



Northern Michigan Weather Topics

Three Lakes Association Annual Meeting



Patrick Bak
National Weather Service
Gaylord, MI
August 4, 2022

Today's National Weather Service

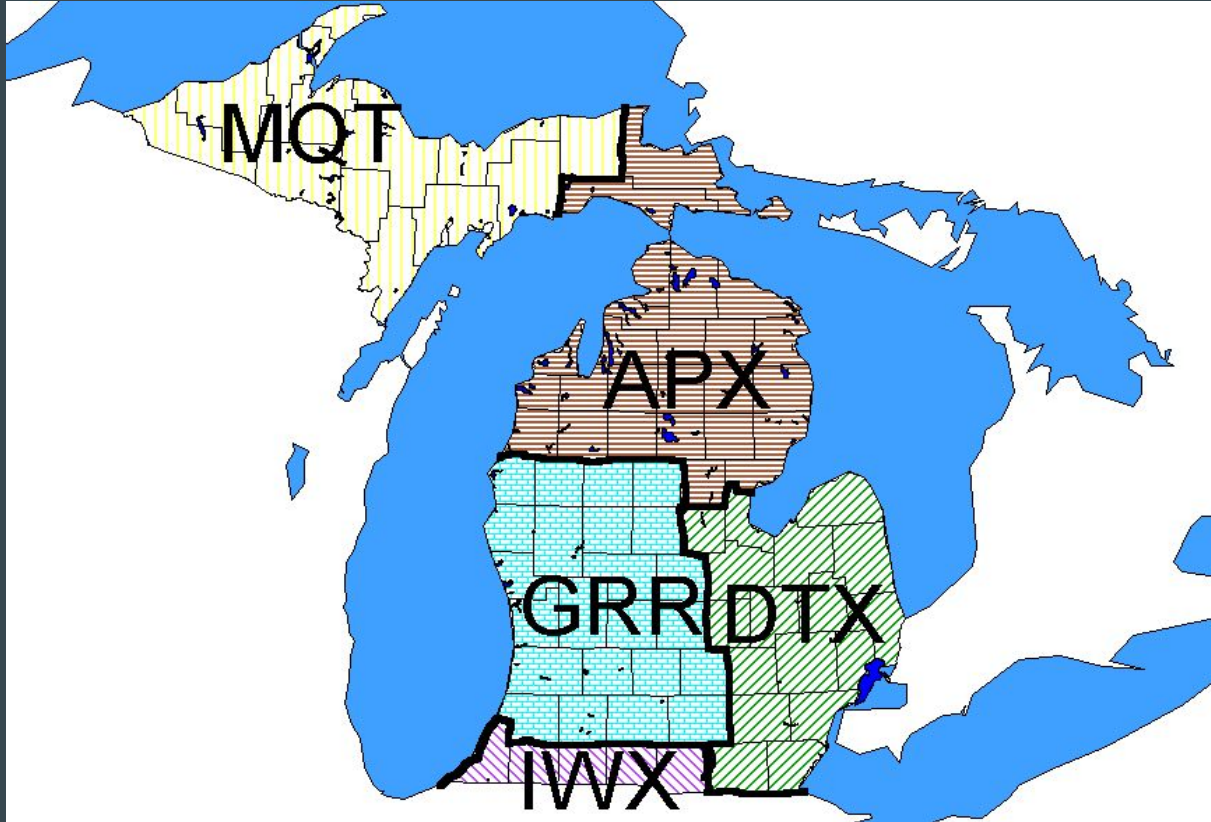


Click city for local weather information



- Approx. 4800 employees
- 122 Forecast Offices
- 13 River Centers
- 9 Special Centers
- Annual budget of ~\$1.1 billion
- Lots of warnings, forecasts, and observations for that price

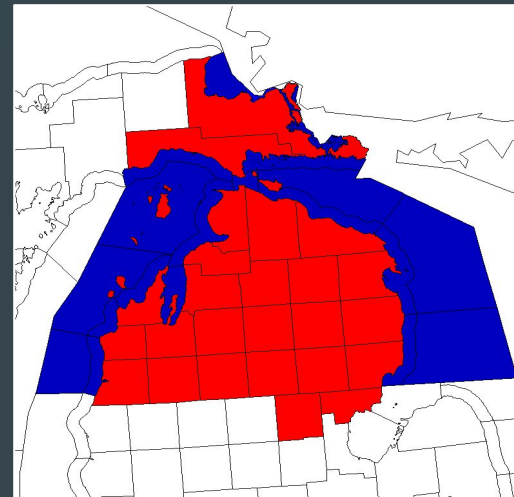
National Weather Service in Michigan



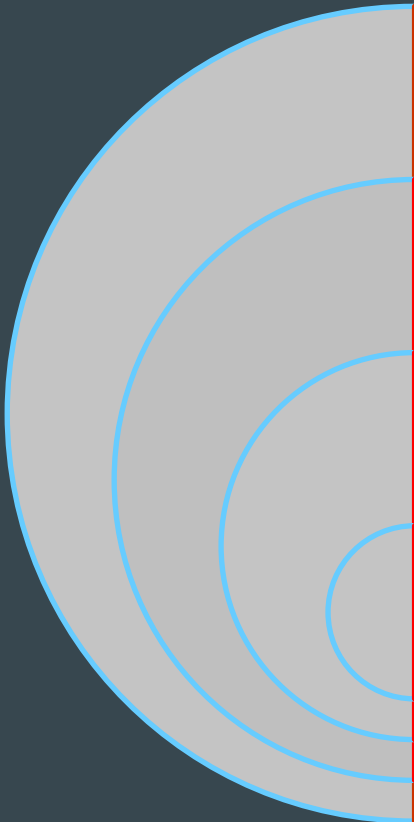
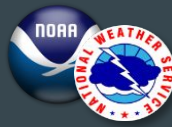
NWS Gaylord Overview



- 22 person staff / open 24 X 7 / 365 days a year
- 25 County Responsibility
- Population over 620,000 (91/122)
- 720 miles of shoreline on Great Lakes
- Active science, observation and preparedness programs
 - 1500 trained weather spotters
 - Local high resolution modeling and research
 - 63 cooperative observers
 - 6 NWR Transmitters (PLN, ANJ, APN, WBR, TVC, GLR)



NWS Gaylord Staff



17 Meteorologists	<ul style="list-style-type: none">• Provide 24 / 7 / 365 forecast and warning services to the people of Northern Michigan
3 Electronics Technicians	<ul style="list-style-type: none">• Provide 24 / 7 / 365 hardware technical support to the operational forecast staff
1 Information Technology Officer	<ul style="list-style-type: none">• Provides software technical support to the operational forecast staff
1 Administrative Assistant	<ul style="list-style-type: none">• Provides administrative support to all staff members

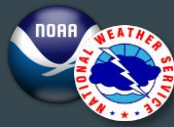
What We Do

- Weather Advisories, Watches & Warnings (Tornado, Severe, Winter Storm, Marine, etc.)
- Decision Support Services (information more relevant to decision makers)
- Forecasts (Text, Digital, and Graphical)
- Aviation Forecasts
- Marine Forecasts – text, graphics
- River Forecasts and Warnings
- Climatology Products
- Outreach and Awareness
- Research and Professional Development



A screenshot of the National Weather Service website for Gaylor, Michigan. The page displays the current weather as "Fair" with a temperature of 62°F (17°C). It also shows forecasts for "This Afternoon" (Sunny, High: 67°F) and "Tonight" (Mostly Clear, Low: 45°F). A map of the region is visible, along with a "Hazardous Weather Outlook" section. The website header includes navigation links for HOME, FORECAST, PAST WEATHER, SAFETY, INFORMATION, EDUCATION, NEWS, SEARCH, and ABOUT. The footer features three panels: a "TODAY" weather summary, a "National Forecast" map of the United States, and a "Global Forecast" map of the world.

NWS Gaylord Website (weather.gov/Gaylord)



The screenshot shows the NWS Gaylord website interface. At the top, there are logos for NOAA and the National Weather Service, followed by the text "NATIONAL WEATHER SERVICE" and "NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION". Below this is a navigation menu with links for HOME, FORECAST, PAST WEATHER, SAFETY, INFORMATION, EDUCATION, NEWS, SEARCH, and ABOUT. A search bar is located on the left, with a "Go" button. The main content area is titled "NWS Forecast Office Gaylord, MI" and includes a "Weather.gov > Gaylord, MI" link. A map of Michigan is displayed, with Gaylord highlighted in yellow. To the right of the map are links for "Watches, Warnings & Advisories" and "Hazardous Weather Outlook". Below the map is a "Today" weather graphic showing "Mostly Sunny" with a high of 67°F and a low of 49°F. To the right of the "Today" graphic are two maps: a national map and a regional map of the Great Lakes area.

Click on desired location on map to get a specific text forecast

Weather Story graphics include varied forecast topics, safety messages, and general weather information, these are also available on our Facebook and Twitter feed


NWS Gaylord Website (weather.gov/Gaylord)



Your local forecast office is [Gaylord, MI](#)

[Español](#) [Share](#) [Facebook](#) [Twitter](#) [LinkedIn](#) [YouTube](#) [RSS](#)










Current conditions at **Oscoda, Oscoda-Wurtsmith Airport (KOSC)**
Lat: 44.45°N Lon: 83.37°W Elev: 633ft

 **Fair**
60°F
16°C

Humidity 56%
Wind Speed E @ 6 mph
Barometer 30.07 in
Dewpoint 48°F (8°C)
Visibility 10.00 mi
Last update 28 Sep 1:35 pm EDT

More Information:
[Local Forecast Office](#)
[More Local Wx](#)
[3 Day Outlook](#)
[Mobile Weather](#)
[Hourly Weather Forecast](#)

Extended Forecast for **4 Miles E Hale MI**

This Afternoon	Tonight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday
								
Sunny	Mostly Clear then Patchy Fog	Patchy Fog then Sunny	Clear	Sunny	Mostly Clear	Sunny	Partly Cloudy	Mostly Sunny
High: 68 °F	Low: 42 °F	High: 72 °F	Low: 43 °F	High: 67 °F	Low: 42 °F	High: 71 °F	Low: 45 °F	High: 73 °F

Detailed Forecast

This Afternoon	Sunny, with a high near 68. Northeast wind around 5 mph.
Tonight	Patchy fog after 5am. Otherwise, partly cloudy, with a low around 42. Southeast wind around 5 mph becoming calm.
Wednesday	Patchy fog before 9am. Otherwise, sunny, with a high near 72. Calm wind.
Wednesday Night	Clear, with a low around 43. East wind around 5 mph becoming calm in the evening.
Thursday	Sunny, with a high near 67. Calm wind becoming east around 5 mph in the afternoon.
Thursday Night	Mostly clear, with a low around 42.
Friday	Sunny, with a high near 71.
Friday Night	Partly cloudy, with a low around 48.
Saturday	Mostly sunny, with a high near 73.
Saturday Night	Mostly cloudy, with a low around 50.
Sunday	Partly sunny, with a high near 66.
Sunday Night	Mostly cloudy, with a low around 47.
Monday	Partly sunny, with a high near 63.

Additional Forecasts and Information

[ZONE AREA FORECAST FOR LOSCO COUNTY MI](#)


[Forecast Discussion](#) [Hourly Weather Forecast](#) [Air Quality Forecasts](#)

Point Forecast: 4 Miles E Hale MI
44.39°N 83.72°W (Elev: 797 ft)

Last Update: 1:35 pm EDT Sep 28, 2021

Forecast Valid: 1pm EDT Sep 28, 2021-6pm EDT Oct 4, 2021

Topographic
[Click Map For Forecast](#)



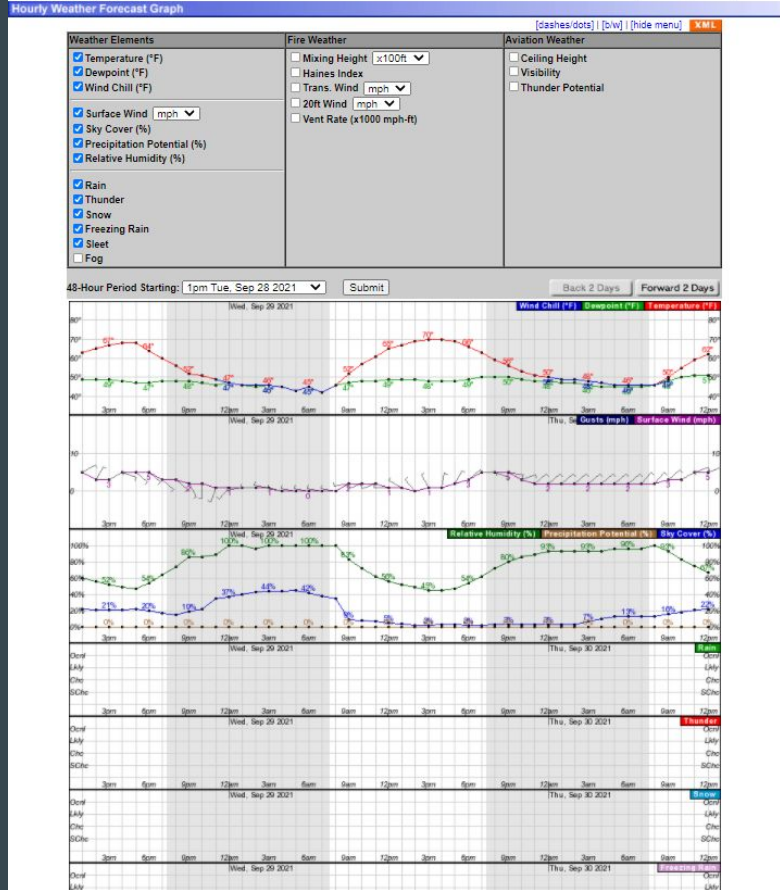
[Disclaimer](#)
Forecast Area

- Forecast from selected point
- Hourly forecast also possible by clicking here

NWS Gaylord Website (weather.gov/Gaylord)



Point Forecast: 4 Miles E Hale MI
44.30N 83.72W (Elev. 797 ft) Last Update: 1:39 pm EDT Sep 28, 2021



- Weather elements can be adjusted by clicking on appropriate box clicking on submit
- Clicking on water vs land on home page will produce a marine graph with wind & waves

CoCoRaHS - Want to help with observations?



- Do you measure precipitation at your house for your own use?
- Would you like to help provide additional weather information for the National Weather Service and other users?
- Consider being a volunteer CoCoRaHS observer.
- <https://www.cocorahs.org/>



What is CoCoRaHS?

CoCoRaHS is a national grassroots,
non-profit, community-based,
high-density precipitation network ...

... made up of volunteers of
all ages and backgrounds



... who take daily measurements of
precipitation right in their own backyards

Once trained,
our volunteer observers
collect data using low-cost
measurement tools ...



4-inch diameter
high capacity rain gauges



Aluminum foil-wrapped
Styrofoam hail pads



Training is important to assure
accurate, high quality data

www.cocorahs.org

Volunteers report their daily observations on our interactive Web site or using our CoCoRaHS mobile App



CoCoRaHS COMMUNITY COLLABORATIVE RAIN, HAIL & SNOW NETWORK

CoCoRaHS March Madness 2018
March 1-31, 2018

Reports received today 3/13/2018 as of 4:12 PM EST

Daily	Multi-day	SigWe	Hail	Conditions	ET
8,531	189	4	0	8	9

My Data Entry : Daily Precipitation Report Form

Precipitation Report Form

Station Number : CD-LR-610

Station Name : Fort Collins 3.5 SW

Denotes Required Field

Observation Date: 3/13/2018

Observation Time: 11:58 AM

Rain and Melted Snow to the nearest hundredth inch that has fallen in the gauge during the past 24 hours

Report was taken at registered location? Yes No

Observation Notes: (This will be available to the public)

Heavy rain last evening. Several tree branches snapped off due to high winds. We were needed that rain!

New Snowfall:

NA	Accumulation of new snow in inches to the nearest tenth
NA	Melted value from core to the nearest hundredth

Total Snow and Ice on Ground at Observation Time

NA	Depth of total snow and ice (new and old) in inches to the nearest half inch
NA	Melted value from core to the nearest hundredth



CoCoRaHS

CD-LR-610
Fort Collins 3.5 SW

Precipitation Report

Observation Date: 2018-03-13

Observation Time: 07:06

Rain/Method Snow: 0.00

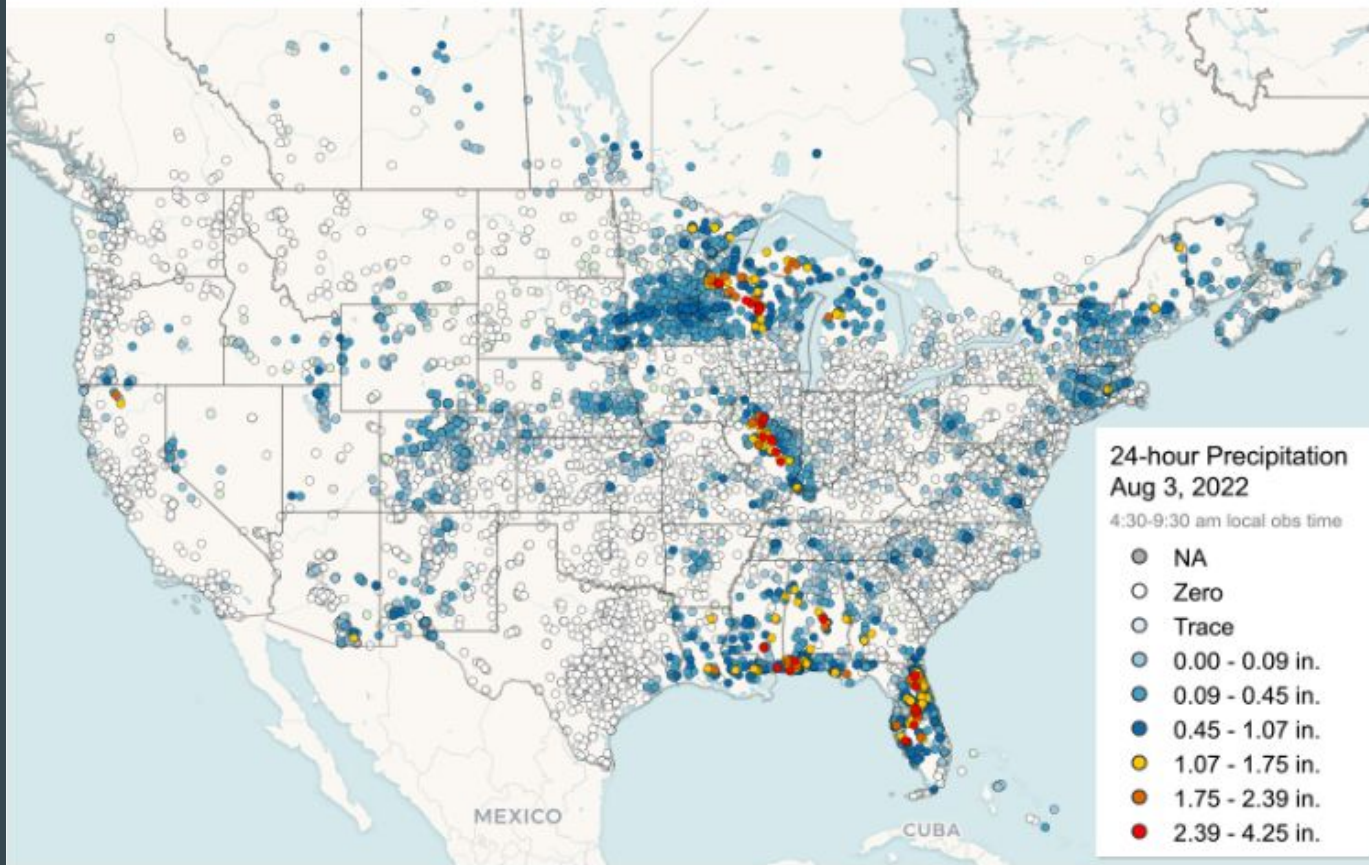
Trace Precip More Details

Metric Units (mm/1cm)

Submit

Reports received today 8/03/2022 as of 2:05 PM EDT

Daily	Multi-day	SigWx	Hail	Condition	ET
10,732	106	5	1	20	108



Different Ways to Receive Weather Alerts



- NOAA Weather Radio (NWR)
 - 24/7 broadcast of forecasts and warnings for listening area
 - “Smoke Detector” for severe weather



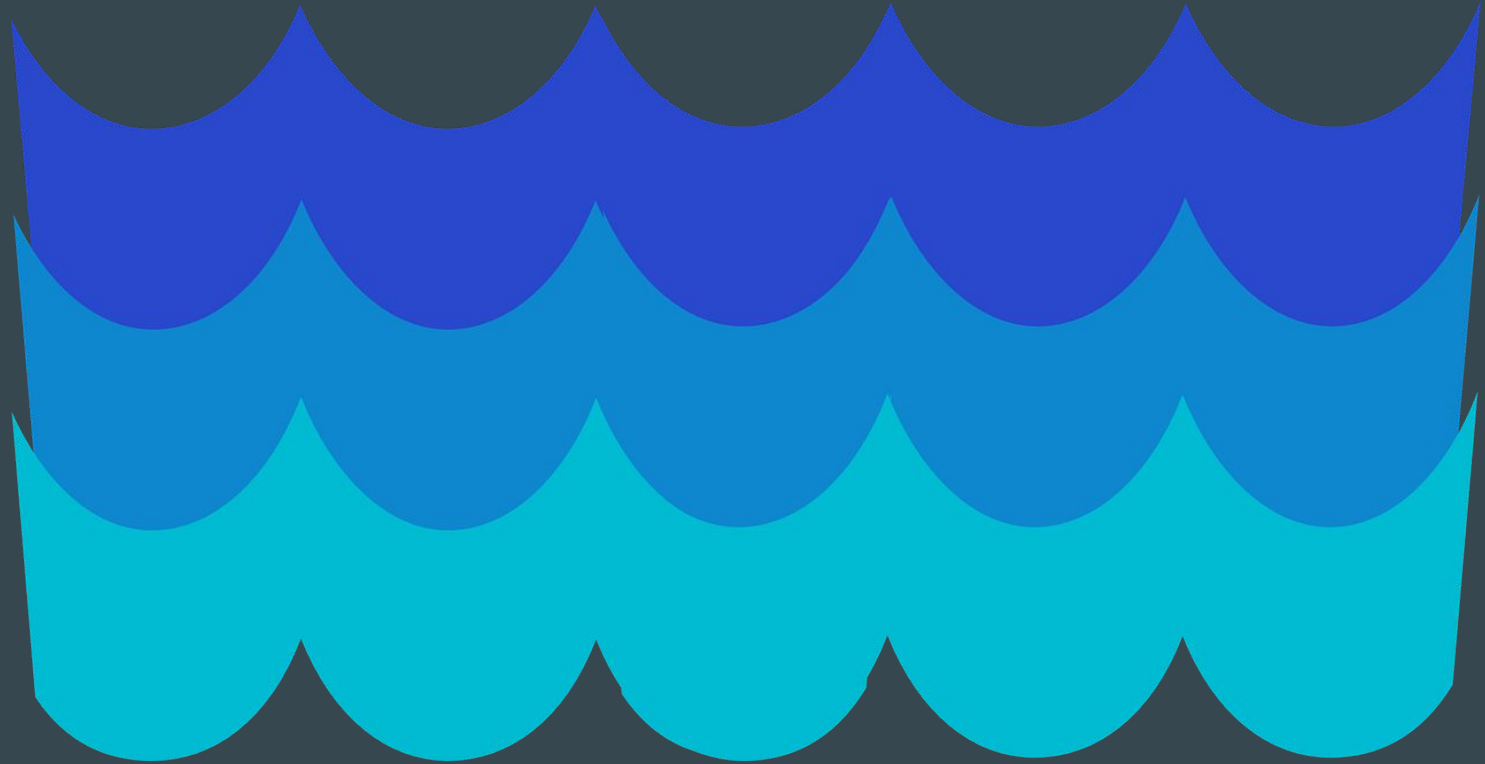
- Opt-in RAVE Alerts from Antrim County
 - <https://www.getrave.com/login/antrimcounty>



- Wireless Emergency Alerts (WEA)
 - Tornado Warnings
 - High-End Severe Thunderstorm Warnings
 - High-End Flash Flood Warnings
 - Snow Squall Warnings



High Water on the Great Lakes



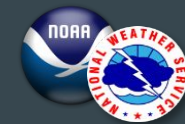


Lake Michigan Water Levels

After a few years of high or near record levels, water levels on the Great Lakes have been generally trending down this past year or so.

- Water levels on Lake Michigan have started their typical seasonal fall
- Water level (as of July 29) is 580.12 feet
 - This level is still 9 inches above the long-term average for July
 - Water level has been steady over the past month, but is 8 inches lower than last July and 25 inches below the July record level set in 2020
- Water levels are forecast to fall an inch in the next month

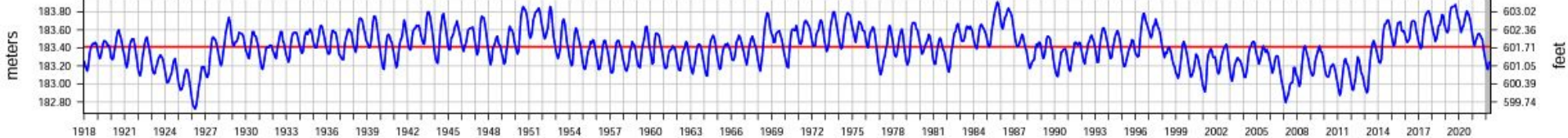
Historical Water Levels



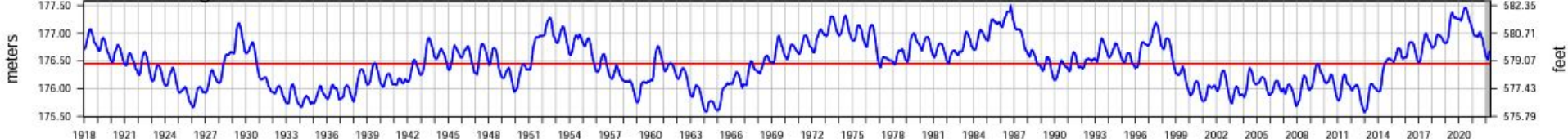
Great Lakes Water Levels (1918–2022)

— Monthly Mean Level — Long Term Average Annual

Lake Superior



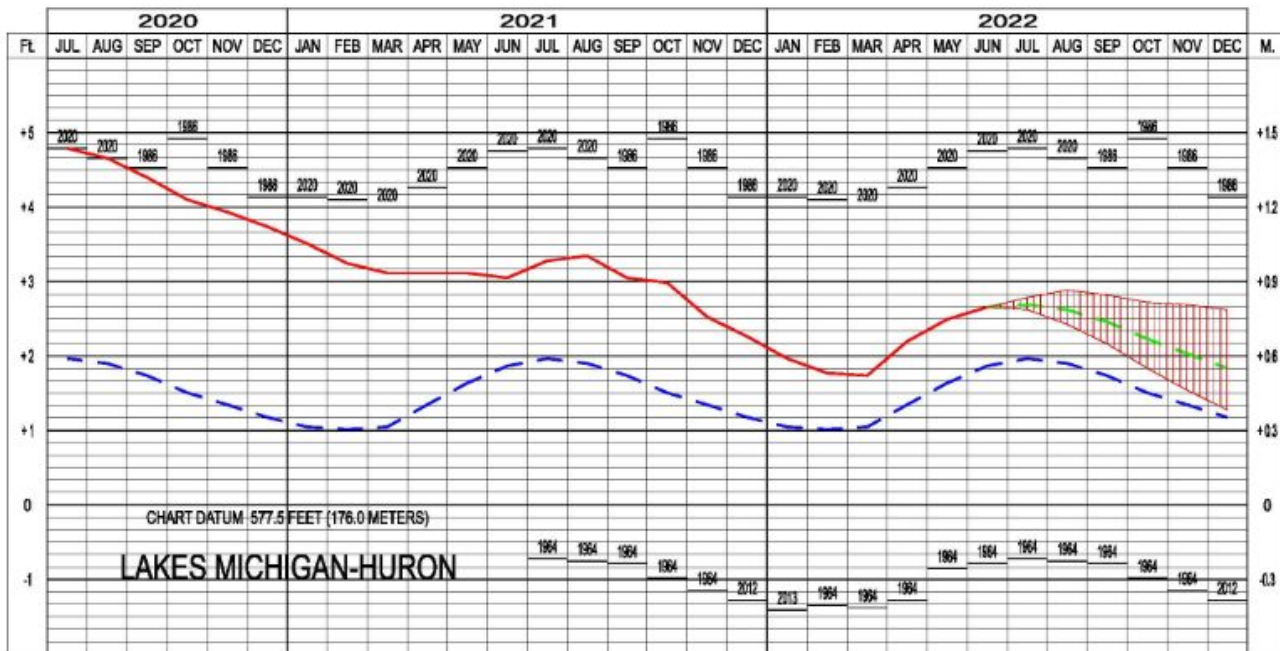
Lake Michigan–Huron





Lake Michigan Water Level and 6 Month Forecast

LAKES MICHIGAN-HURON WATER LEVELS - JULY 2022

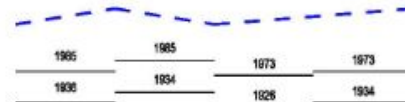


LEGEND LAKE LEVELS

RECORDED
PROJECTED



AVERAGE **
MAXIMUM **
MINIMUM **



** Average, Maximum and Minimum for period 1919-2021

Red line

Current levels

Dashed Green line

6-month forecast

Dashed Blue line

Average levels

Red-shaded area

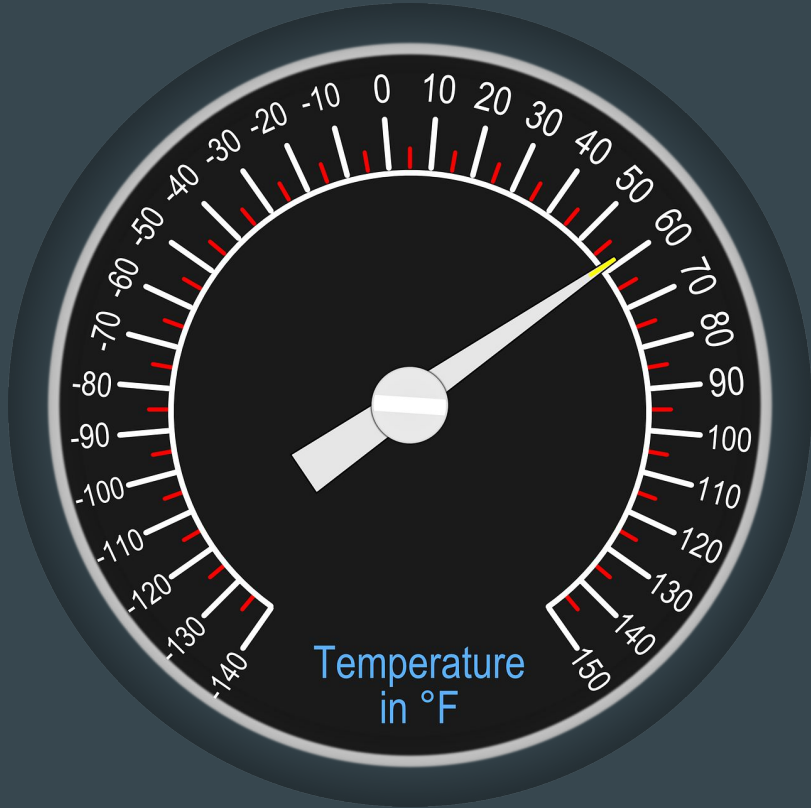
Uncertainty range of forecast

Black horizontal year

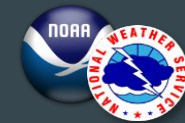
marks

Highest level/year ever measured for that month

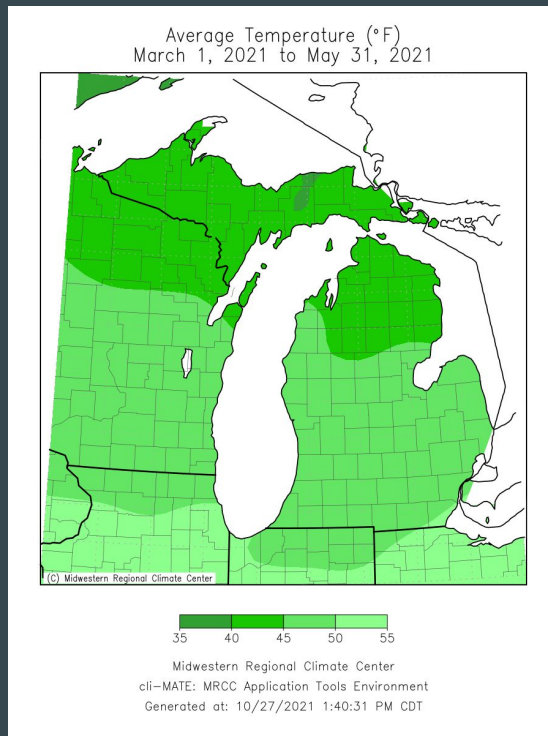
Looking Back At Temps and Precip Over Past Year



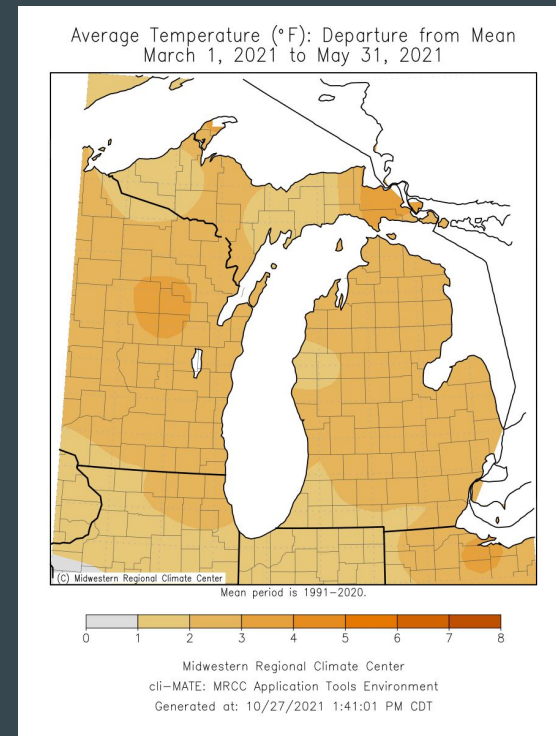
Spring 2021 Temperature



- The average spring temperatures across northern Lower MI were in the lower 40s
- This was warmer than normal



Mean temperatures in the spring were mainly in the lower 40s

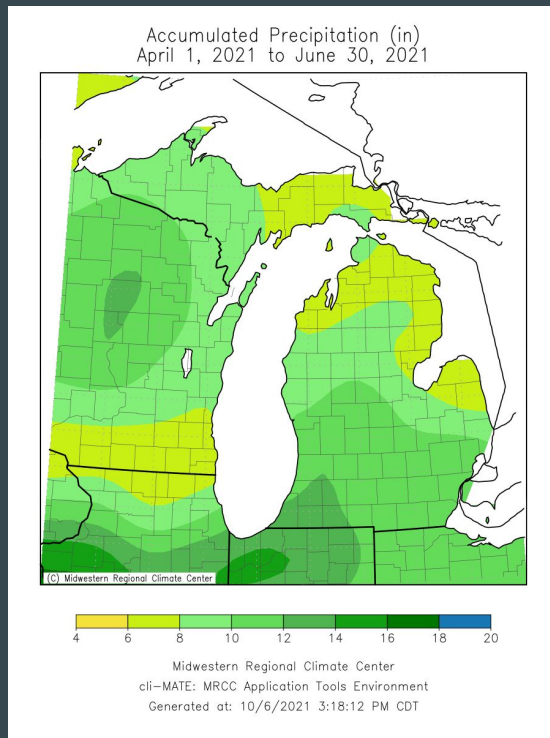


These readings were 1-4 degrees above normal

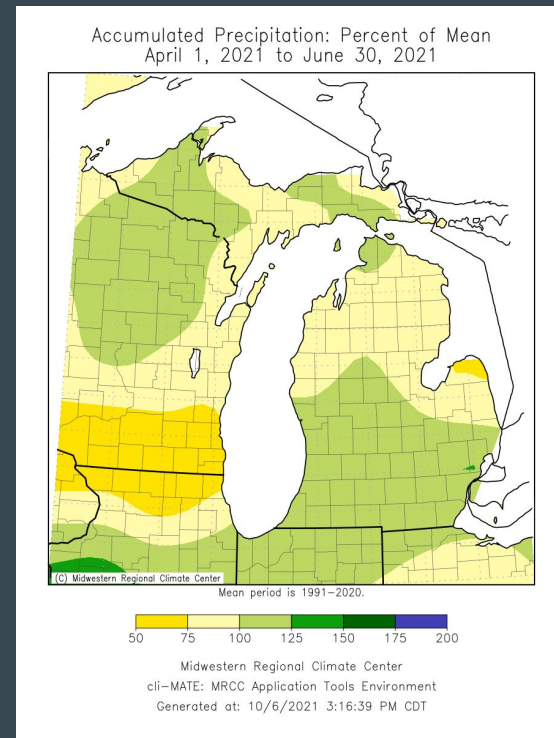
Spring 2021 Precipitation



- Spring 2021 was dry across much of the state, but not as dry as winter had been in most areas.
- Drought conditions continued to develop

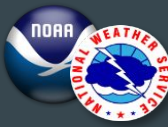


Much of northern Michigan received 6"-10" of precipitation during the spring

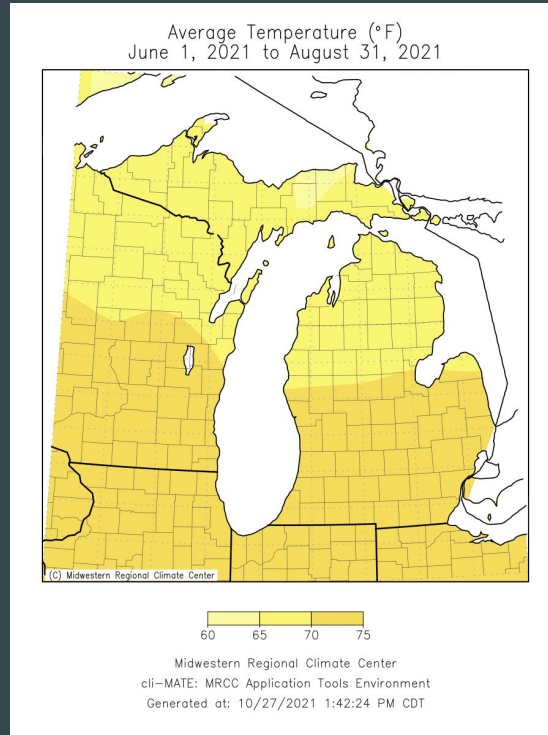


This is 75%-125% of normal across most of the region

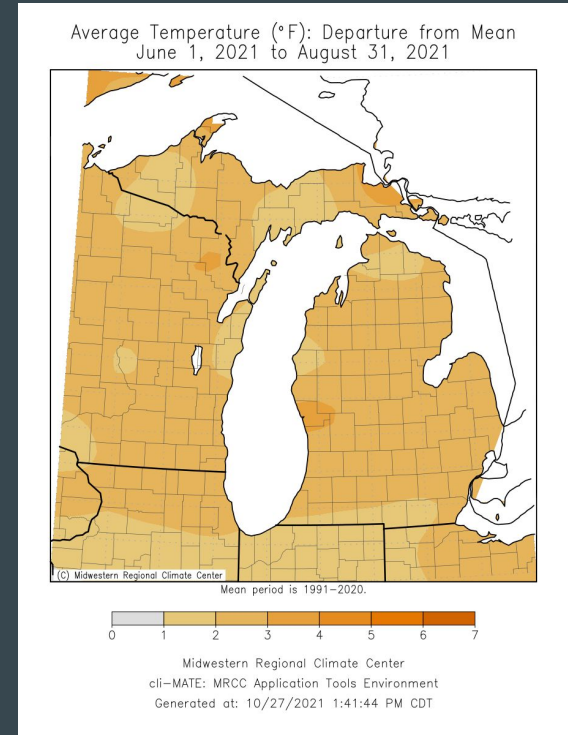
Summer 2021 Temperature



- The average summer temperatures across northern Lower MI were in the 60s
- This was warmer than normal

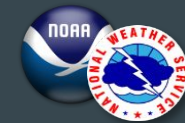


Mean temperatures in the summer were in the 60s

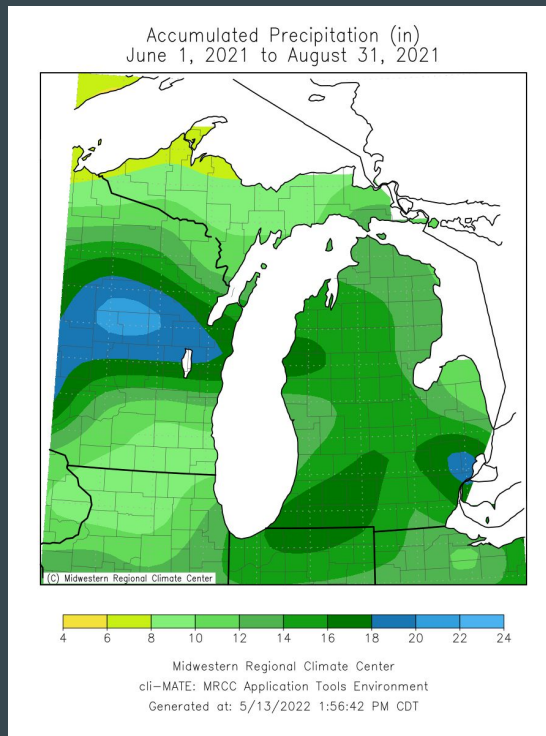


These readings were 1-4 degrees above normal

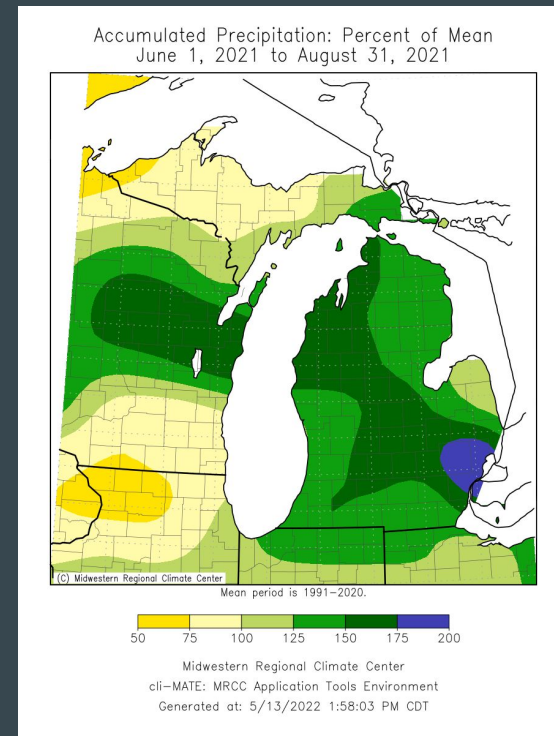
Summer 2021 Precipitation



- Much of the summer of 2021 was wetter than normal across much of lower Michigan
- These wetter conditions helped to end the drought conditions that had developed since the start of the year



Much of northern Michigan received 10"-18" of precipitation during the summer

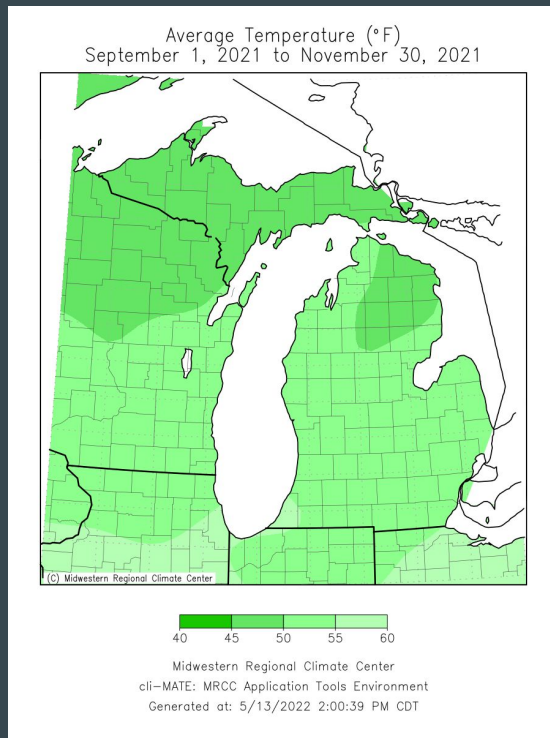


This is 100%-175% of normal across most of the region

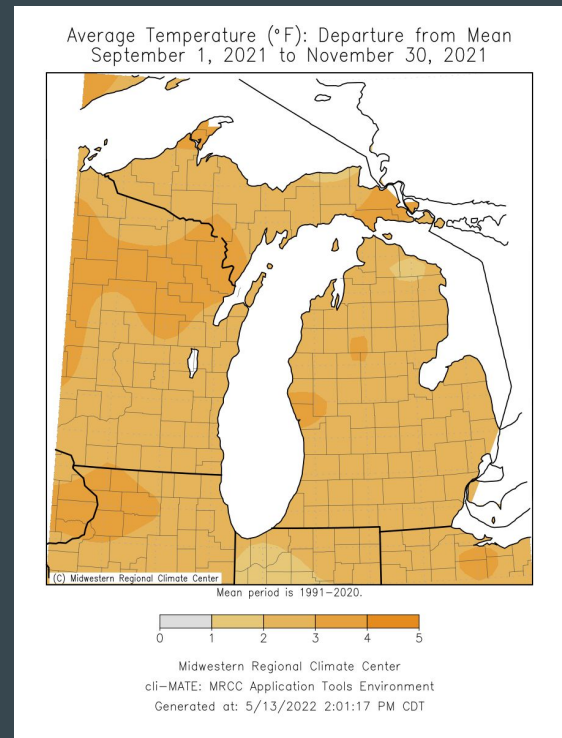
Fall 2021 Temperature



- The average fall temperatures were in the upper 40s-lower 50s
- This was warmer than normal.



Mean temperatures were in the upper 40s-lower 50s

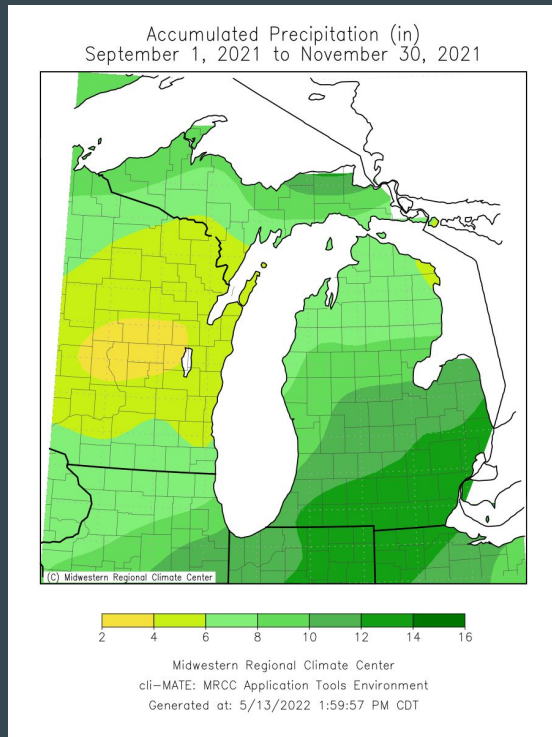


These readings were 1-4 degrees above normal

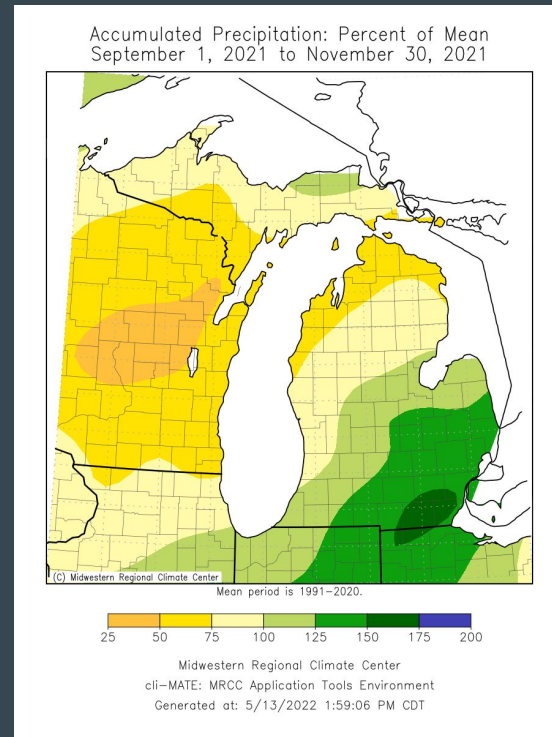
Fall 2021 Precipitation



- Much of northern Michigan received 6-8 inches of rain during the fall.
- This was below normal for most of the area.



Much of northern Michigan received 6-8 inches of rain

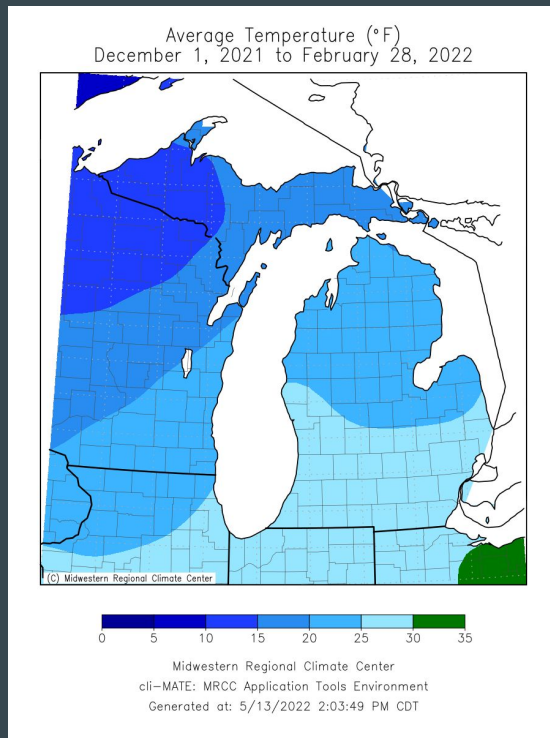


This is 50%-100% of normal across most of the region

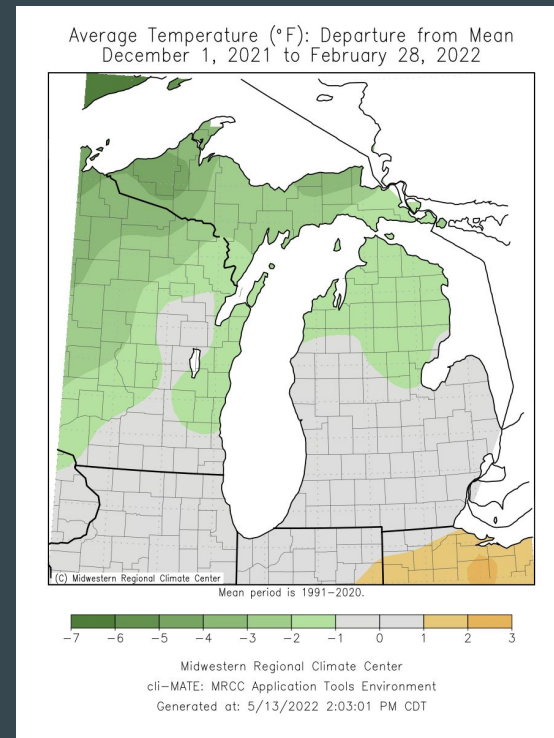
Winter 2021-2022 Temperature



- The temperatures during the winter of 2021-2022 were generally in the upper teens-lower 20s.
- These readings were a couple degrees below normal, although there were several weeks of well below normal temperatures.



Mean temperatures during winter were mainly in the upper teens to lower 20s

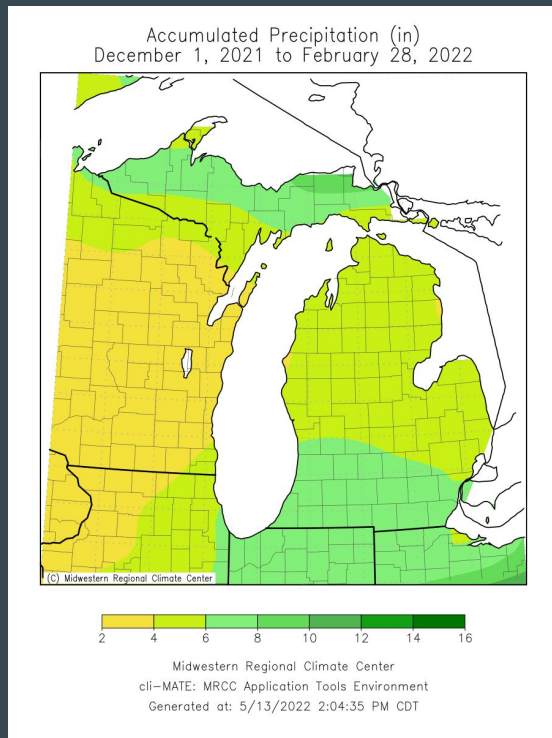


These readings were a degree or two below normal

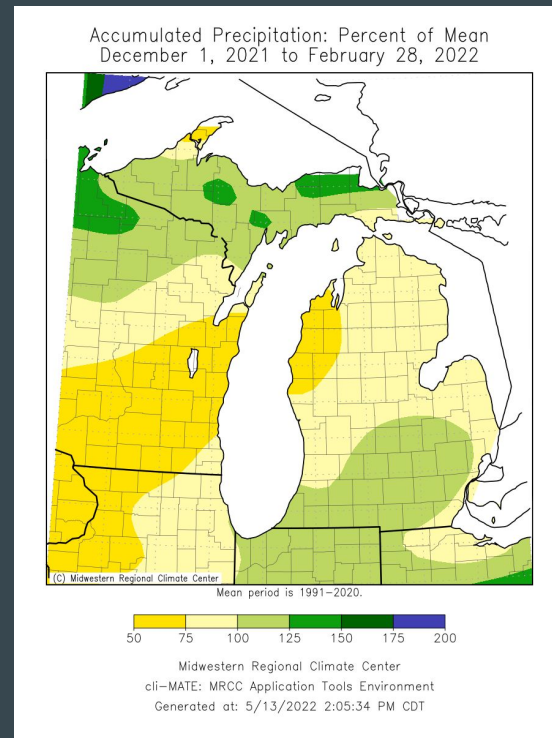
Winter 2021-2022 Precipitation



- The winter of 2021-2022 was drier than normal, with much of the area receiving 4-6 inches of precipitation (rain and melted snow).



Much of northern Michigan
4-6 inches of precipitation



This is as low as 50-75% of normal
across most of the region

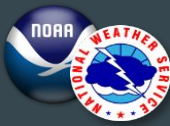


Big Swings in Precipitation - East Jordan

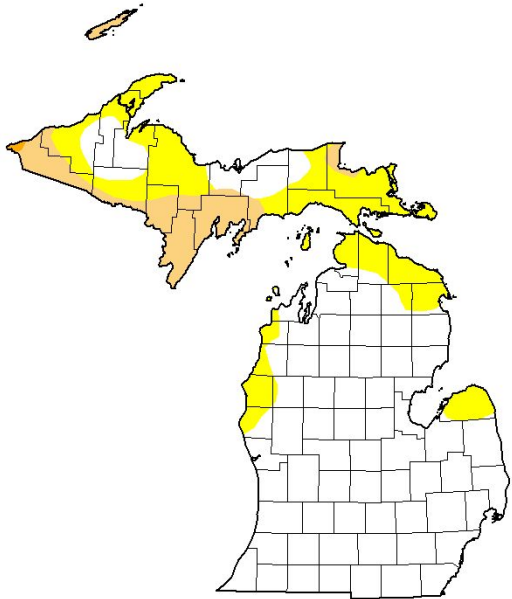
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2021	0.93	1.70	0.76	2.24	2.20	2.22	4.27	4.38	2.65	1.30	3.76	2.25	28.66
2022	1.21	1.33	5.32	3.02	1.27	1.80	2.07	M	M	M	M	M	M
Mean	1.89	1.41	1.69	2.45	2.92	3.13	2.54	3.29	3.45	3.88	2.54	2.18	31.51

- Mean based on about 100 years of record
- One thing this helps show is that “normal” is rarely seen
- However, this is a single point and many times heavy precipitation events are very localized, so this is not necessarily representative of a wide area.

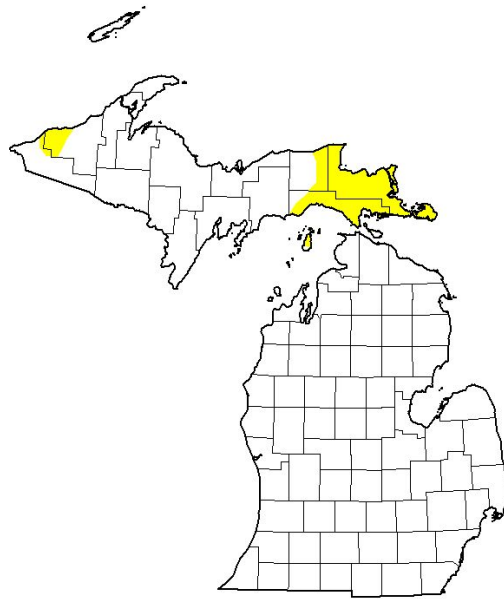
Precipitation Swings Impact Drought - Drought Monitor



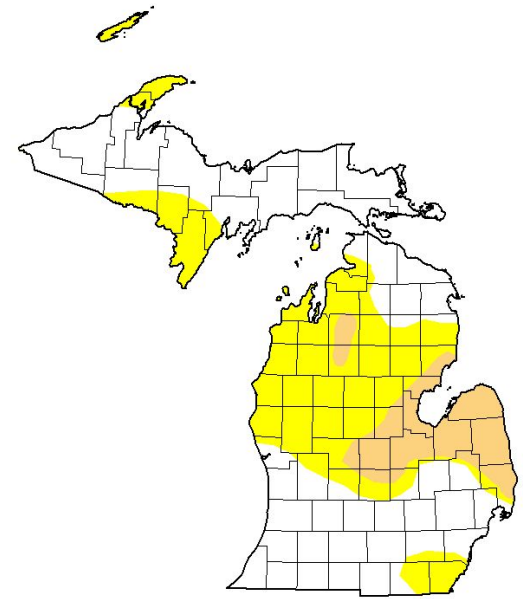
December 28, 2021



April 26, 2022



July 26, 2022





Weather Trends - Late Fall/Colder Spring?

Northern Michigan appears to be seeing some seasonal shifts in recent years

- First fall freezes have been coming later
 - East Jordan COOP station - Average first freeze is September 25 (about 100 years of record) but it has been after that date for 15 out of the past 20 years
- Cold periods lasting longer into spring
 - East Jordan COOP station - Average last snow is April 8 but it has been after that date for 14 out of the past 20 years

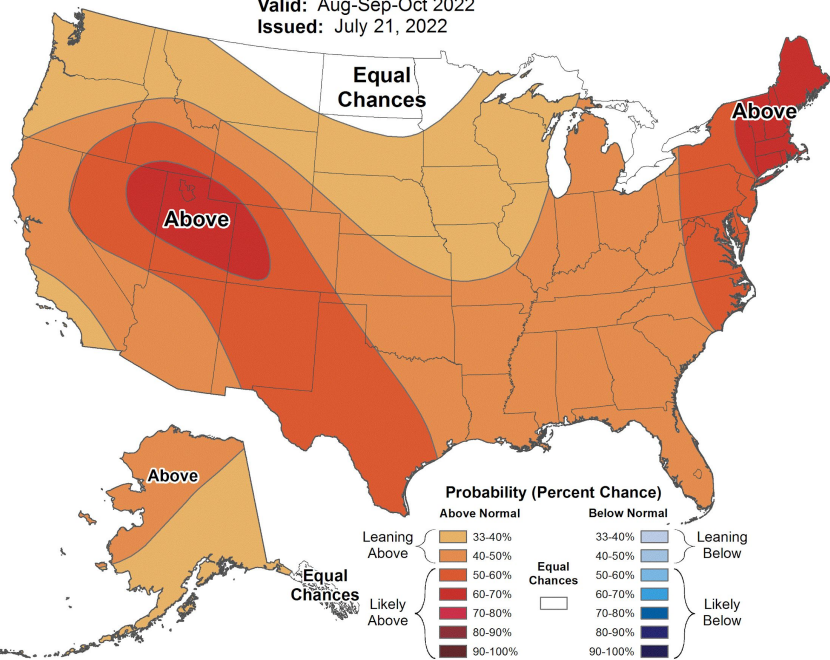
2022 Outlook Heading into Fall (ASO)



Seasonal Temperature Outlook



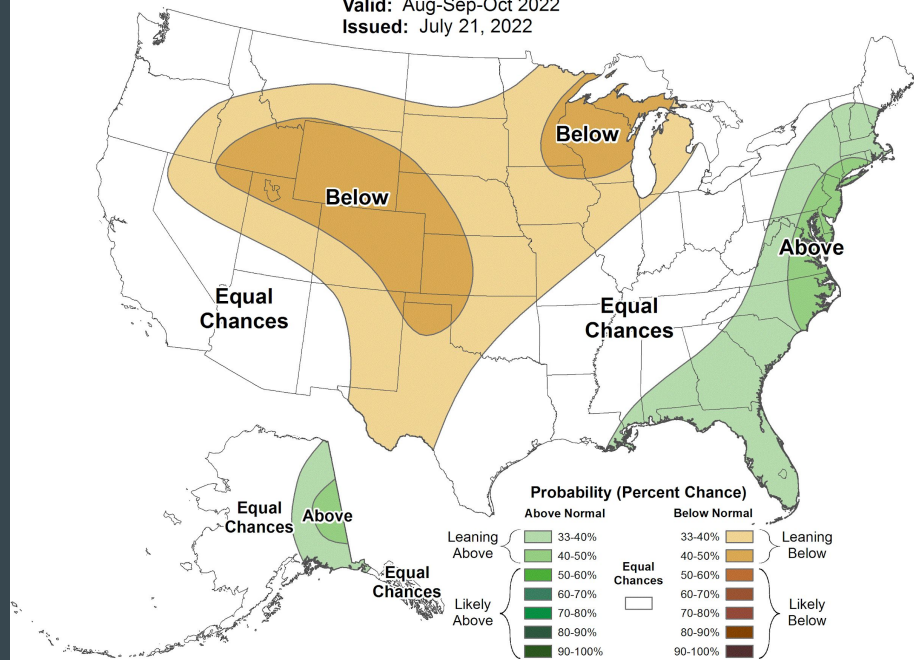
Valid: Aug-Sep-Oct 2022
Issued: July 21, 2022



Seasonal Precipitation Outlook



Valid: Aug-Sep-Oct 2022
Issued: July 21, 2022





Questions or want more information?

Pat Bak

Warning Coordination Meteorologist
NWS Gaylord

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www.weather.gov/gaylord