



Second 2023 Spring Flood & Water Resources Outlook

Released Thursday, February 23rd





NWS La Crosse Second 2023 Spring Flood Outlook Thursday, February 23rd, 2023

Bottom Line, Up Front: What has changed from the 1st Spring Flood Outlook?

- Probabilities for flooding have increased across most of our region's rivers
 - That doesn't mean that all rivers have an above-normal chance for flooding
 - Additional precipitation last week and this week's snowstorm is the primary cause
- This week's spring flood updates include last week's rain and snow, as well as a 7-day forecast starting Tuesday morning (February 21st)
 - This includes expected precipitation from roughly 6pm Monday, Feb 21 until 6pm Monday, Feb 28th
- The weather pattern across the Upper Midwest is favored to become more active, with multiple chances of precipitation through the first week of March





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Spring Flood Risk by Basin

River	Flood Risk
Main Stem Mississippi River	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 above normal risk for the Mississippi mainstem, near to above normal risk for the Mississippi Tributaries in Wisconsin, and near normal and below normal risks for the Mississippi Tributaries in Minnesota and Iowa respectively.
 - Near normal river levels & soil moisture
 - **Above normal snowpack** in Upper Mississippi River Basin
 - Near normal to below snowpack across southern Minnesota, SW Wisconsin, and NE Iowa
 - 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	Neutral to Increased Risk	Decreased Risk	Neutral	Increased Risk
Temperature Outlook	Neutral	Neutral	Neutral	Neutral
Precipitation Outlook	Neutral to Increased Risk	Neutral to Increased Risk	Neutral to Increased Risk	Neutral to Increased Risk



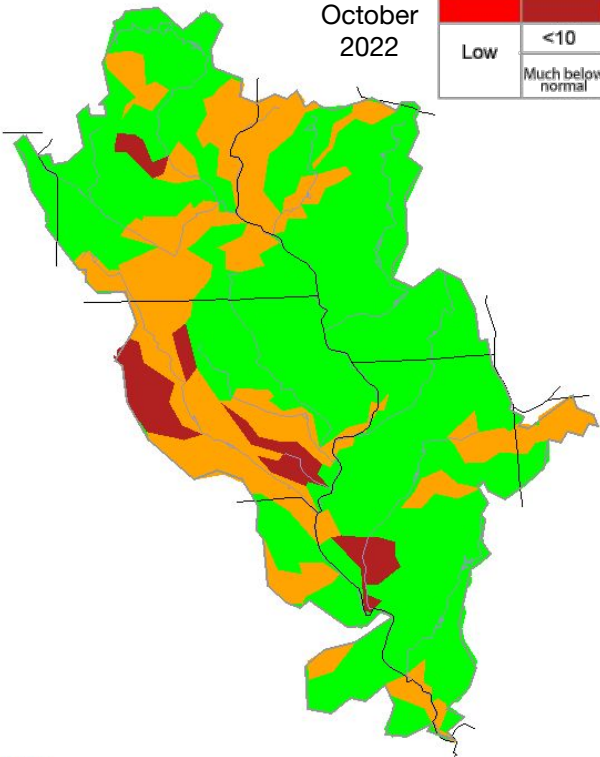


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River Levels along the Upper Mississippi Basin - October 2022 vs January 2023

October 2022

October
2022

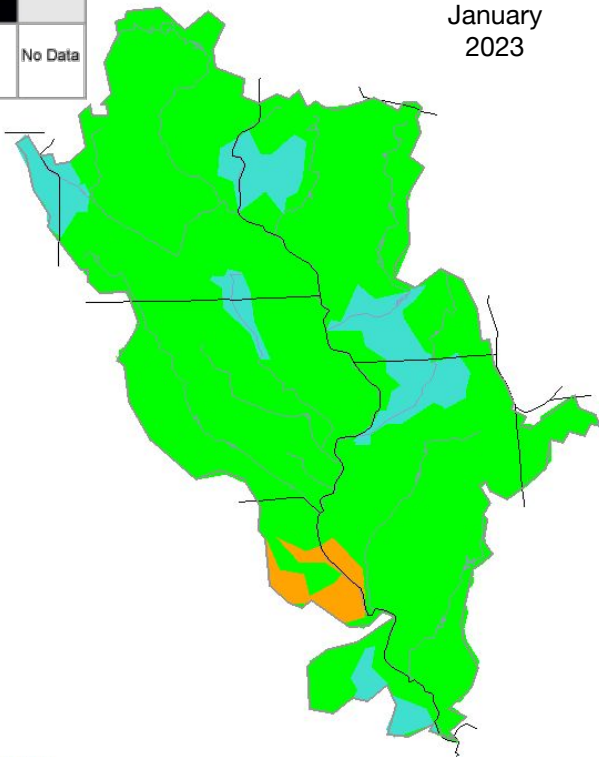


Explanation - Percentile classes

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

January 2023

January
2023



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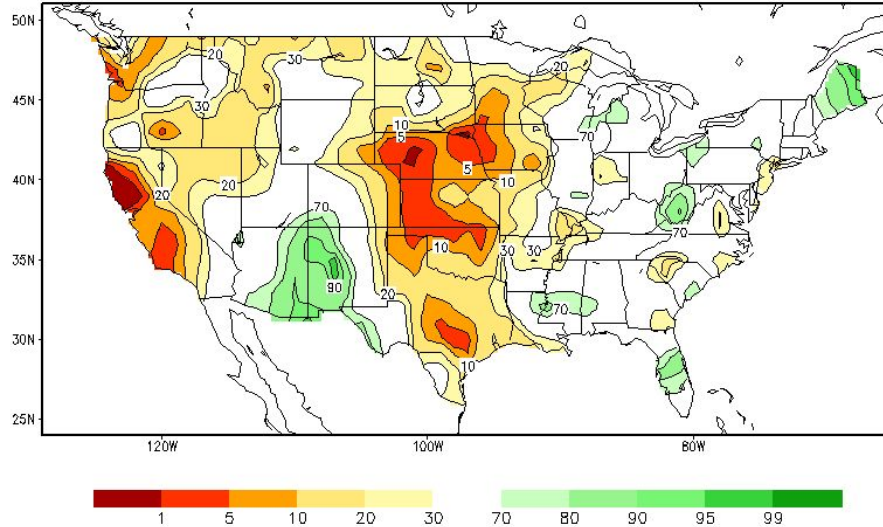
National Weather Service
La Crosse, Wisconsin



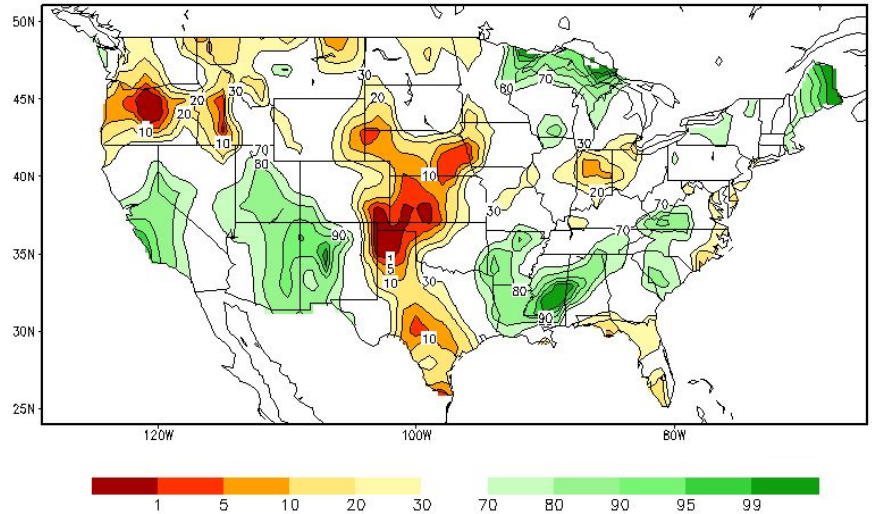
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Soil Moisture along the Upper Mississippi Basin - October 2022 vs February 22nd 2023

Calculated Soil Moisture Ranking Percentile
OCT, 2022



Calculated Soil Moisture Ranking Percentile
FEB 22, 2023





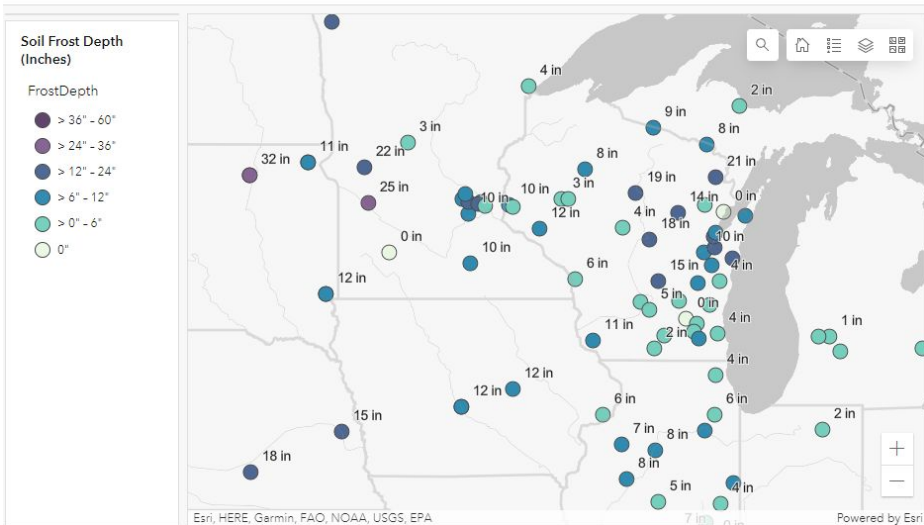
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Frost Depths in the Last 2 Weeks - About the Same

Frost Depth (inches)

In regions of the central U.S.

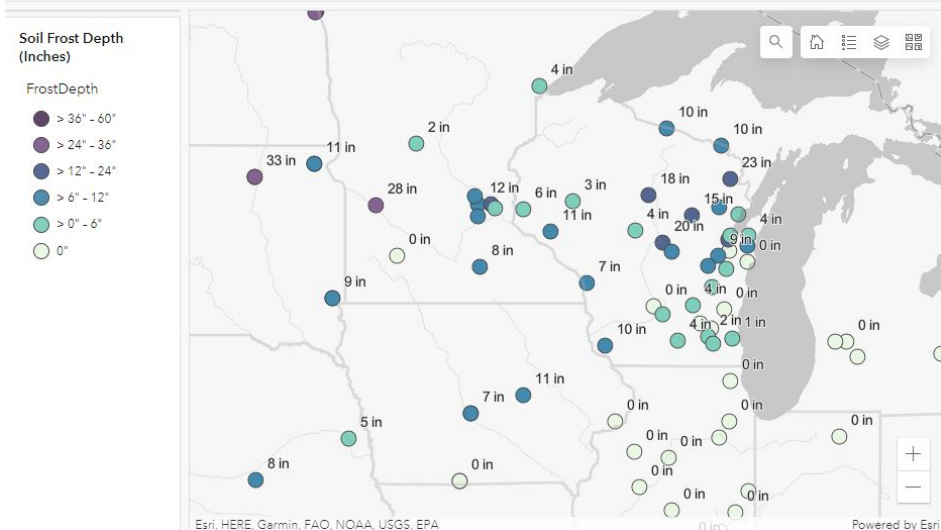
February 8th, 2023



Frost Depth (inches)

In regions of the central U.S.

February 22nd, 2023



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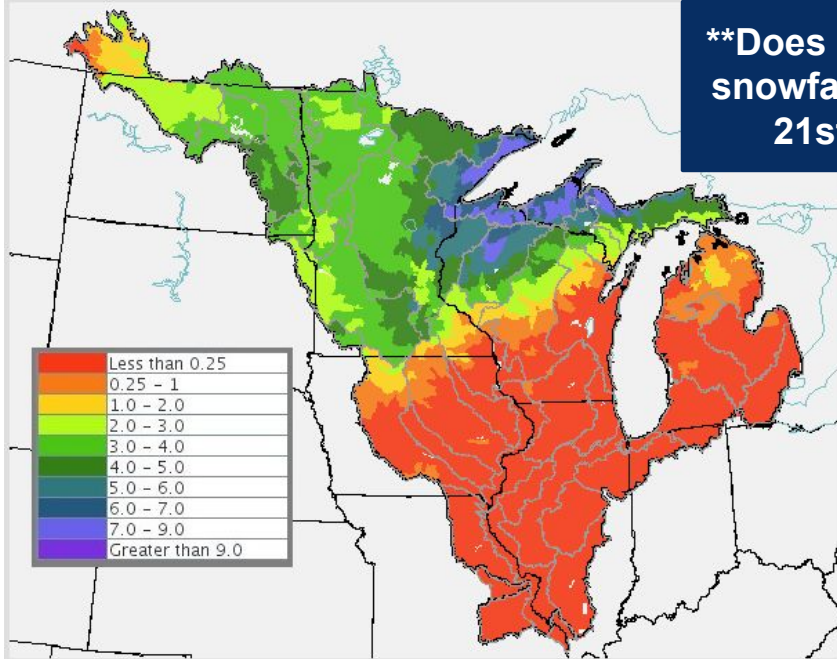


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Current Snow Water Equivalent (Amount of Water in Snowpack) and Historical Comparison



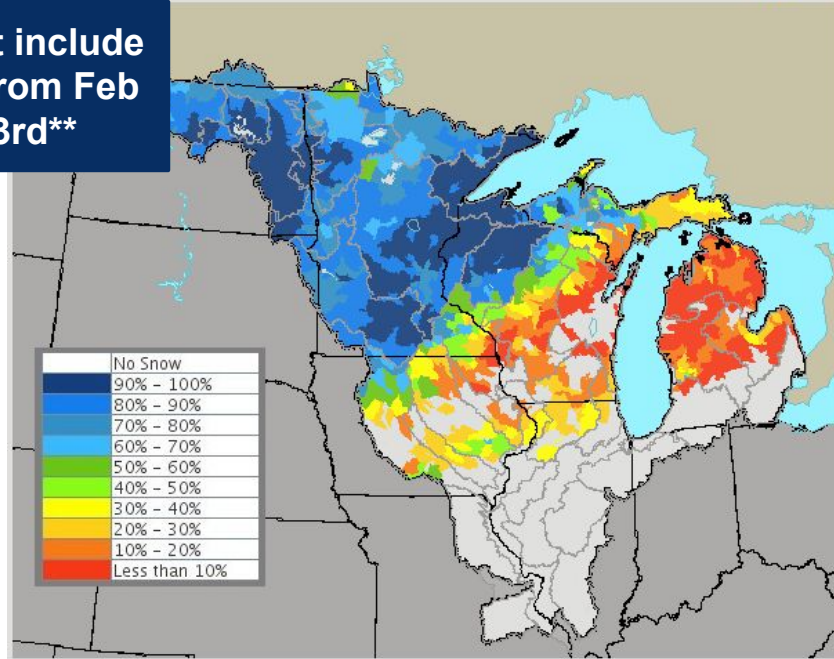
North Central River Forecast Center
Model Simulated Snow Water Equivalent
Valid for 02/20/2023 12 GMT



****Does not include
snowfall from Feb
21st-23rd****



North Central River Forecast Center
Ranked Simulated Snow Water Equivalent
Valid for 02/20/2023 12 GMT



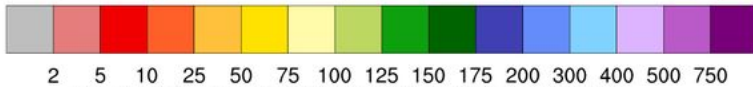
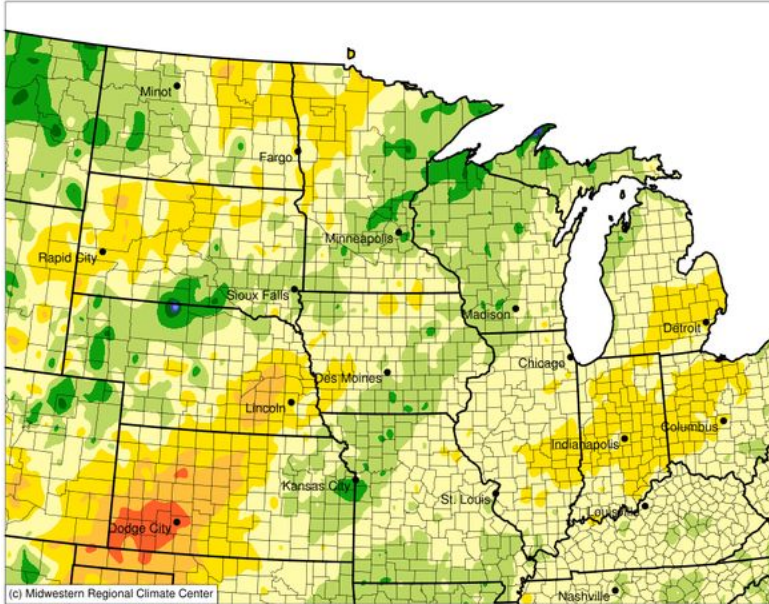


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Water Year Precipitation Compared to Normal

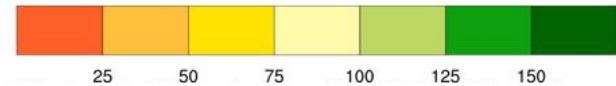
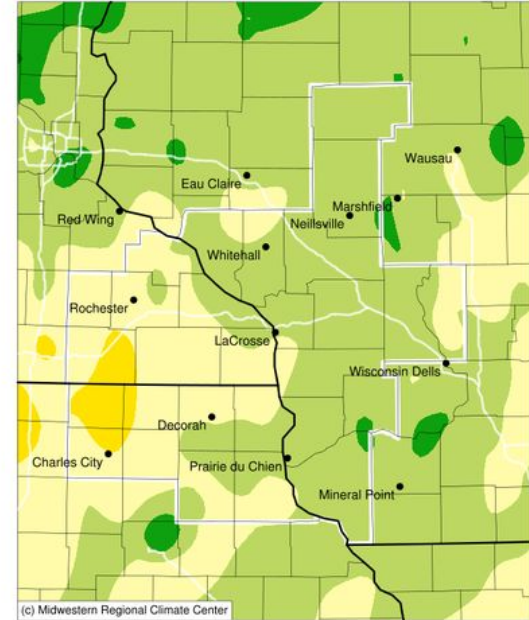
Accumulated Precipitation (in): Percent of 1991-2020 Normals

October 01, 2022 to February 22, 2023



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

October 01, 2022 to February 22, 2023



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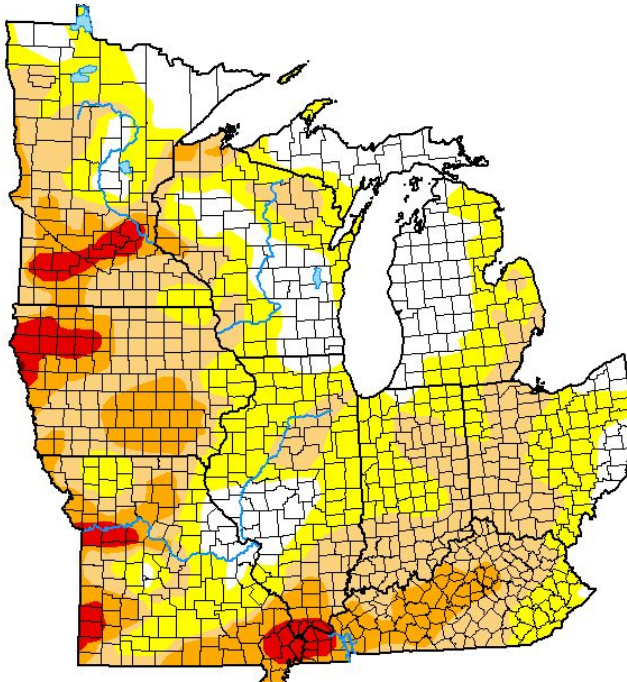


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Drought Comparison - November 1st, 2022 vs February 21st, 2023

U.S. Drought Monitor Midwest

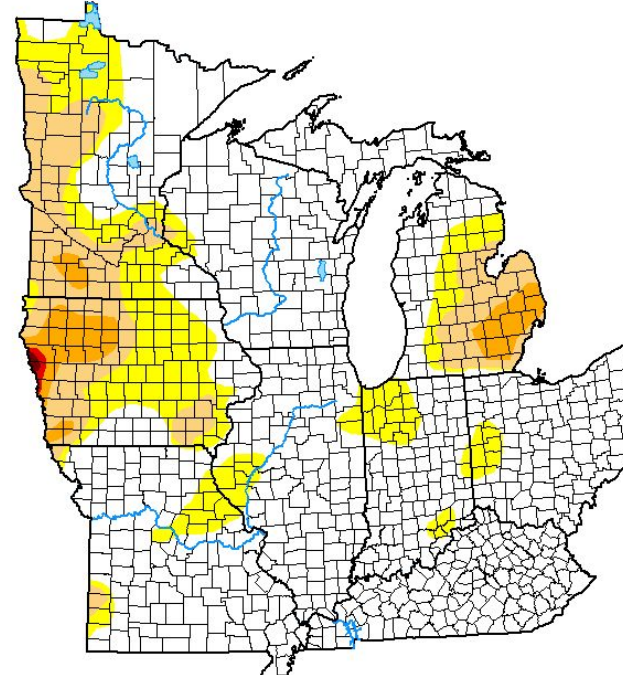
Nov 1 2022



[Drought](#)
[Monitor](#)

U.S. Drought Monitor Midwest

Feb 21 2023



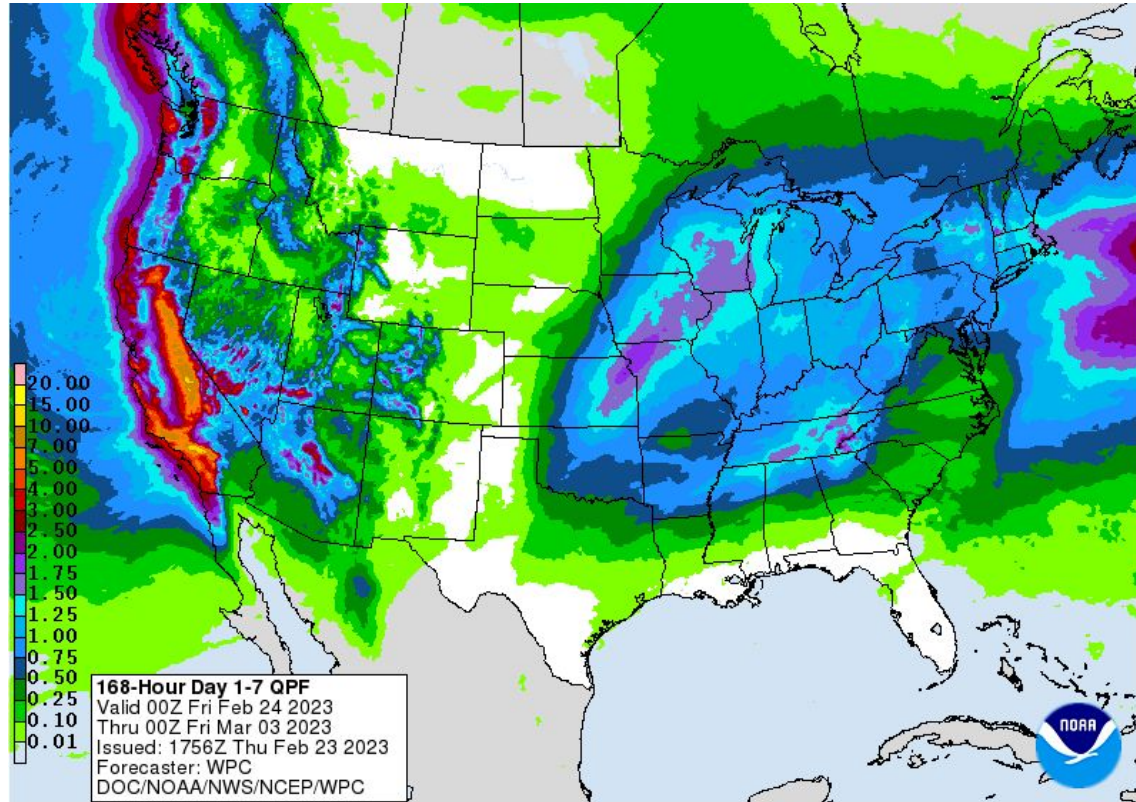
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U.S. Department of Commerce

National Weather Service
La Crosse, Wisconsin



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Precipitation Forecast for the Next 7 Days



*Note this is liquid equivalent precipitation, not snowfall amounts





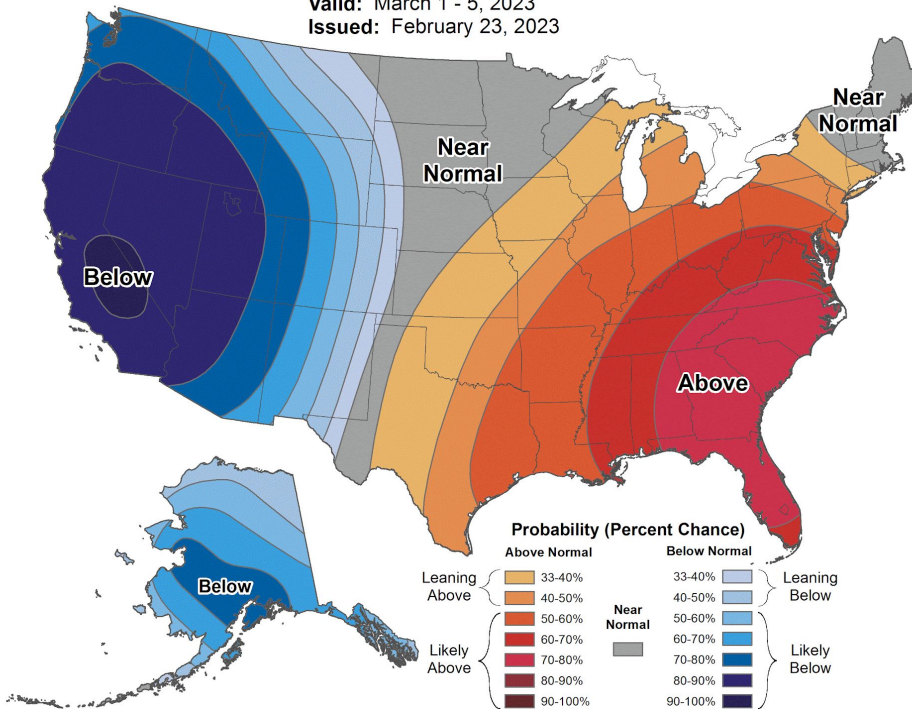
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Temperature and Precipitation Outlook - 6 to 10 Day



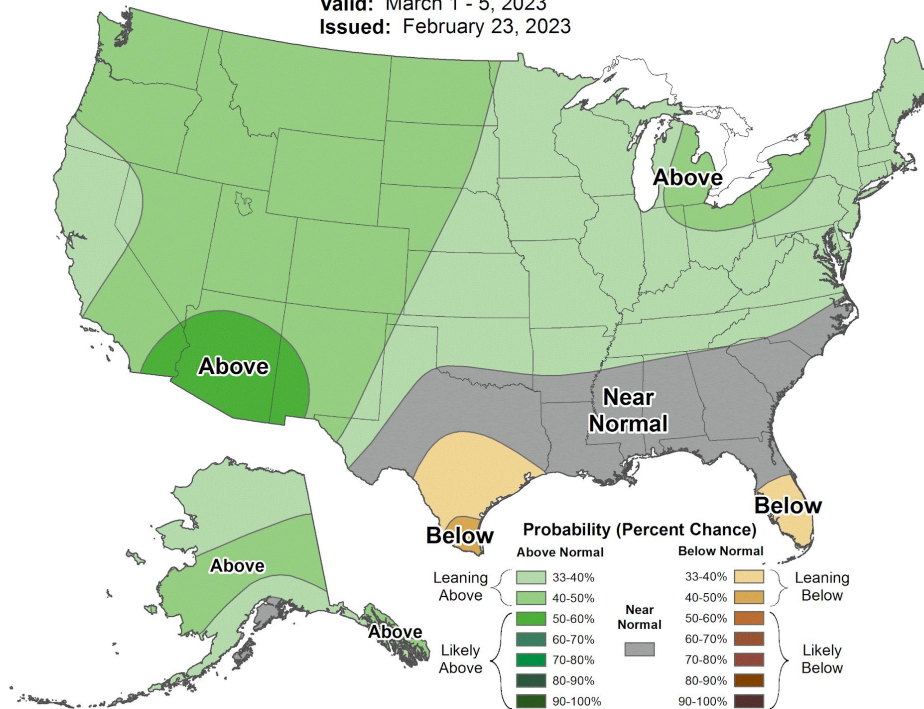
6-10 Day Temperature Outlook

Valid: March 1 - 5, 2023
Issued: February 23, 2023



6-10 Day Precipitation Outlook

Valid: March 1 - 5, 2023
Issued: February 23, 2023





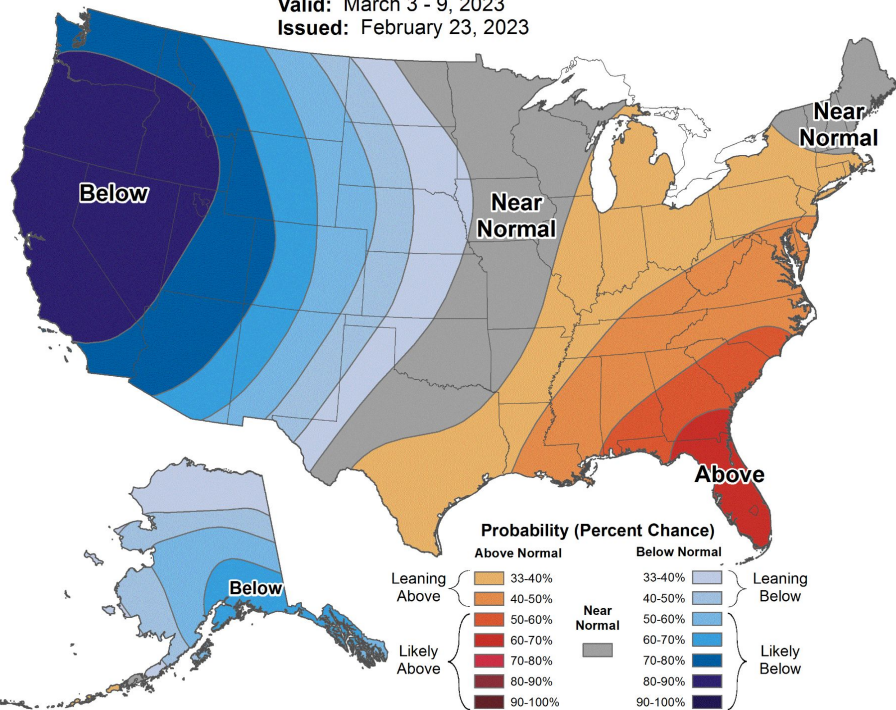
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Temperature and Precipitation Outlook - 8 to 14 Day



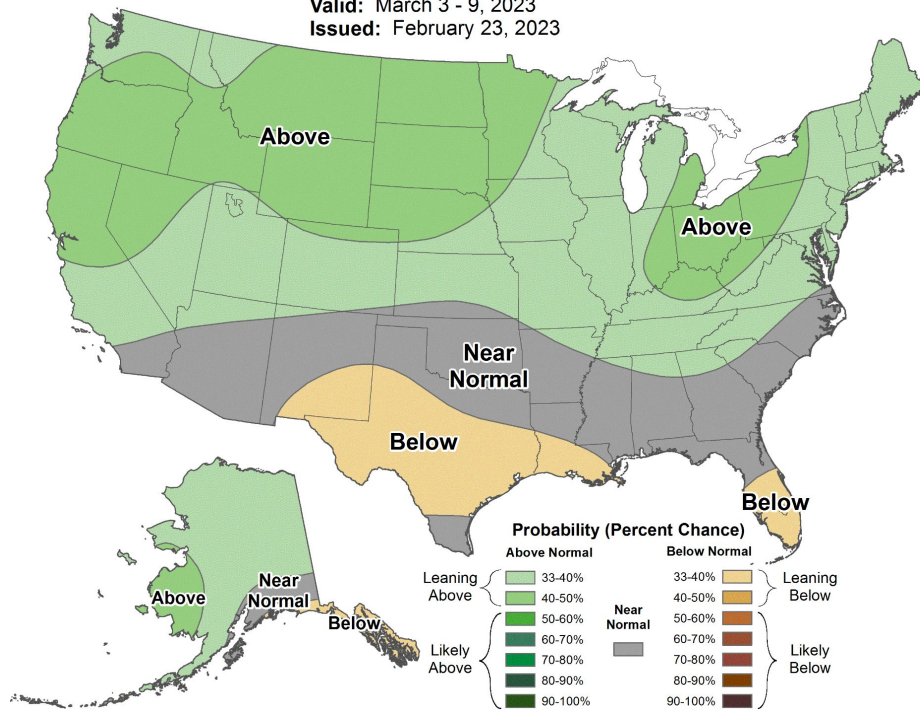
8-14 Day Temperature Outlook

Valid: March 3 - 9, 2023
Issued: February 23, 2023



8-14 Day Precipitation Outlook

Valid: March 3 - 9, 2023
Issued: February 23, 2023





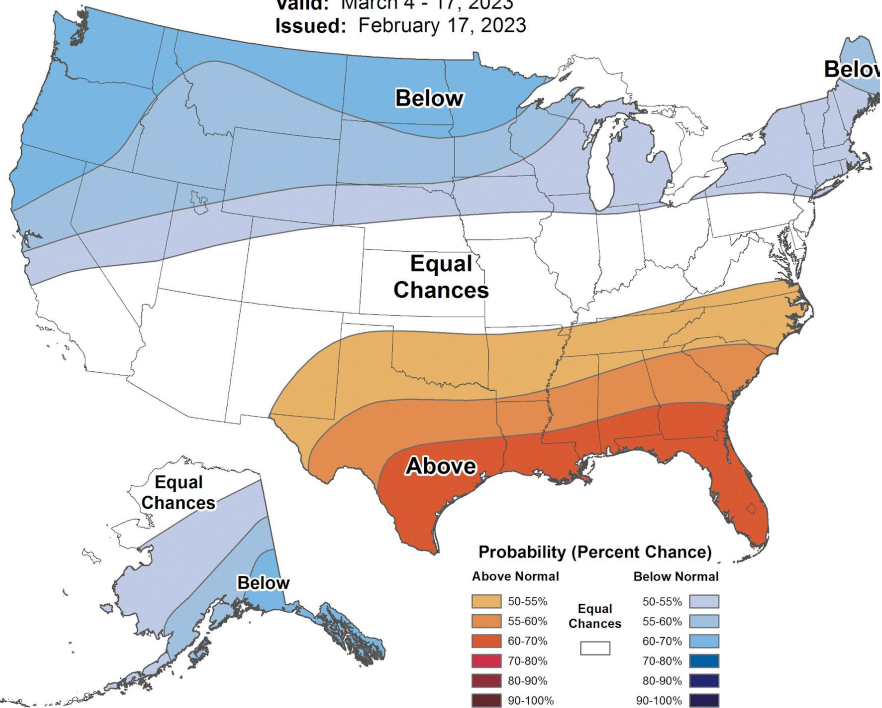
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Temperature and Precipitation Outlook - 3 to 4 Week



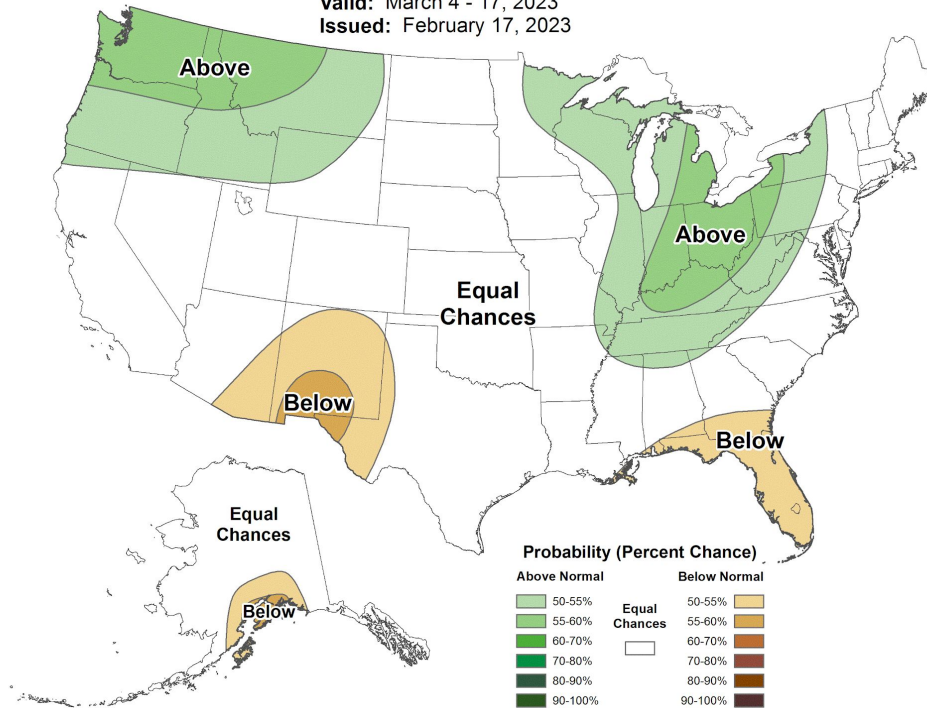
Weeks 3-4 Temperature Outlook

Valid: March 4 - 17, 2023
Issued: February 17, 2023



Weeks 3-4 Precipitation Outlook

Valid: March 4 - 17, 2023
Issued: February 17, 2023





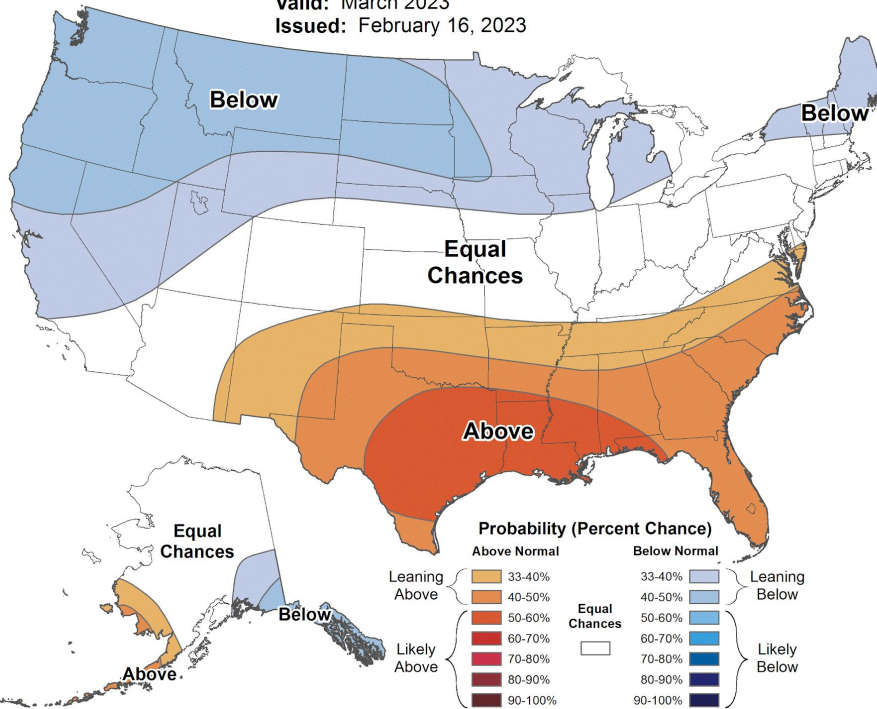
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Temperature and Precipitation Outlook - March



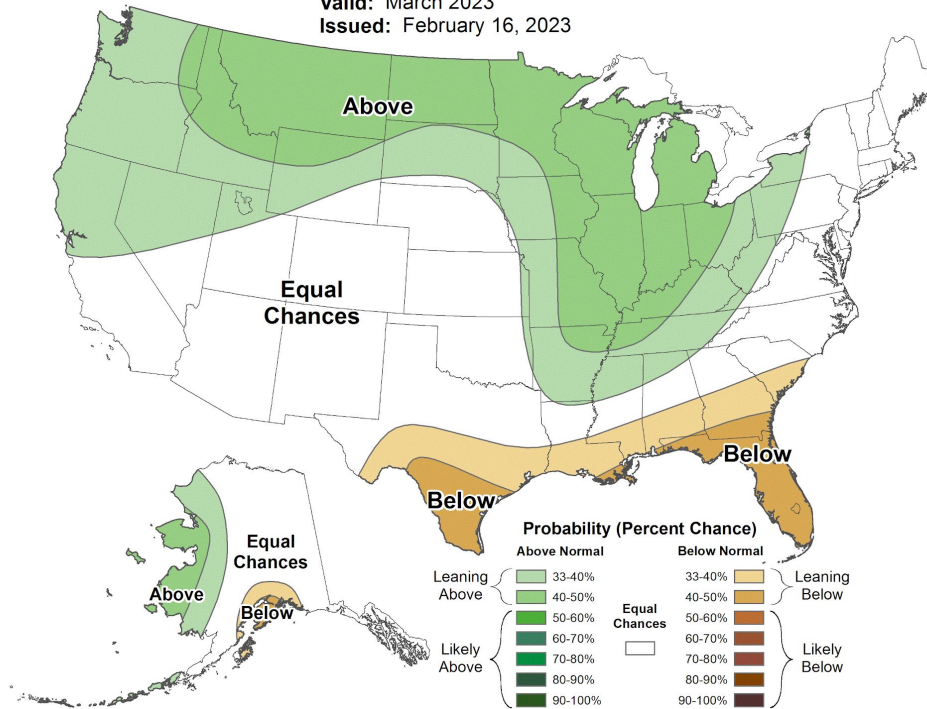
Monthly Temperature Outlook

Valid: March 2023
Issued: February 16, 2023



Monthly Precipitation Outlook

Valid: March 2023
Issued: February 16, 2023





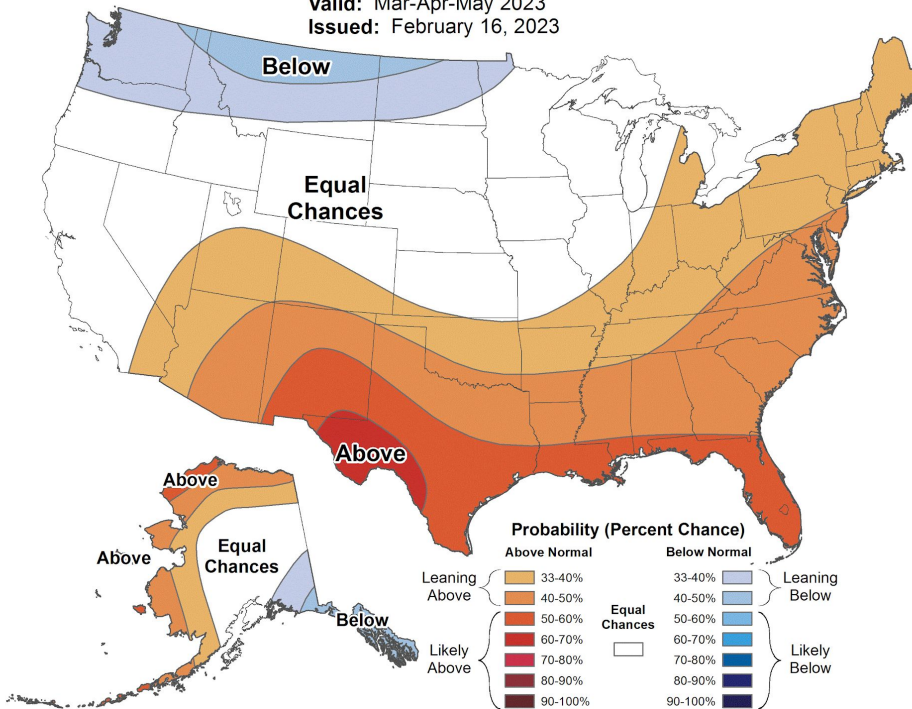
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Temperature and Precipitation Outlook - March through May



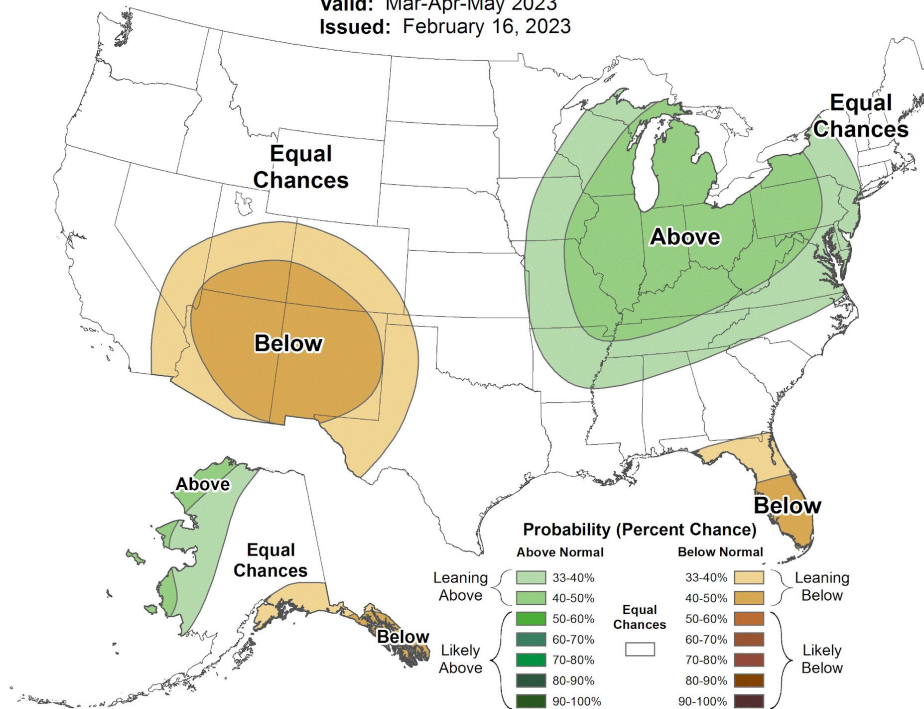
Seasonal Temperature Outlook

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



Seasonal Precipitation Outlook

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

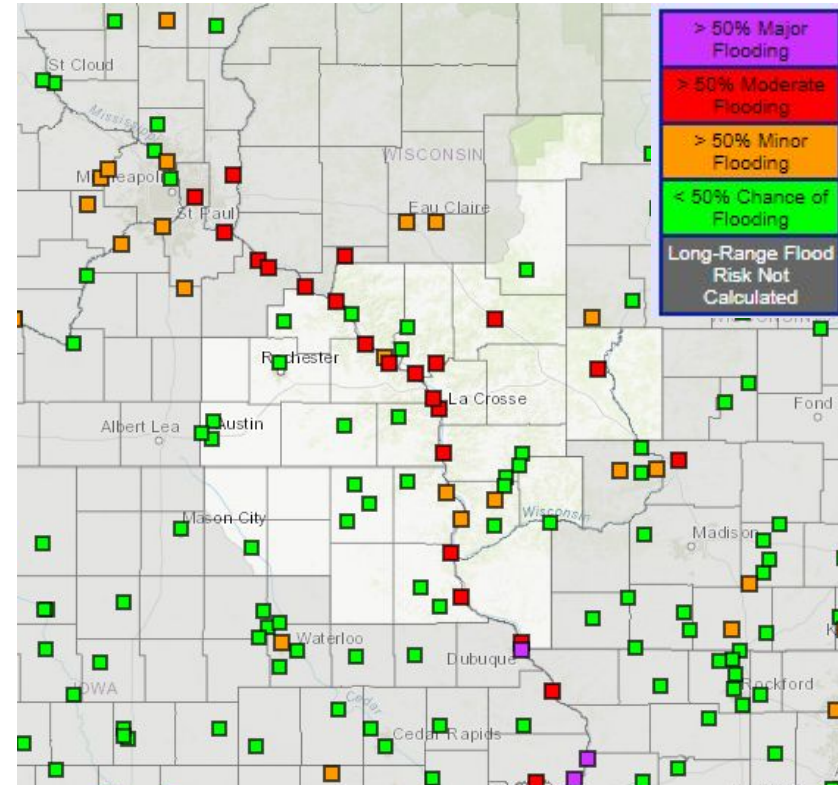




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50% Chance of Exceeding Minor, Moderate, or Major Flood Stage

- 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

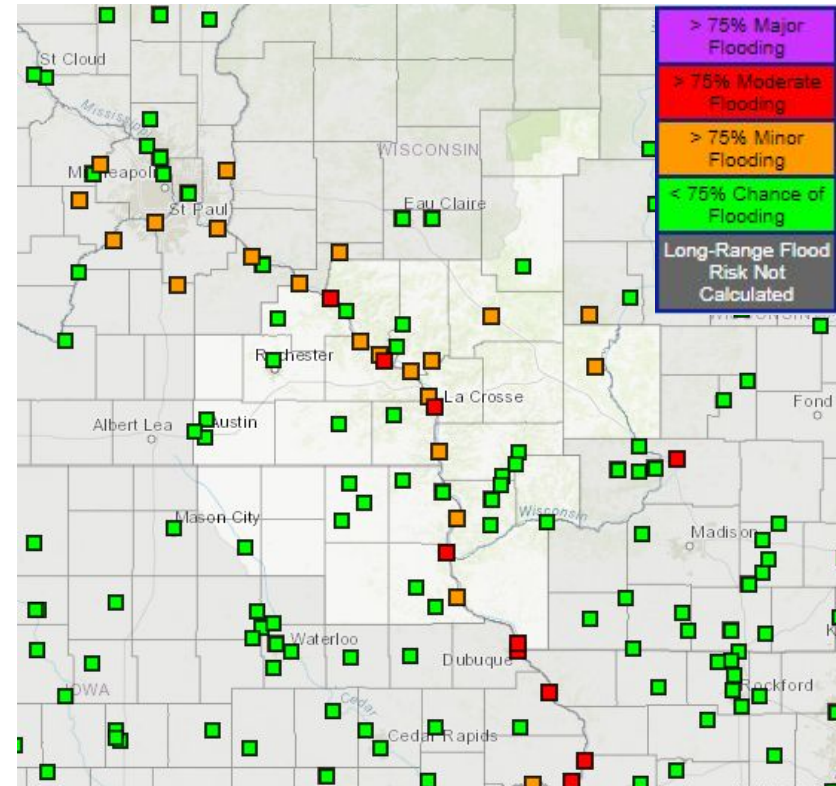




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75% Chance of Exceeding Minor, Moderate, or Major Flood Stage

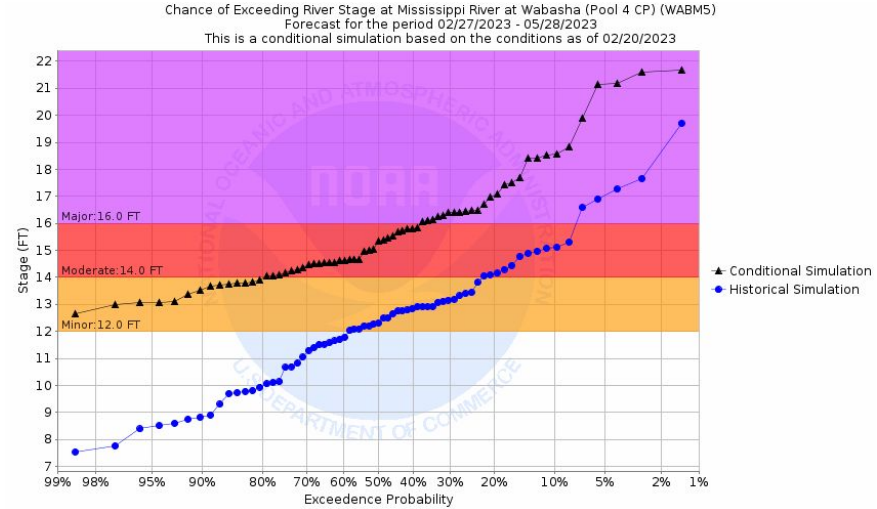
- Points highlighted in orange have a greater than **75% chance** of reaching **minor flood stage** this spring
- Points highlighted in red have a greater than **75% chance** of reaching **moderate flood stage** this spring





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



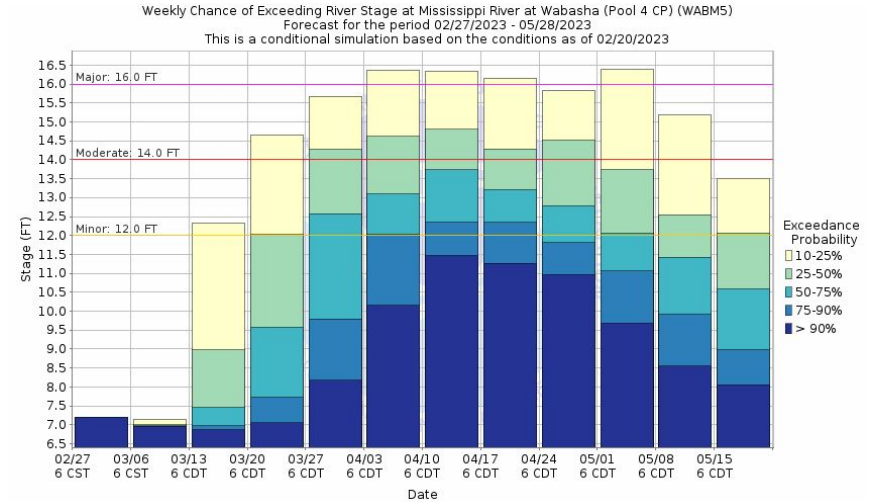
Example from Mississippi River at Wabasha (WABM5)

- Note, black line is to the left of the blue (higher than normal chance)
- >95% (80%) chance of exceeding minor (moderate) flood stage over the next 90 days



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 in the 2nd to 3rd week of March, best chance of reaching minor flood stage is mid-April



Summary - What has changed in the last two weeks?

- Chances for flooding this spring have increased due to recent precipitation - this doesn't mean every river has above normal chances for flooding this spring, nor does it guarantee flooding.
 - Even with high probabilities of flooding this spring, a slow and steady melt, with little to no additional precipitation will lower the flood risk significantly.
- 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.

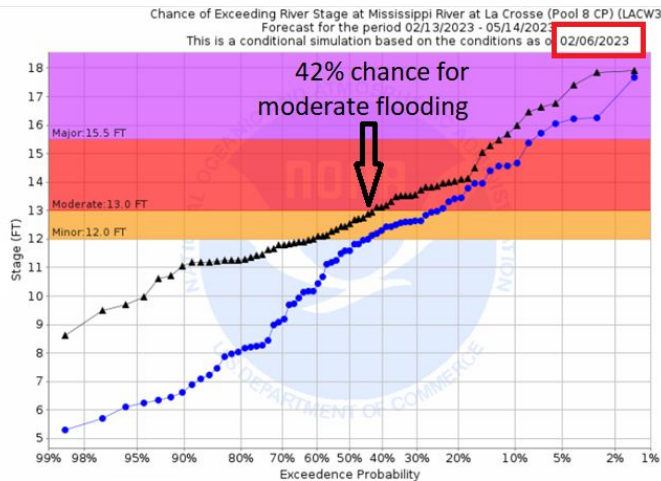
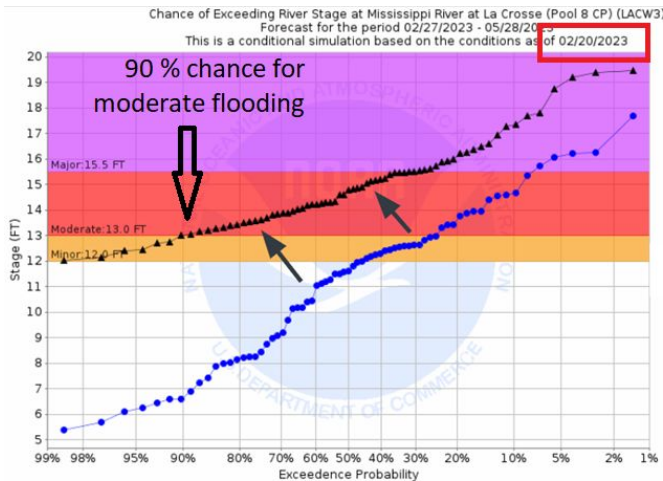


Image:

Comparison of Mississippi River at La Crosse exceedance probabilities this spring from 2nd (left) outlook and 1st (right) outlook

▲ Conditional Simulation
● Historical Simulation





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](#)
- [2nd Spring Flood Outlook Text Information](#)

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

Next Spring Flood Outlook Update: Thursday, March 9th, 2023