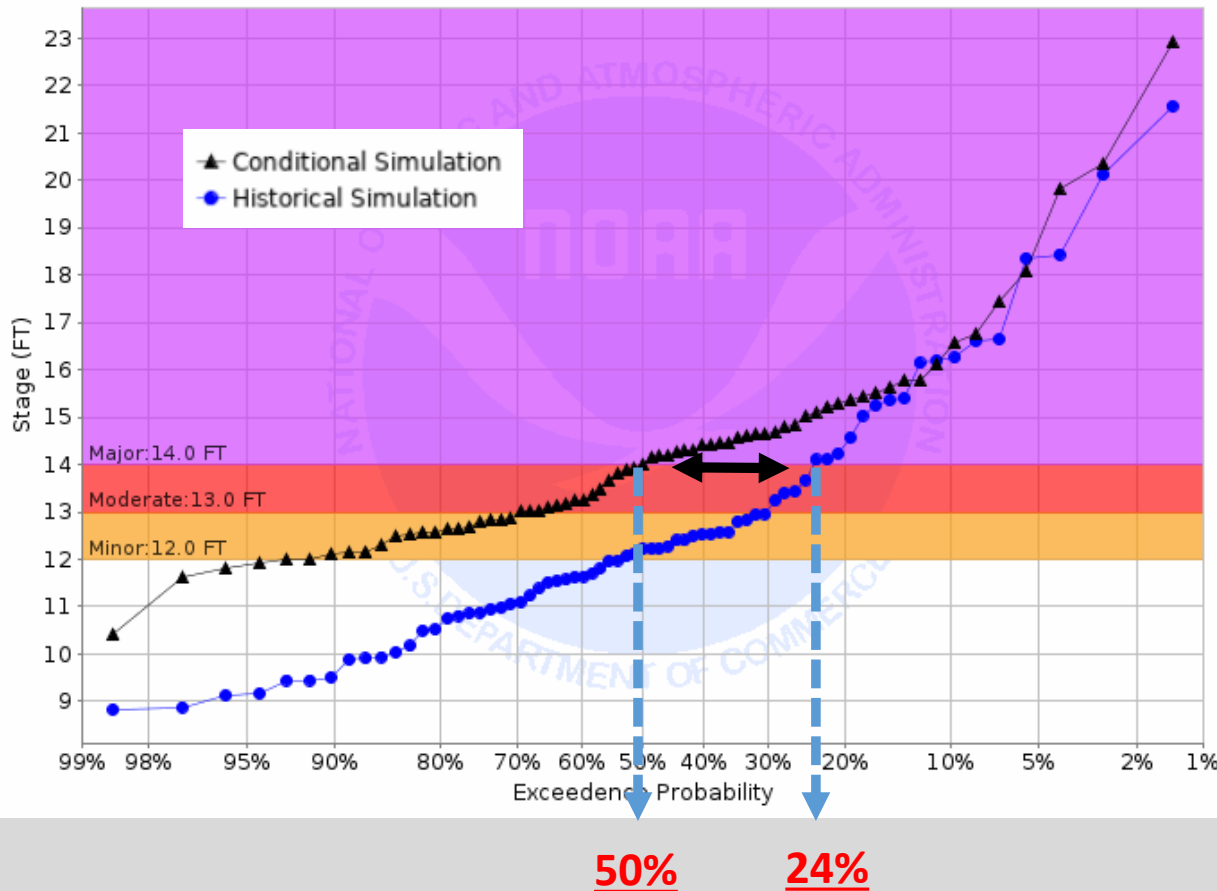


What is the Flood Risk?

And how much outside of normal is it?

Closer the lines are together the closer to normal the flood threat is.

Chance of Exceeding River Stage at Rock River at Moline (MLI12)
Forecast for the period 02/15/2021 - 05/16/2021
This is a conditional simulation based on the conditions as of 02/08/2021

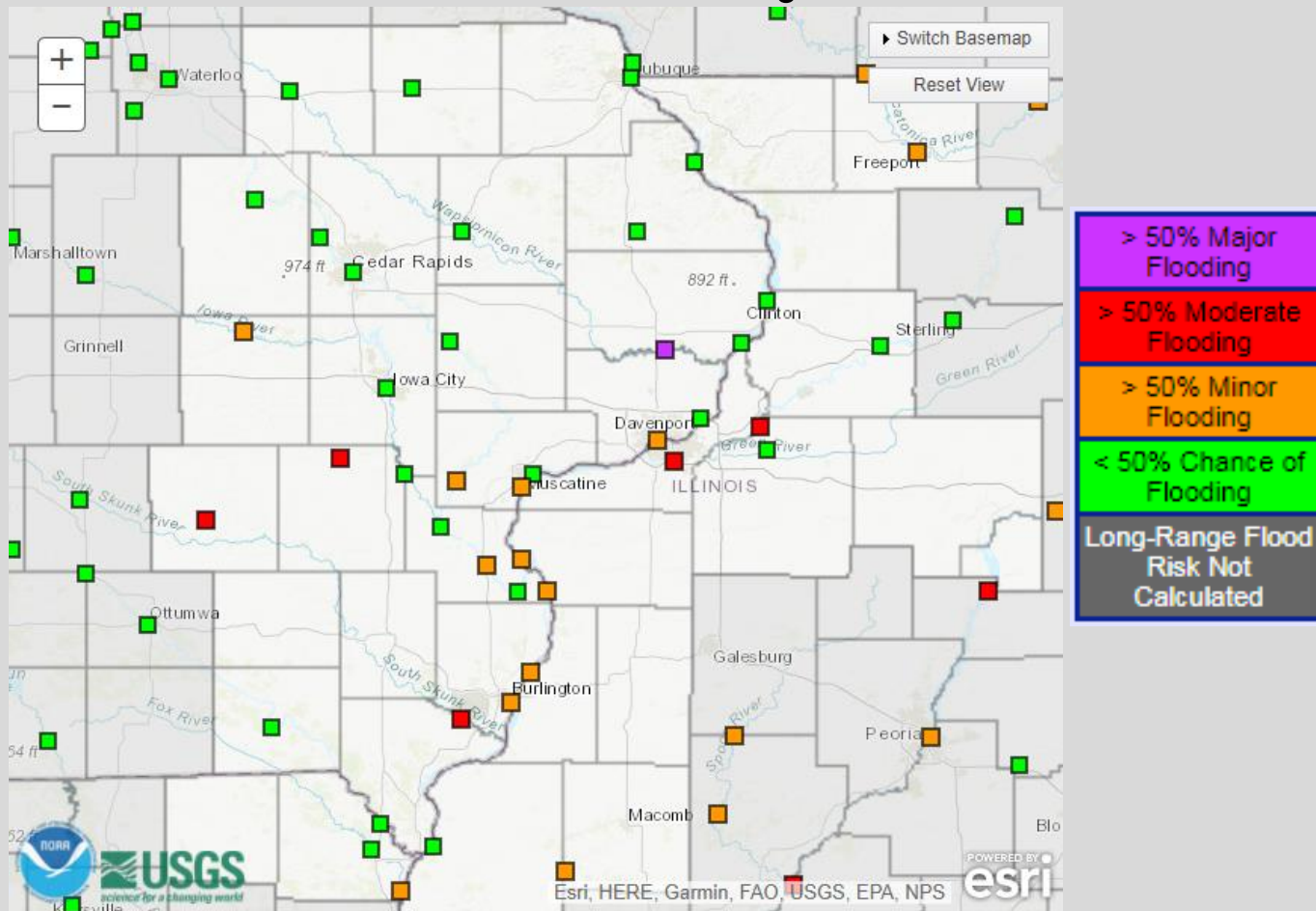


This graphic shows the probability of the Rock River at Moline reaching Major Flood stage (14.0 ft) this year is roughly around 50%. In a normal year this gage has a 24% chance of reaching 14.0 ft.

Long-Range River Outlooks

Locations with chances for flooding:

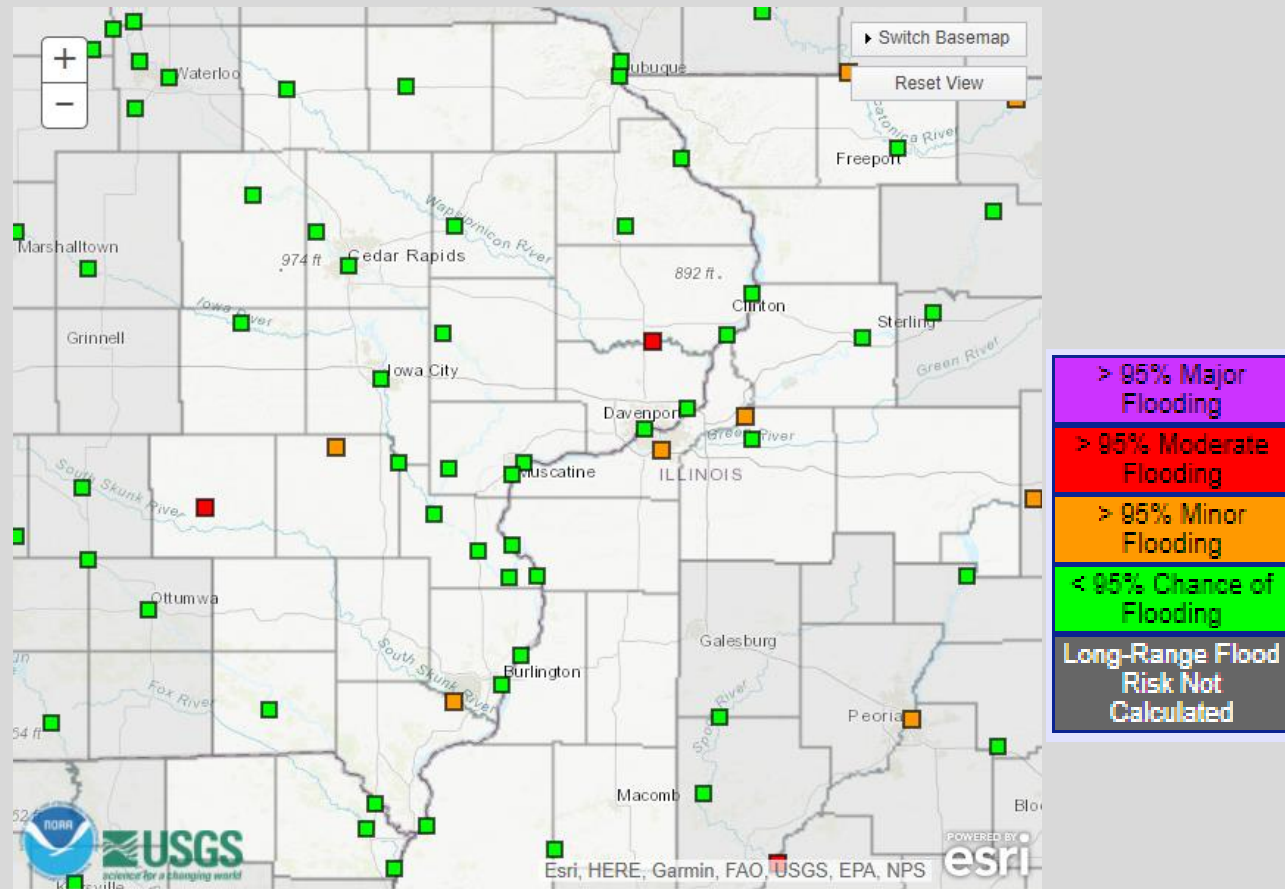
- Around a 50% chance to reach the labeled flood stage



Long-Range River Outlooks

Locations with high chances for flooding:

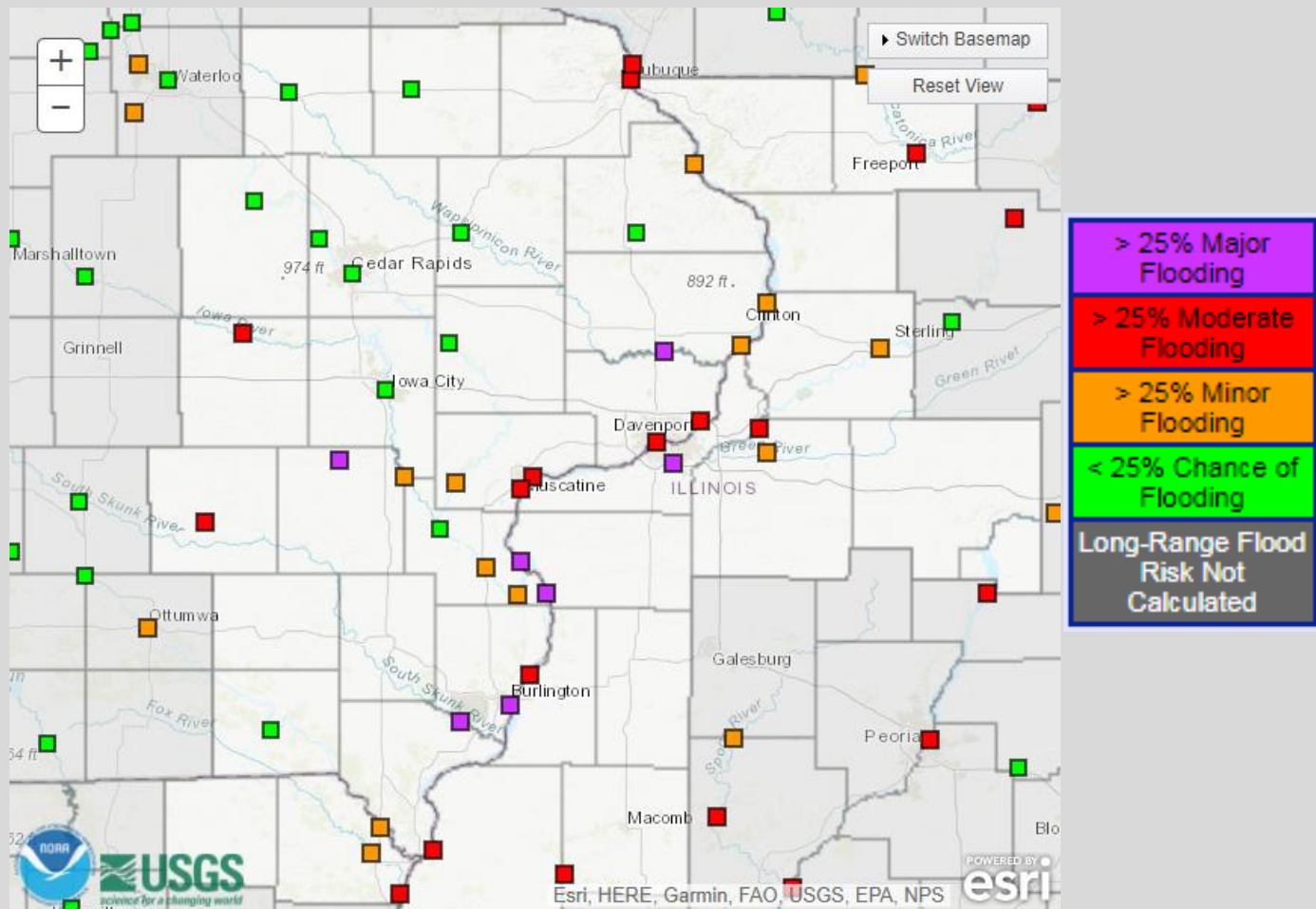
- Greater than 75% chance to reach the labeled flood stage – high probability for flooding
- Only a few locations with high probabilities for flooding.



Long-Range River Outlooks

Locations with chances for flooding:

- Around a 25% chance to reach the labeled flood stage → Lower Confidence (Probability)

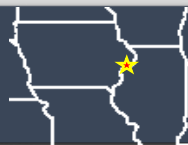


Spring Flood Outlook

--Bottom Line--

Mississippi River – Near to Slightly Above Normal
Local Rivers – Near to Above Normal

- **Below normal precipitation leading into the winter months has lead to dry soils across much of the Upper Mississippi Watershed**
- **Snowpack above normal locally, but below normal in the upper portions of the Mississippi River basin**
- **Warm temperatures have kept frost depths shallow**
- **The higher Liquid Water in the snowpack when combined with the drier soils, shallow frost, and near normal streamflows nearly balance out the flood threat for this Spring Season.**
- **The occurrence and severity of flooding will be determined by the rate of snowmelt and additional spring precipitation**



Spring Flood Outlook Dates

Updated Outlooks:

February 25, 2021

March 11, 2021

**Information from this outlook can be found:
From the North Central River Forecast Center**

<https://www.weather.gov/ncrfc/>

From the Quad Cities Weather Forecast Office:

Quad Cities - [weather.gov/dvn/2021_springfloodoutlook](https://www.weather.gov/dvn/2021_springfloodoutlook)

Jessica Brooks

NWS Quad Cities

jessica.brooks@noaa.gov



Information Sources

- Midwest Regional Climate Center (MRCC) – <http://mrcc.isws.illinois.edu/>
- US Geological Survey (USGS) – <http://www.usgs.gov>
- National Operational Hydrologic Remote Sensing Center (NOHRSC) – www.nohrsc.noaa.gov
- NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
- NOAA Weather Prediction Center – www.wpc.ncep.noaa.gov
- North Central River Forecast Center – www.weather.gov/ncrfc
- https://www.weather.gov/ncrfc/LMI_ROF_NFP_SpringHydroOutlook
- Advanced Hydrological Prediction Service (AHPS) – water.weather.gov/ahps
- US Drought Monitor – droughtmonitor.unl.edu

