



2023 Spring Flood & Water Resources Outlook Update

Released Thursday, March 23rd





Bottom Line, Up Front: What has changed from the last outlook on March 9th?

- An above normal chance for flooding this spring remains across most of our region's rivers
 - Chances for springtime flooding along the **Mississippi Tributaries have decreased**, but chances remain near-normal
 - Chances for springtime flooding along the **Mississippi mainstem remains well above-normal**
 - Chances for significant flooding (moderate to major) on the Mississippi remain - the snowpack remains well above-normal and March brought below normal temperatures
- Continued below normal temperatures are expected through at least the first week of April - leading to a continued slower snowmelt
 - Timeline for highest chances of flooding have shifted back 1 to 2 weeks.
 - The longer we keep the snowpack, the higher the chances are that we will see temperatures climb into the 50s and 60s - leading to a quick melt and potentially more severe flooding
 - 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 Wisconsin	Near Normal
Mississippi Tributaries in Iowa	Near to Below Normal



Spring 2023 Flood Outlook Summary

- Current conditions suggest much above normal risk for the Mississippi mainstem, near to below normal risk for the Mississippi Tributaries in Iowa, and near normal risks for the Mississippi Tributaries in Minnesota and Wisconsin.
 - Near normal river levels & soil moisture
 - **Well above normal snowpack** in Upper Mississippi River Basin
 - Little snowpack remains south of Interstate 90
 - 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
- The longer we hold on to the snowpack across the Upper Mississippi River Basin, the higher the chances are that we will see temperatures jump into the 50s and 60s with the snowpack remaining. This scenario would like to a rapid snowmelt and bring a greater chance of more significant flooding.



NWS La Crosse 2023 Spring Flood Outlook Update

Thursday, March 23rd, 2023

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	Decreased risk	Neutral
Past Precipitation	Increased Risk	Neutral	Neutral	Increased Risk
Temperature Outlook	Increased Risk	Neutral to Increased Risk	Neutral to Increased Risk	Increased Risk
Precipitation Outlook	Neutral to Increased Risk	Neutral to Increased Risk	Neutral to Increased Risk	Neutral to Increased Risk

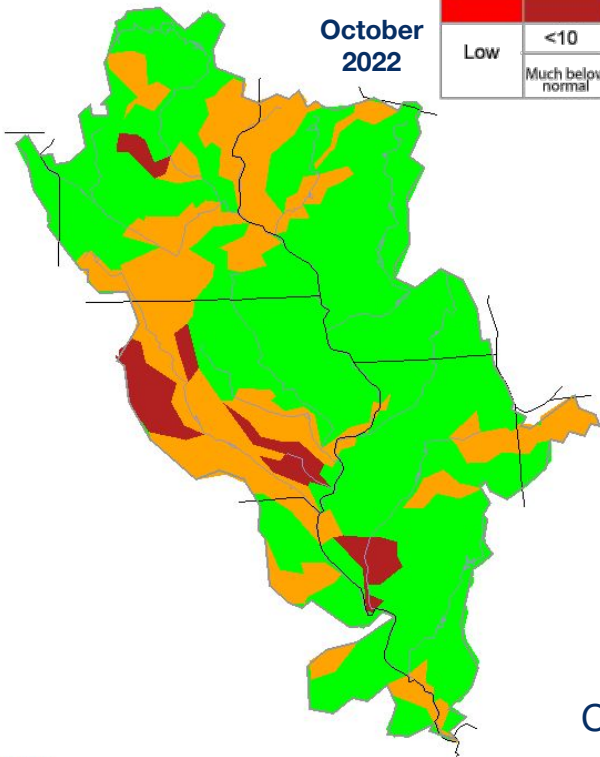




River Levels along the Upper Mississippi Basin - October 2022 vs the last 4 weeks

October 2022

October
2022

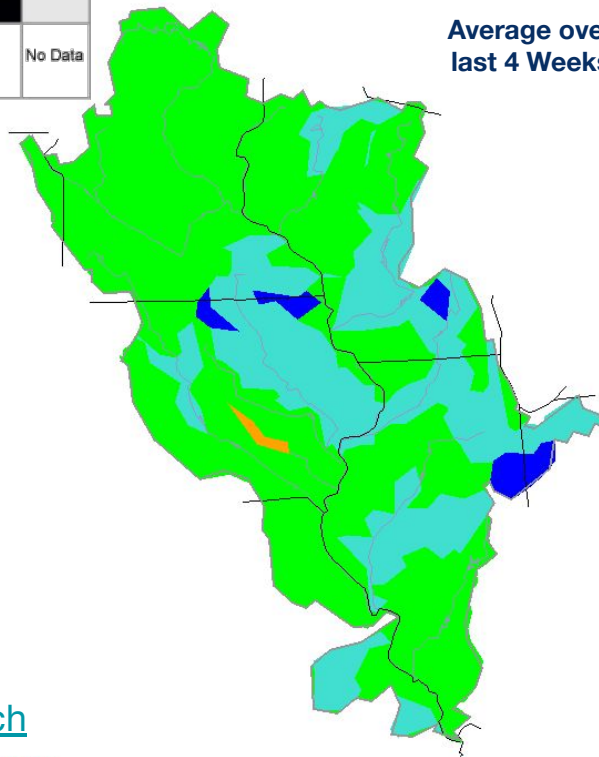


Explanation - Percentile classes

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

Tuesday, March 21, 2023

Average over
last 4 Weeks



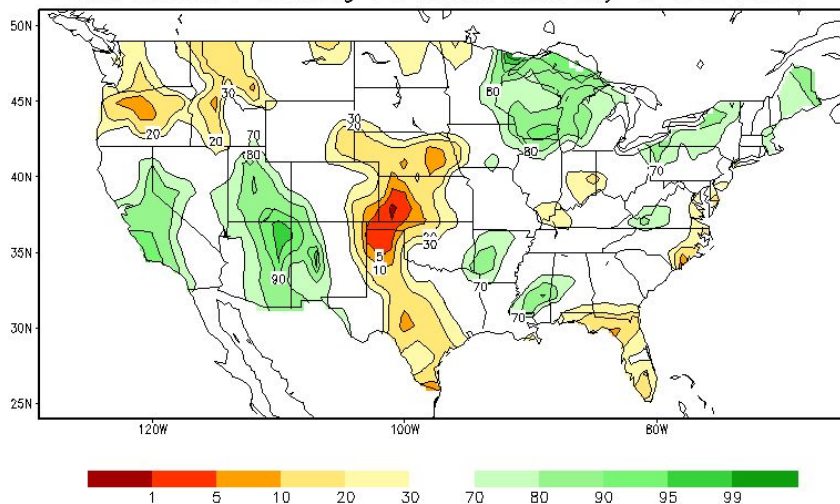
Credit: [USGS WaterWatch](#)



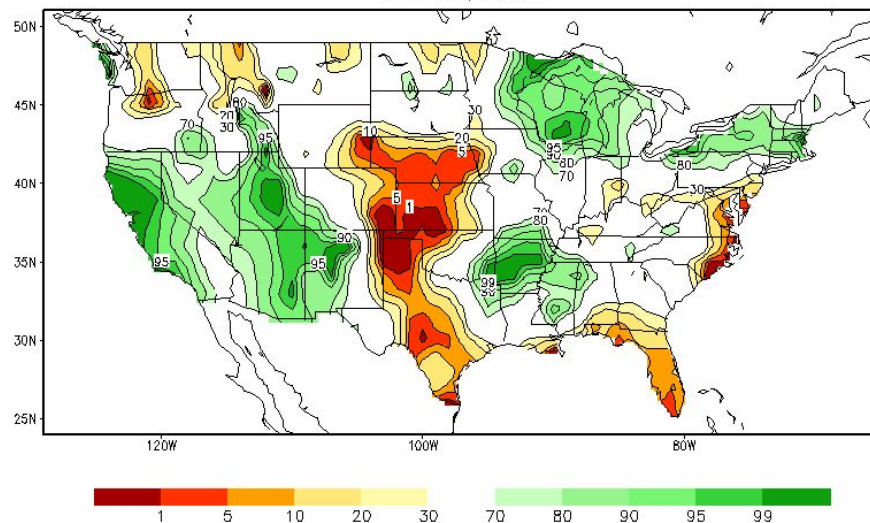


Soil Moisture along the Upper Mississippi Basin - Change from Last Day of February

Soil Moisture Ranking Percentile Last day of FEB, 2023



Calculated Soil Moisture Ranking Percentile
MAR 21, 2023





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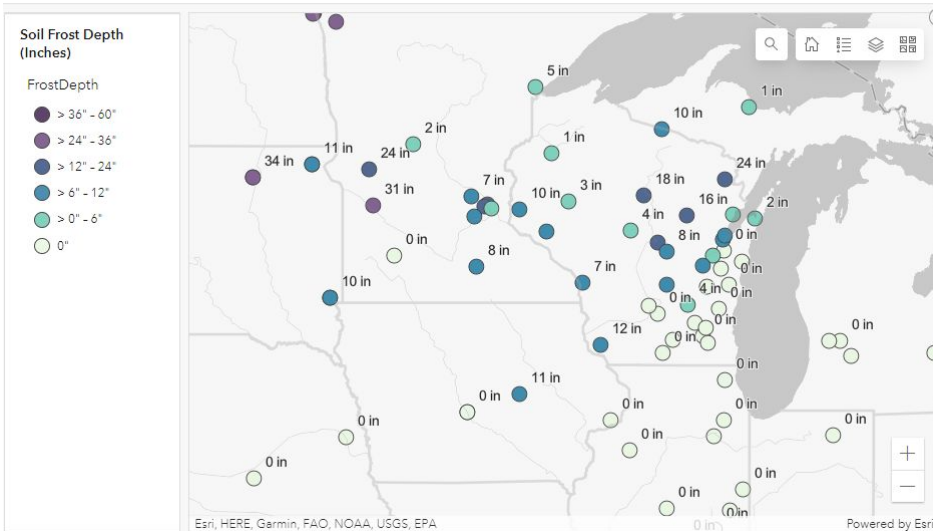
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Frost Depths in the Last 2 Weeks - About the Same, Slight Trend Downward

Frost Depth (inches)

In regions of the central U.S.

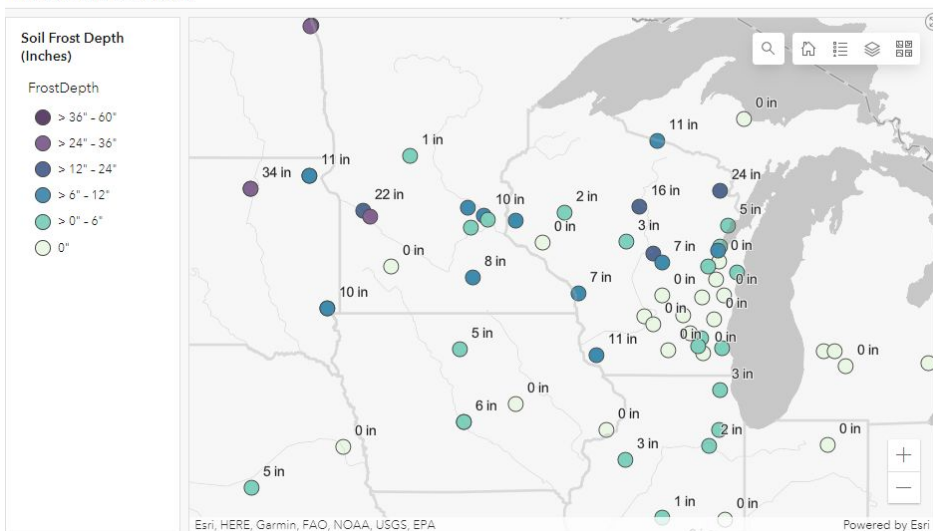
March 8th, 2023



Frost Depth (inches)

In regions of the central U.S.

March 22nd, 2023



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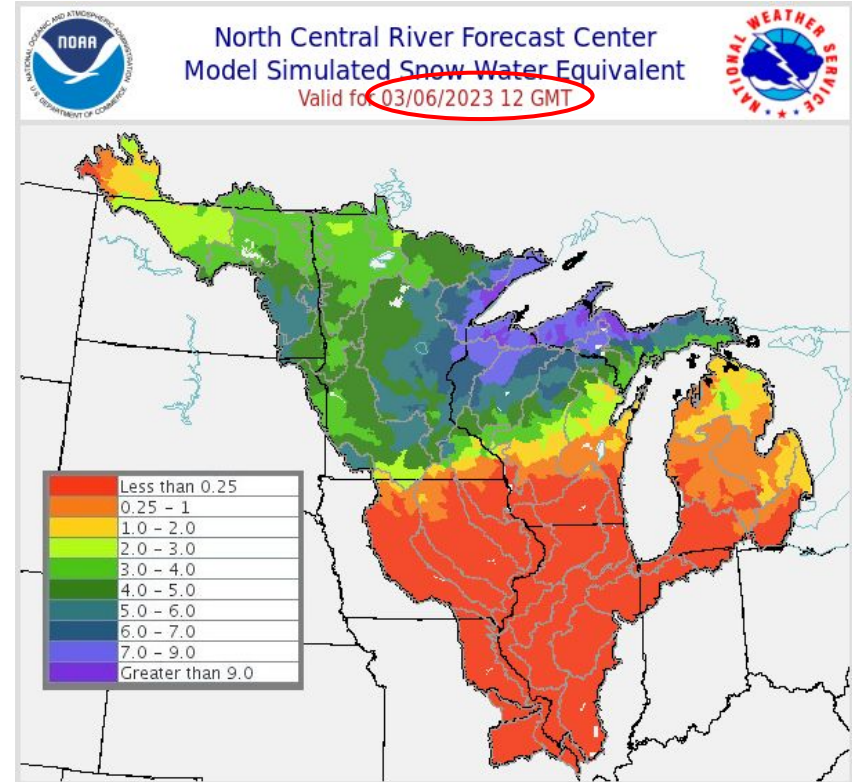
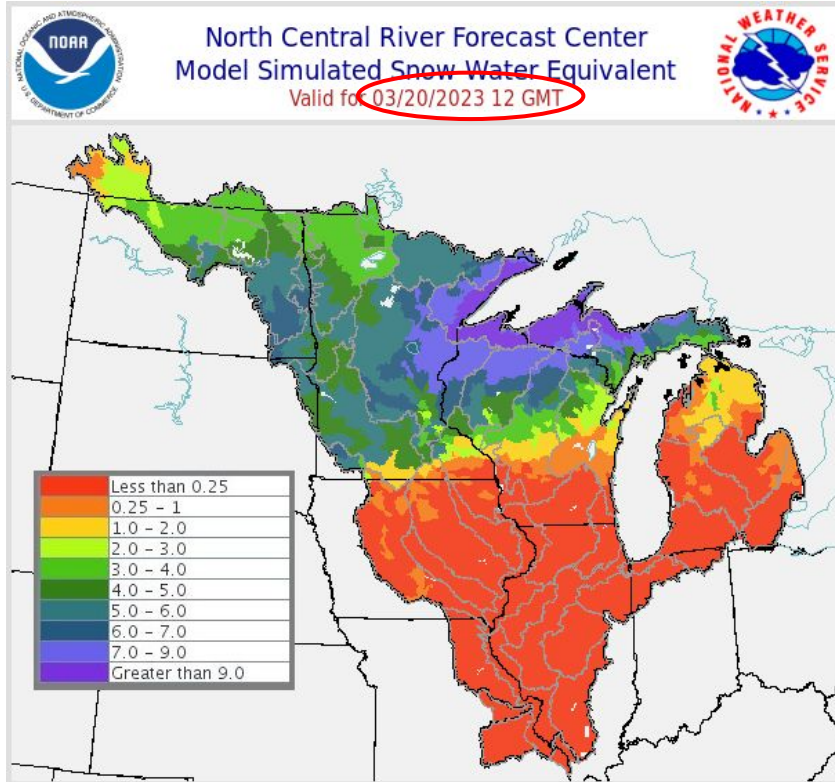
National Weather Service
La Crosse, Wisconsin



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Thursday, March 23rd, 2023

Monday's Snow Water Equivalent (Amount of Water in Snowpack) Compared to Two Weeks Ago



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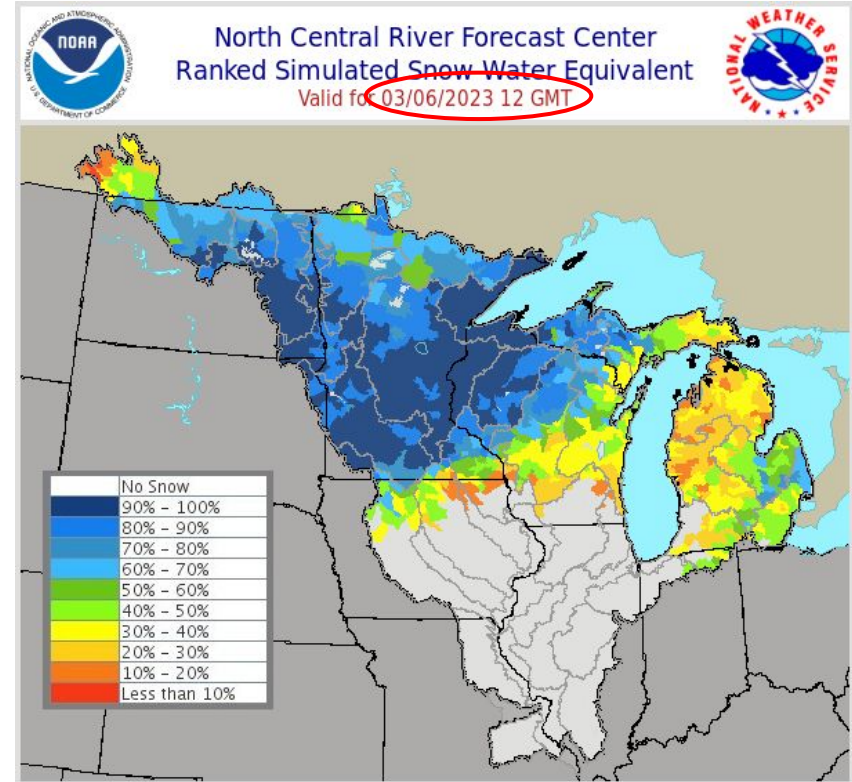
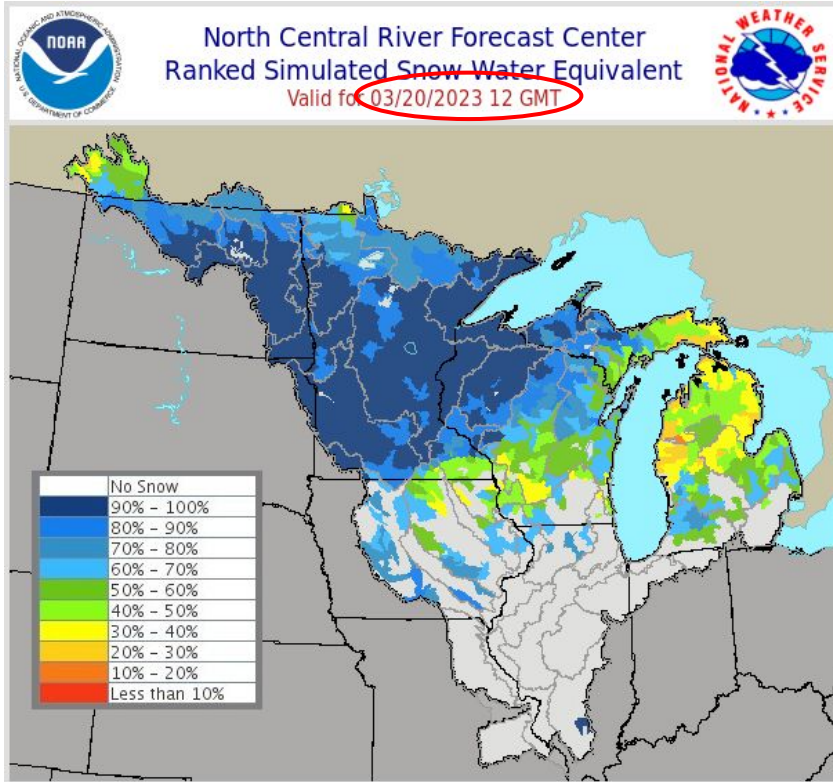
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Thursday, March 23rd, 2023

Snow Water Equivalent Percentile (as of Monday morning) Compared to Two Weeks Ago





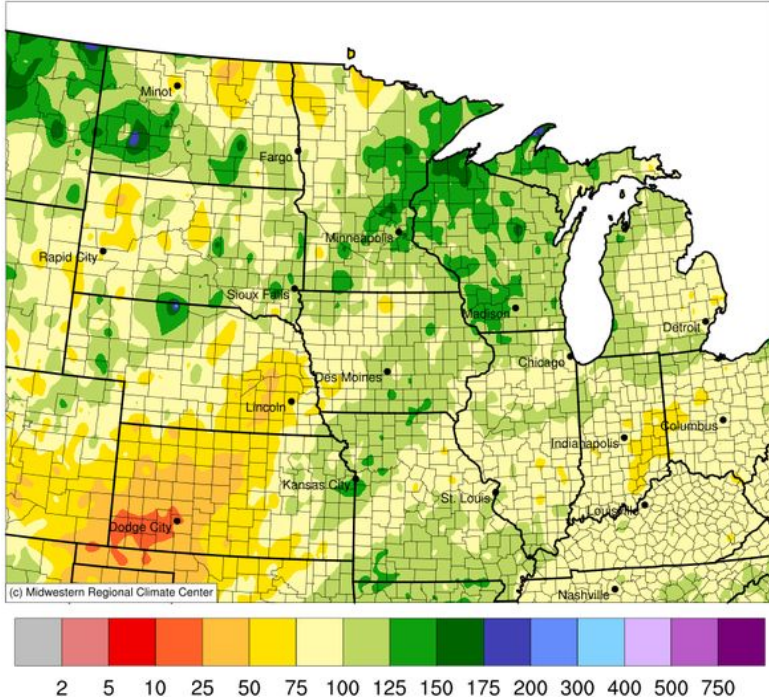
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Thursday, March 23rd, 2023

Water Year Precipitation Compared to Normal

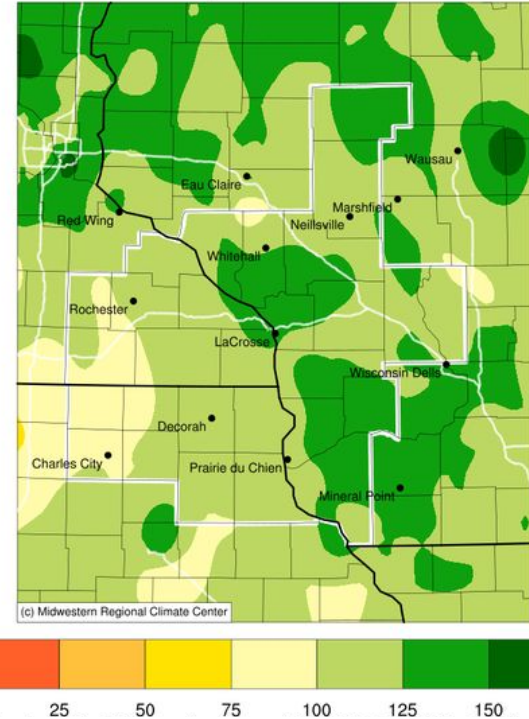
Accumulated Precipitation (in): Percent of 1991-2020 Normals

October 01, 2022 to March 22, 2023



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

October 01, 2022 to March 22, 2023



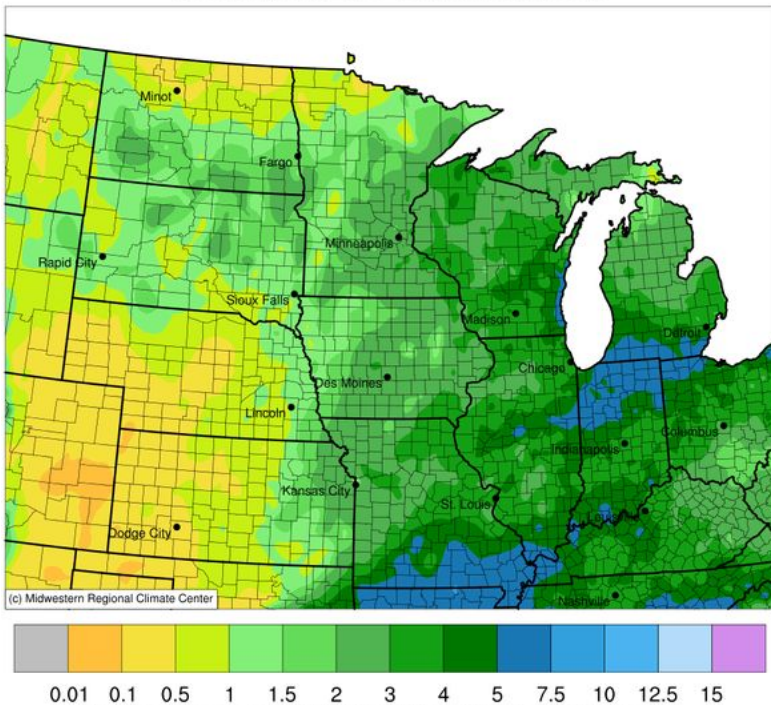
National Oceanic and
Atmospheric Administration
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National Weather Service
La Crosse, Wisconsin

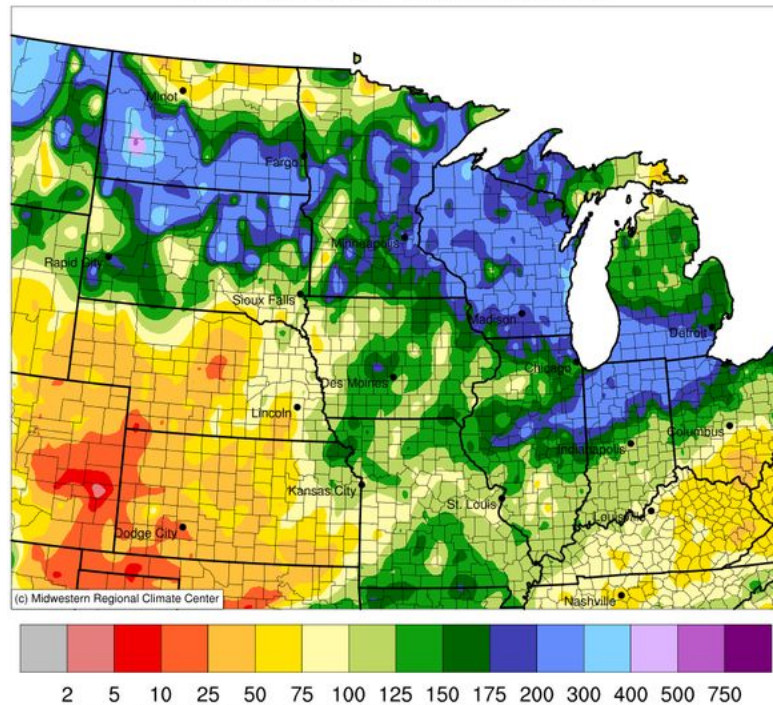


Precipitation Trends in the Last 30 Days

Accumulated Precipitation (in)
February 21, 2023 to March 22, 2023



Accumulated Precipitation (in): Percent of 1991-2020 Normals
February 21, 2023 to March 22, 2023





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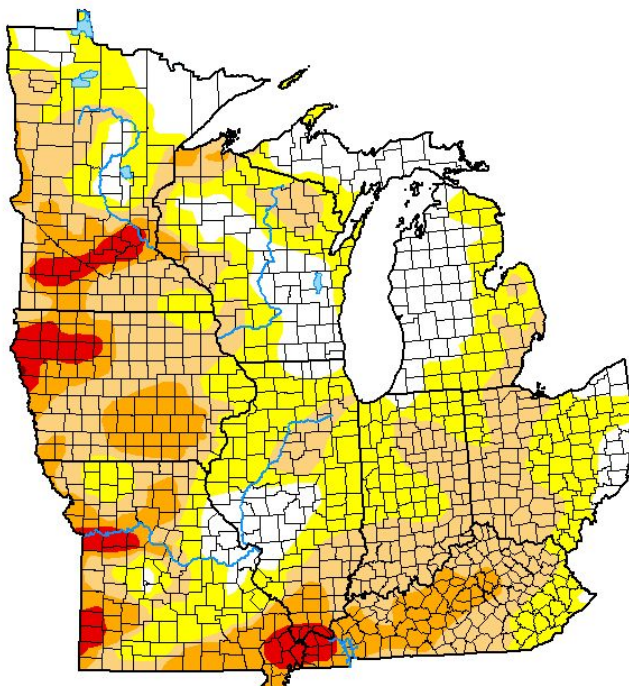
Thursday, March 23rd, 2023

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

U.S. Drought Monitor

Midwest

Nov 1 2022

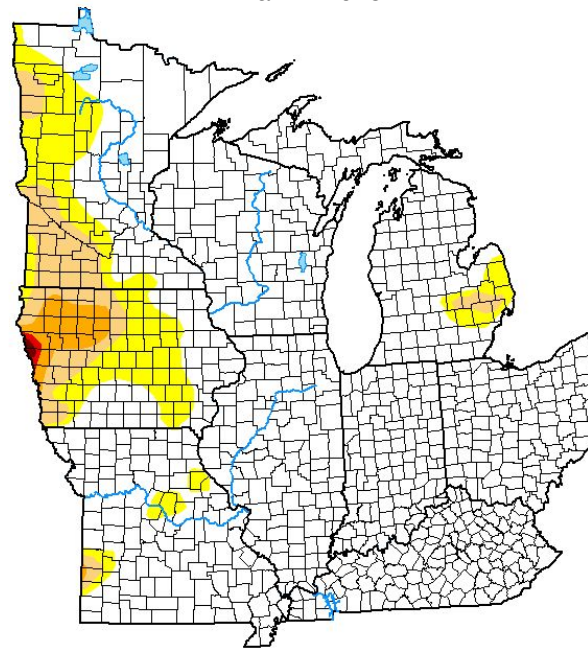


[Drought](#)
[Monitor](#)

U.S. Drought Monitor

Midwest

Mar 21 2023

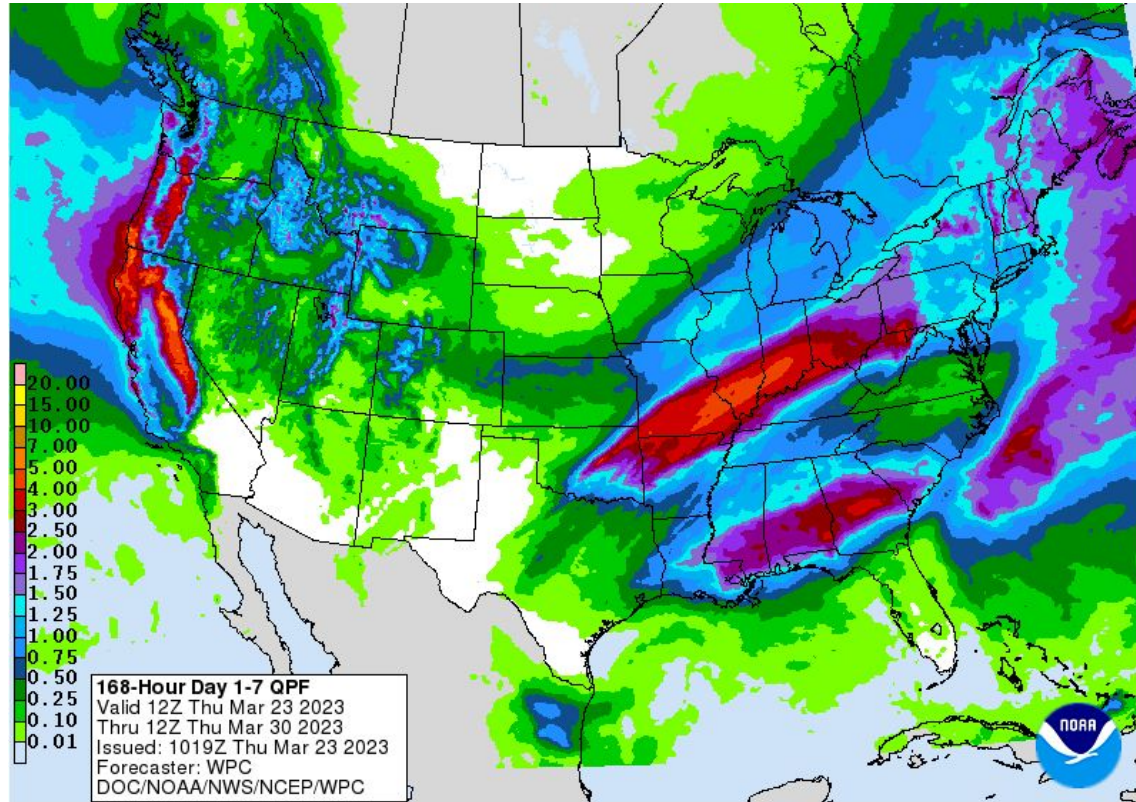


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Precipitation Forecast for the Next 7 Days



*Note this is liquid equivalent precipitation, not snowfall amounts



NWS La Crosse 2023 Spring Flood Outlook Update

Thursday, March 23rd, 2023

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

Weekly Summary

	Thu Mar 23	Fri Mar 24	Sat Mar 25	Sun Mar 26	Mon Mar 27	Tue Mar 28	Wed Mar 29
Max Temp, °F	34	37	39	36	34	30	38
Min Temp, °F	13	3	20	19	19	12	17
Min Wind Chill, °F	5	-4	12	9	7	-1	4
Max Wind, mph	6	7	14	12	14	13	13
Min Wind, mph	3	2	3	6	7	9	10
Max Wind Gust, mph	9	12	21	18	21	20	21
Max Cloud Cover, %	37	62	75	53	73	57	58
Min Cloud Cover, %	12	19	37	28	29	24	40
Max Prob. of Precip., %	0	0	1	1	7	9	23
Max Prob. of Thunder, %	0	0	0	1	1	0	1
Max RH, %	92	100	88	88	84	73	74
Min RH, %	49	54	57	54	51	41	50
Max Dew Point, °F	17	22	24	20	18	11	21
Min Dew Point, °F	9	3	17	15	11	5	10





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Thursday, March 23rd, 2023

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

Weekly Summary

	Thu Mar 23	Fri Mar 24	Sat Mar 25	Sun Mar 26	Mon Mar 27	Tue Mar 28	Wed Mar 29
Max Temp, °F	37	41	39	41	40	35	39
Min Temp, °F	23	16	25	23	24	21	21
Min Wind Chill, °F	16	7	13	12	14	9	9
Max Wind, mph	9	13	16	13	12	15	16
Min Wind, mph	5	5	13	7	7	9	9
Max Wind Gust, mph	14	18	29	18	18	23	24
Max Cloud Cover, %	78	40	85	58	77	65	71
Min Cloud Cover, %	10	6	48	30	62	28	44
Max Prob. of Precip., %	1	2	22	2	13	11	34
Max RH, %	87	92	81	92	88	84	78
Min RH, %	52	52	54	52	57	47	54
Max Dew Point, °F	23	25	24	25	25	22	26
Min Dew Point, °F	18	11	19	21	21	15	14



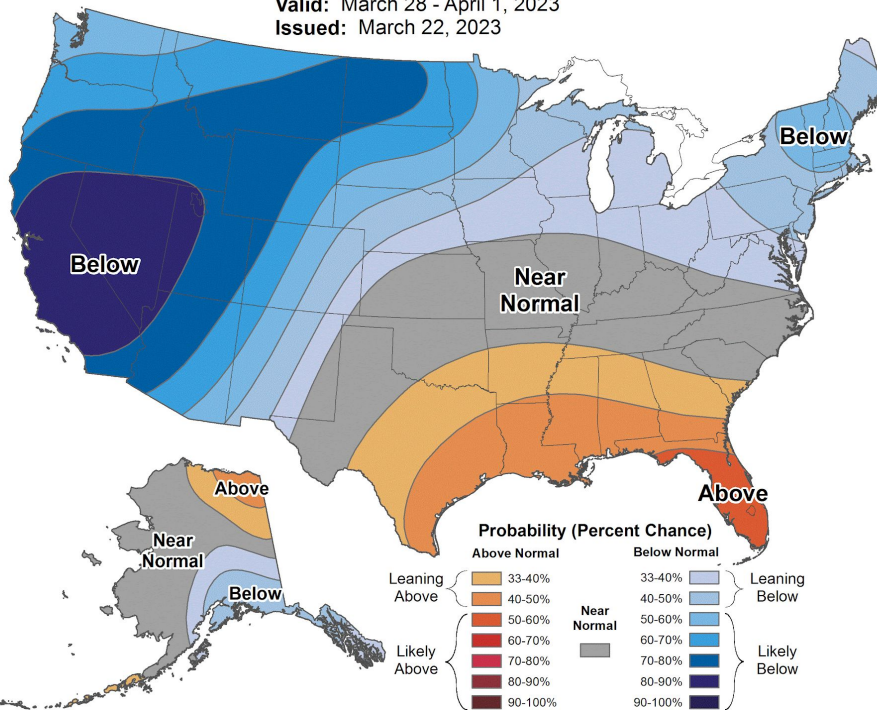


Temperature and Precipitation Outlook - 6 to 10 Day



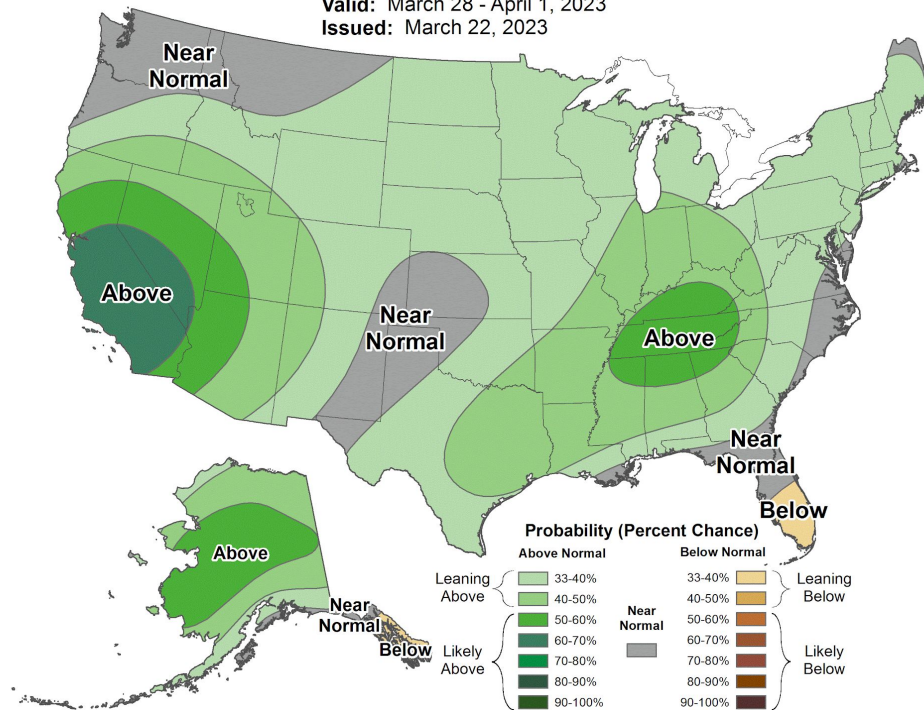
6-10 Day Temperature Outlook

Valid: March 28 - April 1, 2023
Issued: March 22, 2023



6-10 Day Precipitation Outlook

Valid: March 28 - April 1, 2023
Issued: March 22, 2023





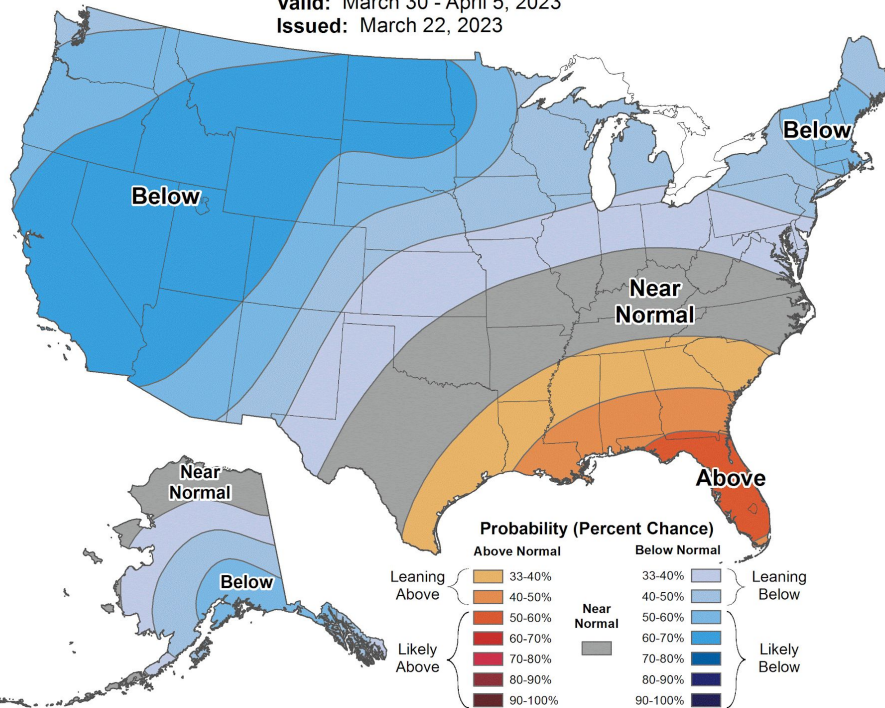
Temperature and Precipitation Outlook - 8 to 14 Day



8-14 Day Temperature Outlook

Valid: March 30 - April 5, 2023

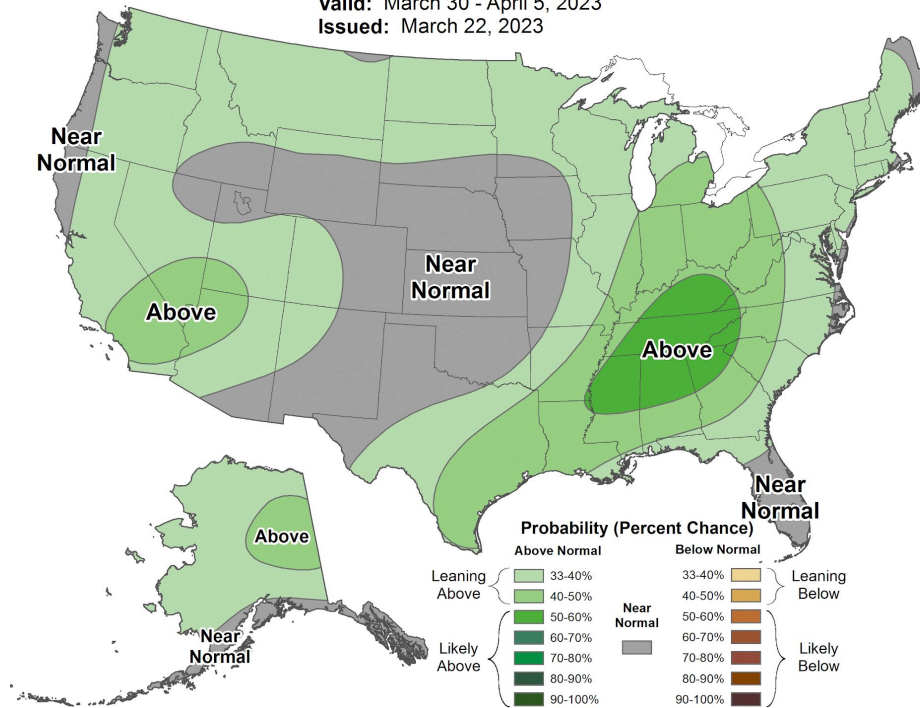
Issued: March 22, 2023



8-14 Day Precipitation Outlook

Valid: March 30 - April 5, 2023

Issued: March 22, 2023





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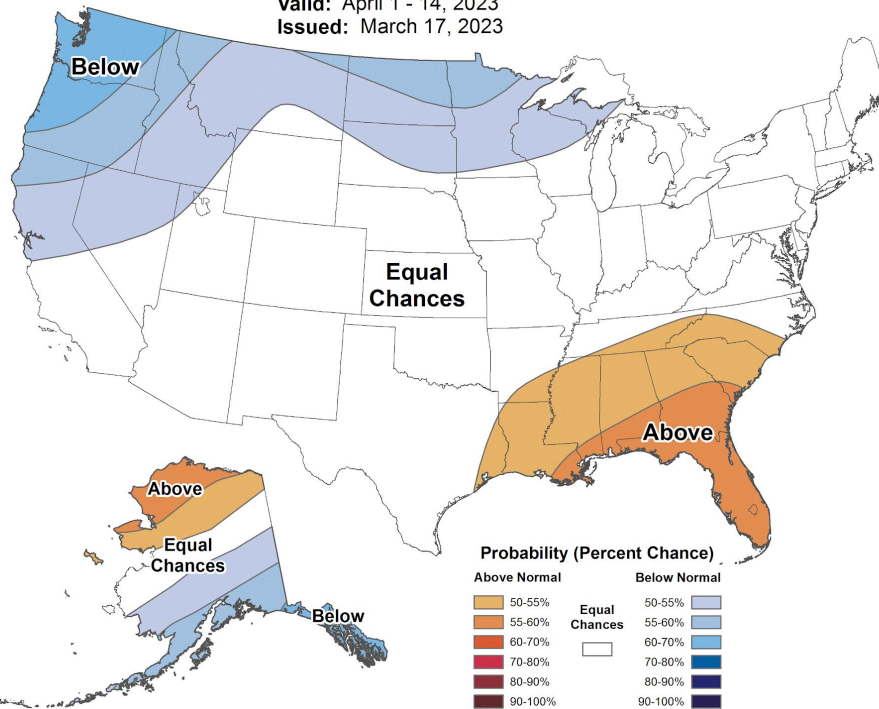
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Temperature and Precipitation Outlook - 3 to 4 Week



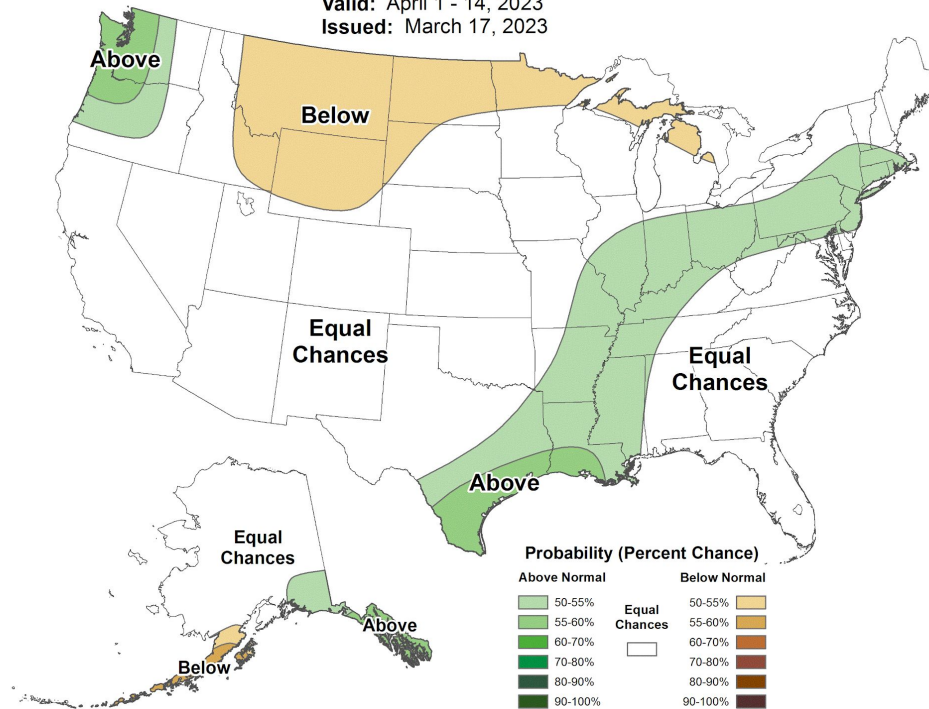
Weeks 3-4 Temperature Outlook

Valid: April 1 - 14, 2023
Issued: March 17, 2023



Weeks 3-4 Precipitation Outlook

Valid: April 1 - 14, 2023
Issued: March 17, 2023



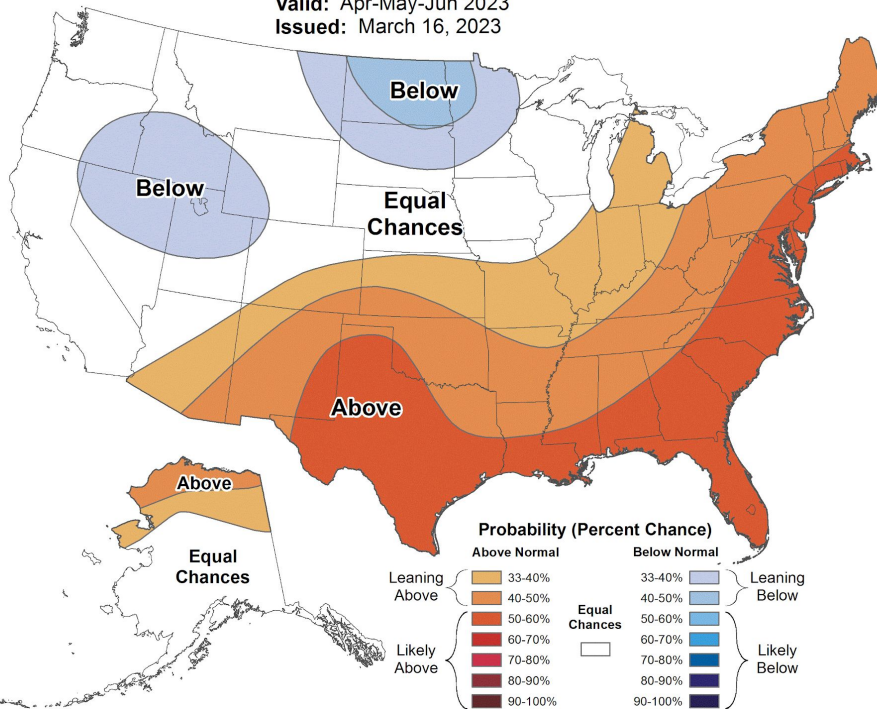


Temperature and Precipitation Outlook - March through May



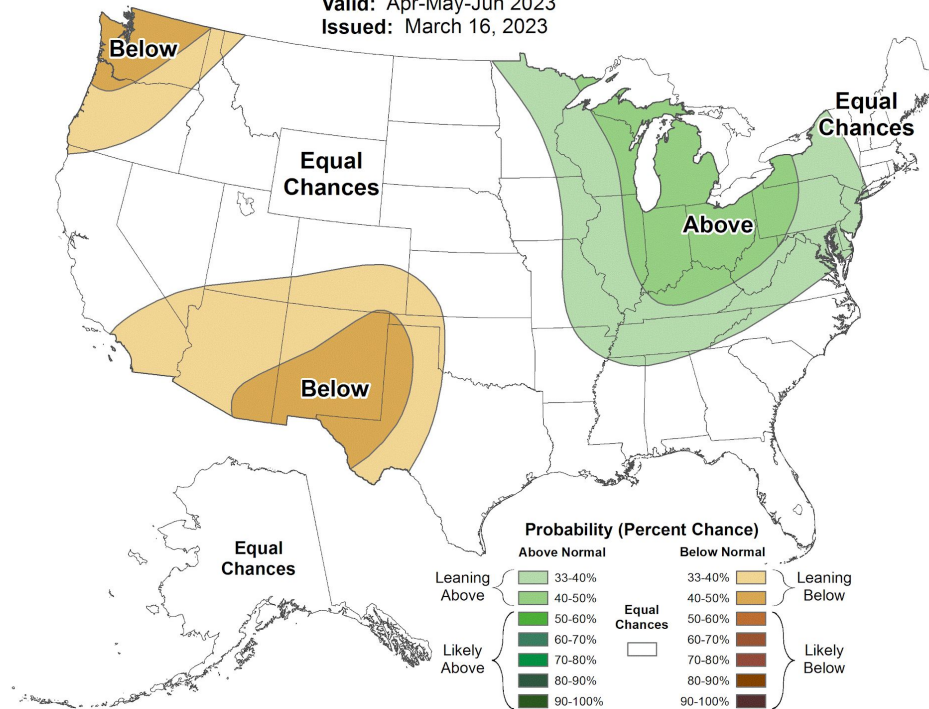
Seasonal Temperature Outlook

Valid: Apr-May-Jun 2023
Issued: March 16, 2023



Seasonal Precipitation Outlook

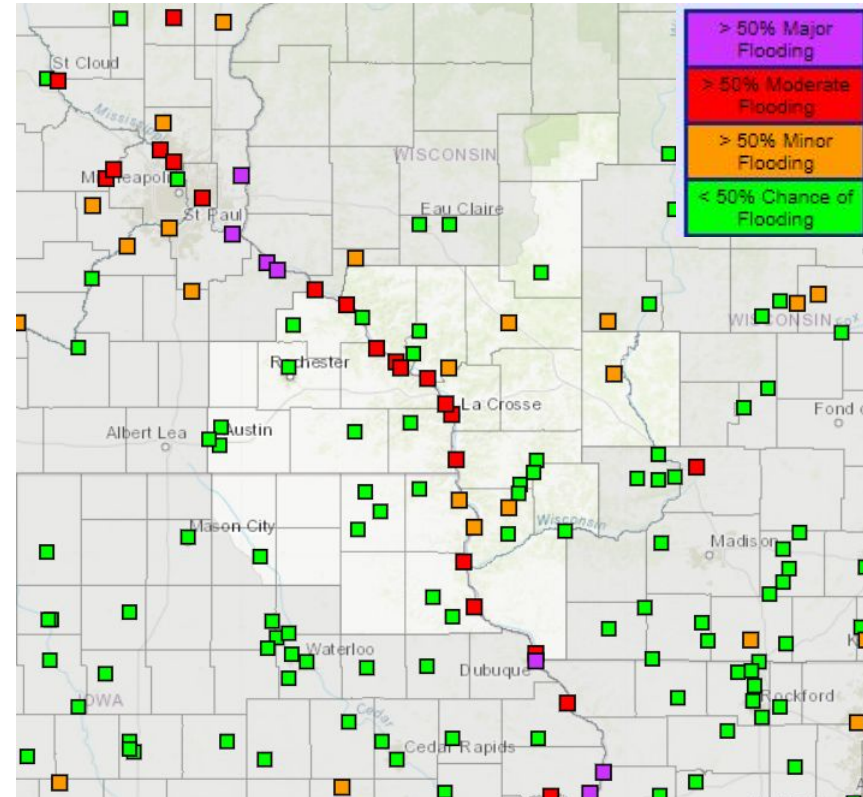
Valid: Apr-May-Jun 2023
Issued: March 16, 2023





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

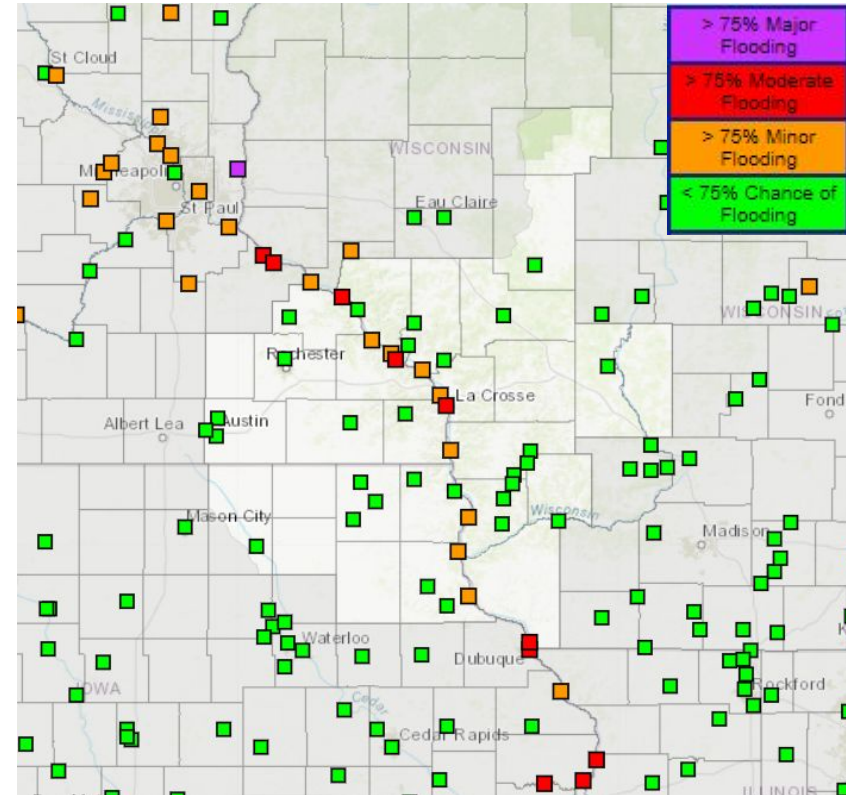
- Points highlighted in orange have a greater than **50% chance** of reaching **minor flood stage** this spring
- Points highlighted in red have a greater than **50% chance** of reaching **moderate flood stage** this spring
- Points highlighted in purple have a greater than **50% chance** of reaching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





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

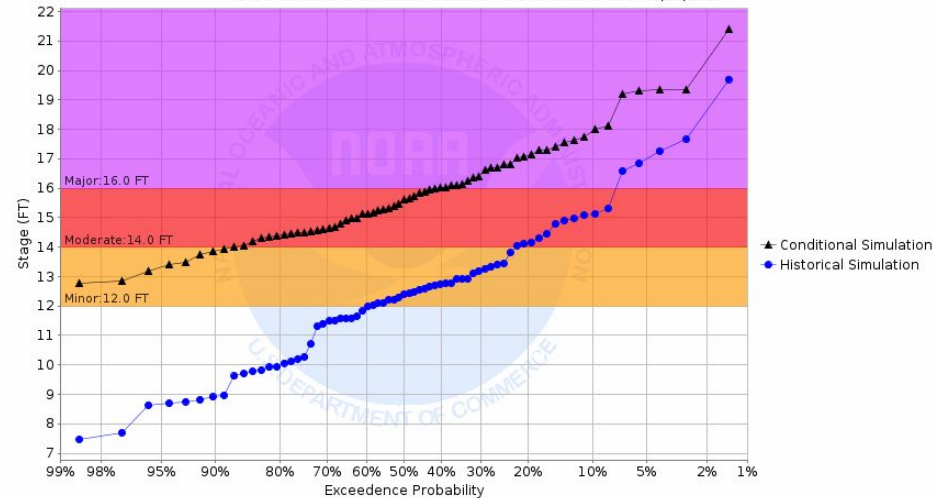
Long Range Flood Risk - [Available on AHPS](#) (Advanced Hydrologic Prediction Service)

- 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

Chance of Exceeding River Stage at Mississippi River at Wabasha (Pool 4 CP) (WABM5)

Forecast for the period 03/27/2023 - 06/25/2023

This is a conditional simulation based on the conditions as of 03/20/2023



Example from Mississippi River at Wabasha (WABM5)

- Note, black line is to the left of the blue (higher than normal chance)
- >95% (88%) chance of exceeding minor (moderate) flood stage over the next 90 days

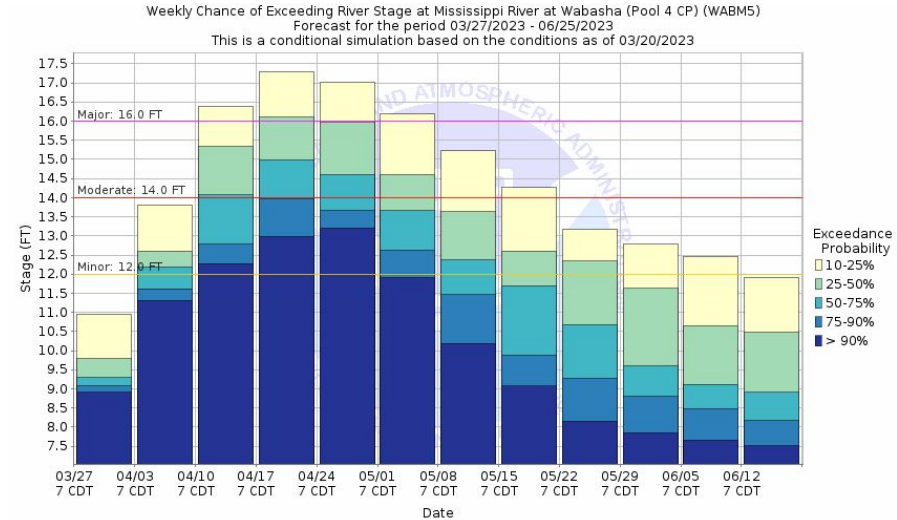




Long-Range River Level Probabilistic Info - Chance of Exceeding Levels by Week This Spring

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 2023 Spring Flood Outlook Update

Thursday, March 23rd, 2023

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

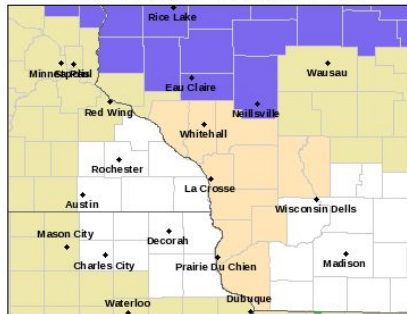
High: 39°F

NWS Forecast Office La Crosse, WI

[Weather.gov](#) > La Crosse, WI

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Rivers and Lakes](#) [Climate and Past Weather](#)

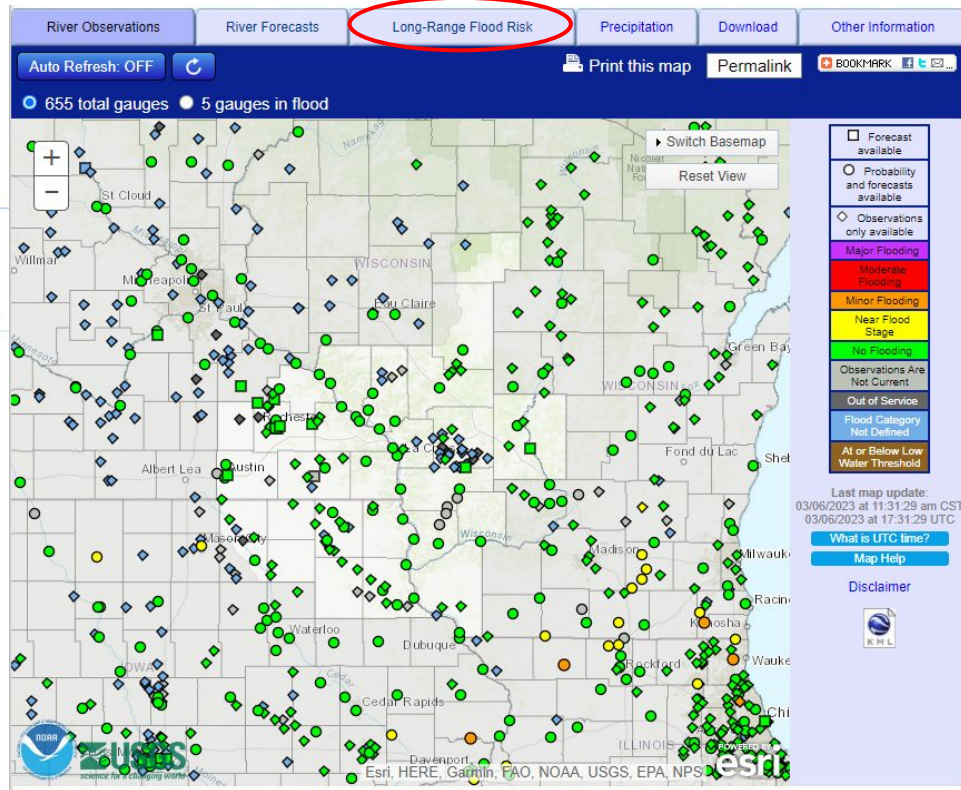
Click a location below for detailed forecast.



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

[Watches,
Warnings &
Advisories](#)

[Flood Warning](#)
[Winter Weather
Advisory](#)
[Special Weather
Statement](#)
[Hazardous Weather
Outlook](#)



Last map update:
03/06/2023 at 11:31:29 am CST
03/06/2023 at 17:31:29 UTC

[What is UTC time?](#)

[Map Help](#)

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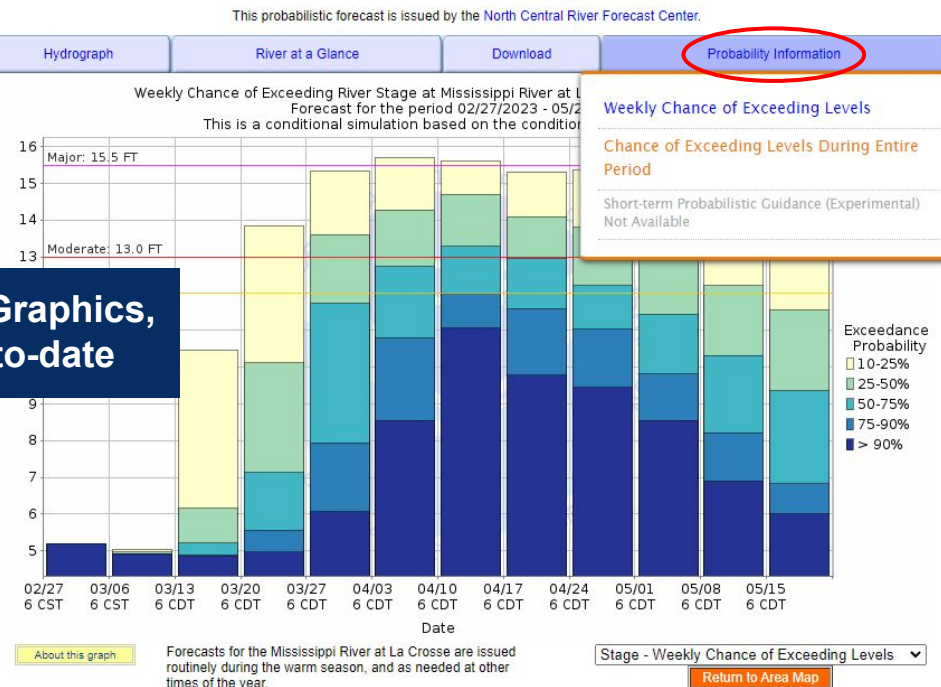
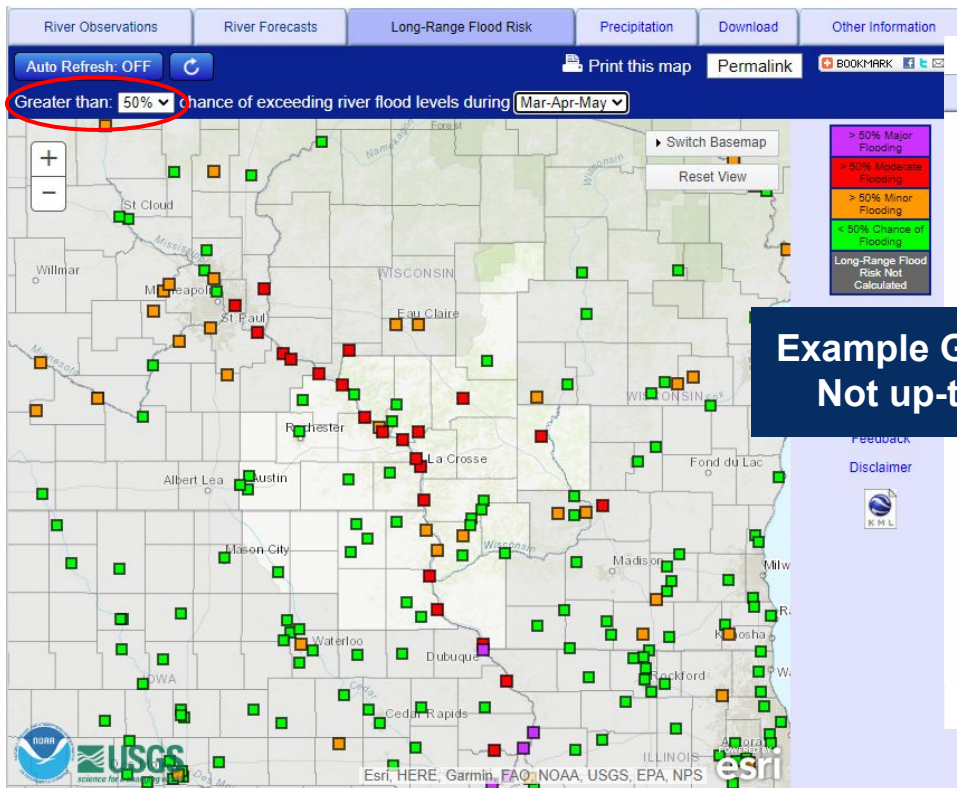
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Thursday, March 23rd, 2023

How to Access Spring Outlook Probabilistic Information on our Website



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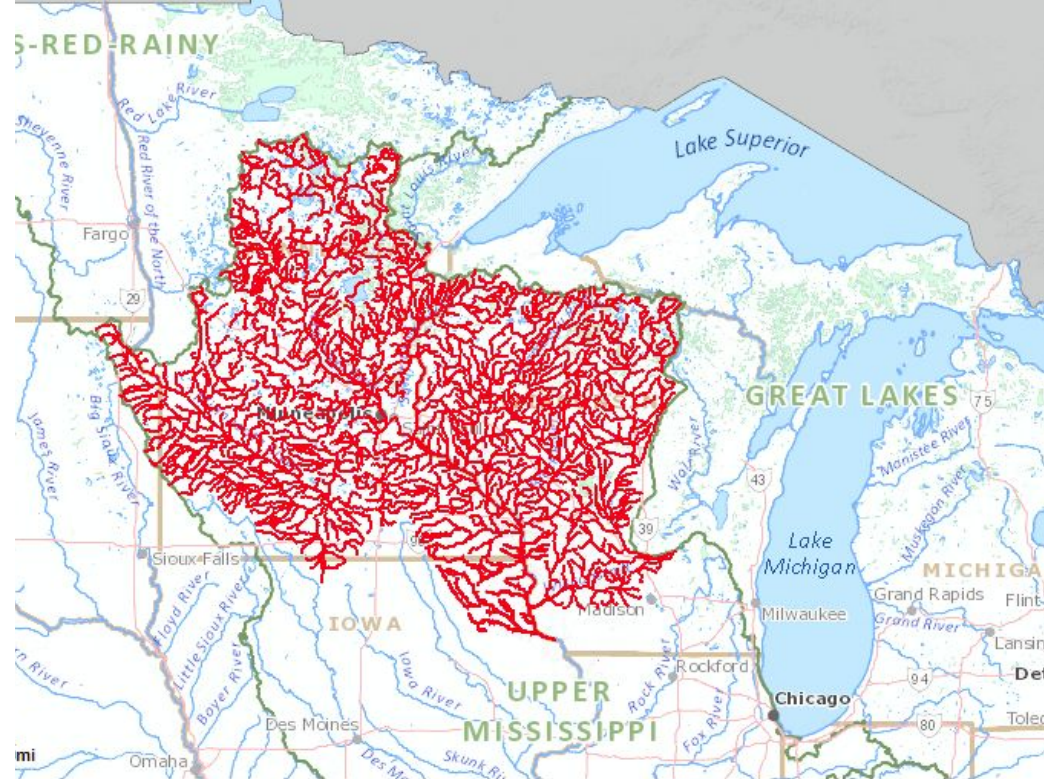
U.S. Department of Commerce

National Weather Service
La Crosse, Wisconsin



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

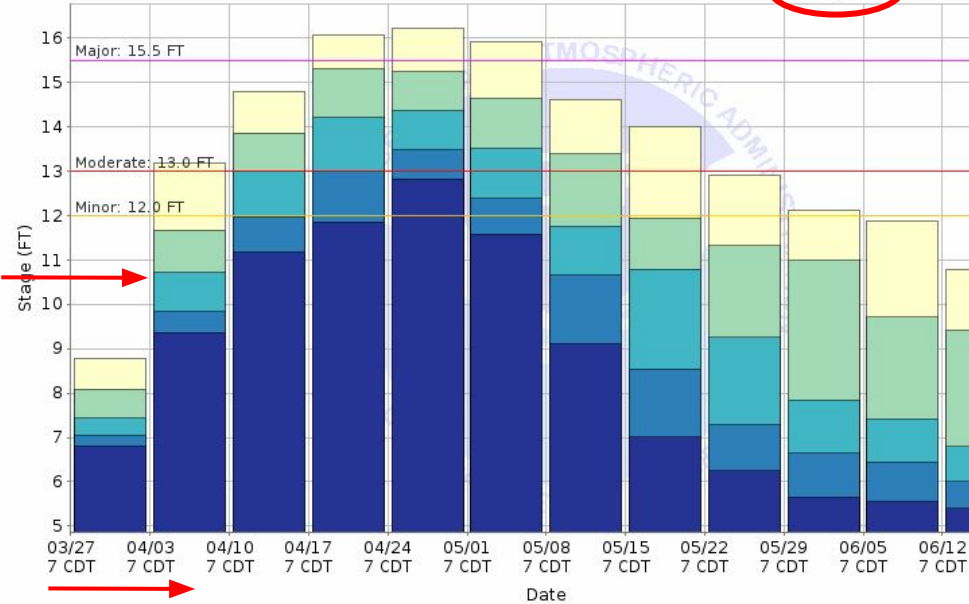


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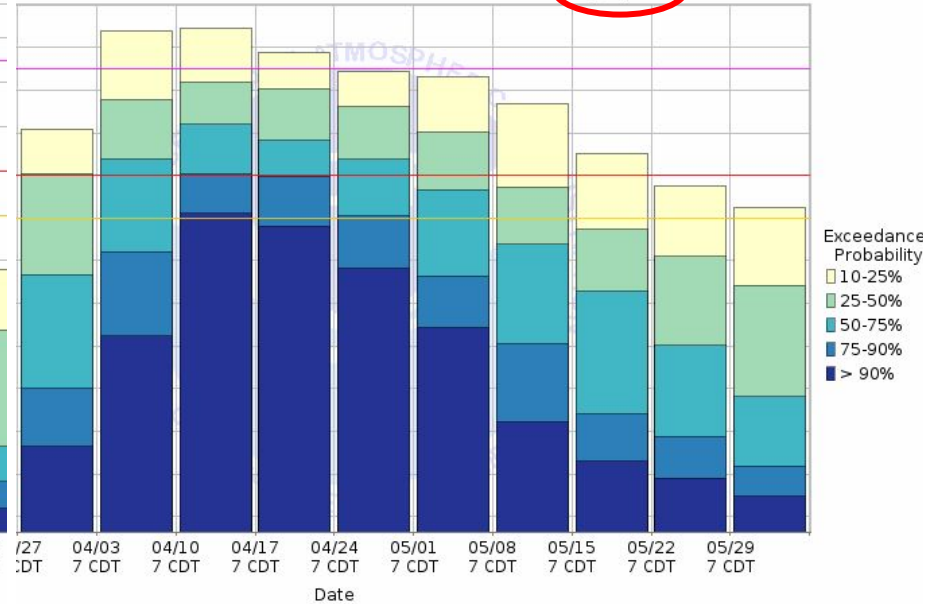
Thursday, March 23rd, 2023

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

Weekly Chance of Exceeding River Stage at Mississippi River at La Crosse (Pool 8 CP) (LACW3)
Forecast for the period 03/27/2023 - 06/25/2023
This is a conditional simulation based on the conditions as of 03/20/2023



Weekly Chance of Exceeding River Stage at Mississippi River at La Crosse (Pool 8 CP) (LACW3)
Forecast for the period 03/13/2023 - 06/11/2023
This is a conditional simulation based on the conditions as of 03/06/2023





Additional Information and Contact Information

Informational Links:

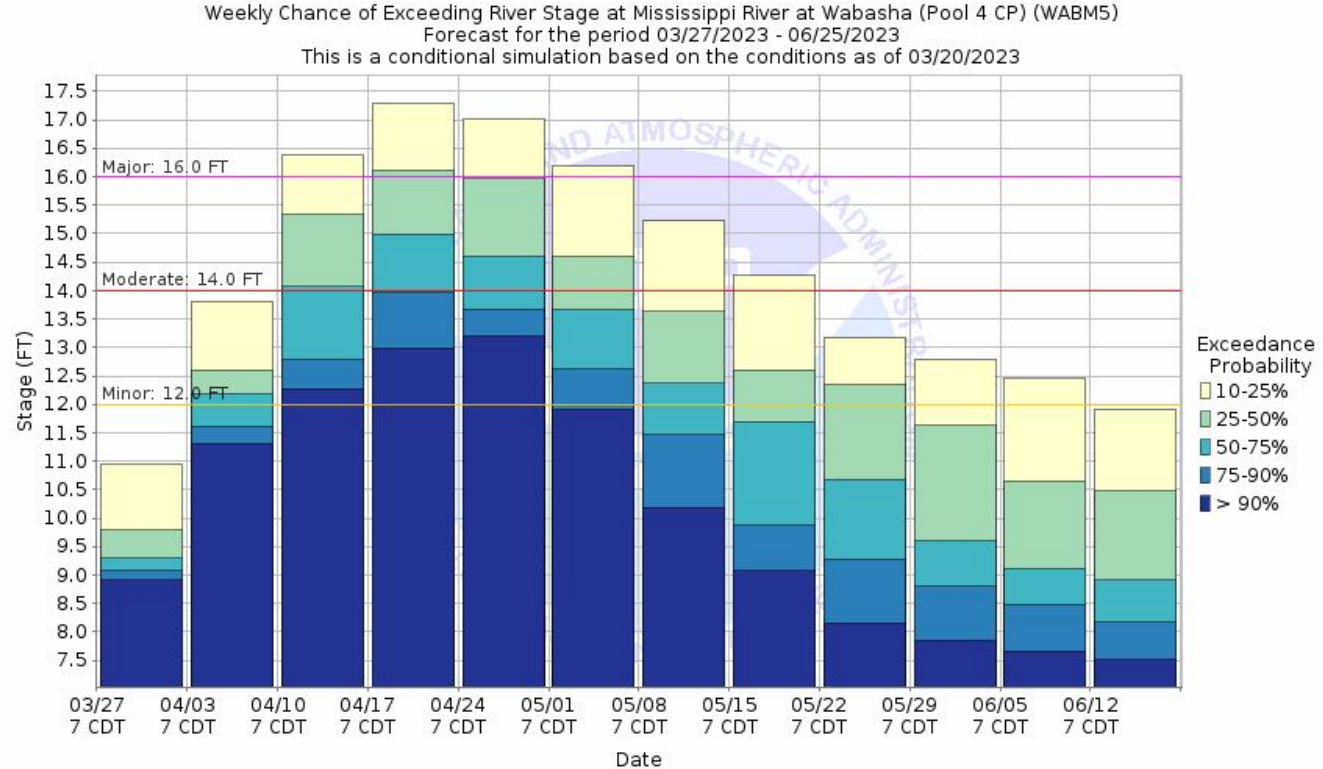
- [Current River Levels and Forecast](#)
- [Long-Range Flood Risk by River Point](#) (Spring Flooding Potential)
- [Latest Hydrographs by Basin](#)
- [Updated Spring Flood Outlook Text Information](#)

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



Detailed Timing Look at Mississippi River at Wabasha

- A slow and steady rise in the river is expected heading into April
- Highest chances for reaching flood stage late in the 2nd week through the 4th week of April
- Low chances of Minor Flood Stage remain through May





Detailed Timing Look at Mississippi River at Wabasha



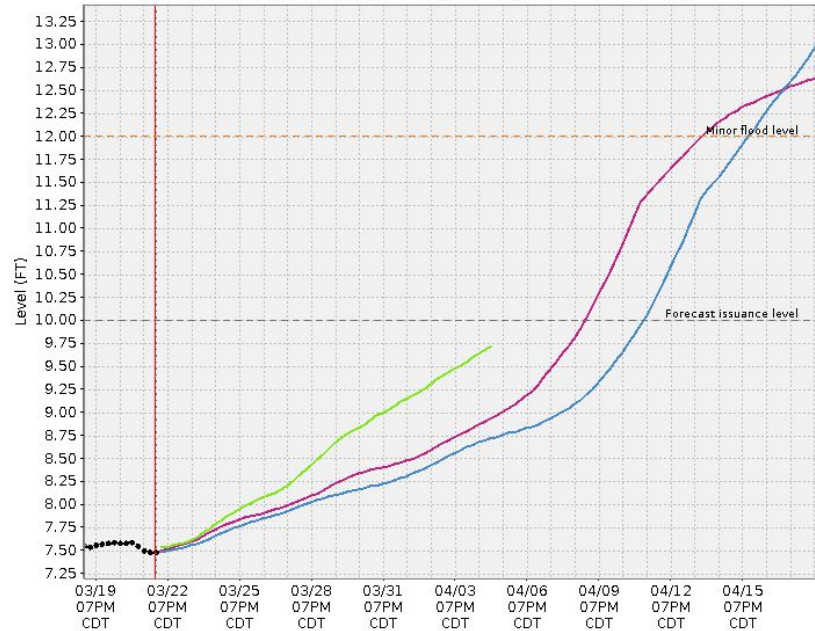
QPF Scenario River Guidance
North Central River Forecast Center
Valid Time 03/22/2023 07 AM CDT



- Graphic to the right represents simulations for the Mississippi River at Wabasha.
 - These graphics are run on an automated process without forecaster intervention and are meant to serve as guidance
 - You can find out more information about these simulations [here](#).
- Use of these graphics is intended purely for qualitative purposes and are subject to change - they are updated each morning.

Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.

Simulated Stage: Mississippi River at Wabasha, MN / WABM5



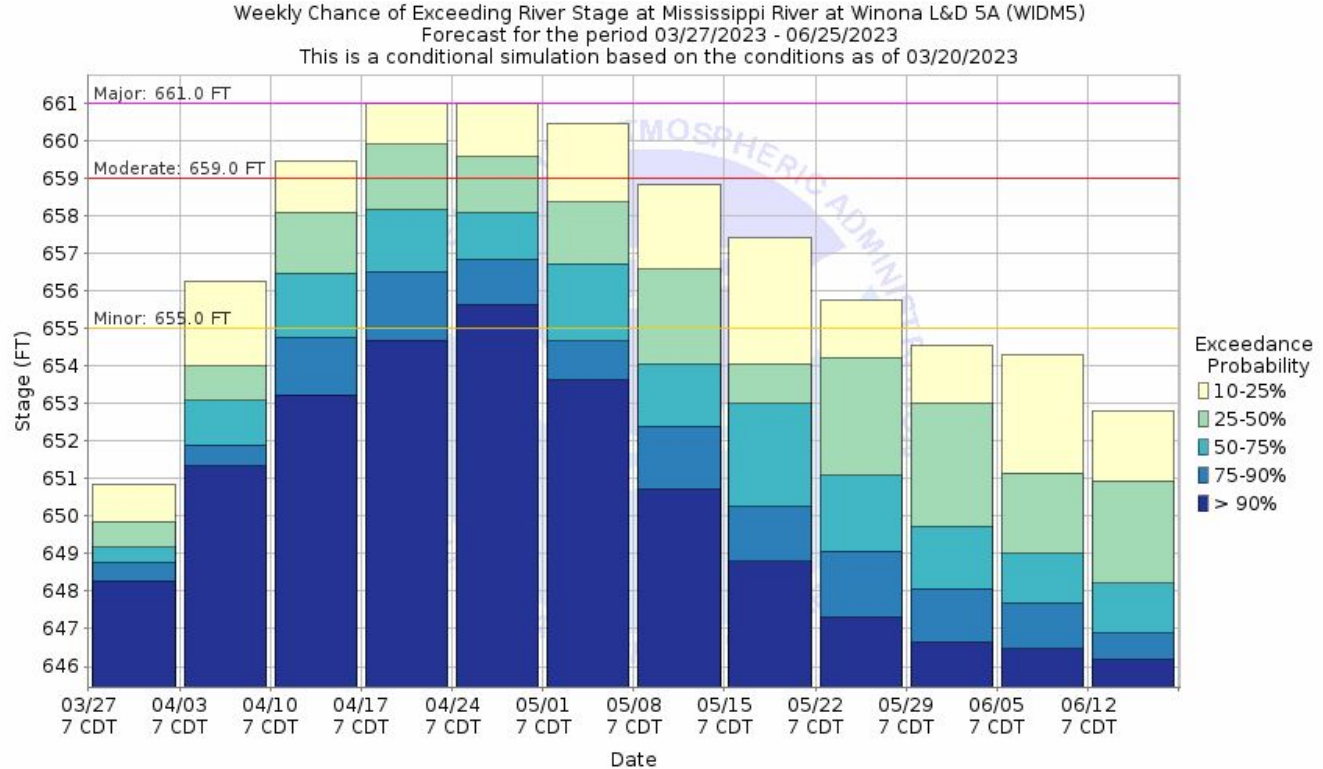
— NCRFC Operational Simulation — NCRFC 5-Day QPF — NAEFS 16-Day QPF Forecast





Detailed Timing Look at Mississippi River at Winona - L&D 5

- A slow and steady rise in the river is expected heading into April
- Highest chances for reaching flood stage peak in the 4th week of April
 - Higher chances begin in the 3rd week of April and last through the first week of May





Detailed Timing Look at Mississippi River at Winona - L&D 5A

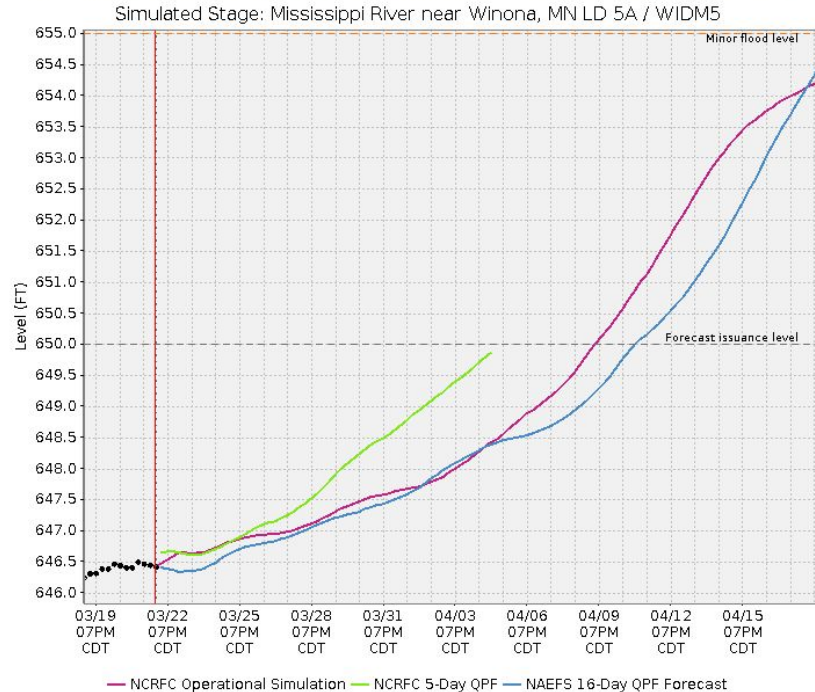


QPF Scenario River Guidance
North Central River Forecast Center
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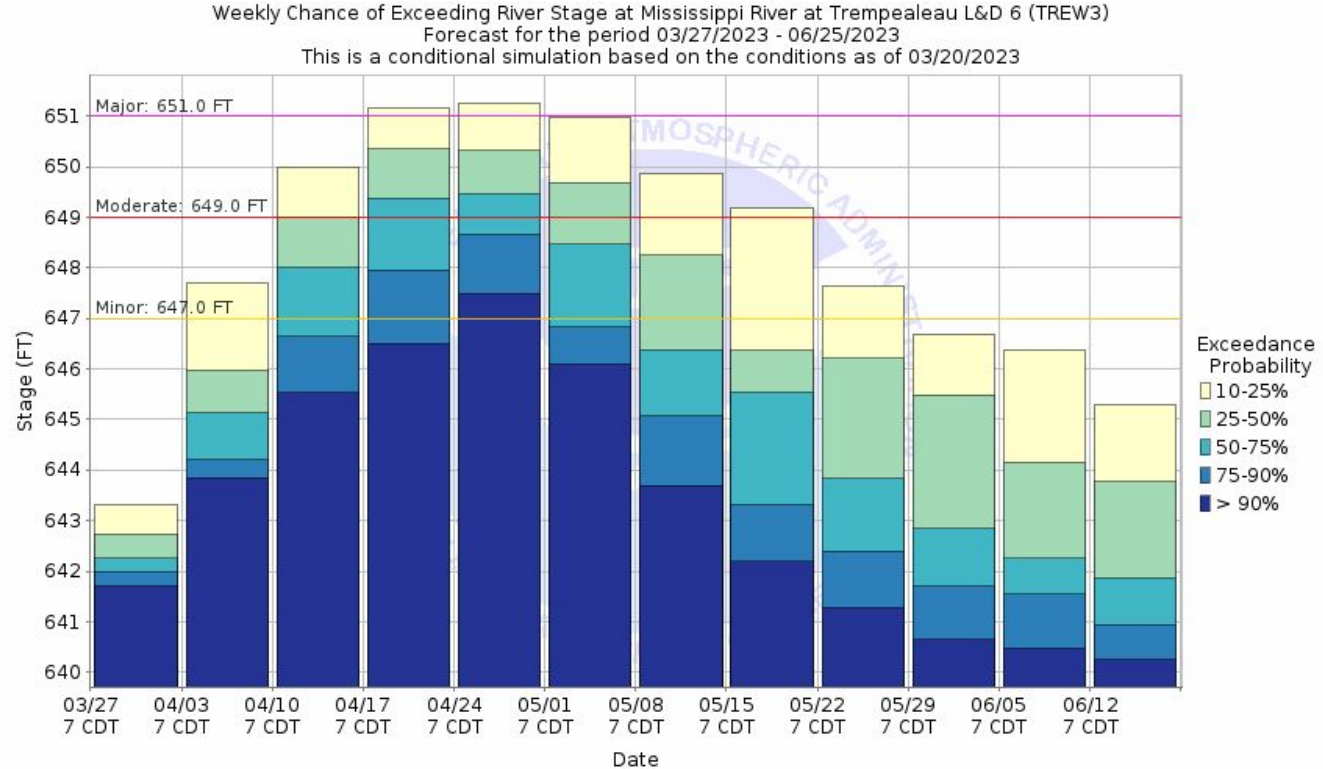
Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.





Detailed Timing Look at Mississippi River at Trempealeau - L&D 6

- A slow and steady rise in the river is expected heading into April
- Highest chances for reaching flood stage peak in the 4th week of April
 - Higher chances begin in the 3rd week of April and last through the first week of May





Detailed Timing Look at Mississippi River at Trempealeau - L&D 6



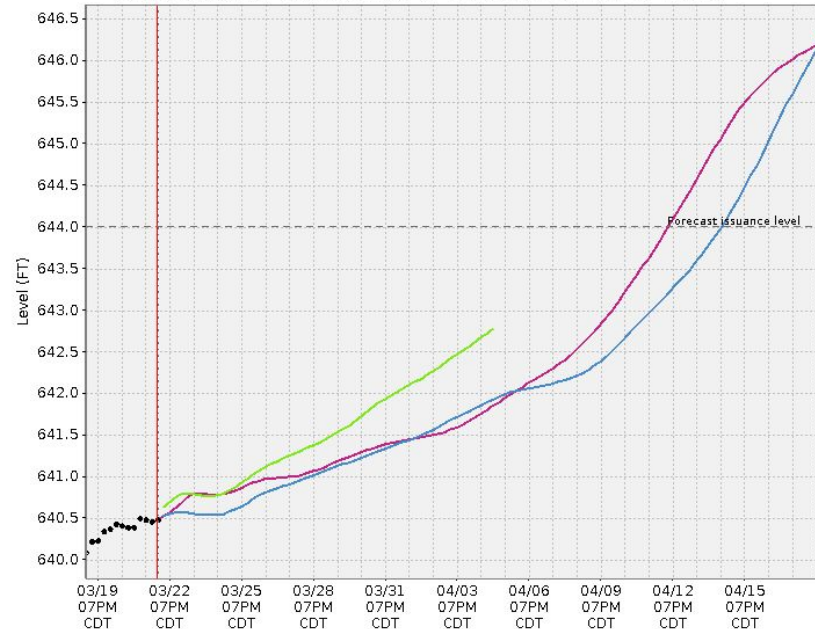
QPF Scenario River Guidance
North Central River Forecast Center
Valid Time 03/22/2023 07 AM CDT



- Graphic to the right represents simulations for the Mississippi River at Trempealeau LD6.
 - These graphics are run on an automated process without forecaster intervention and are meant to serve as guidance
 - You can find out more information about these simulations [here](#).
- Use of these graphics is intended purely for qualitative purposes and are subject to change - they are updated each morning.

Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.

Simulated Stage: Mississippi River at Trempealeau, WI LD 6 / TREW3



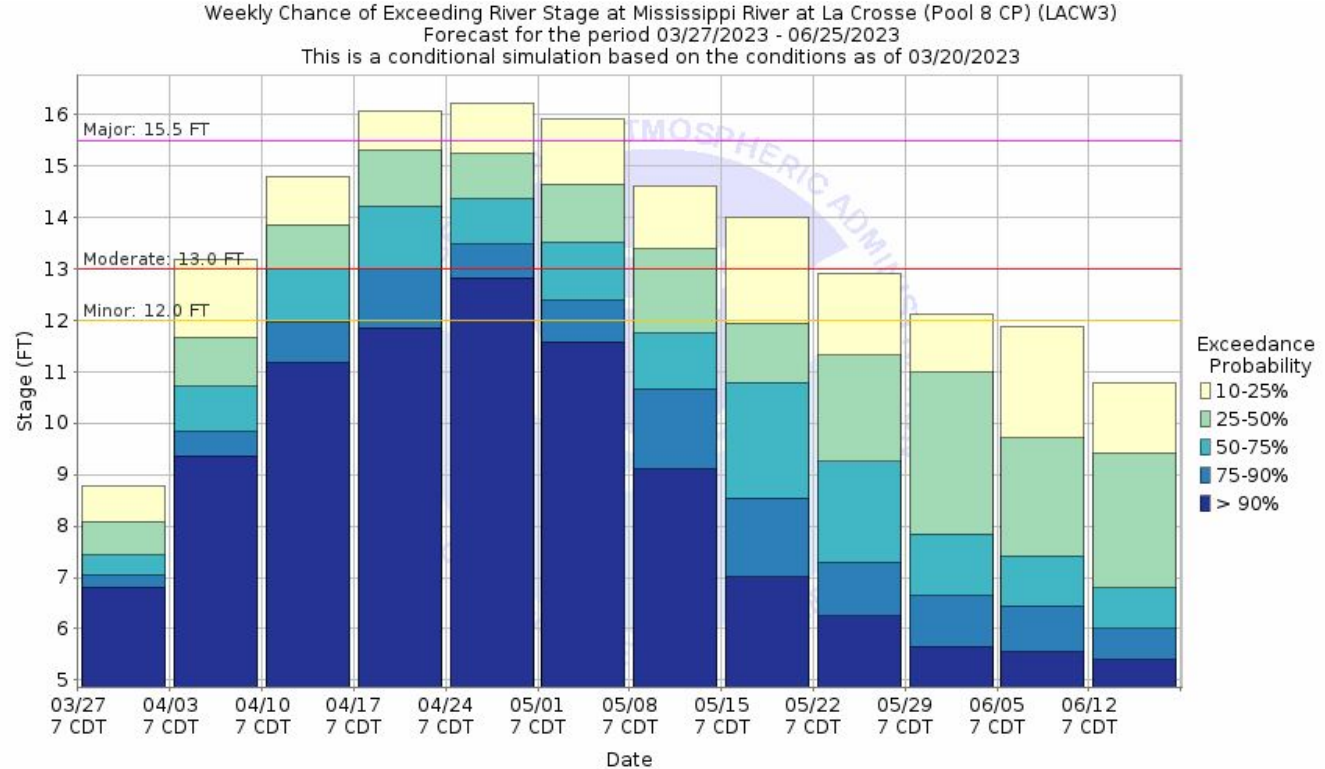
— NCRFC Operational Simulation — NCRFC 5-Day QPF — NAEFS 16-Day QPF Forecast





Detailed Timing Look at Mississippi River at La Crosse

- A slow and steady rise in the river is expected heading into April
- Highest chances for reaching flood stage peak in the 4th week of April
 - Higher chances begin in the 3rd week of April and last through the first week of May





Detailed Timing Look at Mississippi River at La Crosse



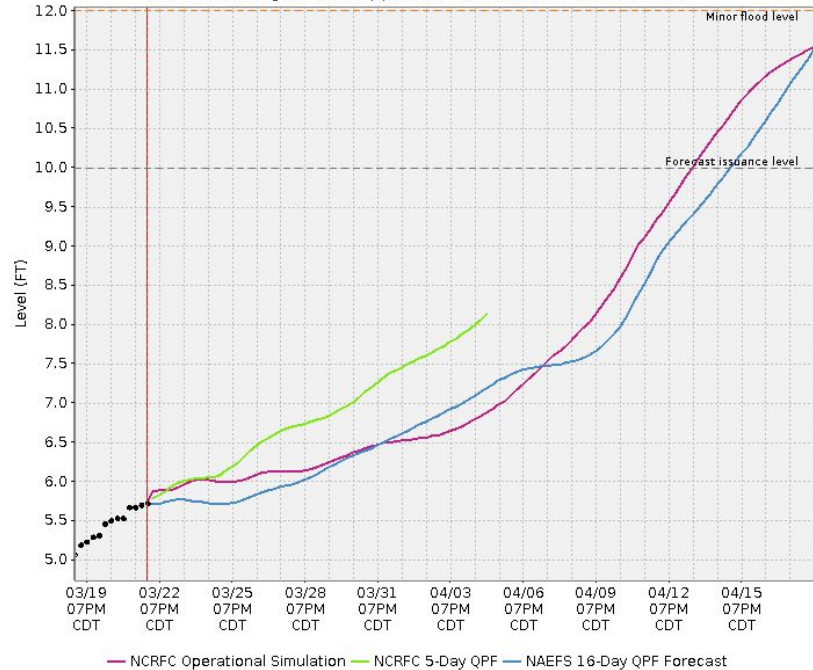
QPF Scenario River Guidance
North Central River Forecast Center
Valid Time 03/22/2023 07 AM CDT



- Graphic to the right represents simulations for the Mississippi River at La Crosse.
 - These graphics are run on an automated process without forecaster intervention and are meant to serve as guidance
 - You can find out more information about these simulations [here](#).
- Use of these graphics is intended purely for qualitative purposes and are subject to change - they are updated each morning.

Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.

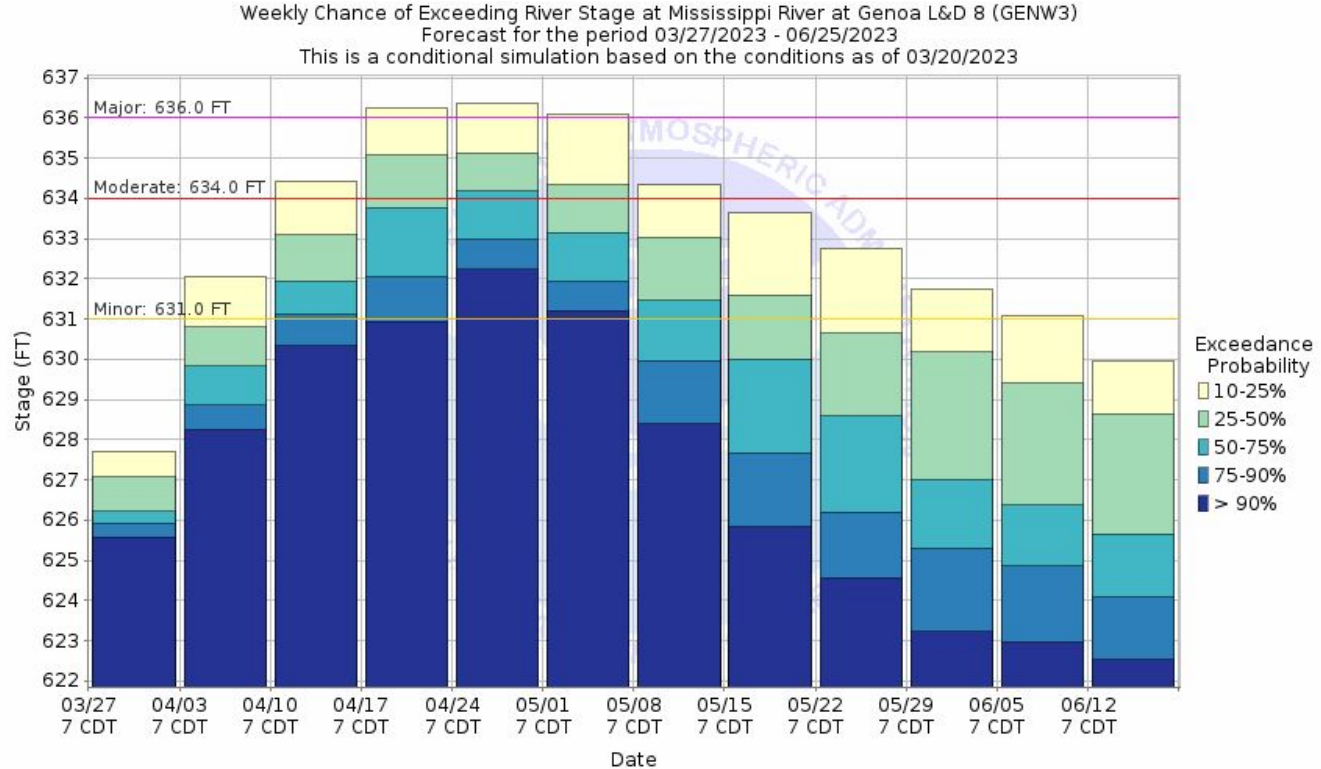
Simulated Stage: Mississippi River at LaCrosse, WI / LACW3





Detailed Timing Look at Mississippi River at Genoa - L&D 8

- A slow and steady rise in the river is expected heading into April
- Highest chances for reaching flood stage peak in the 4th week of April
 - Higher chances begin in the 3rd week of April and last through the first week of May





Detailed Timing Look at Mississippi River at Genoa - L&D 8

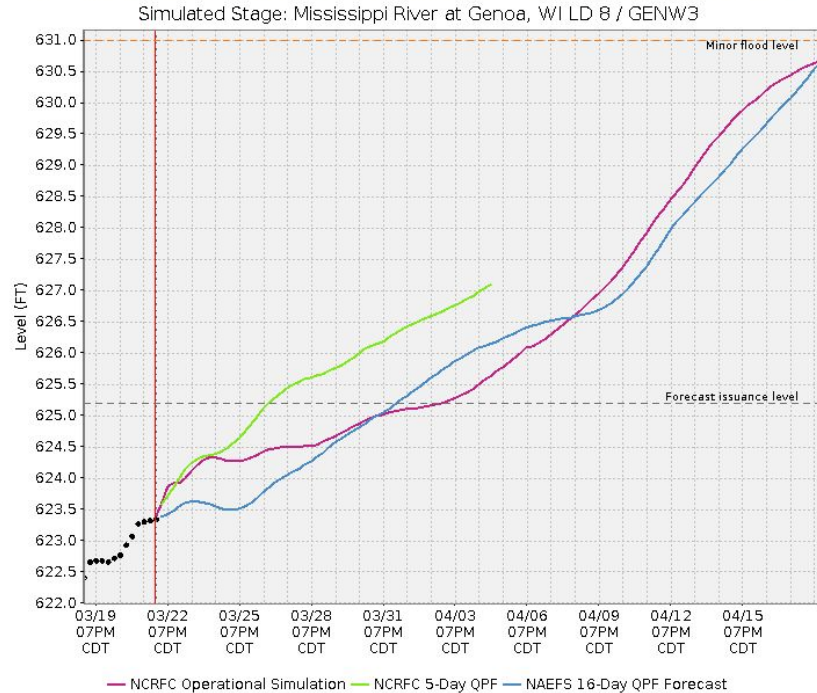


QPF Scenario River Guidance
North Central River Forecast Center
Valid Time 03/22/2023 07 AM CDT



- Graphic to the right represents simulations for the Mississippi River at Genoa LD8.
 - These graphics are run on an automated process without forecaster intervention and are meant to serve as guidance
 - You can find out more information about these simulations [here](#).
- Use of these graphics is intended purely for qualitative purposes and are subject to change - they are updated each morning.

Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.

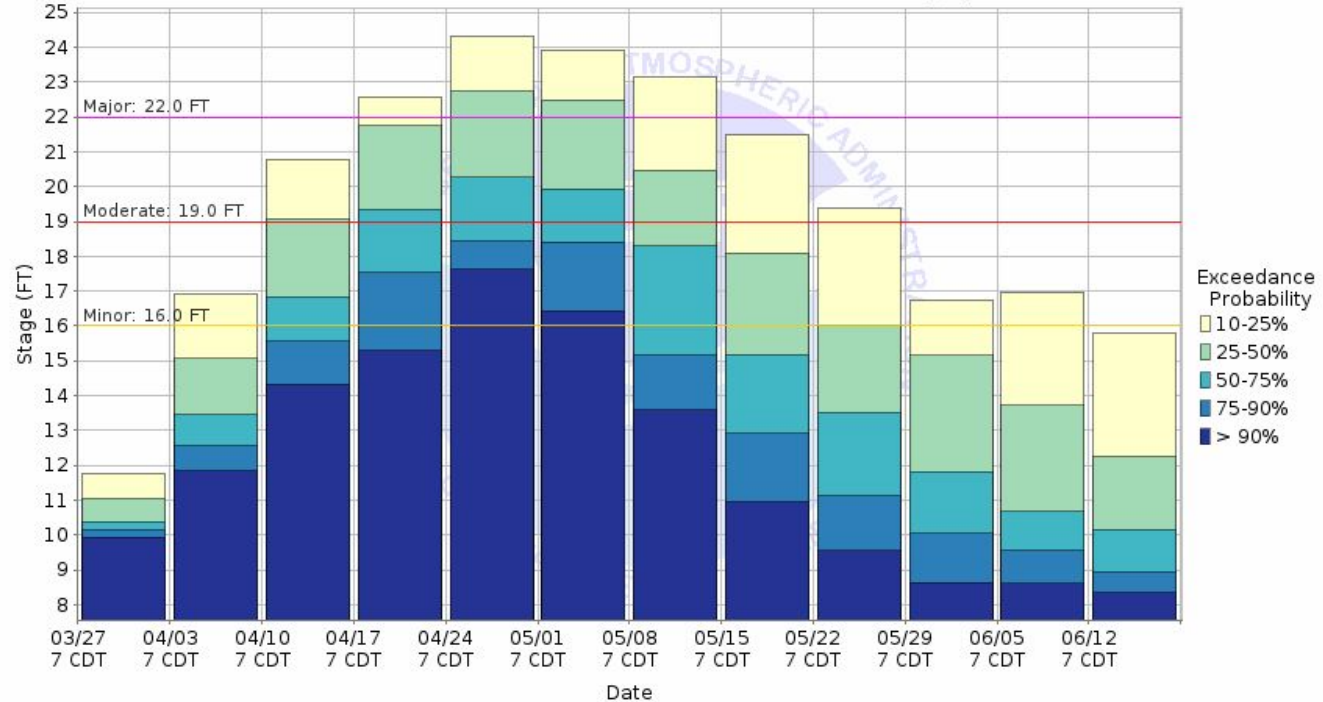




Detailed Timing Look at Mississippi River at McGregor

- A slow and steady rise in the river is expected heading into April
- Highest chances for reaching flood stage peak in the 4th week of April
 - Higher chances begin late in the 3rd week of April and last through the first week of May

Weekly Chance of Exceeding River Stage at Mississippi River at McGregor (MCGI4)
Forecast for the period 03/27/2023 - 06/25/2023
This is a conditional simulation based on the conditions as of 03/20/2023





Detailed Timing Look at Mississippi River at McGregor

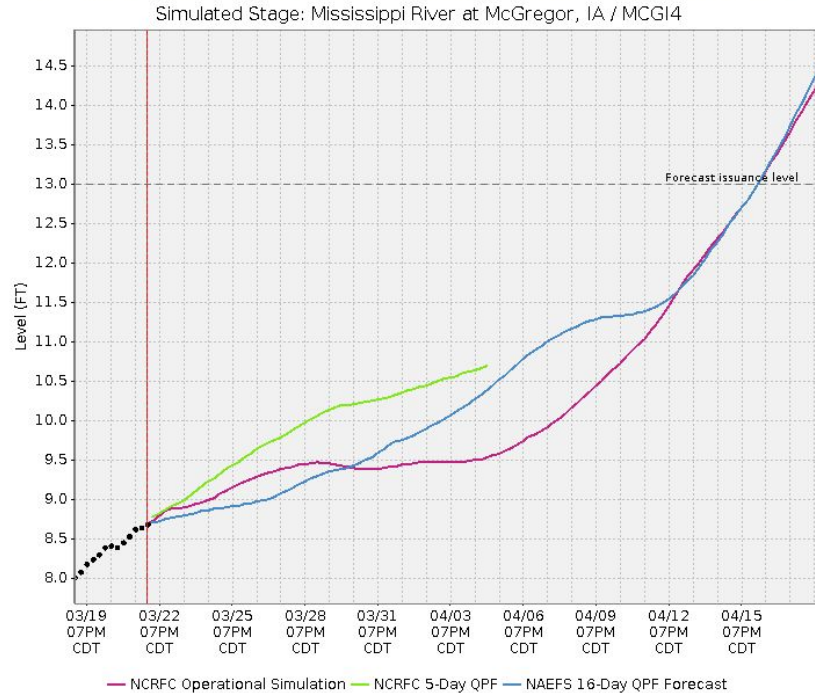


QPF Scenario River Guidance
North Central River Forecast Center
Valid Time 03/22/2023 07 AM CDT



Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.

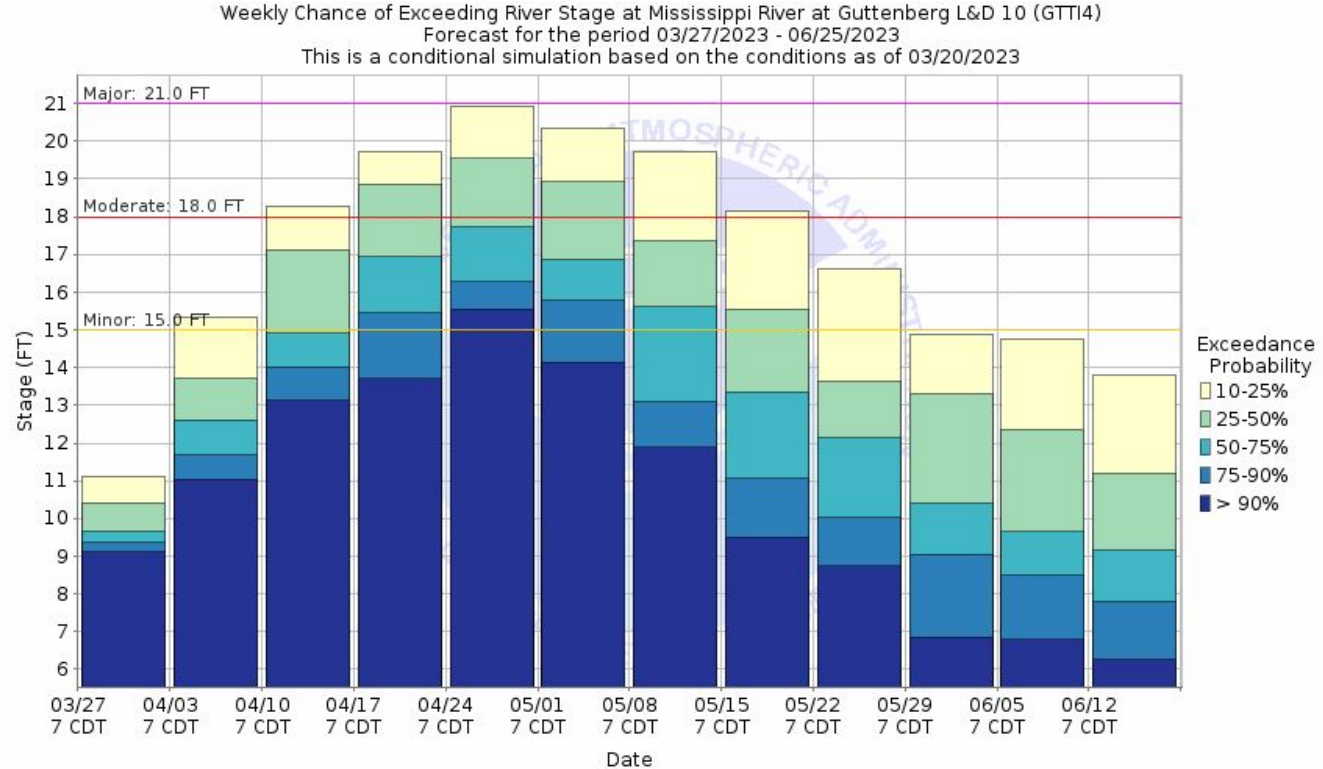
- Graphic to the right represents automated simulations for the Mississippi River at McGregor.
 - These graphics have no review or influence from RFC forecasters
 - You can find out more information about these simulations [here](#).
- Use of these graphics is intended purely for qualitative purposes and are subject to change - they are updated each morning.





Detailed Timing Look at Mississippi River at Guttenburg - L&D 10

- A slow and steady rise in the river is expected heading into April
- Highest chances for reaching flood stage peak in the 4th week of April
 - Higher chances begin late in the 3rd week of April and last through the first week of May





Detailed Timing Look at Mississippi River at Guttenburg - L&D 10

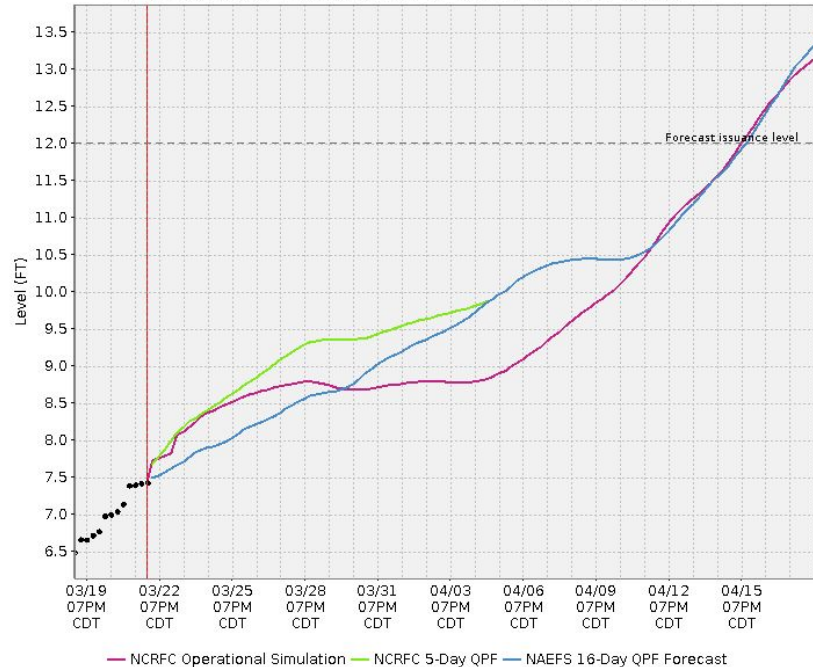


QPF Scenario River Guidance
North Central River Forecast Center
Valid Time 03/22/2023 07 AM CDT



Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.

Simulated Stage: Mississippi River at Guttenburg, IA LD 10 / GTT14



- Graphic to the right represents simulations for the Mississippi River at Guttenburg LD10.
 - These graphics are run on an automated process without forecaster intervention and are meant to serve as guidance
 - You can find out more information about these simulations [here](#).
- Use of these graphics is intended purely for qualitative purposes and are subject to change - they are updated each morning.

