Final 2023 Spring Flood & Water Resources Outlook

Released Thursday, March 9th

Bottom Line, Up Front: What has changed from the First Two Spring Flood Outlooks?

- Probabilities for flooding continue to increase across most of our region's rivers
  - Greatest chances for flooding this spring remain along the Mississippi mainstem
  - Chances for significant flooding on the Mississippi have increased - due to the deep snowpack across Minnesota and Wisconsin and continued cooler than normal temperatures
- The weather pattern across the Upper Midwest is favored to be cooler than normal, which will slow down the spring melt
  - If the snowmelt is too slow, the risk of springtime flooding will increase
    - Holding on to snow further into spring increases the chances of a rapid melt and/or a heavy rainfall event on top of an existing snowpack (larger runoff)
    - **If the melt is delayed** & **significant rainfall** is added, the chances for **significant flooding increase** accordingly
    - The severity of the flooding is dependent on how long the cooler temperatures last, timing and rate of snowmelt, and any additional precipitation

Spring Flood Risk by Basin

River	Flood Risk
Main Stem Mississippi River	Much Above Normal
Mississippi Tributaries in Minnesota	Near Normal
Mississippi Tributaries in Iowa	Near to Below Normal
Mississippi Tributaries in Wisconsin	Near to Above Normal

Spring 2023 Flood Outlook Summary

- Current conditions suggest much above normal risk for the Mississippi mainstem, near to above normal risk for the Mississippi Tributaries in Wisconsin, and near normal risks for the Mississippi Tributaries in Minnesota and Iowa.
    - Near normal river levels & soil moisture
    - **Well above normal snowpack** in Upper Mississippi River Basin
        - Near normal to below snowpack across southern Minnesota, SW Wisconsin, and NE Iowa
    - Slower than normal melt expected during the month of March
    - Below normal frost depths
    - Drought across parts of the region going into the winter months
- These conditions can and often change. The biggest factor affecting spring flood risks are the weather conditions during and leading up to the sensitive period of melting snow. A slow and steady melt, with little to no additional precipitation will lower the flood risk significantly. Conversely, a fast warm up, coupled with moderate to heavy amounts of rainfall **would significantly increase** the flood risk.

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How Does Each Factor Affect the Spring Flood Risk by Basin

Factors	Mainstem Mississippi	MN Tributaries (SE MN)	IA Tributaries (NE IA)	WI Tributaries (SW WI)
River Levels	Neutral	Neutral	Neutral	Neutral
Soil Moisture	Neutral	Neutral	Neutral	Neutral
Frost Depth	Decreased risk	Decreased risk	Decreased risk	Decreased risk
Snowpack	**Increased Risk**	Neutral	Neutral	Neutral
Past Precipitation	**Increased Risk**	Decreased Risk	Neutral	**Increased Risk**
Temperature Outlook	Neutral to **Increased Risk**	Neutral to **Increased Risk**	Neutral to **Increased Risk**	Neutral to **Increased Risk**
Precipitation Outlook	Neutral to **Increased Risk**	Neutral to **Increased Risk**	Neutral to **Increased Risk**	Neutral to **Increased Risk**

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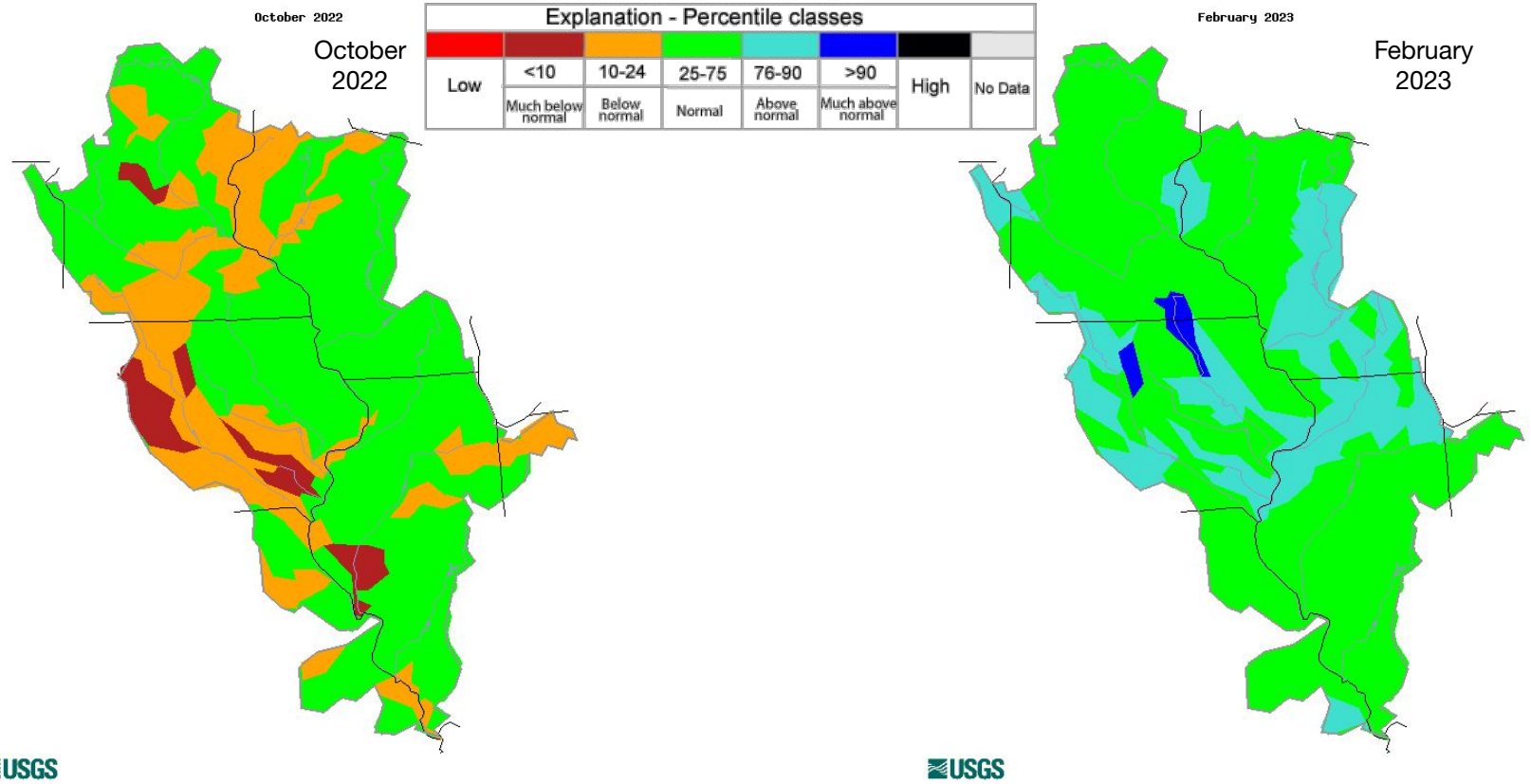
River Levels along the Upper Mississippi Basin - October 2022 vs February 2023



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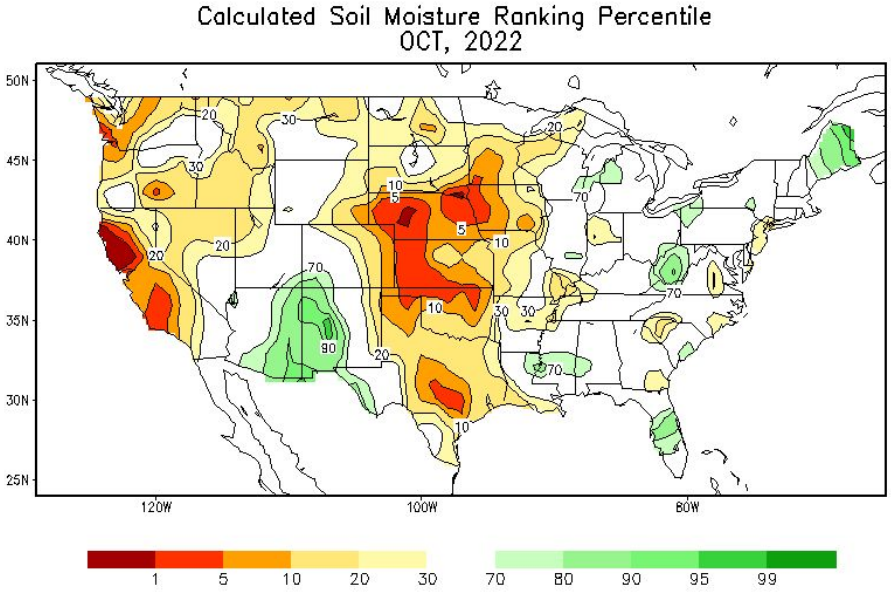
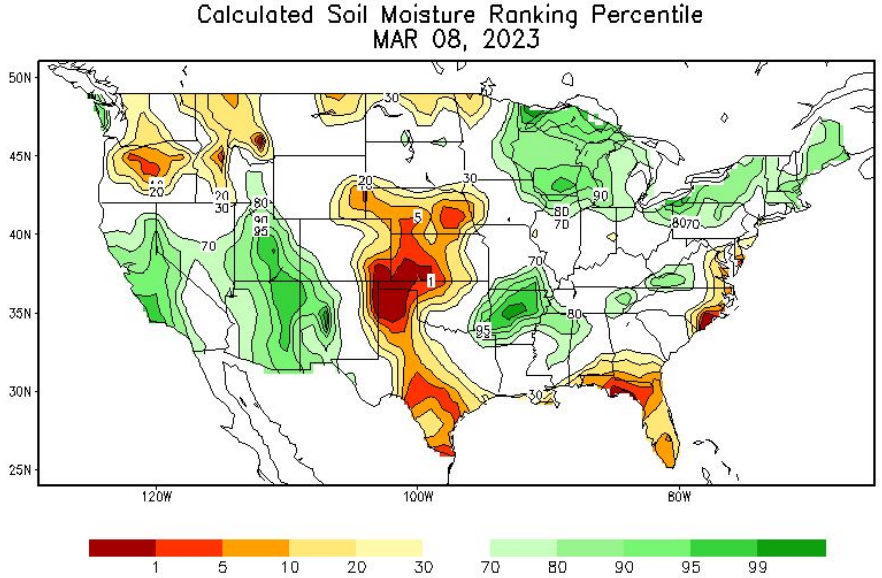
Soil Moisture along the Upper Mississippi Basin - October 2022 vs March 8th 2023





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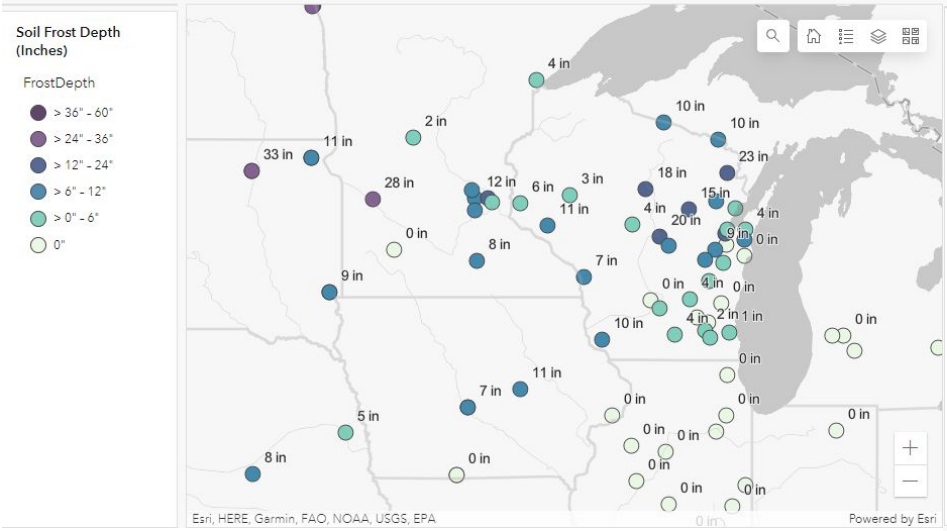
Frost Depths in the Last 2 Weeks - About the Same

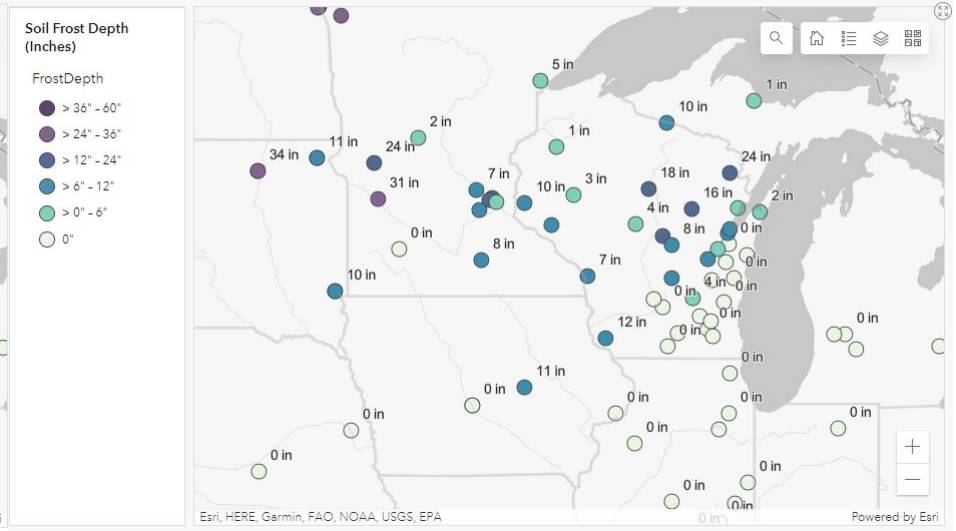
Frost Depth (inches)
In regions of the central U.S.

February 22nd, 2023



Frost Depth (inches)
In regions of the central U.S.

March 8th, 2023



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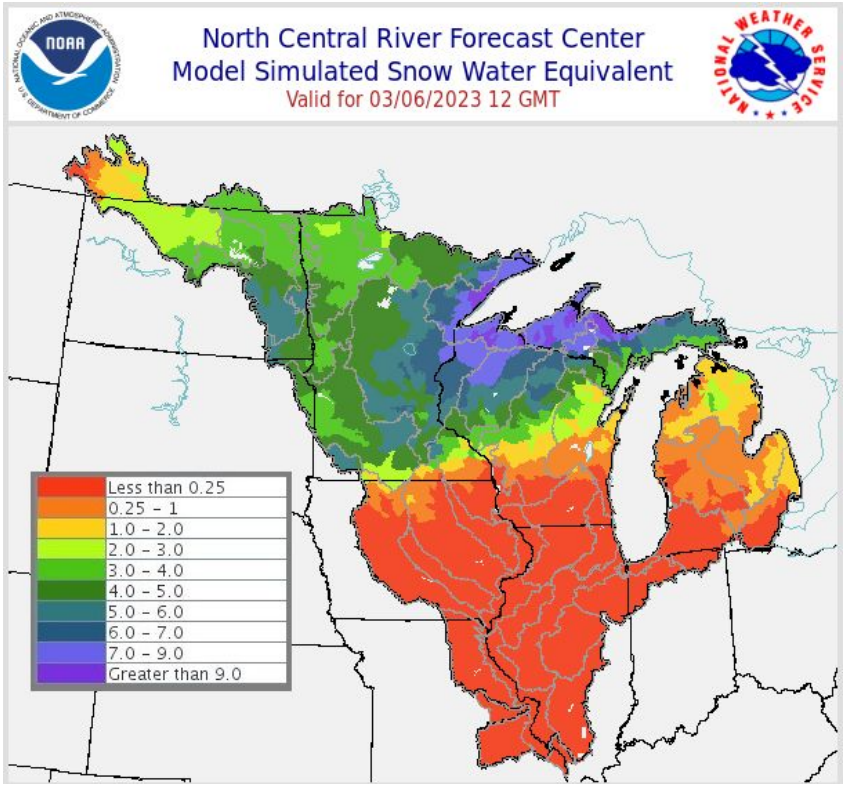
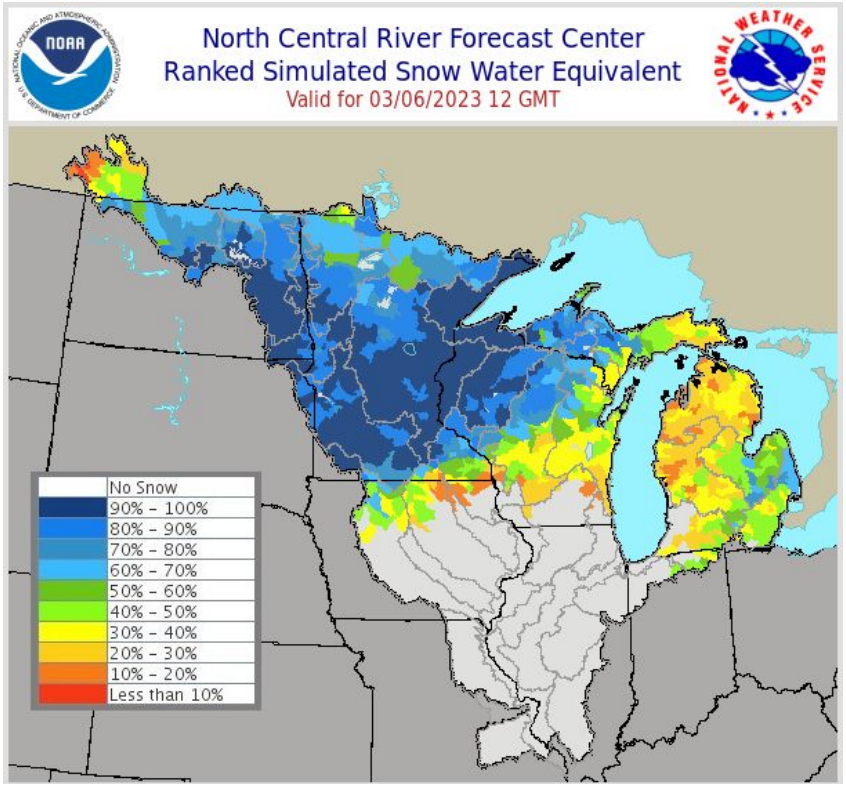
Current Snow Water Equivalent (Amount of Water in Snowpack) and Historical Comparison





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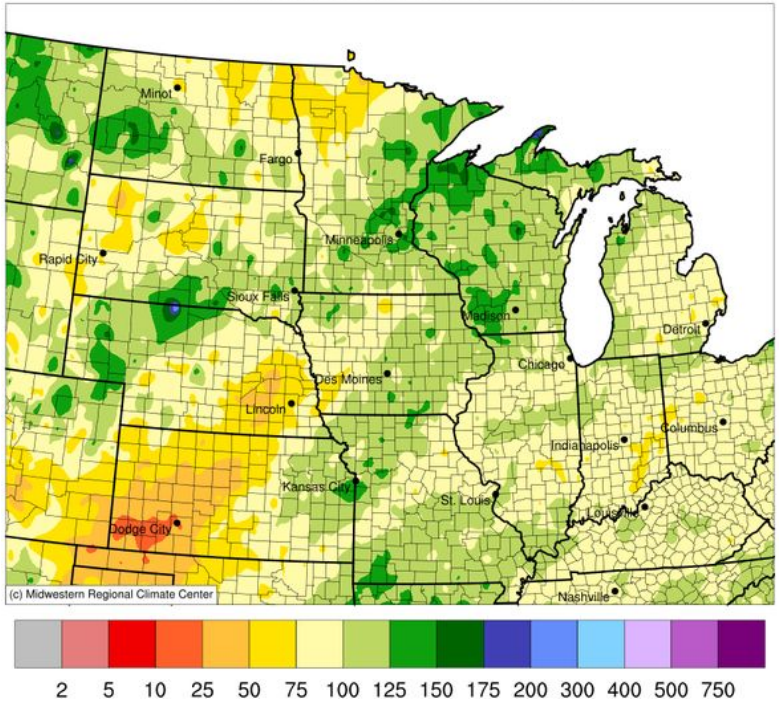
Water Year Precipitation Compared to Normal

Accumulated Precipitation (in): Percent of 1991-2020 Normals

October 01, 2022 to March 08, 2023



Accumulated Precipitation (in): Percent of 1991-2020 Normals

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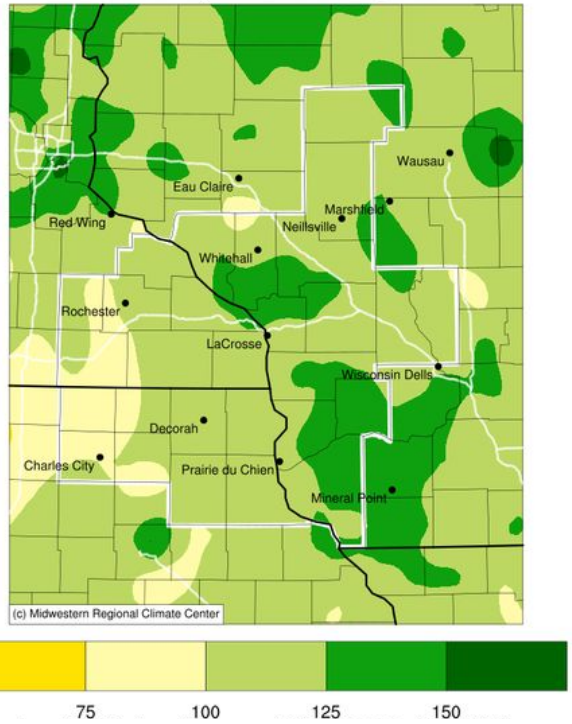

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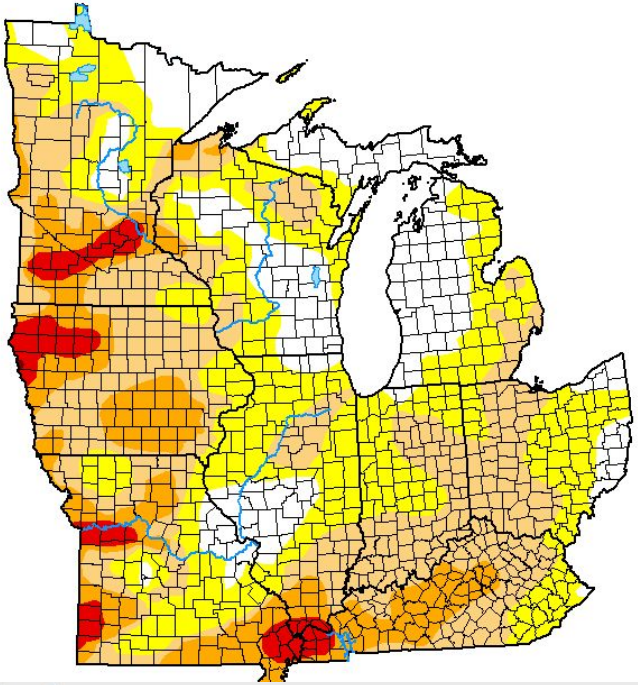
Drought Comparison - November 1st, 2022 vs March 7th, 2023

Drought Monitor

U.S. Drought Monitor

Midwest

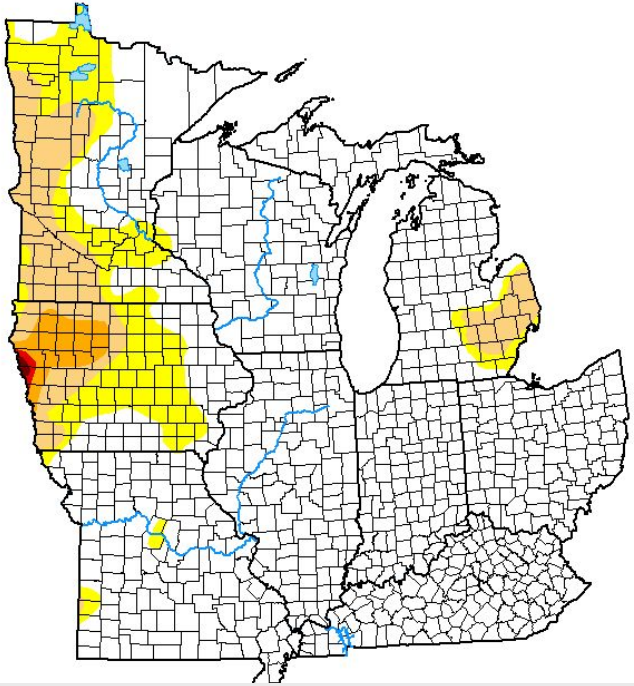
Nov 1 2022



U.S. Drought Monitor

Midwest

Mar 7 2023



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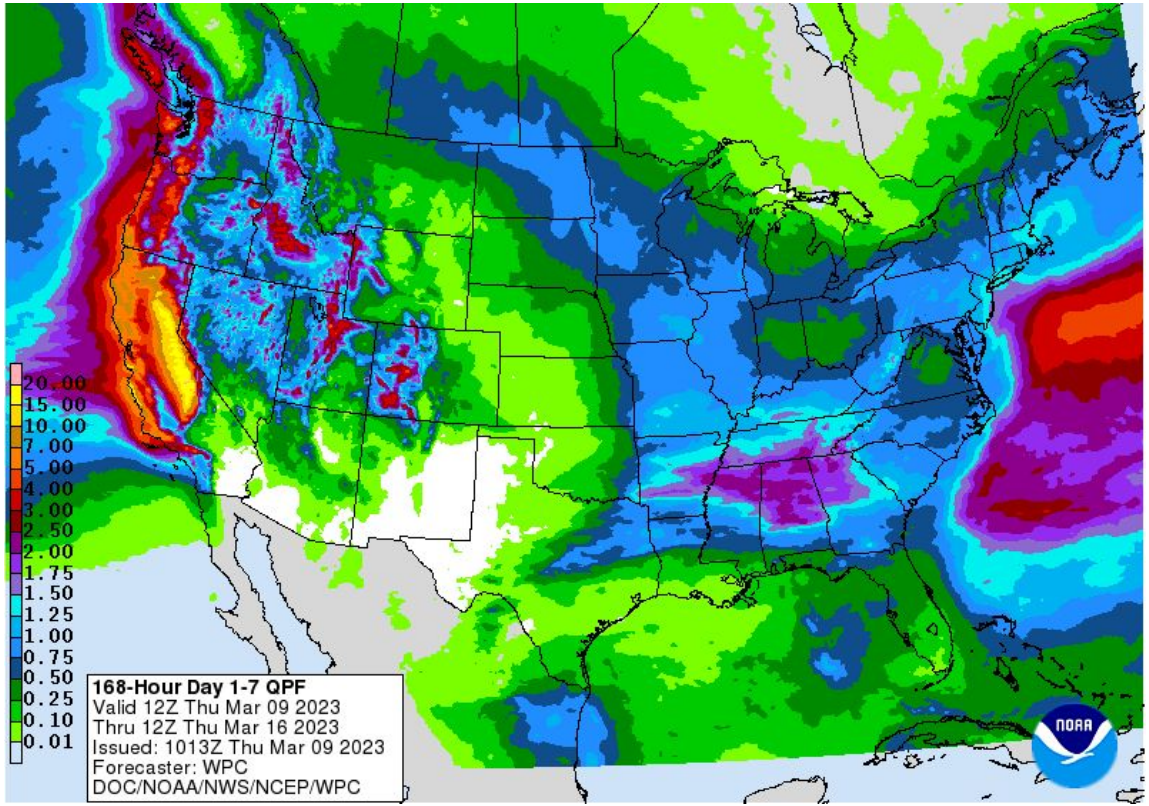
Precipitation Forecast for the Next 7 Days



*Note this is liquid equivalent precipitation, not snowfall amounts

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The Next Week's Forecast for Abbotsford, WI - Are we going to melt the snowpack?

Weekly Summary	Thu Mar 9	Fri Mar 10	Sat Mar 11	Sun Mar 12	Mon Mar 13	Tue Mar 14	Wed Mar 15
Max Temp, °F	33	31	29	32	29	31	37
Min Temp, °F	25	21	15	24	14	7	16
Min Wind Chill, °F	14	11	2	12	2	-5	3
Max Wind, mph	14	13	16	16	17	10	14
Min Wind, mph	12	7	9	10	9	8	9
Max Wind Gust, mph	28	24	25	24	25	15	21
Max Cloud Cover, %	98	98	89	89	72	44	65
Min Cloud Cover, %	98	63	59	70	20	19	46
Max Prob. of Precip., %	99	95	80	84	21	1	31
Max RH, %	88	96	93	100	91	95	93
Min RH, %	69	75	76	83	65	60	62
Max Dew Point, °F	25	25	24	27	20	18	26
Min Dew Point, °F	22	18	13	22	10	5	14

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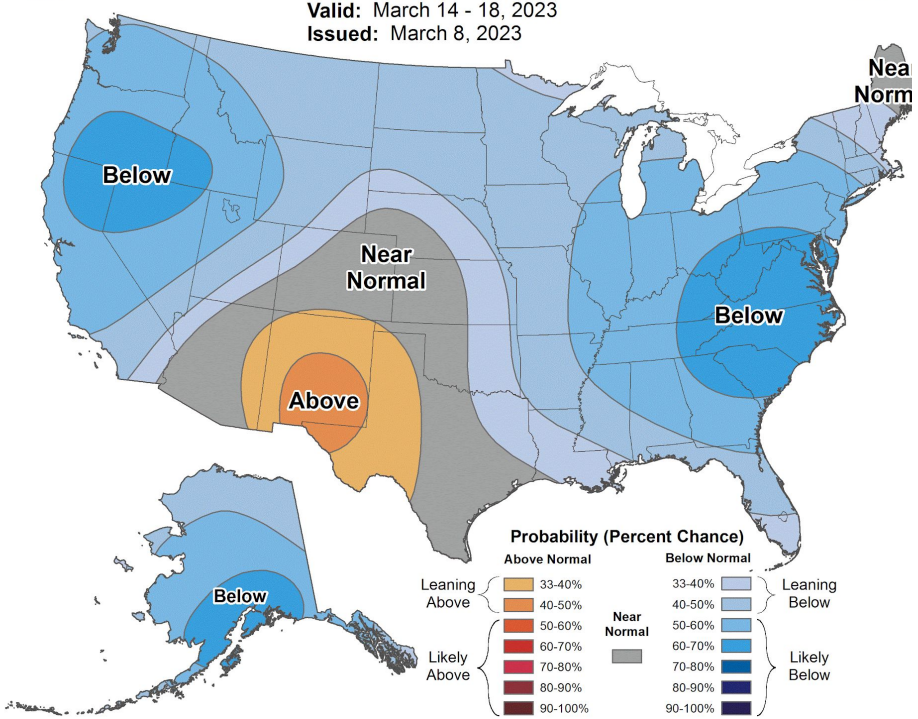
Temperature and Precipitation Outlook - 6 to 10 Day

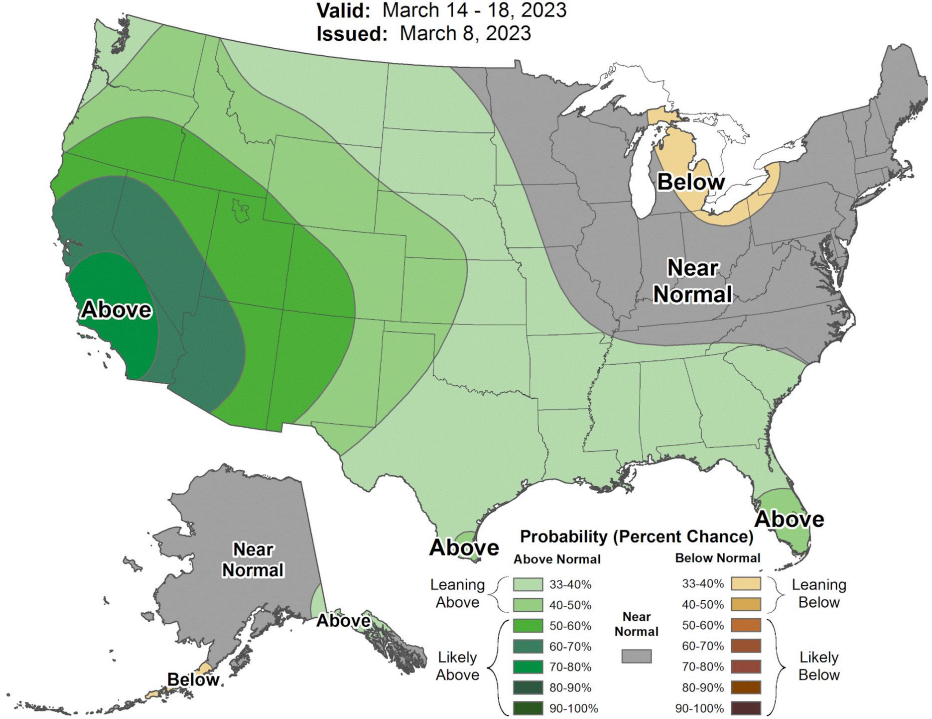
6-10 Day Temperature Outlook

Valid: March 14 - 18, 2023
Issued: March 8, 2023



6-10 Day Precipitation Outlook

Valid: March 14 - 18, 2023
Issued: March 8, 2023



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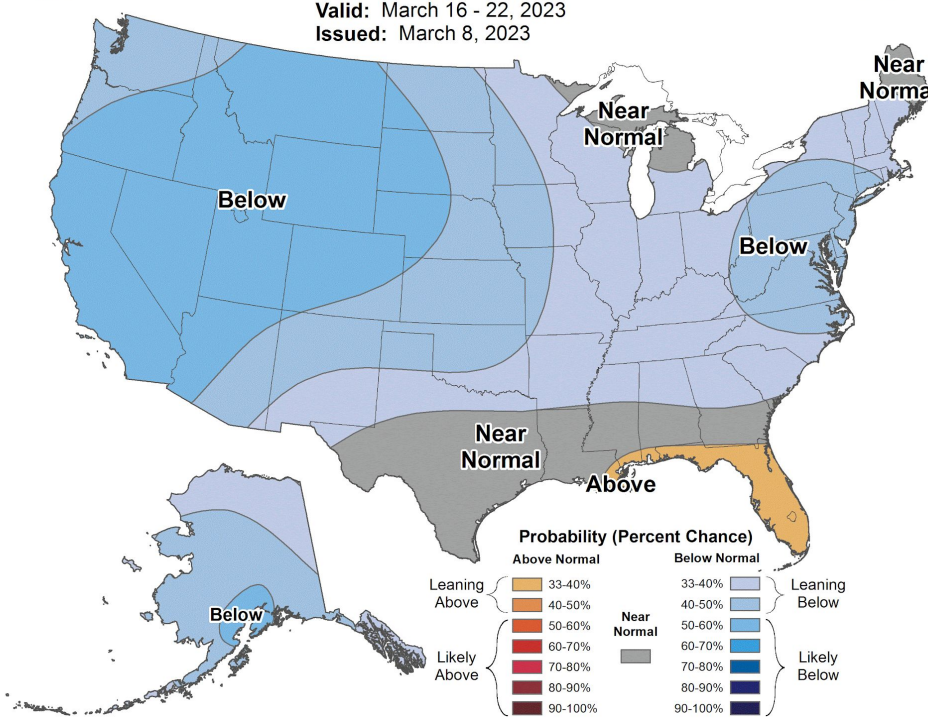
Temperature and Precipitation Outlook - 8 to 14 Day

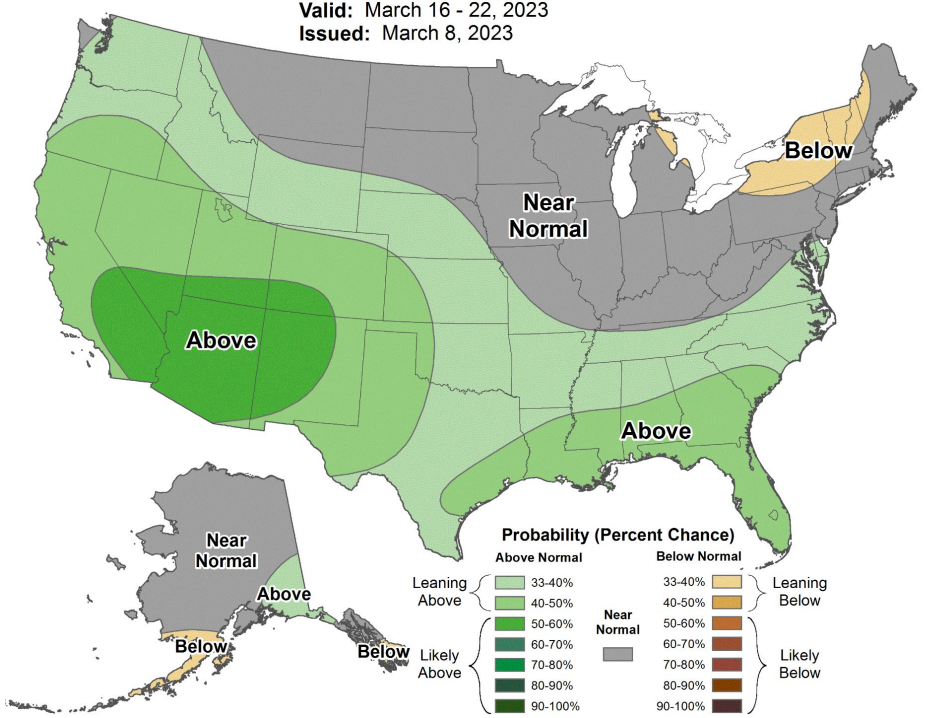
8-14 Day Temperature Outlook

Valid: March 16 - 22, 2023
Issued: March 8, 2023



8-14 Day Precipitation Outlook

Valid: March 16 - 22, 2023
Issued: March 8, 2023



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U.S. Department of Commerce

National Weather Service
La Crosse, Wisconsin

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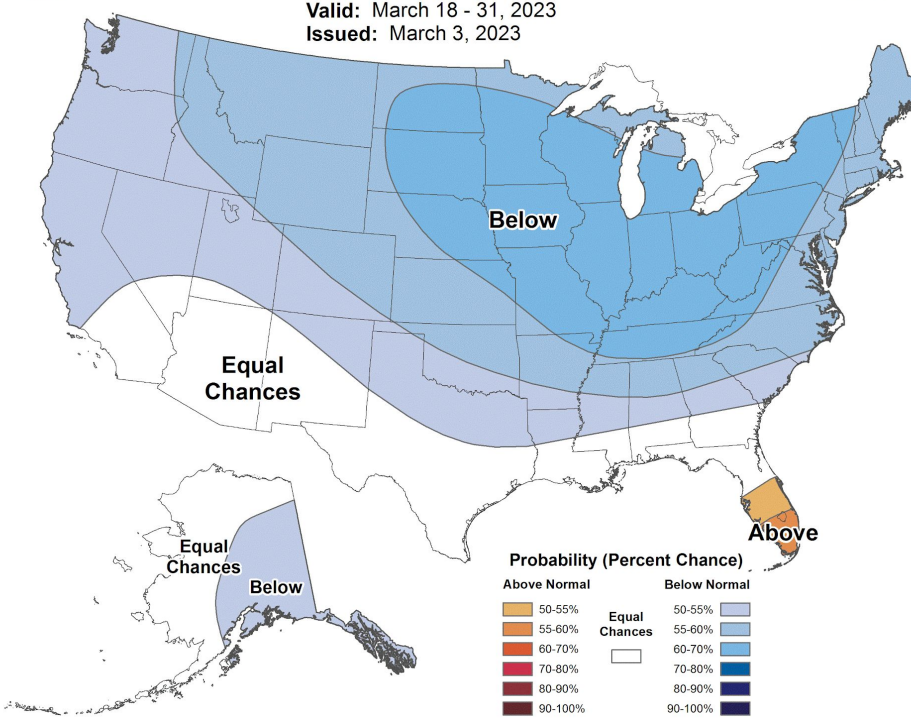
Temperature and Precipitation Outlook - 3 to 4 Week

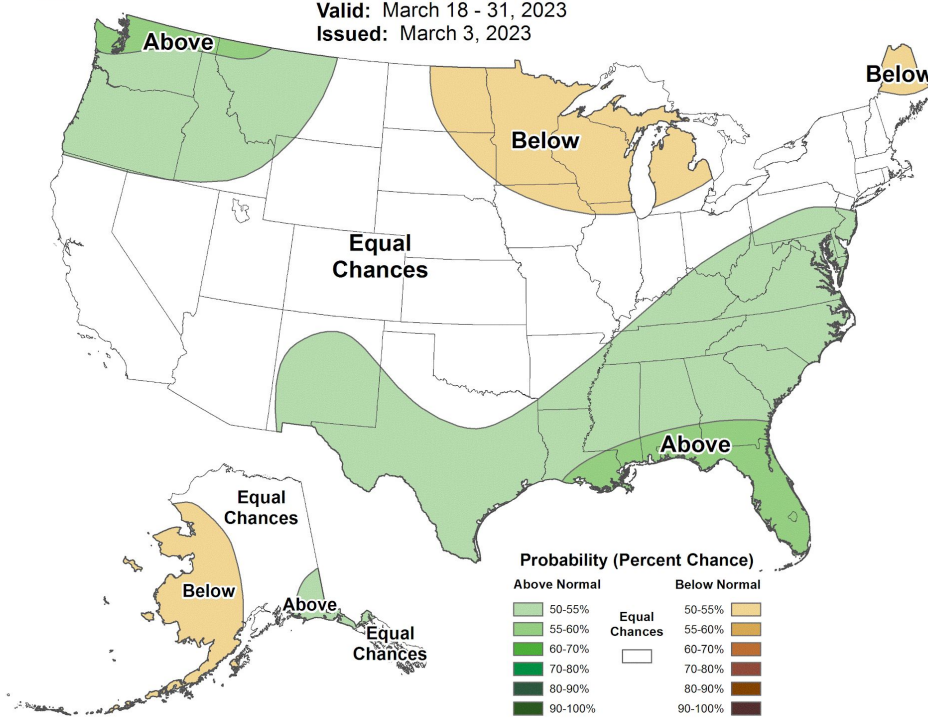
Weeks 3-4 Temperature Outlook

Valid: March 18 - 31, 2023
Issued: March 3, 2023



Weeks 3-4 Precipitation Outlook

Valid: March 18 - 31, 2023
Issued: March 3, 2023



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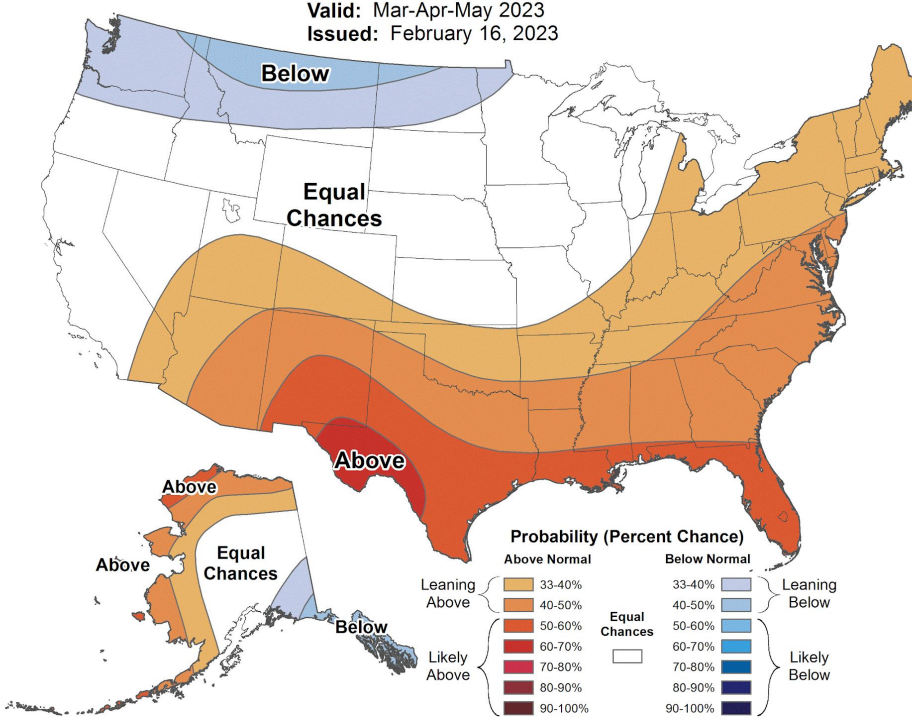
Temperature and Precipitation Outlook - March through May

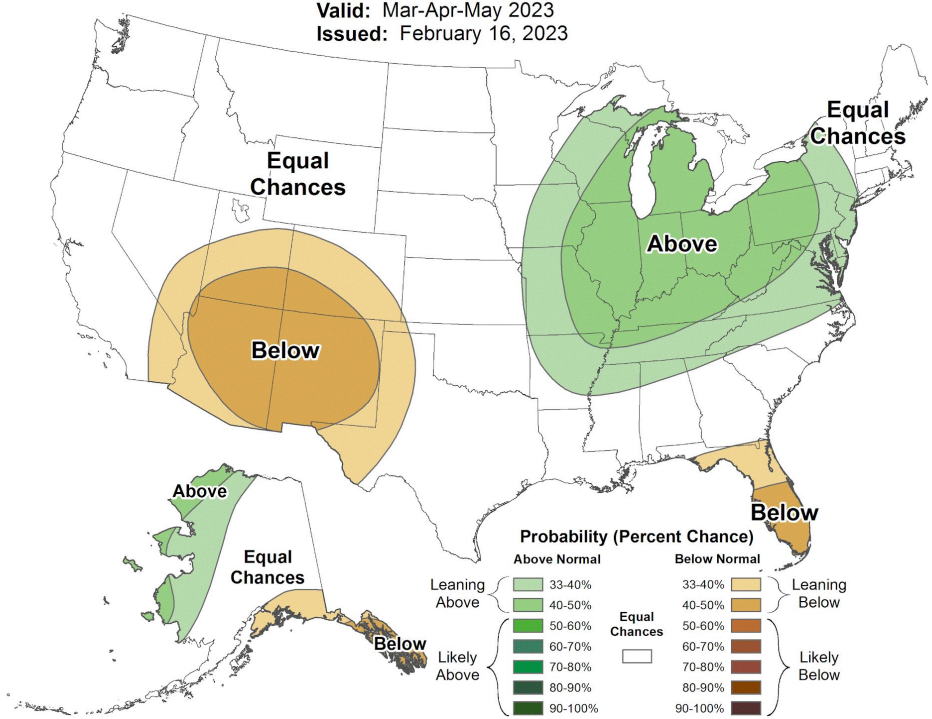
Seasonal Temperature Outlook

Valid: Mar-Apr-May 2023
Issued: February 16, 2023



Seasonal Precipitation Outlook

Valid: Mar-Apr-May 2023
Issued: February 16, 2023



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NWS La Crosse Final 2023 Spring Flood Outlook

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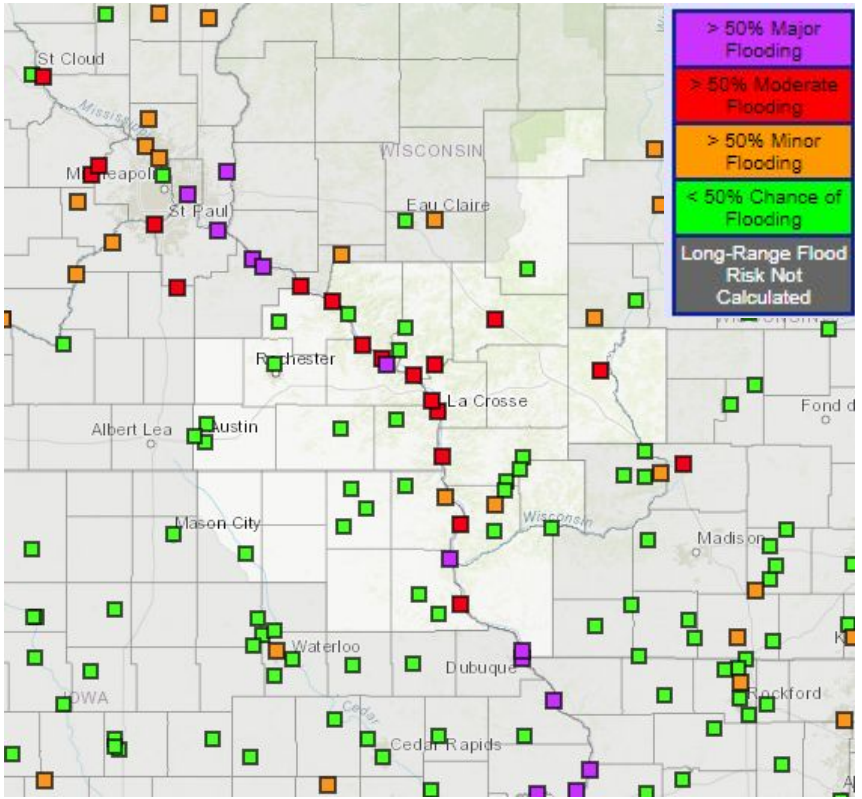
50% Chance of Exceeding Minor, Moderate, or Major Flood Stage

- Points highlighted in orange have a greater than **50% chance** of reaching **minor flood stage** this spring
- Points highlighted in red have a greater than **50% chance** of reaching **moderate flood stage** this spring
- Points highlighted in purple have a greater than **50% chance** of reaching **major flood stage** this spring

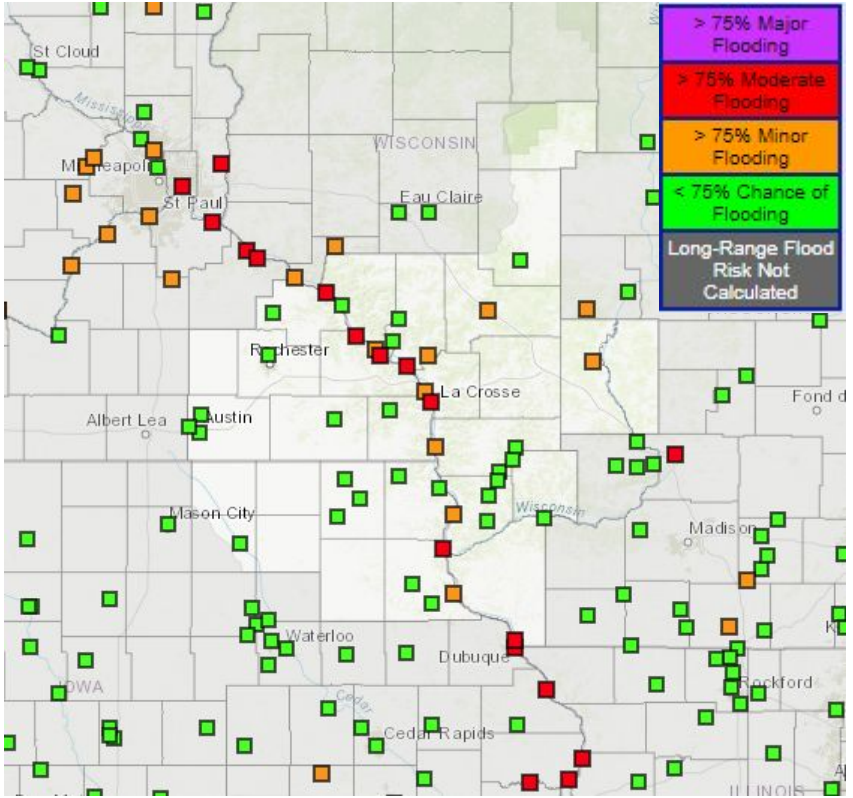


NWS La Crosse Final 2023 Spring Flood Outlook

Thursday, March 9th, 2023

75% Chance of Exceeding Minor, Moderate, or Major Flood Stage

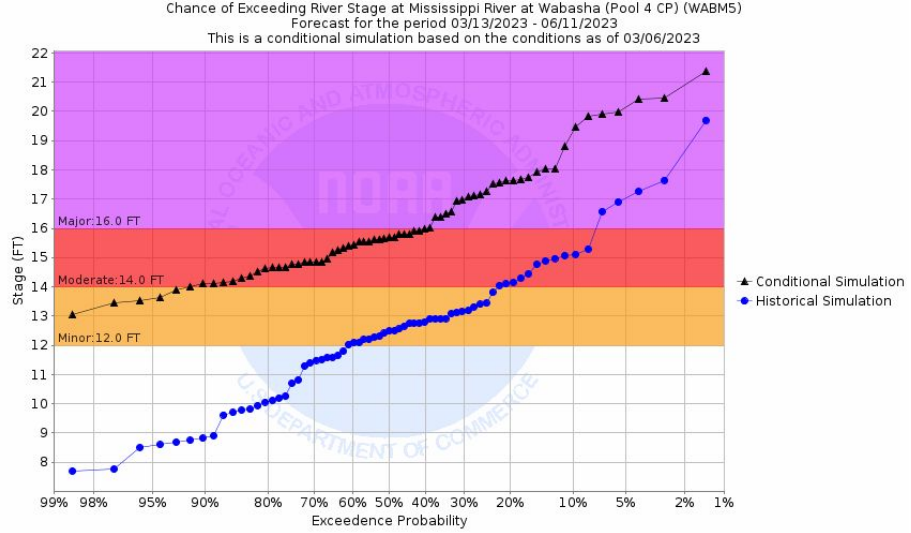
- Points highlighted in orange have a greater than **75% chance** of reaching **minor flood stage** this spring
- Points highlighted in red have a greater than **75% chance** of reaching **moderate flood stage** this spring
- Points highlighted in purple have a greater than **75% chance** of reaching **major flood stage** this spring



Long-Range River Level Probabilistic Info - Chance of Exceeding Levels This Spring

Long Range Flood Risk - Available on AHPS (Advanced Hydrologic Prediction Service)

- Blue line is considered the historical normal chance for flooding (based on historical averages)
- The black line is based on this winter's conditions (current river levels, amount of snow received, etc…)
- When the black line is to the left of the blue line, chances for higher river levels and flooding are higher than the historical average
- Conversely, when the black line is to the right of the blue line, chances for higher river levels and flooding are lower than the historical average



Example from Mississippi River at Wabasha (WABM5)

- Note, black line is to the left of the blue (higher than normal chance)
- >95% (92%) chance of exceeding minor (moderate) flood stage over the next 90 days

NWS La Crosse Final 2023 Spring Flood Outlook

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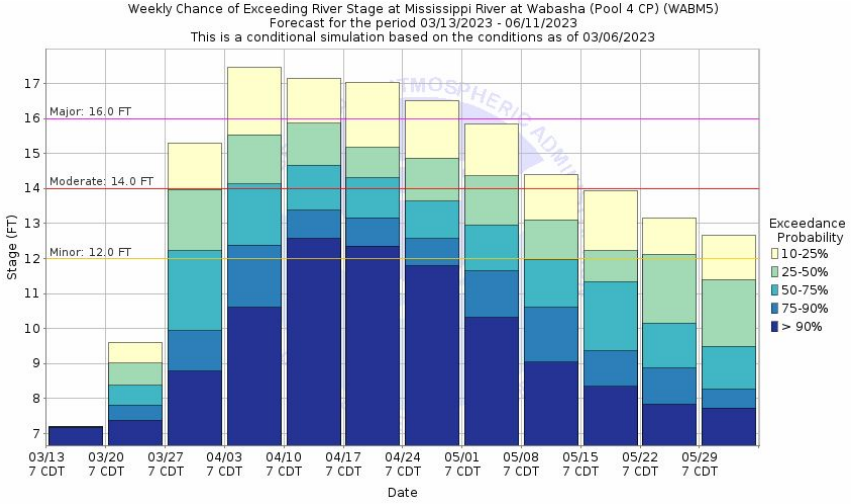
Long-Range River Level Probabilistic Info - Chance of Exceeding Levels by Week This Spring

Long Range Flood Risk - Available on AHPS (Advanced Hydrologic Prediction Service)

- The bar graph to the right represents the exceedance probabilities each week through the spring melt season
- The yellow color of the bar graph represents the 10 to 25% exceedance probability
    - Essentially, there is a 10 to 25% chance that the river reaches that particular level during that particular week
- The exceedance probabilities increase as colors become more blue - 25 to 50%(light green), 50 to 75% (teal), 75 to 90%(Light blue), and > 90% (dark blue)



Example from Mississippi River at Wabasha (WABM5)

- Note, higher chances of flooding begin near the end of March, best chance of reaching flood stage is mid-April

NWS La Crosse Final 2023 Spring Flood Outlook

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How to Access Probabilistic Information on our Website

www.weather.gov/lacrosse

Local forecast by "City, St" or ZIP code

Enter location ... Go

Location Help

News Headlines

- 2023 NWS La Crosse Spotter Training Schedule Now Available!
- Meteorological Winter 2022-23 Climate Summary
- February 2023 Climate Summary
- 2023 Spring Snowmelt Flood Outlook

MY FORECAST
2 Miles S La Crosse WI

Fog/Mist

36°F

2°C Get Detailed info

Today

30%

Chance Rain/Sleet and Patchy Fog

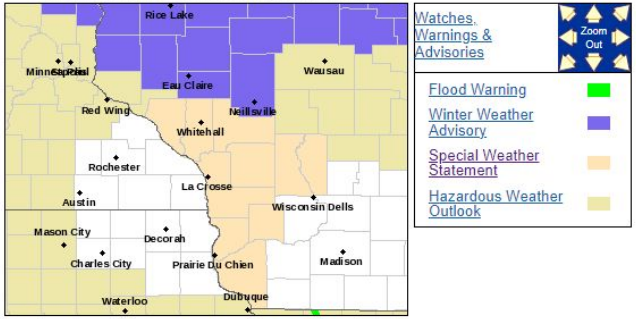
High: 39°F

NWS Forecast Office La Crosse, WI

Weather.gov > La Crosse, WI

Current Hazards | Current Conditions | Radar | Forecasts | Rivers and Lakes | Climate and Past Weather

Click a location below for detailed forecast.

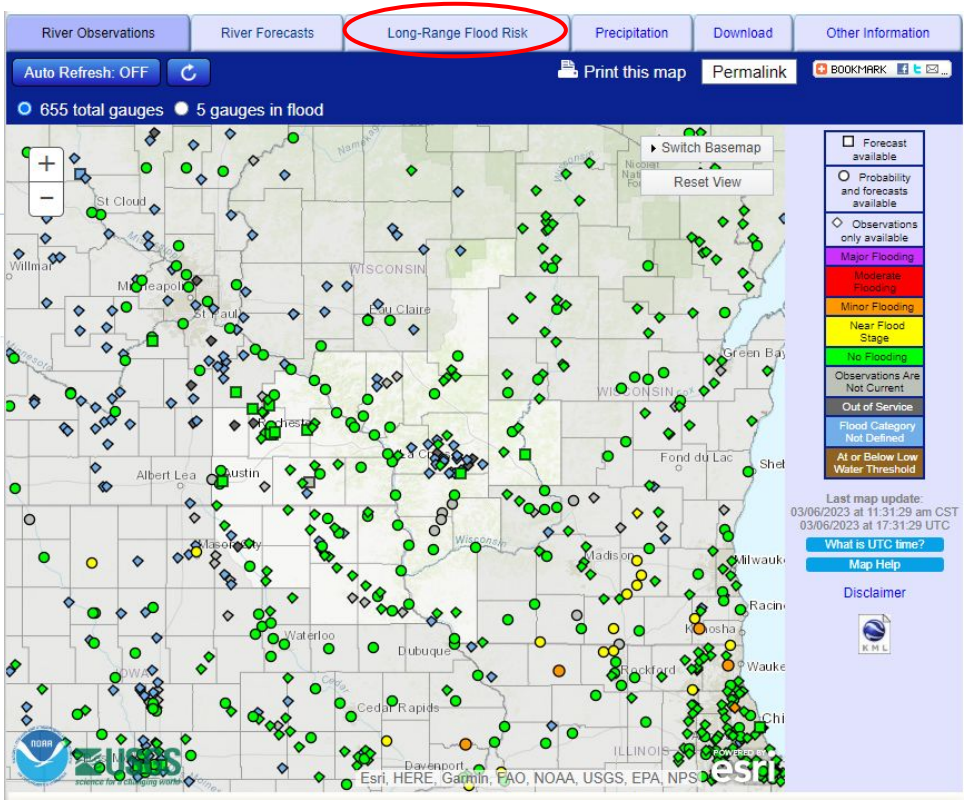


Watches, Warnings & Advisories

Zoom Out

- Flood Warning
- Winter Weather Advisory
- Special Weather Statement
- Hazardous Weather Outlook

Last Map Update: Mon, Mar. 6, 2023 at 11:21:08 am CST



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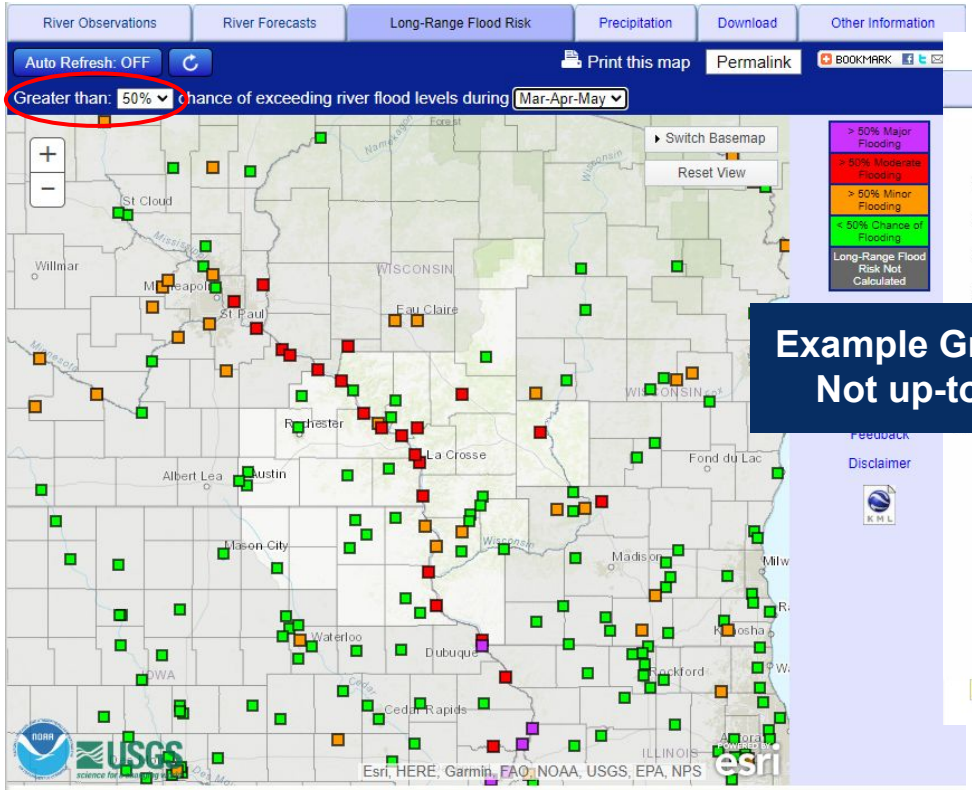
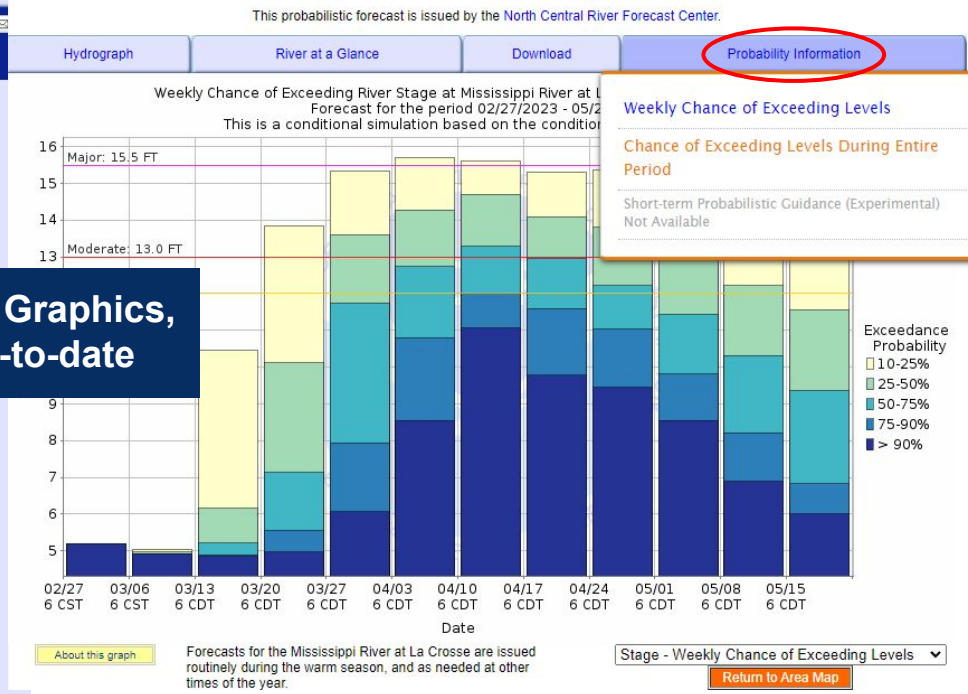
How to Access Spring Outlook Probabilistic Information on our Website



Example Graphics, Not up-to-date



Why are the chances for flooding on the Mississippi River much higher than elsewhere?

- Many rivers route downstream into the Mississippi River
  - Minnesota
  - Wisconsin
  - St. Croix
  - Chippewa
  - Turkey
  - Black
  - And countless others
- Over 17,500 miles of river, and all those river's water, flows into the Mississippi by the time it reaches La Crosse, WI.
  - ~21,614 miles by Dubuque, IA

Credit: USGS Streamer

Chances for Significant Flooding on the Mississippi River have Increased - Why?

The weather leading up to and during the snowmelt period is the biggest factor.

Factors that Increase Chances

- A colder than normal March
  - Greater chance that snowpack remains later into March and April
  - Greater chance that a snowpack will be present if/when a warm up and/or heavy rainfall event occurs this spring
- Every major river basin upstream has well above normal snowpack present
- Any additional precipitation between now and the end of snowmelt will affect the flood chances accordingly

Factors that Decrease Chances

- Little to no additional precipitation during the sensitive snowmelt period
- Slow and steady snowmelt
  - Emphasis on steady - too slow of a melt will keep a snowpack.
- No rapid warm up and/or heavy rainfall event near the end of March
- Normal precipitation after the snow melts - to allow rivers to fall back to normal flows

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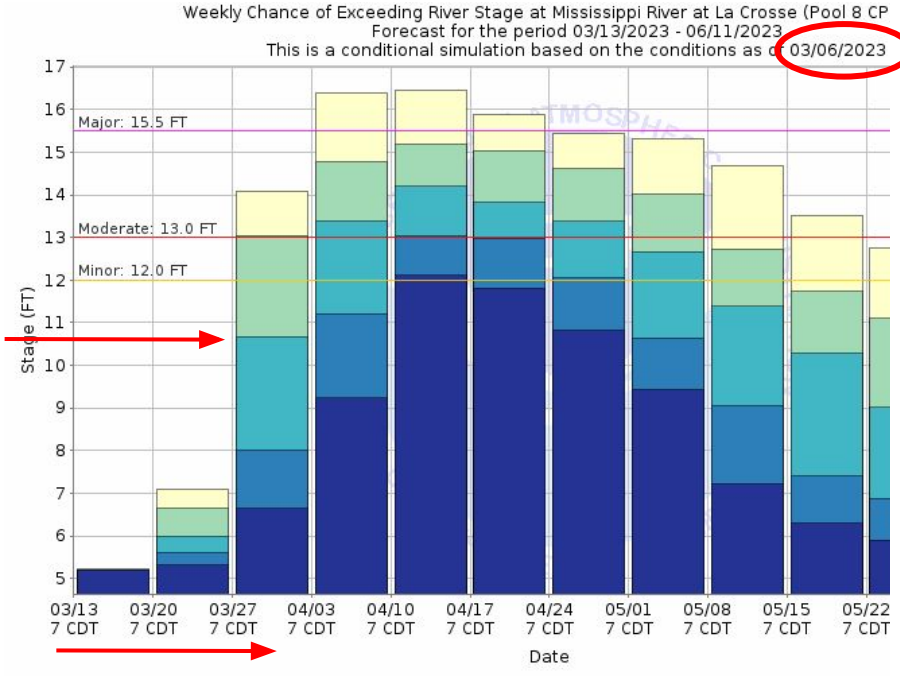
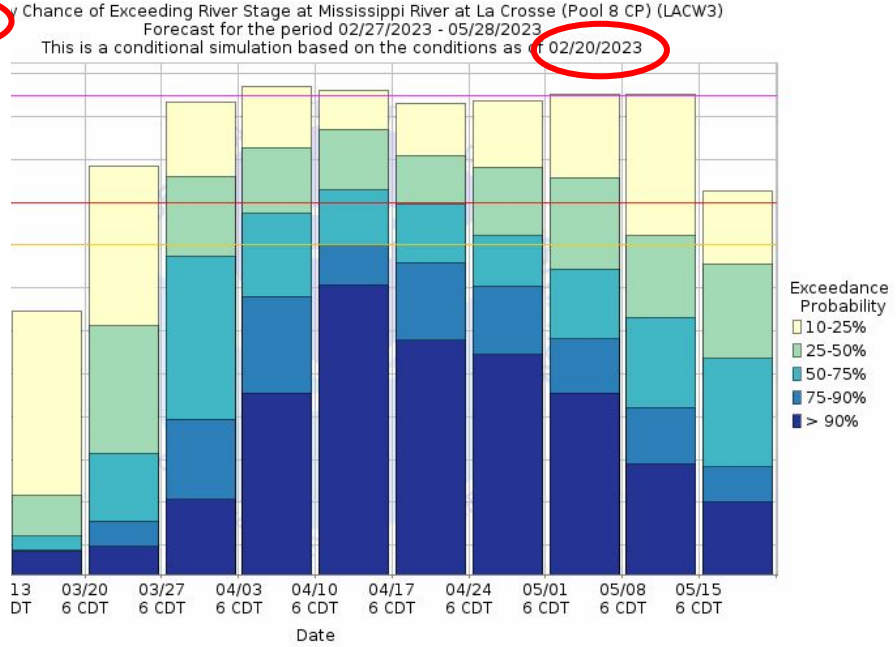
Colder than Normal March Expected - Time Window for Higher Flood Chances Shifted





Additional Information and Contact Information

Informational Links:

- Current River Levels and Forecast
- Long-Range Flood Risk by River Point (Spring Flooding Potential)
- Latest Hydrographs by Basin
- 3rd Spring Flood Outlook Text Information

Please reach out to jordan.wendt@noaa.gov for any questions, comments, or media inquiries