



National Weather Service

2025 Winter Partners Webinar

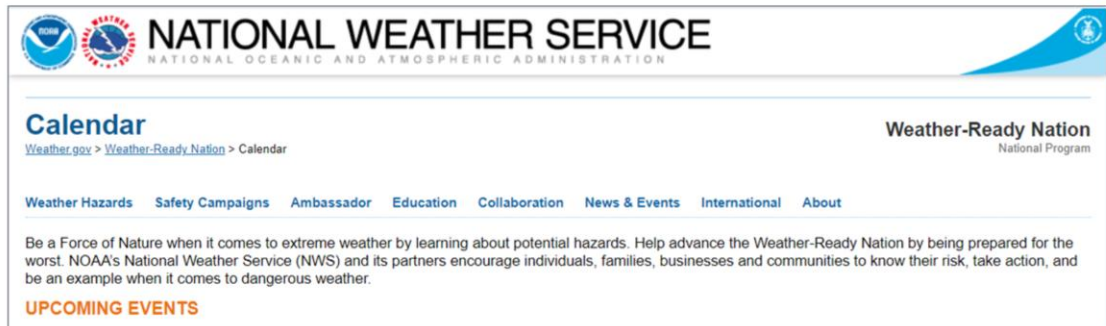
Eric Guillot, Winter Weather Program Lead, NWS Headquarters
Michael Muccilli, Winter Weather Program Coordinator, NWS Headquarters
Jon Gottschalck, Operational Prediction Branch Chief, Climate Prediction Center



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

Presentation Will Be Available!

- Presentation PDF and Recording will be made available!
- Publicly posted at our Weather Ready Nation calendar page:
- <https://www.weather.gov/wrn/calendar>



The screenshot shows the top section of the National Weather Service (NWS) website. At the top left are the NOAA and NWS logos. The main header reads "NATIONAL WEATHER SERVICE" with "NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION" below it. On the right is the "Weather-Ready Nation National Program" logo. Below the header is a "Calendar" section with a breadcrumb trail: "Weather.gov > Weather-Ready Nation > Calendar". A navigation bar includes links for "Weather Hazards", "Safety Campaigns", "Ambassador", "Education", "Collaboration", "News & Events", "International", and "About". A paragraph of text encourages being a "Force of Nature" by learning about potential hazards. Below this is a section titled "UPCOMING EVENTS".

Webinar Outline

- Winter Season Outlook
- Winter Program Overview
- Operational Products
- Experimental Products
- Outreach Materials and Initiatives



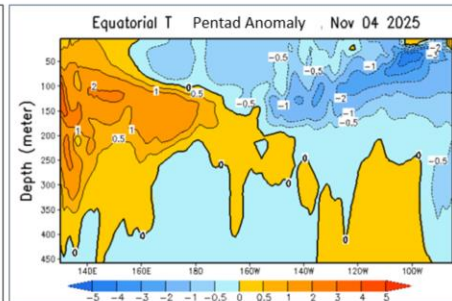
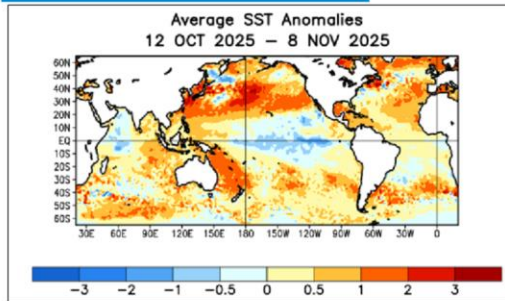


NOAA Winter Season Outlook

Factors Influencing the NOAA Winter Outlook

- Expectations of La Nina conditions during the winter months
 - ENSO-neutral, weak La Nina and combined winter season composites
 - Statistical forecast tools linked to past, current and future values of Nino3.4 region
- Influence of North Pacific above-normal ocean surface temperatures and anomalous snow cover / depth across the northern hemisphere
- Stratosphere current conditions and Quasi Biennial Oscillation (QBO) phase
- Both positive and negative long-term temperature trends
- Dynamical model guidance from the North American Multi-Model Ensemble (NMME) and Copernicus ensemble prediction systems

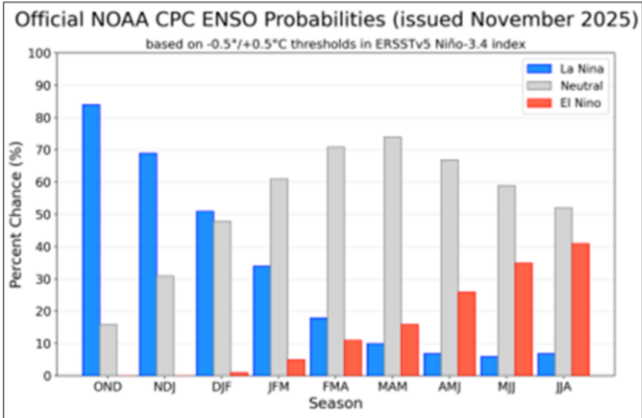
Seasonal Conditions – Pacific Ocean



ENSO Alert System Status: **La Nina Advisory**

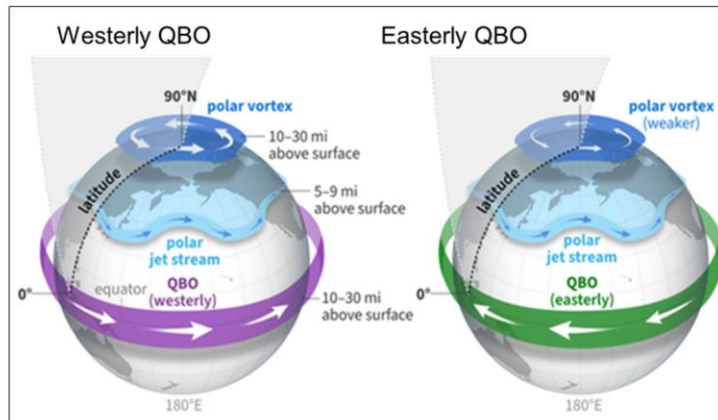
- La Niña conditions are present and favored to persist through December 2025 - February 2026
- Equatorial Pacific sea surface temperatures (SSTs) are below-normal in the central and eastern Pacific (left)
- Oceanic heat content (right) indicates a reservoir of colder than normal ocean water below the surface (blue shades) across the east-central Pacific ocean
- Large area of above-normal SSTs present in the north Pacific.

ENSO Outlook



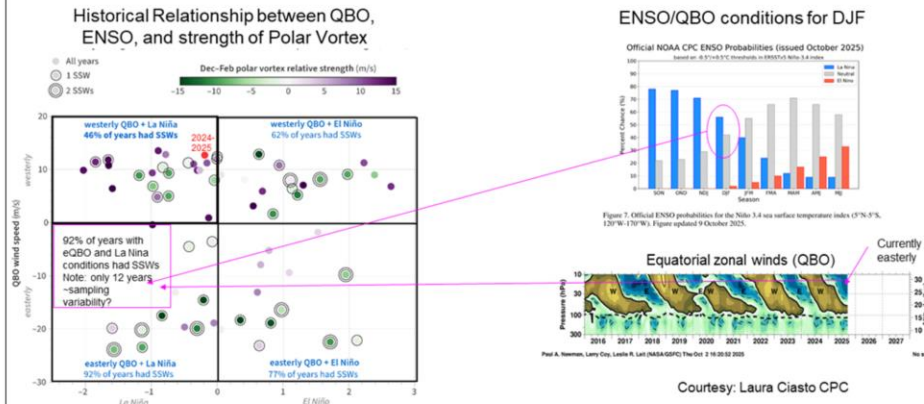
- La Nina is favored to continue through the winter season Dec-Jan-Feb (DJF) 2025-2026, but fade thereafter
- The odds favor a transition to ENSO neutral (gray bars) by late winter and early Spring 2026

Other Factors - Stratospheric Polar Vortex

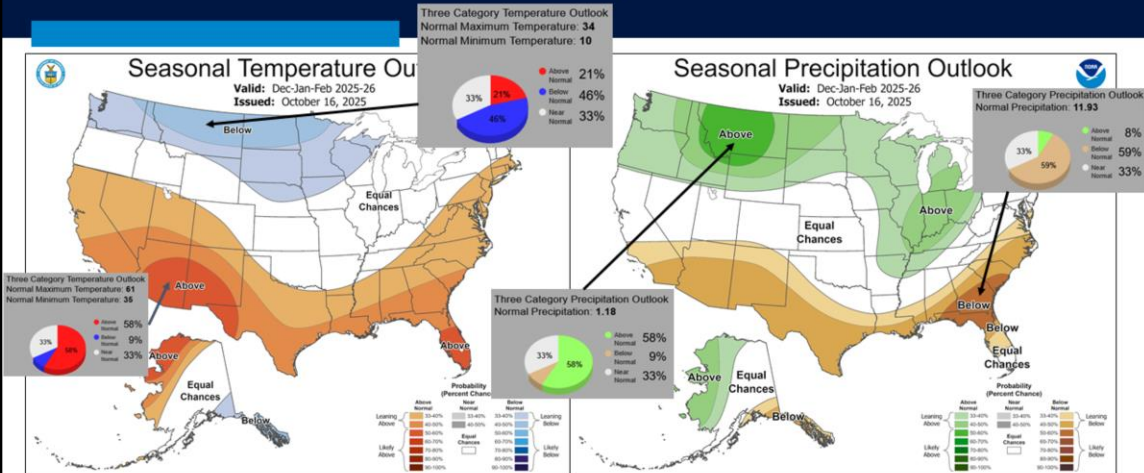


Other Factors - Stratospheric Polar Vortex

Role of QBO and ENSO on likelihood of SSWs



Dec-Jan-Feb T/P Outlooks

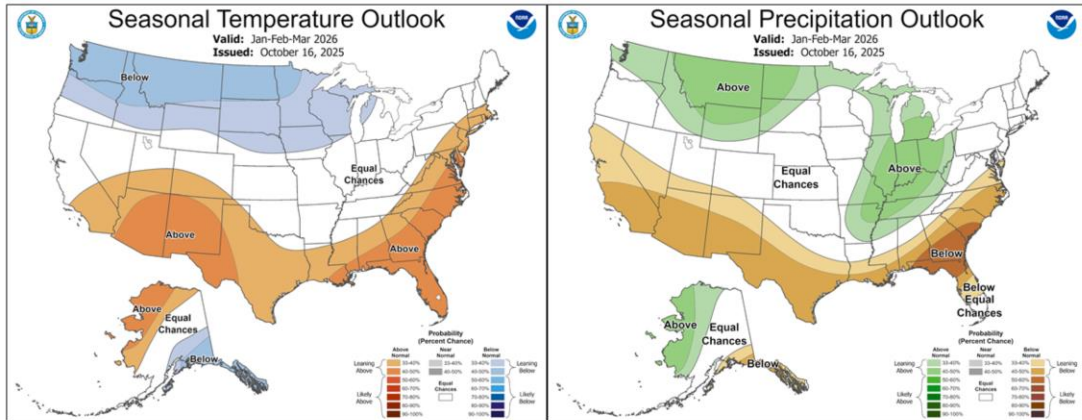


To be updated at 8:30 AM November 20, 2025

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/

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Jan-Feb-Mar T/P Outlooks

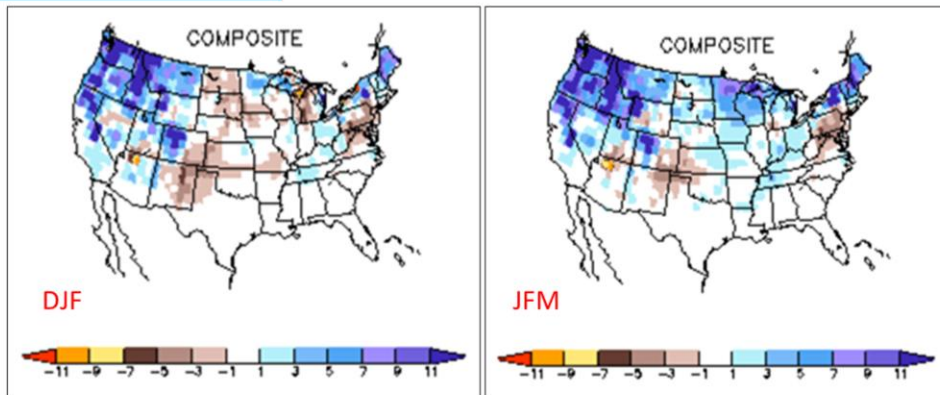


To be updated at 8:30 AM November 20, 2025

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/

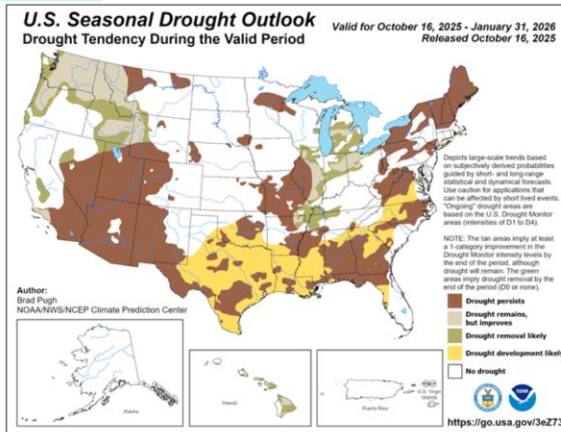
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La Nina Potential Typical Impacts - Snowfall



- Dec-Jan-Feb (DJF) seasonal snowfall departures from normal for La Nina events (left)
- Jan-Feb-Mar (JFM) seasonal snowfall departures from normal for La Nina events (right)

Nov-Dec-Jan Drought Outlook



To be updated at 8:30 AM November 20, 2025

https://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.png

Department of Commerce | National Oceanic and Atmospheric Administration | weather.gov

Take Home Messages

- La Niña conditions have developed in the Pacific Ocean and a La Niña advisory is in effect.
- Although expectations are for a short duration event, La Niña is still anticipated to result in impacts during the 2025-2026 winter season. The coverage and intensity of typical La Nina impacts, however, are uncertain.
- High variability and frequent subseasonal changes likely again this winter as compared to more persistent conditions.

Take Home Messages (cont.)

- Above-normal temperatures are favored for northwest Alaska, California, the central Great Basin, central Rockies and Southwest eastward to the Southeast and lower mid-Atlantic.
- Colder than normal conditions are most likely for parts of the Pacific Northwest, northern Rockies eastward to the upper Midwest and for southeast Alaska.
- Drier-than-normal conditions are favored for the southern tier of the U.S. with enhanced precipitation most likely for much of the northern CONUS, Ohio Valley and western Alaska.
- Drought development is possible for areas in the southern Plains and Southeast with some improvement in the Ohio Valley and Pacific Northwest.



NWS Winter Program Overview

How Does NWS Forecast Winter Weather?



Weather Forecast Offices (WFOs)

- Issue ALL winter-related Advisories, Watches, and Warnings



Weather Prediction Center (WPC)

- Specializes in bigger picture, longer-term (days) winter outlook, and impact information

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17

- There are 122 WFOs at the NWS
- Geographically distributed to provide local forecast information to the public and decision support briefings to local partners
- WPC is the primary National Center for winter weather - located in College Park, MD
- Focused on the winter weather “big picture”
- Works closely with WFOs for consistent message

What Great Forecasts and IDSS can Do!

2011 Atlanta 'Snowmageddon'



2025 Atlanta Snowstorm Success



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18

On the left is the 2011 Atlanta 'Snowmageddon' event in early January, which hit right when people were leaving work and resulted in over 1200 traffic accidents. (4.4" of snow)

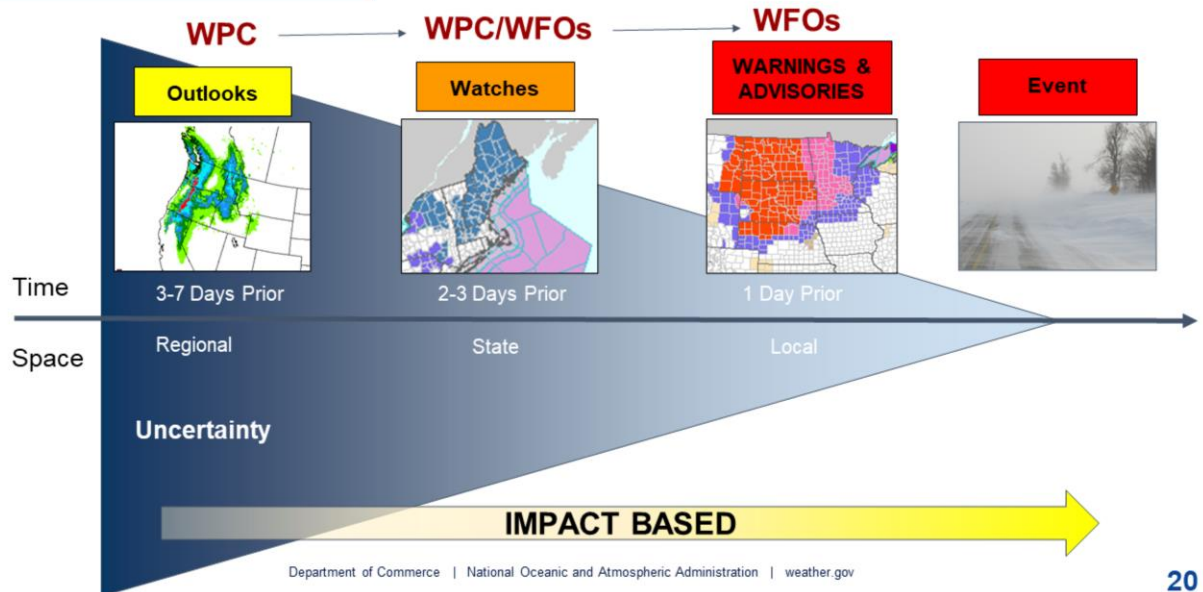
On the right is the 2025 Atlanta snowstorm also in early January, which had a lot of IDSS leading up to it, and resulted in limited impacts on the city and its people. (2.1" of snow)

We at the NWS really strive to communicate with emergency managers and local officials to ensure that the forecast is consumed by as many decision makers as possible.



Operational Winter Products

Winter Weather Product Cascade



20

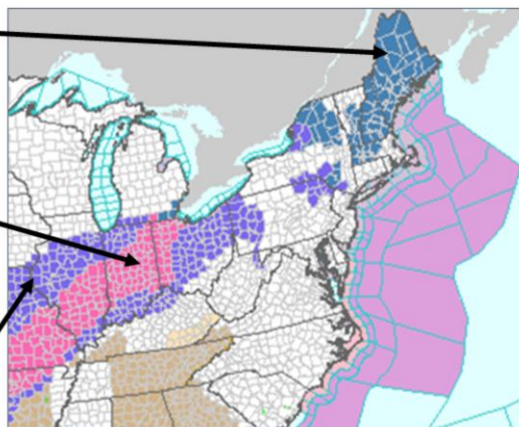
Outlooks - largely objective

Watches - mostly objective

Warning - objective base + subjective impacts

Winter Hazard Products

- **Winter Storm Watch:** Conditions favorable ($\geq 50\%$ confidence) for a winter weather event to meet or exceed locally defined criteria or cause severe impacts
- **Winter Storm Warning:** A winter weather event is expected ($\geq 80\%$ confidence) to meet or exceed locally defined criteria or cause severe impacts
- **Winter Weather Advisory:** A winter weather event is expected to cause impacts, but will not exceed warning criteria or reach high enough severity levels to warrant a warning



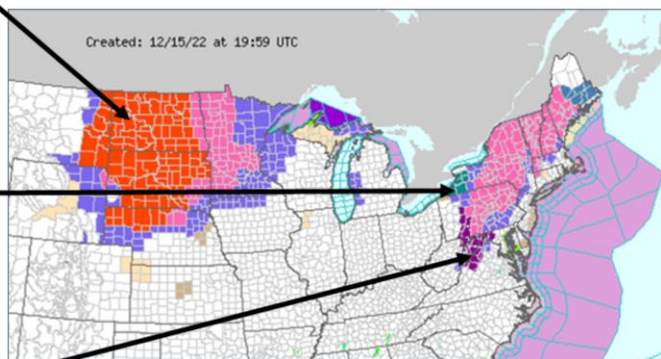
Example Hazard Map

Snow Criteria Map: weather.gov/snow-criteria

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Winter Hazard Products

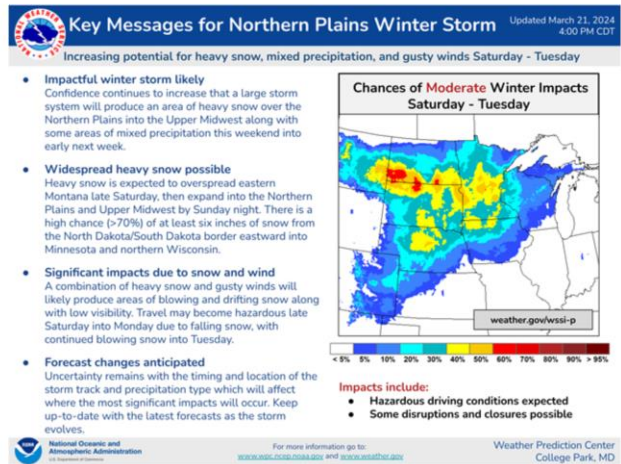
- **Blizzard Warning:** Sustained or frequent wind gusts ≥ 35 mph and visibility $\leq \frac{1}{4}$ mile in snow or blowing snow is expected ($\geq 80\%$ confidence) to last for ≥ 3 hours
- **Lake Effect Snow Warning:** Lake Effect Snow is expected ($\geq 80\%$ confidence) to meet or exceed locally defined warning criteria or cause severe impacts. *Used in the Northeast US only*
- **Ice Storm Warning:** Ice accumulation is expected ($\geq 80\%$ confidence) to meet or exceed locally defined ice amount criteria or cause severe impacts



Example Hazard Map

Winter Key Messages

- **Goal:** Galvanize partners and the media around a consistent, coordinated message
- Used for high-impact storms that are expected to cause travel disruptions or pose a hazard to life and property and/or are rare events



Available here:

https://www.wpc.ncep.noaa.gov/key_messages/LatestKeyMessage_1.png
https://www.wpc.ncep.noaa.gov/key_messages/LatestKeyMessage_2.png

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23

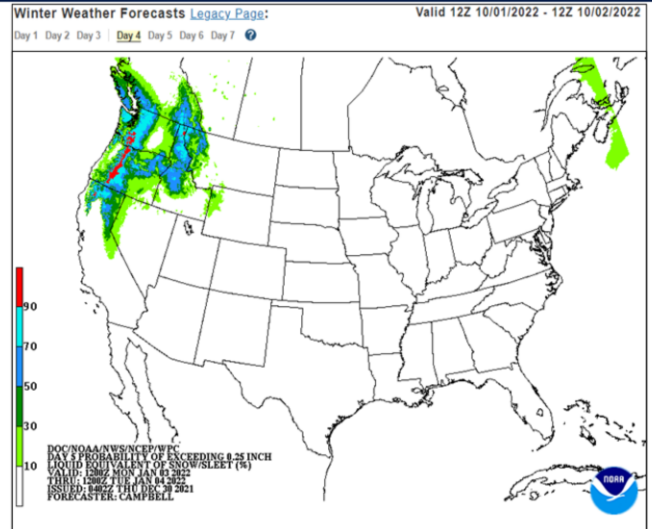
- Collaborated among WFOs & WPC and integrated for consistent messaging
- Available on WPC website and across Social Media platforms (if active)

Days 4-7 Winter Weather Outlook

- **Goal:** Support advanced planning of hazardous winter weather for both internal NWS and external partners
- Depicts the probability of winter precipitation exceeding 0.25 inches of water equivalent over a 24-hour period

Winter Weather Outlook Page:

https://www.wpc.ncep.noaa.gov/wwd/pwpf_d47/pwpf_medr.php



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24

- Four separate graphics produced twice daily showing the forecast for Days 4, 5, 6 and 7

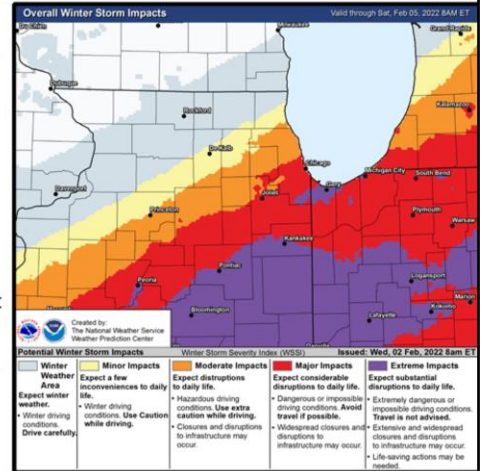
Winter Storm Severity Index (WSSI)



- **Goal:** Forecast the **severity** of community impacts from winter storms throughout the contiguous United States, including tree damage, property damage, transportation impacts, and disruptions to daily life

2025 updates:

- Updated tree type and land cover datasets
- Wind factor in "Snow Load" and "Ice Accumulation" components
- Population density and average traffic count information included
- "Ground Blizzard" component combined with "Blowing Snow" component
- "Blowing Snow" now accounts for duration-based impacts
- Preceding 12-hour precipitation accumulations now included in "Snow Amount" and "Ice Accumulation" components
- Removal of the "Flash Freeze" Component



Available here: www.weather.gov/wssi

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25

- The WSSI provides output for Days 1-3 (and also in 24 hour intervals)
- The WSSI is updated every two hours and incorporates the local snowfall forecast into its output

WSSI Components & Scale



Snow Amount

Indicates potential impacts due to the total amount of snow or snow accumulation rate



Snow Load

Indicates potential infrastructure impacts due to the weight of snow



Ice Accumulation

Indicates potential infrastructure impacts due to combined effects and severity of ice and wind



Blowing Snow

Indicates the potential disruption due to blowing and drifting snow, either pre-existing or currently falling



Potential Winter Storm Impacts

Winter Weather Area

Expect Winter Weather.

- Winter driving conditions. **Drive carefully.**

Minor Impacts

Expect a few inconveniences to daily life.

- Winter driving conditions. **Use caution while driving.**

Moderate Impacts

Expect disruptions to daily life.

- Hazardous driving conditions. **Use extra caution while driving.**
- Closures and disruptions to infrastructure may occur.

Major Impacts

Expect considerable disruptions to daily life.

- Dangerous or impossible driving conditions. **Avoid travel if possible.**
- Widespread closures and disruptions to infrastructure may occur.

Extreme Impacts

Expect substantial disruptions to daily life.

- Extremely dangerous or impossible driving conditions. **Travel is not advised.**
- Extensive and widespread closures and disruptions to infrastructure may occur.
- Life-saving actions may be needed.

Impact definitions

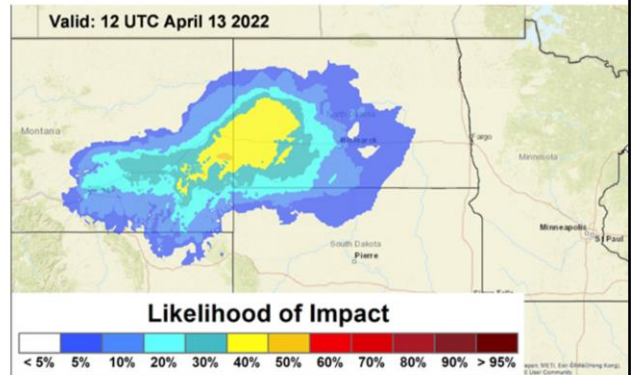
Probabilistic Winter Storm Severity Index (WSSI-P)



- **Goal:** Forecast the *probability* of reaching community impact from winter storms throughout the continental United States using the WSSI impact thresholds

2025 updates:

- Updated tree type and land cover datasets
- Wind factor in "Snow Load" and "Ice Accumulation" components
- Population density and average traffic count information included
- Ground blizzard science added to the "Blowing Snow" component
- Preceding 12-hour precipitation accumulations now included in "Snow Amount" and "Ice Accumulation" components
- Deterministic WSSI is now a member of the WSSI-P ensemble for the first 78 hours of product output



High Probabilities of Minor provide an envelope of expected impacts

Available here:

<https://www.weather.gov/wssi-p>

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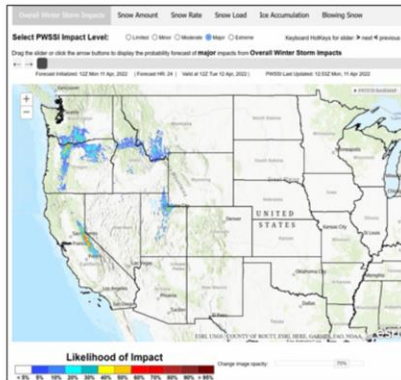
27

- The WSSI-P provides output for Days 1-7 in six hour intervals and is updated four times a day

Example of WSSI-P Impact Probabilities for a Winter Storm



Moderate



Major



Extreme

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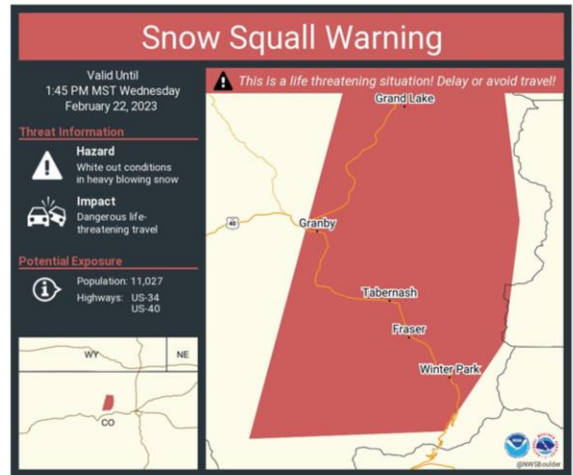
28

- High Probabilities of **Moderate** show where there is likely to be disruptions to daily life
- High Probabilities of **Major or Extreme** depict where the most severe impacts are likeliest to occur

Snow Squall Warnings and IBW Tags

- **Goal:** issued for intense, but brief, heavy snow, gusty winds, and reduced visibilities
- Impact Based Warning (IBW) tags have been implemented:
 - No tag - indicates snow squall conditions are expected
 - "SIGNIFICANT" tag - an intense snow squall with a substantial threat to safe travel is expected

WEA will **ONLY** activate for high-end events with the "SIGNIFICANT" tag



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29

- Snow Squall Warnings (SQW) are issued for intense and short duration periods of heavy snowfall, gusty winds, and reduced visibilities, possibly to whiteout
- Improvements with its messaging to decision makers and to the public continues
- Impact Based Warning (IBW) tags have been implemented to better convey a snow squall's impact:
 - No tag (General SQW) indicates snow squall conditions are expected, however mitigating actions & societal factors will reduce threat to safe travel (i.e. overnight)
 - A "SIGNIFICANT" tag indicates an intense snow squall with a substantial threat to safe travel is expected (will trigger a Wireless Emergency Alert (WEA))



Experimental Winter Products

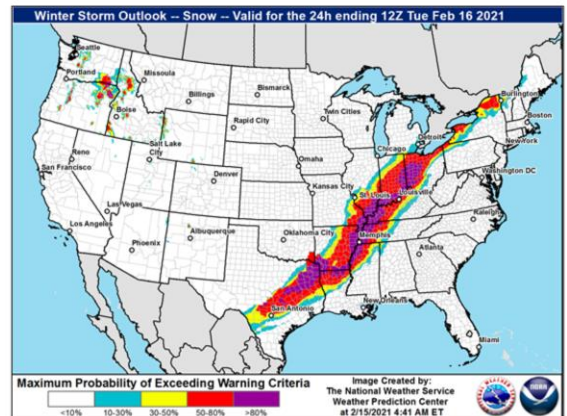
Experimental Winter Storm Outlook (WSO)



- **Goal:** Display the probability of realizing hazardous snow/ice accumulations using WFO-specific Watch/Warning criteria as a proxy threshold

2025 Update:

No changes this year



Available here:

<https://www.wpc.ncep.noaa.gov/wwd/wso>

Snowfall Criteria:

weather.gov/snow-criteria

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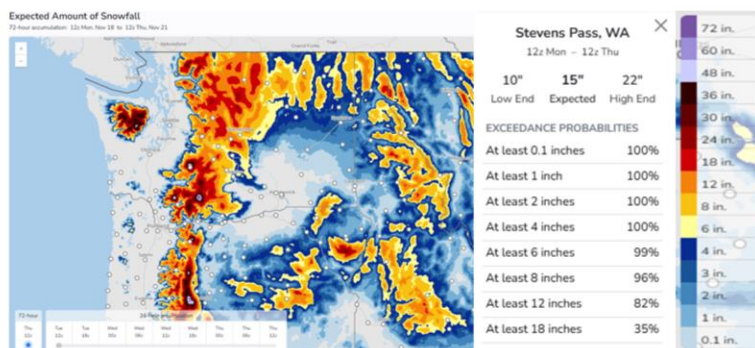
31

- Provides a Days 1-4 “Outlook” product in the winter product suite, serving to unify both external messaging and internal collaboration for consistent and collaborative Winter Storm Watch issuance
- The WSO uses the event-based heavy snow watch/warning criteria as part of the evaluation (see: weather.gov/snow-criteria)

Experimental Probabilistic Precipitation Portal



- **Goal:** A website to view probabilistic snow, ice, and liquid precipitation CONUS forecasts for 72 hours



2025 Updates:

- Addition of probabilistic ice
- Underlying dataset shifts to the National Blend of Models (NBM)

Links/Outreach: <https://www.weather.gov/prob-snow/>

PPP Available here:

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

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32

- Probabilities generated:
 - Expected Amount - the official forecast amount of snow
 - Low End (Best Case) Amount - 90% chance of receiving at least xx inches of snow
 - High End (Worst Case) Amount - 10% chance of receiving at least xx inches snow
 - Exceedance Probabilities - chances of receiving at least 0.1, 1, 2, 4, 6, 8, 12, and 18 inches of snow

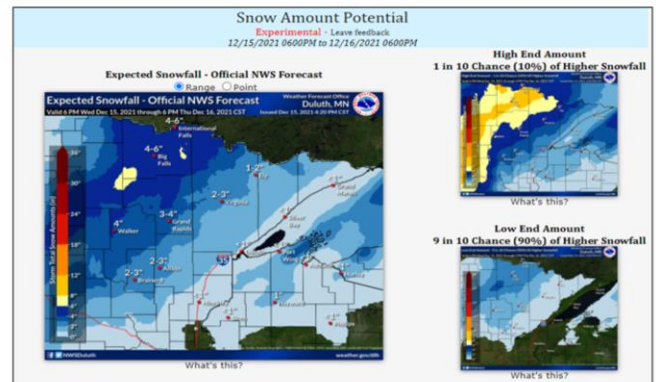
Experimental Probabilistic Winter Web Pages



- **Goal:** Provide customers and partners a range of snowfall amounts to better communicate forecast uncertainty during winter weather events on a local level

2025 Updates:

- Available for all CONUS locations for the first time
- Probabilistic ice now available



Local office Experimental pages:

<https://www.weather.gov/prob-snow/>

- This provides the same information as the PPP, but at a more localized level for WFOs and local partners
- Each WFO displays these products on their local winter web pages

Experimental Snow Character Maps



- **Goal:** Display the consistency of snow (dry/fluffy or heavy/wet) to better inform partners and the public regarding potential hazardous impacts

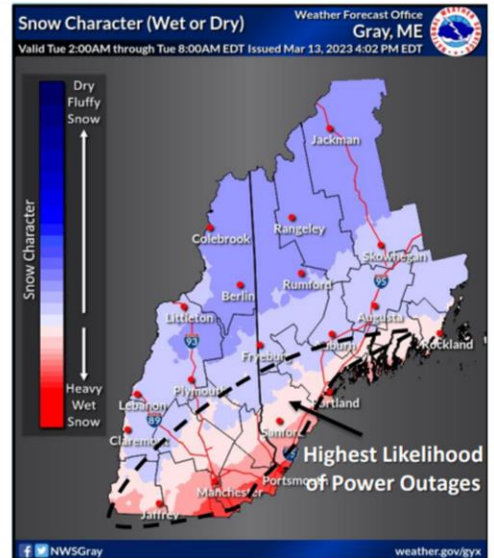
2025 Update:

- More WFOs continue to bring these maps online on their local winter web pages

Available here:

<https://digital.weather.gov>

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- These graphics are able to be made for the Lower 48 states and also Alaska. The underlying data can be accessed through the National Digital Forecast Database (NDFD) under “Snow-to-Liquid Ratio”

Avalanche Weather

Avalanche Weather Guidance:

- **Goal:** Provides partners & public with weather forecasts for prediction of avalanche conditions, risk, mitigation, & recovery

...Mount St. Helens...

Date	Friday 09/23										Saturday 09/24				
Time (LT)	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00
	6a	9a	12	3p	6p	9p	12	3a	6a	9a	12	3p	6p	9p	12
Cloud Cover	SC	PI	SC	SC	SC	SC	SC	SC	PI	SC	SC	SC	SC	SC	SC
Cloud Cover (%)	40	15	30	30	40	40	35	30	25	30	30	30	30	30	30
Temperature	40	44	49	51	49	45	45	44	44	49	55	57			
Max/Min Temp					51				44						
Wind Dir	W	NW	W	W	NW	W	NW	NW	NW	NW	S	SW			
Wind (mph)	8	4	4	6	5	5	8	8	5	2	3	4			
Wind Gust (mph)	20			16			19	17							
Precip Prob (%)	10	5	10	10	10	10	10	10	10	5	5	0			
Precip Type															
12 Hour QPF															
12 Hour Snow															
Low End Snow															
High End Snow															
12 Hour Ice															
Snow Level (kft)	8.5	8.5	9.5	10.0	10.0	10.0	10.0	10.0	9.6	10.5	11.0	11.0			



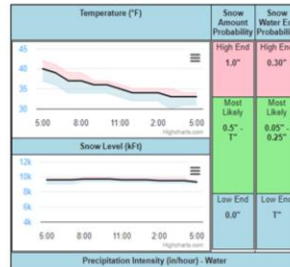
Offices that provide avalanche weather services in Yellow.

Experimental Avalanche Weather Web Pages:

- **Goal:** Information for partners & public to obtain avalanche weather products & information

Available here:

www.weather.gov/wrh/AvalancheWeather



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35

- Includes: NWS weather alerts, avalanche center avalanche alerts, relevant weather discussion, precipitation summary tables, and tabular, graphical, and probabilistic forecasts



Outreach Material

NWS Winter Safety Content



- NWS Winter Safety Graphics:
 - <https://www.weather.gov/safety/cold-winter-hazards>
 - <https://www.weather.gov/safety/winter>
- The Great Outdoors: Feature on weather safety while recreating outdoors
 - <https://www.noaa.gov/explainers/great-outdoors-weather-safety>



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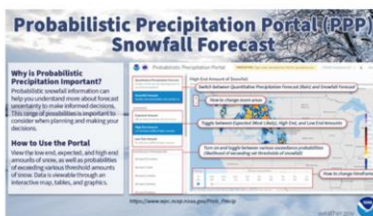
37

- Contains content on winter hazards, including infographics, social media plans, presentations and videos
- Encourage partners to use and share this information

NWS Educational/Outreach Materials



- Probabilistic Winter Precipitation Resources:
<https://www.weather.gov/prob-snow>
- Snow Squall Warning Resources:
<https://www.weather.gov/media/safety/Snow-Squall-IBW.pdf>
- Winter Storm Severity Index Resources:
www.weather.gov/wssi
- Probabilistic Winter Storm Severity Index:
www.weather.gov/wssi-p



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Contact Information

Eric Guillot:
eric.guillot@noaa.gov

Michael Muccilli:
michael.muccilli@noaa.gov

Jon Gottschalck:
jon.gottschalck@noaa.gov

Important Links



NWS Key Messages

https://www.wpc.ncep.noaa.gov/key_messages/LatestKeyMessage_1.png
https://www.wpc.ncep.noaa.gov/key_messages/LatestKeyMessage_2.png

Days 4-7 Winter Weather Outlook

https://www.wpc.ncep.noaa.gov/wwd/pwpf_d47/pwpf_medr.php

Experimental Winter Storm Outlook

<https://www.wpc.ncep.noaa.gov/wwd/wso>

Winter Storm Severity Index

www.weather.gov/wssi

Probabilistic Winter Storm Severity Index

<https://www.weather.gov/wssi-p>

Local Probabilistic Snow

<https://www.weather.gov/prob-snow/>

Avalanche Weather

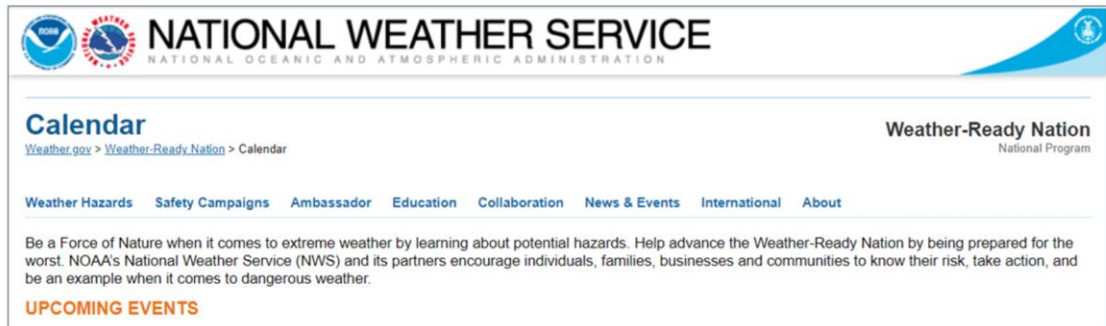
www.weather.gov/wrh/AvalancheWeather

NDFD Products:

<https://digital.weather.gov>

Presentation Will Be Available!

- Presentation PDF and Recording will be made available!
- Publicly posted at our Weather Ready Nation calendar page:
- <https://www.weather.gov/wrn/calendar>



The screenshot shows the NOAA National Weather Service website. At the top, there are logos for NOAA and the Weather-Ready Nation program, followed by the text "NATIONAL WEATHER SERVICE" and "NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION". Below this is a navigation bar with links: "Weather Hazards", "Safety Campaigns", "Ambassador", "Education", "Collaboration", "News & Events", "International", and "About". The main heading is "Calendar", with a sub-link "Weather.gov > Weather-Ready Nation > Calendar". To the right, it says "Weather-Ready Nation National Program". A paragraph of text encourages being a "Force of Nature" by learning about potential hazards. Below this, the text "UPCOMING EVENTS" is displayed in orange.