NWS Winter Weather Resources and 2025-26 Outlook

Michigan Winter Operations Conference

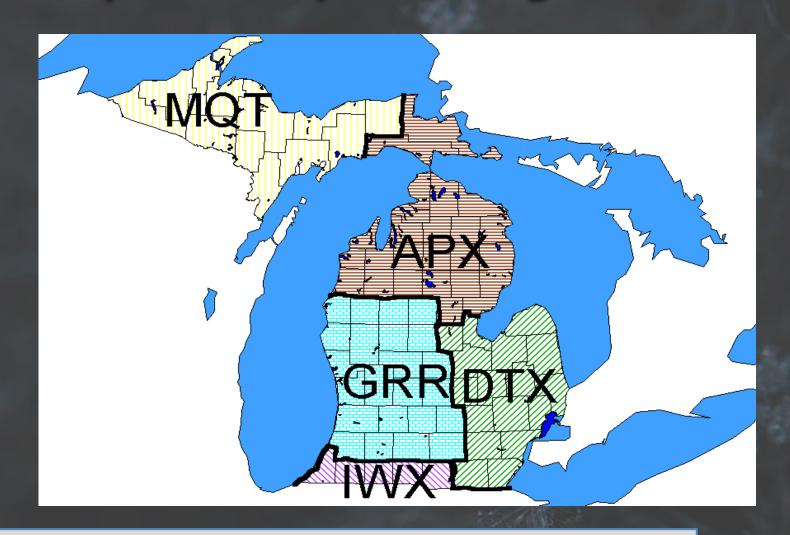
Patrick Bak
National Weather Service Gaylord MI

Outline

- Winter weather web resources
- Look back at two major events from last winter
- Winter Outlook 2025-26

NWS Office Responsibility in Michigan

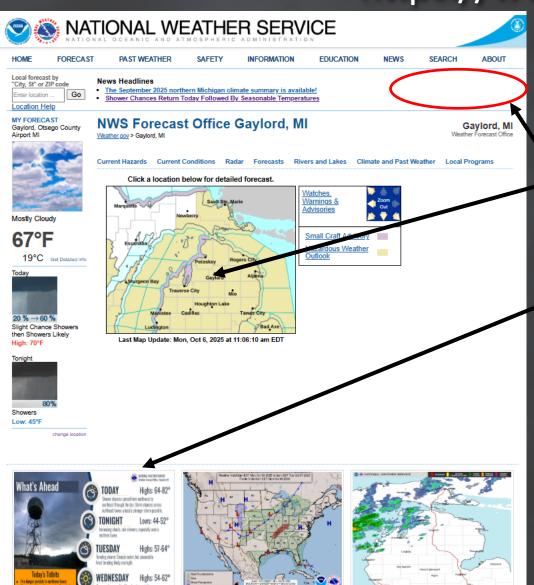
- NWS Marquette weather.gov/MQT
- NWS Gaylord weather.gov/Gaylord
- NWS Grand Rapids weather.gov/GRR
- NWS Detroit weather.gov/DTX
- NWS North Webster
 - weather.gov/iwx



Contact your local office for more specific local information or to be added to their weather notification list for email blasts and webinars

NWS Office Pages

https://www.weather.gov/XXX



Click on desired location on map to get a specific text forecast (hourly forecasts can be obtained from the page that follows)

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

If there is one in effect, a detailed Decision Support slide deck will be linked here

NWS Office Pages Decision Support Packets

Significant Lake Effect Snow Event

Long-duration event will last through the holiday weekend

Key Messages

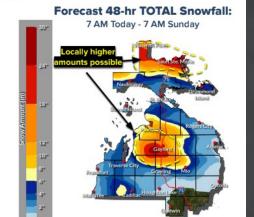
- → Long-duration lake effect snow event to continue through
- → Localized 1-2 ft. possible by Saturday morning.
- Additional 12" or more possible Saturday-Saturday night.
- Localized 3-day snowfall totals (tonight into Sunday night) of 2-3 ft possible.
 - Most likely near Sault Ste. Marie and eastern Antrim/southern Otsego counties.
- → Intense, narrow bands of snow combined with gusty winds will lead to dangerous travel, including rapidly changing conditions in and out of snow bands

NEW Important Updates

Confidence has increased in more intense snowfall band persisting over southern Emmet and Cheboygan counties.

Next Scheduled Briefing

This afternoon or as needed



National Weather Service Gaylord, MI

Winter Impacts Timing

November 29, 2024 4:14 AM

Significant impacts to travel are expected through the extended holiday weekend.

Impact Level

Impact Details

- Dangerous travel is expected at times through the entire holiday weekend.
- Rapid changes in conditions expected in and out of snow hands
 - Near whiteout conditions expected at times under heaviest snow.
- Snowfall rates of 1-3" per hour will lead to quick accumulations on roadways.
- Accumulating snow will lead to slippery
- Blowing/drifting snow could further worsen driving conditions and recover some previously plowed roadways.
- Isolated power outages possible.

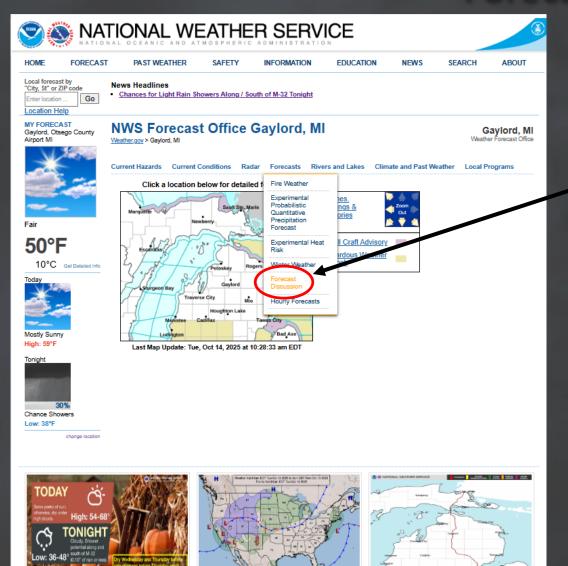


- Different offices have different triggers to issue packets
- While there will be similarities, different offices adjust packet content based on partner feedback
- These are generally sent via an email blast to office distribution lists but are also linked to the local office home page (as seen on previous slide)
- These packets often contain timing and confidence detail, along with a wide range of useful graphics



National Weather Service Gaylord, MI

NWS Office PagesForecast Discussions



- Area Forecast Discussions run out through 7 days and contain the forecaster's thoughts on the forecast including confidence and range of possibilities
- Mouse over the "Forecasts" tab above the map in the center of the page to open the menu with the Forecast Discussion link

Area Forecast Discussion National Weather Service Gaylord MI 224 PM EDT Mon Oct 13 2025

.KEY MESSAGES...

- Scattered showers this afternoon/evening.
- Cooler Tuesday-Wednesday with temperatures rebounding again late in the week.
- Better chances for showers return over the weekend.

88

.SHORT TERM /THROUGH TUESDAY NIGHT/... Issued at 223 PM EDT Mon Oct 13 2825

Pattern Synopsis/Forecast: Early this afternoon, closed upper-level low pressure sits near the Manitoba/Ontario border with attendant sfc low pressure nearing Hudson Bay. Associated cold front draped to the south across northern Ontario, the central U.P. into eastern MI. This boundary will make slow eastward progress across northern MI early this evening through tonight accompanied by decaying shower chances.

In the wake of this system, upper-level heights build with upstream sfc high pressure settling in across the upper MS Valley and northern Great Lakes on Tuesday. By Tuesday might, low pressure begins to show signs of materializing lee of the Rockies with a developing warm front stretched from the Plains into the mid-MS Valley. Increased isentropic ascent north of this boundary, despite paltry moisture, may yield another low end shower chance Tuesday night.

Forecast Details: As expected, showers really struggling with eastward extent across northern NI so far today, with the primary axis of any shomer activity having been stuck upstream over parts of northeast NI and central U.P. While shower chances do gradually build farther east into parts of northern lower and eastern upper through the remainder of the afternoon and evening, not really appearing to be much hope for meaningful rain amounts. Otherwise, winds turn northeasterly post fropa tonight with lows largely in the 40s area-wide. Some low probabilities for at least patchy fog once again, but highly dependent on overnight cloud trends and the ability for winds to decouple after veering out of the northeast.

Any Tuesday morning fog/stratus should again gradually burn off/mix out with partly sunny skies anticipated by Tuesday afternoon. High temps expected to be a good 100 dogrees cooler than today in many areas -- largely spanning the 50s -- save for some low-mid 60s creeding in near Saginaw Bay.

88

.LONG TERM /WEDNESDAY THROUGH SUNDAY/...
Issued at 223 PM EDT More Oct 13 2025

Day 3-4 (Nednesday - Thursday):

High pressure largely in control through the midweek timeframe. Plenty of sunshine anticipated Wednesday with highs in the 50s. Chilly Wednesday night with growing probabilities for some of the typically colder icebox locations to fall to near 20 F for a low temp Wednesday night/Thwasday morning.

kinds turn out of the south Thursday with daytime highs rebounding a handful of degrees. Increasing clouds to be the rule, especially late in the day, in advance of another round of isentropically driven precio that may cross the area Thursday might.

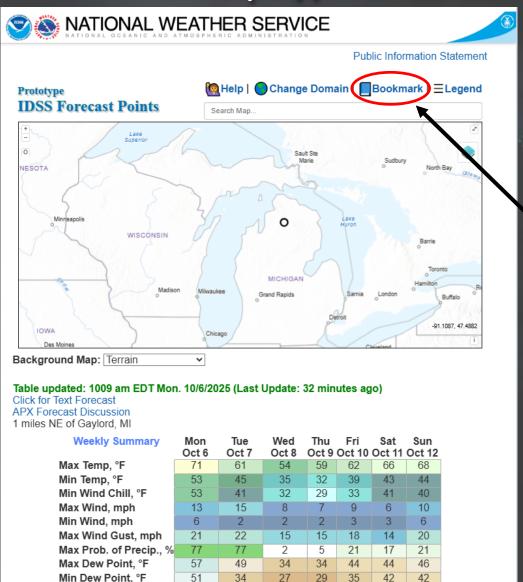
Day 5-7 (Friday - Sunday): By late in the week, low pressure is expected to be situated near the Wanitoba/Ontario border with Thursday night's warm front positioned well to the north. Temps creep up another few degrees for Friday before another round of showers and even a few rumbles of thunder becomes increasingly likely Saturday as a cold front makes headway west to east across the Great takes. Cooler again behind that boundary with potential for lake effect/enhanced rain showers to wrap up the tail end of the

NWS Office Pages Forecast Discussions

- Forecast Discussions can be technical at times, but contain useful information
- Bulleted "Key Messages" at the top of the discussion highlight the most important forecast items of the coming days

Forecast Points

https://www.weather.gov/forecastpoints



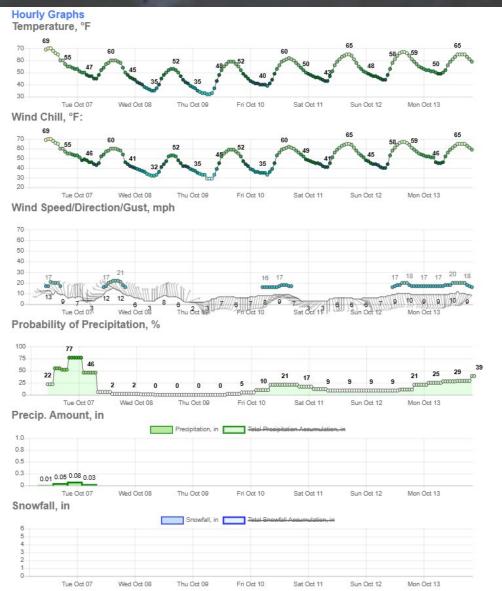
Max RH. %

- Click on desired forecast point on map
 - Map is dynamic and can zoom/pan
- Point can be bookmarked for future use
- Contains Weekly Summary, Hourly Table, and Hourly Graphs

Forecast Points

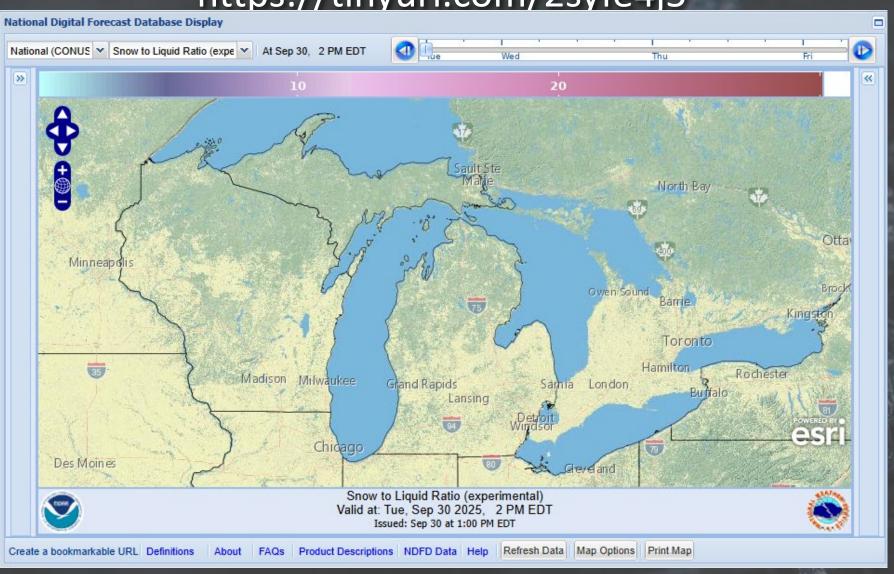
https://www.weather.gov/forecastpoints

Hourly Table																		
Day of week:	Monday 10/6															Tuesday 10/7		
Time:	10ам 11ам 12рм 1рм 2рм 3рм 4рм 5рм 6рм 7рм 8рм 9рм 10рм 11рм 12ам 1ам														2AI			
Weather:	2	<u> </u>	2	4	*	4	*	800	803	993	800	8	Ses	See.	<i>S</i>	800	800	
Temperature (°F):	66	69	70	70	68	66	65	60	60	57	55	55	54	53	53	51	50	
Wind Chill, °F:	66	69	70	70	68	66	65	60	60	57	55	55	54	53	53	51	48	
Wind Speed (mph):	10	12	13	12	9	12	10	9	9	8	6	6	7	6	7	7	6	
Wind Gust (mph):	16	17	17	21	20	20	20	17	15	13	10	9	9	10	10	10	10	
Wind Direction (°):	220	240	260	270	280	300	320	330	340	350	0	10	10	0	0	0	0	
Wind Direction:	*	×	-	→	→	*	*	*	*	+	+	+	+	+	+	+	+	
Prob. of Precip. (%):	19	22	22	22	55	55	55	52	52	52	77	77	77	77	77	77	46	
Prob. of Thunder (%):	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Precip. Amount (in.):		0.05							0.08									
Snow (in.):	0.0					0.0						0.0						
Ice (in.):	0.00				0.00						0.00							
Dew Point (°F):	56	55	55	56	57	55	55	54	52	52	52	52	51	51	51	49	48	
RH (%):	70	61	59	61	68	68	70	81	75	83	90	90	90	93	93	93	93	
Sky Cover (%):	31	55	62	75	79	83	85	87	89	94	94	94	95	96	96	97	94	
Wave Height (ft):	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	4																₽	



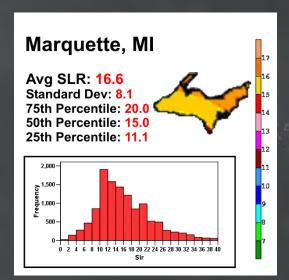
Snow to Liquid Ratio (experimental)

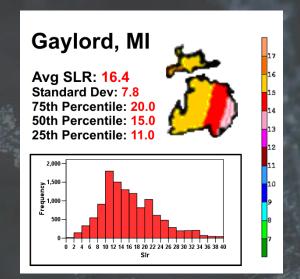
https://tinyurl.com/2syfe4j5

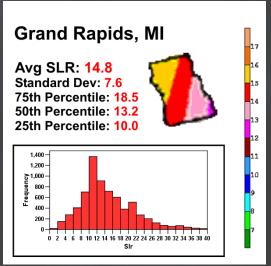


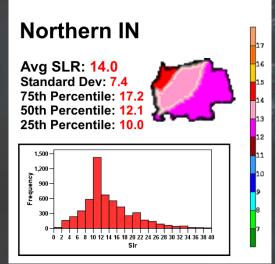
How wet is the snow going to be? Fluffy, slushy, or in between?

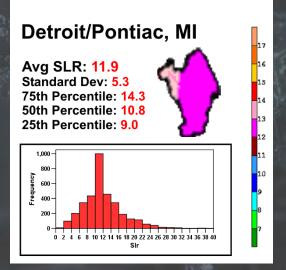
Snow to Liquid RatioWhat is "normal"?





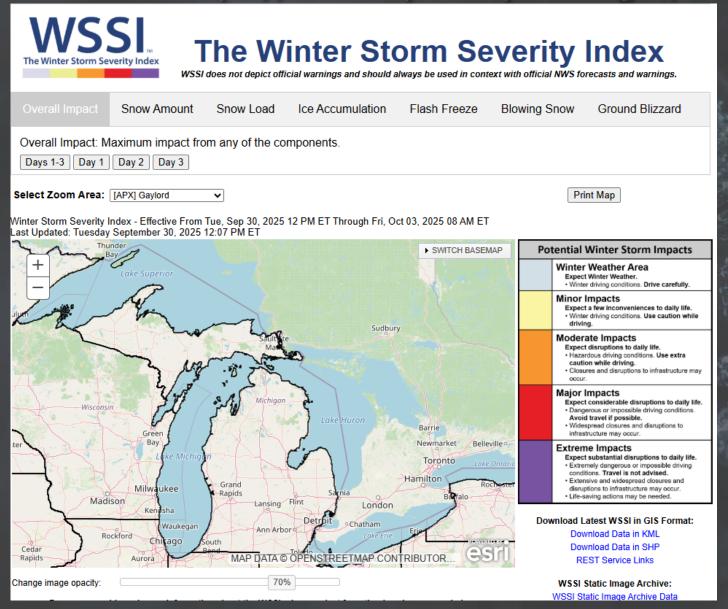






Winter Storm Severity Index (WSSI)

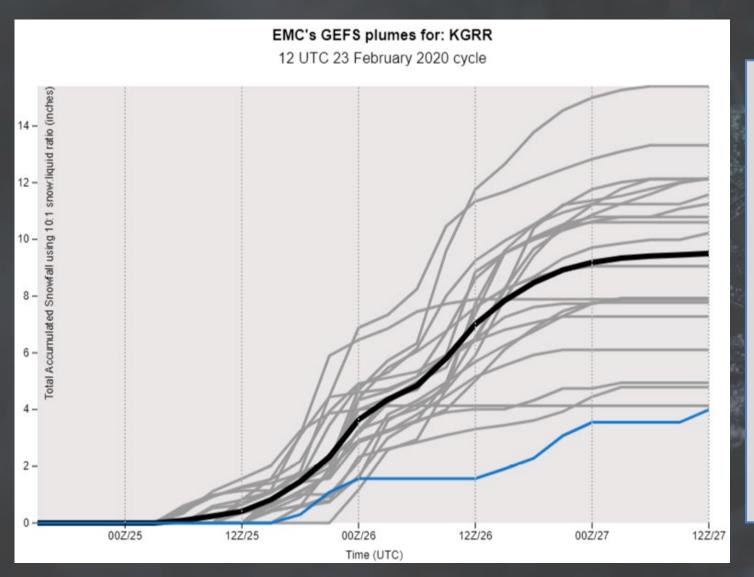
https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php?id=APX



- Looks 3 days into the future and can collectively look at all 3 days or individual days
- Index is comprised of 6 individual items (shown below) that can be looked at individually or in a composite
 - Snow Amount
 - Snow Load
 - Ice Accumulation
 - Flash Freeze
 - Blowing Snow
 - Ground Blizzard

Why Can't Snow Totals Be More Exact?

The case for probabilistic forecasting



- We literally have dozens of numerical weather prediction models to analyze while producing a forecast
- Forecast confidence is higher when the model solutions generally agree – we call this clustering
- However, model disagreement/spread is often considerable in storm track, strength, and thermal profile – all of these have a significant impact on expected snow or ice totals
- Probabilistic forecasts help to show a range of possibilities while also providing a most likely forecast

Precipitation Probabilities

https://www.wpc.ncep.noaa.gov/Prob_Precip





Probabilistic Precipitation Portal

Experimental

Powered by Esri

Quantitative Precipitation Forecast

Includes rainfall, plus the liquid equivalent of any frozen precipitation

Snowfall Forecast

Includes sleet accumulation, but excludes ice

Ice Forecast

Includes ice accumulation from freezing rain, and excludes sleet

SCENARIOS

Expected Amount

Official National Weather Service forecast

High End Amount

1 in 10 chance (10%) of higher amounts

Low End Amount

9 in 10 chance (90%) of higher amounts

EXCEEDANCE PROBABILITIES

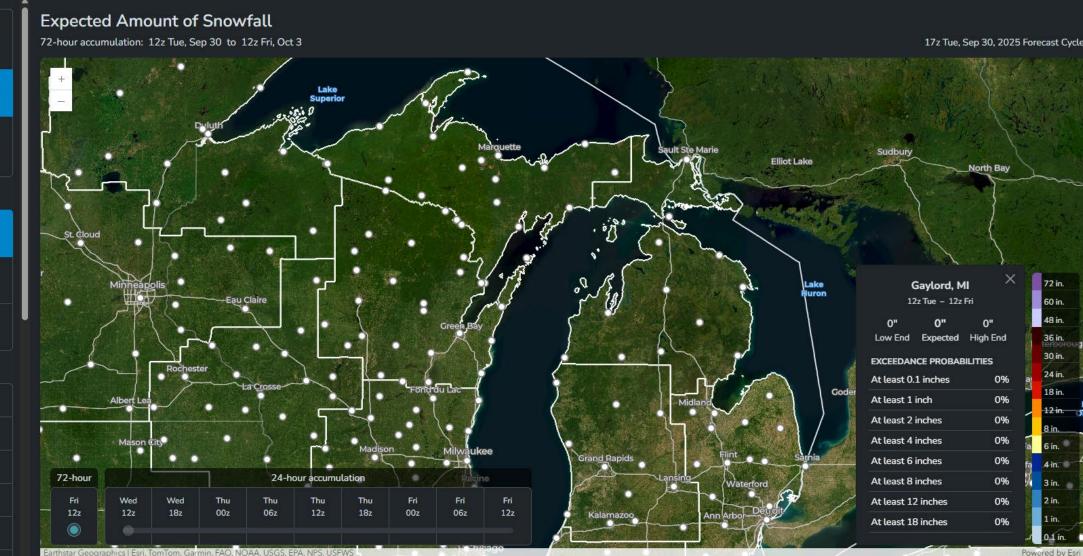
At least 0.1 inches

At least 1 inch

At least 2 inches

At least 4 inches

At least 6 inches



Probabilistic Forecasts

Winter Storm Tuesday - Tue Night



Probability of 6" Snow Probability of 8" Snow High (70-100%) Medium (40-70%) (10-40%)

WINTER STORM TIMELINE

SNOW BEGINS HEAVIEST SNOW Wednesday A.M.

Tuesday A.M. Tuesday Afternoon-Evening

- LINGERING SNOW
- Probabilistic forecasts can be displayed in many different ways
- Different ways at different time scales
- NWS offices are still experimenting with the best ways to present the data (feel free to provide feedback)

DETAILS

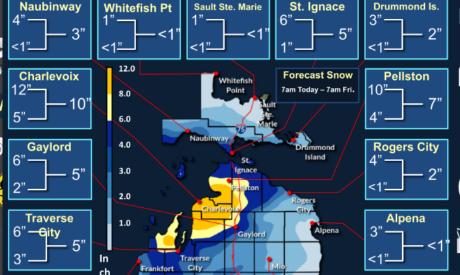
Frankfort

Manistee

A winter storm will bring accumulating snow to the region Tuesday - Tuesday night with snow lingering into Wednesday.

Cadillac

Winds gusting 25-35 mph will further



Higgins

Heavy Snow Today - Tonight



Several inches of snow expected with localized amounts over 12" possible by Friday AM.



Intense snowfall rates of 1-2" per hour or higher within heaviest snow bands.



Heaviest snowfall may not begin until this evening for some locations.



Oscoda

Mio

Gladwin

Near-zero visibility possible at times with intense snowfall rates.

Understanding the Map:

High-End Snow Low-End Snow

80% chance for snow amounts to fall between the ranges given at labeled locations.

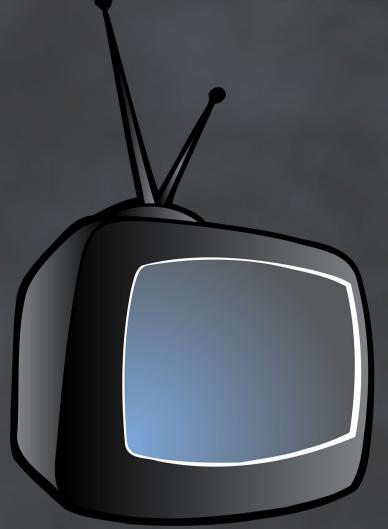
Forecast Wider snow range means less certainty.

National Weather Service Gaylord, M

Best



TV vs App vs NWS Forecasts



- Local TV meteorologists are key NWS Partners and help us broadcast weather forecast, warning, and safety information
- Generally don't have time to drill into the details during newscasts
- Can have large broadcast areas requiring a more generalized forecast

TV vs App vs NWS Forecasts



- NWS does not have an official app although some apps share NWS data
- Apps deliver forecast information without interpretive input in most cases
- Forecast output may come from only one weather "model"

TV vs App vs NWS Forecasts



- NWS forecast offices are spread throughout the country and local forecasters develop expertise with respect to unique local weather patterns
- Many NWS forecast products add interpretive content which helps express forecast confidence and range of possibilities

November-December 2024 Lake Effect Snow Event

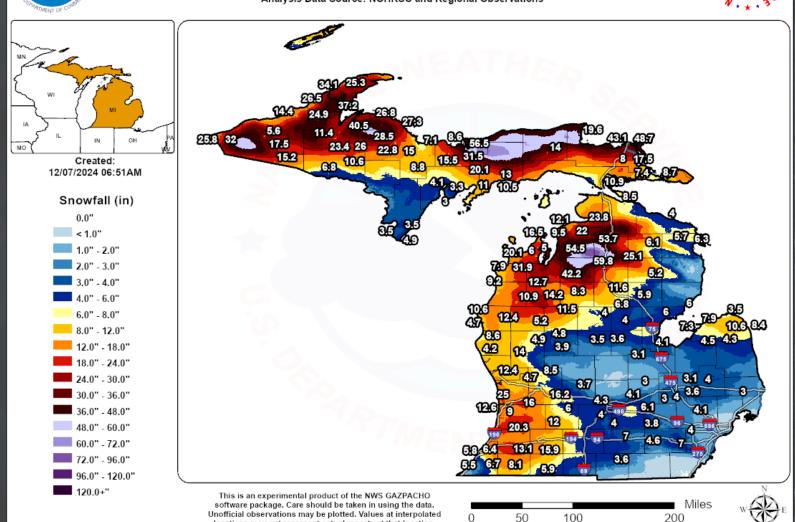


National Weather Service State of Michigan

Snowfall Analysis 11/26/2024 07:00AM to 12/06/2024 07:00AM EST

Analysis Data Source: NOHRSC and Regional Observations





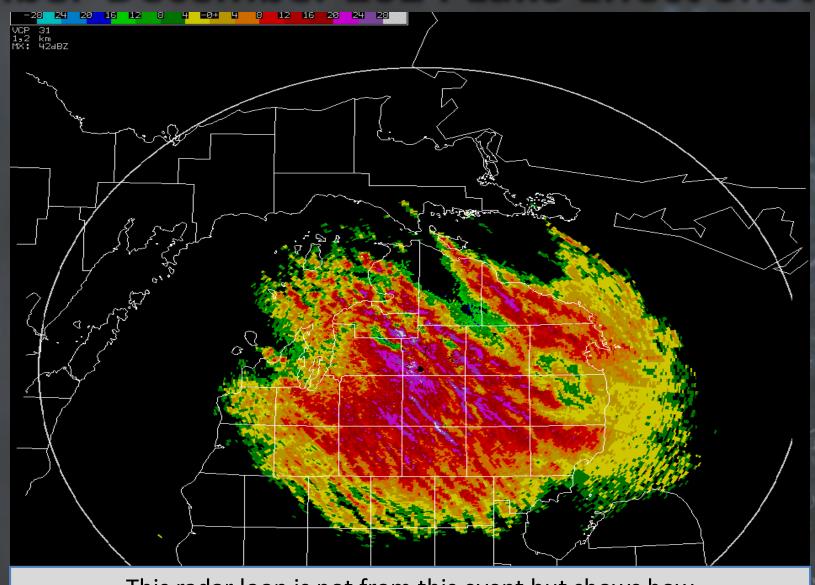
locations may not represent actual reports at that location.

November-December 2024 Lake Effect Snow Event

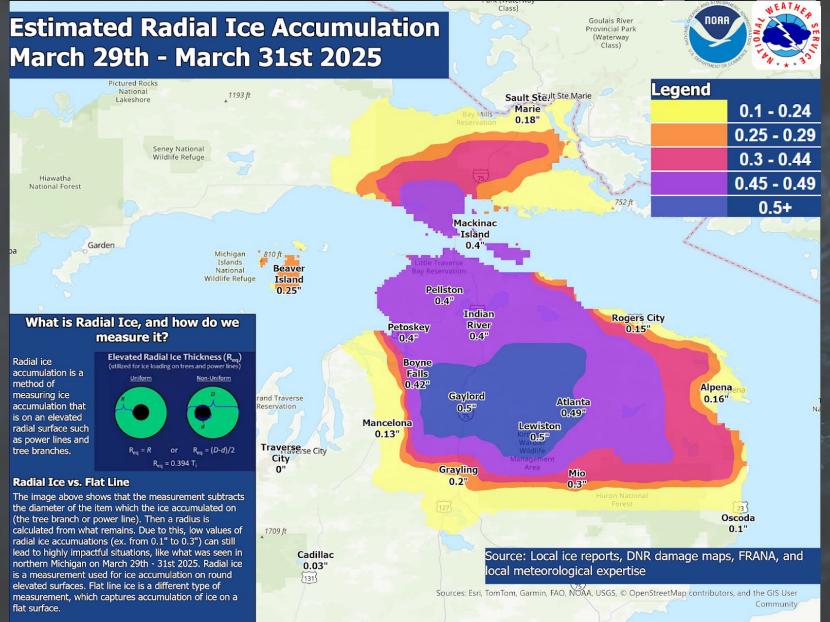


- A prolonged lake effect snow event occurred around Thanksgiving weekend
- Most snowfall fell from November 28th- December 2nd
- Great Lakes were a few degrees warmer than normal at that time and completely ice free
- Wind direction was unusually steady during the event which allowed the same areas to keep getting snow instead of "spraying" it around

November-December 2024 Lake Effect Snow Event



This radar loop is not from this event but shows how lake effect bands shift around with wind direction changes

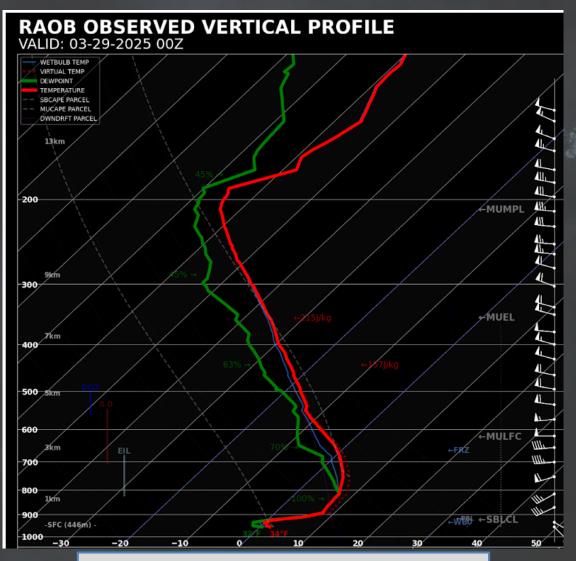


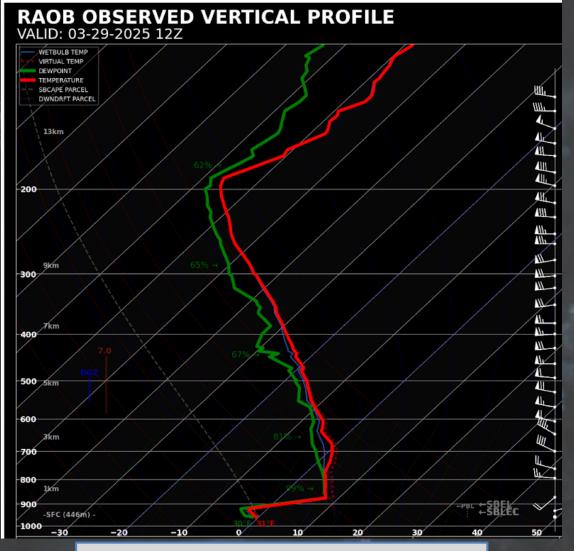






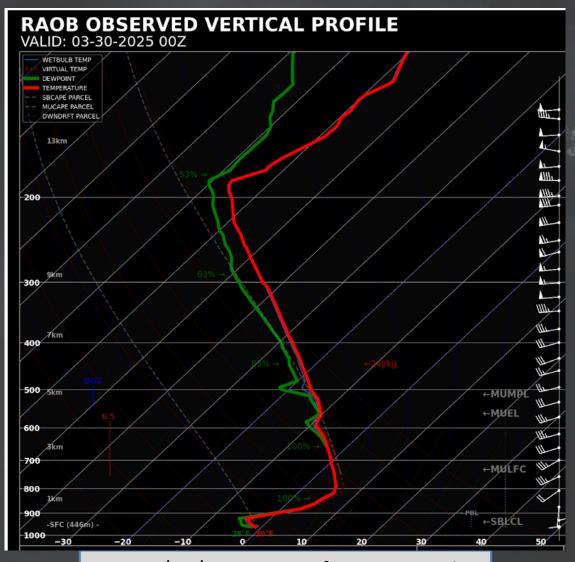


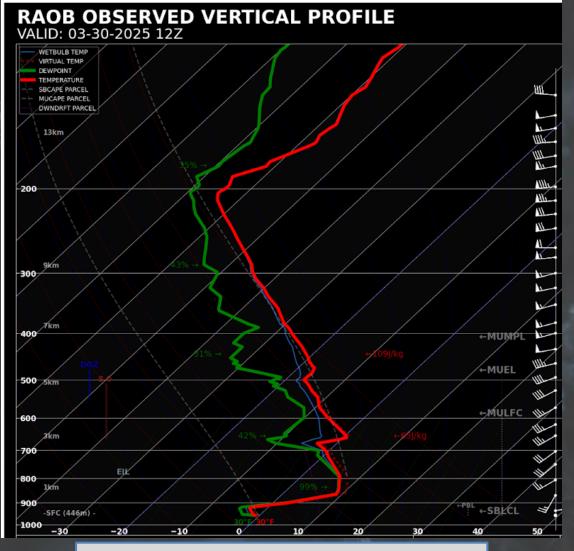




Friday 3/28/25 8 PM Surface Temp 34°

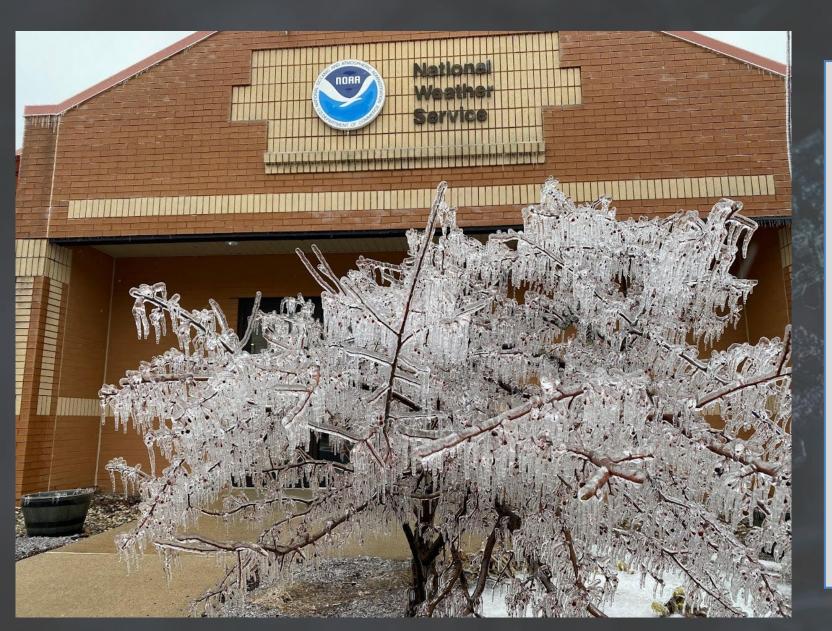
Sat 3/29/25 8 AM Surface Temp 31°





Sat 3/29/25 8 PM Surface Temp 30°

Sun 3/30/25 8 AM Surface Temp 30°



- A historic ice storm impacted parts of northern Michigan from March 28th – 31st 2025
- Twelve counties were put under a State of Emergency due to extensive damage to trees and infrastructure
- Power outages lasted for weeks in some areas
- Multiple waves of freezing rain accumulated over half an inch of ice in spots on elevated surfaces
- Forecast was extremely difficult with an unusually persistent layer of surface based cold air beneath a thick layer of relatively warm air

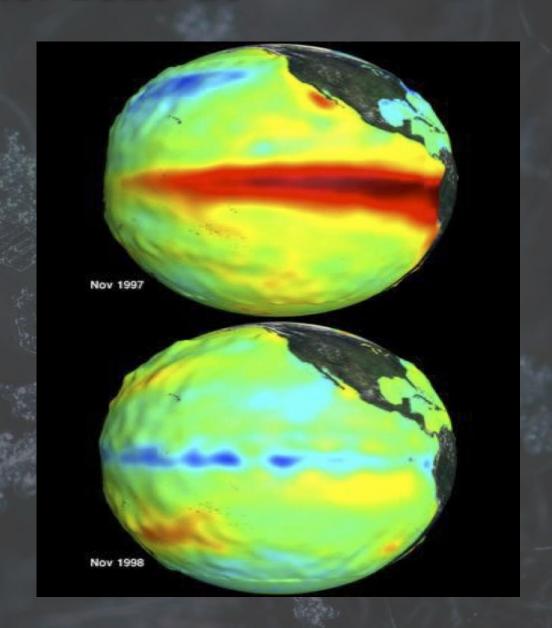
La Niña and Winter 2025-26

WHAT IS EL NIÑO?

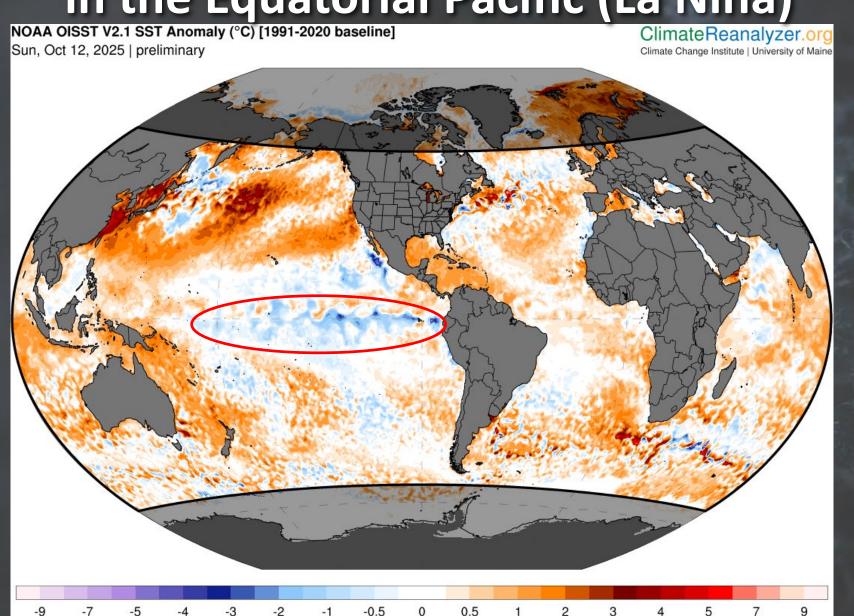
El Niño is a warming of the central to eastern tropical Pacific that occurs every two to seven years, on average.

WHAT IS LA NIÑA?

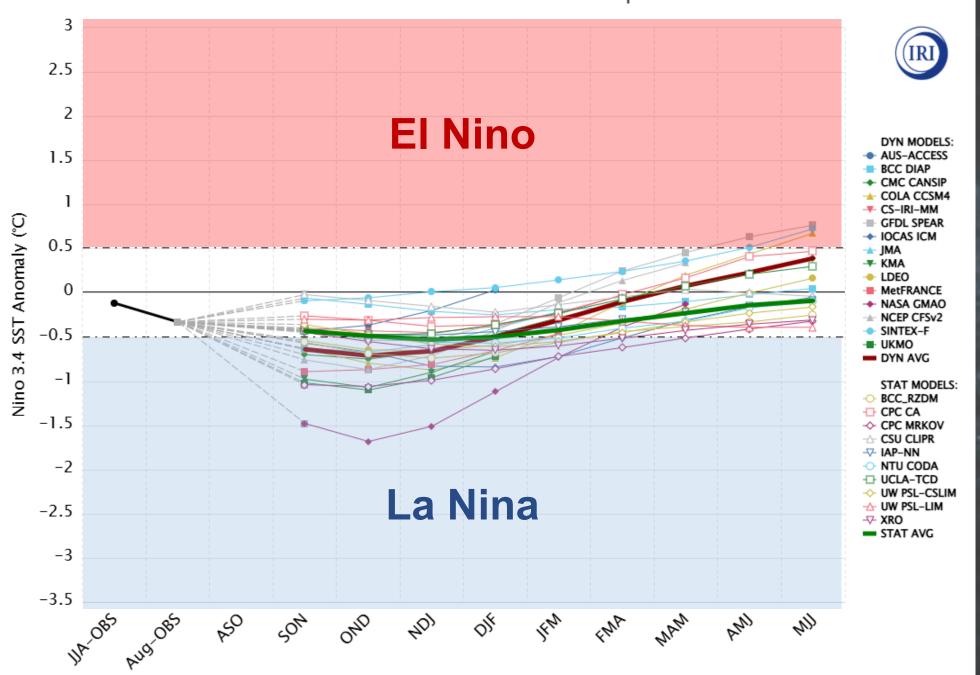
La Niña, the counterpart to El Niño, is a cooling of the waters across the same region. It often lasts longer than El Niño, sometimes persisting or recurring for two or more years.



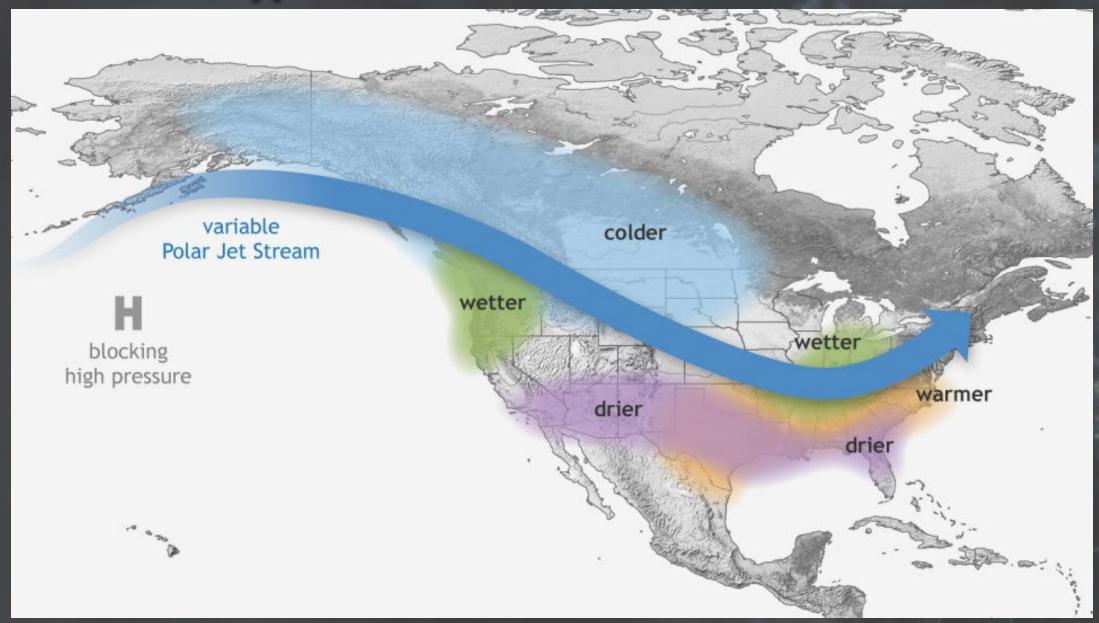
Persistent Cooler Than Normal Waters in the Equatorial Pacific (La Niña)



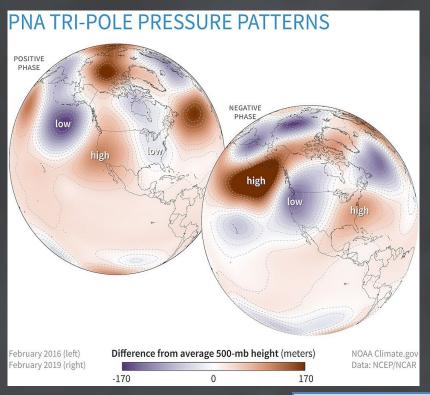
Model Predictions of ENSO from Sep 2025

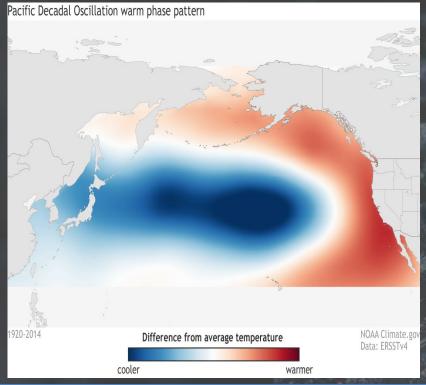


"Typical" La Nina Winter Pattern



A Lot More Than ENSO...

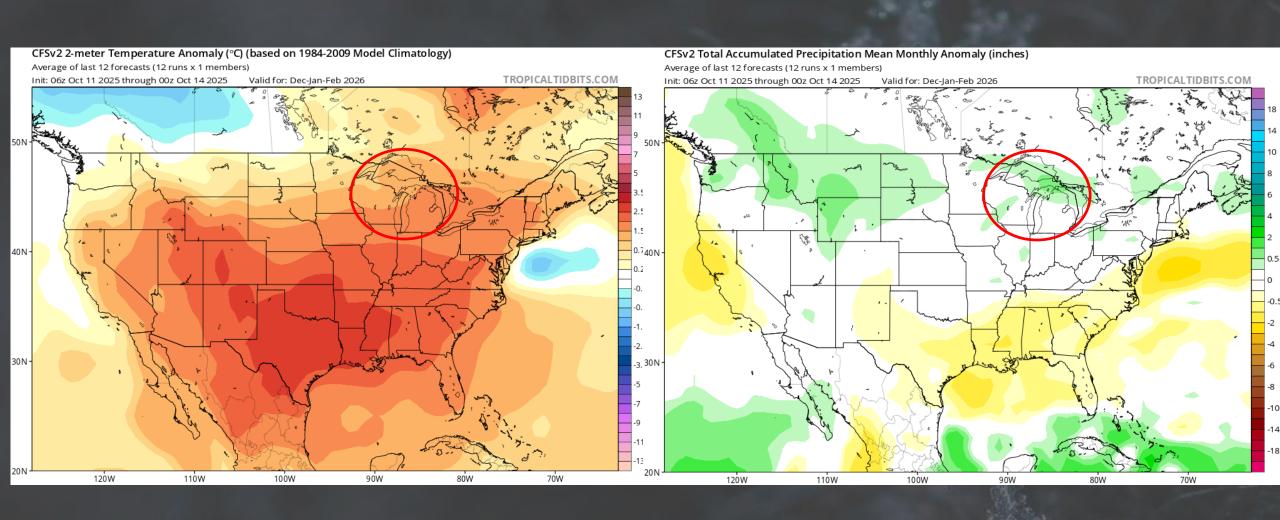






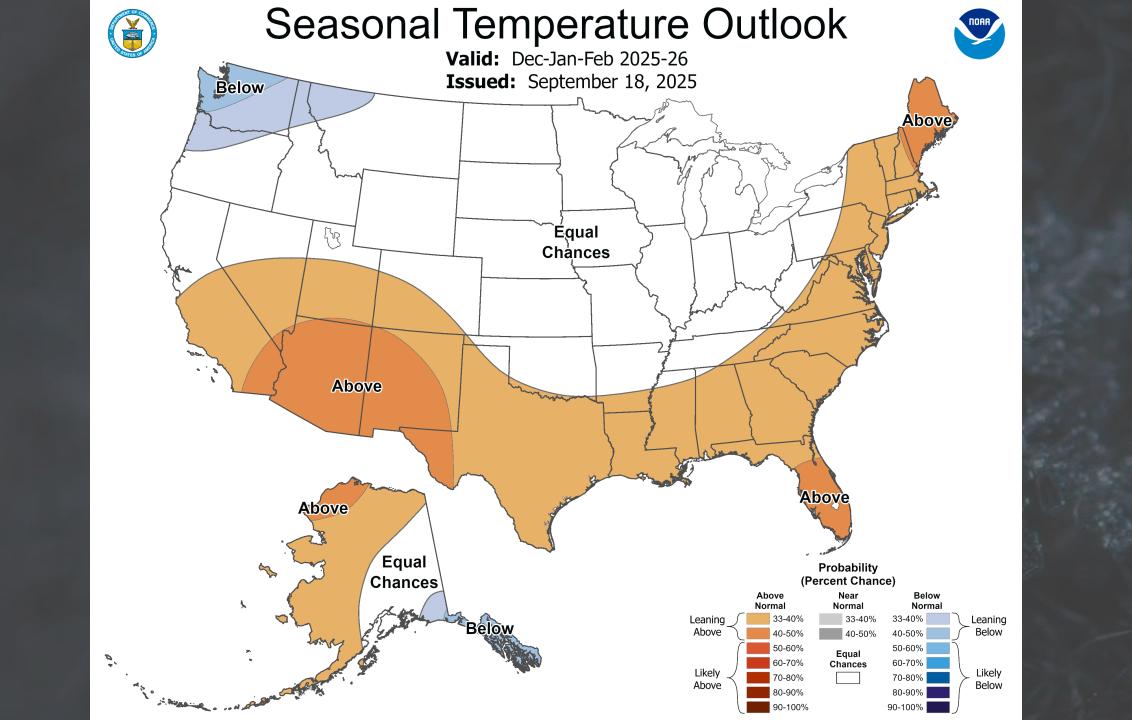
- Teleconnections (weekly time scales)
- Madden Julian Oscillation
- Different regional oceanic temperatures
- Volcanic Eruptions
- Etc, etc, etc

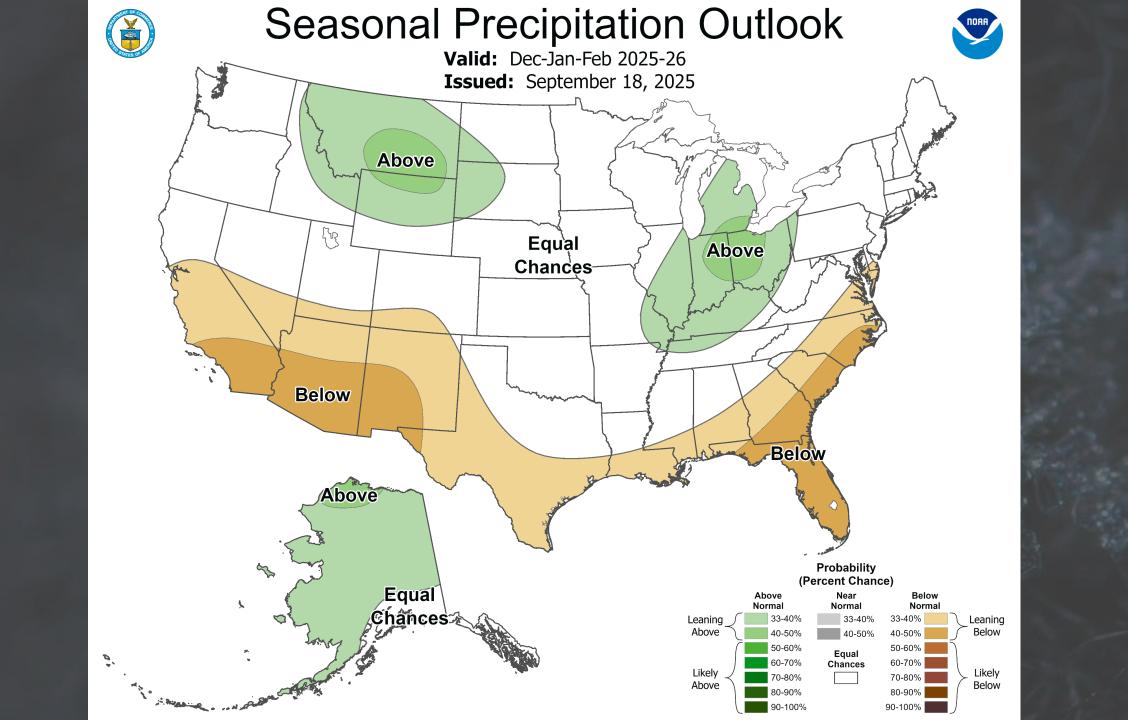
Climate Models



What Might Winter 2025-2026 Look Like?

- Temperatures generally near average overall
- Precipitation favoring near to wetter than normal
- Odds are that a La Niña pattern (cooler than normal water in the equatorial Pacific) will be in place through the winter
- Periods of colder than normal and thus snowy conditions at times (more normal lake effect snow)
 - Very rare for an entire season to be warm, or cold & snowy
- Winter Outlooks are often based on El Niño/La Niña cycle, but many other less predictable patterns impact seasonal weather like mentioned





Questions or want more information?

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