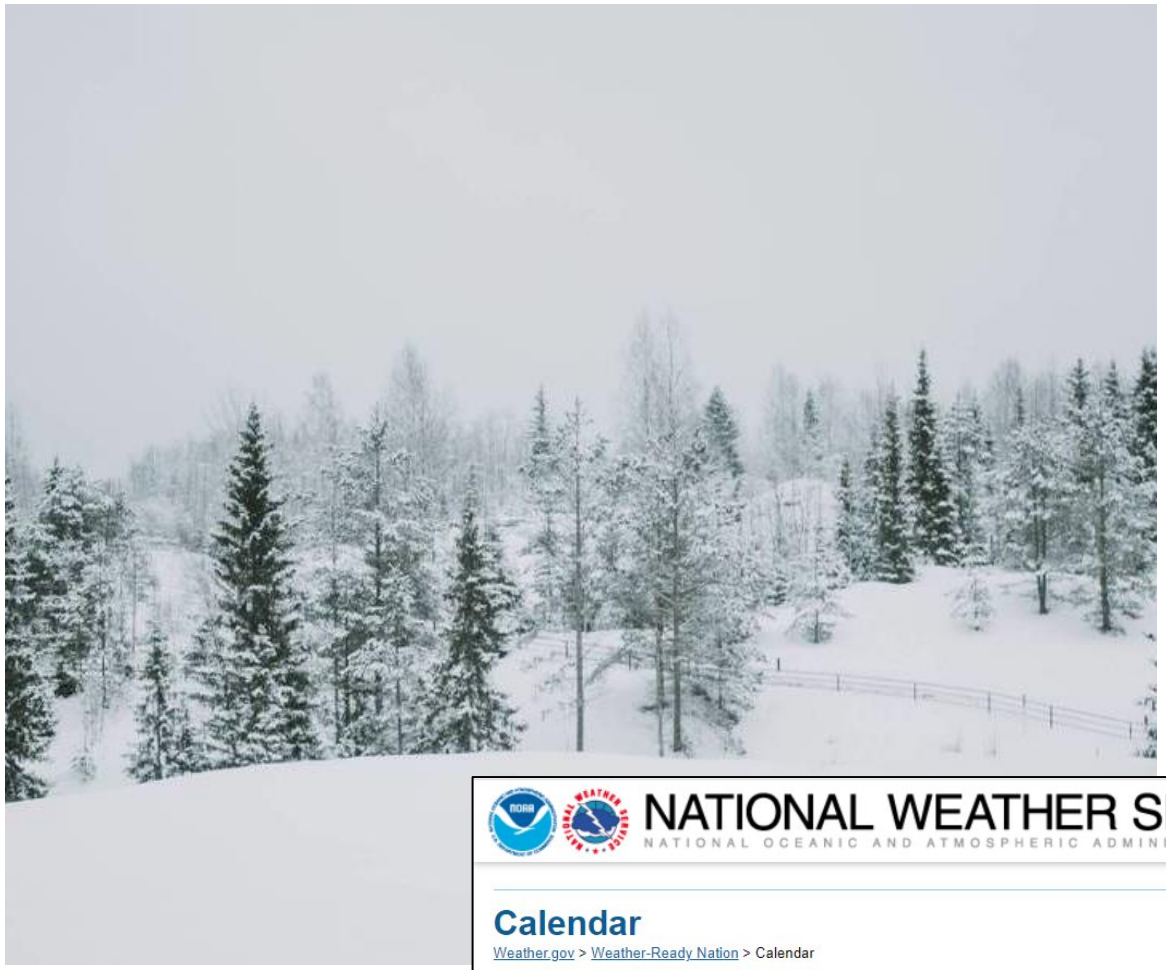
# National Weather Service Update on Winter Weather Initiatives October 19, 2023

Sarah Perfater, Michael Muccilli, Eric Guillot, Alex Lamers



# Presentation Will Be Available!

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

# Winter Program Overview

- The Winter Weather Services Program is one of 11 National Service Programs in the National Weather Service (NWS). The Winter Program works with internal and external stakeholders to facilitate improvements to winter weather products and services.
- The program goals include moving toward a consistent suite of products and services that are collaborative, probabilistic, and impact-based

**NWS HQ Staff**:

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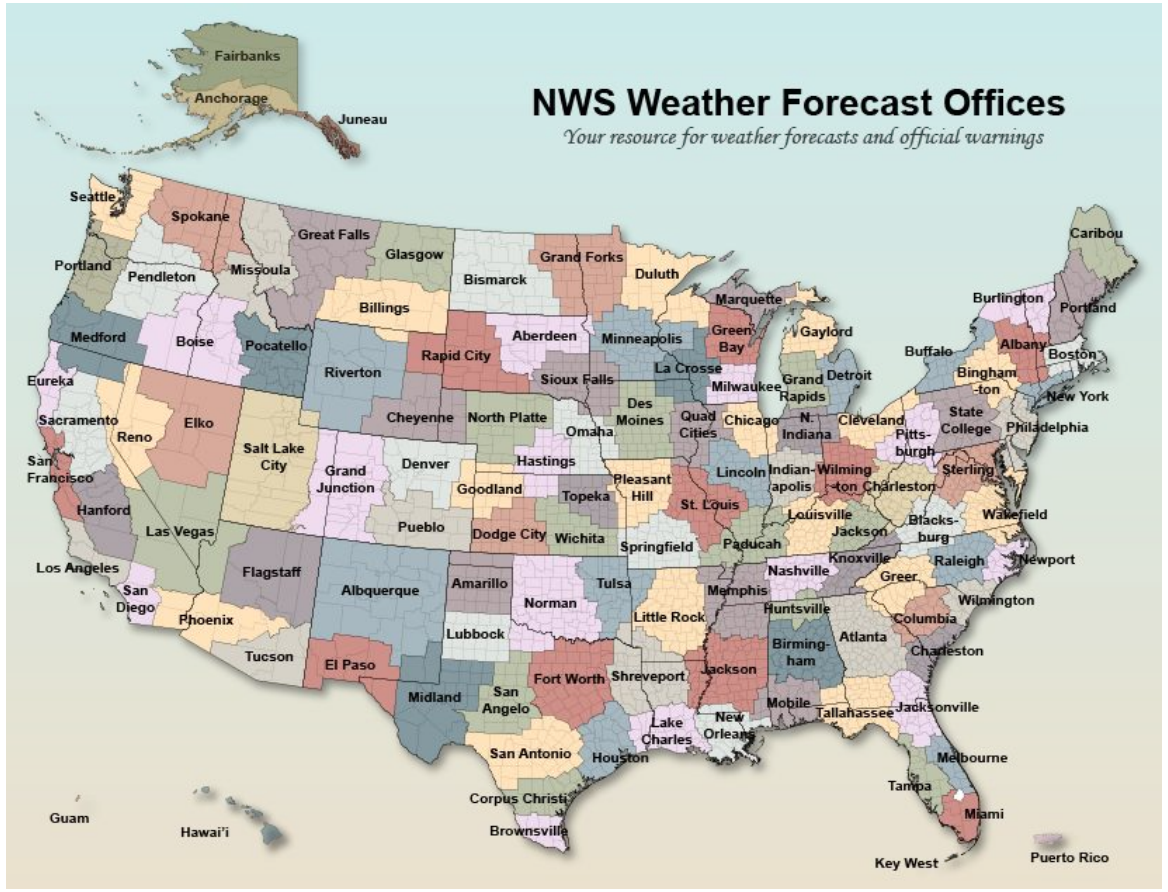
# OUTLINE

- **Winter Program and Vision Overview**
- Winter Key Messages
- **Winter Weather Outlook**
- Experimental Winter Storm Outlook
- **Modernized of Heavy Snow Watch/ Warning Criteria**
- Winter Storm Severity Index
- **Probabilistic Snow Products**
- Snow Ratio Grids
- **Impact-Based Warning tags for snow squalls & new Local Storm Reports**
- Avalanche Weather Initiative
- **Seasonal Safety Campaign**
- Updated Outreach Materials and Initiatives

# Detailed Winter Program Vision

- Building blocks to One Consistent, Collaborated, Impact-based Forecast among the National and Local Levels
- Communicating the range of possible outcomes (potential scenarios) while still leveraging single-value forecasts to support better decisions
- Engaging with partners and agency experts across the weather enterprise to continually improve the winter suite of products and services

# WEATHER FORECAST OFFICES




## Headlines & Hazards

All Official Watches, Warnings, & Advisories

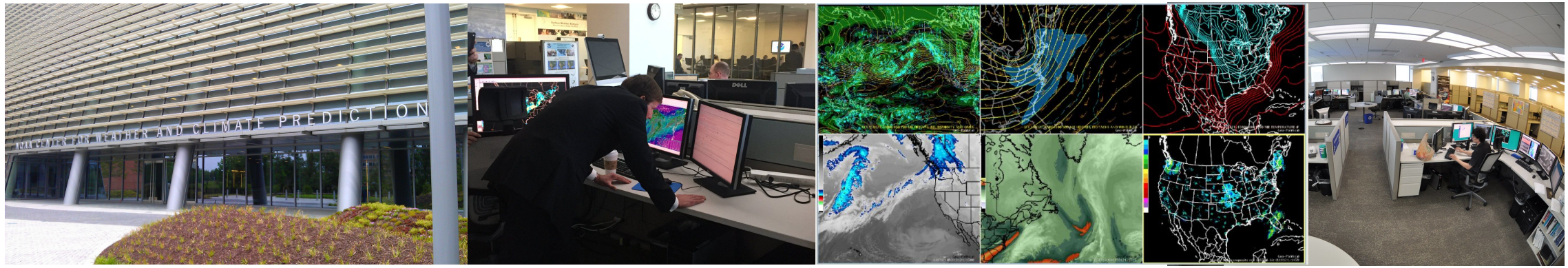
## Graphical Products

Official graphical forecasts of Snow, Ice, & Other Winter Elements

## Decision Support

On-Site Support, Briefings, Emails, & Webinars to Local Partners

# WEATHER PREDICTION CENTER




## Graphical Products

Probabilistic heavy snow/icing guidance products for Days One, Two, and Three; Winter Weather Outlook

## Text Products

Heavy snow/icing discussion (meteorological reasoning for the 24-hour probabilistic heavy snow and icing guidance)

## Decision Support

Key Messages

Support to the NWS winter weather watch/warning/ outlook programs

## Winter Storm Outlook

Hazardous snow/ice accumulations using WFO-specific Watch/Warning criteria as a proxy threshold

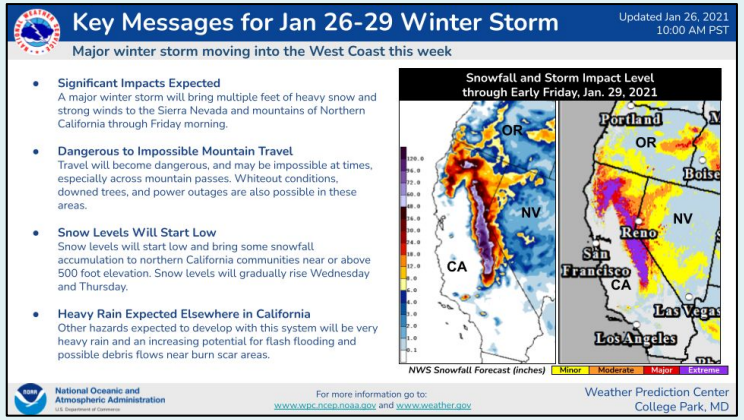
## Winter Storm Severity Index

Depicts potential severity of community impacts from winter storms

# WINTER KEY MESSAGES

***Available as a Top Story on [WPC Homepage]***

## The Concept




- Key messages will highlight the agency's most essential information for upcoming winter hazards
- Available on WPC homepage and integrated into WFO & WPC messaging

## The Purpose


- Galvanize partners and media around consistent, coordinated message
- Used for High-impact scenarios that are expected to cause travel disruptions or pose a hazard to life and property and/or rare events

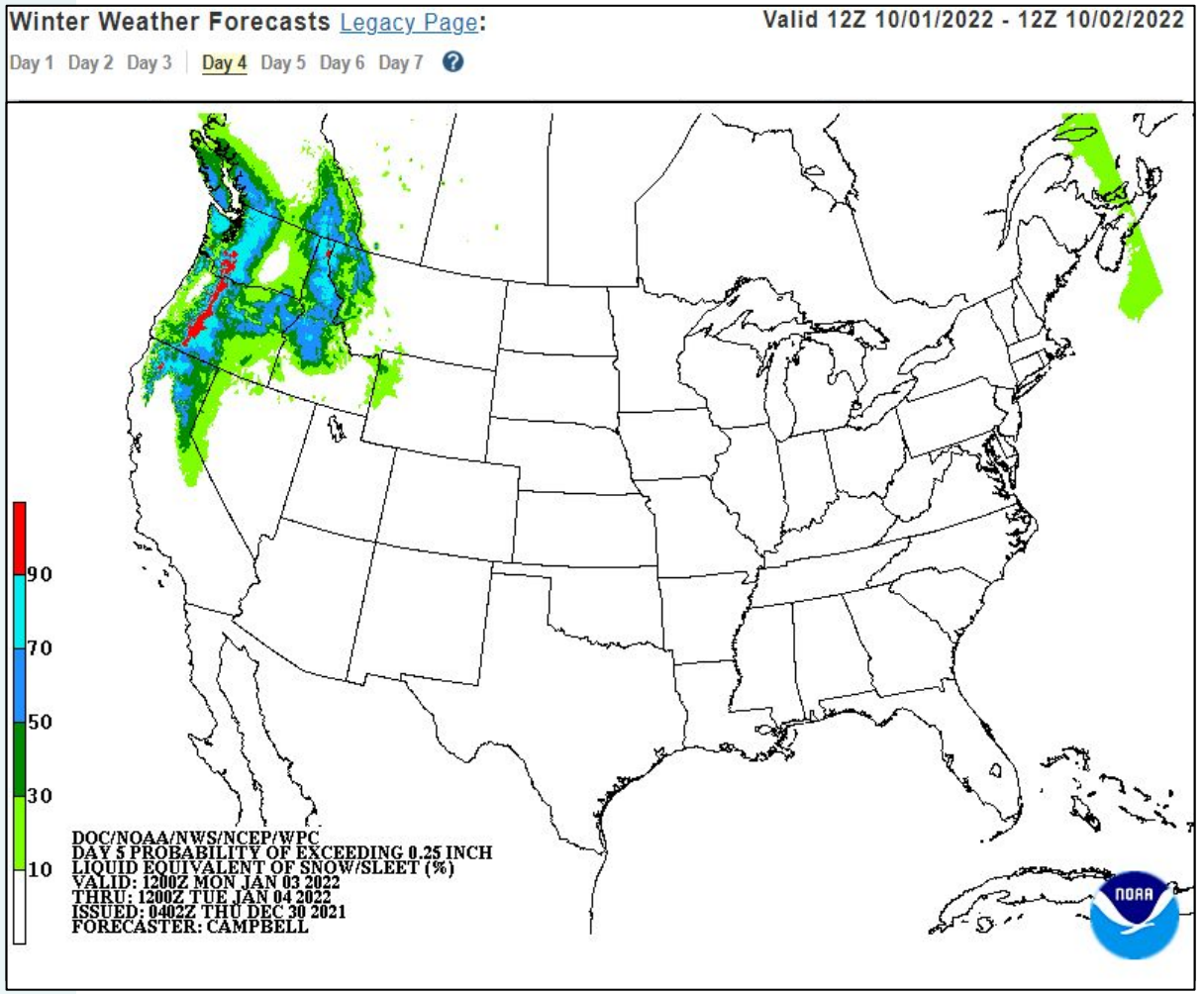
## Collaboration

| Day | Night | Description |
|---|---|---|
| 16-17Z | - | WPC creates (day shift only) |
| 17-19Z | - | Collaboration window |
| 19-20Z | 04-08Z | WPC updates and incorporates feedback |
| 20-21Z | 08-09Z | WPC issues key messages (included in QPFHSD text product) |

- Collaboration occurs among National Centers with Regional and Local Offices
- Feedback is aggregated to ensure National and Local consistency of message

# DAYS 4-7 WINTER WEATHER OUTLOOK

- **Goal:** Supports advanced planning of hazardous winter weather for both internal NWS and external partners
- Web-based, graphical, probabilistic forecast depicting the probability of winter precipitation (snow & sleet) exceeding 0.25 inches (~6 mm) water equivalent over a 24-hour period (12Z–12Z, or roughly 8 am - 8 am Eastern Time)
- Four separate graphics produced twice daily showing the forecast for Days 4, 5, 6 and 7
- Available on NDFD




**Winter Weather Outlook Page:**
https://www.wpc.ncep.noaa.gov/wwd/pwpf_d47/pwpf_medr.php

# NEW: MODERNIZED HEAVY SNOW WATCH/WARNING CRITERIA

***What is being changed?***

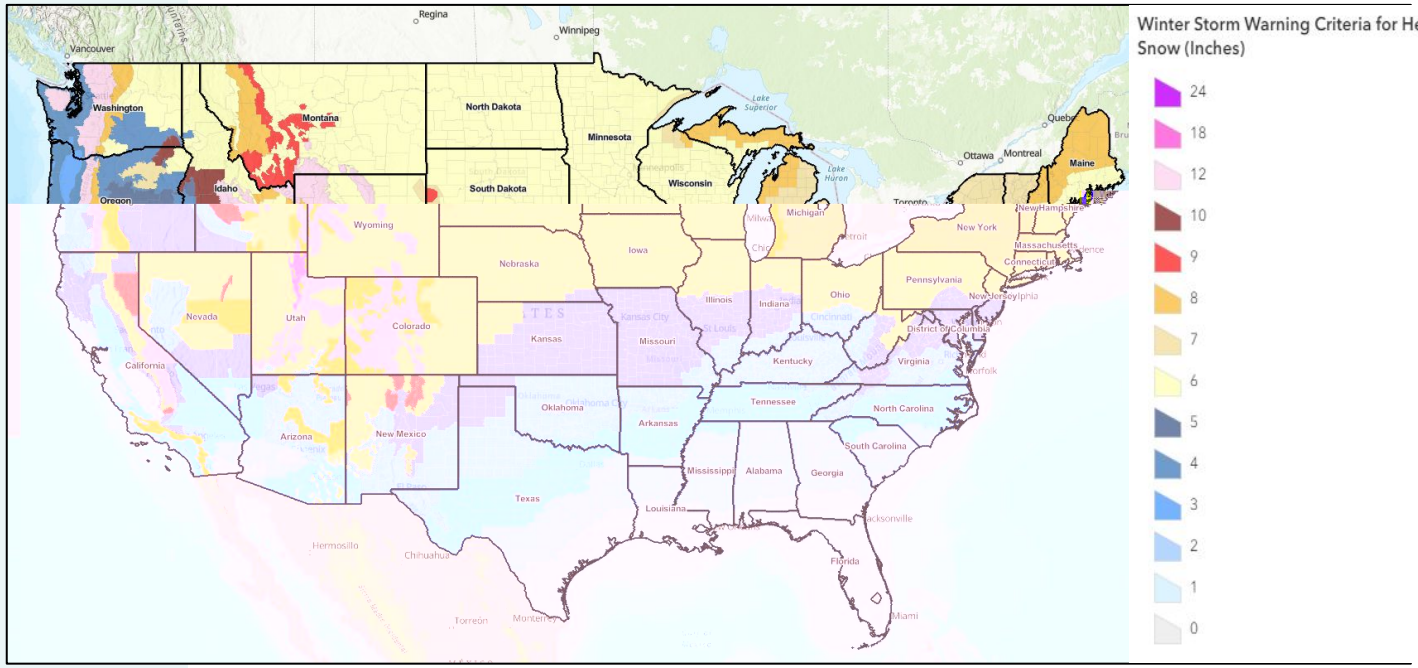
- Change from 12 and 24 hour criteria to Event-based criteria
- Removal of non-meteorological discontinuities
- New interactive platform (ArcGIS)

***Why change?***

- Improve hazard decision making, support services, collaboration, and messaging across all platforms
- Move towards issuing products on anticipated impacts
- New platform will allow for a continually-updated criteria map with greater accessibility

# NEW: MODERNIZED HEAVY SNOW WATCH/WARNING CRITERIA

- NWS teams worked internally and with external partners to establish the changes to the heavy snow winter watch/warning criteria
- Mainly resulted in only minor changes (1-2”), but removed many non-meteorological boundaries and moved toward a more science-based set of criteria!
- The criteria will be **implemented this upcoming winter**. Look for outreach materials. WFOs will continue to collect feedback from core partners!
- Will inform the Experimental Winter Storm Outlook



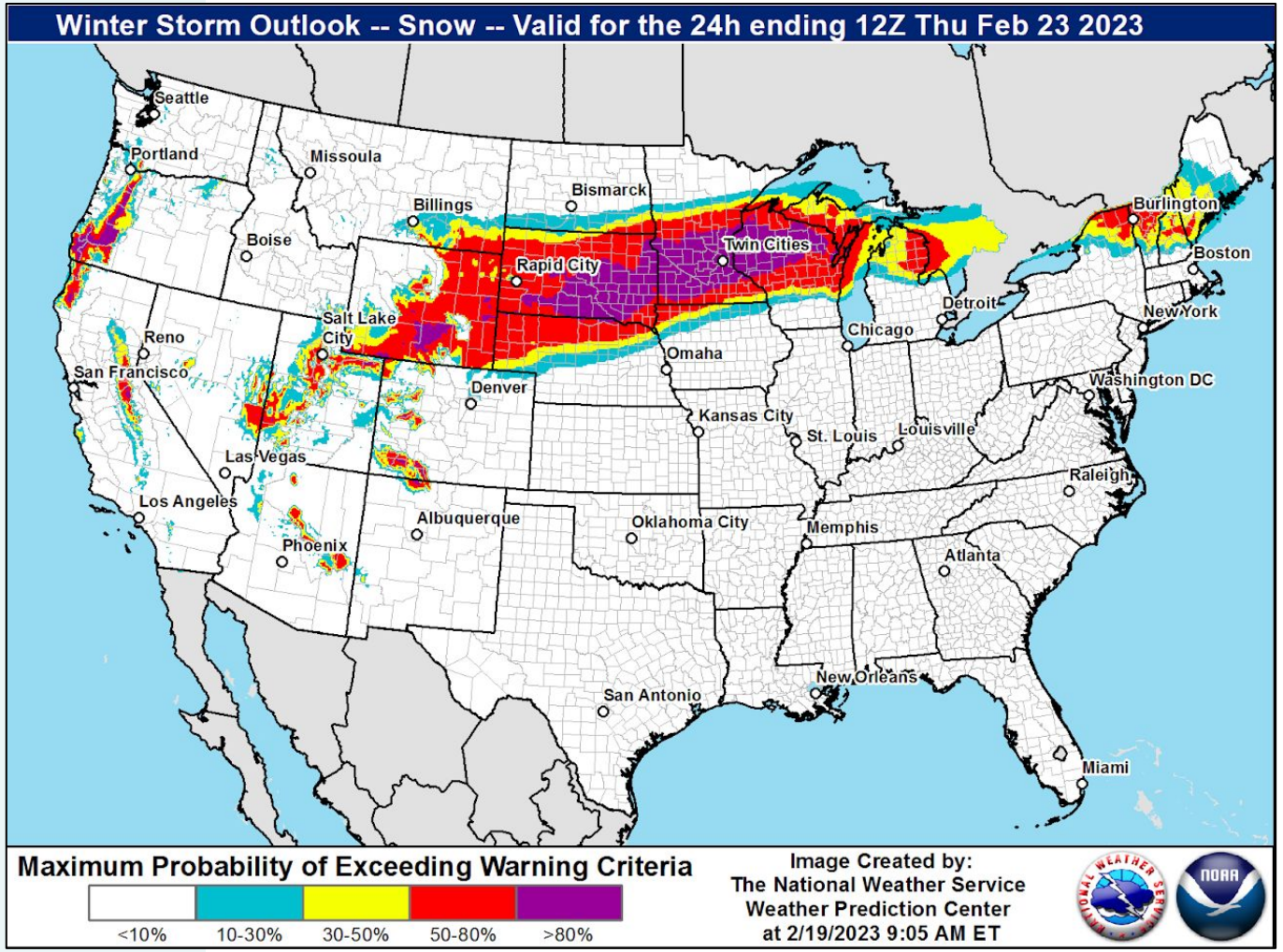

***Event-Based Heavy Snow Watch/Warning Criteria (inches)***

**GOAL: Improve consistency in Winter Storm Watch/Warning Issuance and Public Messaging**

[weather.gov/snow-criteria](weather.gov/snow-criteria)

# 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
- **New this year**: The WSO will use the newly-established, event-based heavy snow watch/warning criteria as part of the evaluation. Please provide feedback via the survey link!
- **Underway**: Physical and Social Science evaluations of the Winter Storm Outlook are underway, led by the Winter Program, to determine changes to a future product.



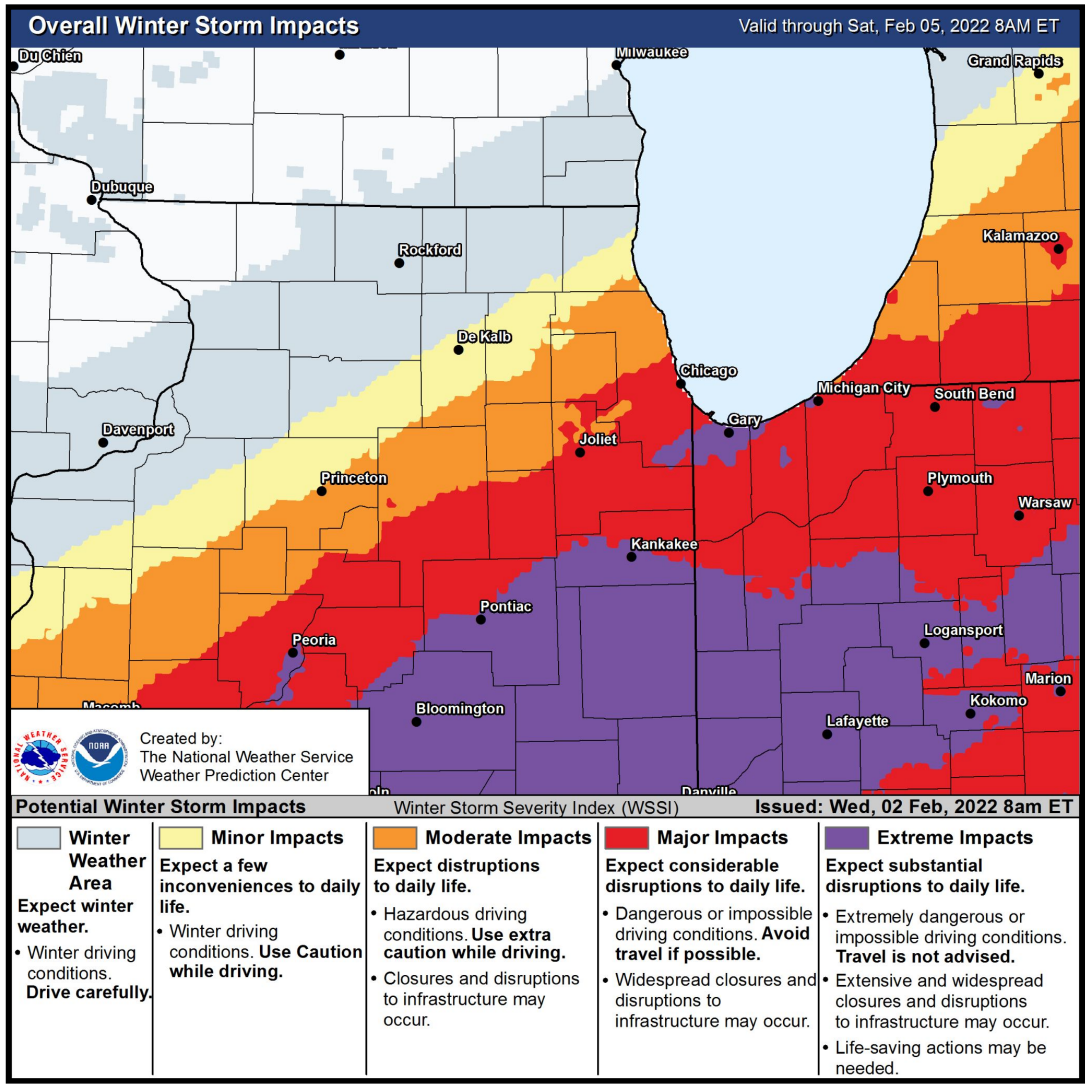

https://www.wpc.ncep.noaa.gov/wwd/wso

**Provide Feedback:**

https://www.surveymonkey.com/r/ExpWinterStormOutlook_2023-2024

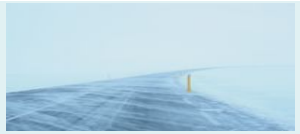
# WINTER STORM SEVERITY INDEX (WSSI)

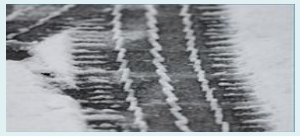
- **Goal:** Forecast the potential severity of community impacts from winter storms throughout the contiguous United States, including tree damage, property damage, transportation impacts, and disruptions to daily life
- Provides winter storm impact information out 3 days, in daily increments, includes meteorological & non-meteorological factors
- Five levels of impact provided, updated every 2 hours
- Summary graphic is a composite of the maximum impact from any of the six components




http://www.weather.gov/wssi

# WSSI - Components and Scale





**Ground Blizzard**
Indicates the potential travel-related impacts of strong winds interacting with pre-existing snow cover

**Flash Freeze**
Indicates the potential of flash freezing during or after precipitation events.

**Blowing Snow**
Indicates the potential disruption due to blowing and drifting snow

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

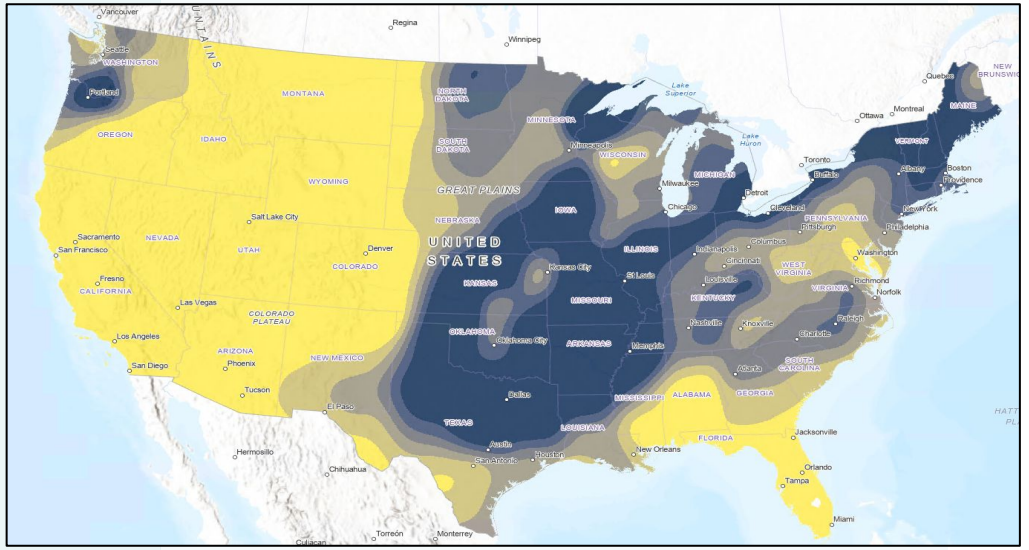
**Snow Load**
Indicates potential infrastructure impacts due to the weight of snow

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

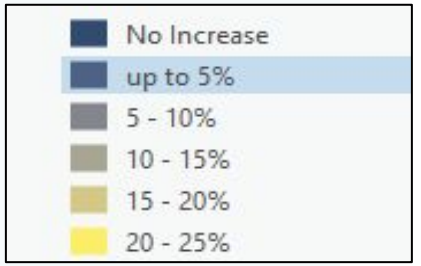
| Potential Winter Storm Impacts | |
|---|---|
| | **Winter Weather Area**<br>**Expect Winter Weather.**<br>• Winter driving conditions. **Drive carefully.** |
| | **Minor Impacts**<br>**Expect a few inconveniences to daily life.**<br>• Winter driving conditions. **Use caution while driving.** |
| | **Moderate Impacts**<br>**Expect disruptions to daily life.**<br>• Hazardous driving conditions. **Use extra caution while driving.**<br>• Closures and disruptions to infrastructure may occur. |
| | **Major Impacts**<br>**Expect considerable disruptions to daily life.**<br>• Dangerous or impossible driving conditions. **Avoid travel if possible.**<br>• Widespread closures and disruptions to infrastructure may occur. |
| | **Extreme Impacts**<br>**Expect substantial disruptions to daily life.**<br>• Extremely dangerous or impossible driving conditions. **Travel is not advised.**<br>• Extensive and widespread closures and disruptions to infrastructure may occur.<br>• Life-saving actions may be needed. |

# WSSI - UPDATES THIS YEAR

- Non Meteorological Factors
  - Enhanced datasets for
    - Snow & ice load and regional hardiness data
    - Vegetation Index (dense vegetation for snow load component)
    - Coniferous Forest Density (eliminates non-realistic discontinuities)
    - Land Use resolution increase/smoothing (eliminates non-realistic discontinuities)
  - Updated algorithm for duration of impacts (blowing snow and ground blizzard)
- Flash Freeze and Ground Blizzard extended out to 72 hours
- Ice Accumulation Improvements
  - Updated ice & wind methodology
  - Integrated an ice climatology to introduce regionalization
  - Impact level threshold changes (Minor/Moderate → Transportation, Major/Extreme → Power Outages/Disruptions)
- Flash Freeze
  - Account for refreezing from snow melt

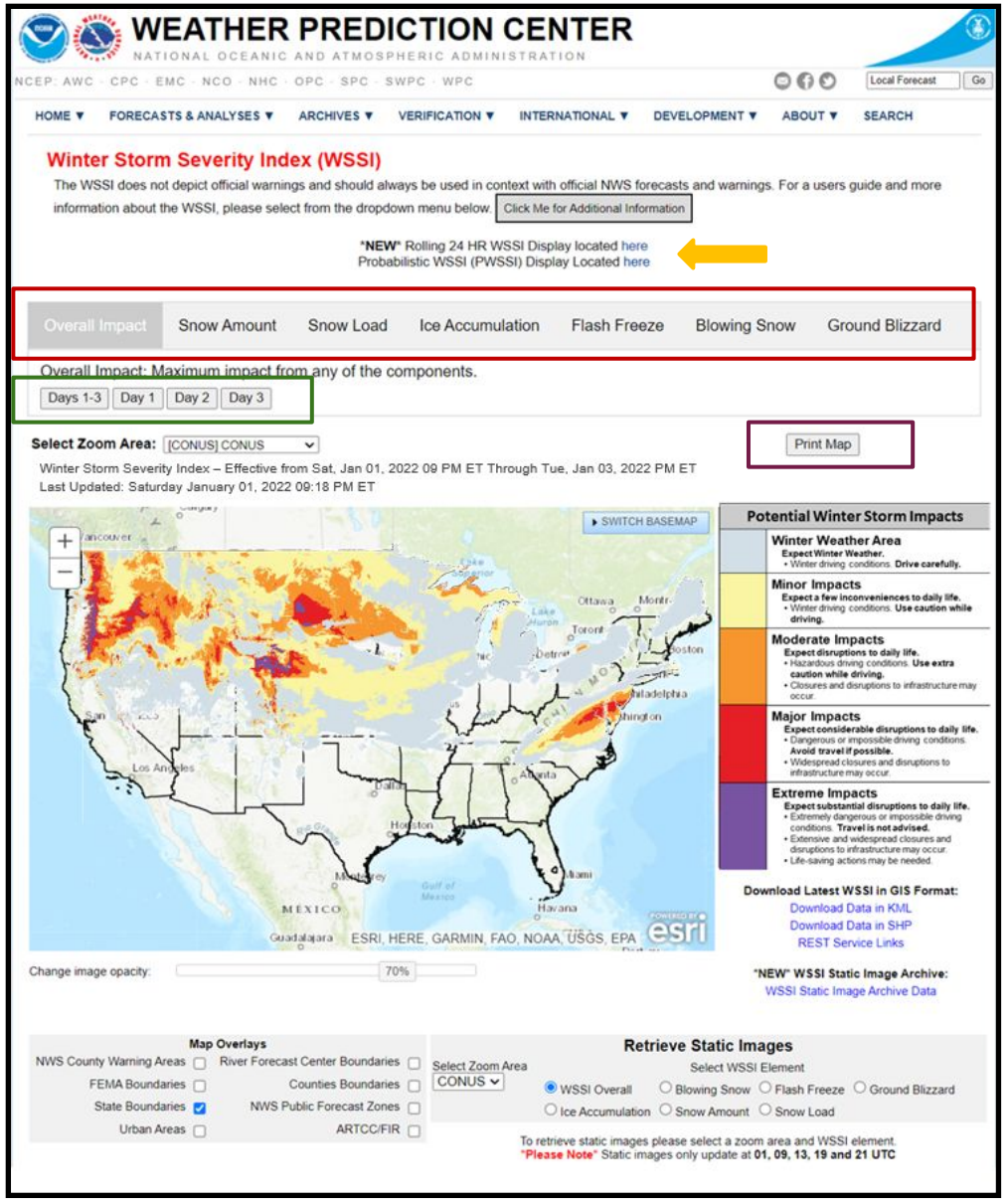



***Ice Amount Factoring***



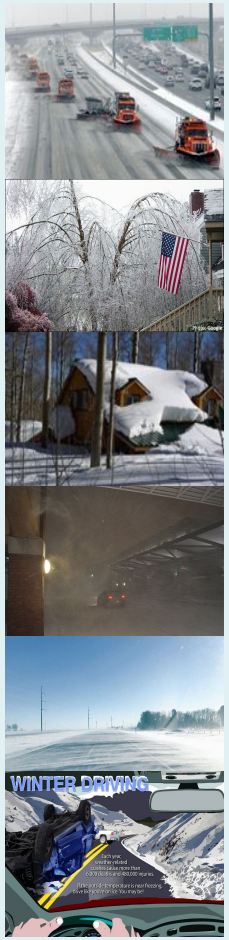
# WSSI Web Page

- Clickable tabs
  - Loads WSSI components upon click
  - Day Period tabs
- Rolling 6-Hr Data Viz Option
  - Allow users to visualize the impact levels progression through time versus viewing per calendar day
  - 24-hour forecast period with the start time advancing every 6 hours (i.e. 18Z to 18Z, 00Z to 00Z, etc.)
- Zoom-to-WFO Drop-down Box
- Print map button
  - Creates a PDF of the map with your specifications
- Variety of basemaps via Basemap dropdown button
- Ability to browse static images
- Links to download GIS data (REST Service, SHP and KML)

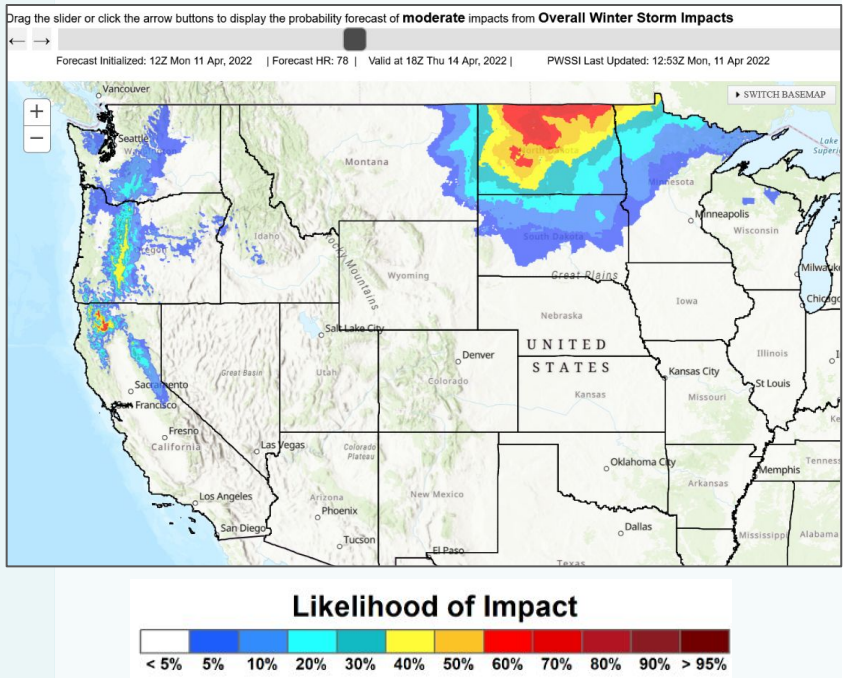



http://www.weather.gov/wssi

# PROBABILISTIC WINTER STORM SEVERITY INDEX (WSSI-P)




- Depicts probability of reaching an impact level for winter hazards using the WSSI impact thresholds
- Probabilistic WSSI **will become operational** in November to support messaging of potential impacts of winter storms from Days 1-7
- Robust social science research applied to impact definitions, aligned with the deterministic WSSI, to effectively communicate the likelihood of winter storm severity
- Public training material available to improve understanding and usability among a broad base of users
- Please provide feedback through your local Weather Forecast Office!

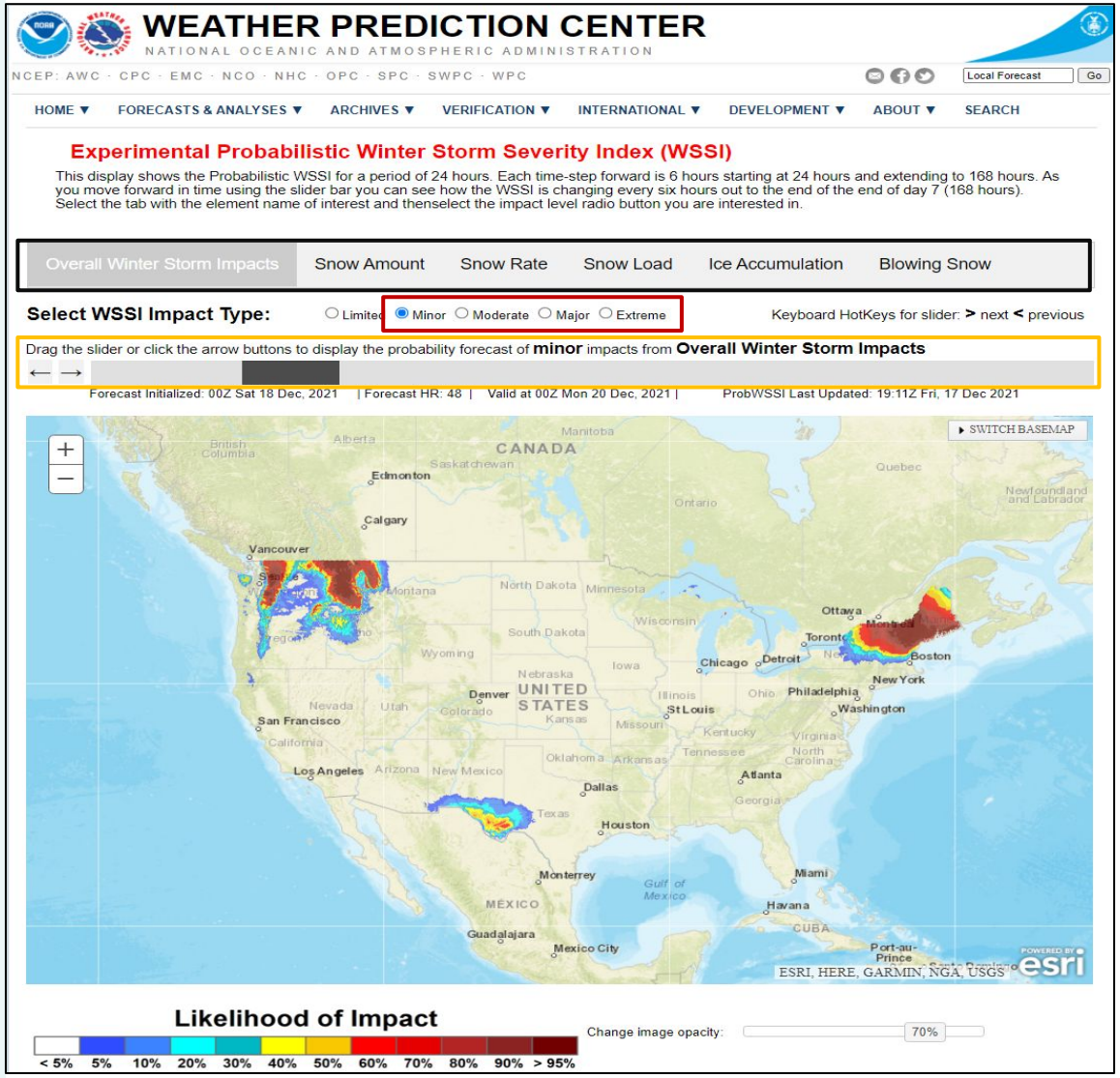



***Depicts probability of reaching an impact level for winter hazards using the WSSI impact thresholds***

**Available here**:
https://www.wpc.ncep.noaa.gov/wwd/wssi/prob_wssi.php

# WSSI-P Web Page

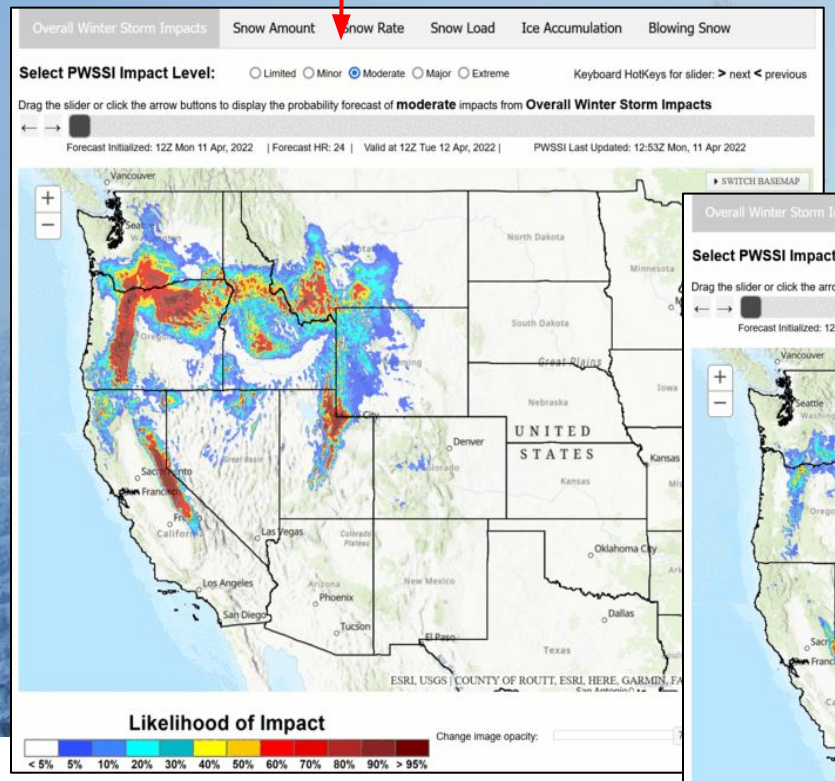
- The WSSI-P web page has several interactive mechanisms that work together to produce the image overlay on the web map.
- Each image depicts a likelihood of impact, ranging from 5% to >95%, for a component and impact level.
- Default option shown when the page loads is the likelihood of Moderate impacts from the Overall Winter Storm components.
- Click a component tab to view the impact forecast for each component or the Overall Winter Storm Impacts tab to view the combined greatest threat.
- Component options are: Overall Winter Storm Impacts, Snow Amount, Snow Rate, Snow Load, Ice Accumulation, and Blowing Snow.
- Select a WSSI Impact Level radio button for the level of impact
  - Impact types include: Minor, Moderate, Major, Extreme
- The slider bar controls the forecast time.
  - Advance or retreat the dark gray slider or click the arrow buttons, or use the > to go forward in time or the < key to go back in time.

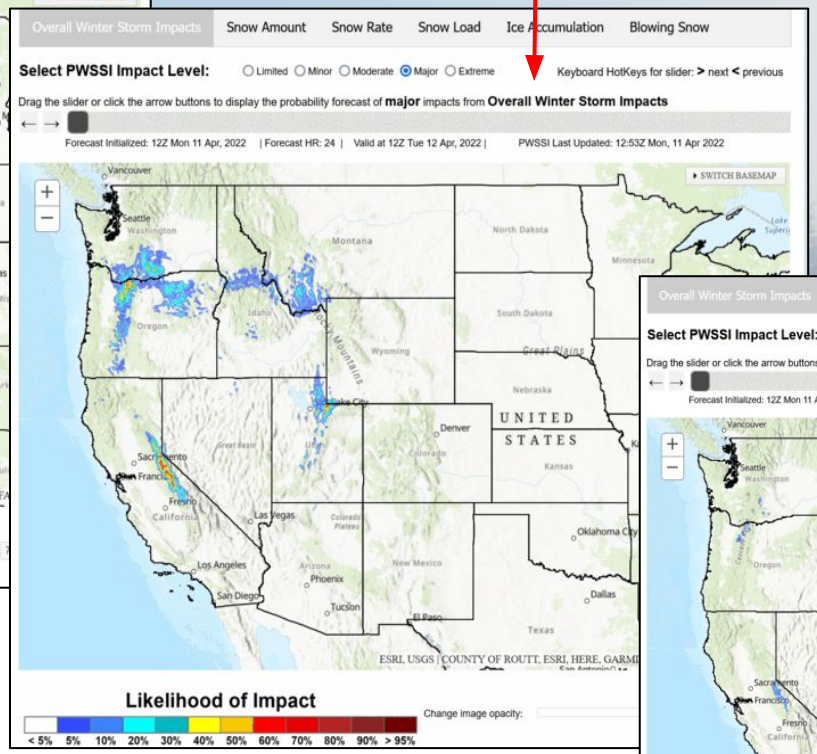


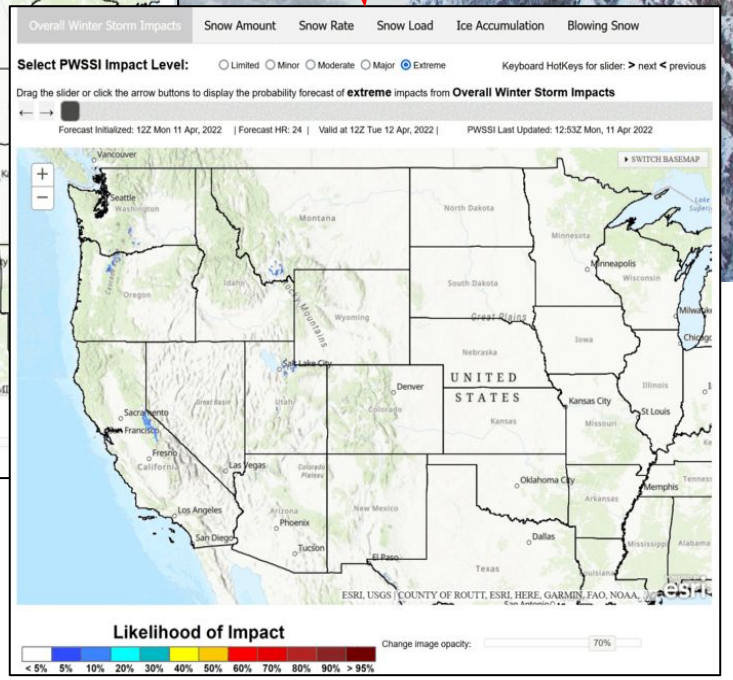
*High Probabilities of Moderate show where there is likely to be disruptions to daily life*

*High Probabilities of Minor provide an envelope of expected impacts*

*High Probabilities of Major or Extreme depict where the most severe impacts are likeliest to occur*




## Potential Winter Storm Impacts

### 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.

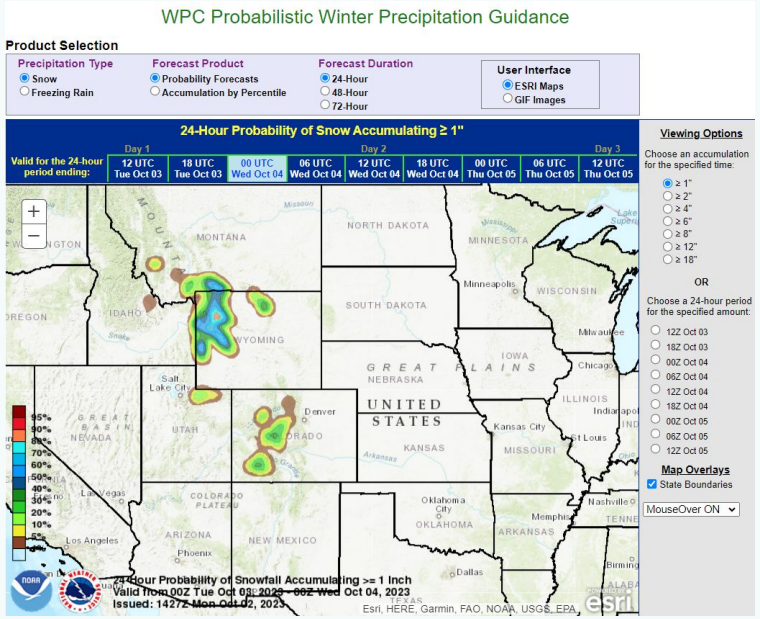
**WSSI-P**: The likelihood of realizing Moderate, Major, or Extreme Impacts from a Winter Weather Event

# *Questions so far related to….?*

***Program Vision***
***Key Messages***
***Winter Weather Outlook***
***Winter Storm Outlook***
***Watch/Warning Criteria***
***Winter Storm Severity Index***
***Probabilistic Winter Storm Severity Index***

# PROBABILITY OF WINTER PRECIPITATION (PWPF)

## WPC National Product

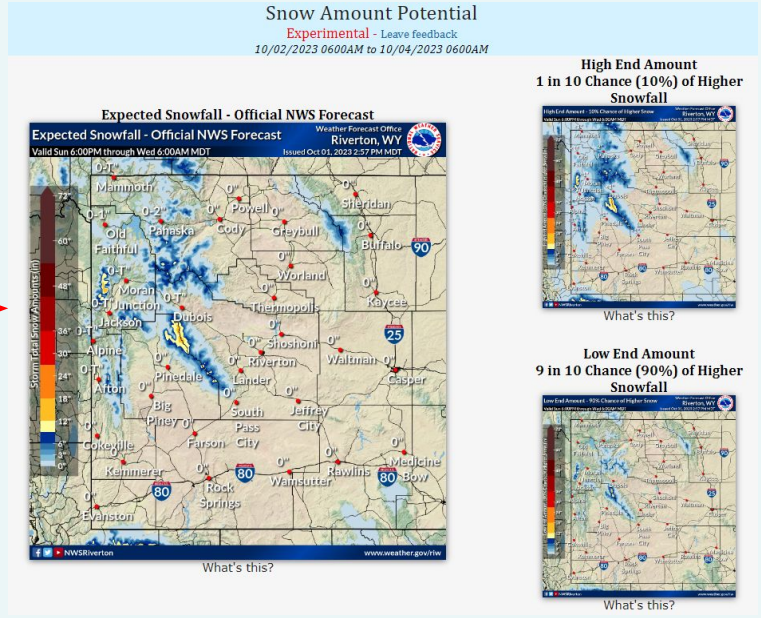



61-member ensemble of forecast models

Expert starting point provided by WPC

https://www.wpc.ncep.noaa.gov/pwpf/wwd_accum_probs.php

## WFO Local Product

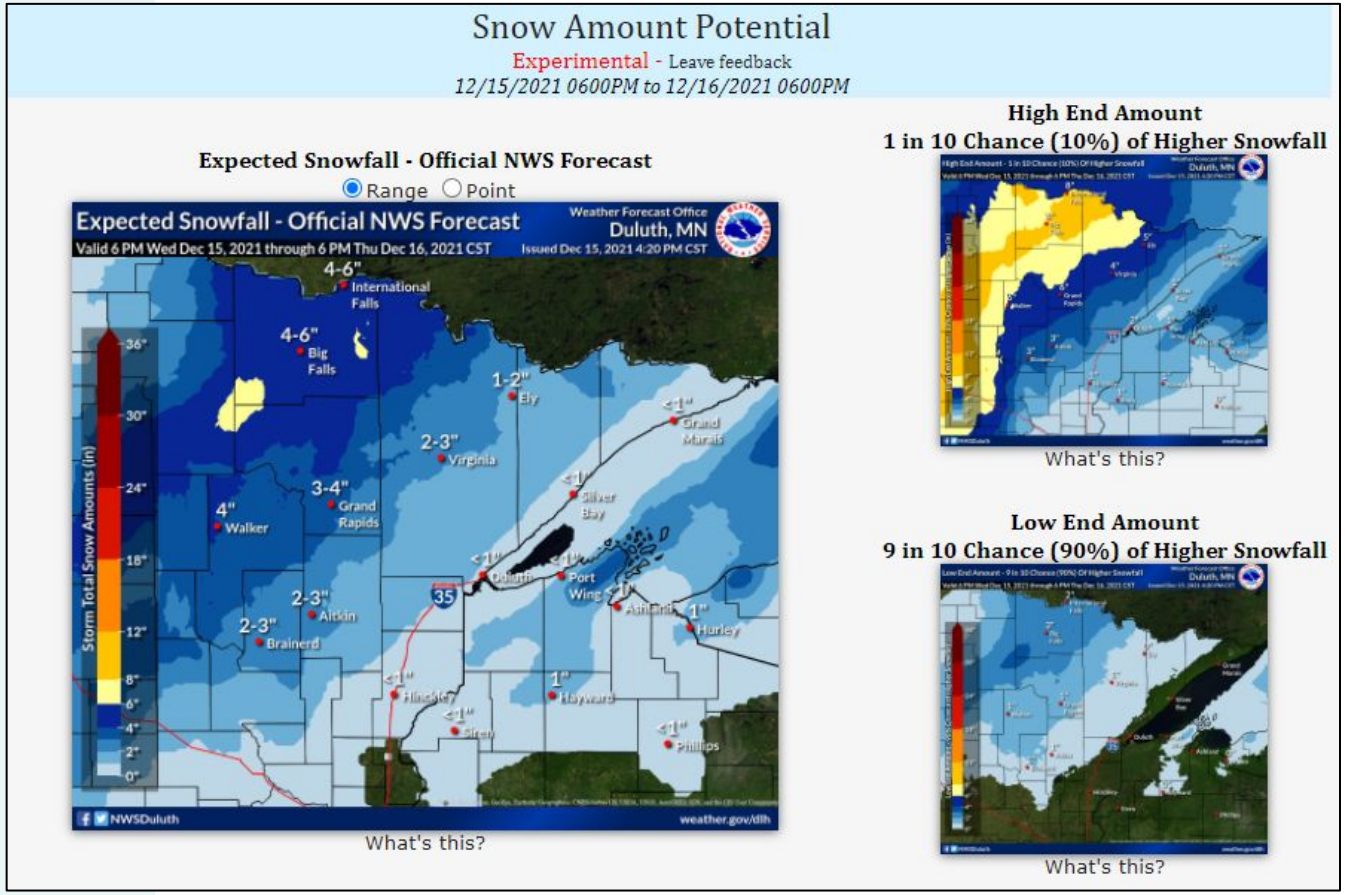



WFOs add local knowledge and create graphics

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

# EXPERIMENTAL LOCAL PWPF

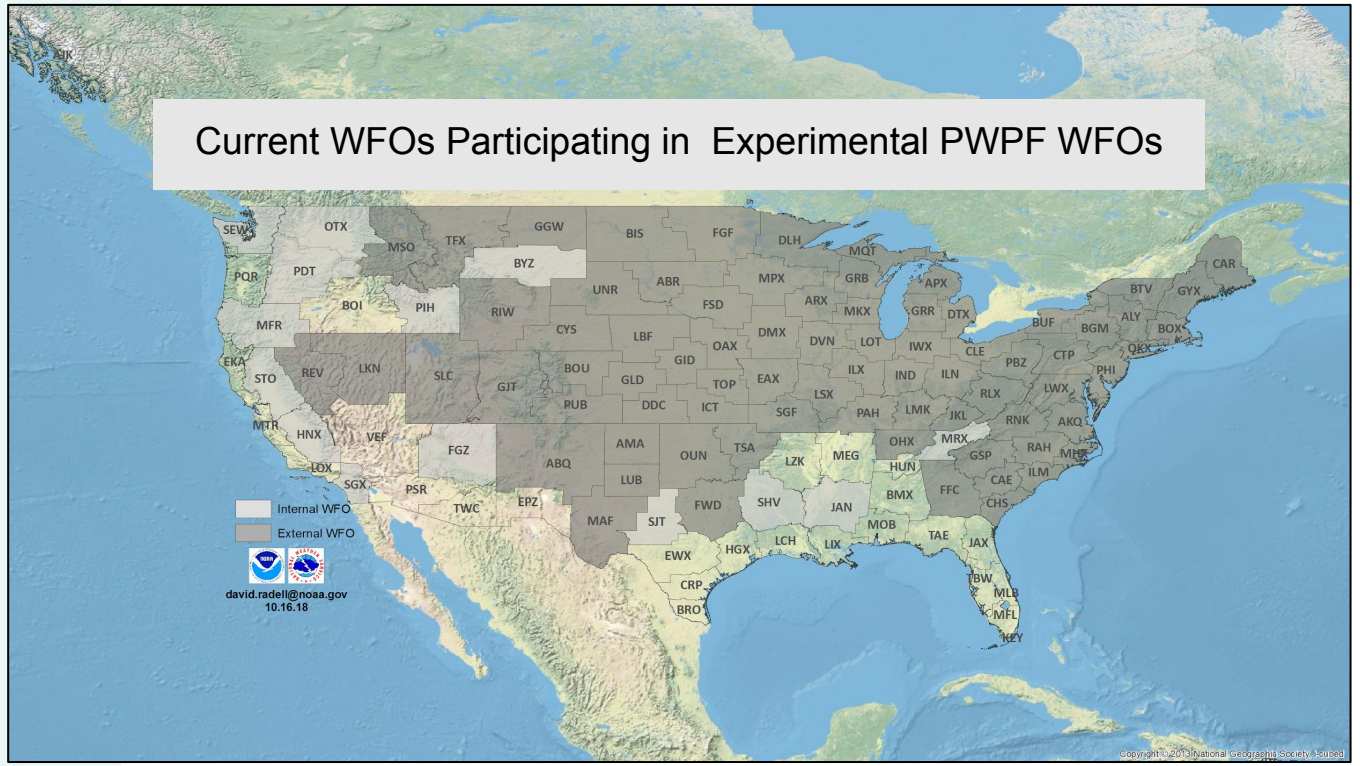
- **Goal**: Provide customers and partners a range of snowfall amounts to better communicate forecast uncertainty during winter weather events on a local level.
- Significant model diversity contributes to a range of possible outcomes (*check out our "Understanding Uncertainty" explainer later in this presentation!*).
  - Experimental 10th and 90th percentile graphics are available on the National Digital Forecast Database (NDFD).




**Local office Experimental PWPF page:**
https://www.weather.gov/btv/winter

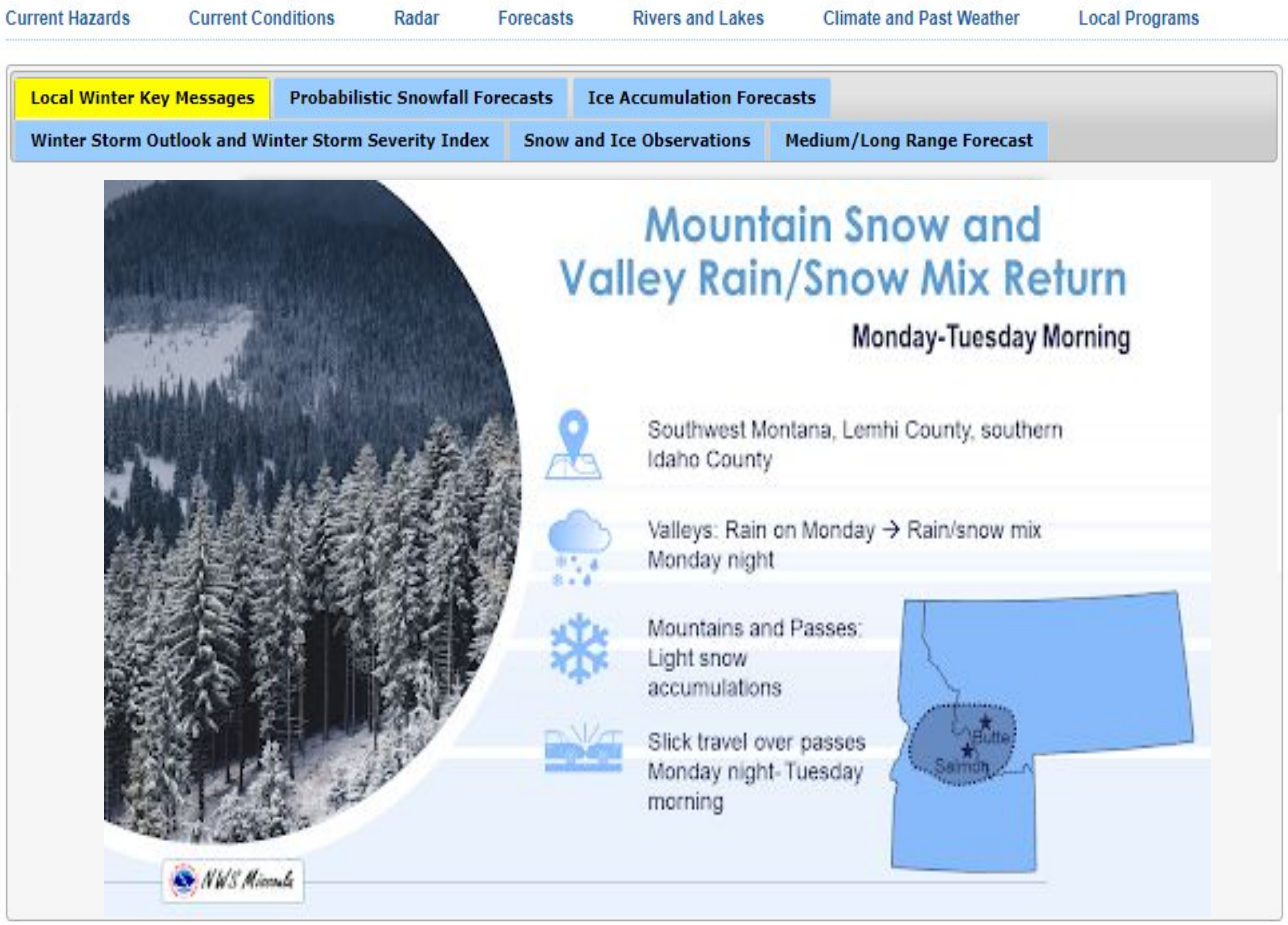
# EXPERIMENTAL LOCAL PWPF

- Number of sites remains frozen as a centralized operational prototype is in development.
- We are internally developing, testing and evaluating the prototype this upcoming season for its ability to generate and disseminate these products.

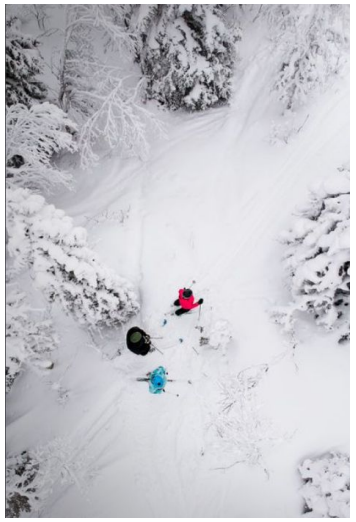


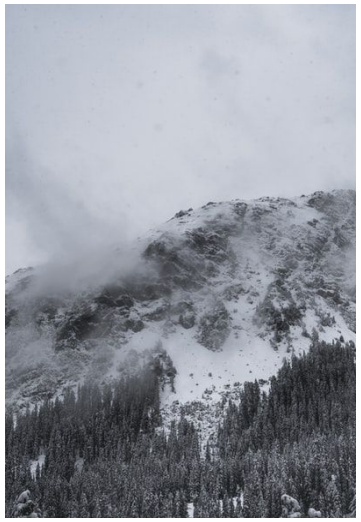

**Provide feedback:**
https://www.surveymonkey.com/r/WinterWeatherProbabilisticExperiment_2023-2024

# WFO Winter Web Pages for Easy Navigation




- Standardized template provides more uniform tab options across offices
- Local winter key messages are highlighted
- Localized perspectives of the Winter Storm Outlook and Winter Storm Severity Index





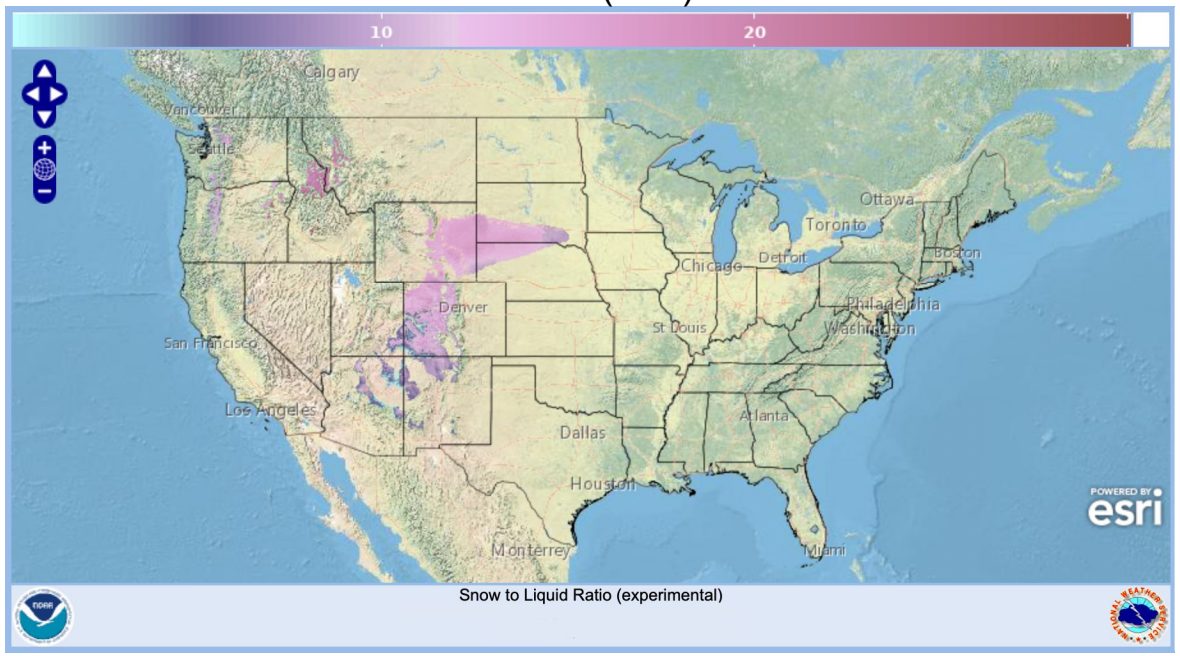
# Experimental Snow Ratio Grid in National Digital Forecast Database (NDFD)

- The NWS creates a 6-hour QPF forecast grid and a Snow Amount forecast grid, therefore we use these to create a Snow Ratio Grid

$$\text{Snow Ratio} = \frac{\text{Snow Amount}}{\text{QPF}}$$

- Assists forecasters with distinguishing between heavy, wet snow and light, fluffy snow
- Enhances decision support messaging to emergency managers, key partners, and the public (see next slide).

Snow Ratio (xx:1)




Example of Snow Ratio Grid from NDFD Viewer

https://digital.mdl.nws.noaa.gov/

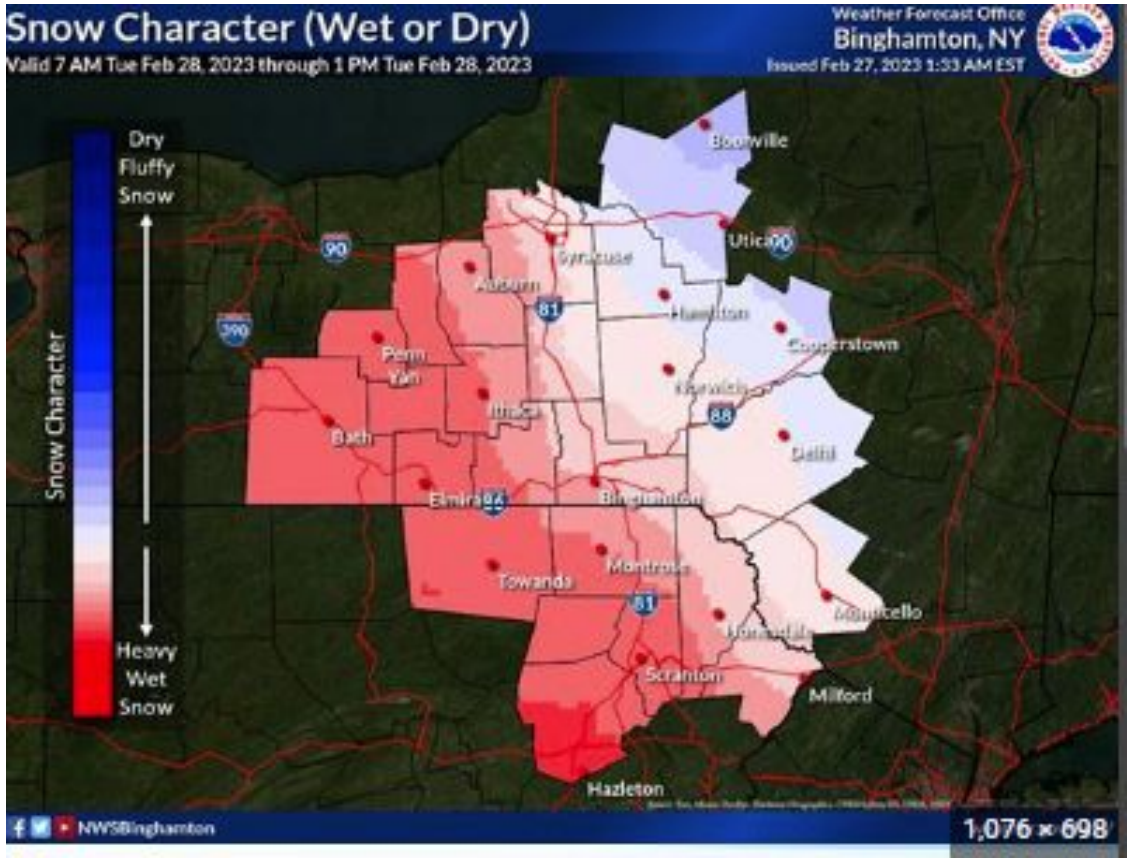
# NEW: Snow Character Map from WFOs

- Snow Ratios can be interpreted to glean useful information:
  - < 10:1 = a heavy, wet snow
  - > 15:1 = a dry, powdery snow

- This season, some WFOs will be creating “Snow Character” maps on their local Winter web pages under the “Other Snow/Ice Information” tab.

- By using snow ratio as a basis, a wet vs. dry snow map can be created for a winter weather event. In this example:
  - Southern areas can expect a “heavier, wet snow”
  - Northern areas can expect a “drier, fluffier snow.”

- Heavier snows are more difficult to shovel or plow, while drier snows are more easily blown by wind and can cause reduced visibility.



Example of Snow Character Map from WFO Binghamton, NY

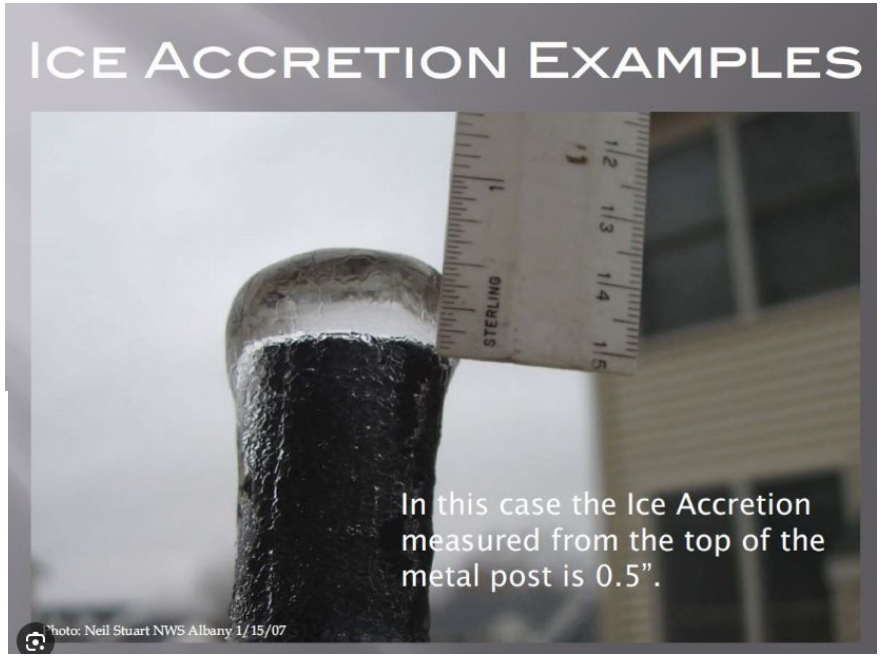
# Flat vs. Radial Ice

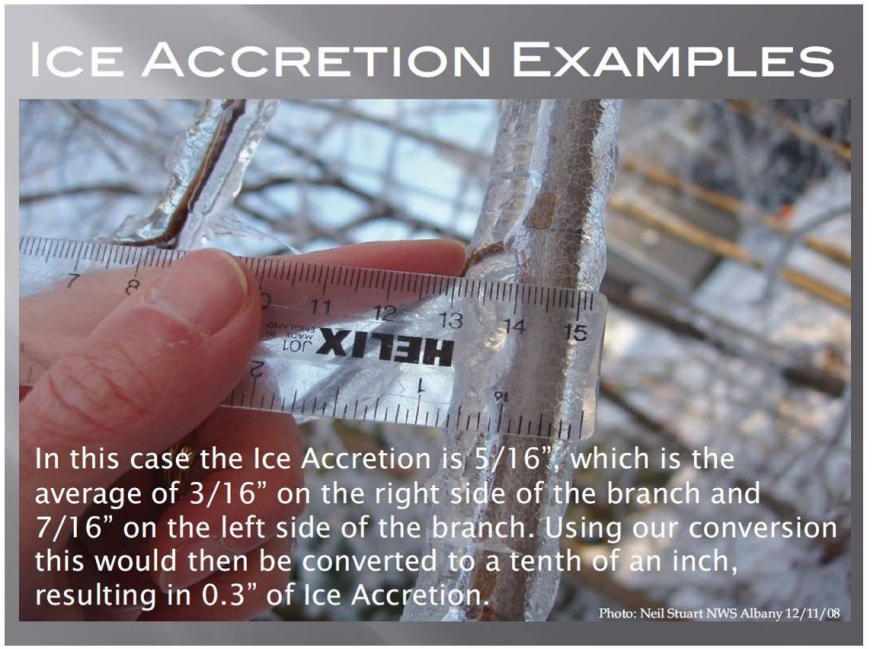
- Ice accretion from freezing rain can be measured two different ways:
  - "Flat ice" is ice measured on an elevated flat surface, such as on a table or plank
  - "Radial ice" is ice measured on a round surface, such as on a tree branch or dowel

- NWS currently forecasts only elevated flat ice, but is investigating the possibility of modifying that policy in the future

- We'd like to ask a few poll questions to this group to assist this effort

Ice accretion examples of both flat ice (top) and radial ice (right). Photos courtesy of CoCoRaHS.



# Freezing Rain Ice Accretion Poll Questions

# Poll Question #1

Based on your needs, which type of ice measurement or forecast (flat or radial) would help you most with your decision making?

a) Flat ice (such as on a table)
b) Radial ice (such as around a tree branch)
c) Both
d) I'm not sure

# Poll Question #2

What amount of ice prompts you to initiate a decision or action?

a) Trace (light glaze)
b) 0.1 inches
c) 0.25 inches
d) 0.5 inches or greater
e) Ice amounts do not affect my decision making

# Poll Question #3

Which is most important for your decision making: ice accumulation amounts, or the anticipated impacts?

a) Only ice amounts are important
b) Only the impacts are important
c) Both are equally important
d) Ice amounts are more important, but I need to know both
e) Ice impacts are more important, but I need to know both

# Impact-Based Warning Tags for Snow Squall Warnings

## What is a Snow Squall Warning

Brief (30-60 minutes) warnings issued for short duration intense bursts of snow & wind leading to whiteout visibility & possible flash freezes on roads.

## What's New:

Up to 2 Impact-Based Warning Tags will be appended to the bottom of Snow Squall Warnings

- General (No Tag), SIGNIFICANT
- OBSERVED, RADAR-INDICATED

**General**: Used frequently for snow squall conditions but mitigating actions, combined with societal context, will reduce the threat to safe travel

**Significant**: Used only when snow squalls pose a substantial threat to safe travel, such that WEA is warranted to alert all devices in the path.

```
...A SNOW SQUALL WARNING REMAINS IN EFFECT UNTIL 630 PM EST...

 At 540 PM EST, a dangerous snow squall was located near Owls Head, moving east at 40
mph.

HAZARD...Flash freeze on roads and rapidly falling visibility due to intense bursts of
heavy snow and gusty winds.

SOURCE...Radar indicated.

IMPACT...Dangerous and life-threatening travel conditions are expected to develop
rapidly in the warning area.

Locations impacted include...
Chazy, Mooers, Altona

PRECAUTIONARY/PREPAREDNESS ACTIONS...
Slow Down! Rapid changes in visibility and road conditions are expected with this
dangerous snow squall. Be alert for sudden whiteout conditions.
&&

LAT...LON 4467 7395 4479 7419 4489 7403 4500 7380
TIME...MOT...LOC 1815Z 259DEG 51KT 4512 7345 4501

SNOW SQUALL...RADAR INDICATED
SNOW SQUALL IMPACT...SIGNIFICANT
$$
```

## What This Means

Before: All Snow Squall Warnings activate WEA (Wireless Emergency Alerts).

**Now: WEA will only activate for high-end events with the SIGNIFICANT tag**

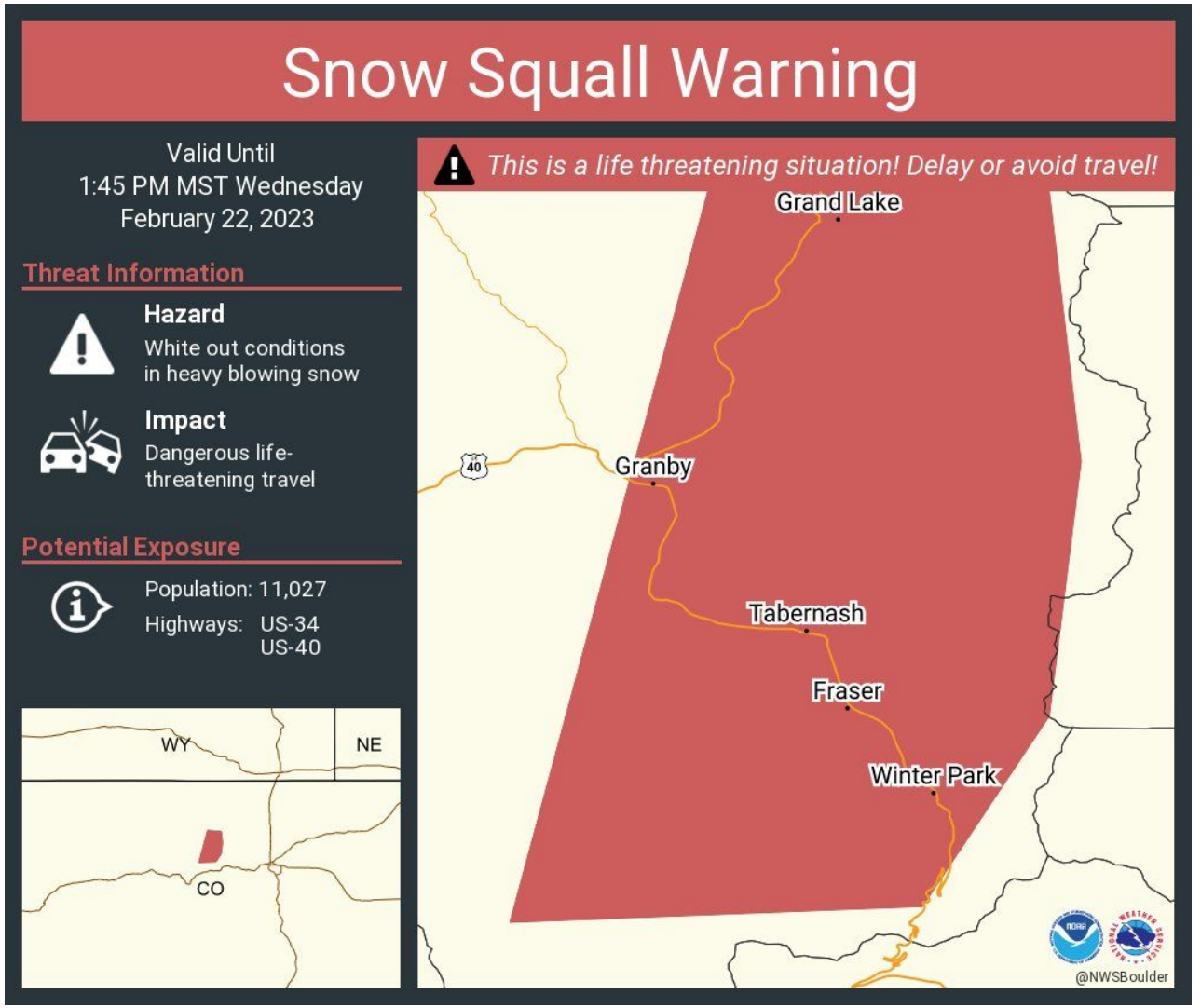
# Impact-Based Warning Tags for Snow Squall Warnings

Why make these changes:

- Improve public response to Snow Squall Warnings
  - Allow for overnight issuance of Snow Squall Warnings to activate highway message boards & notify partners/public without WEA activation
  - Mitigate WEA over-alerting by ensuring WEA activation is reserved for high-impact events

*Implementation began last winter at* a select group of WFOs, with national implementation for this winter.

For more information, see the fact sheet:
https://www.weather.gov/media/safety/Snow-Squall-IBW.pdf



# Updated Local Storm Reports

What is a Local Storm Report (LSR):

- NWS-generated report of weather phenomenon or weather-related damage
- Often relays information from Trained Skywarn Spotters, Emergency Management Officials, Broadcast Media, or other trusted sources
- Used to keep partners & the public informed as an event is ongoing & for post-event verification

Winter LSRs:

*Measurements -*

Snow, Freezing Rain, Sleet

*Impacts -*

Snow/Ice Damage*, Blizzard, Snow Squall*, Avalanche

** indicates new for this season*

| | | | | | |
|---|---|---|---|---|---|
| 0253 PM | Snow Squall | Plattsburgh Intl Arpt | | 44.65N | 73.47W |
| 02/27/2022 | | Clinton | NY | ASOS | |
| | Heavy snow with one quarter mile visibility and winds gusting to 32 knots. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 0700 AM | Snow | Saranac | | 44.64N | 73.74W |
| 04/19/2022 | M6.5 inch | Clinton | NY | CoCoRaHS | |
| | 24-hour snowfall. | | | | |

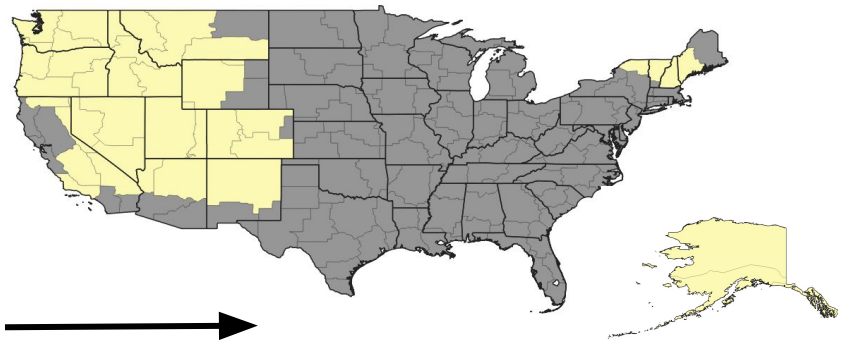
# AVALANCHE WEATHER INITIATIVE

## *Avalanche Weather Guidance*

- Provides partners & public with forecast weather parameters critical to prediction of avalanche conditions, risk, mitigation, & recovery.
- Forecast Elements may include: temperature, weather, probability of precipitation, snowfall, liquid or snow-water equivalent, ice accumulation, snow level, winds, & cloud cover.
- Optional:
  - Forecast Discussion
  - Long Term Extension to Day 7
  - Probabilistic Snowfall Forecasts.

...Mount St. Helens...

| Date | Friday 09/23 | | | | | | | | Saturday 09/24 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (LT) | 06 | 09 | 12 | 15 | 18 | 21 | 00 | 03 | 06 | 09 | 12 | 15 |
| | 6a | 9a | 12 | 3p | 6p | 9p | 12 | 3a | 6a | 9a | 12 | 3p |
| Cloud Cover | SC | FW | SC | SC | SC | SC | SC | SC | FW | SC | SC | SC |
| Cloud Cover (%) | 40 | 15 | 30 | 30 | 40 | 40 | 35 | 30 | 25 | 25 | 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 | | | | | 0.00 | | | | 0.00 | | | |
| 12 Hour Snow | | | | | 0.0 | | | | 0.0 | | | |
| Low End Snow | | | | | 0.0 | | | | 0.0 | | | |
| High End Snow | | | | | 0.0 | | | | 0.0 | | | |
| 12 Hour Ice | | | | | 0.00 | | | | 0.00 | | | |
| 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 |

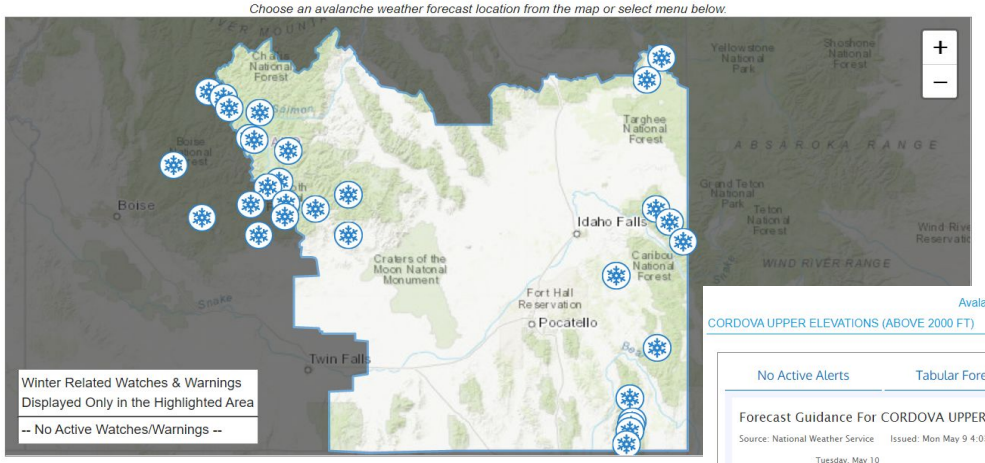


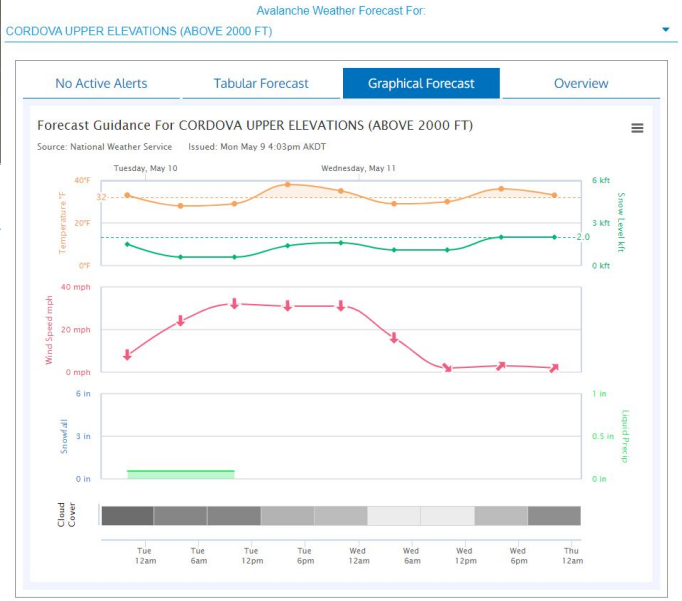
Offices that produce the AVG in Yellow. If you are an avalanche partner, **work with your WFO** for more information or to set up forecast areas.

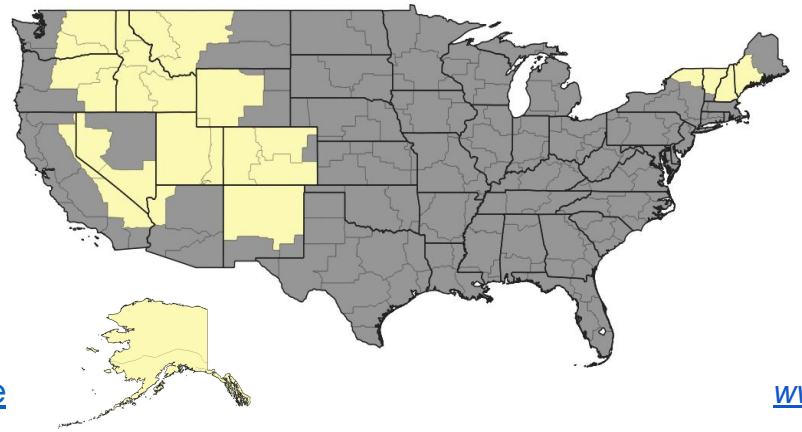
# AVALANCHE WEATHER INITIATIVE

## *Experimental Avalanche Weather Web Pages*

- Critical sources of information for partners & public to easily obtain avalanche weather products & information
- Includes: NWS weather alerts, avalanche center avalanche alerts, clickable points or polygons, relevant weather discussion, precipitation summary tables, a tabular & graphical forecast, & a local content section



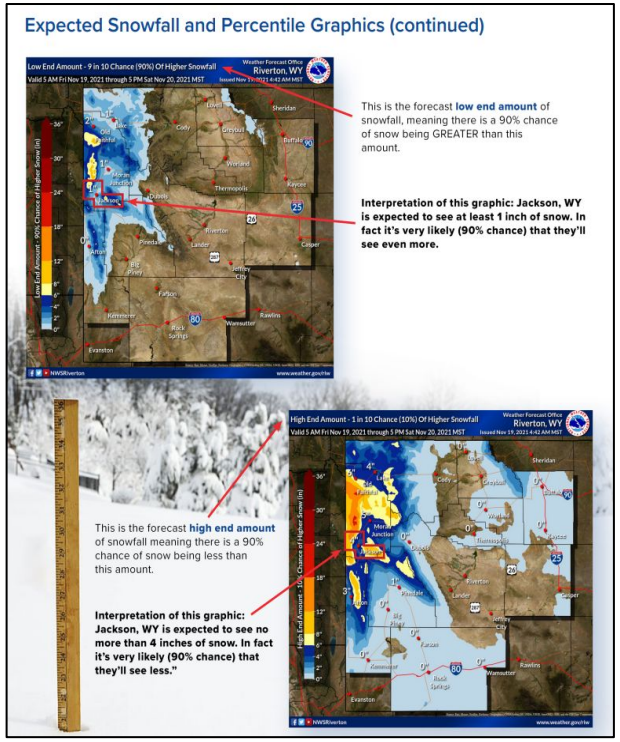
Feedback:
https://www.surveymonkey.com/r/ExpStandardizedWFOAvalancheWeatherWebpage_2023_2024

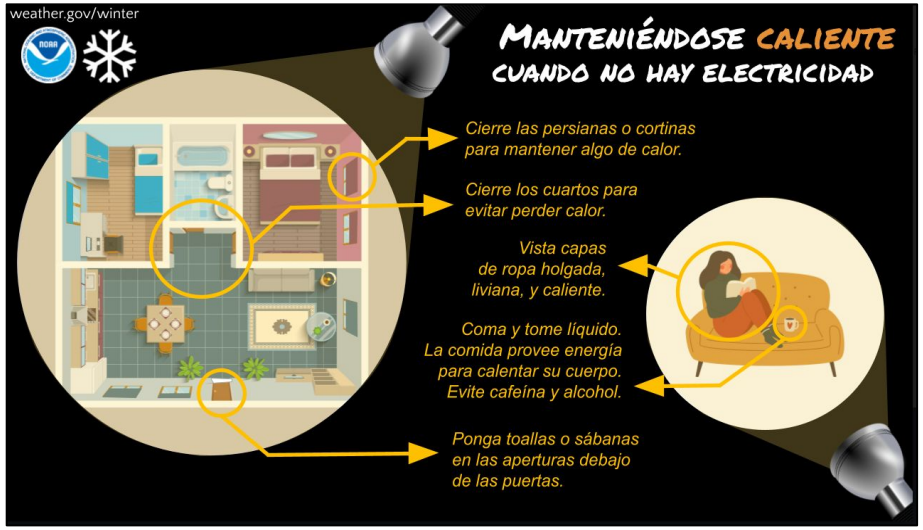
www.weather.gov/slc/AvalancheWeather

# NWS Winter Seasonal Safety Campaign

- NWS Winter Seasonal Safety Campaign launches on December 1 (first day of meteorological winter)
- Contains content on winter hazards, including infographics, social media plans, presentations and videos
- Encourage partners to use and share this information
- See: https://www.weather.gov/wrn/winter_safety


# Updated Outreach Materials


- Probabilistic Snowfall Resources: https://www.weather.gov/prob-snow
- Snow Squall IBW Tag Resources: https://www.weather.gov/media/safety/Snow-Squall-IBW.pdf
- Winter Storm Severity Index Resources: www.weather.gov/wssi (top of page)
- ***Coming Soon: Probabilistic WSSI & Modernized Criteria***

# NOAA: The Great Outdoors

- Feature on weather safety while recreating outdoors
- Discusses outdoor risks, with the winter edition focusing on Extreme Cold & Exposure, Avalanche Danger, Winter Storms, & Ice Safety
- Will include fundamental actions to take and safety content for sharing



https://www.noaa.gov/explainers/great-outdoors-weather-safety

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## LINKS:

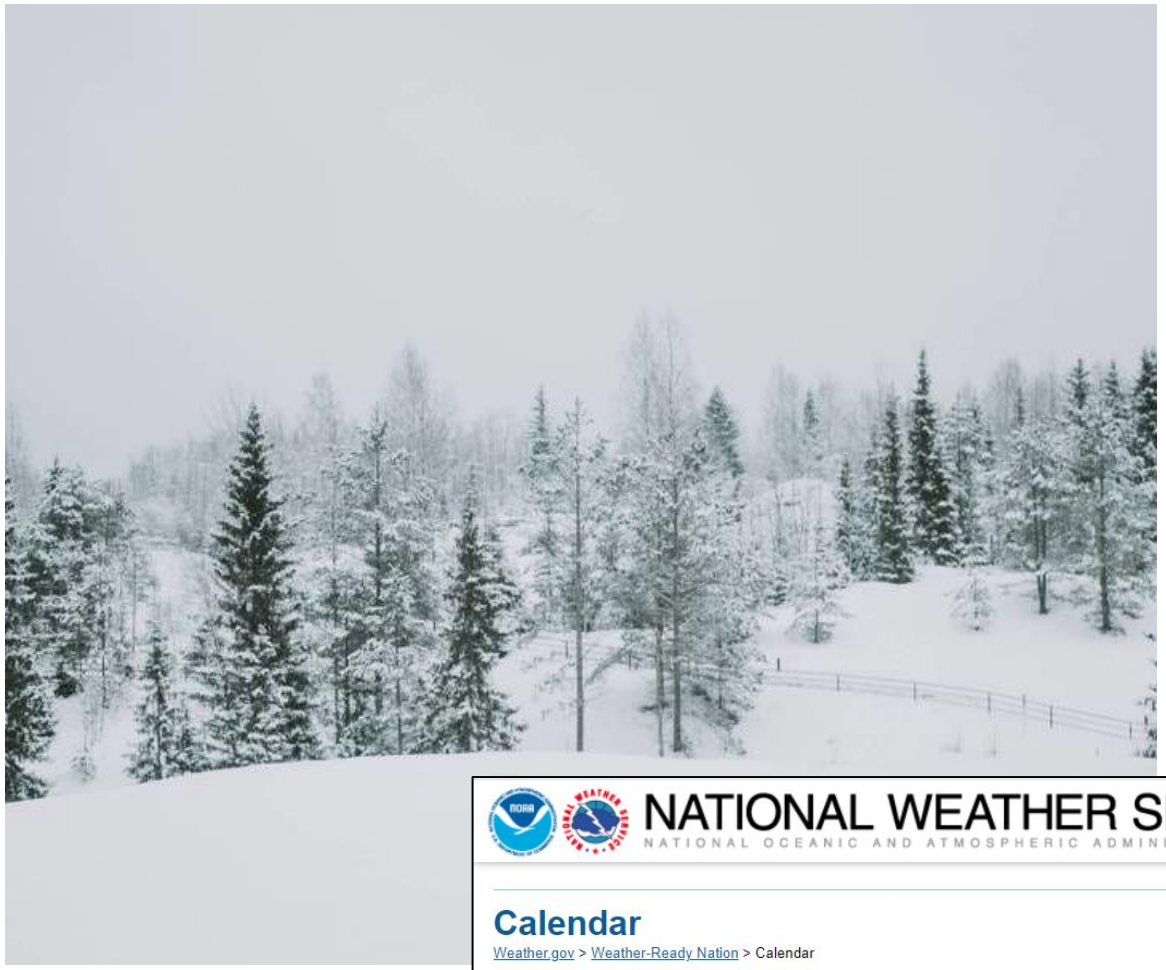
**WPC PWPF page:**
https://www.wpc.ncep.noaa.gov/pwpf/wwd_accum_probs.php

**Local office Experimental PWPF page:**
https://www.weather.gov/btv/winter

**Operational WSSI:**
www.weather.gov/wssi

**WSSI-P:**
https://www.wpc.ncep.noaa.gov/wwd/wssi/prob_wssi.php

**Experimental WSO:**
https://www.wpc.ncep.noaa.gov/wwd/wso



# Presentation Will Be Available!

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