

# Meteorological “Winter” 2023-2024: What Happened?

A look at the ways “record mild” was redefined for  
Michigan’s Upper Peninsula

Dec. 1, 2023 - Feb. 29, 2024, MQT WFO

Rebecca Economides, NOAA Volunteer WFO MQT

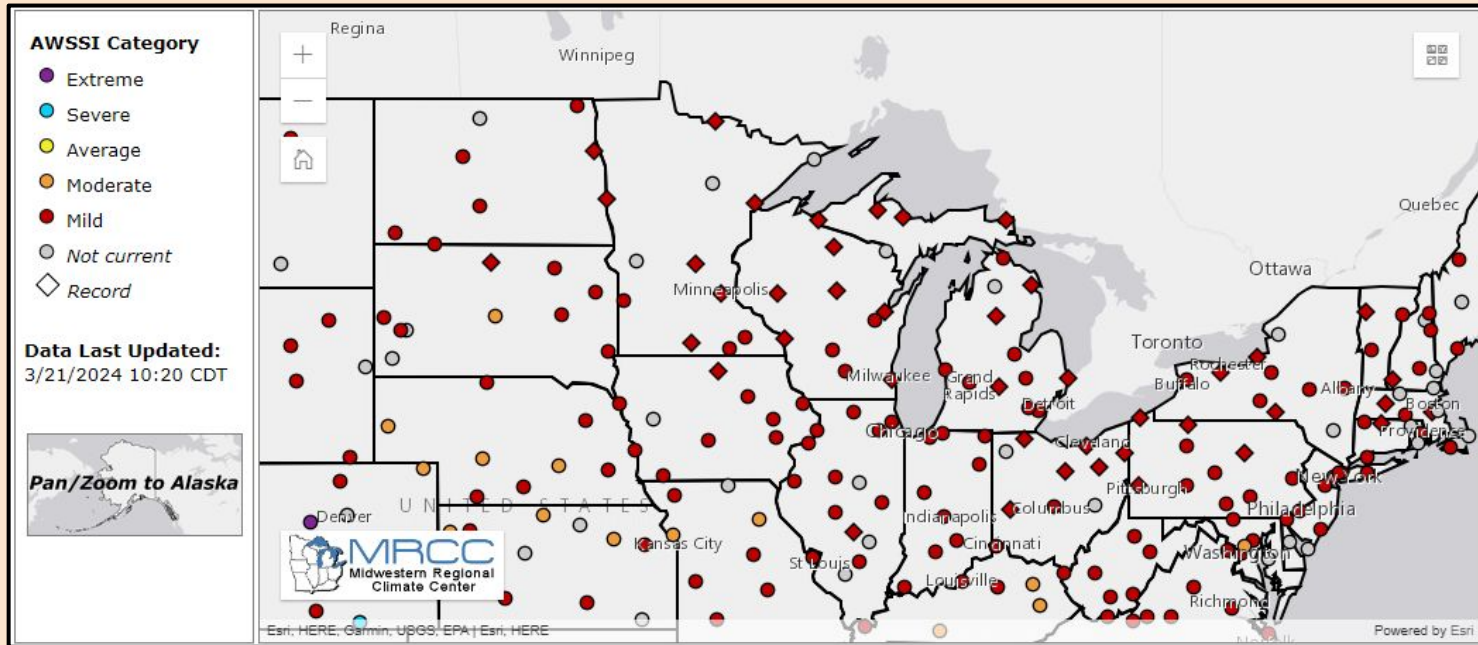
Image shows VIIRS data on Feb. 3, 2024 (NOAA CoastWatch)



Marquette  
April 5, 2024  
3:23 PM Eastern



# We know this past winter was mild in the UP. But how mild was it?

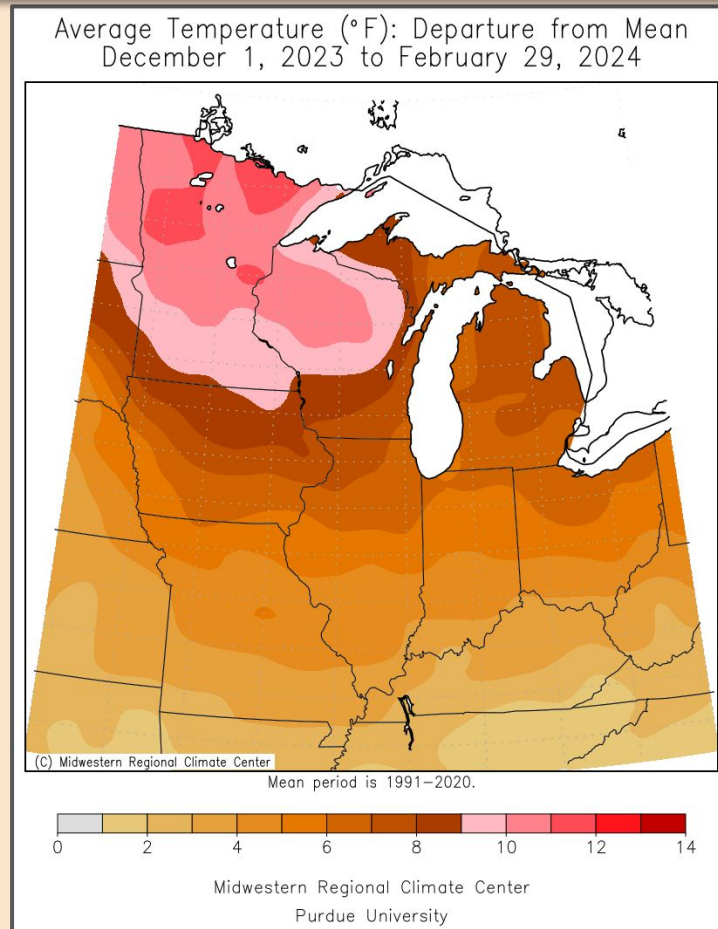
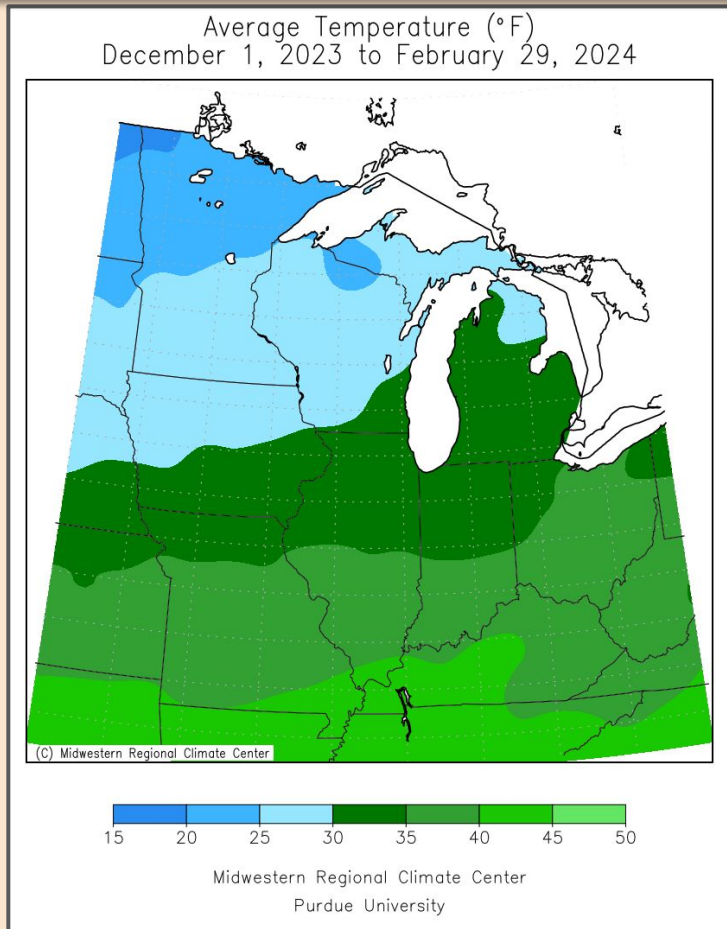


Accumulated Winter Season Severity Index (AWSSI) as of March 24, 2024 from the Midwestern Regional Climate Center (MRCC)

As of March 24, 2024, the AWSSI for Ironwood, Herman, Marquette, and Sault Ste. Marie all indicate a **record mild winter**.

The AWSSI combines snowfall, snow depth, maximum temperature and minimum temperature into a single number whose goal is to objectively quantify the severity, or mildness, of the winter season in a given location. The [MRCC](#) says that “...the severity of a winter is related to the intensity and persistence of cold weather, the amount of snow, and the amount and persistence of snow on the ground”. This index uses data going back to 1950.

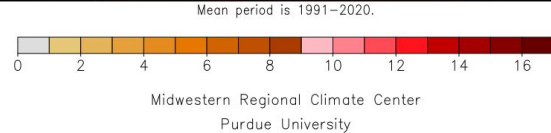
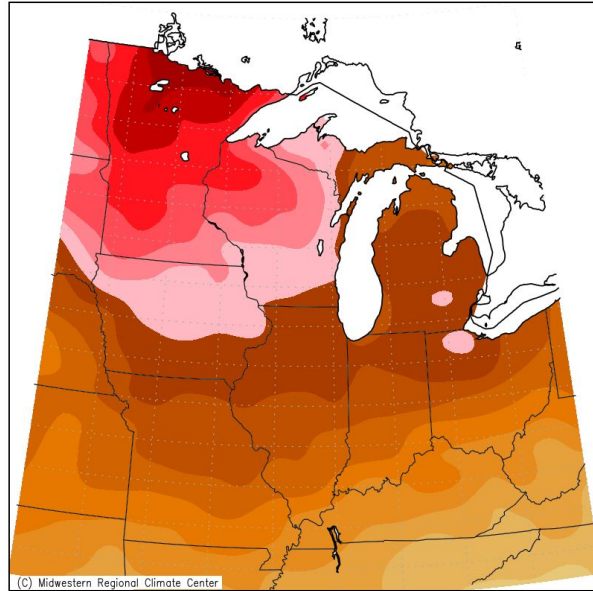
# Upper Midwest seasonal average temperature and seasonal average temperature departure from mean, Dec. 1, 2023 - Feb. 29, 2024



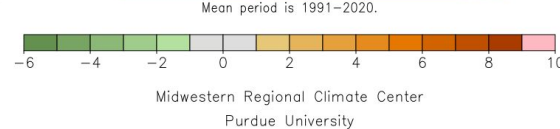
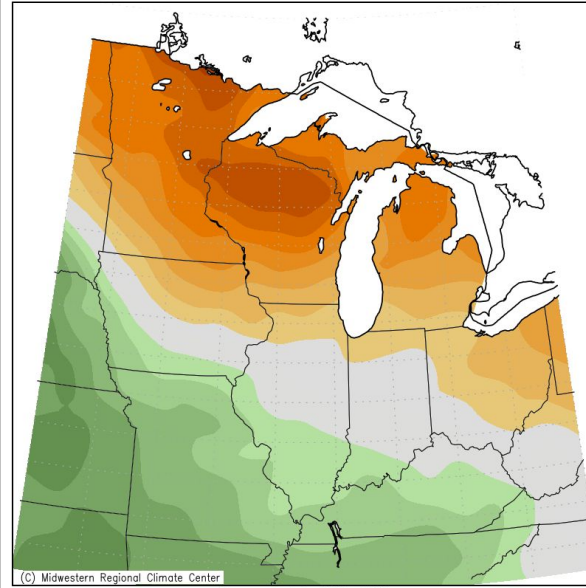
Most of the UP experienced an average seasonal temperature between 20°F and 30°F. This represents a departure from the mean climatic average temperature of between 6°F and 10°F for most of the UP.

# Upper Midwest monthly temperature departure from climatic mean, Dec. 2023, Jan. 2024, and Feb. 2024

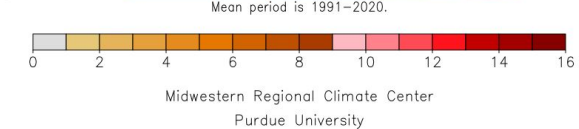
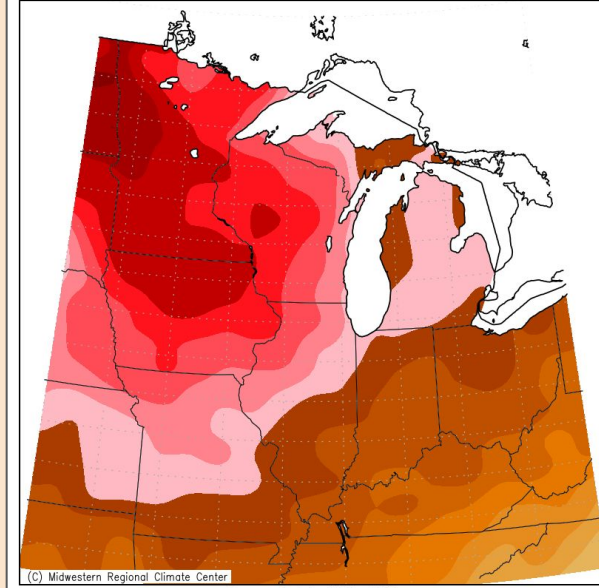
Average Temperature (°F): Departure from Mean  
December 1, 2023 to December 31, 2023



Average Temperature (°F): Departure from Mean  
January 1, 2024 to January 31, 2024



Average Temperature (°F): Departure from Mean  
February 1, 2024 to February 29, 2024



December and February were particularly anomalously warm in the UP, with temperature departures ranging from 6°F to 11°F above the climatic mean, and high temperatures being concentrated in the western half of the UP. January's temperature departures, though still positive, were much closer to the climatic normal.



# Average Seasonal Maximum and Minimum Temperature Anomalies - specific locations around UP

Location	Avg. Seasonal Max. Temp. Anomaly (°F)
Ironwood	8.6
Iron Mountain	7.6
Hancock-Houghton	9.1
Negaunee (MQT WFO)	7.7
Munising	6.6
Manistique	4.3

At the locations examined, average seasonal maximum temperatures ranged from 4°F to 9°F above climate normals.

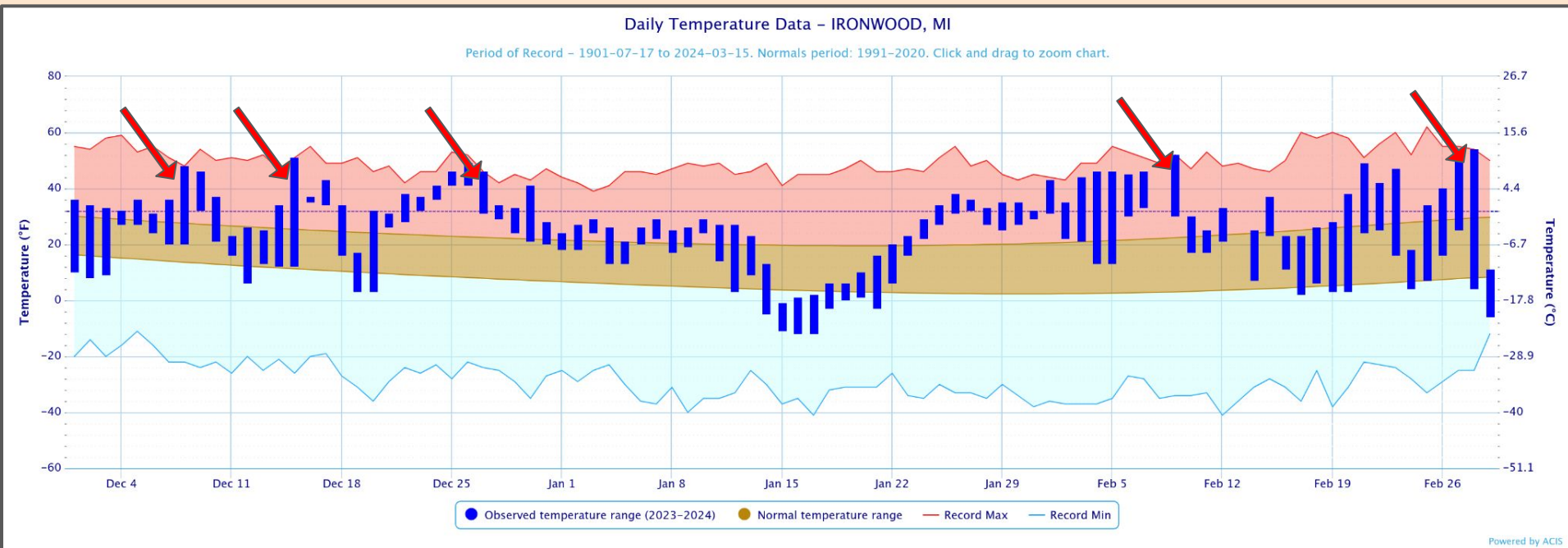
The stations were chosen because they were spread spatially throughout the CWA and because they have long, reliable historical temperature records.

Location	Avg. Seasonal Min. Temp. Anomaly (°F)
Ironwood	10.4
Iron Mountain	10.9
Hancock-Houghton	10.4
Negaunee (MQT WFO)	9.1
Munising	8.4
Manistique	8.0

At the locations examined, average seasonal minimum temperatures ranged from 8°F to 11°F above climate normals.

# Seasonal Time Series for Ironwood, MI – western UP

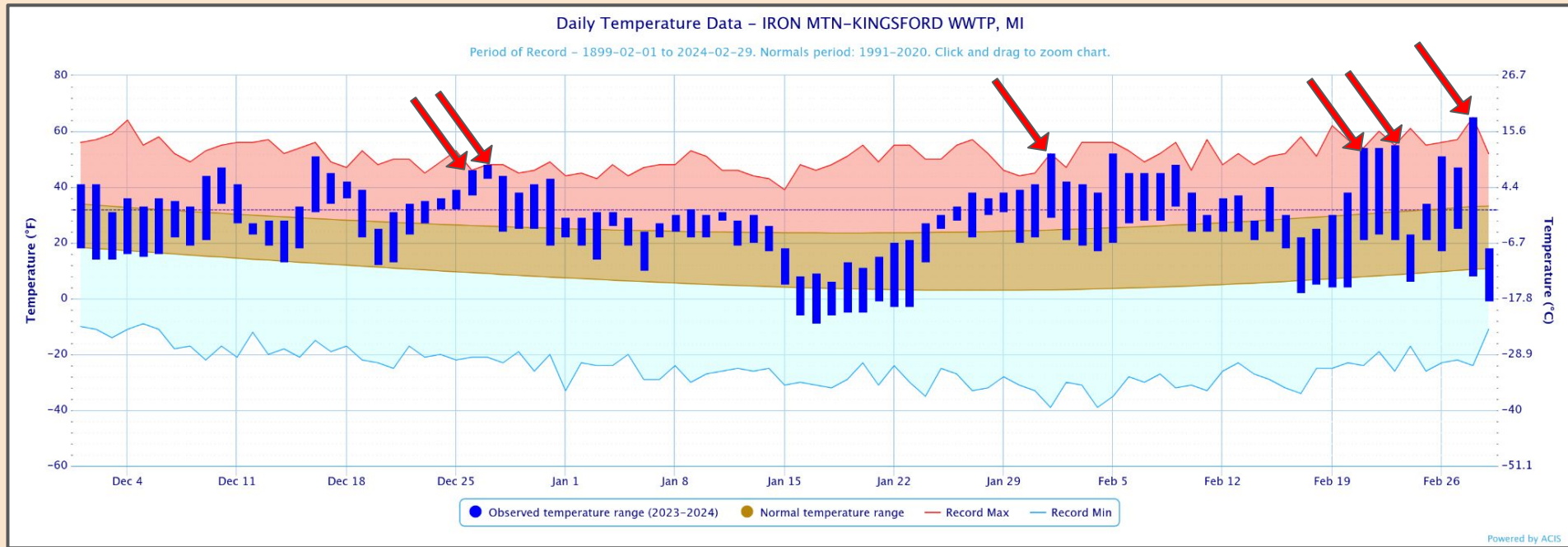
The following series of graphs show daily maximum and minimum temperatures from Dec. 1, 2023 through Feb. 29, 2024 as well as climatic normal temperatures and record daily high and low temperatures.



Temperatures at Ironwood broke the record for maximum daytime high temperature **five** times this season: 12/8, 12/15, 12/27, 2/9, 2/28  
Period of record: 1901 - present

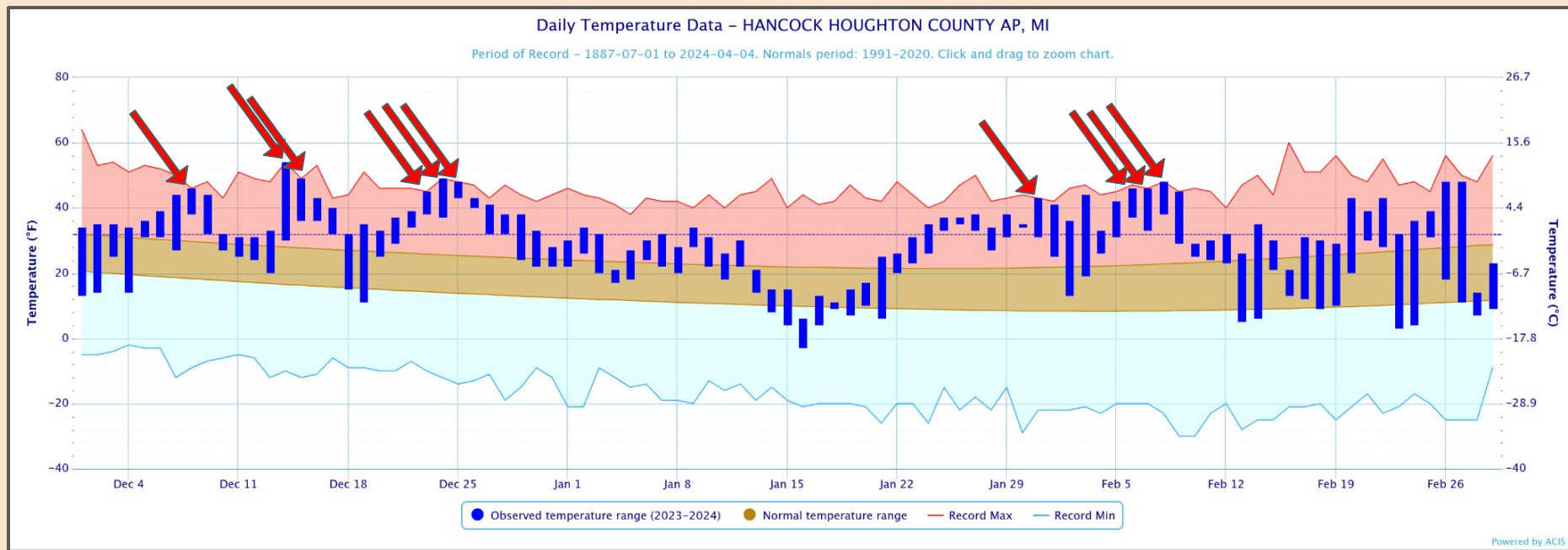


# Seasonal Time Series for Iron Mountain-Kingsford – south-central UP



Temperatures at Iron Mountain-Kingsford broke the record for maximum daytime high temperature **six** times this season: 12/26, 12/27, 2/1, 2/21, 2/23, 2/28  
Period of record: 1899 - present

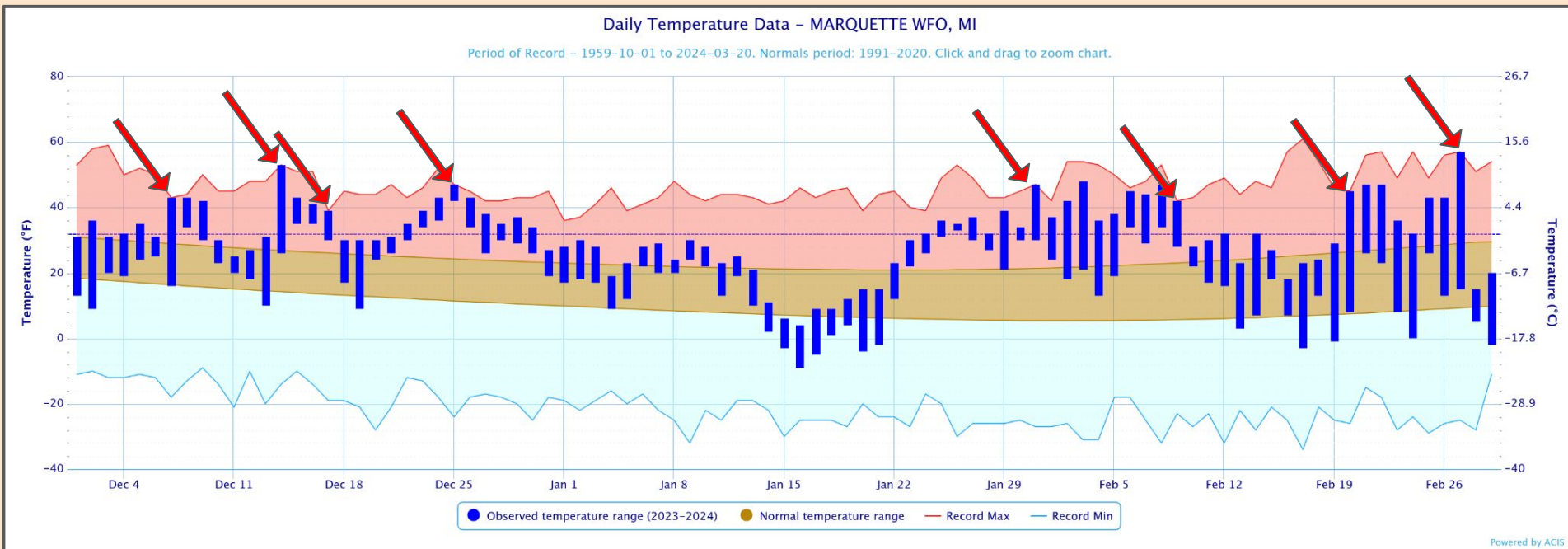
# Seasonal Time Series for Hancock-Houghton – Keeweenaw



Temperatures at Hancock-Houghton Airport broke the record for maximum daytime high temperature **ten** times this season: 12/8, 12/14, 12/15, 12/23, 12/24, 12/25, 1/31, 2/7, 2/8, 2/9  
Period of record: 1887 - present

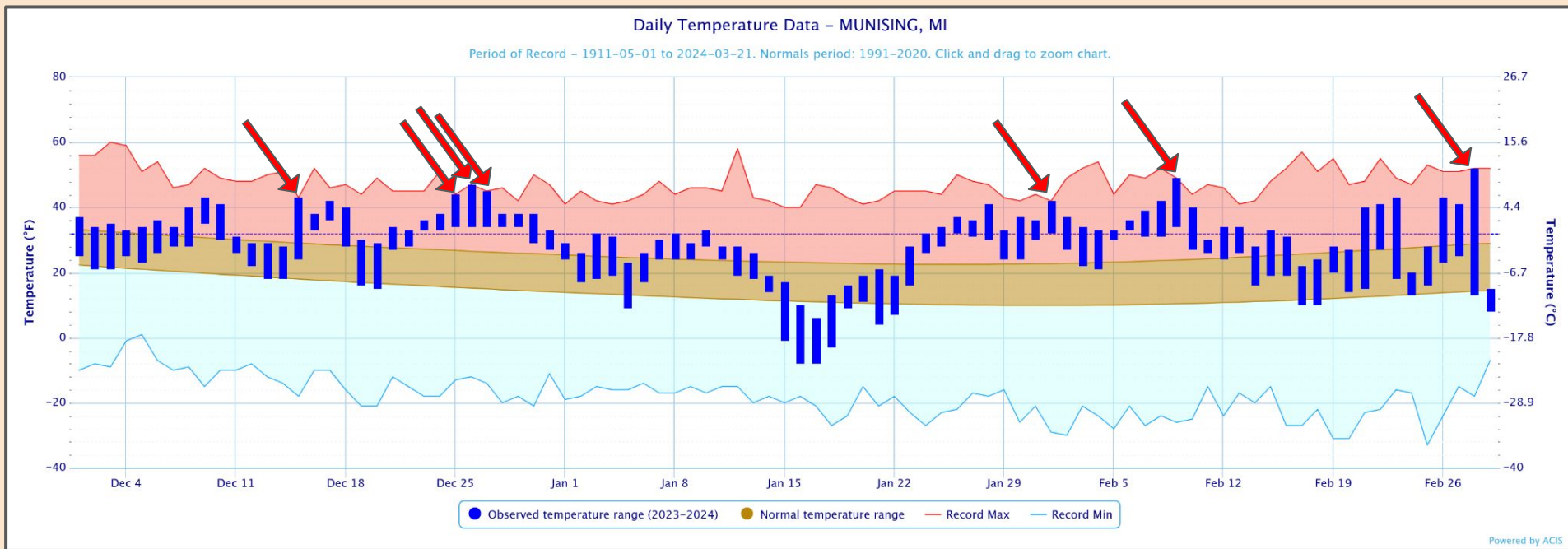


# Seasonal Time Series for Negaunee (MQT WFO) – north-central UP



Temperatures in Negaunee at the Marquette WFO broke the record for maximum daytime high temperature **eight** times this season: 12/7, 12/14, 12/17, 12/25, 1/31, 2/9, 2/20, 2/27  
Record dates to 1961.

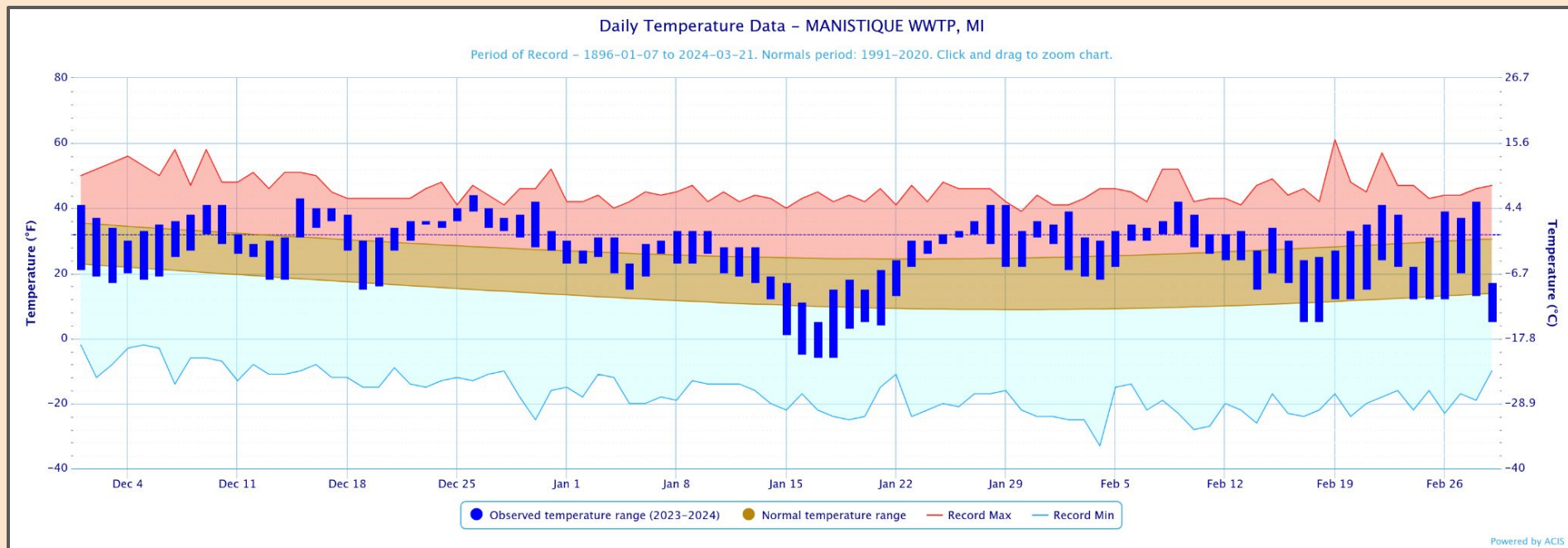
# Seasonal Time Series for Munising – north-eastern UP



Temperatures in Munising broke the record for maximum daytime high temperature at least **seven** times this season: 12/15, 12/25, 12/26, 12/27, 2/1, 2/9, 2/28  
Record dates to 1911.



# Seasonal Time Series for Manistique – southeastern UP



Temperatures in Manistique broke the record for maximum daytime high temperature **zero** times this season.  
Record dates to 1896.

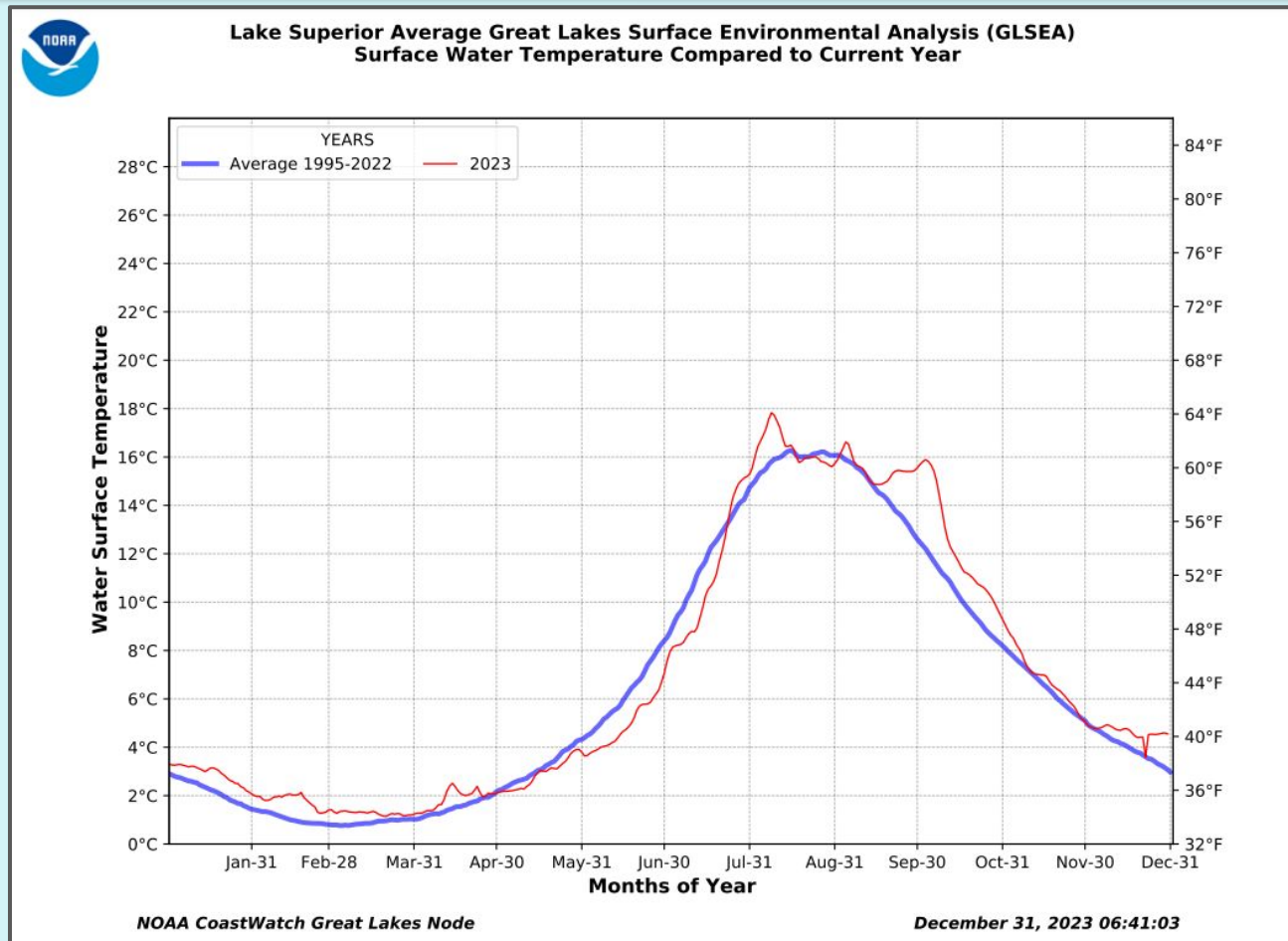
# Manistique – top ten highest seasonal average maximum daily temperatures

Even though single-day maximum high temperatures did not break the historical record in Manistique this past winter, it was still a warm winter.

In 2023-2024, Manistique experienced its **fifth** warmest seasonally-averaged daily maximum high temperature on record.

Maximum 3-Month Mean Max Temperature for MANISTIQUE WWTP, MI			
Click column heading to sort ascending, click again to sort descending.			
Rank	Value	Dates	Missing Days
1	33.8	2001-12-01 through 2002-02-28	1
2	32.6	1982-12-01 through 1983-02-28	1
3	32.4	2011-12-01 through 2012-02-29	0
4	32.3	1952-12-01 through 1953-02-28	1
5	32.1	2023-12-01 through 2024-02-29	0
6	32.0	1953-12-01 through 1954-02-28	0
7	31.9	1946-12-01 through 1947-02-28	0
8	31.8	1997-12-01 through 1998-02-28	1
9	31.8	1943-12-01 through 1944-02-29	0
10	31.7	2015-12-01 through 2016-02-29	0
Period of record: 1896-01-07 to 2024-04-05			

# 2023 Lake Superior Surface Temperature



This graph shows the sea surface temperature of Lake Superior throughout 2023 relative to the 1995 - 2022 average. On Dec. 31, 2023 Lake Superior SST was at ~40°F, with the average being ~37.5°F (bottom right).



# 2024 Lake Superior Temperature, with Past Years and Historic Average

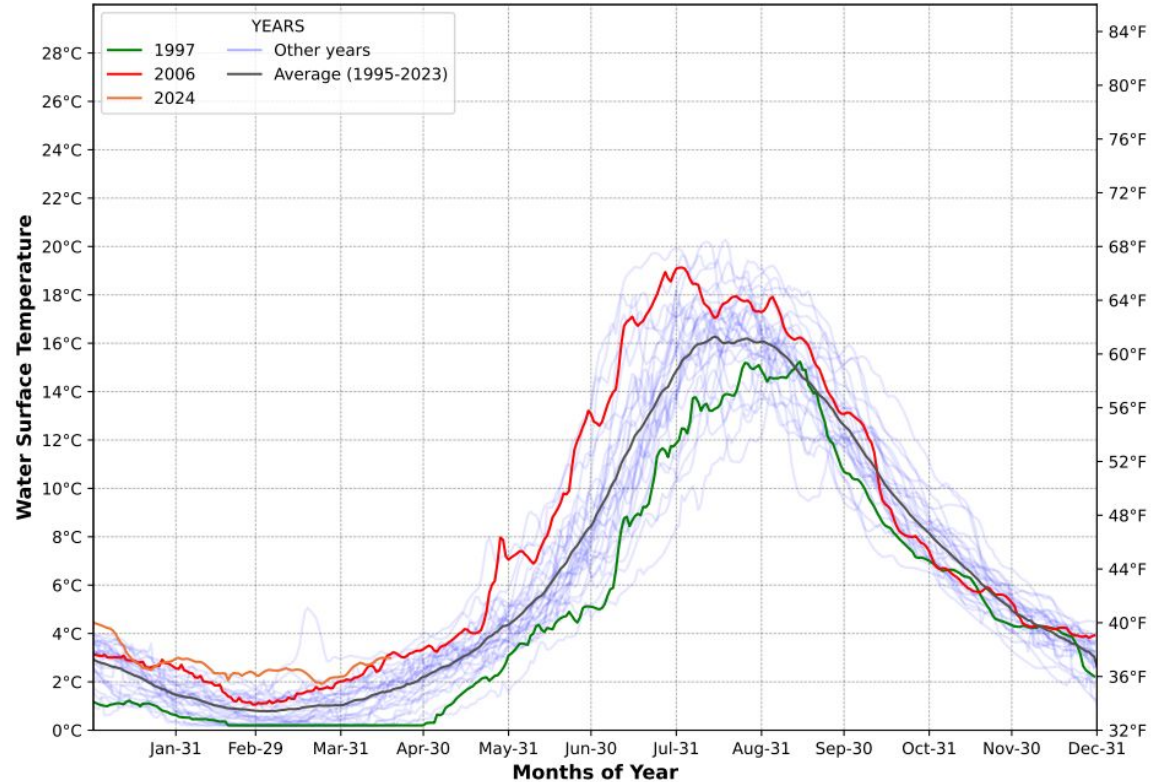
Looking at the tan line in the bottom left quadrant of the graph, we can see that the lake surface temperature in 2024 is (so far) warmer than most other years depicted here.

The red and green curves highlight the entire year's curve of the maximum and minimum SST on the day the data was accessed.



Lake Superior Average GLSEA Surface Water Temperature (1995 - 2024)

The warmest year on April 18 for the period of record (1995-2023) was in 2006 (shown in red)  
The coldest year on April 18 for the period of record (1995-2023) was in 1997 (shown in green)



NOAA CoastWatch Great Lakes Node

April 19, 2024 07:40:05

Marquette

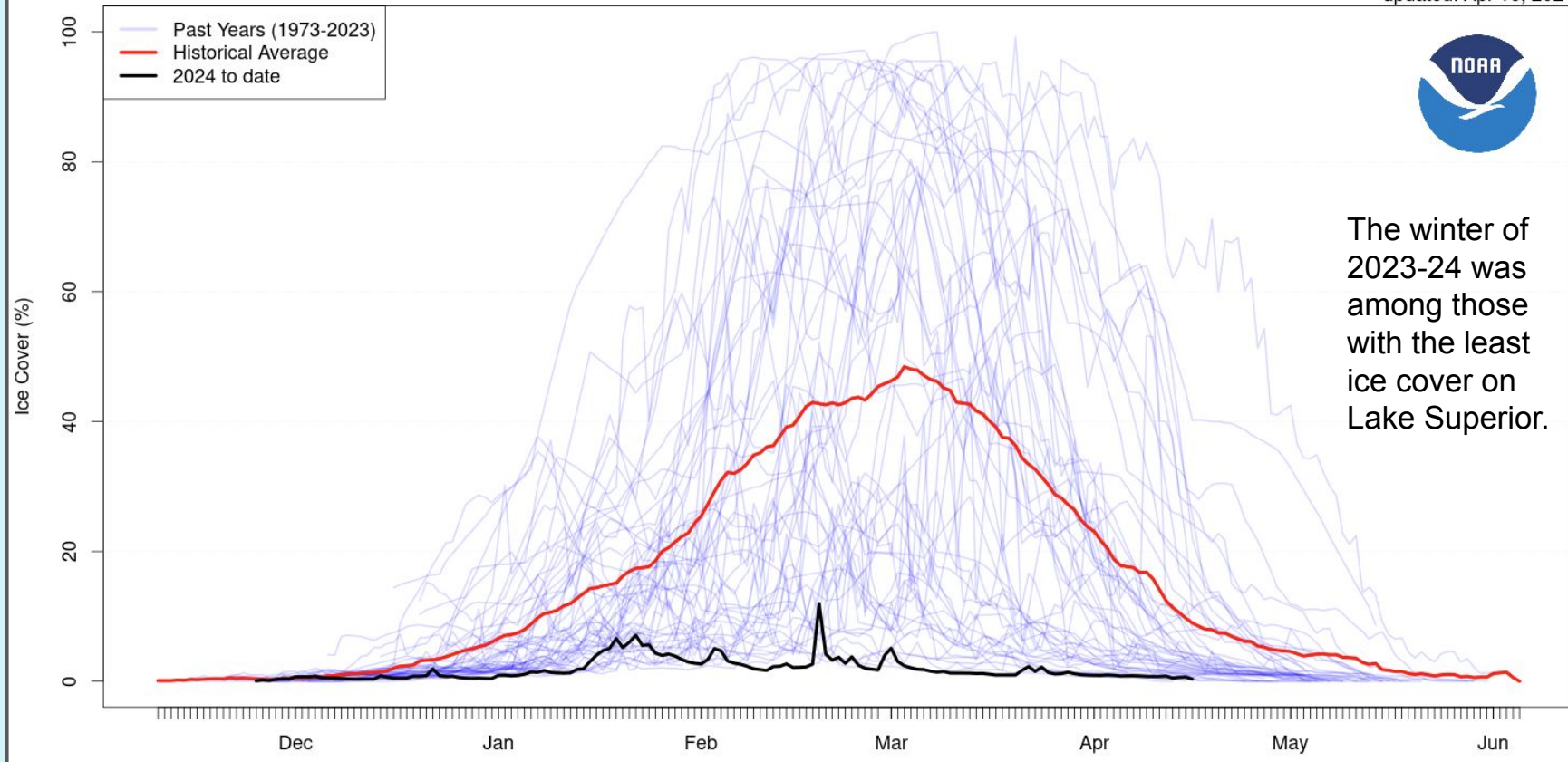
May 2024



# Lake Superior Seasonal Historic Ice Cover

## Lake Superior Average Ice Cover

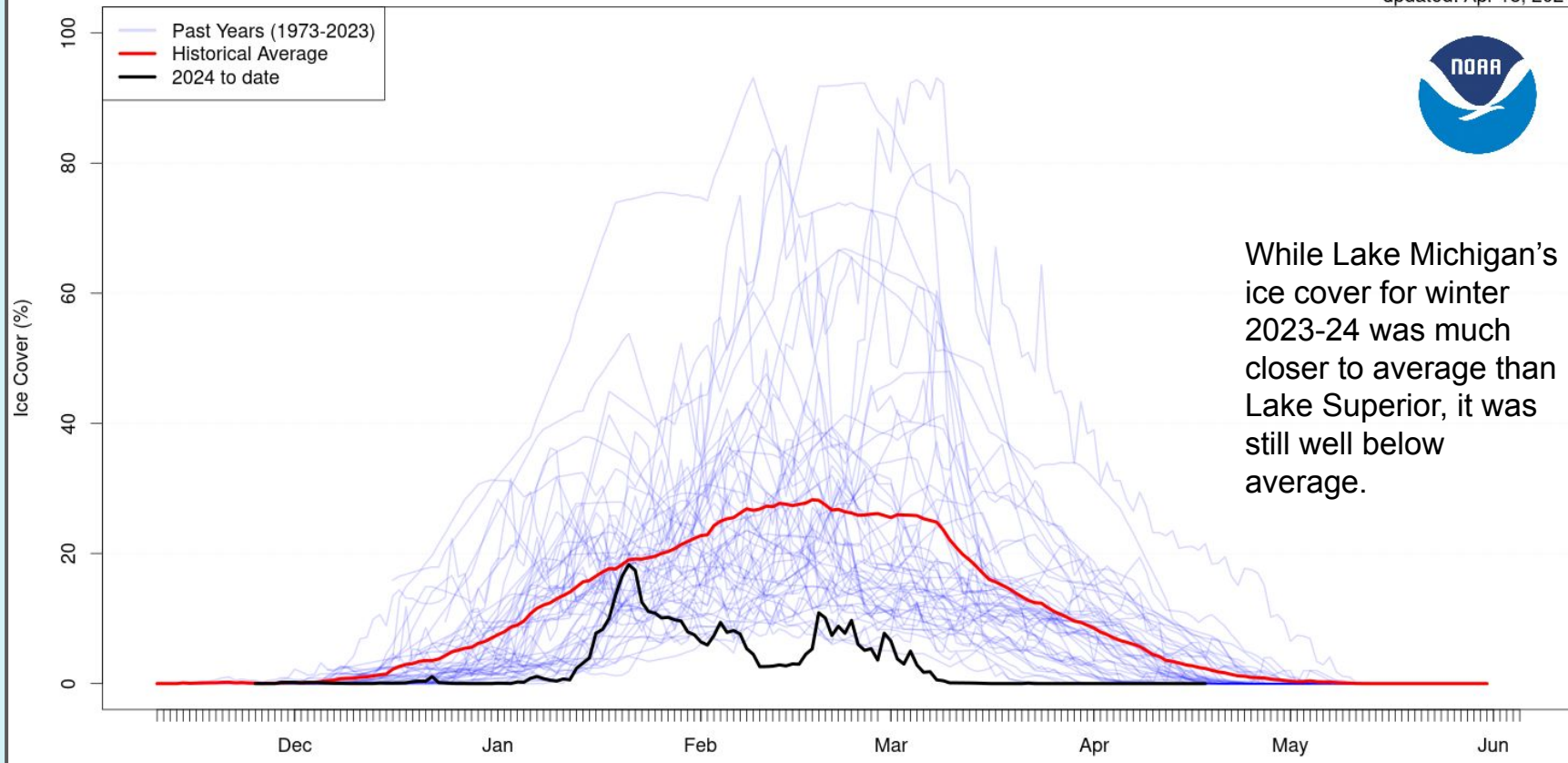
updated: Apr 16, 2024



# Lake Michigan Seasonal Historic Ice Cover

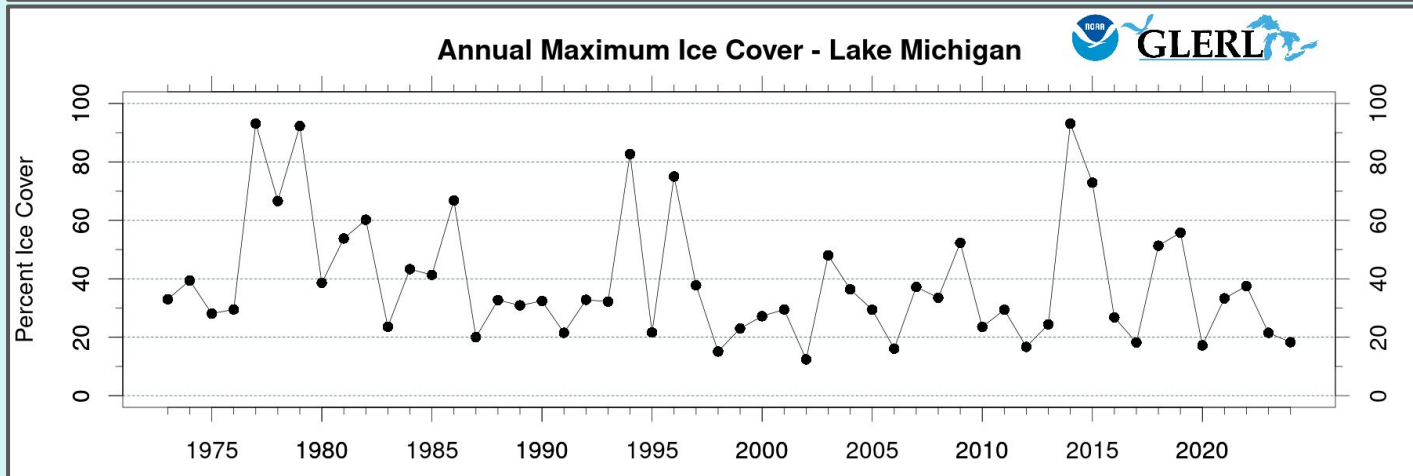
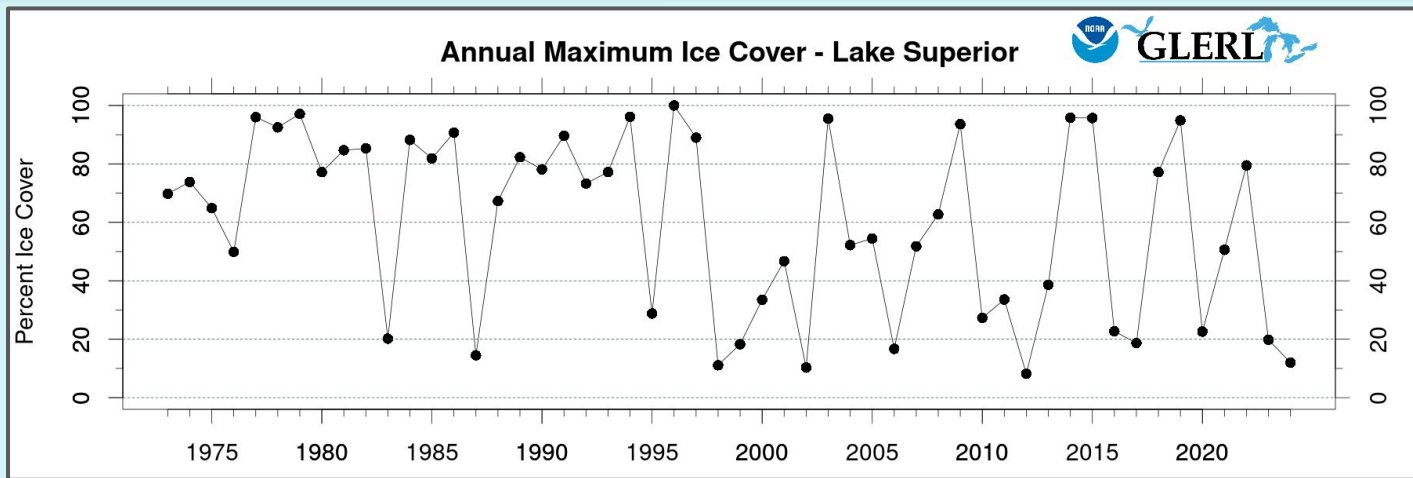
## Lake Michigan Average Ice Cover

updated: Apr 18, 2024





# Lakes Superior and Michigan Historic Maximum Ice Cover



Maximum ice coverage on Lake Superior typically occurs between the end of February and early March. For Lake Michigan, this usually occurs between mid-February and the end of February. This past winter, maximum ice on the Great Lakes occurred in late January thanks to anomalously warm temperatures for most of the winter, except for a cold snap in early January.

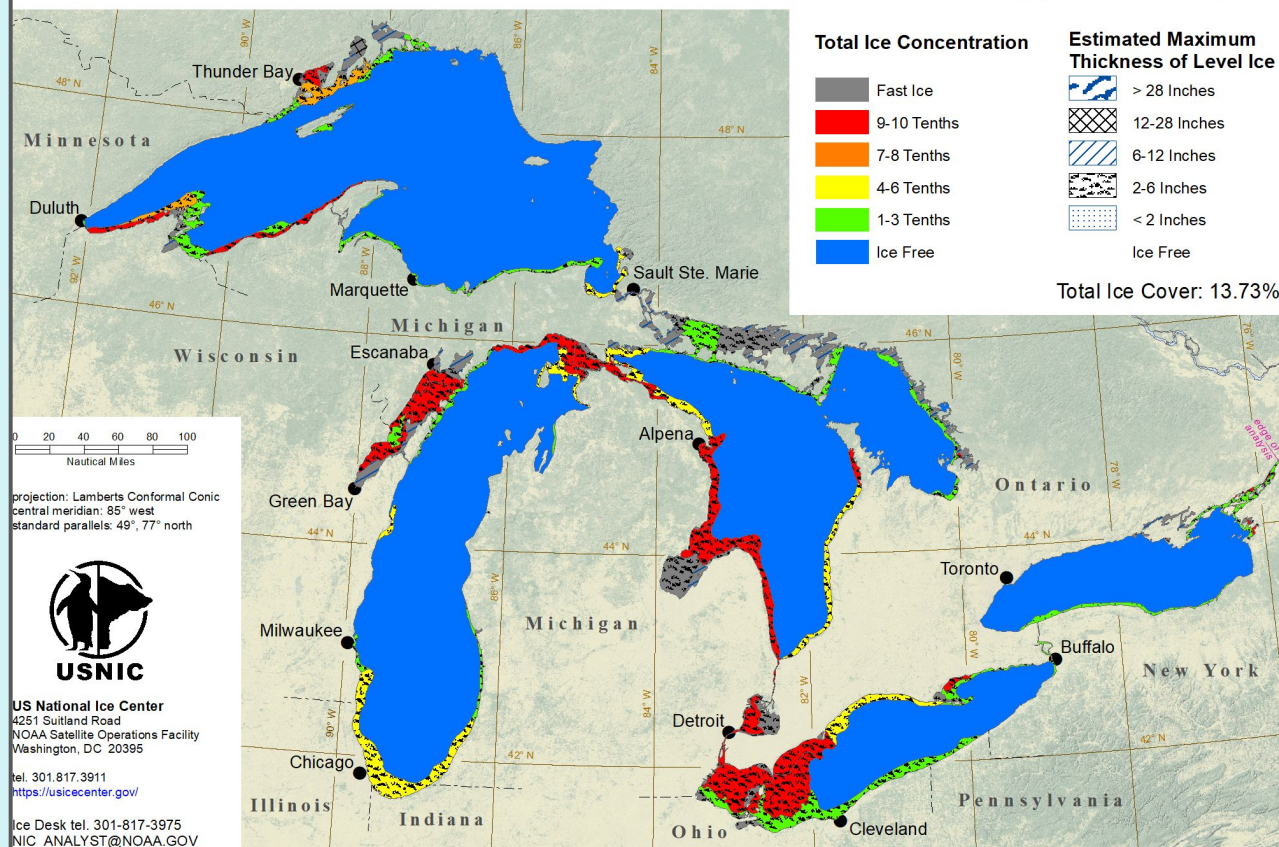
# 2023-24 Great Lakes Ice Cover: a spatial view

For the 2023-24 season, maximum ice cover on the Great Lakes occurred on approximately Jan. 23, 2024, with almost 14% of the lakes covered in ice.

## U. S. NATIONAL ICE CENTER USCG DISTRICT 9 GREAT LAKES ICE ICE CONCENTRATION AND LEVEL ICE THICKNESS

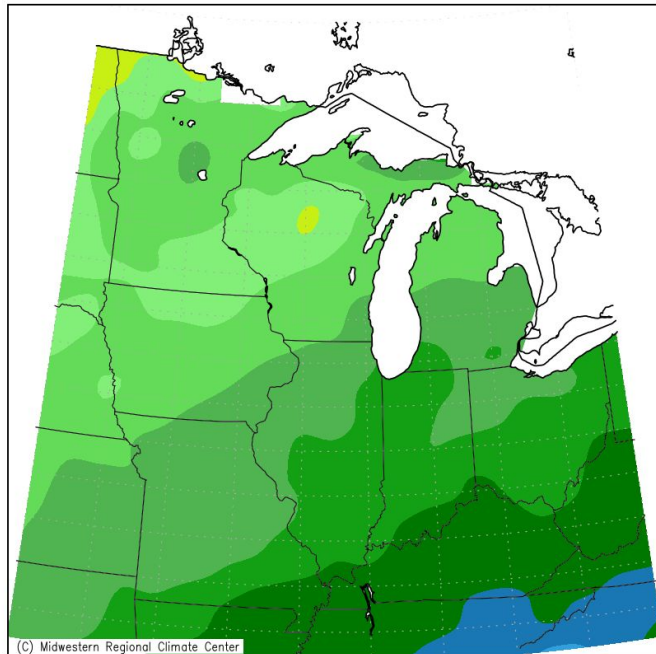
ICE DATE: 23 JAN 2024

MAP PRODUCED: 23 JAN 2024



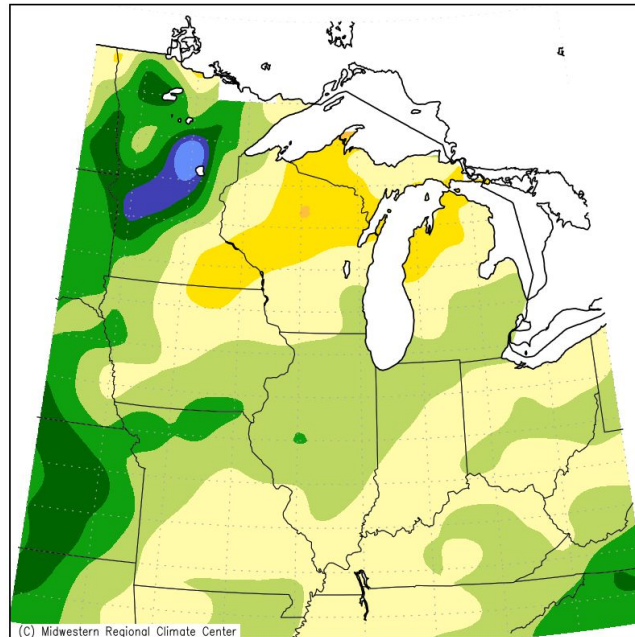
# Upper Midwest accumulated precipitation and accumulated precipitation percent of mean, Dec. 1, 2023 - Feb. 29, 2024

Accumulated Precipitation (in)  
December 1, 2023 to February 29, 2024

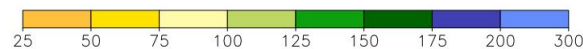


Midwestern Regional Climate Center  
Purdue University

Accumulated Precipitation: Percent of Mean  
December 1, 2023 to February 29, 2024



Mean period is 1991–2020.



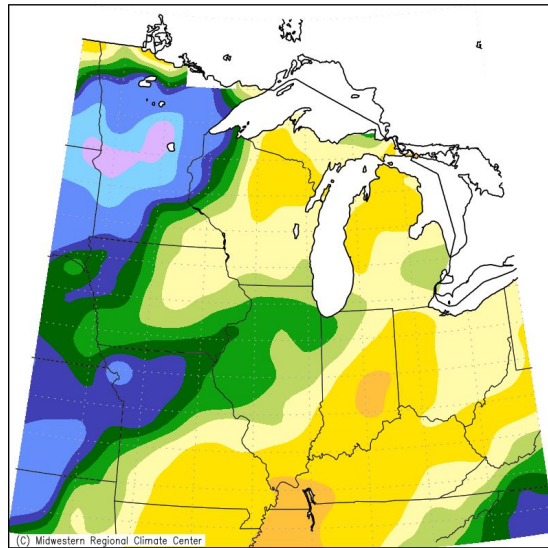
Midwestern Regional Climate Center  
Purdue University

Most of the UP experienced seasonal liquid precipitation accumulations between 3 and 5 inches, with higher amounts along the Lake Superior shoreline of the eastern UP. These amounts represent between 50% and 75% of normal accumulations in the western UP, and between 75% and 100% of normal accumulations in the eastern UP.

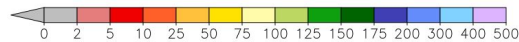


# Upper Midwest accumulated precipitation and accumulated precipitation percent of mean, Dec. 2023, Jan. 2024, and Feb. 2024

Accumulated Precipitation: Percent of Mean  
December 1, 2023 to December 31, 2023

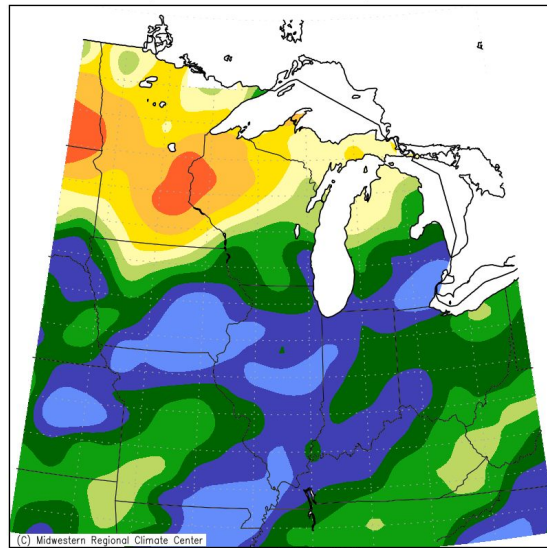


(C) Midwestern Regional Climate Center  
Mean period is 1991–2020.

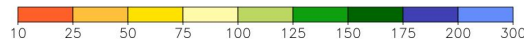


Midwestern Regional Climate Center  
Purdue University

Accumulated Precipitation: Percent of Mean  
January 1, 2024 to January 31, 2024

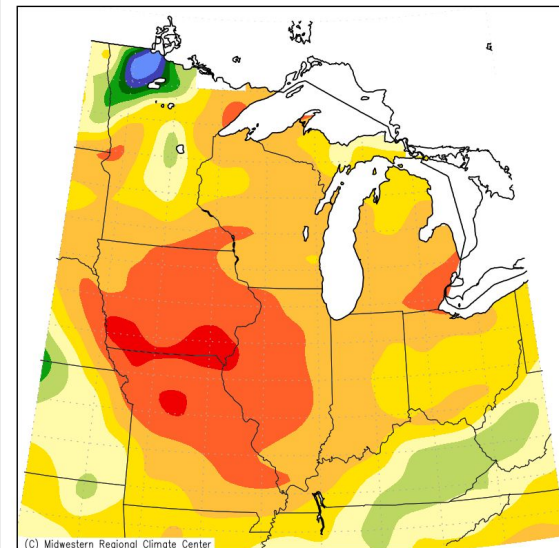


(C) Midwestern Regional Climate Center  
Mean period is 1991–2020.

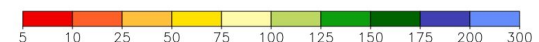


Midwestern Regional Climate Center  
Purdue University

Accumulated Precipitation: Percent of Mean  
February 1, 2024 to February 29, 2024



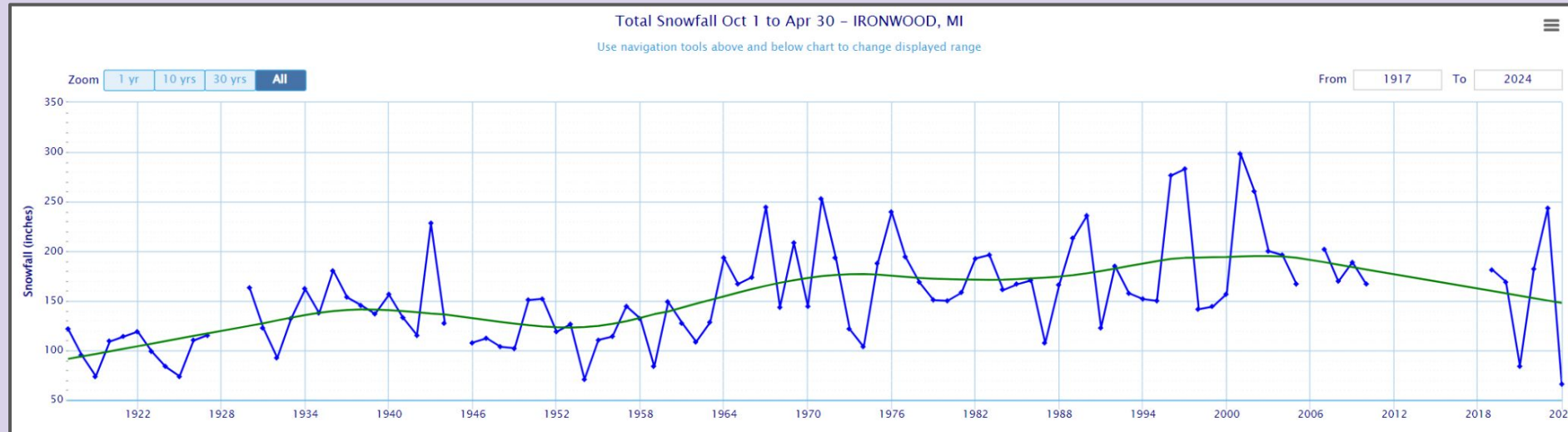
(C) Midwestern Regional Climate Center  
Mean period is 1991–2020.



Midwestern Regional Climate Center  
Purdue University

December in the Upper Midwest was largely anomalously dry, with some regions experiencing below normal precipitation; in January these geographic patterns mostly swapped geospatially and showed more divergence between values. In February, the entirety of the Upper Midwest showed well below normal precipitation accumulations. For the UP, December was somewhat dry, with January being drier, and February even drier.

# Ironwood Water Year Historic Snowfall, Oct. 1 – April 30



Between 1917 and 2024, the 2023-24 water year at Ironwood ranked as receiving the **least** amount of snowfall, with **66.3 total inches**.

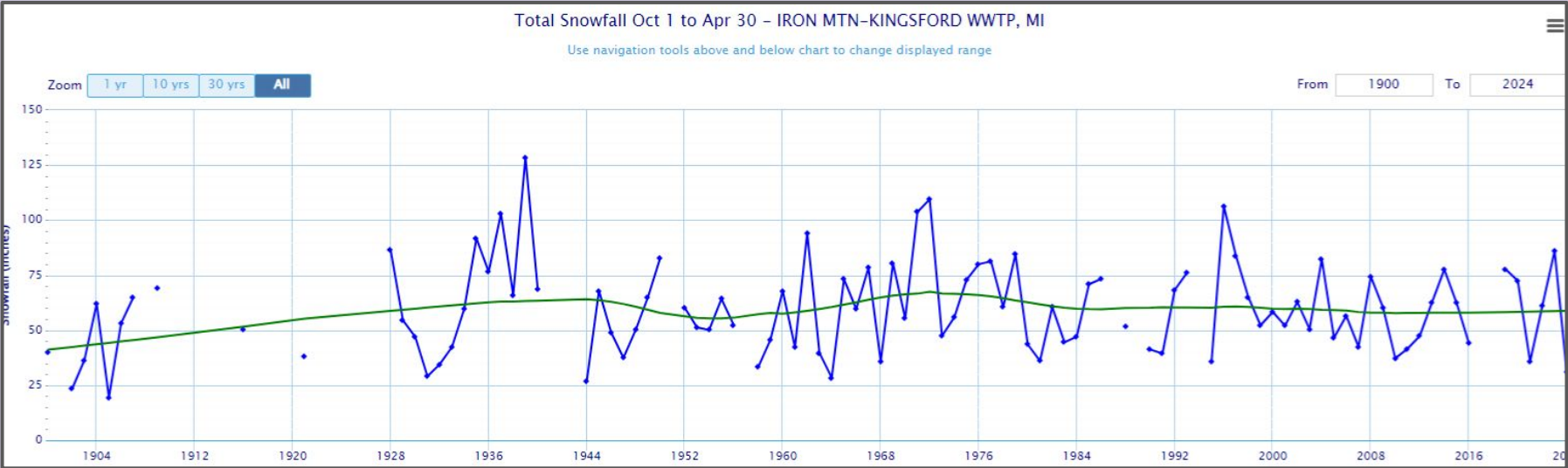
Rank	Ending Date	Total Snowfall Oct 1 to Apr 30
1	2024-04-30	66.3
2	1954-04-30	70.9
3	1925-04-30	74.0
-	1919-04-30	74.0
5	1924-04-30	83.5
6	1959-04-30	83.7
7	2021-04-30	84.4
8	1932-04-30	92.5
9	1918-04-30	95.0
10	1923-04-30	99.0

Rank	Season	Number of Days Snow Depth < 1
1	1923-1924	22
2	2023-2024	20
3	1998-1999	16
4	1931-1932	14
5	2020-2021	13
6	1946-1947	9
7	2012-2013	8
-	1918-1919	8
9	2015-2016	7
-	2001-2002	7

Between **Dec. 1, 2023** and **Feb. 29, 2024** Ironwood experienced **20 days** with snowpack of less than one inch, which was the **2nd most** of any season between 1917-2024.



# Iron Mountain Water Year Historic Snowfall, Oct. 1 – April 30



Between 1900 and 2024, the 2023-24 water year at Iron Mountain ranked as receiving the **6th lowest** amount of snowfall, with **30.9 total inches**.

Rank	Ending Date	Total Snowfall Oct 1 to Apr 30
1	1905-04-30	19.4
2	1902-04-30	23.4
3	1944-04-30	26.7
4	1964-04-30	28.4
5	1931-04-30	29.0
6	2024-04-30	30.9
7	1958-04-30	33.2
8	1932-04-30	34.5
9	2021-04-30	35.7
-	1995-04-30	35.7

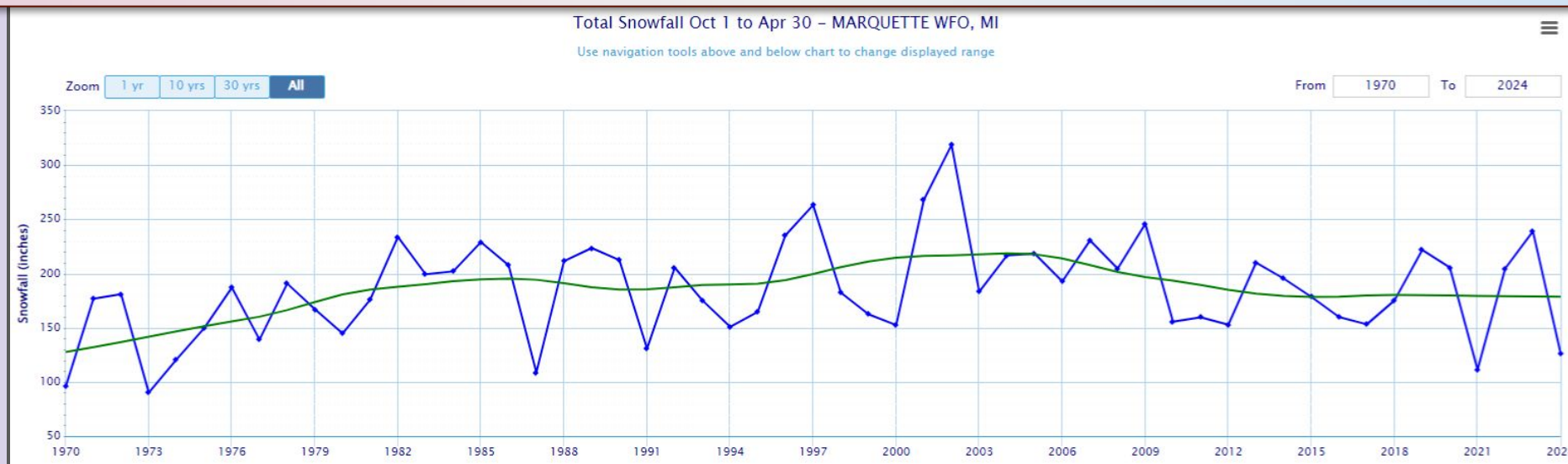
Rank	Season	Number of Days Snow Depth < 1
1	2023-2024	53
2	2002-2003	42
3	1907-1908	35
4	1960-1961	34
5	2001-2002	31
6	2006-2007	30
7	2015-2016	28
8	1953-1954	25
9	1904-1905	24
10	1899-1900	20

Between Dec. 1, 2023 and Feb. 29, 2024 Iron Mountain experienced **53 days** with snowpack of less than one inch, which was **the most** of any season between 1900- 2024.





# MQT WFO (Negaunee) Water Year Historic Snowfall, Oct. 1 – April 30



Between 1970 and 2024, the 2023-24 water year at WFO MQT ranked as receiving the **6th lowest** amount of snowfall, with **126.5 total inches**.

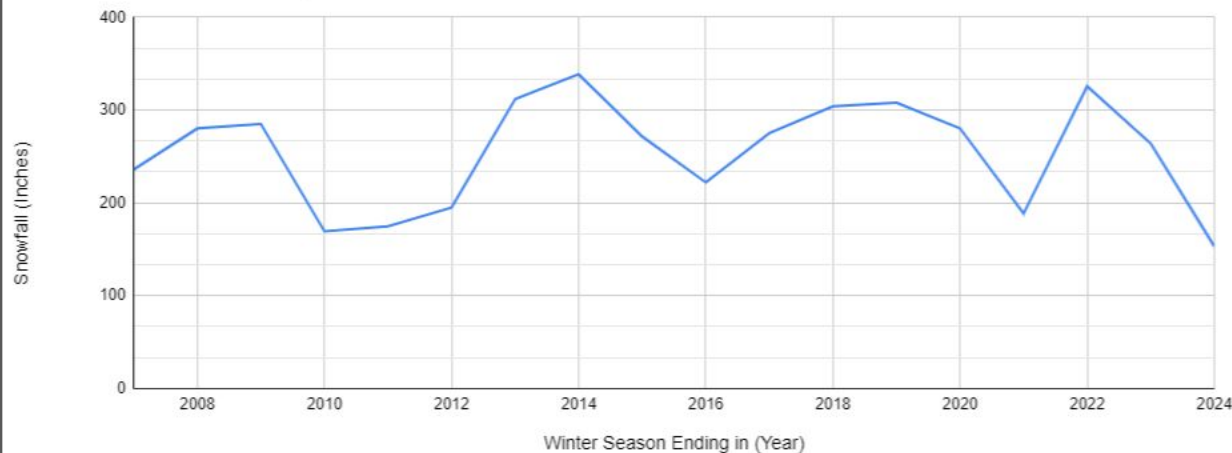
Rank	Ending Date	Total Snowfall Oct 1 to Apr 30
1	1973-04-30	90.1
2	1970-04-30	95.7
3	1987-04-30	108.7
4	2021-04-30	111.3
5	1974-04-30	120.6
6	2024-04-30	126.5
7	1991-04-30	130.7
8	1977-04-30	139.0
9	1980-04-30	144.7
10	1975-04-30	149.6

Rank	Season	Number of Days Snow Depth < 1
1	1998-1999	17
2	2023-2024	11
3	2006-2007	8
-	1994-1995	8
5	2015-2016	7
6	2017-2018	6
-	1999-2000	6
-	1990-1991	6
9	2016-2017	5
-	2012-2013	5

Between **Dec. 1, 2023** and **Feb. 29, 2024** MQT WFO in Negaunee experienced **11 days** with snowpack of less than one inch, which was **the 2nd most** of any season between 1970 - 2024.

# Delaware (Keweenaw) Water Year Snowfall Oct. 1 – April 30

Total Snowfall Oct 1 to April 30 - DELAWARE MI

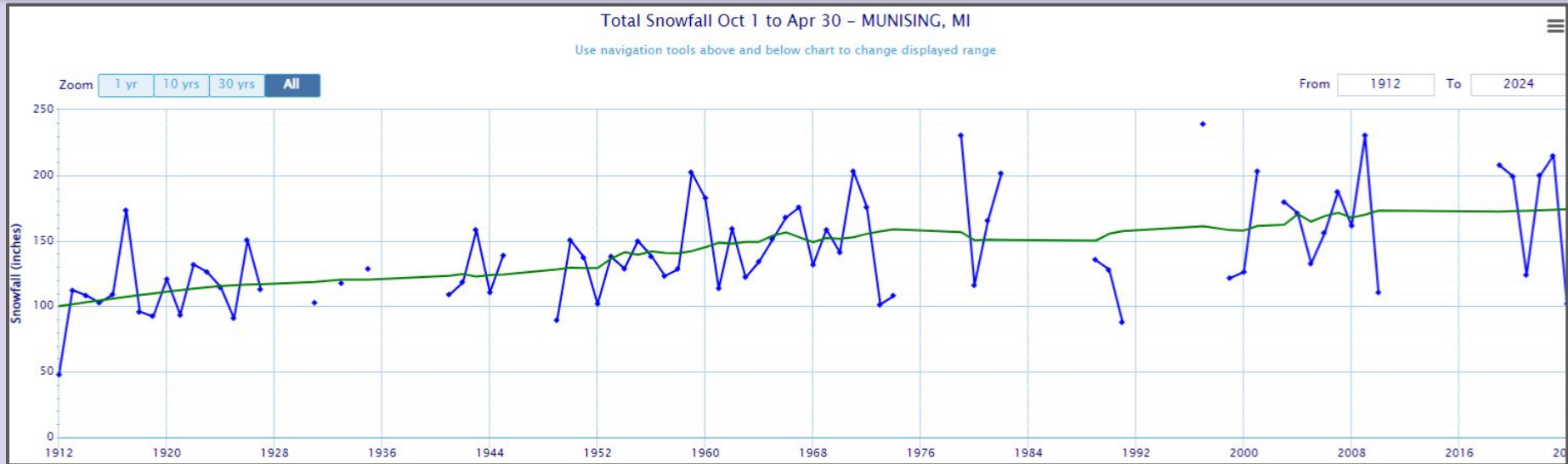


This data is available from the [Keweenaw County Road Commission](#). Snow depth data is not easily available.

Between 2007 and 2024, the 2023-24 water year in Delaware ranked as receiving the **lowest** amount of snowfall, with **153.25 inches**.

Rank	Winter Season Ending in (Year)	Snowfall (Inches)
1	2024	153.25
2	2010	169.3
3	2011	174.5
4	2021	188.4
5	2012	195
6	2016	222
7	2007	236
8	2023	264
9	2015	271.5
10	2017	275
11	2020	280.1
12	2008	280.2
13	2009	285
14	2018	304
15	2019	308
16	2013	312
17	2022	325.6
18	2014	338.5

# Munising Water Year Historic Snowfall, Oct. 1 – April 30



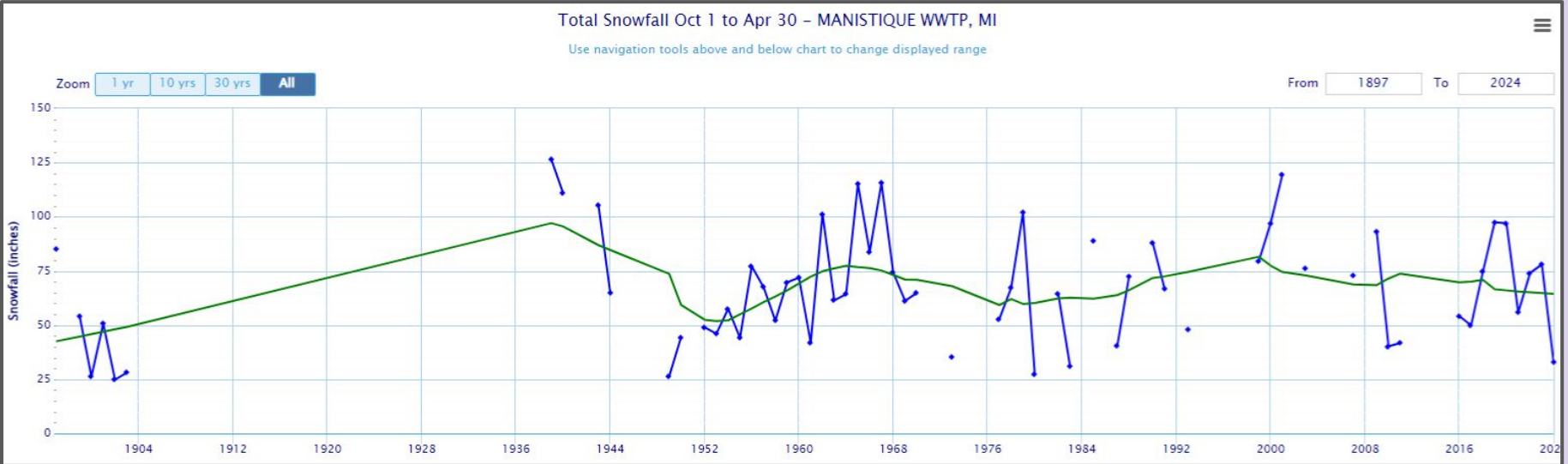
Between 1912 and 2024, the 2023-24 water year at Munising ranked as receiving the **9th lowest** seasonal snowfall amount with **101.7 inches**.

Rank	Ending Date	Total Snowfall Oct 1 to Apr 30
1	1912-04-30	48.0
2	1991-04-30	87.6
3	1949-04-30	89.7
4	1925-04-30	90.6
5	1919-04-30	92.1
6	1921-04-30	93.5
7	1918-04-30	95.9
8	1973-04-30	101.4
9	2024-04-30	101.7
-	1952-04-30	101.7

Rank	Season	Number of Days Snow Depth < 1
1	2015-2016	28
2	2006-2007	19
3	1998-1999	16
4	1914-1915	13
-	1911-1912	13
6	1920-1921	12
7	2020-2021	11
-	1913-1914	11
9	2023-2024	10
-	2001-2002	10

Between **Dec. 1, 2023** and **Feb. 29, 2024** Munising experienced **10 days** with snowpack of less than one inch, which was **the 9th most** of any season between 1902 - 2024.

# Manistique Seasonal Historic Snowfall, Dec. 1 - Feb. 29



Between 1897 and 2024, the 2023-24 water year at Manistique ranked as receiving the **7th lowest** amount of snowfall in inches, with **33.0 total inches**.

Rank	Ending Date	Total Snowfall Oct 1 to Apr 30
1	1902-04-30	24.8
2	1900-04-30	26.2
3	1949-04-30	26.4
4	1980-04-30	27.5
5	1903-04-30	28.0
6	1983-04-30	30.8
7	2024-04-30	33.0
8	1973-04-30	35.5
9	2010-04-30	40.2
10	1987-04-30	40.4

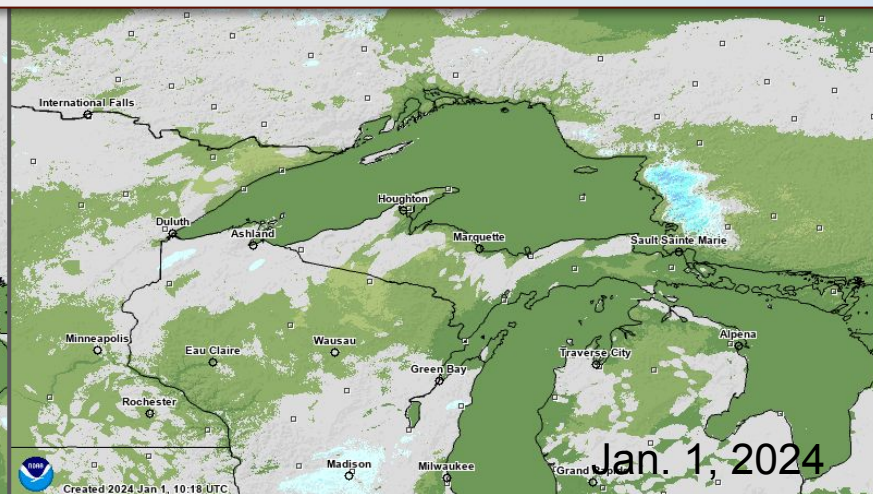
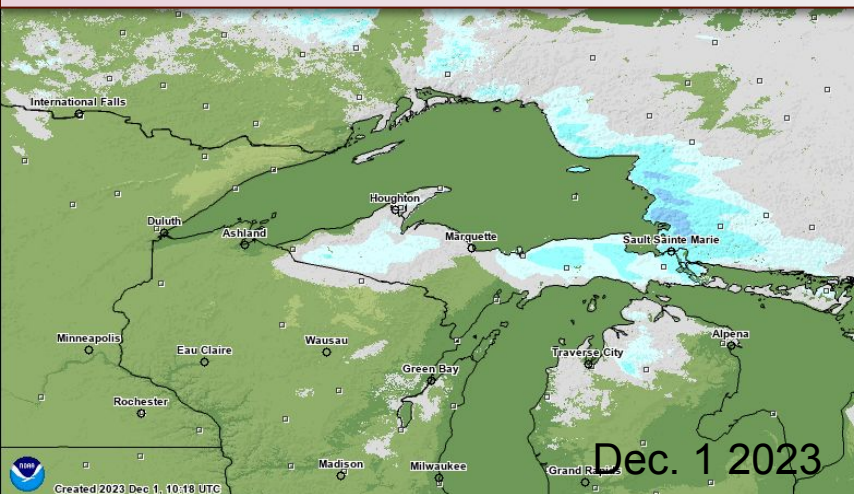
Rank	Season	Number of Days Snow Depth < 1
1	1949-1950	45
2	2023-2024	41
3	2002-2003	33
4	2015-2016	28
-	1979-1980	28
-	1954-1955	28
7	1982-1983	25
8	2006-2007	24
-	1952-1953	24
-	1943-1944	24

Between **Dec. 1, 2023** and **Feb. 29, 2024**, Manistique experienced **41 days** with snowpack of less than one inch, which was the **2nd most** of any season between 1897 - 2024.

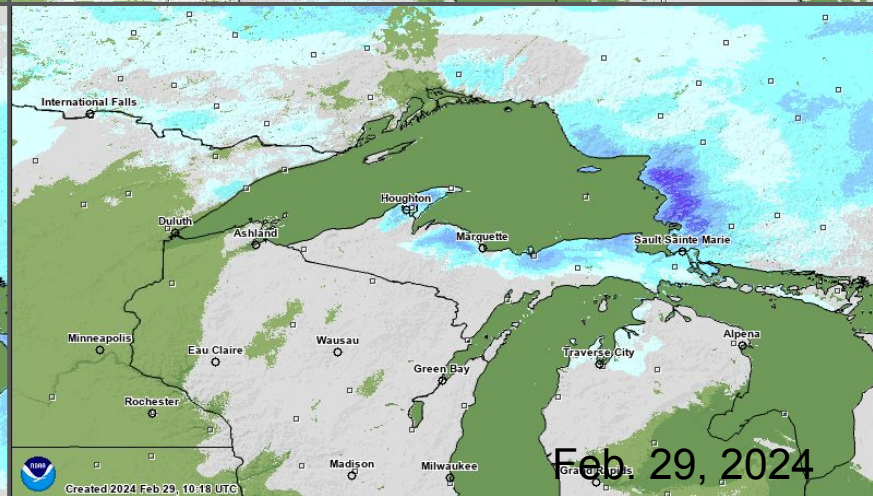
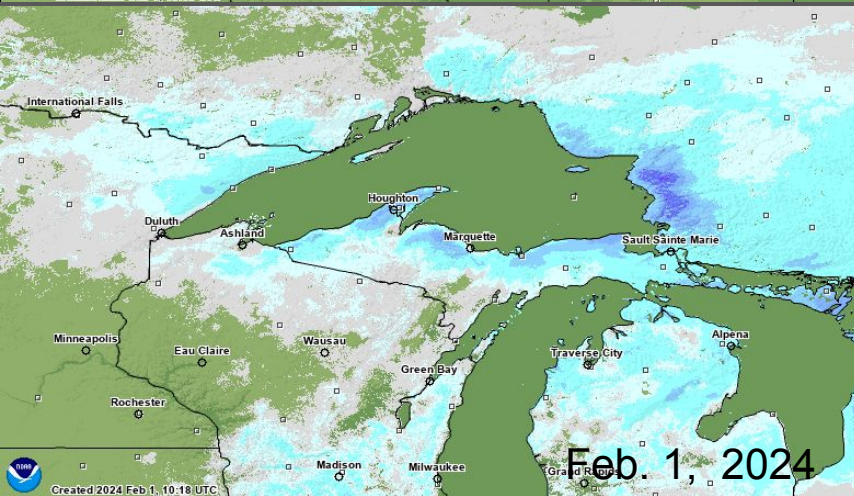




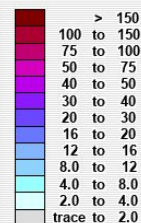
# Snow Depth, Dec. 1 – Feb. 29



These maps show satellite-derived snow depth throughout the winter season. Data from [NOHRSC's Interactive Map](#).

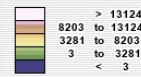


Inches of depth



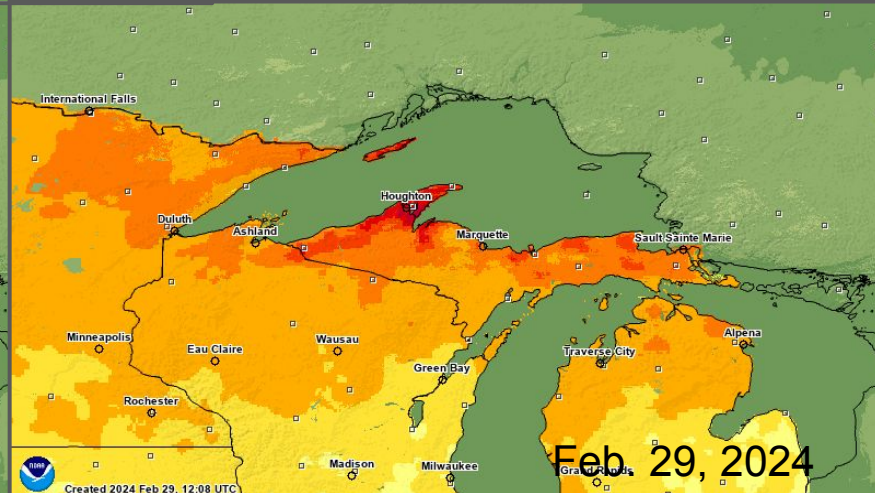
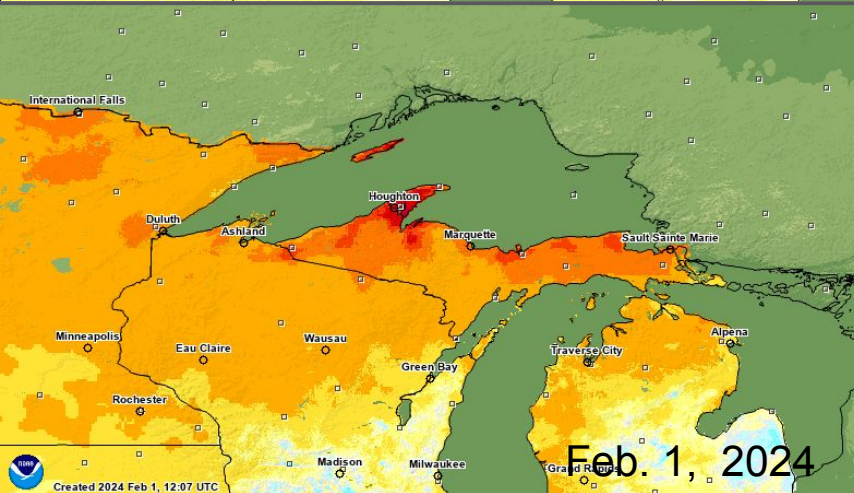
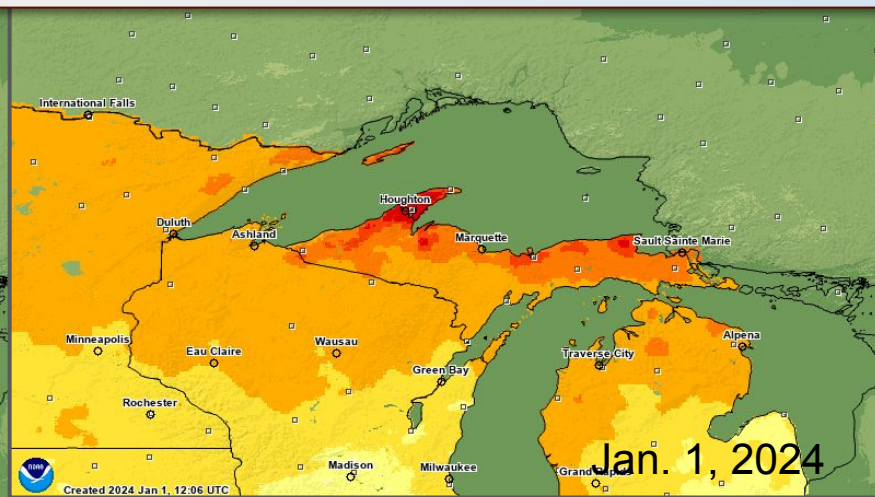
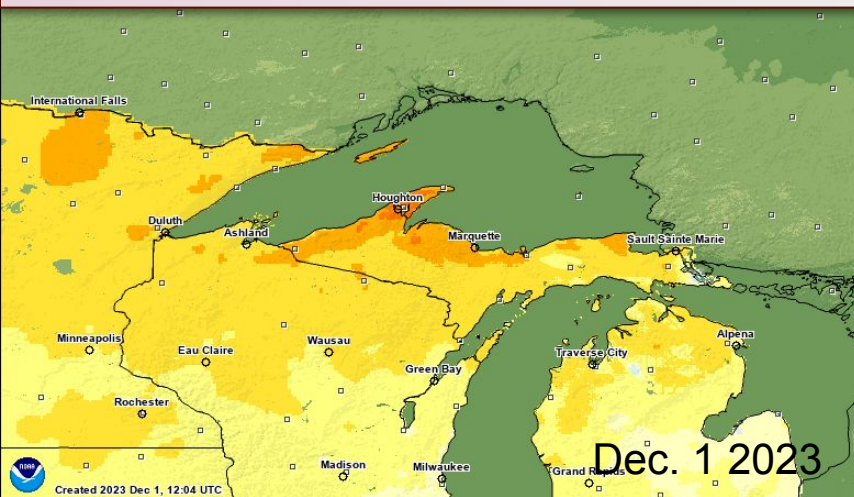
Not Estimated

Elevation in feet

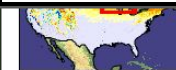




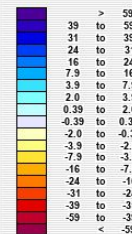
# Snow Depth Departure from Normal, Dec. 1 – Feb. 29



These maps show satellite-derived snow depth anomaly throughout the winter season. Data from [NOHRSC's Interactive Map](#).



Inches of depth

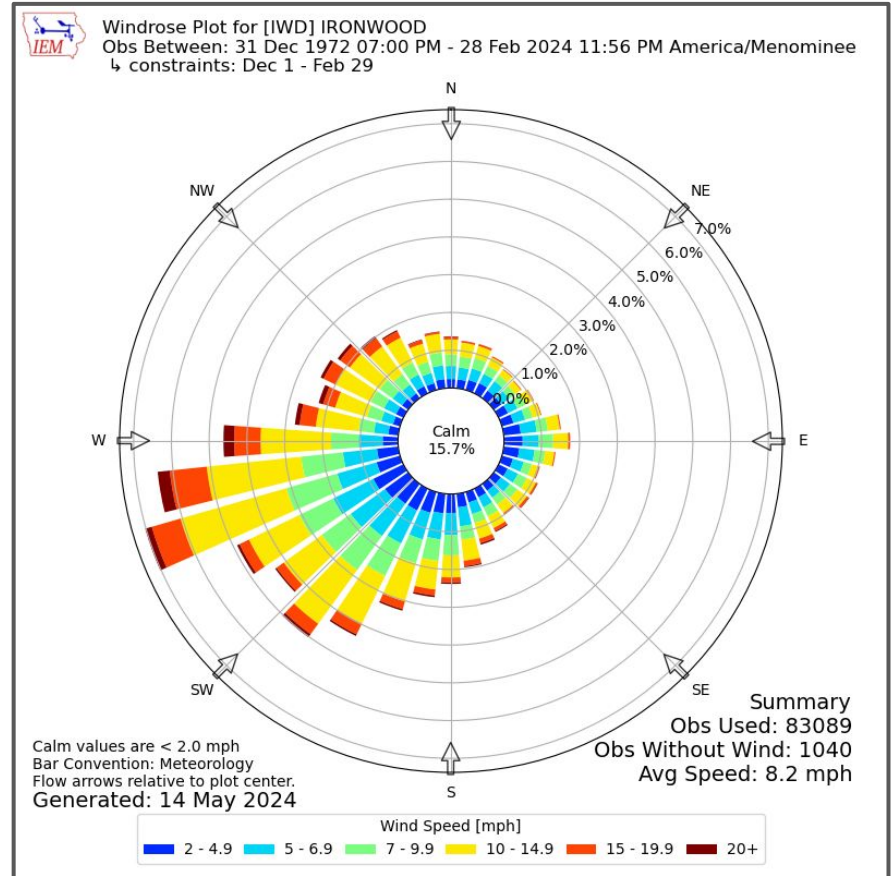
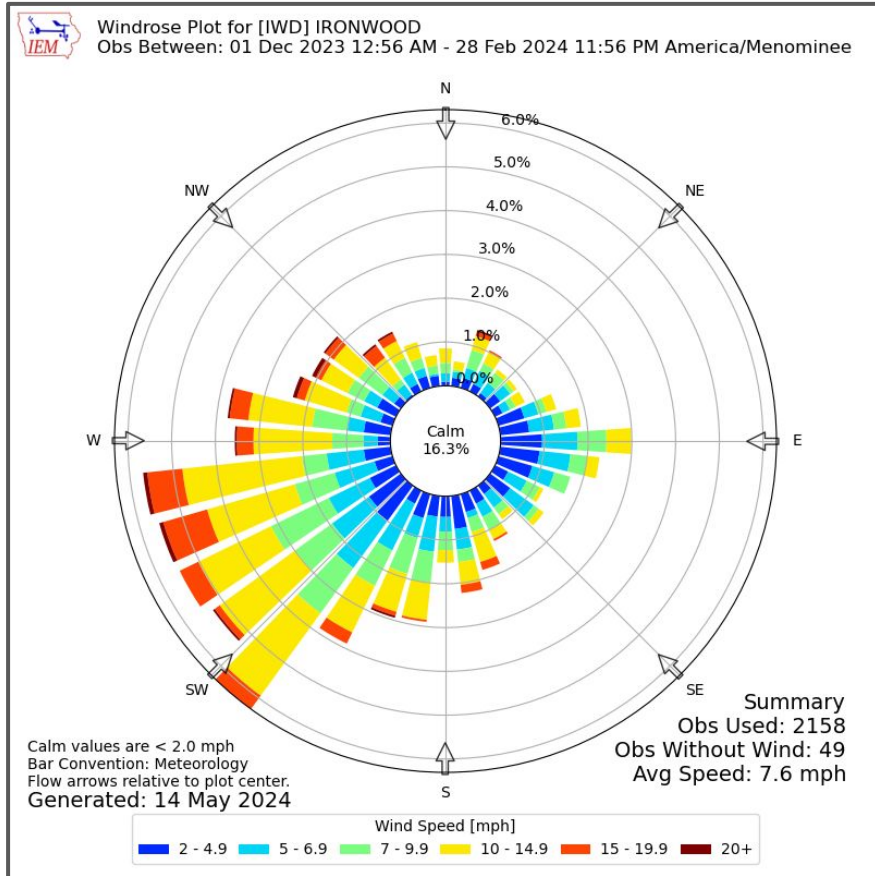


Not Estimated

Elevation in feet



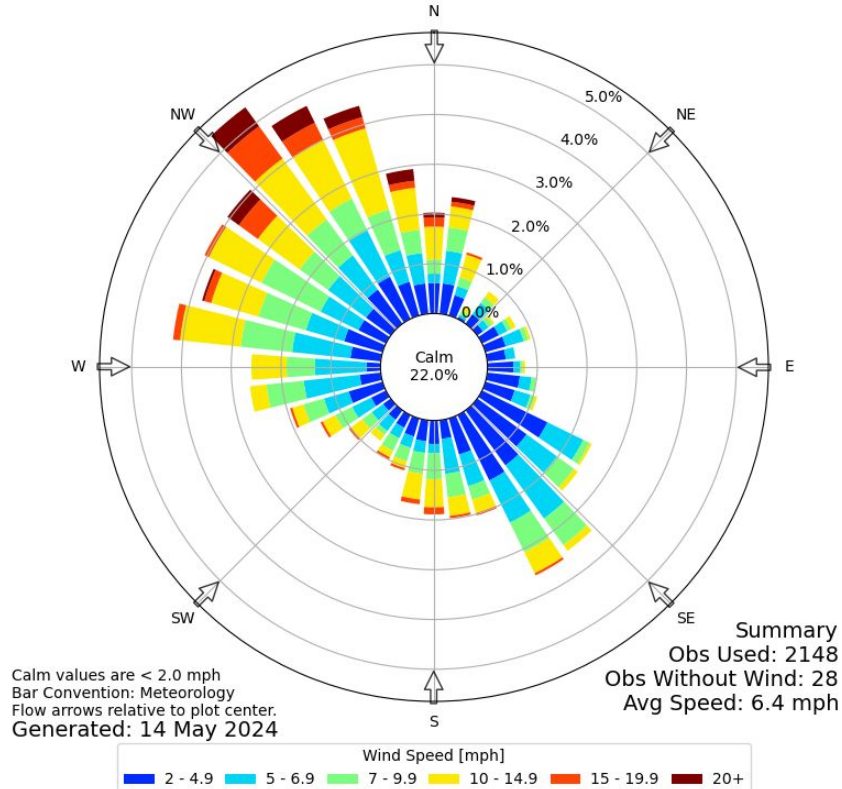
# Ironwood Winds, 2023-24 (left) and Historical (right), Dec. 1 – Feb. 29



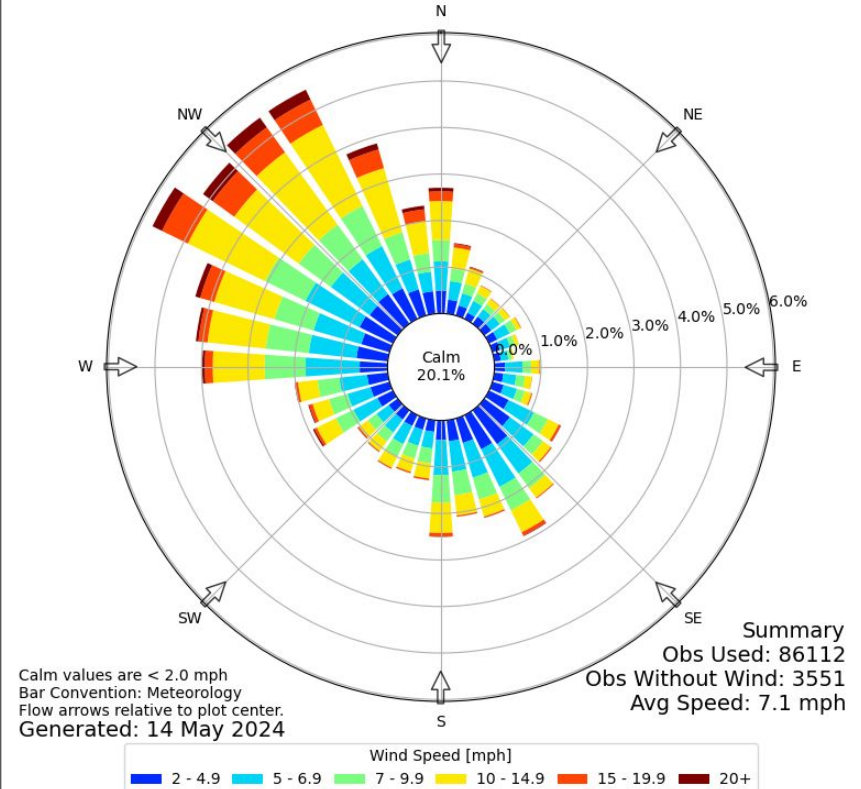


# Iron Mountain Winds, 2023-24 (left) and Historical (right), Dec. 1 – Feb. 29

Windrose Plot for [IMT] IRON MOUNTAIN  
Obs Between: 01 Dec 2023 12:54 AM - 28 Feb 2024 11:54 PM America/Menominee

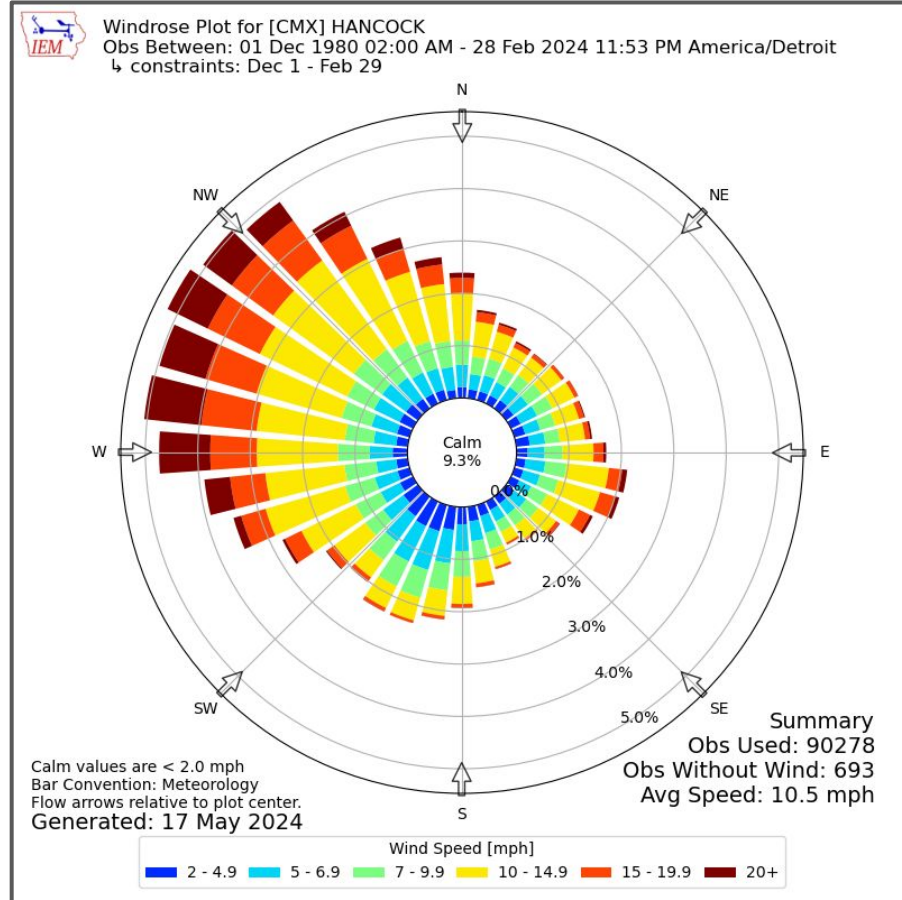
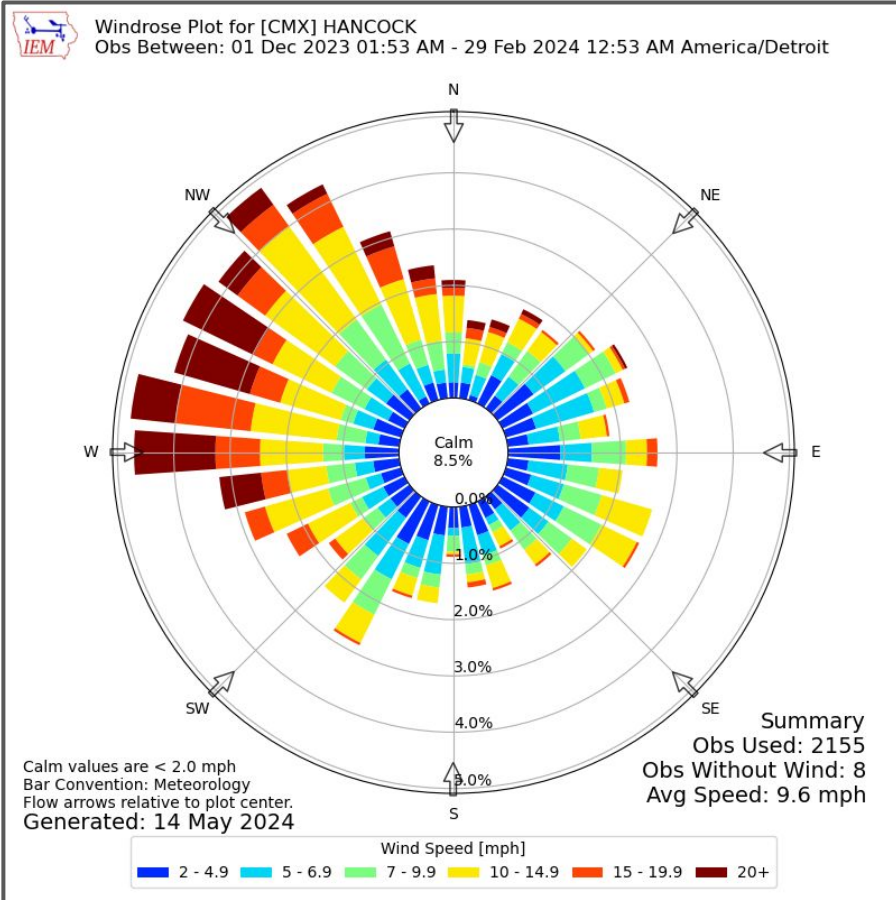


Windrose Plot for [IMT] IRON MOUNTAIN  
Obs Between: 31 Dec 1972 07:00 PM - 28 Feb 2024 11:54 PM America/Menominee  
↳ constraints: Dec 1 - Feb 29





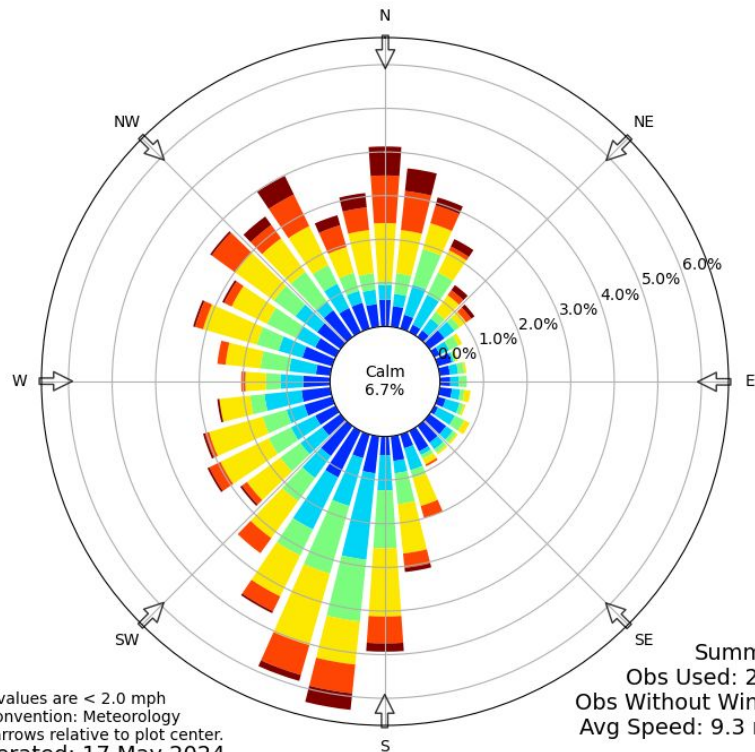
# Hancock Winds, 2023-24 (left) and Historical (right), Dec. 1 – Feb. 29



# Gwinn/Sawyer Winds, 2023-24 (left) and Historical (right), Dec. 1 – Feb. 29



Windrose Plot for [SAW] GWINN/SAWYER AFB  
Obs Between: 01 Dec 2023 01:58 AM - 29 Feb 2024 12:58 AM America/Detroit



Calm values are < 2.0 mph  
Bar Convention: Meteorology  
Flow arrows relative to plot center.  
Generated: 17 May 2024

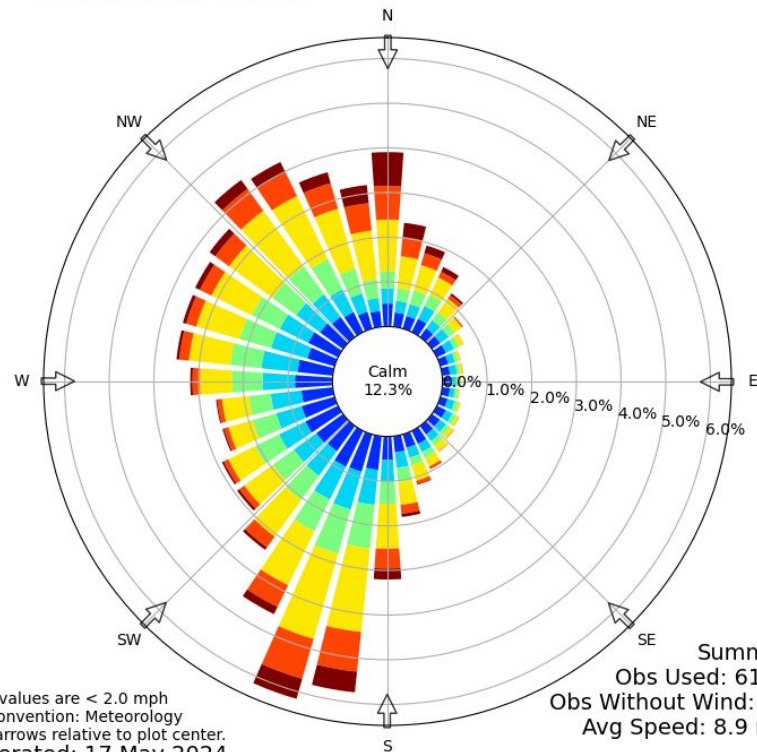
Summary  
Obs Used: 2116  
Obs Without Wind: 7  
Avg Speed: 9.3 mph

Wind Speed [mph]

2 - 4.9 5 - 6.9 7 - 9.9 10 - 14.9 15 - 19.9 20+



Windrose Plot for [SAW] GWINN/SAWYER AFB  
Obs Between: 01 Dec 1980 02:00 AM - 28 Feb 2024 11:58 PM America/Detroit  
↳ constraints: Dec 1 - Feb 29



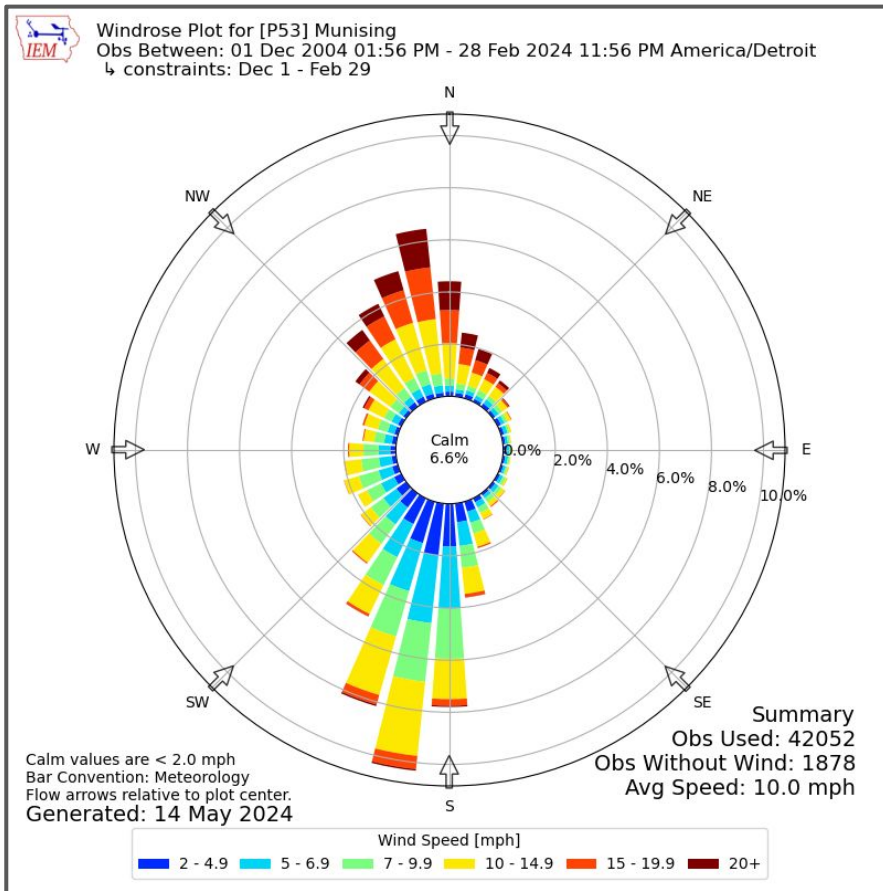
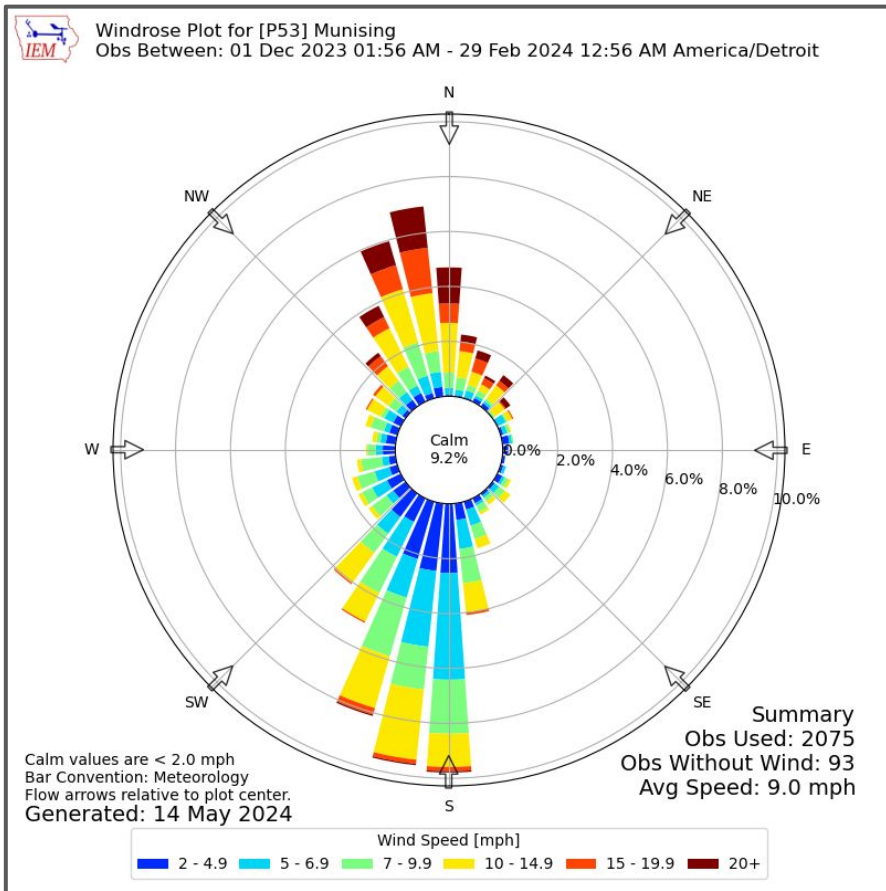
Calm values are < 2.0 mph  
Bar Convention: Meteorology  
Flow arrows relative to plot center.  
Generated: 17 May 2024

Summary  
Obs Used: 61444  
Obs Without Wind: 262  
Avg Speed: 8.9 mph

Wind Speed [mph]

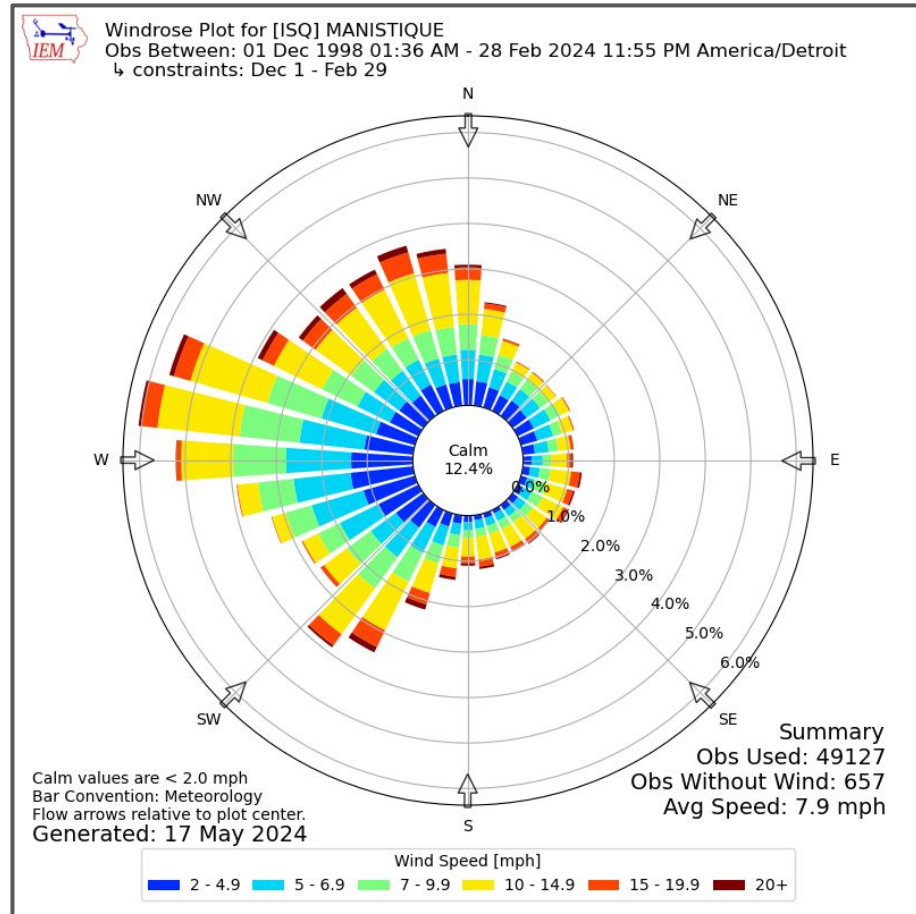
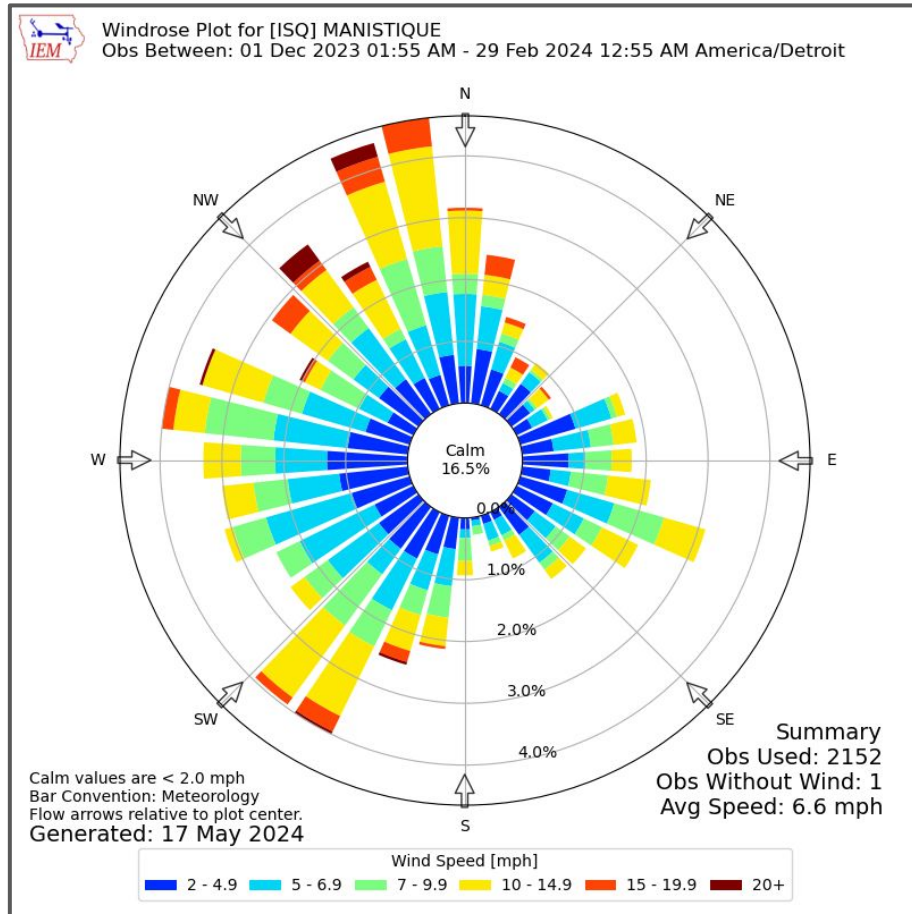
2 - 4.9 5 - 6.9 7 - 9.9 10 - 14.9 15 - 19.9 20+

# Munising Winds, 2023-24 (left) and Historical (right), Dec. 1 – Feb. 29

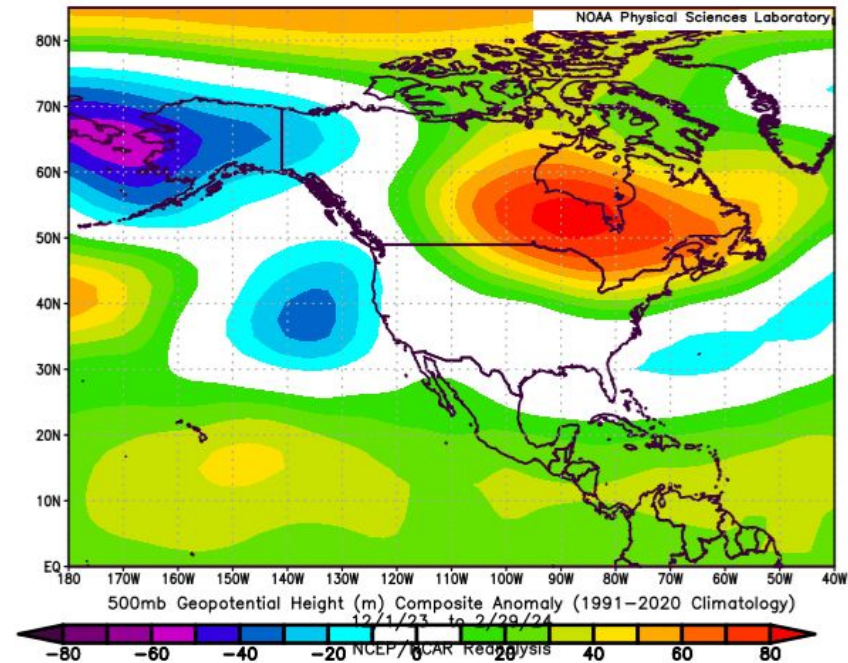
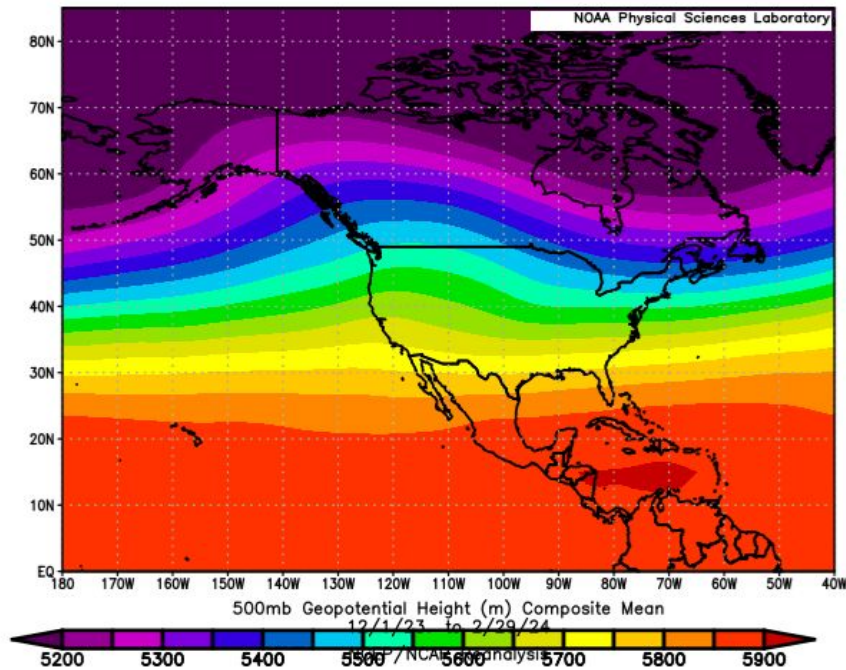




# Manistique Winds, 2023-24 (left) and Historical (right), Dec. 1 – Feb. 29

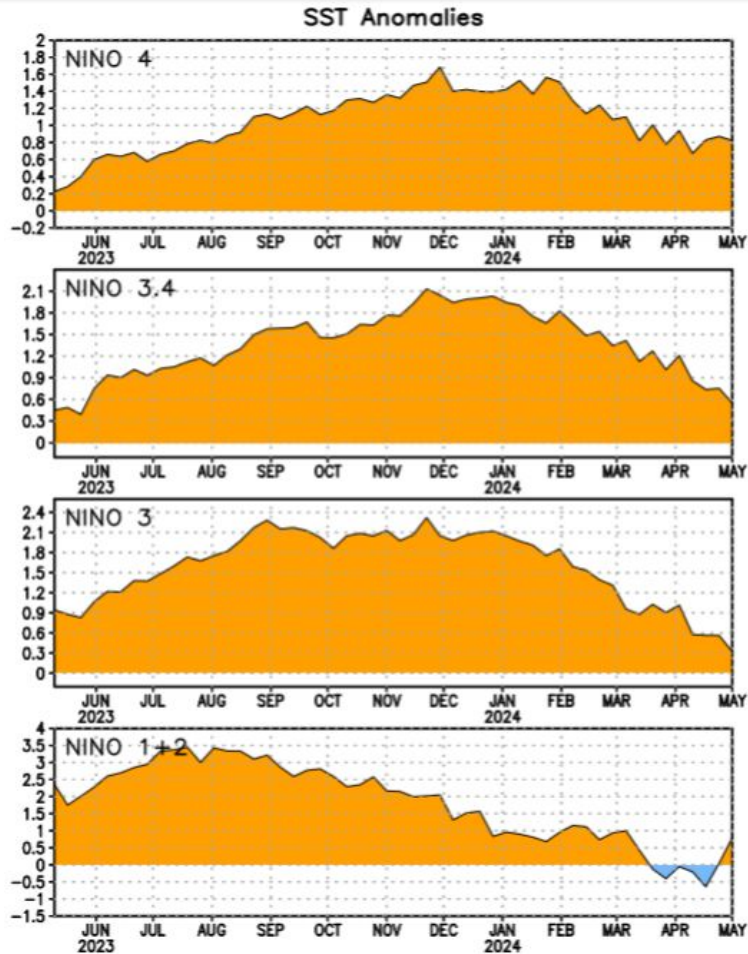


# 500 mb Geopotential Heights Mean and Anomaly, Dec. 1 – Feb. 29



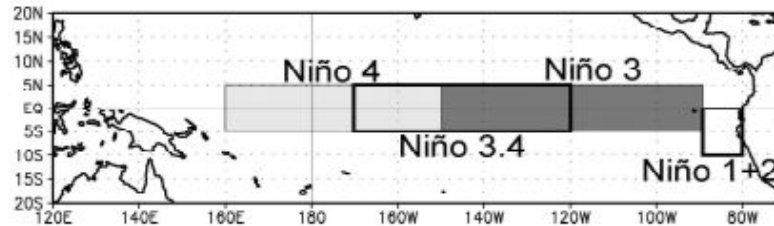
Over the 2023-24 winter season, positive 500 mb height anomalies centered over Ontario extended south over much of the Upper Midwest. These geopotential height anomalies reflect the unusually warm airmasses over the Great Lakes this past winter.

# El Niño Pattern, Winter 2023-24



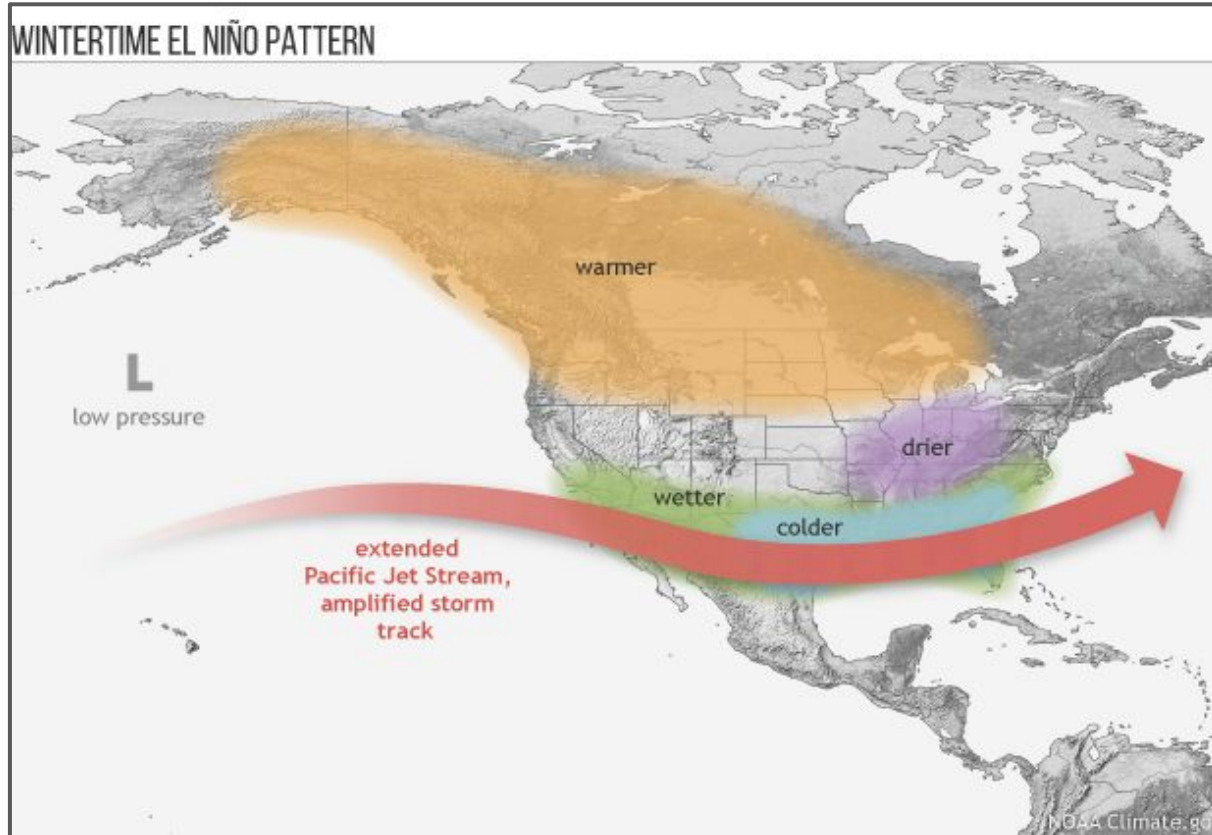
The graphic to the left shows sea surface temperature anomalies for the four Niño regions (see graphic below) June 2023 through May 2024. This anomaly increases noticeably throughout the 2023-24 winter months.

El Niño was a large driver of warm temperatures in the Great Lakes region this past winter. The Oceanic Niño Index (ONI), which represents SST anomalies in the Niño region 3.4, was +1.8 °C for the months of Dec-Jan-Feb. This indicates a very strong El Niño pattern.



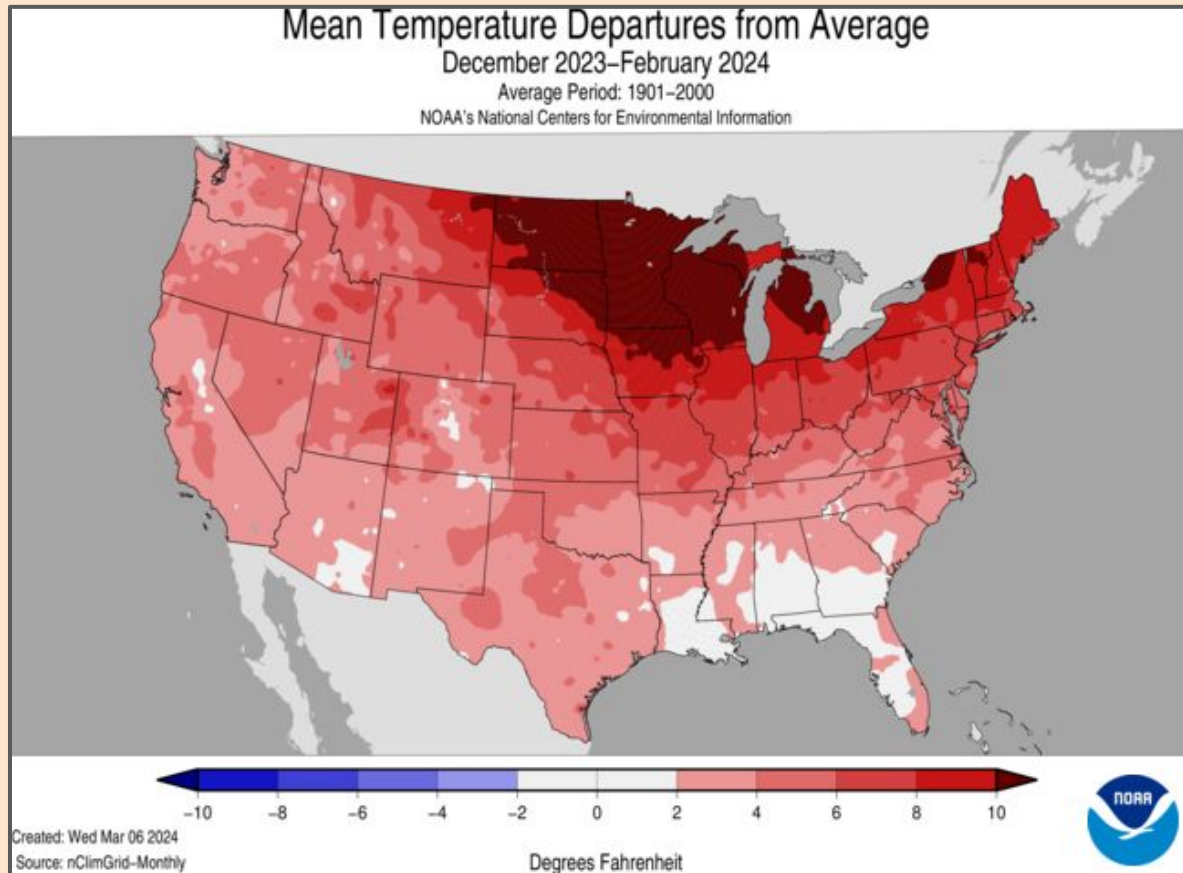


# What does El Niño mean for the UP?

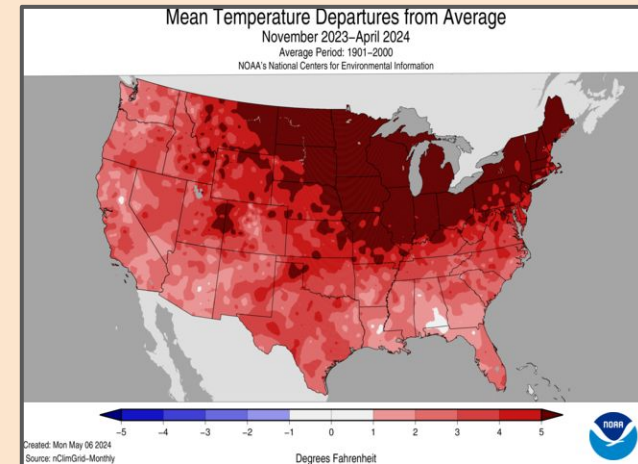


We can expect a typical El Niño pattern to produce warmer winter temperatures in the UP. From the anomalously high 500 mb heights, we know that this was the case this past winter. So we can say that our warm temperatures were at least in part attributable to a strong El Niño pattern persisting throughout the winter 2023-24.

# National Temperature Anomaly, Dec. 2023 - Feb. 2024

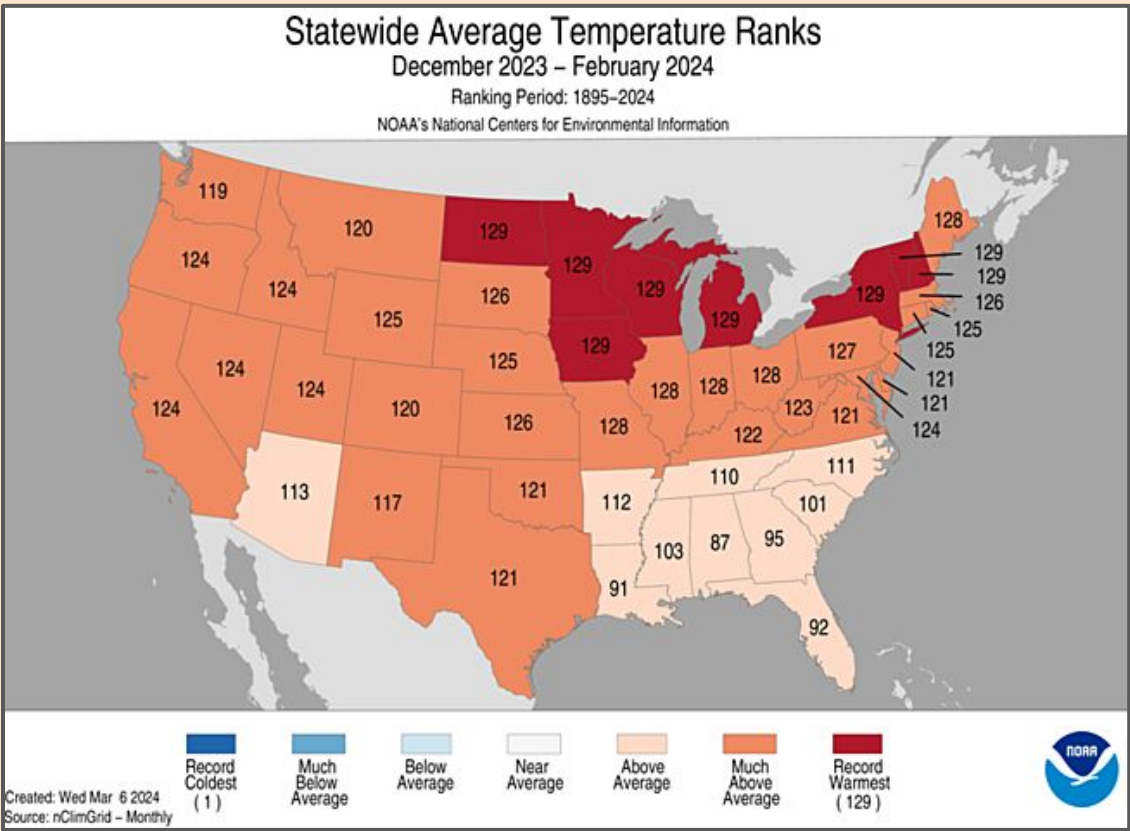


Temperature maps generated through [NCEI's Climate Monitoring "U.S. Maps"](#) page.



The map to the left shows that the anomalous winter warmth of 2023-24 was not isolated to the UP; it affected the entire Upper Midwest. The smaller map above shows this trend is not isolated temporally; six-month temperature anomalies Nov. 2023 through April 2024 are even higher than the Dec. 2023 - Jan. 2024 ones.

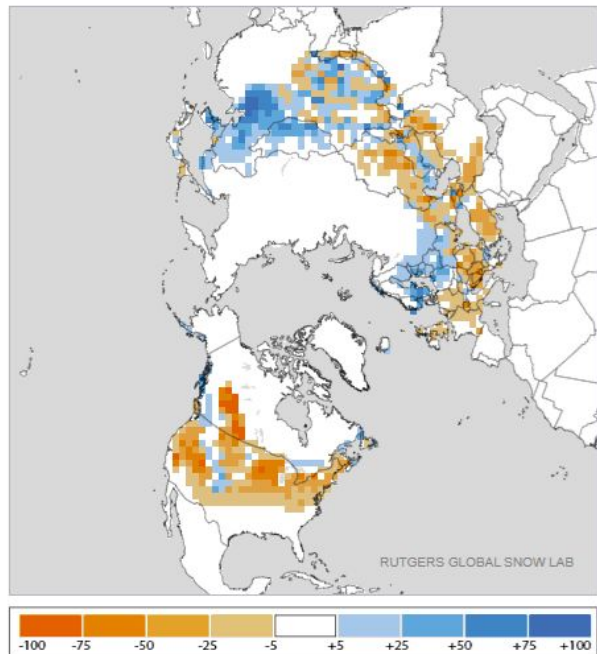
# Statewide Average Temperature Ranks, Dec. 2023 - Feb. 2024



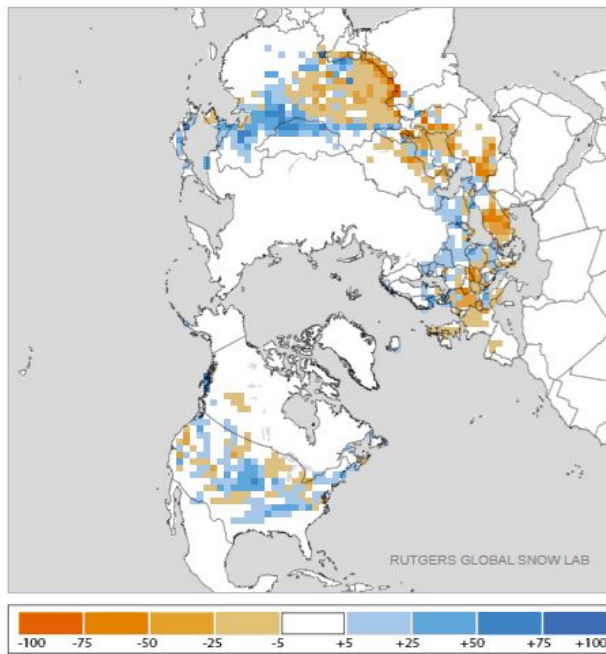
The anomalous warmth of winter 2023-24 was felt throughout the CONUS, as every state saw above average temperatures. It was most pronounced in the Upper Midwest and Northeast states, with states from North Dakota to New Hampshire experiencing their warmest winter on record.

# Northern Hemisphere Snow Cover Extent Anomaly, Dec. - Feb.

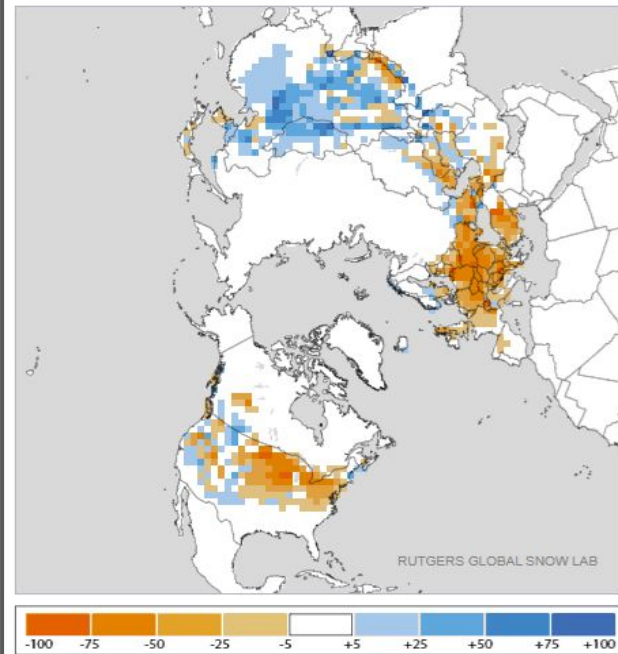
Monthly SCE Departure - December 2023



Monthly SCE Departure - January 2024



Monthly SCE Departure - February 2024



Abnormal snow cover extent was not confined to America's Upper Midwest. In December and February, northern China and Mongolia underwent noticeably higher snow cover amounts than typical. In February, most of Europe experienced anomalously low snow cover. Data from Rutgers Global Snow Laboratory.



# UP Winter 2023-24 Summary

- **December** was **7-11°F** above normal and received **50 - 100%** of normal precipitation.
- **January** was **3-5°F** above normal and received **50 - 75%** of normal precipitation.
- **February** was **6-12°F** above normal and received **25 - 75%** of normal precipitation.

Though the entire Upper Peninsula experienced an extremely mild winter, conditions were less extreme in the eastern UP. The western and southern UP and the Keweenaw experienced higher positive temperature anomalies and higher negative precipitation anomalies.

Notably, in the Keweenaw:

- the seasonal average daily maximum temperature anomaly at Houghton-Hancock was the highest of the locations we sampled, at 9.1°F above the climatic normal
- the seasonal average daily minimum temperature anomaly at Houghton-Hancock was the second highest of locations we sampled, at 10.4°F above the climatic normal
- snow data sampled in the Delaware area shows the least amount of the snowfall in the past 18 years

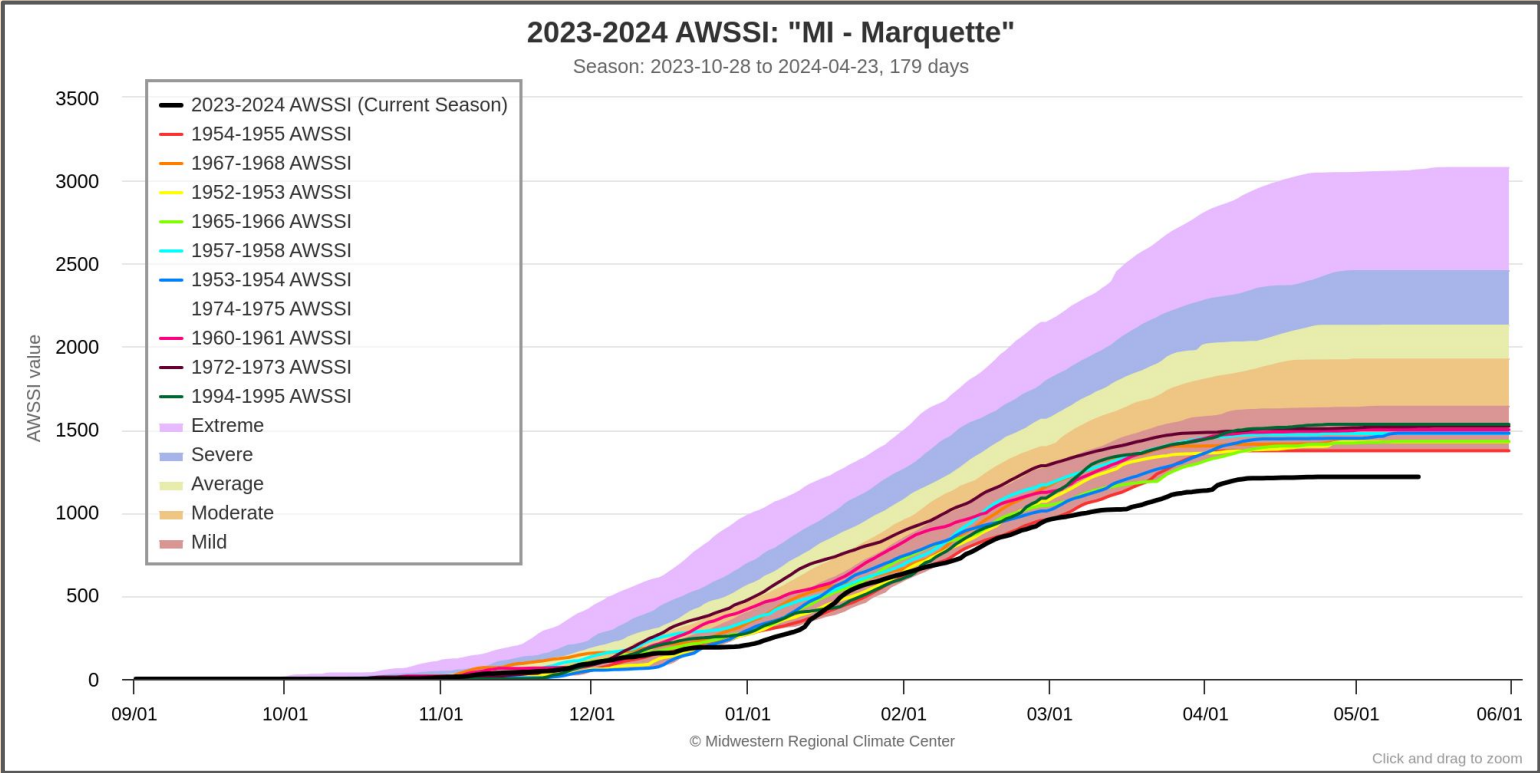
Despite recording between 30 and 150 inches of snow falling in locations around the UP between December 1 and February 29, the extremely high temperatures melted existing snowpack. Locations recorded as high as 53 days and as low as 10 days with snowpack of less than one inch.



Marquette

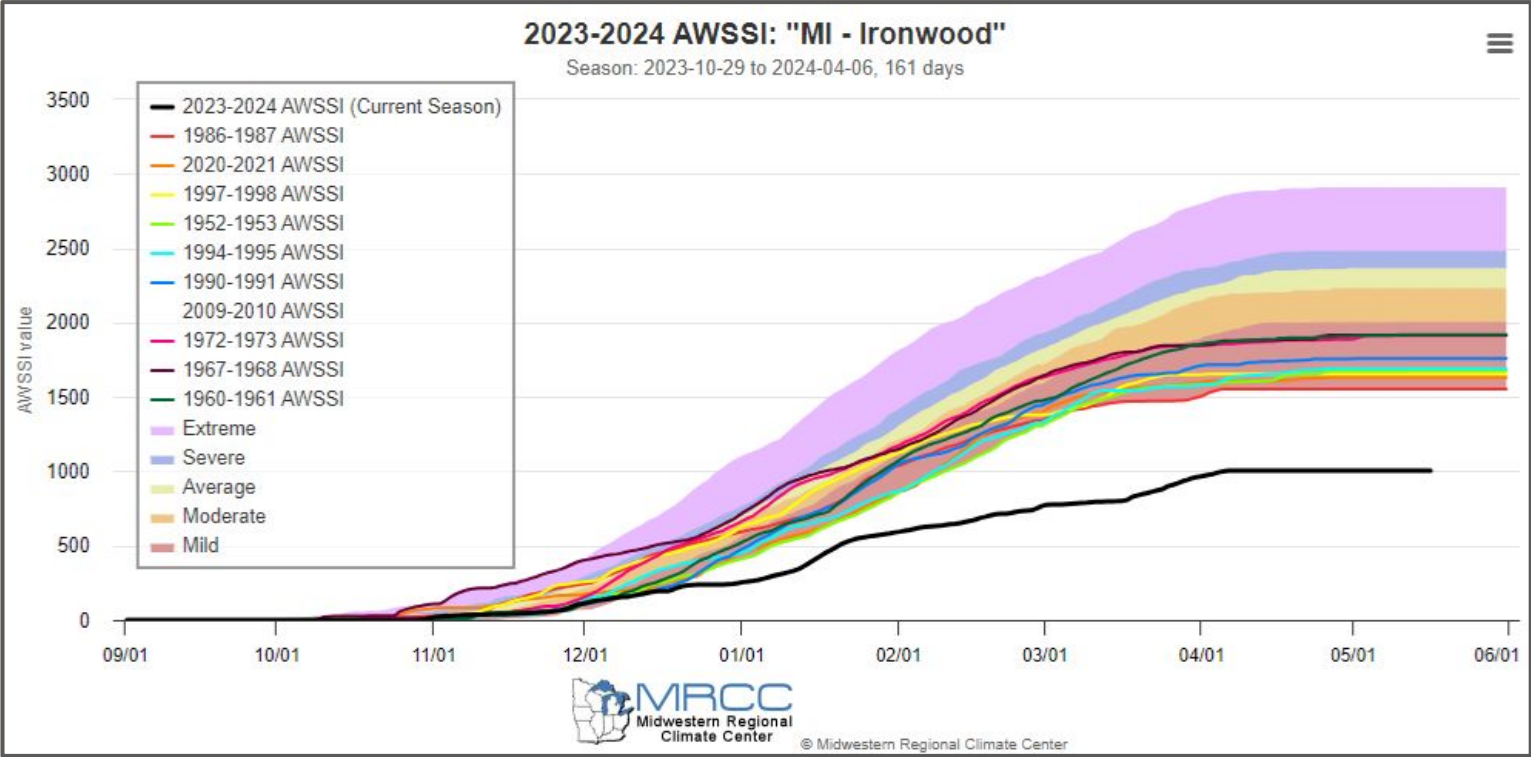
May 2024

# So...how mild was it?



This chart shows the 2023-2024 season AWSSI for Marquette as of May 14, 2024 in black with the ten seasons closest to this seasons AWSSI score in colored lines. For most of the 2023-24 season, the AWSSI sits well below any other years' scores.

# So...how mild was it?



This chart shows the 2023-2024 season AWSSI for Ironwood as of May 18, 2024 in black with the ten seasons closest to this seasons AWSSI score in colored lines.

Ironwood's 2023-24 AWSSI score sits remarkably below the other years' scores from mid-December onward.


So how mild was it?

**Extremely mild.**





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☐ Quarterly Summary

[Great Lakes Quarterly Report: December 2023 - February 2024](#)

### Quarterly Climate Impacts and Outlook

#### Great Lakes Significant Events – December 2023 - February 2024



Areas around Lake Superior ended winter in moderate to severe drought due to a significant lack of winter rain and snow.

Duluth had its 2nd warmest and 4th least snowy winter.

Over a dozen tornadoes touched down in the Chicago area, northern Indiana, and Michigan on February 27.

Average Great Lakes ice cover from January 1 to March 12 was the lowest on record.

Back-to-back lake effect snow events in mid-January dumped about 80 inches (203.2 cm) of snow east of Lake Erie.

Syracuse and Rochester, New York, had their warmest winters on record.

Above-normal temperatures were widespread and persistent across the basin in December. Green Bay, Milwaukee, and Muskegon had their warmest December on record, with most other locations across the basin with a top five warmest December. Most precipitation fell as rain instead of snow.

A brief blast of winter weather affected the basin in mid-January, fueling bitter wind chills in the west and isolated heavy snow in the east. Cold temperatures lingered for almost 2 weeks, allowing ice extent on the Great Lakes to reach a season-high of 18 percent on January 22 before quickly dropping back to historically low levels in February.

### Great Lakes Region

March 2024

Links to sources and more learning can be found throughout the slides in the text and on images. To the left is an easy-reading report put out by the Midwest Regional Climate Center.