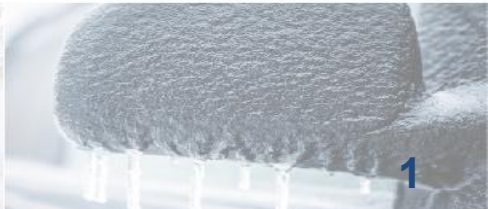


National Weather Service Update on Winter Weather Initiatives



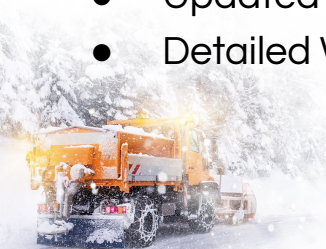
Winter Partners Webinar October 26, 2021

Stephen Baxter, Sarah Perfater, Michael Muccilli



Outline

- Winter Program and Vision Overview
- Winter Key Messages
- Updated Local ProbSnow Pages/Graphics
- Eastern United States Projects
 - Days 3-7 Winter Storm Threat Product
 - Lake-Effect Snow Warning Polygons
- Impact-Based Warning tags for snow squalls
- Updates on Avalanche Weather Initiative
- Experimental Winter Storm Outlook
- Winter Storm Severity Index
- Updated Outreach Materials and Initiatives
- Detailed Winter Program Vision



Winter Program Overview

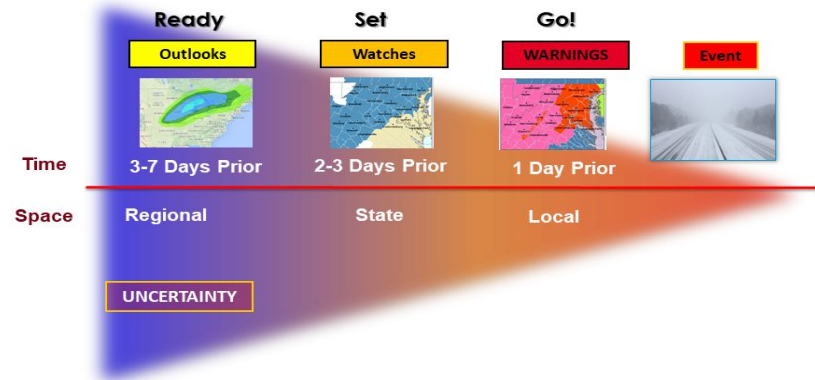
- The Winter Weather Services Program is one of 11 National Service Programs in the NWS. The Winter Program works with internal and external stakeholders to facilitate improvements to winter weather products and services.
- The program goals include moving toward a consistent suite of products and services that are **collaborative, probabilistic, and impact-based**.
 - NWS HQ Staff:
 - Stephen Baxter, Outgoing Winter Program Manager (Stephen.Baxter@noaa.gov)
 - Sarah Perfater, Acting Winter Program Manager, Winter Program Coordinator for Research to Operations and Training (Sarah.Perfater@noaa.gov)
 - Michael Muccilli, Winter Program Coordinator for Evolving Service and Outreach (Michael.Muccilli@noaa.gov)
 - Weather Prediction Center Contact:
 - Alex Lamers, Warning Coordination Meteorologist (Alex.Lamers@noaa.gov)



Winter Program Vision

Accurate, consistent, and actionable forecasts save lives and property

- Collaborative Forecast Process
- Consistent Messaging
- Probabilistic Impact Information Drives Messaging



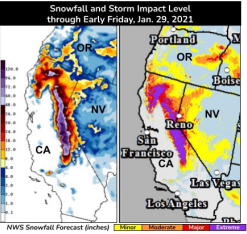
Winter Key Messages

The Concept

Key Messages for Jan 26-29 Winter Storm Updated Jan 26, 2021 10:00 AM PST

Major winter storm moving into the West Coast this week

- Significant Impacts Expected**
A major winter storm will bring multiple feet of heavy snow and strong winds to the Sierra Nevada and mountains of Northern California through Friday morning.
- Dangerous to Impossible Mountain Travel**
Travel will become dangerous, and may be impossible at times, especially across mountain passes. Whiteout conditions, downed trees, and power outages are also possible in these areas.
- Snow Levels Will Start Low**
Snow levels will start low and bring some snowfall accumulation to northern California communities near or above 500 foot elevation. Snow levels will gradually rise Wednesday and Thursday.
- Heavy Rain Expected Elsewhere in California**
Other hazards expected to develop with this system will be very heavy rain and an increasing potential for flash flooding and possible debris flows near burn scar areas.



NWS Snowfall Forecast (inches) Minor Moderate Heavy

For more information go to: www.wpc.ncep.noaa.gov and www.weather.gov

National Oceanic and Atmospheric Administration Weather Prediction Center College Park, MD

- Key messages will highlight the agency's most essential information for upcoming winter storms
- 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

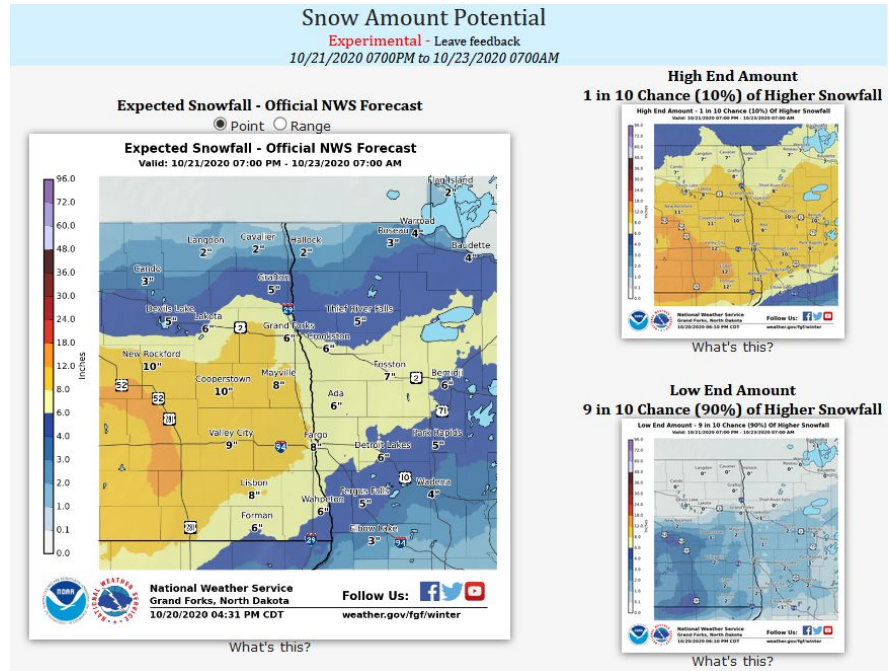
Collaboration

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
- Key Messages are only initiated during the day
- Updates may occur overnight if necessary

Experimental WFO Probabilistic Winter Precipitation Forecast (PWPF)

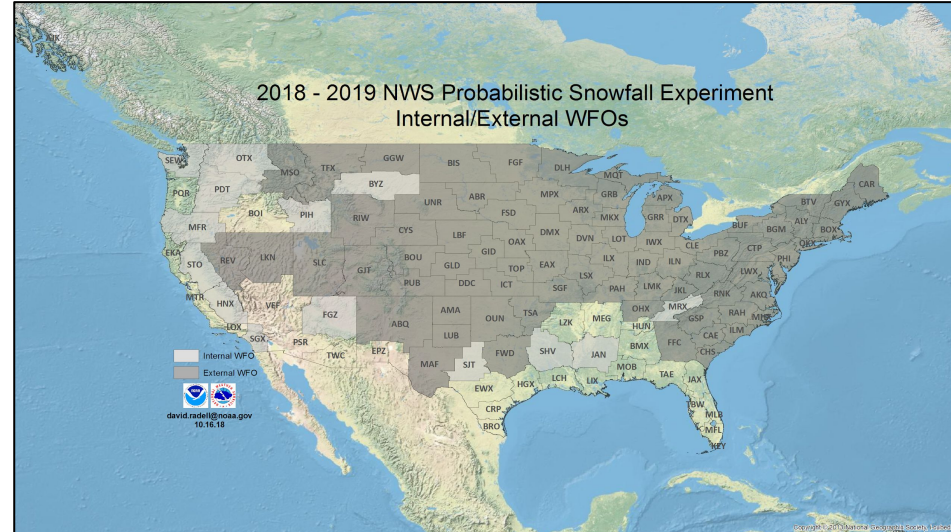
- **Goal:** Provide customers and partners a range of snowfall amounts to better communicate forecast uncertainty during winter weather events on a local level.
- 61-member ensemble
 - Expert starting point provided by WPC
 - WFOs add local knowledge
- Significant model diversity contributes to a range of possible outcomes.
- Experimental 10th and 90th percentile graphics are available on [NDFD](#).



Local office Experimental PWPF page:
<https://www.weather.gov/btv/winter>
2021-2022 Winter Partners Webinar

Experimental WFO Probabilistic Winter Precipitation Forecast (PWPF)

- Number of sites remains frozen as a plan for centralized operational transition is in progress.
- We are testing a new process for generating and disseminating these products this winter.
 - This will not result in a change to the current user experience at this time...

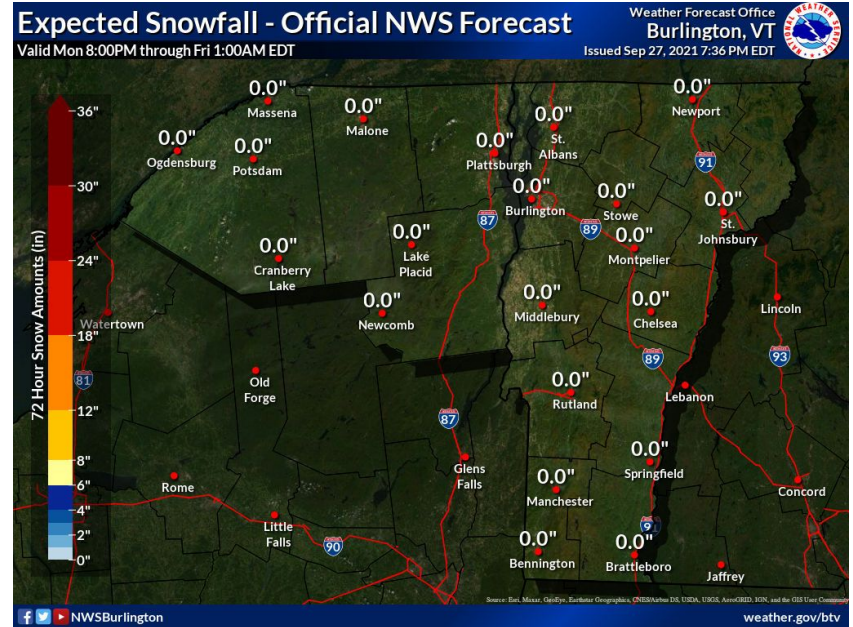


Provide feedback:

<https://www.surveymonkey.com/r/ProbWinterExp>

Experimental WFO Probabilistic Winter Precipitation Forecast (PWPF)

- ...but there are some positive developments being implemented in the experiment!
- New graphics will be rolled out during the upcoming winter season.
- The local winter web page (e.g. [weather.gov/btv/winter](https://www.weather.gov/btv/winter)) is being updated

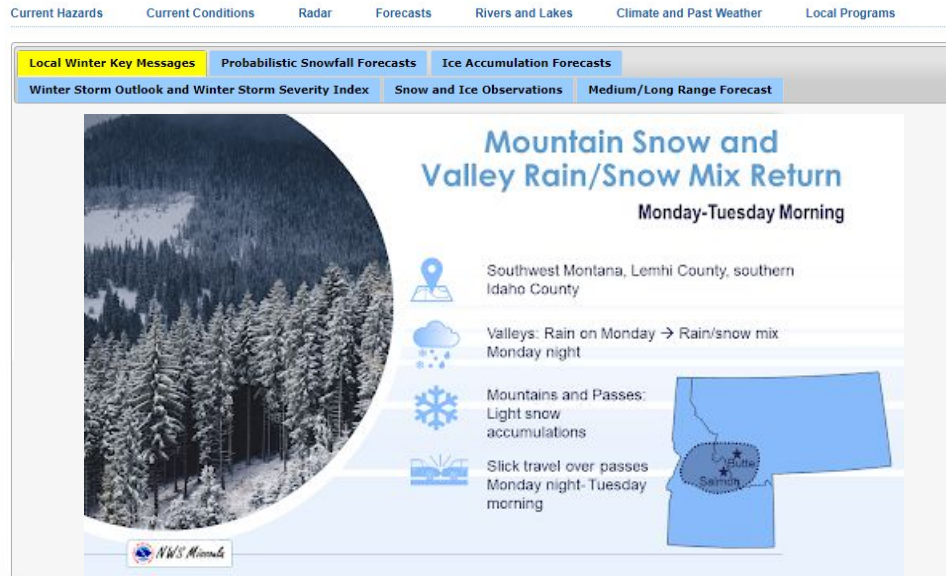


Provide feedback:

<https://www.surveymonkey.com/r/ProbWinterExp>

Updated WFO Winter Web Pages

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



The screenshot displays a web interface for winter weather forecasts. At the top, there is a navigation bar with tabs: Current Hazards, Current Conditions, Radar, Forecasts, Rivers and Lakes, Climate and Past Weather, and Local Programs. Below this is a secondary navigation bar with tabs: Local Winter Key Messages (highlighted in yellow), Probabilistic Snowfall Forecasts, and Ice Accumulation Forecasts. A third navigation bar contains: Winter Storm Outlook and Winter Storm Severity Index, Snow and Ice Observations, and Medium/Long Range Forecast.

The main content area features a large circular image of a snowy forest on the left. To the right, the title reads "Mountain Snow and Valley Rain/Snow Mix Return" with the subtitle "Monday-Tuesday Morning". Below the title, there are three sections of text, each with an icon:

- Location:** Southwest Montana, Lemhi County, southern Idaho County (with a location pin icon).
- Valleys:** Rain on Monday → Rain/snow mix Monday night (with a cloud and rain/snow icon).
- Mountains and Passes:** Light snow accumulations (with a snowflake icon).

Additional information includes "Slick travel over passes Monday night-Tuesday morning" (with a road and snow icon) and a map of Idaho with a red star indicating the location of Salmon. The NWS Montana logo is visible in the bottom left corner of the content area.

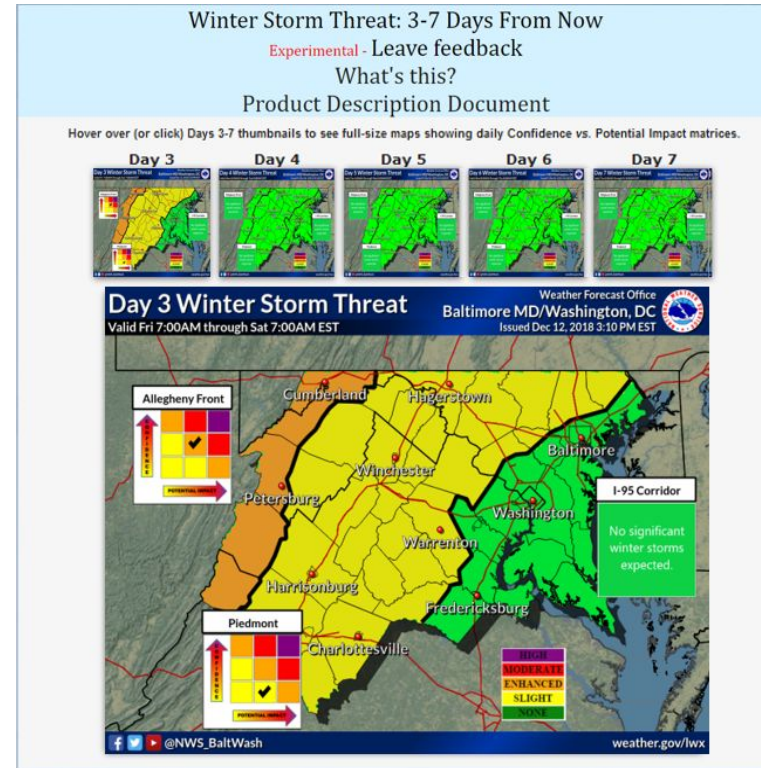
Eastern United States Projects

Experimental Days 3 - 7 Winter Storm Threat Product

- An ongoing experimental winter storm threat product is being conducted at 3 WFOs in Eastern Region.
- The inputs combine guidance from WPC's multi-model ensembles, with the WFO forecaster analysis of additional ensemble fields, mesoscale factors, and societal drivers to provide insights on levels of enhanced winter storm threat.
- A 3x3 matrix of confidence and impact is displayed for each climate zone within a county warning area.

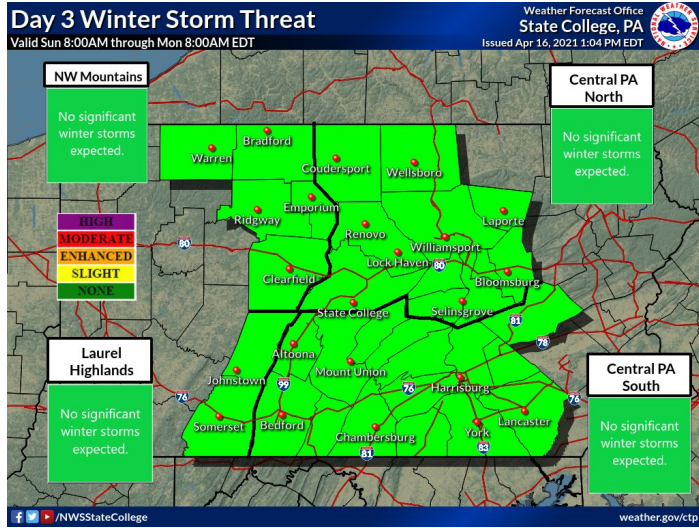
Provide feedback:

https://www.surveymonkey.com/r/ExpWinterStormThreatIndex_2021



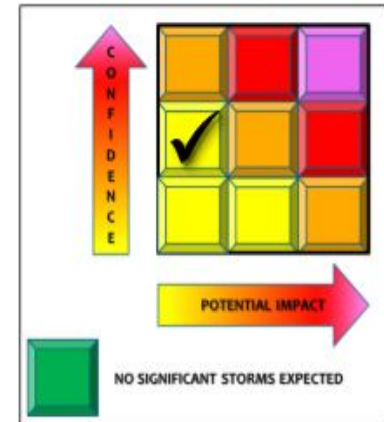
Eastern United States Projects

Experimental Days 3 - 7 Winter Storm Threat Product



High	High threat of high impact winter storm. Potential impacts include significant travel delays, closures, and threats to life and property. Plan ahead to minimize impact on you and your family.
Moderate	Moderate winter storm threat. Potential impacts include significant travel delays and closures. Plan ahead to minimize impact on you and your family.
Enhanced	Enhanced winter storm threat. Primary threat is disruption to travel.
Slight	Slight winter storm threat. If threat materializes, may cause travel disruptions.
None	No significant winter storm threat is currently expected. However, light wintry precipitation may still be possible.

- We are evaluating this in the context of other impact-based threats information (e.g. Winter Storm Severity Index), with the goal of providing consistent, impact-based information to meet stakeholder needs.



Eastern United States Projects

Experimental Lake Effect Snow Warning Polygons

Benefits

- *Enhanced information:* Highlights highest impact areas
- *More precise warnings:* Reduces size of the False Alarm area
- *Increased effectiveness of the warning:* Allows for a more organized and cost-effective use of public resources to minimize the effects of these high-impact LES events

Future Plans

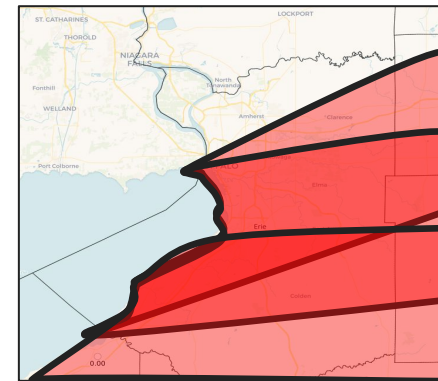
Goal: Operational Status, through this display, the operational WWA map, or a separate viewer

Consideration: NWS exploring transition from zone-based long-fuse hazard products to polygon-based

Note: Feedback gathered from this experiment will help NWS provide more precise watches and warnings in the future and will support a decision on the best way forward to make these polygons operational.

Example

```
...LAKE EFFECT SNOW WARNING  
REMAINS IN EFFECT...  
  
* WHAT...  
* WHERE...  
* WHEN...  
&&  
  
Experimental content below  
COORD...4258 7825 4275 7819 4277 7864 4267 7904  
4257 7914 4238 7950 4230 7975 4199 7977 4208 7952  
4215 7936 4225 7898 4239 7861  
TIME Y17M12D10T1100Z-Y17M12D11T1100Z  
COORD...4227 7898 4228 7904 4240 7914 4241 7929  
4233 7942 4232 7954 4225 7976 4199 7977 4201 7923  
4199 7897 4199 7873 4203 7873  
TIME Y17M12D11T1100Z-Y17M12D11T1700Z  
COORD...4260 7822 4274 7805 4282 7803 4284 7820  
4277 7864 4278 7881 4274 7903 4232 7975 4223 7976  
4224 7961 4244 7887 4250 7853  
TIME Y17M12D11T1700Z-Y17M12D12T0800Z
```



Output Options

- Interactive (ESRI) map (https://www.weather.gov/buf/les_polygon)
- Static graphics or GIF (https://www.weather.gov/buf/les_polygonStatic)
- KML
- Text

Questions so far related to....?

Program Vision

Key Messages

Local PWPF

Local Winter Pages

Days 3-7 Product

Lake Effect Snow Polygons



Coming Soon: Impact-Based Warning Impact 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.

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

Coming Changes

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.

What This Means

WEA will only activate for high-end events with the SIGNIFICANT tag when implemented. This is similar to the Flash Flood Warning changes in 2019 (and Severe Thunderstorm Warnings in 2021).

```
...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 o
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
$$
```

Coming Soon: Impact-Based Warning Impact Tags for Snow Squall Warnings

Why make these changes:

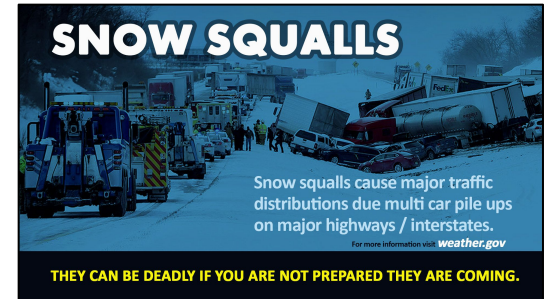
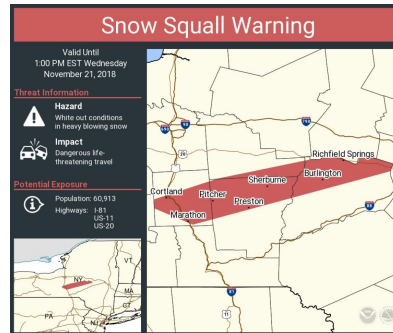
- Improve public response to Snow Squall Warnings
- Mitigate known issue of WEA overuse & user fatigue
 - Allow for overnight issuance of Snow Squall Warnings to activate highway message boards & notify partners/public without WEA activation
- Ensure WEA activation is reserved for high-impact events

When is Implementation?

No Earlier than October 2022

Feedback Received:

- Internal NWS Feedback positive **across all NWS Regions**
- **92%** of Responses from Public Survey (536 users) were **positive**
- Some concerns include... “possible overuse of ‘general’ warnings,” “shouldn’t all warnings be significant,” & “unnecessarily complicated”
- With increased training & outreach, negatives will be mitigated



Updates: Avalanche Weather Initiative

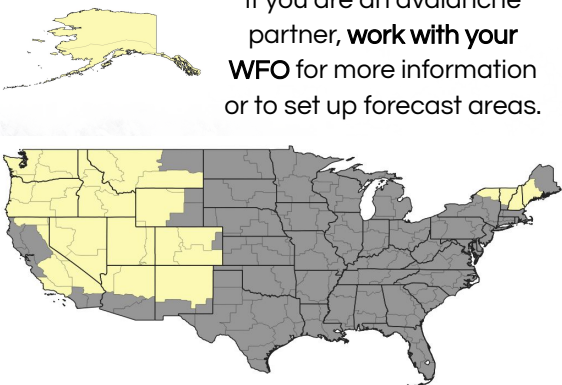
Avalanche Weather Guidance

Forecast Elements may include: temperatures, weather, probability of precipitation, snowfall, liquid or snow-water equivalent, ice accumulation, snow level, winds, and cloud cover.

Changes for this year include expansion to **27 WFOs (yellow below)** and improved display to allow for variable time resolution.

Available on or about November 1st.

If you are an avalanche partner, **work with your WFO** for more information or to set up forecast areas.



Avalanche Weather Guidance														
National Weather Service Burlington VT														
:1025 AM EDT Fri Oct 15 2021														
*****THE NORTHERN ADIRONDACKS*****														
Date	Friday 10/15						Saturday 10/16							
Time (LT)	06	09	12	15	18	21	00	03	06	09	12	15	18	21
	06	9a	12	3p	6p	9p	12	3a	6a	9a	12	3p	6p	9p
Cloud Cover	OV	OV	OV	OV	OV	OV	OV	OV	OV	OV	OV	OV	BK	BK
Cloud Cover (%)	75	75	75	80	85	95	95	90	85	100	95	85	75	65
Temperature	59	61	62	60	59	58	56	57	59	60	57	53	49	44
Max/Min Temp	62						56						60	
Wind Dir	SW	SW	W	SW	SW	SW	S	S	SW	W	W	W	W	W
Wind (mph)	10	11	10	9	16	25	27	28	36	37	28	29	32	28
Wind Gust (mph)							46						58	
Precip Prob (%)	30	30	30	20	30	50	50	50	50	80	100	100	70	40
Precip Type	R	R	R	R	R	R	R	R	R	R	R	R	R	R
12 Hour QPF	0.05						0.13						0.60	
12 Hour Snow	0.0						0.0						0.0	
12 Hour Ice	0.00						0.00						0.00	

Experimental WFO Avalanche Weather Website

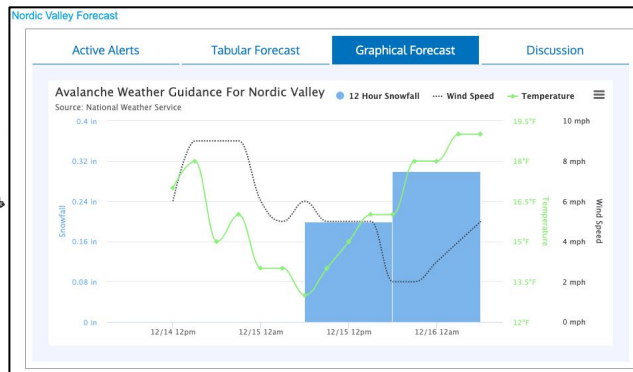
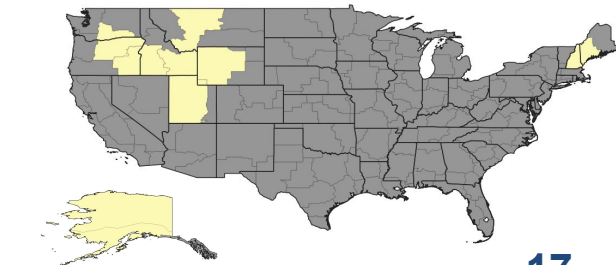
Avalanche weather web pages are critical sources of information for partners to easily obtain avalanche products & information. Standardization will make each page consistent with one other, increasing the visibility and accessibility of information.

An experimental standardized web page is available for comment and review through **April 30, 2022 at 9 WFOs (yellow below)**.

If comments are favorable, this experimental web page will be considered for implementation on a wider scope for the winter of 2022-2023.

Available this winter (date tbd):

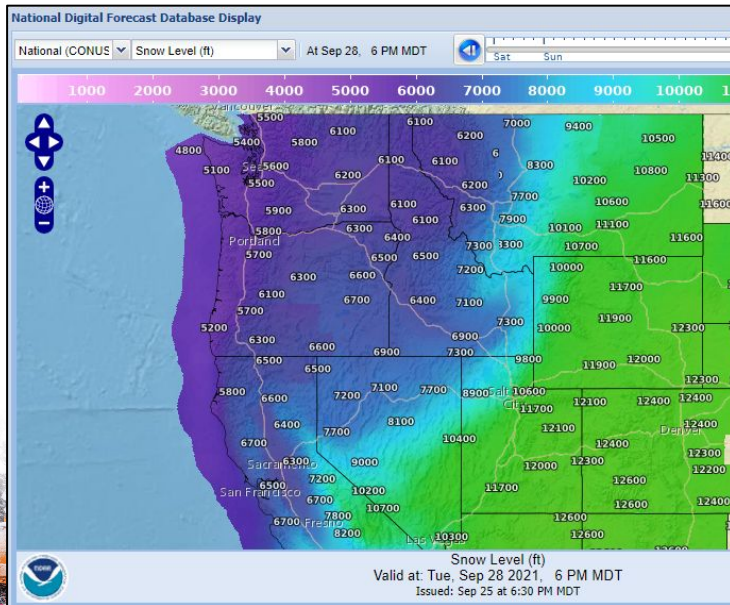
<https://www.weather.gov/slc/AvalancheWeather>



Updates: Avalanche Weather Initiative

Snow Level Grid Now Available

Available for locations from the Front Range of the Rocky Mountains westward at <https://digital.mdl.nws.noaa.gov/>



Additional Avalanche Safety Content

In partnership with USFS/National Avalanche Center, a suite of new avalanche awareness and safety content will be available this winter (with dual branding).

https://www.weather.gov/wrn/winter_safety

AVALANCHE WATCH

An Avalanche Watch is issued when **dangerous avalanche conditions are possible**.

Be prepared to adjust your plans in case a Warning is issued.

Be Prepared.



weather.gov

AVALANCHE WARNING

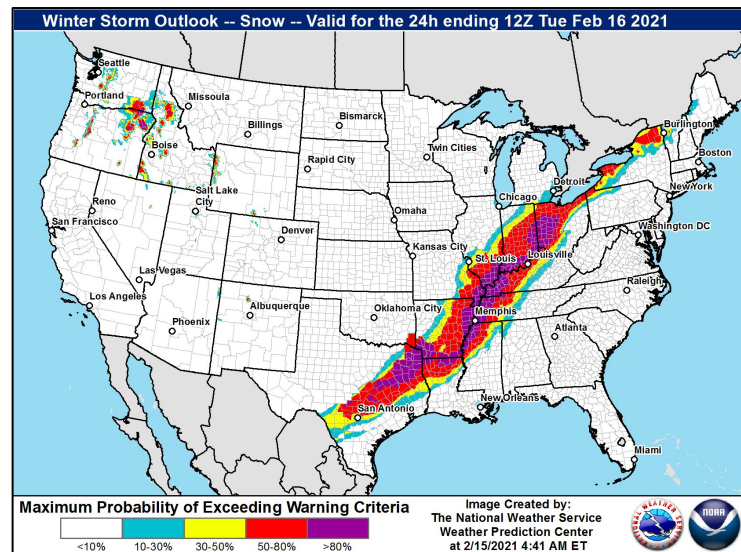
An Avalanche Warning is issued when **dangerous avalanche conditions currently exist**.

Avoid avalanche terrain until conditions improve.

Take Action!

Experimental Winter Storm Outlook

- In its 4th season of providing the probability of realizing hazardous snow/ice accumulations using WFO-specific Watch/Warning criteria as a proxy threshold.
- Provides a Days 1-4 “Outlook” product in the winter program, serving to unify both external messaging and internal collaboration for consistent and collaborative Winter Storm Watch issuance.
- One of a few key factors considered in the issuance of Winter Storm Watches, as meeting certain thresholds for warning criteria triggers enhanced coordination between WPC & affected WFOs.



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

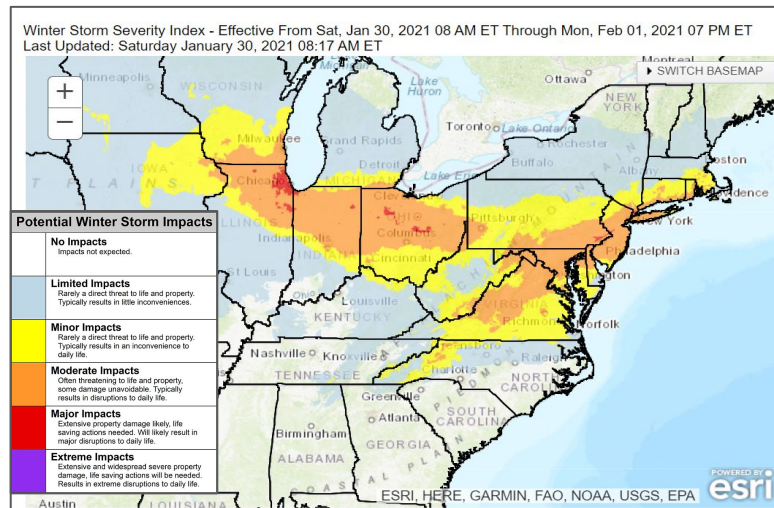
Provide Feedback:

https://www.surveymonkey.com/r/WinterStormOutlook_2021

Winter Storm Severity Index (WSSI)

Deterministic WSSI Updates

- **Goal:** Forecast the potential severity of community impacts from winter storms throughout the continental United States, including tree damage, property damage, transportation impacts, and disruptions to daily life
 - Provides winter storm impact information out to 72 hours, and in 24 hour intervals *with a new Experimental Day 4!*
 - Includes meteorological & non-meteorological factors
 - Six levels of impact provided
 - Summary graphic is a composite of the maximum impact from any of the six components
 - Continued social science research applications to evolve language, scale, and colors



Output available here:
www.weather.gov/wssi

Updates every 2 hours

WSSI - Components & Scale



Snow Load

Indicates potential infrastructure impacts due to the weight of snow



Ground Blizzard

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



Snow Amount

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



Flash Freeze

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



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

Potential Winter Storm Impacts

	<p>No Impacts Impacts not expected.</p>		<p>Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.</p>
	<p>Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.</p>		<p>Major Impacts Extensive property damage likely, life saving actions needed. Will likely result in major disruptions to daily life.</p>
	<p>Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.</p>		<p>Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.</p>



WSSI: Webpage

- Clickable tabs
 - Loads WSSI components upon click
 - Day Period tabs
 - **New Experimental Day 4/Days 1-4 tabs**
 - **New Rolling 6-Hr Data Viz Option**
- Zoom-to-WFO Drop-down Box
- Print Image button
 - Creates a PDF of the map with your specifications
- Variety of basemaps
 - Switch Basemap dropdown button
- Browse static images
- Links to GIS data (SHP and KML)

WEATHER PREDICTION CENTER
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECASTS & ANALYSES ARCHIVES VERIFICATION INTERNATIONAL DEVELOPMENT ABOUT SEARCH

Winter Storm Severity Index (WSSI)

The WSSI does not depict official warnings and should always be used in context with official NWS forecasts and warnings. For a users guide and more information about the WSSI, please select from the dropdown menu below. [Click Me for Additional Information](#)

NEW! Rolling 24 HR WSSI Display located here

Overall Impact Snow Amount Snow Load Ice Accumulation Flash Freeze Blowing Snow Ground Blizzard

Overall Impact: Maximum impact from any of the components.

Days 1-3 Day 1 Day 2 Day 3 **EXPERIMENTAL** Day 4 Days 1-4

Select Zoom Area: [CONUS] CONUS [Print Map]

Winter Storm Severity Index - Effective From Thu, Sep 30, 2021 01 PM ET Through Sat, Oct 02, 2021 08 PM ET
Last Updated: Thursday September 30, 2021 01:22 PM ET

Potential Winter Storm Impacts

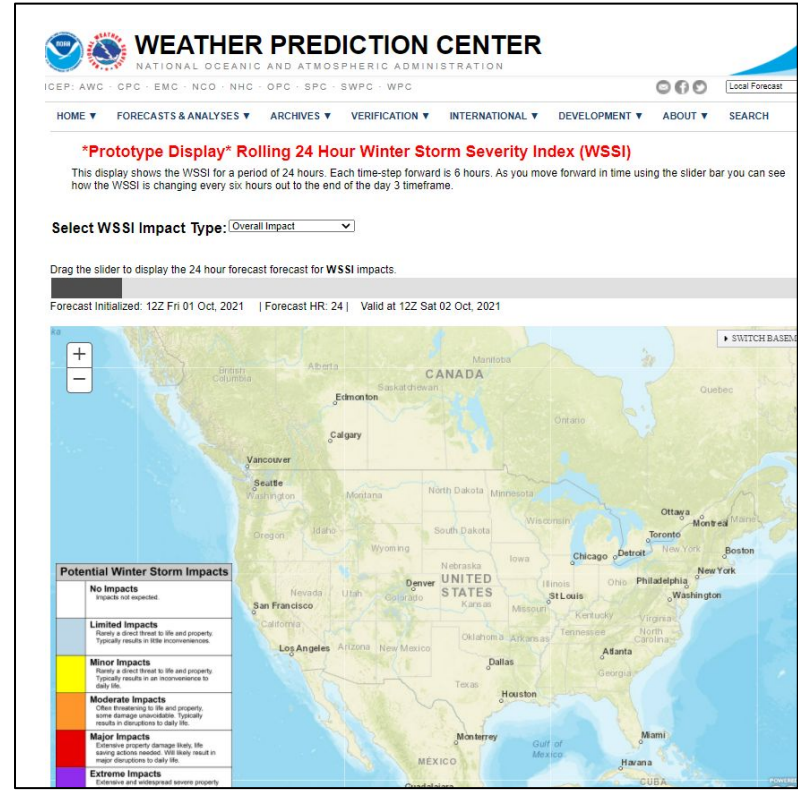
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Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.
Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.
Major Impacts Extensive property damage likely, life saving actions needed. WSI likely result in major disruptions to daily life.
Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.

Download Latest WSSI in GIS Format:
Download Data in KML
Download Data in SHP

www.weather.gov/wssi

WSSI: **NEW** Rolling 6-HR Visualization Option

- Allow users to visualize the impact levels progression through time versus viewing per calendar day.
- Drop-down box allows user to select Impact Type to be visualized on the map
- Users can display a WSSI 24-hour forecast period with the start time advancing every 6 hours (i.e. 18Z to 18Z, 00Z to 00Z, etc.)

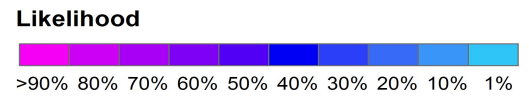
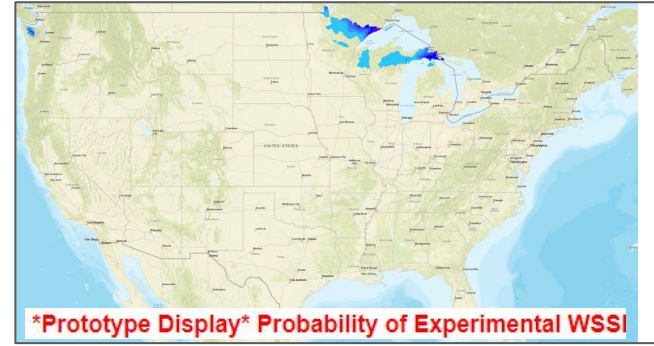


https://origin.wpc.ncep.noaa.gov/wwd/wssi/wssi_rolling_24h.php



Winter Storm Severity Index (WSSI) Coming Soon: Experimental Probabilistic WSSI

- Probabilistic WSSI is still in development, which may serve as a key input into collaborative Winter Storm Watches
- Social science improvements underway to better align the WSSI with impacts and successfully communicate likelihood of forecast severity
- Public training material will be provided to improve understanding and usability among a broad base of users



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

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



QUESTIONS AND ANSWERS ABOUT
SNOW SQUALLS
WWW.WEATHER.GOV/SAFETY

WHAT ARE THEY?
Quick intense bursts of snow
Accompanied by strong gusty winds
Short-lived, typically less than 3 hours
Normally occur during the day

WHAT ARE THE IMPACTS?
Rapidly reduced visibility
Treacherous travel conditions
Potential for chain-reaction accidents

WHAT'S A SNOW SQUALL WARNING?
Warning is usually 30-60 minutes in length
Issued for small areas where snow squalls are expected
Similar to a Tornado or Severe Thunderstorm Warning

HOW CAN YOU STAY SAFE?
Have a way to get forecasts and warnings
Consider an alternate route or delaying travel
Stay alert for rapidly changing road conditions
Reduce speed and use low beam headlights

WEATHER.GOV

Updated Outreach Materials

After the Winter Storm: **POWER OUTAGE**



Be careful with heat sources

Candles and space heaters are a fire risk. Also stay warm by bundling up and keeping doors closed, placing towels in cracks.



Practice portable generator safety

Use outdoors, at least 20 feet away from doors/windows/garages to avoid carbon monoxide poisoning. Follow instructions on proper use.



Check on neighbors

Once your family is safe, check on your neighbors and make sure they are OK.

weather.gov



SNOW SQUALLS

- Intense bursts of snow and wind
- Short duration
- Whiteout visibility
- Rapidly deteriorating road conditions

National Weather Service **SNOW SQUALL WARNINGS**

- Issued when a snow squall is occurring or imminent
- Typically in effect for 30-60 minutes in a small, targeted area
- Can trigger a Wireless Emergency Alert to your phone
- When issued, slow down or delay travel

weather.gov



weather.gov/winter



MANTENIÉNDOSE CALIENTE CUANDO NO HAY ELECTRICIDAD

- Cierre las persianas o cortinas para mantener algo de calor.
- Cierre los cuartos para evitar perder calor.
- Vista capas de ropa holgada, liviana, y caliente.
- Coma y tome líquido. La comida provee energía para calentar su cuerpo. Evite cafeína y alcohol.
- Ponga toallas o sábanas en las aperturas debajo de las puertas.

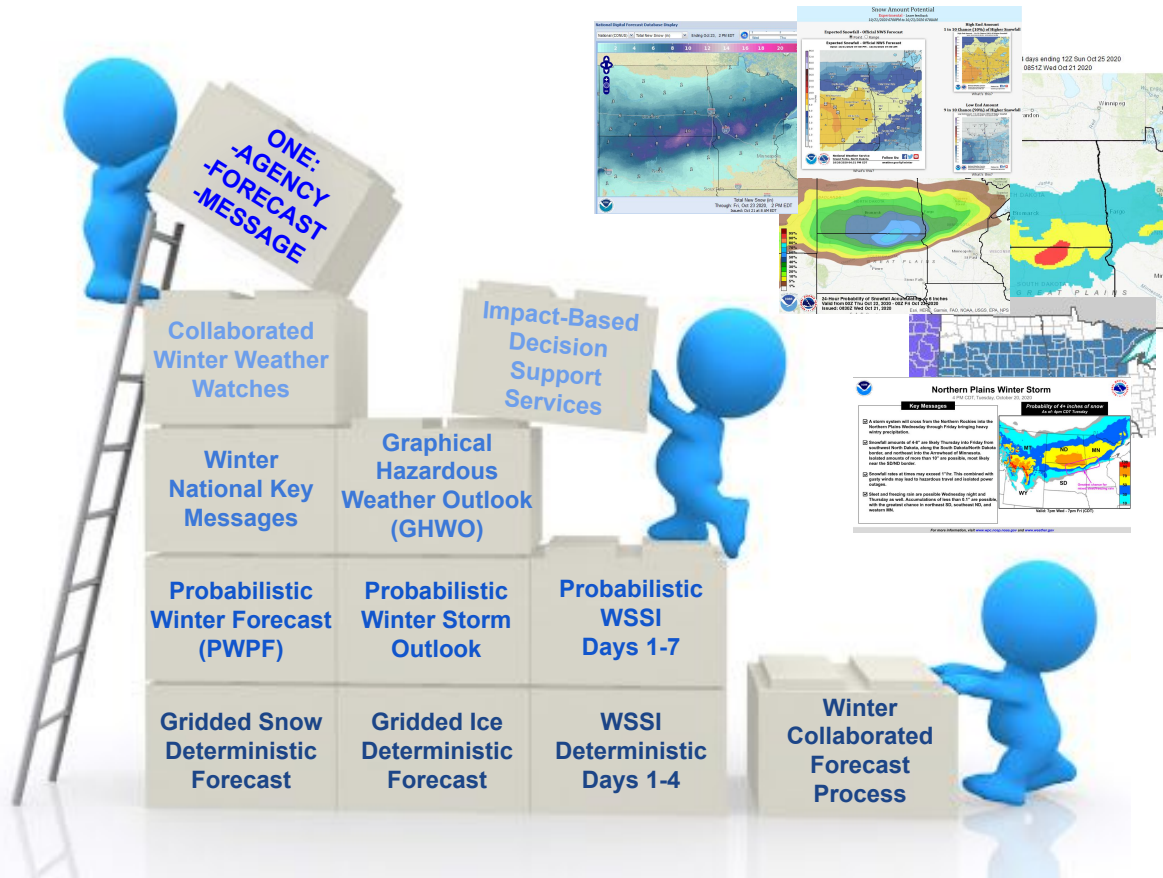
COVID-19 Related Cold Weather Messaging

- The NWS Winter Program coordinated with the NWS Office of Communications and the Centers for Disease Control to develop cold weather messaging and graphics that are especially relevant during the pandemic:
 - *Bundling up and staying dry are two of the best things you can do to stay safe from cold temperatures this fall and winter. Wear layers to stay warm and continue to follow CDC guidelines on how to protect yourself and stop the spread of COVID-19, including wearing a mask. Learn to protect yourself from the cold at [weather.gov/safety/cold](https://www.weather.gov/safety/cold).*



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 while still leveraging single-value forecasts for better decisions
- Engaging with partners and agency experts across the weather enterprise to continually improve the winter suite of products and services





Update on Winter Weather Initiatives



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Links:

WPC PWWF page:

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

Local office Experimental PWWF page:

<https://www.weather.gov/btv/winter>

Operational WSSI:

www.weather.gov/wssi

Experimental WSO Webpage:

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

Experimental WSO Product Survey:

https://www.surveymonkey.com/r/WinterStormOutlook_2021

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