Spring Flood Outlook Update

March 23, 2023
11:00 AM

Late March 2023 Update

📌 Key Messages

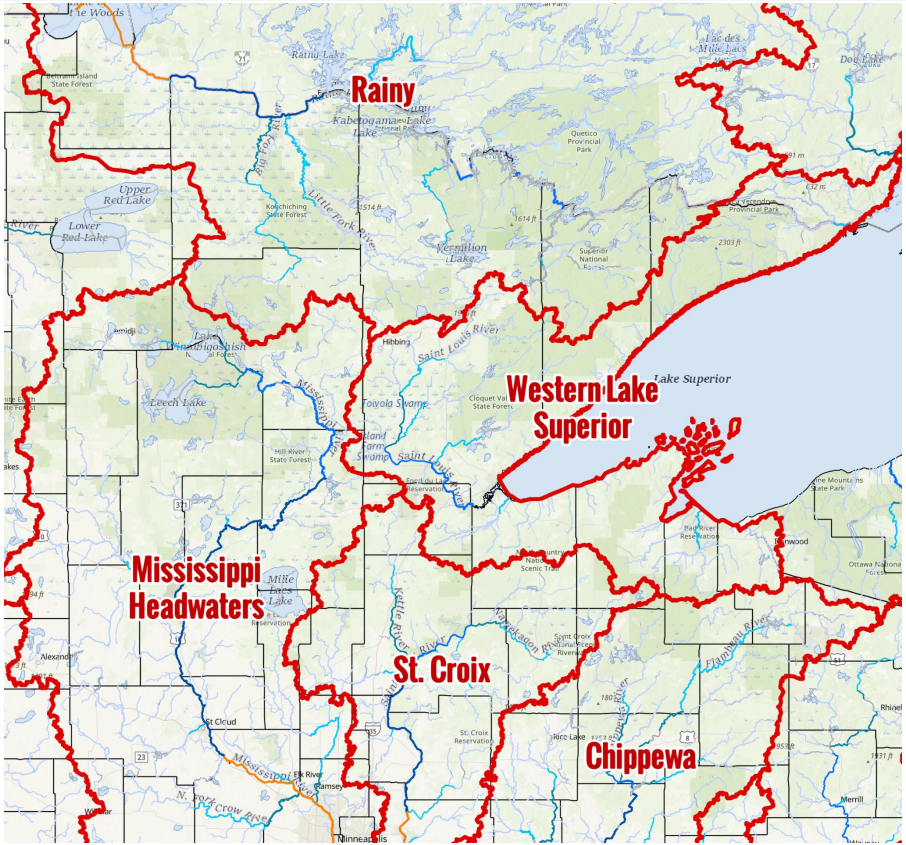
- Most river basins have an **extreme, near record above normal amount of water in the snowpack**, increasing the risk for spring flooding
- **Spring Flooding is highly dependent on weather conditions in late March and April** - slower melt reduces the risk of flooding, faster melt and rainfall events increase the risk of flooding

NEW What Has Changed

- **Increase for spring flooding risk** compared to previous outlook
- Snow amounts and snow water equivalent continues to **increase** across the area

Next Scheduled Briefing

➔ Early April



Current Snow Depth

March 23, 2023
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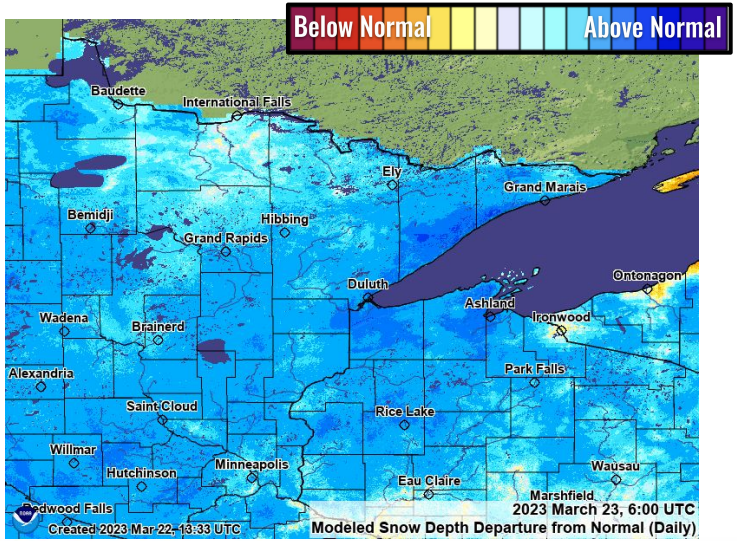
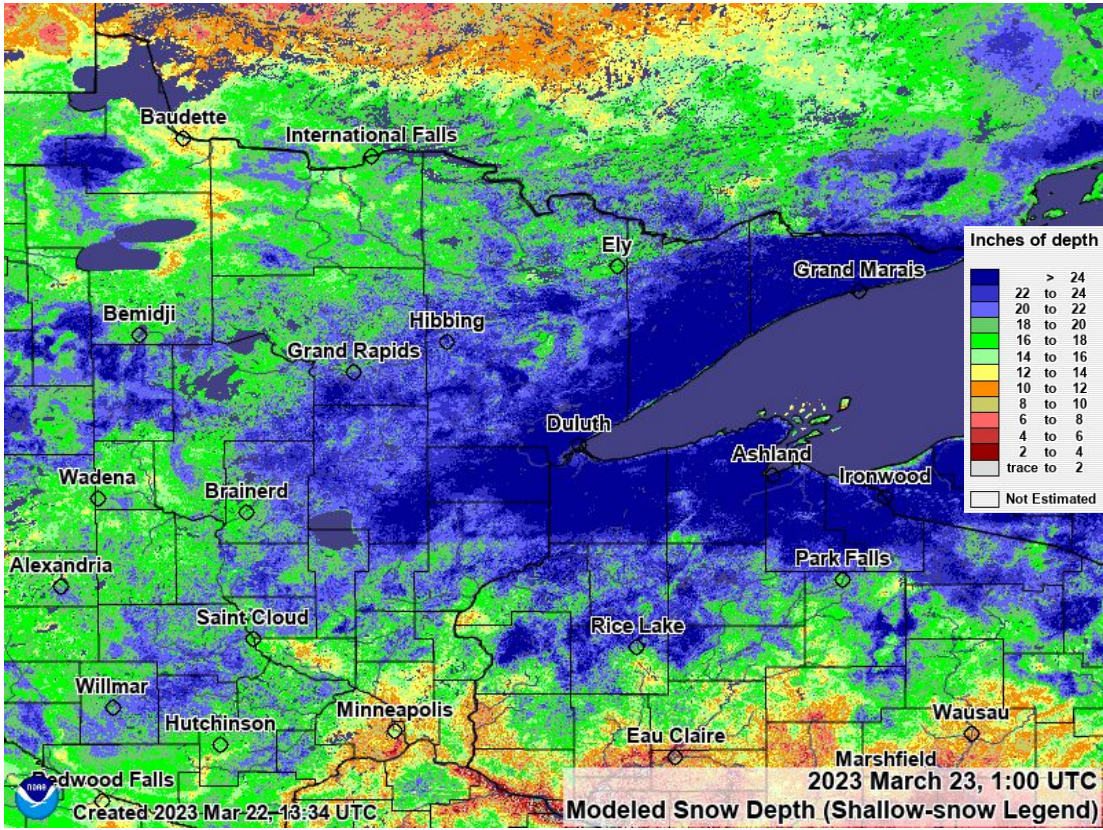
Current depth of the snowpack

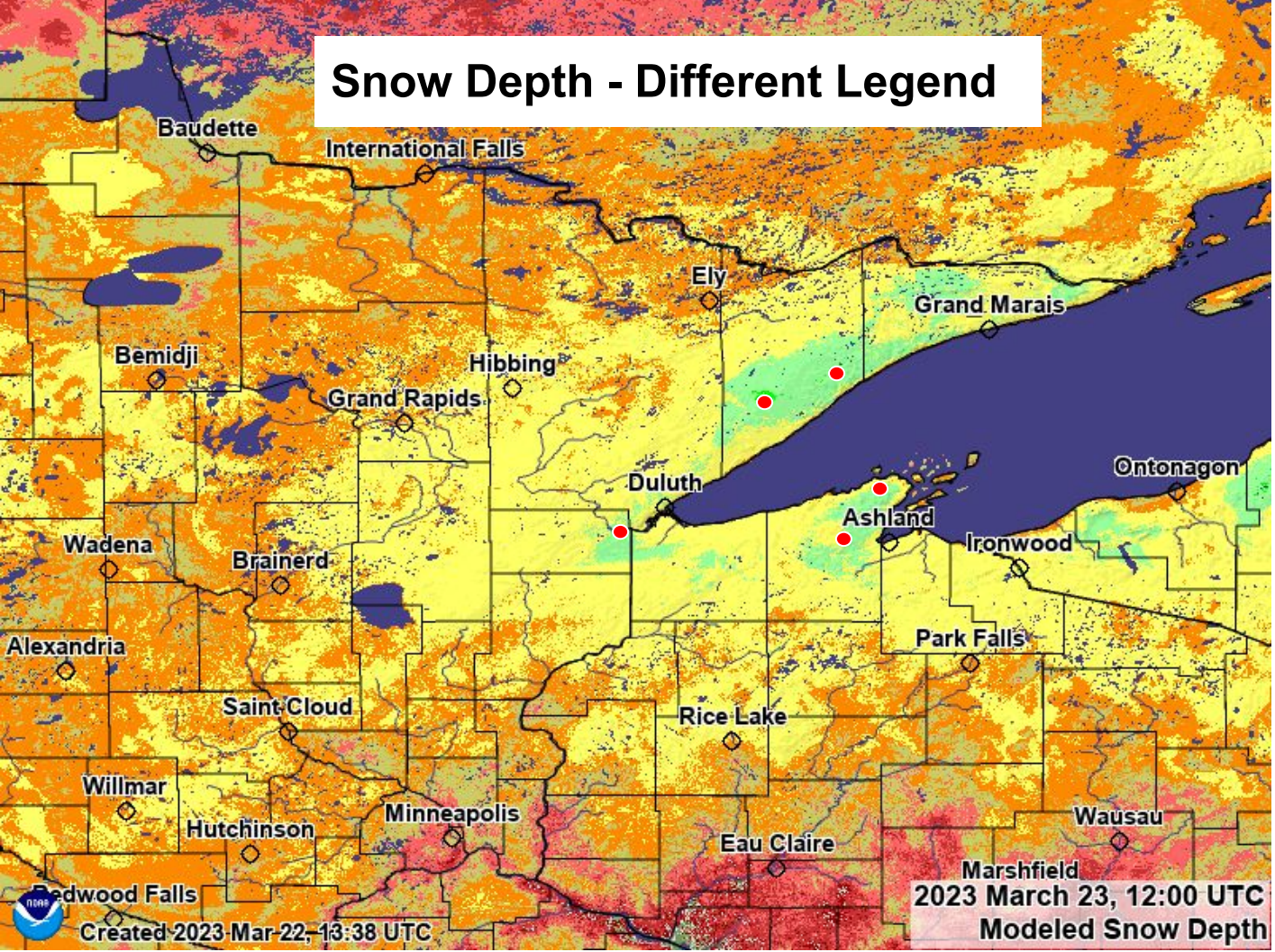
- Snow depth remains above normal for most of the Northland.
  - Areas of below normal snowpack have largely disappeared across Koochiching County.

Snow Depth Departure from Normal





Snow Depth - Different Legend



Inches of depth

>	150
100 to	150
75 to	100
50 to	75
40 to	50
30 to	40
20 to	30
16 to	20
12 to	16
8.0 to	12
4.0 to	8.0
2.0 to	4.0
trace to	2.0

Observations with 40” or more snow depth

Current Snow Water Equivalent

March 23, 2023
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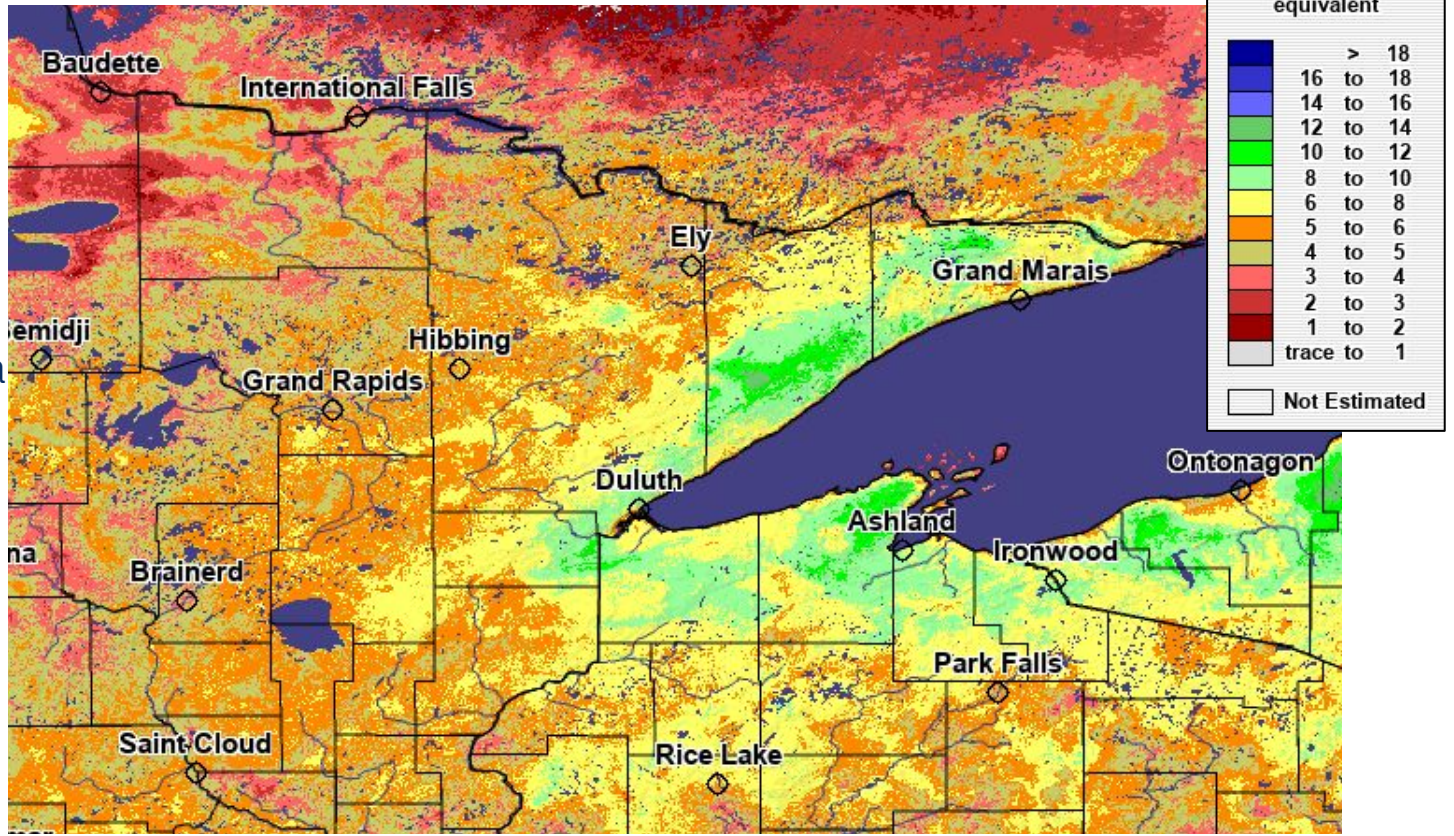
Map shows a modeled estimate of water in the snowpack

- Currently widespread **4-7” of water in the snowpack** for most the region (Rainy, Mississippi Headwaters, St Croix, and Chippewa basins)
- **Western Lake Superior basin has 6-10”+ of water in the snowpack** for both the north and south shore, which is well above normal



National Oceanic and Atmospheric Administration
U.S. Department of Commerce

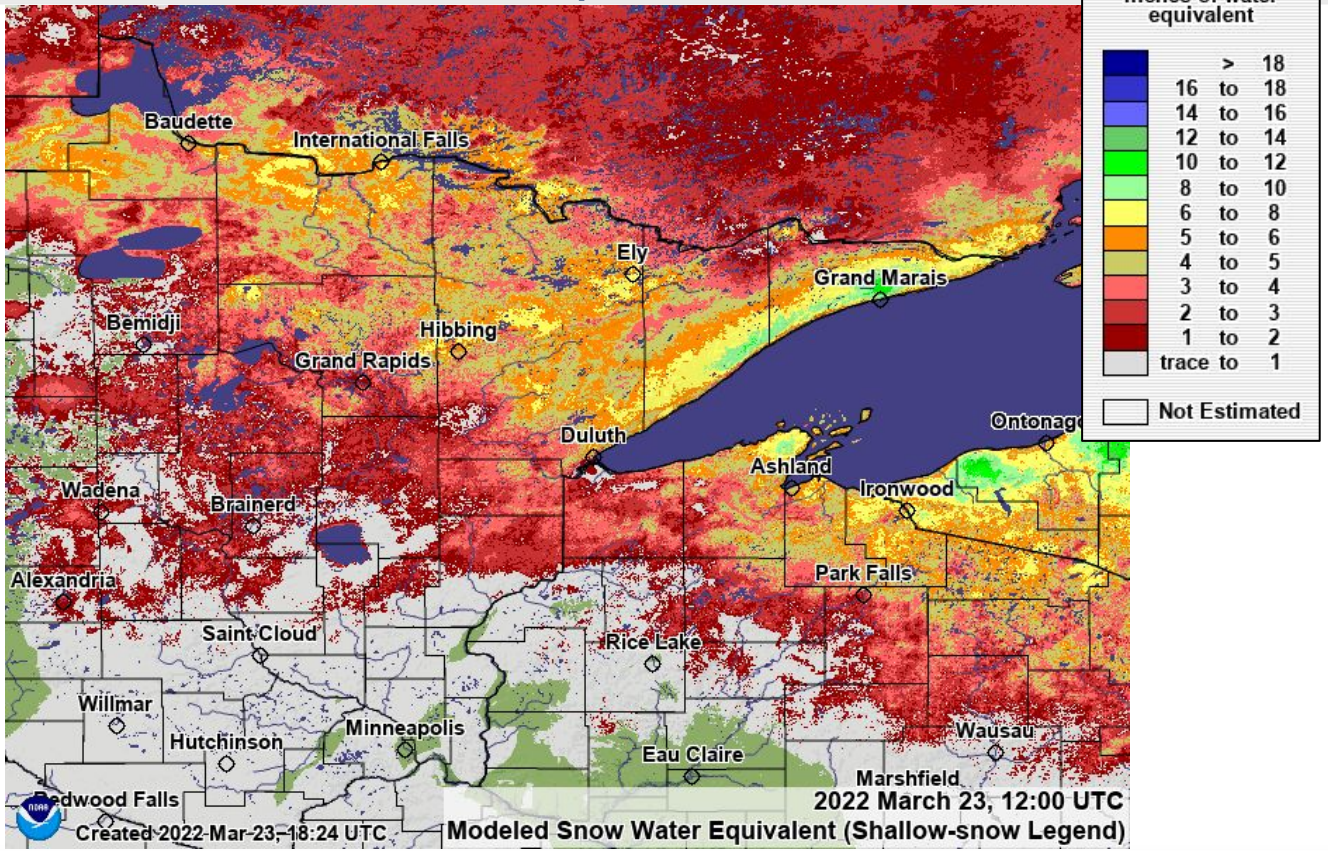
National Weather Service
Duluth, MN

March 2022 SWE

March 23, 2023
11:00 AM

Map shows a modeled estimate of water in the snowpack

- Melt had already begun by late March.
- Still widespread snow over northern MN and WI South Shore.
  - Lake enhancement hugged much closer to shore last year.

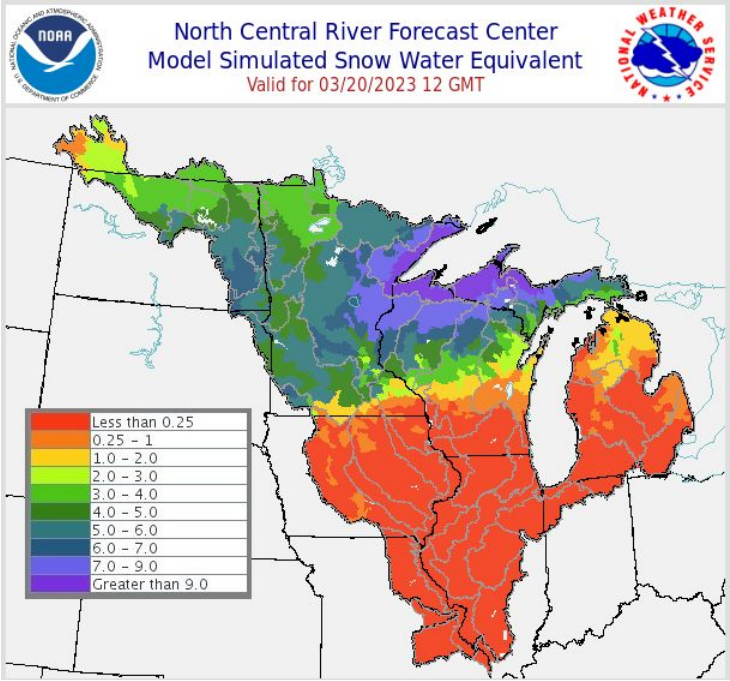


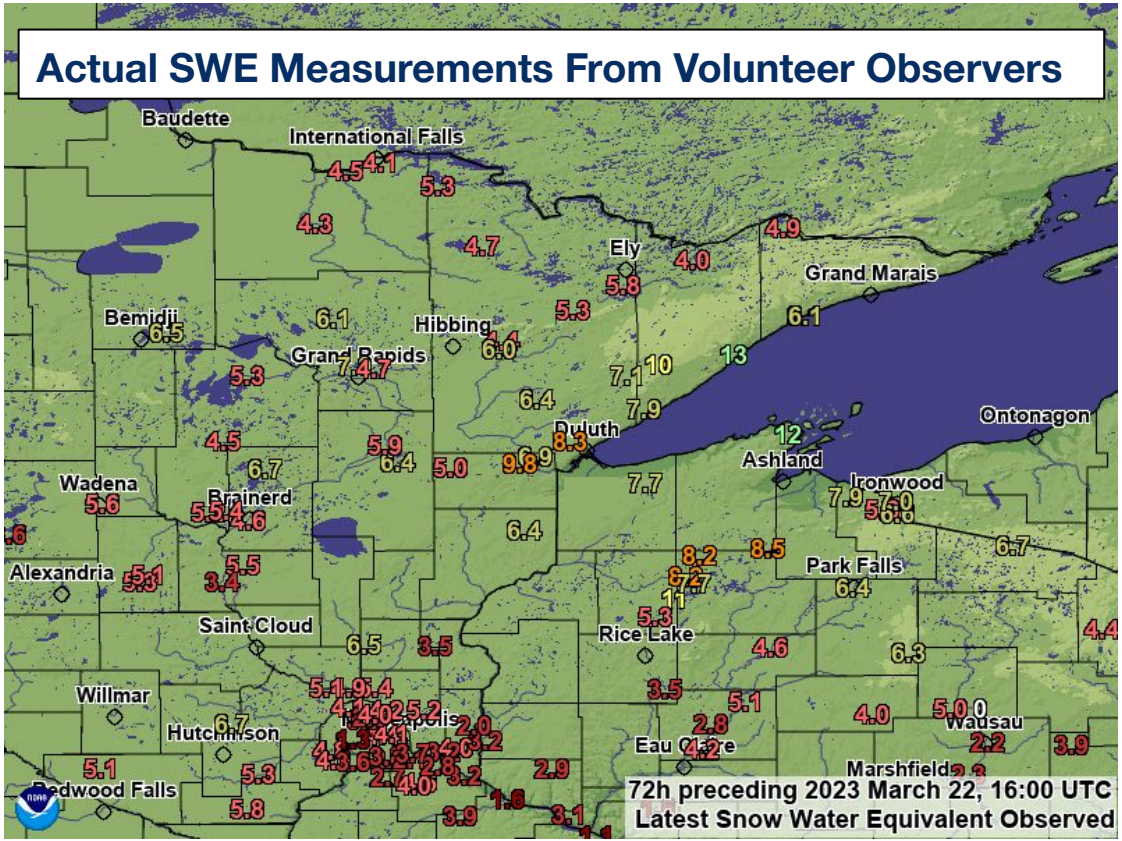
Current Snow Water Equivalent

March 23, 2023
11:00 AM

Latest Observations and Ranked SWE

- 4-12” SWE across the region
- Near highest SWE across Western Lake Superior and Upper Mississippi basins.





Current Regional Snow Water

March 23, 2023
11:00 AM

How much water is in the snow pack right now compared to normal?

Rainy River

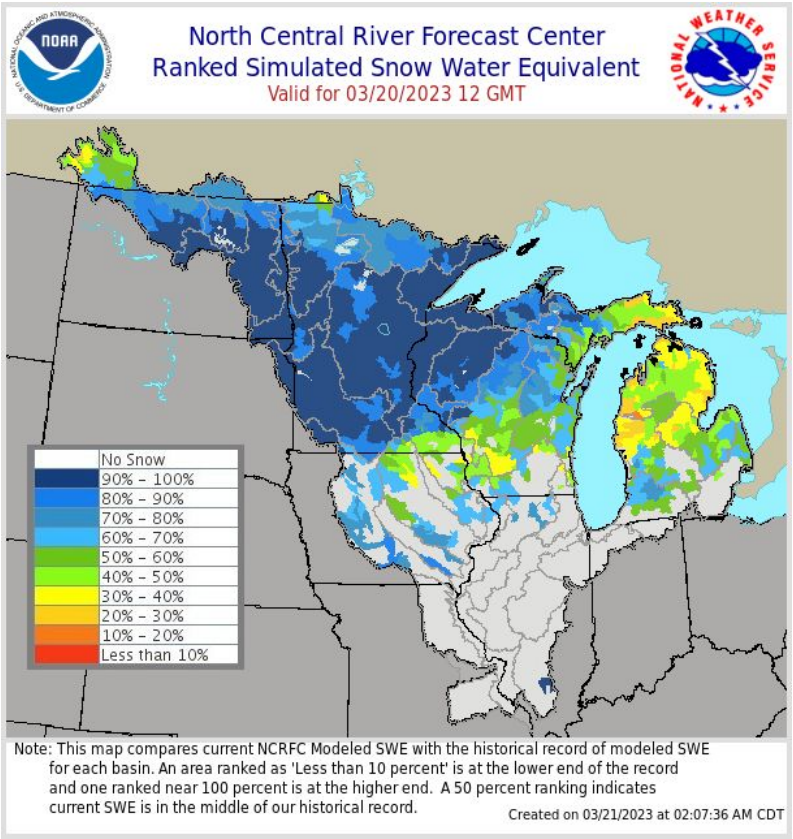
→ Slightly to Much Above Normal

Mississippi Headwaters

→ Much Above Normal

St Croix River

→ Much Above Normal



Western Lake Superior North Shore (MN)

→ Much Above Normal

Western Lake Superior South Shore (WI)

→ Much Above normal

Chippewa

→ Much Above Normal

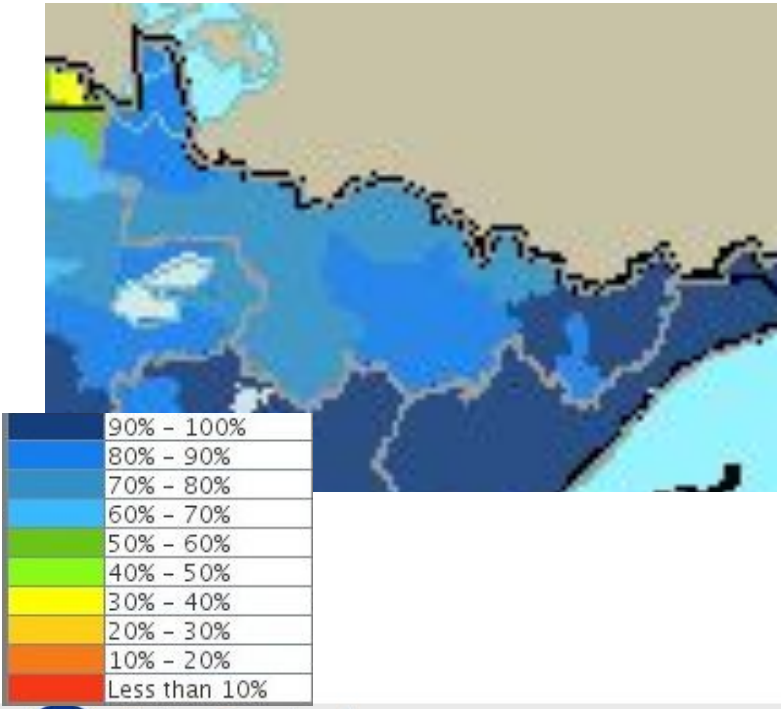
Rainy River Basin

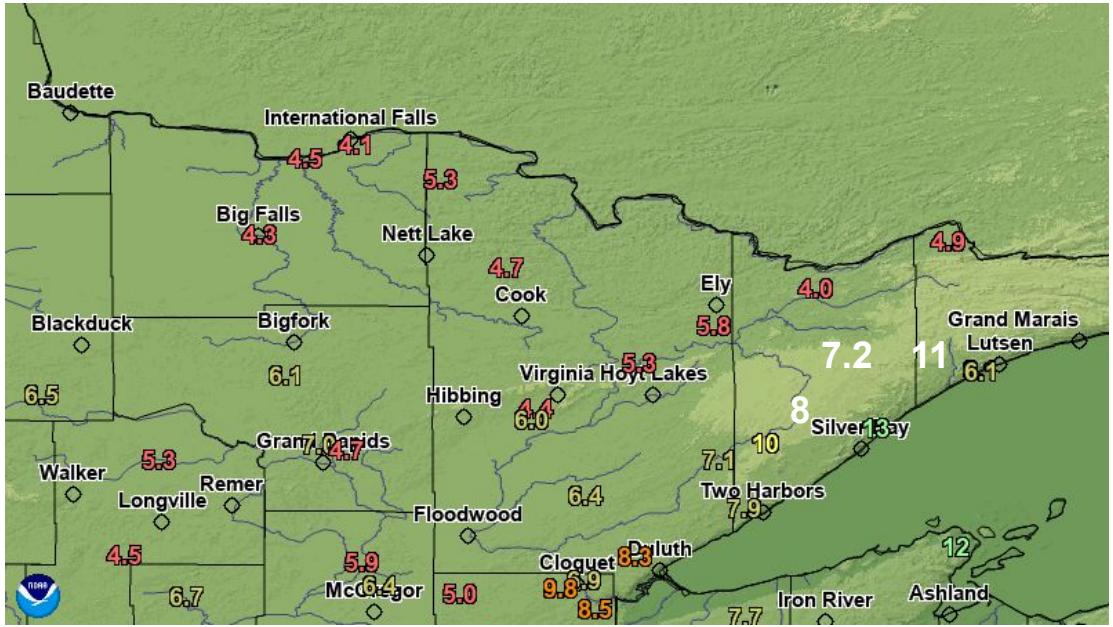
March 23, 2023
11:00 AM

How much water is in the snow pack right now compared to normal?

Rainy River

→ Slightly to Much Above Normal





Similar to last year.

→ but *many* more observations this year

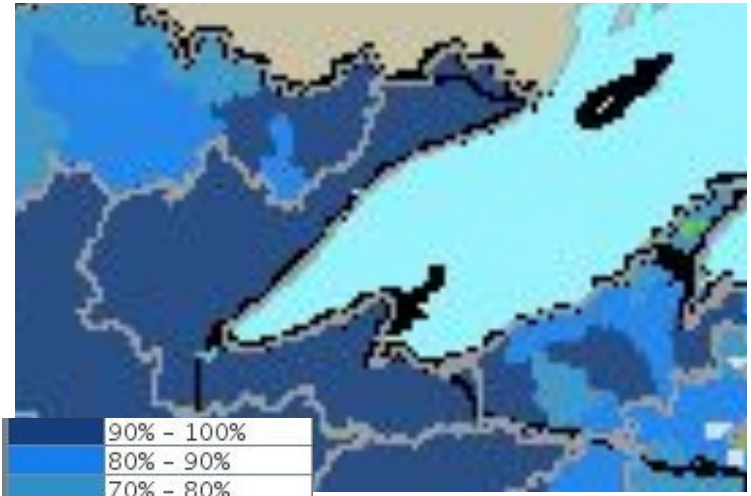
Western Lake Superior

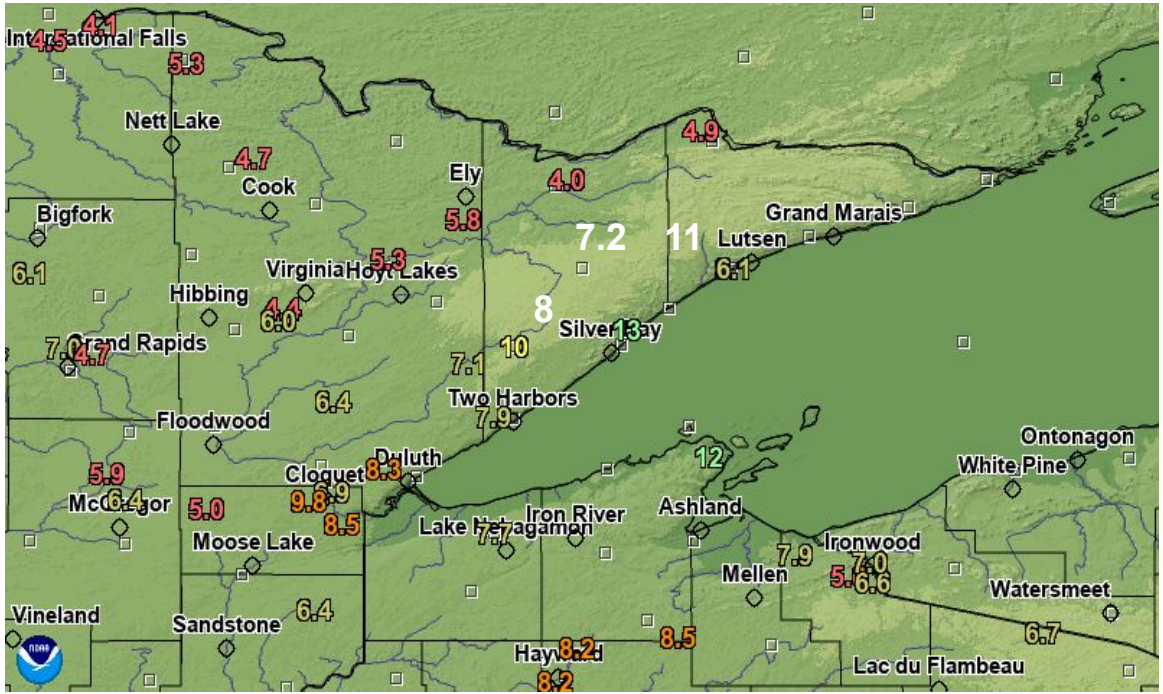
March 23, 2023
11:00 AM

How much water is in the snow pack right now compared to normal?

Western Lake Superior

→ Much Above Normal





90% - 100%
80% - 90%
70% - 80%
60% - 70%
50% - 60%
40% - 50%
30% - 40%
20% - 30%
10% - 20%
Less than 10%

1-4” greater than last year

→ but more observations this year

National Oceanic and Atmospheric Administration
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National Weather Service
Duluth, MN

St. Croix and Chippewa

March 23, 2023
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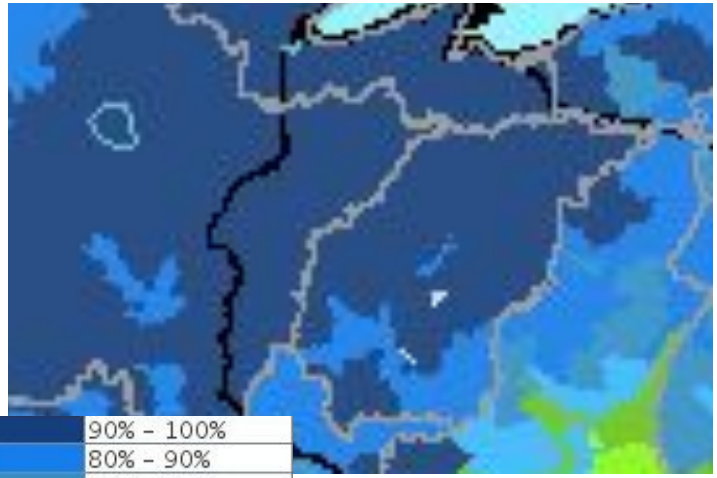
How much water is in the snow pack right now compared to normal?

St. Croix/Chippewa

→ Much Above Normal



90% – 100%
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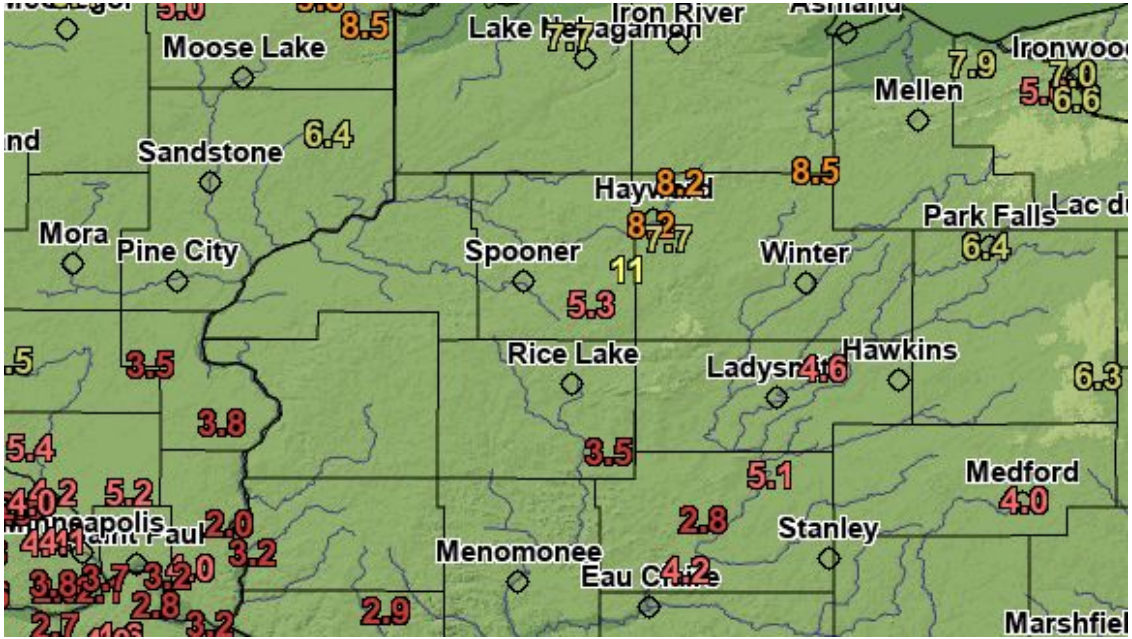
Less than 10%



4-6” greater than last year

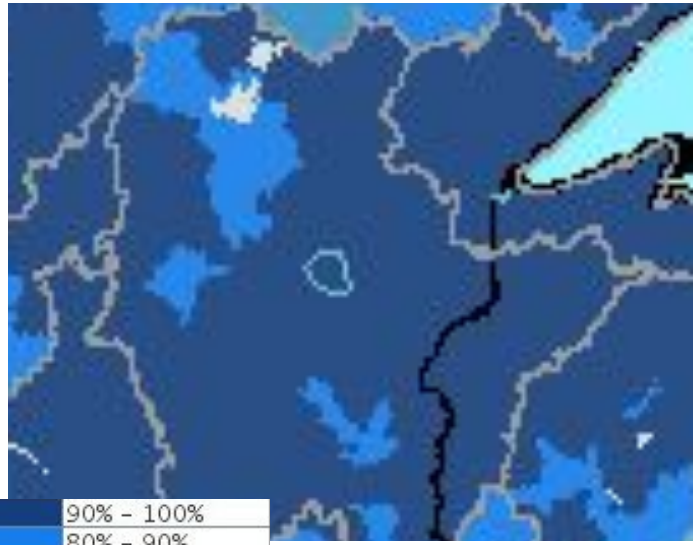
Mississippi Headwaters

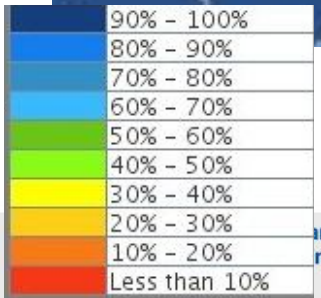
March 23, 2023
11:00 AM

How much water is in the snow pack right now compared to normal?

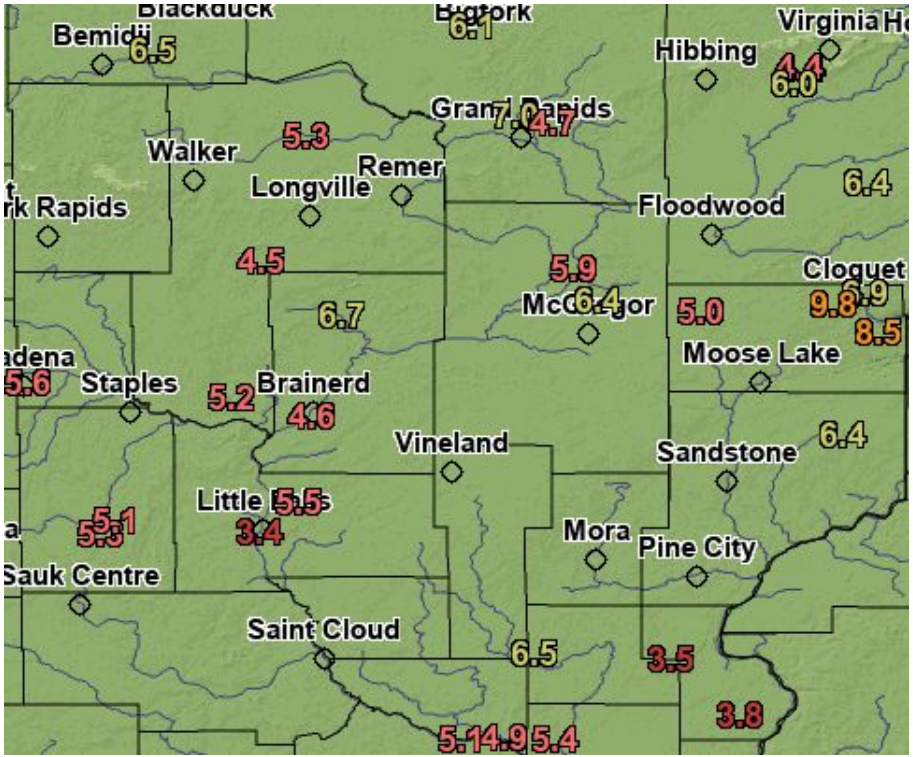
Miss. Headwaters

→ Much Above Normal



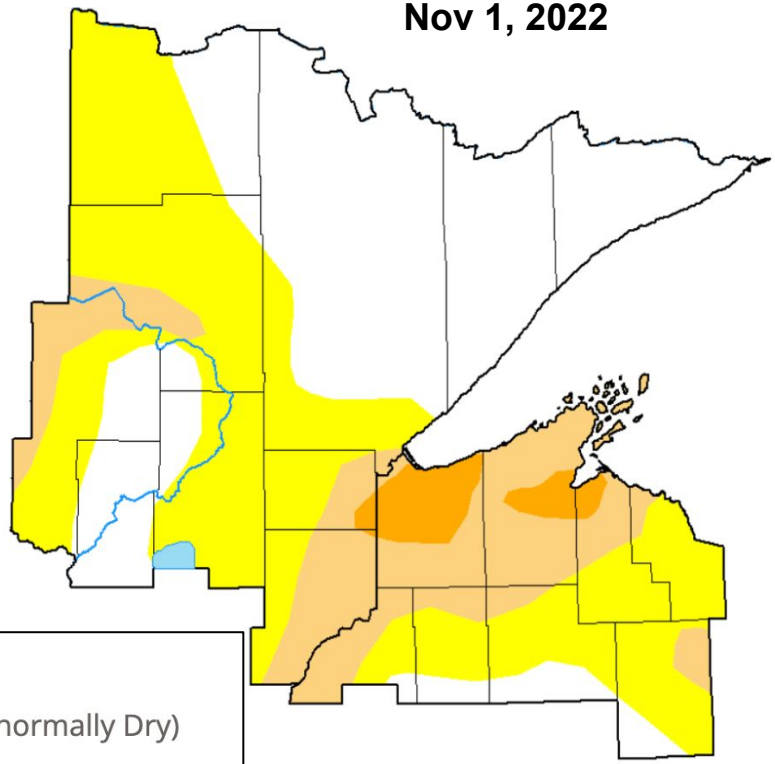


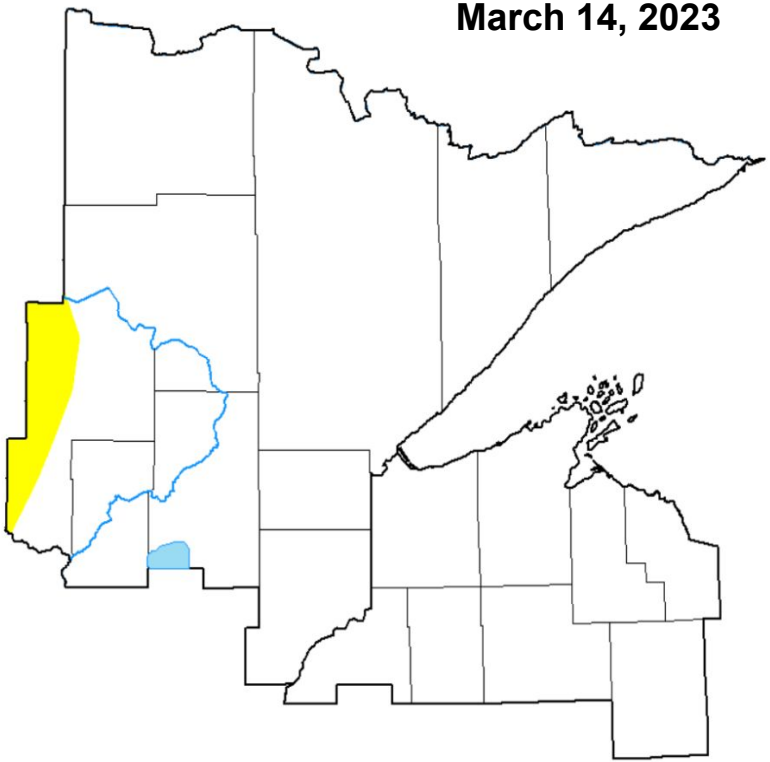
1-4” greater than last year



Winter Drought Removal

March 23, 2023
11:00 AM





None
D0 (Abnormally Dry)
D1 (Moderate Drought)
D2 (Severe Drought)

National Weather Service
Duluth, MN

Rainy Basin Outlook

March 23, 2023
11:00 AM

|**Add Weather/Water Message (optional)**|

Point	Flood Stage	Chance of Minor Flood	Chance of Moderate Flood
Littlefork at Littlefork			
S. Kawishiwi nr Ely			

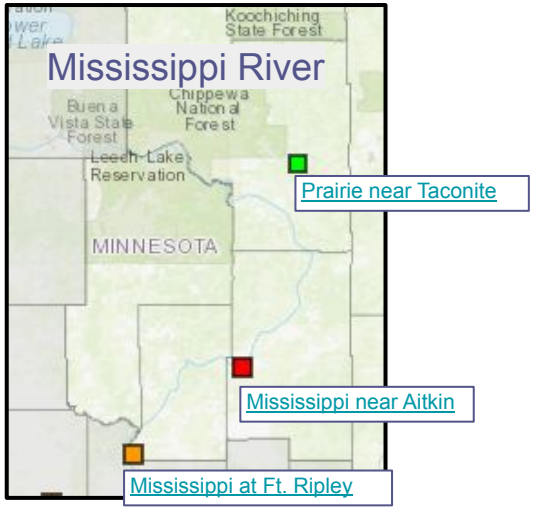
View Interactive Map:

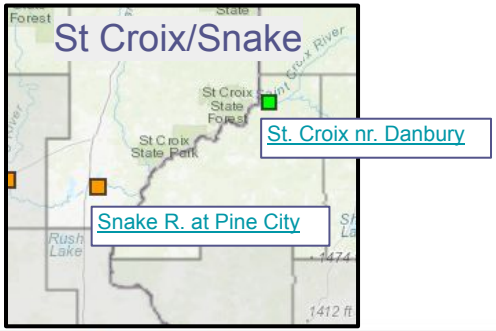
- River Observations
- Short-Term River Forecasts
- Long-Range River Flood Risk

Upper Mississippi Basin Outlook

March 23, 2023
11:00 AM

Spring Flood Outlook





Point	Flood Stage	Chance of Minor Flood	Chance of Moderate Flood	Chance of Major Flood
Prairie near Taconite	10 ft.	5%	<5%	<5%
Miss. near Aitkin	13 ft.	**>95%**	**>95%**	**28%**
Miss. at Ft. Ripley	10.5 ft.	**95%**	**61%**	19%
St. Croix nr. Danbury	7 ft.	**63%**	25%	7%
Snake at Pine City	9 ft.	**71%**	**34%**	5%

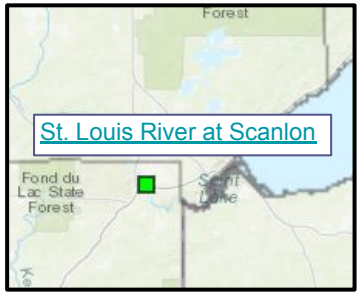
View Interactive Map:

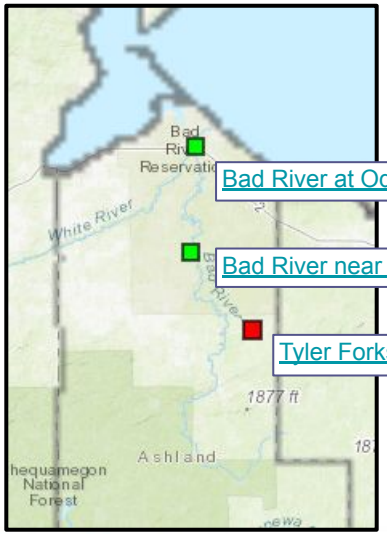
- River Observations
- Short-Term River Forecasts
- Long-Range River Flood Risk

W. Lake Superior Basin Outlook

March 23, 2023
11:00 AM

Spring Flood Outlook





Point	Flood Stage	Chance of Minor Flood	Chance of Moderate Flood	Chance of Major Flood
St. Louis at Scanlon	10.5 ft.	**79%**	**61%**	10%
Bad River at Odanah	8.5 ft.	**40%**	14%	<5%
Bad River nr. Odanah	16.0 ft.	12%	5%	<5%
Tyler Forks River nr. Mellen	9.0 ft.	**95%**	**86%**	**32%**

View Interactive Map:

- River Observations
- Short-Term River Forecasts
- Long-Range River Flood Risk

Short Term Outlooks

March 23, 2023
11:00 AM

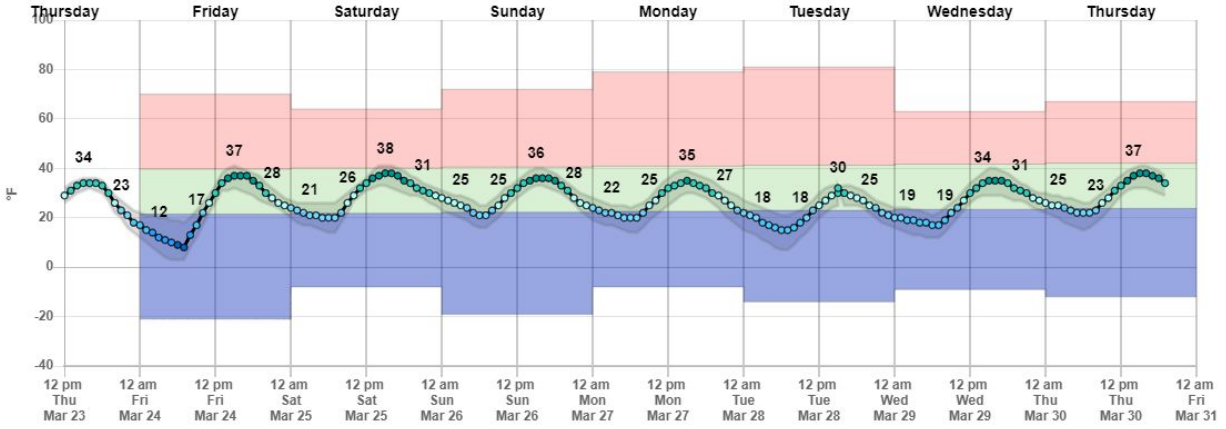
These are general outlooks that depict broad trends for the weeks and months ahead

Next 7 Days

→ **Near to below normal temperatures**

→ **Dry Conditions** - Just a few low chances for precip through mid next week

→ Impact to Spring Flooding: **Positive - Slow melt and no precipitation**

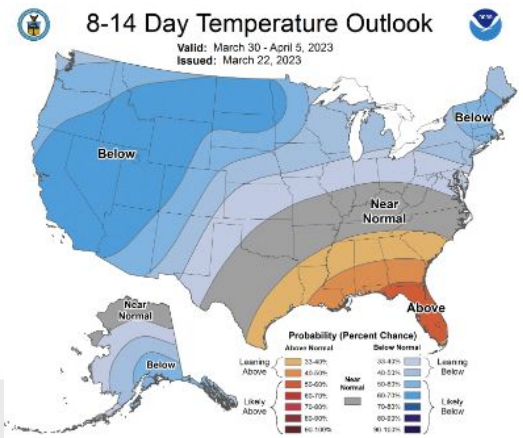


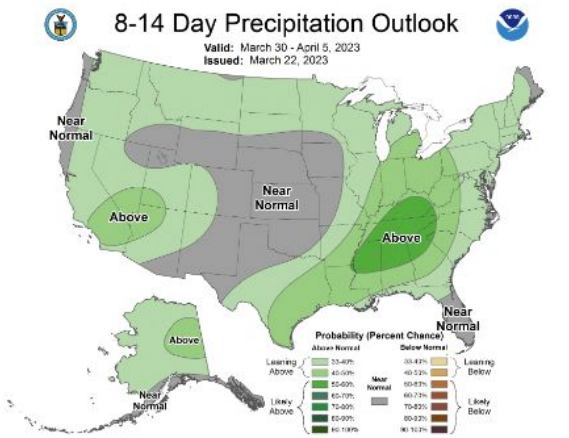
8-14 Day Outlook

→ **Below Normal Temps**

→ **Precipitation: Slightly leaning above normal**

→ Impact to Spring Flooding: **Neutral, Cooler temperatures are better to keep the snow melt slower**





Long Term Outlooks

March 23, 2023
11:00 AM

These are general outlooks that depict broad trends for the weeks and months ahead

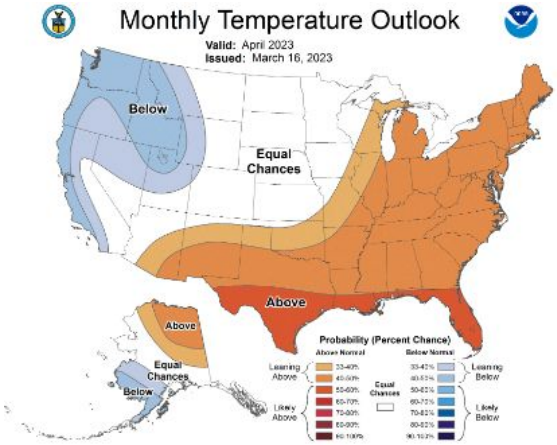
April Outlook

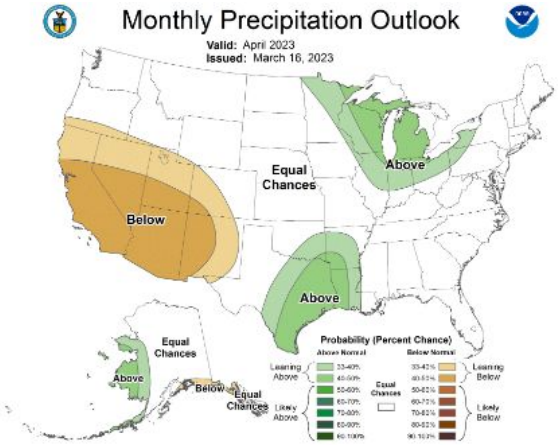
→ Temps: Equal Chances

→ Precipitation: slightly above normal.

→ Impact to Spring Flooding: **Mostly Neutral, but *will delay runoff***

- ***Greater potential for rain on snow events.***



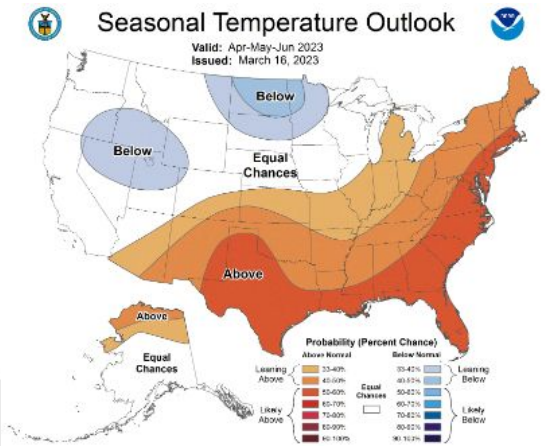


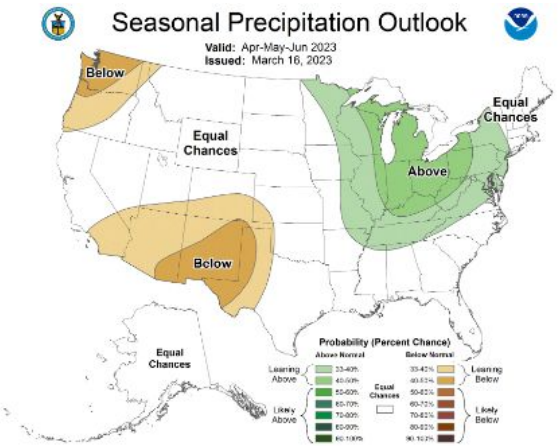
Seasonal Outlook (April-May-June)

→ Temps: Maybe slightly below normal

→ Precipitation: slightly above normal

→ Impact to Spring Flooding: **Negative, greater chance for more precipitation on existing snow.**



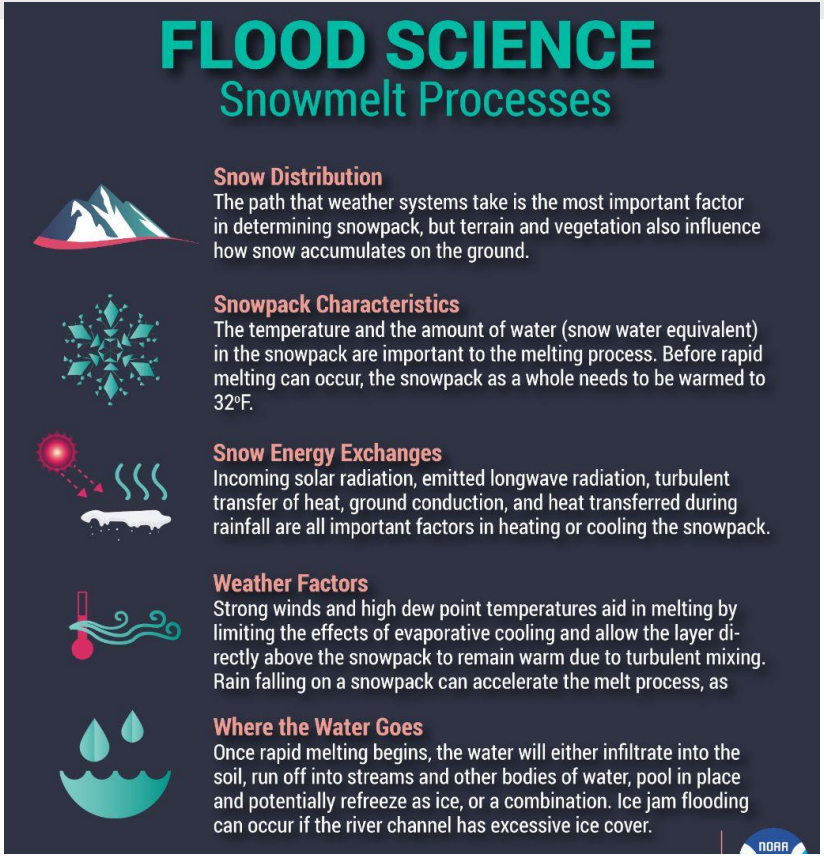


Variables Affecting Snow Melt

March 23, 2023
11:00 AM

Factors to keep in mind in the coming month(s)

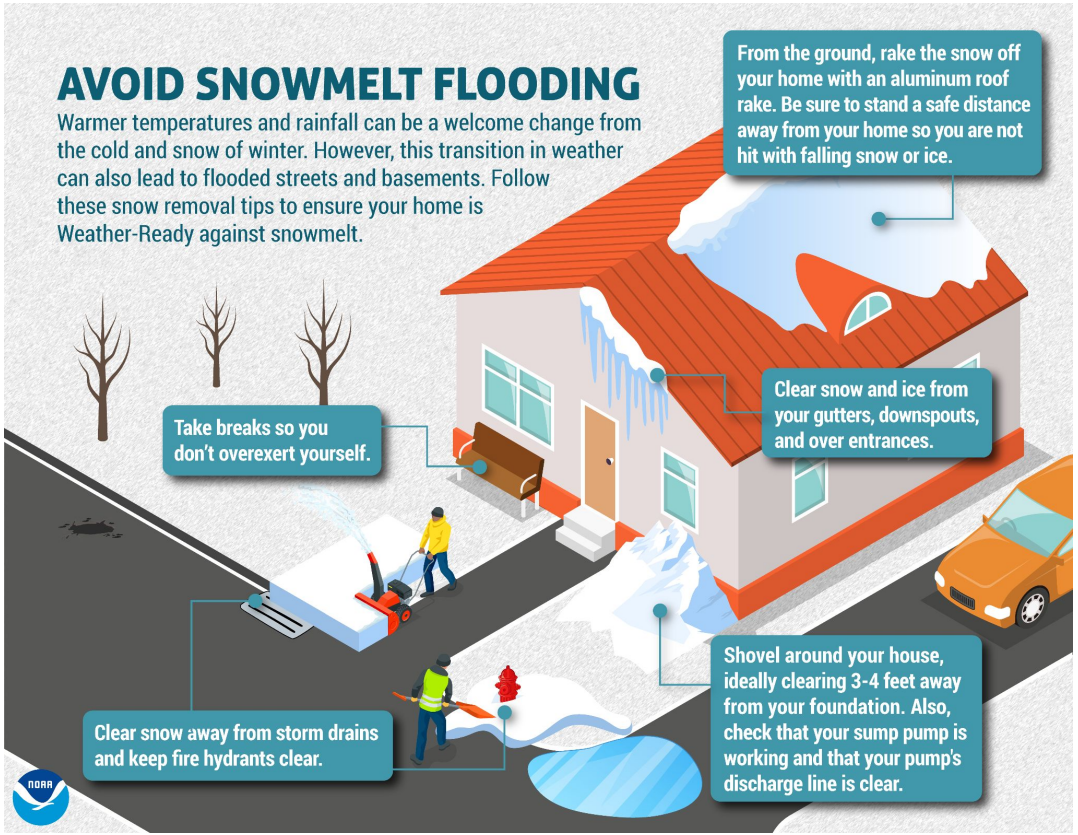
- **Nighttime low temperatures** 🌃
  - Once lows stay above freezing, melt rate will increase.
- **Wind speeds** 💨
  - Faster wind speeds = faster melt
- **Dewpoints** 💧
  - Higher dew point = faster melt
- **Sunshine** ☀️
- **Precipitation on snow** 🌧️
  - Rain on ripe snowpack can lead to rapid snow melt
- **Frost Depth** 🧊
  - More frozen ground = more direct runoff into rivers/lakes



Prepare for Flooding Now

March 23, 2023
11:00 AM

- **Shovel around your house**, ideally clearing 3-4 feet away from your foundation.
- **Check that your sump pump is working** and that your pump's discharge line is clear. (consider getting a sump pump if you do not have one)
- Move valuables and hazardous materials stored in basements upstairs or to higher locations.
- **Clear snow away from storm drains** and keep fire hydrants clear.
- Clear snow and ice from your gutters, downspouts, and over entrances.



Spring Flood Outlook Update

March 23, 2023
11:00 AM

Potential for Spring Flooding across Northeast Minnesota and Northwest Wisconsin

Key Messages

- The spring flooding potential across the Northland is **above normal**
- **Increased risk for Moderate to potentially Major Flooding on the Mississippi River at Aitkin, Fort Ripley.**
- Increased risk of minor flooding for the Bad River and the St. Louis River.
- **If you have experienced spring snowmelt flooding problems in the past, you will likely experience problems this spring!**

Next Scheduled Briefing

- By April 7

Threat	Impact to Potential Spring Flooding	Link to Image(s)
High river levels	**Some above normal streamflow** *(minimal rivers that are open/not affected by ice)*	USGS WaterWatch MN WI
High soil moisture	**Above normal**	CPC Soil Moisture
Winter Precipitation	**Above normal**	Climate Prediction Center 6 to 10 Day 8 - 14 Day
Snowpack/ Liquid Equivalent	**Extreme, Near Record High**	Snow Analysis Snow Depth Ranking
Rate of Snowmelt	**To Be Determined**	**24**, **48**, & **72** hr Snowmelt
Frost Depth	**Little to None**	Frost Depth Map
Spring Precipitation	**Leaning Slightly Above Normal**	Point Forecast (7 Days) Precip Outlook (Long Term)

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National Weather Service
Duluth, MN