Update on Winter Weather Initiatives

Partner Webinar
October 30, 2018

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Outline

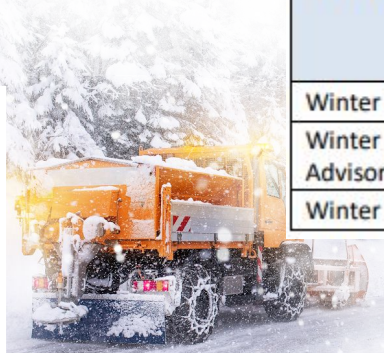
- Hazard Simplification
- Snow Squall Warnings
- Probabilistic Winter Precipitation Forecast Experiment
- Winter Storm Severity Index
- Winter Storm Watch Collaboration
- New Outreach Materials

Hazard Simplification Project

- Some users have found Watch, Warning, Advisory terms confusing
- NWS working with social and behavioral scientists to explore better ways to communicate hazard messages
- Large number of available product types can lead to complicated map depictions of hazards and can potentially be confusing
- Encouragement during HazSimp Workshops and through surveys to reduce suite of hazards and to simplify text formats

Term Used in Question	Number Who Answered Question	Response Options		
		A storm is possible, and may pose a threat to life and/or property	A storm is certain, and may pose a threat to life and/or property	A storm is certain, but does not pose a direct threat to life and/or property
Winter Storm Warning	422	42.2%	43.8%	14.0%
Winter Weather Advisory	432	60.4%	22.2%	17.4%
Winter Storm Watch	444	68.9%	19.8%	11.3%

"Cold Region" Survey Responses - Source ERG (2018)

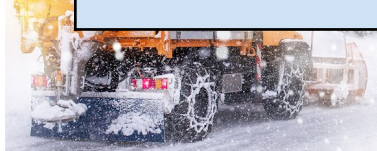


Hazard Simplification Project: Winter Product Consolidation

Previous Winter Products		
Lake Effect Snow Advisory	Consolidated to →	Winter Weather Advisory
Winter Weather Advisory		
Freezing Rain Advisory		

Winter Storm Watch	Consolidated to →	Winter Storm Watch
Lake Effect Snow Watch		
Blizzard Watch		

Winter Storm Warning	Consolidated to →	Winter Storm Warning
*Lake Effect Snow Warning**		~~Ice Storm Warning~~
Ice Storm Warning		Blizzard Warning
Blizzard Warning		



Consolidated in select Regions during 2017/18 season and consolidated in all Regions during 2018/19 season

Hazard Simplification Project

Poll Time:

- ***Hazard consolidation has made it more difficult for you, or your organization, to clearly understand or convey winter threats.***
  - Strongly agree
  - Agree
  - Neither agree nor disagree
  - Disagree
  - Strongly disagree

Hazard Simplification Project: Winter Warning Consolidation

Current Warning products
Winter Storm Warning
Ice Storm Warning
Blizzard Warning

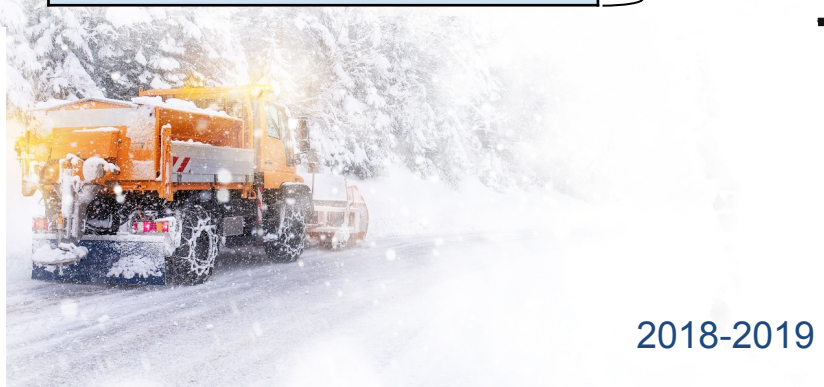
Consolidate →

Consolidated Option 1
Winter Storm Warning

Current Warning products
Winter Storm Warning
Ice Storm Warning
Blizzard Warning

Consolidate →

Consolidated Option 2
Winter Storm Warning: (for) Accumulating Snow
Winter Storm Warning: (for) Mixed Precip
Winter Storm Warning: (for) Significant Icing
Winter Storm Warning: (for) Blizzard Conditions



Hazard Simplification Project: Winter Warning Consolidation

Hazard Simplification Project: Winter Warning Consolidation Survey available here:
https://www.surveymonkey.com/r/winterwarning
Survey available through November 10, 2018

1. Please indicate the degree to which you agree or disagree with the statements below.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I don't know
NWS should consolidate its Winter Warning products (Winter Storm Warning, Ice Storm Warning, Blizzard Warning) to one Winter Storm Warning product **as shown in Option 1**.	○	○	○	○	○	○
NWS should consolidate its Winter Warning products (Winter Storm Warning, Ice Storm Warning, Blizzard Warning) to one Winter Storm Warning product with four headline options **as shown in Option 2.**	○	○	○	○	○	○
NWS should do **no further consolidation** of the Winter Warning (precipitation) products.	○	○	○	○	○	○

2. If you have any additional comments, suggestions or concerns with the proposed Winter precipitation warning products consolidation, please describe them below.

Hazard Simplification Project: Wind Chill Consolidation

Survey closed - June 2018
Potential implementation - Feb. 2021*

Current Products
Extreme Cold Watch
Wind Chill Watch

Consolidated to → **Extreme Cold Watch**

Extreme Cold Warning
Wind Chill Warning

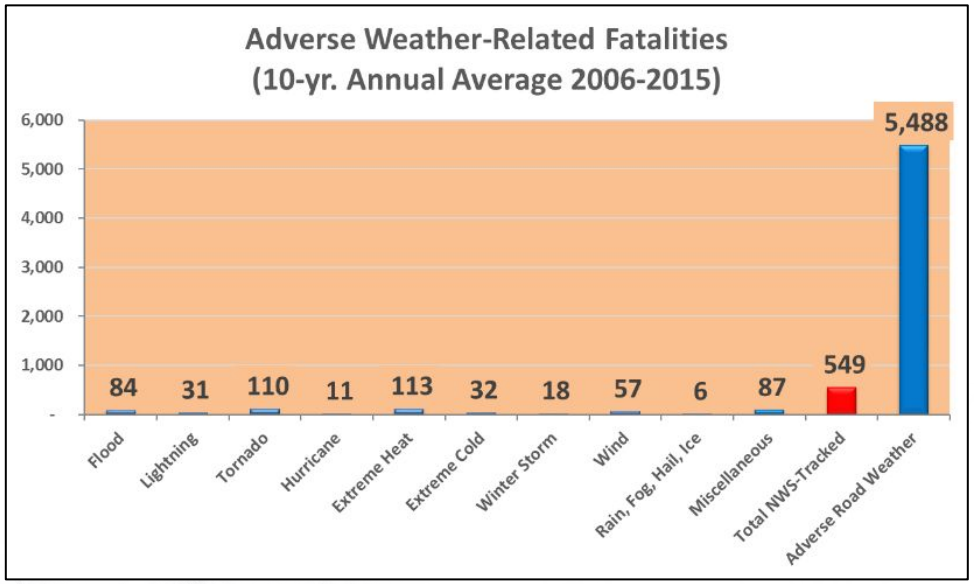
Consolidated to → **Extreme Cold Warning**

Wind Chill Advisory

Renamed to → **Cold Weather Advisory**

****Implementation timeline coincides with internal NWS software upgrade***

New Product: Snow Squall Warning



- Approximately 21% of all auto accidents are weather-related
  - 1.2M weather-related crashes per year
- Annually, weather-related accidents result in*:
  - ~5,000 deaths and 418K+ injured
  - Estimated costs =
    - $5B+ in property damage
    - $3B+ for medical care
    - $8B+ for lost productivity
- Variable speeds are a common source of accidents, especially multi-vehicle accidents

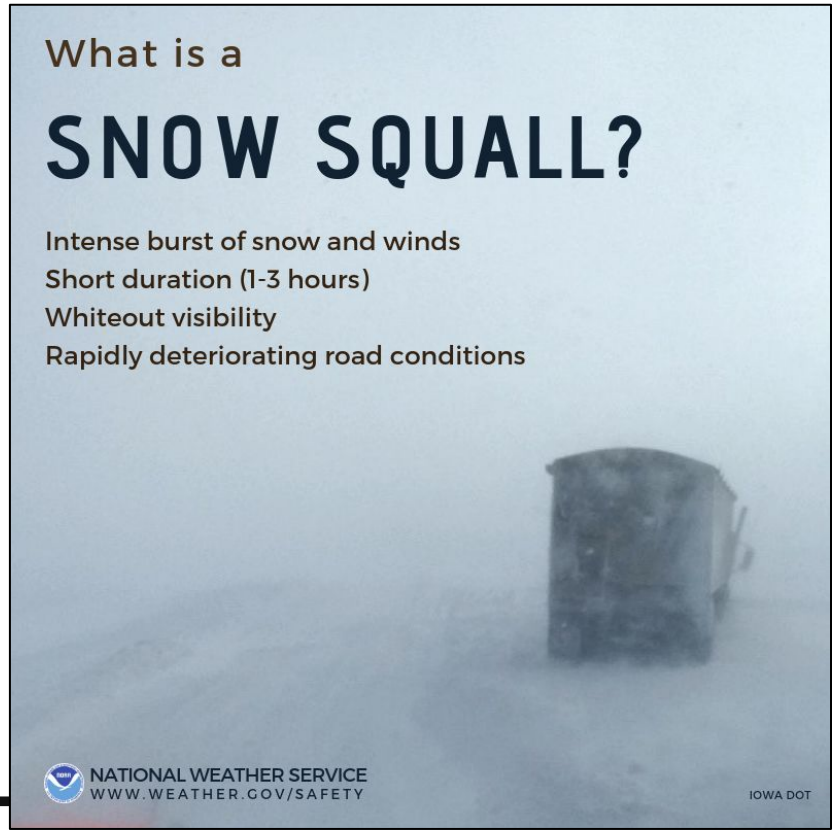
** Source Federal Highways Administration*

New Product: Snow Squall Warning

- Short-lived burst of heavy snowfall resulting in a rapid onset of near zero visibilities and slick roads
  - Often accompanied by gusty winds
  - Intensity similar to short-term blizzard

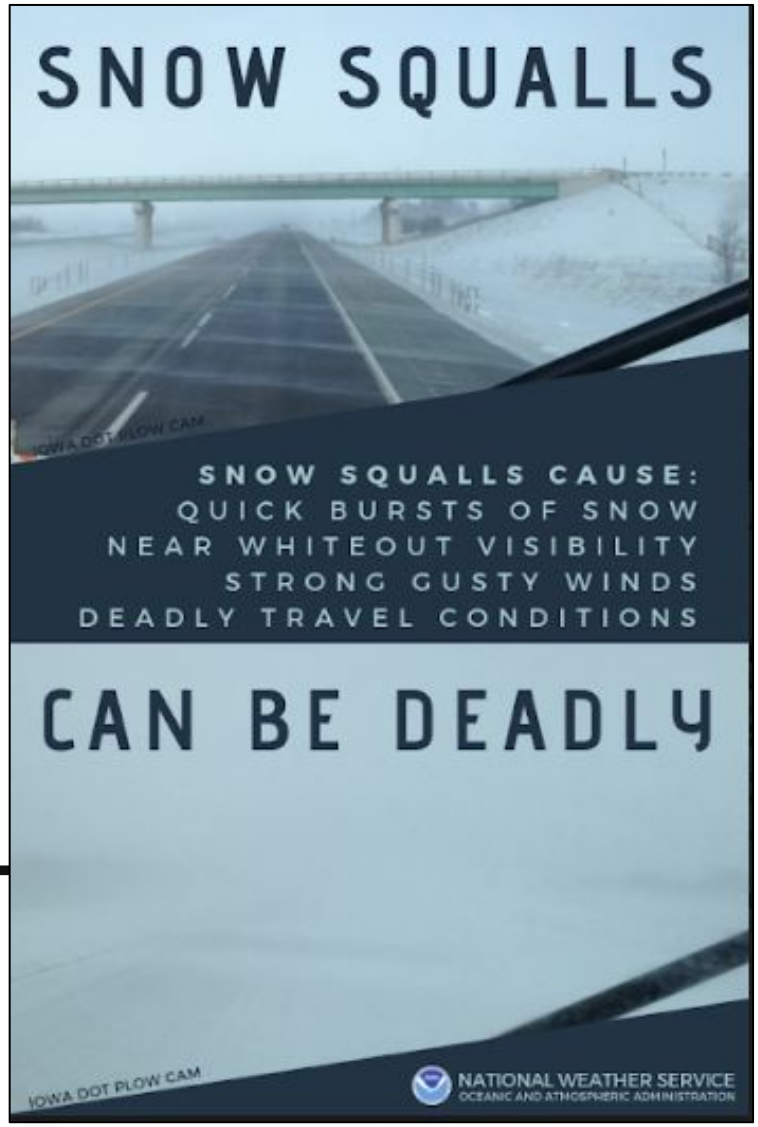
- Snow squalls responsible for many significant chain-reaction accidents
  - Variable speed much more likely as drivers go from clear/dry conditions to a white-out
  - Typically a daytime phenomena

- Also issued for plunging temperatures and gusty winds behind cold fronts sufficient to produce flash freezes and blowing snow

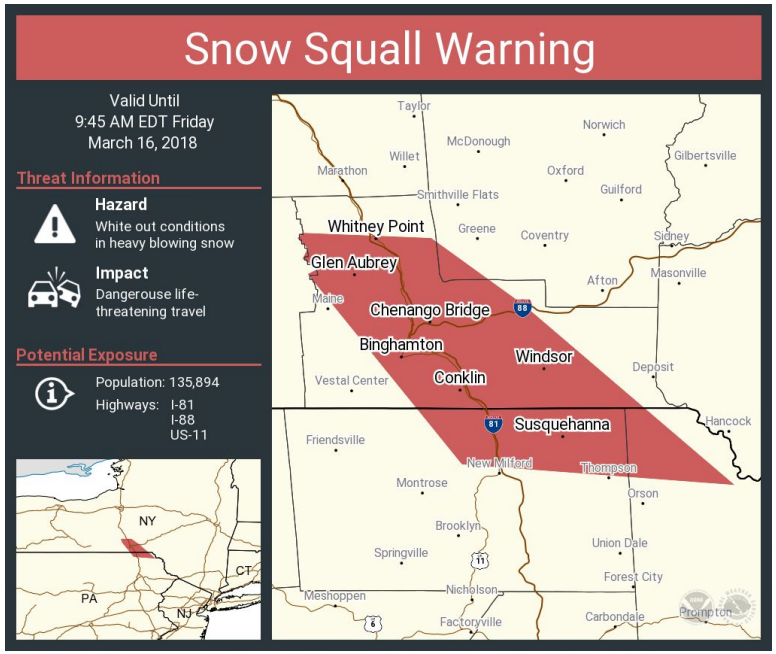


New Product: Snow Squall Warning

- Available nationwide November 1st, 2018
- Issued for areas with no winter weather headlines or within ongoing Winter Weather Advisories
- Valid time will typically be 30-60 minutes
- No EAS activation at this time. WEA notifications are expected by winter of 2019-20.



New Product: Snow Squall Warning



- Polygon issued for a portion of a county or counties
- WFOs will update the product for an extension in area or time by issuing a new Snow Squall Warning
- Product will be cancelled or allowed to expire when conditions no longer meet criteria
- Snow Squall Warning will provide three discrete information segments

  HAZARD...White-out conditions in heavy snow and blowing snow

  SOURCE...Radar indicated and webcams

  IMPACT...Dangerous life-threatening travel

New Product: Snow Squall Warning

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BULLETIN - EAS ACTIVATION REQUESTED
Snow Squall Warning
National Weather Service Burlington VT
647 PM EDT Wed Apr 4 2018

NYC033-089-042345-
/O.NEW.KBTV.SQ.W.0001.180404T2247Z-180404T2345Z/
Franklin NY-St. Lawrence NY-
647 PM EDT Wed Apr 4 2018

The National Weather Service in Burlington has issued a

* Snow Squall Warning for...
  Franklin County in northern New York...
  Southeastern St. Lawrence County in northern New York...

* Until 745 PM EDT

* At 647 PM EDT, a dangerous snow squall was located along a line
  extending from near South Bombay to near Balmat, moving east at 25
  mph.

  HAZARD...Visibility of less than one quarter mile in brief heavy
           snow and blowing snow. Wind gusts in excess of 45 mph.
           Higher elevation roads will become snow covered and
           slippery.

  SOURCE...Radar and webcams.

  IMPACT...Dangerous life-threatening travel.

* Locations impacted include... Tupper Lake, Adirondack Regional
  Airport, Oswegatchie, Moira, Bangor, Parishville, Colton,
  Piercefield, Bryants Mill, Wawbeek, Degrasse, Carry Falls
  Reservoir, Cranberry Lake, Brushton, Lawrenceville, Malone, Debar
  Mountain, Horseshoe Lake, Lake Ozonia and Star Lake.

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 4482 7400 4463 7395 4410 7448 4405 7504
      4420 7541 4489 7461
TIME...MOT...LOC 2247Z 285DEG 23KT 4487 7462 4417 7545
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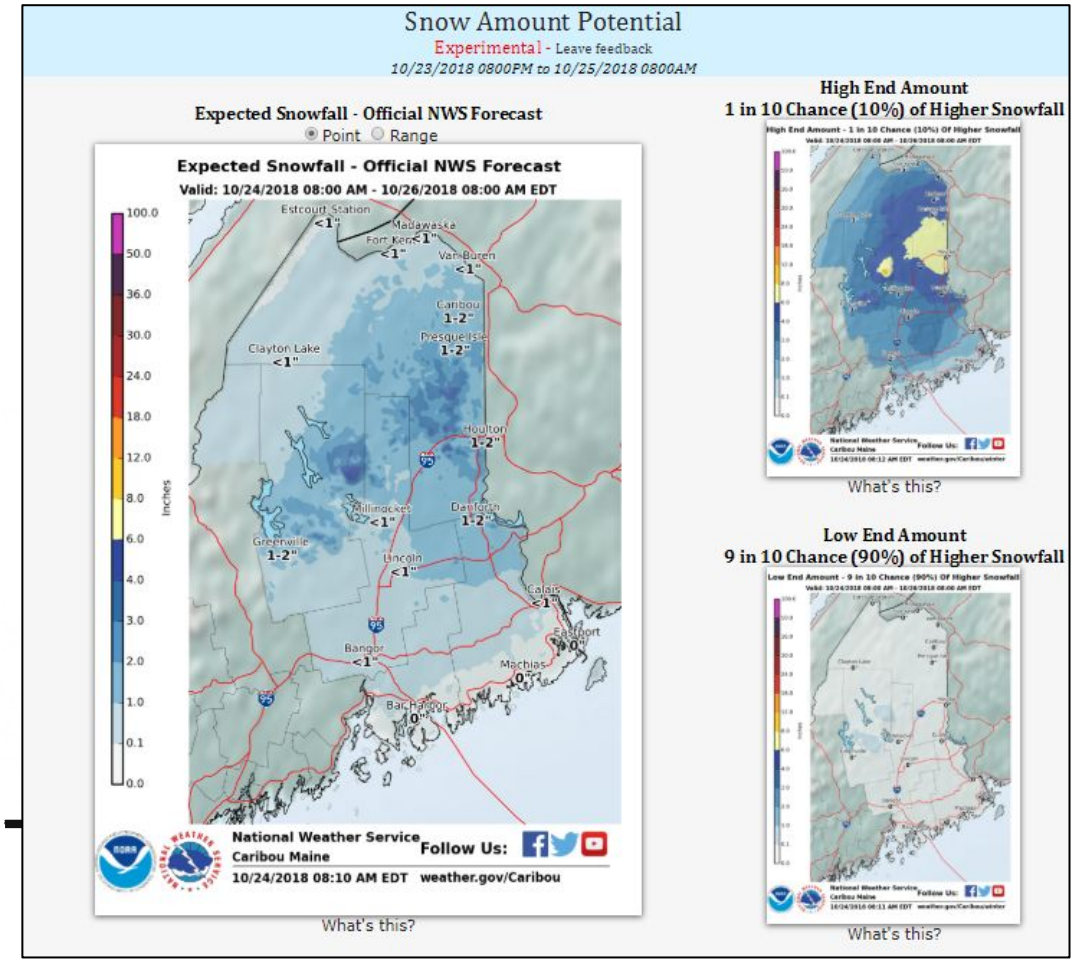
Snow Squall Warning

Poll Question:

- ***Do you intend to give the Snow Squall Warnings high visibility similar to other short fuse convective threats, such as SVRs?***
  - Yes
  - No
  - Not sure

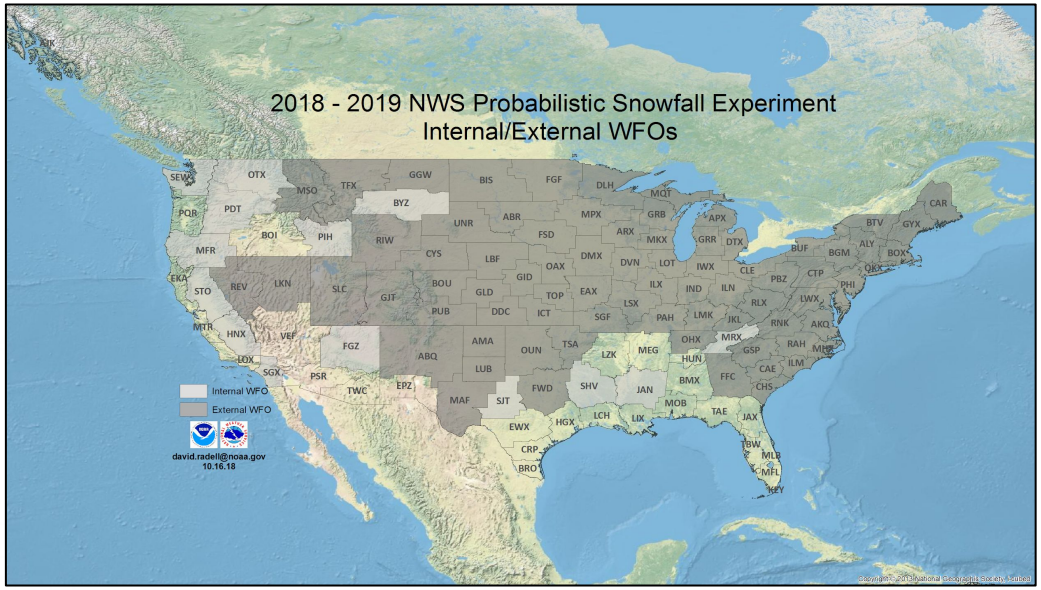
Probabilistic Winter Precipitation Forecast (PWPF) Experiment

- Goal: Provide customers and partners a range of snowfall and icing amounts to better communicate forecast uncertainty during winter weather events
- 46-member ensemble (45 models + WPC)
  - Expert first guess forecast provided by WPC; WFOs add local knowledge
- Significant model diversity contributes to a range of possible outcomes



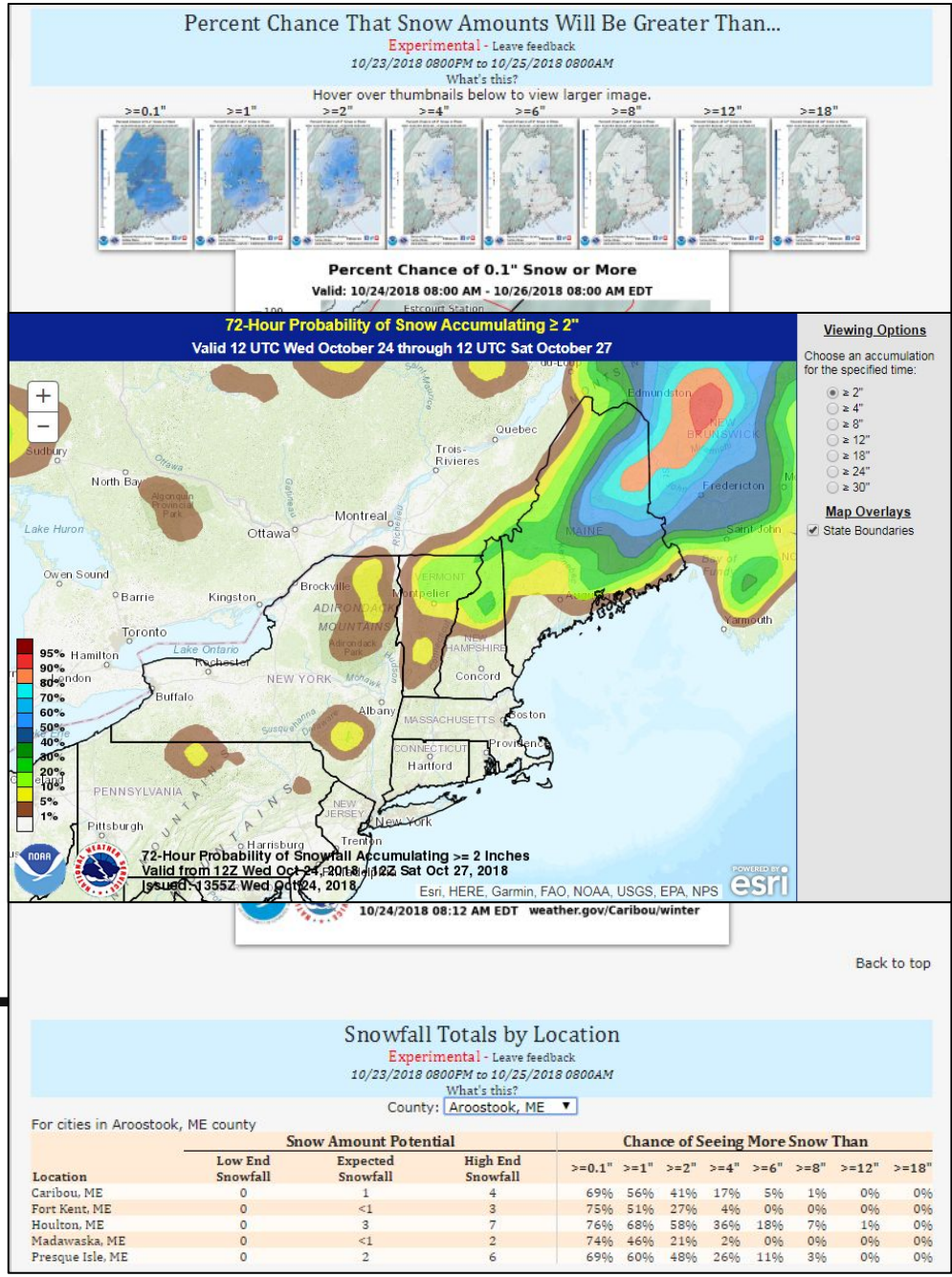
Probabilistic Winter Precipitation Forecast Experiment

- Experiment expanding to 76 offices sharing output externally
  - 14 offices conducting internal reviews
- Minor change to membership for 2018-19
  - Changes incorporate more high-res members in short term
  - Better captures snowbands, complex terrain
- Will post the 24/48/72-hour 10% and 90% probabilities on Experimental NDFD Site
  - Date TBD



PWPF Experiment

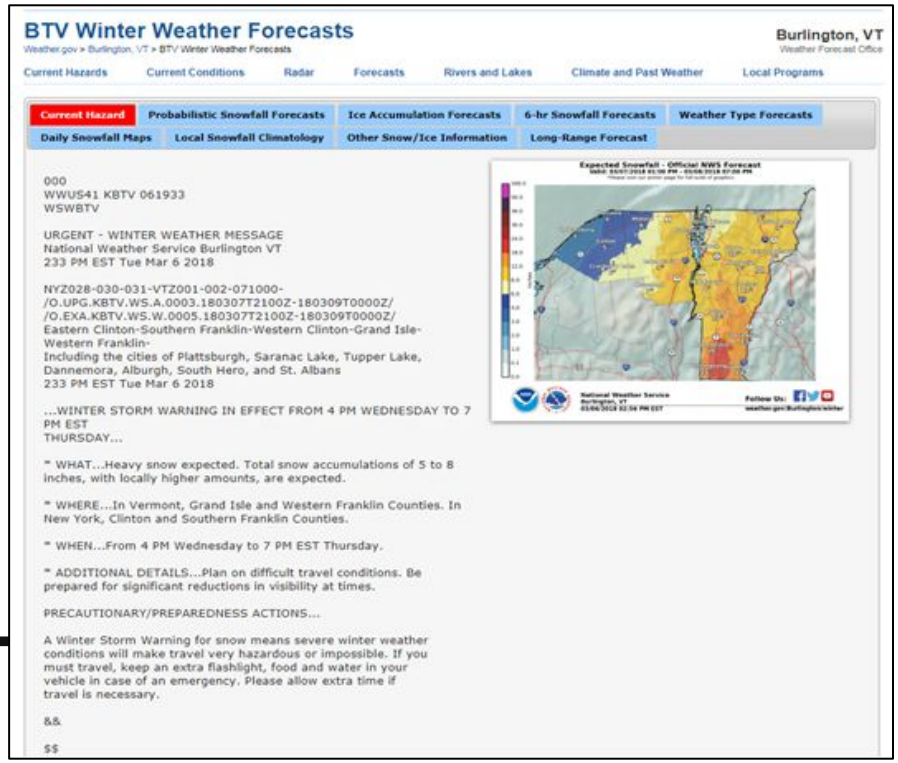
- Snowfall range probability tables have been removed
  - Social scientists reviewed comments and found limited use of this data
- Tables now only include exceedance probabilities
  - Probability of >= 1", >=4" etc.
- Snowfall range between 10th & 90th percentiles are generally not large
  - *Can be wide if event timing, precipitation type, or location of heavy snow band is uncertain*
  - *Note that a couple of outlier models can impact the 'tails' of the ensemble distribution*



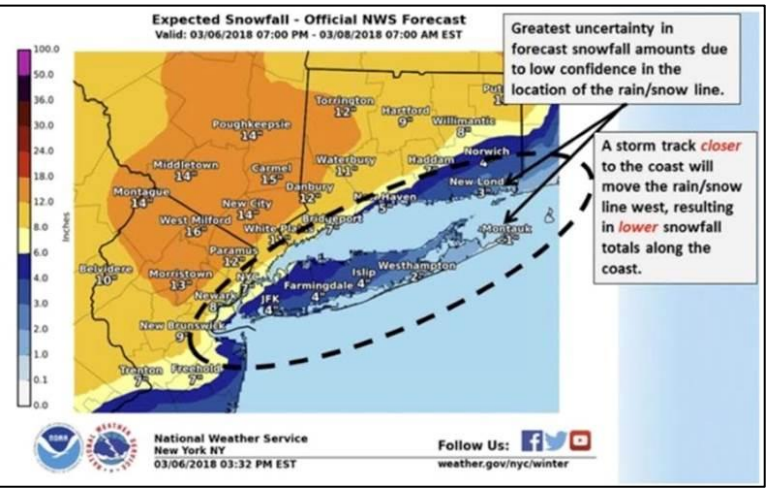
Probabilistic Winter Precipitation Forecast Experiment

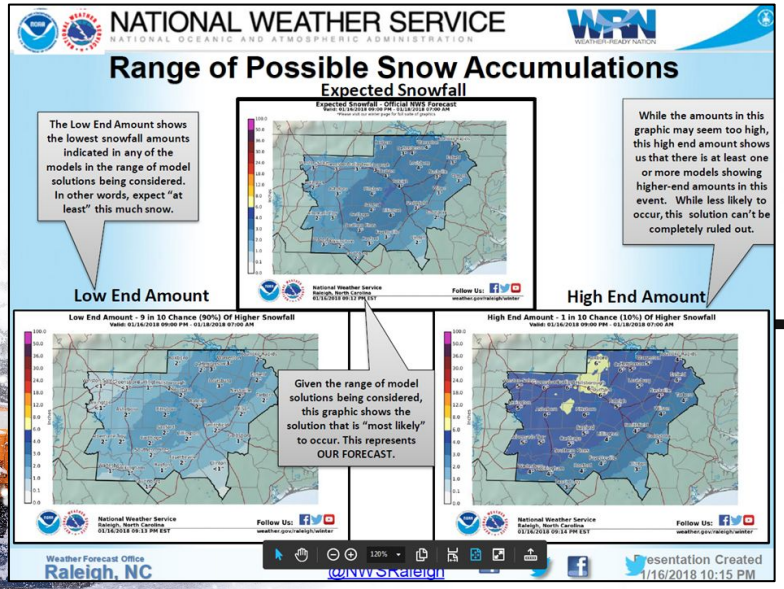
New approach to handling events "in progress"

- Offices have option to add a tab to the PWPF webpage during winter storms
- Tab ("Current Hazard") will contain current WSW as well as storm total snowfall (past & future) graphic when WSW headline is issued
- Probabilistic Snowfall Forecasts tab would then contain only future snowfall using a time window selected by the forecaster (24-h, 48-h, etc)



Probabilistic Winter Precipitation Forecast Experiment - Lessons Learned





- Highlighting areas of greatest uncertainty (eg., rain/snow line) can provide additional information to core partners, in context
- Reinforcing the most likely/expected snowfall as our "official forecast" within the "range of possibilities" with ProbSnow
  - Short descriptions are helpful if audience is new to the products

Slide material provided by Dave Radell

Probabilistic Winter Precipitation Forecast Experiment - Feedback

- Having different display types is a positive
  - Survey respondents expressed different favorites (data versus text)
    - Expected amount and 10th & 90th percentiles most preferred
  - Many positive comments about exceedance probabilities and tables

- Users liked changes in web page design/layout and labeling of graphics

- Large majority understood (and like) the concept of depicting the range of possibilities / uncertainties
  - A few comments about taking some time to learn, but once they figured it out they really got it

Slide material provided by Jeff Waldstreicher

Probabilistic Winter Precipitation Forecast Experiment

Poll Time:

- ***Having the 'Low End', 'High End' & 'Expected Amount' will help me better understand, or convey, the range of possible outcomes.***
  - Strongly agree
  - Agree
  - Neither agree nor disagree
  - Disagree
  - Strongly disagree

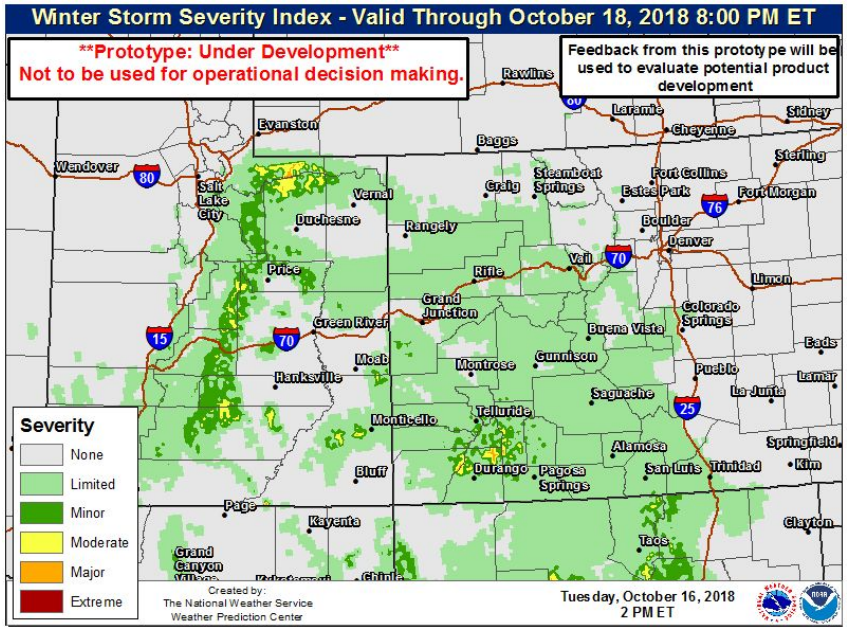
WPC page: https://www.wpc.ncep.noaa.gov/pwpf/wwd_accum_probs.php
Local office: https://www.weather.gov/btv/winter

Ongoing Prototype: Winter Storm Severity Index (WSSI)

- Winter Storm Severity Index:
  - Assists NWS forecasters in maintaining situational awareness regarding potential significance of weather related impacts based upon the current forecast
  - Enhances communication to external partners, media and general public of an event's expected severity (e.g., societal impacts) and spatial extent

- Provides winter storm "impact" info out to 72 hours
  - Includes meteorological & non-meteorological factors
  - Six levels of impact provided in color-coded scale

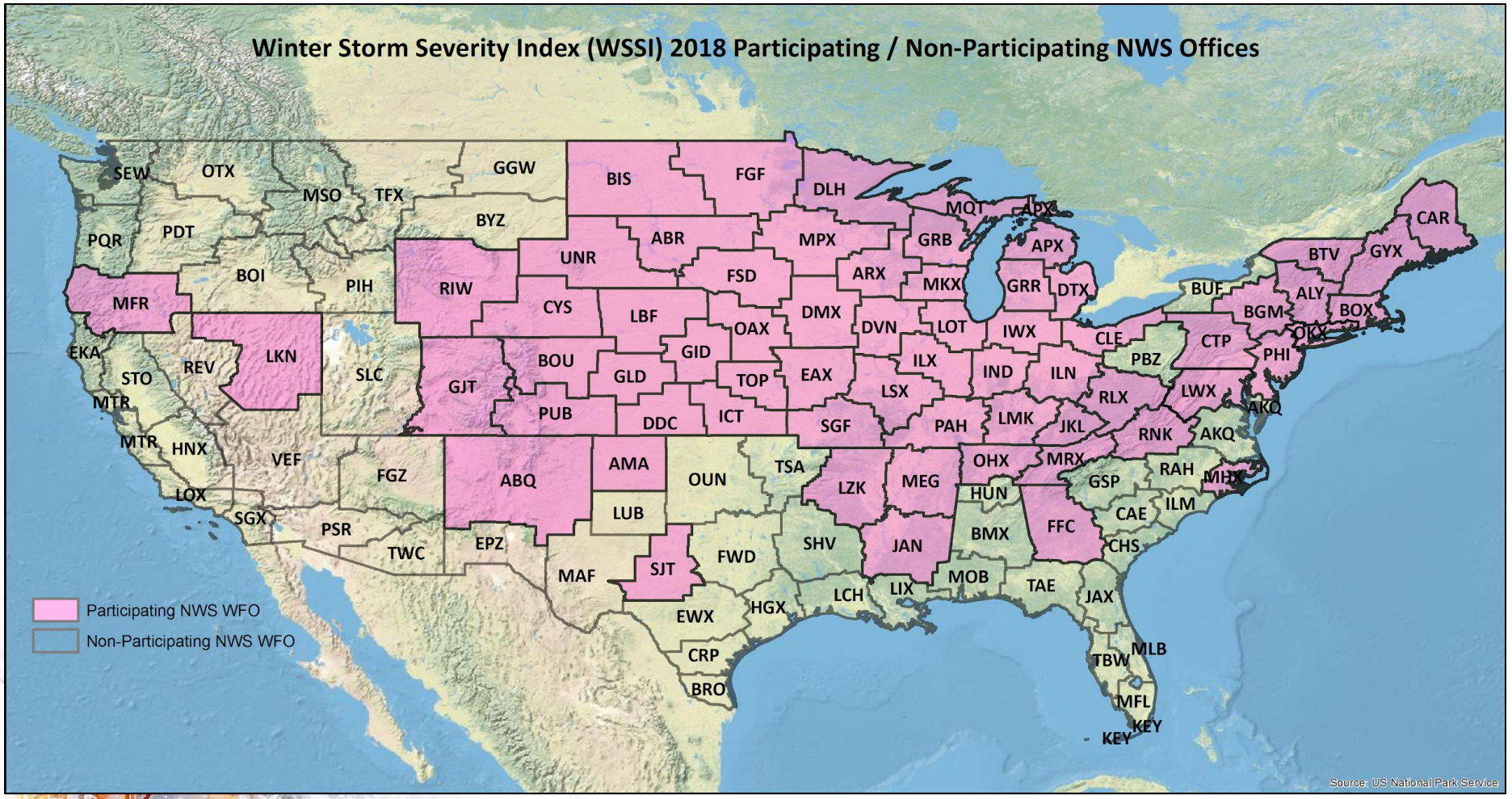
- 62 prototype offices will display output this winter



Output available here:
https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php

Material courtesy of Josh Kastman and Jim Nelson (WPC)

Winter Storm Severity Index: Participating Offices



Material courtesy of Josh Kastman and Jim Nelson (WPC)

Winter Storm Severity Index: Overview

- Goal of the Product
  - Summarize multiple winter weather impacts from a storm into an easily consumable graphic
  - 72 Hour forecast
    - Data comes from the NWS National Digital Forecast Database (NDFD)
    - Updates every 2 hours
- Summary graphic is a composite of the maximum impact from any of the six components

WSSI Impact Description

WSSI Descriptor	General Description of Expected Storm Severity Impacts
None	No snow or ice forecast. No potential for ground blizzard conditions
Limited	Small accumulations of snow or ice forecast. Minimal impacts, if any expected. In general, society goes about their normal routine.
Minor	Roughly equated to NWS Advisory Level criteria. Minor disruptions, primarily to those who were not prepared. None to minimal recovery time needed
Moderate	Roughly equated to a NWS Warning Level criteria. Definite Impacts to those with little preparation. Perhaps a day or two of recovery time for snow and/or ice accumulation events.
Major	Significant impacts, even with preparation. Typically several days recovery time for snow and/or ice accumulation events.
Extreme	Historic. Widespread severe impacts. Many days to at least a week of recovery needed for snow and/or ice accumulation events.

Material courtesy of Josh Kastman and Jim Nelson (WPC)



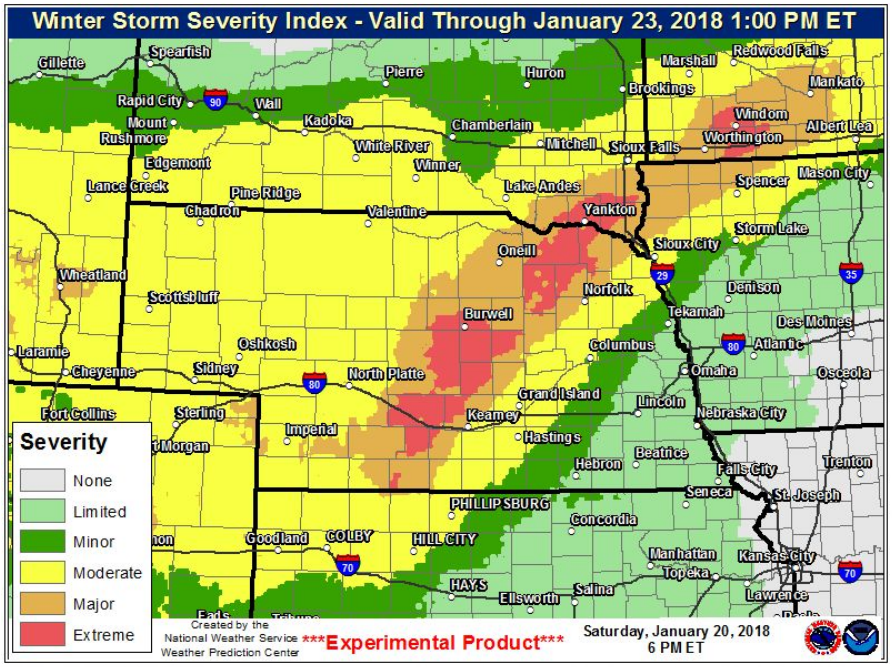


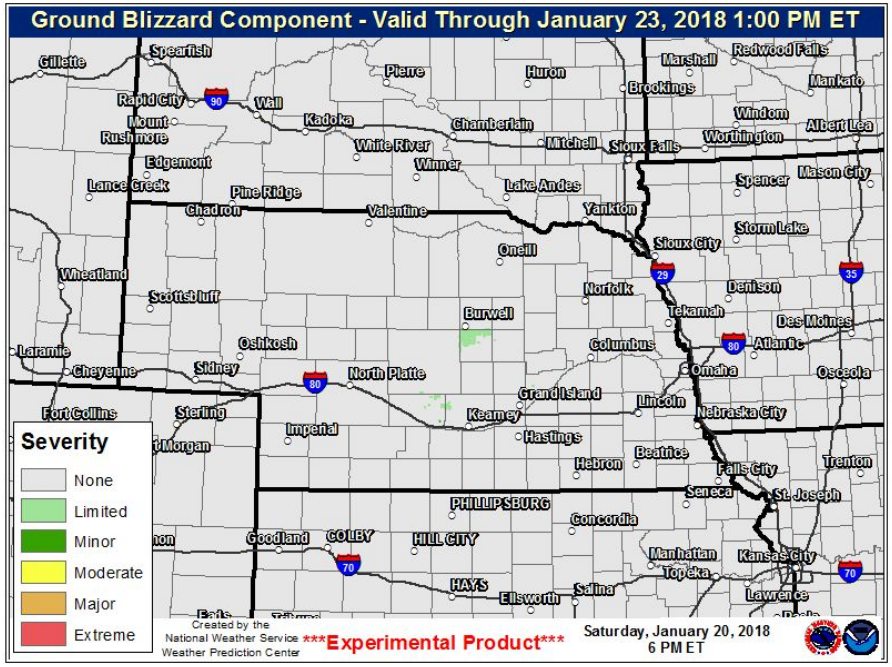
Winter Storm Severity Index: Overview

WSSI consists of 6 different storm components

- Snow Accumulation
  - Total amount or rate will heavily impact transportation system
- Ice Accumulation
  - Combined effects of accretion and wind on utilities, foliage, transportation
- Snow Load
  - Where weight of snow could result in damage to trees and power line
- Blowing Snow
  - Identify where blowing snow may impact transportation
- Ground Blizzard
  - Where pre-existing snow and strong winds combine to impact transportation
- Flash Freeze (regional)
  - Identifies areas with potential for roads to become ice covered

Winter Storm Severity Index: Example





Material courtesy of Josh Kastman and Jim Nelson (WPC)

Winter Storm Severity Index: 2017-18 External Survey

- Positive External Feedback
  - Usefulness
  - Quality
- Most users visit daily throughout the season
- 95% would like to see this product nationally

"I think this is a fantastic product/service, it may just need some calibration for higher impact events."

"The detailed descriptions of the severity level give a good indication of probable weather conditions. The six components in the storm severity index will help me to make more informed decisions for travel and participation in outdoor activities."

" I particularly like that the product focuses on impacts. I think users can get lost in the details and deterministic forecasts for various types of wintry weather precipitation. This is what people need…"

"I really think it's designed ideally for partner communication and clarity with regards to winter weather precipitation."

Material courtesy of Josh Kastman and Jim Nelson (WPC)

Winter Storm Severity Index

Poll Question:

- ***Do you find the severity index for the six individual storm components (e.g., snow accumulation, blowing snow etc.) valuable?***
  - Yes
  - No
  - Not sure

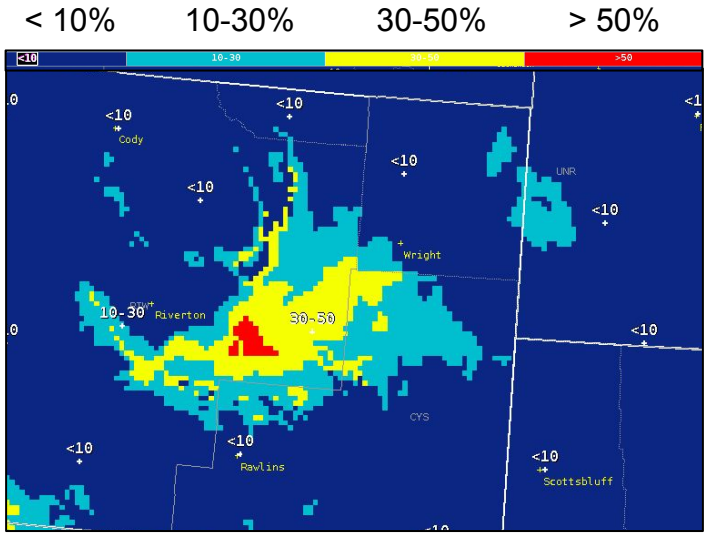
Output available here:
https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php

Winter Storm Watch Collaboration

- Internal test which leverages expertise at the national and local levels to aid Winter Storm Watch decision making

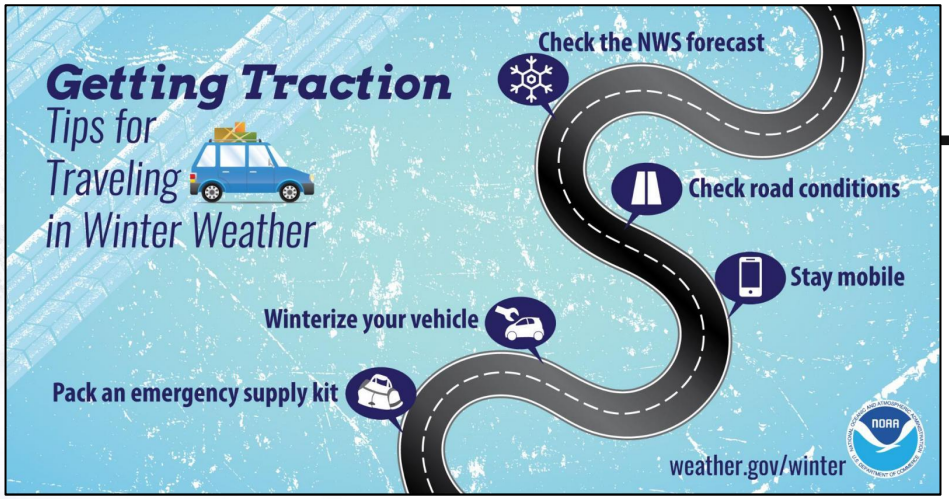
- Weather Prediction Center will provide experimental Winter Storm Outlooks to WFOs for snow & freezing rain
  - Probability of exceeding warning criteria
  - Contours of 10, 30 and 50 percent
  - Days 1 through 3

- 30+ percent chance of meeting warning criteria triggers enhanced coordination between WPC & affected WFOs



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

Update on Winter Weather Initiatives

Contributors:

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Rob Cox
Chris Franks
Danielle Negele
Michelle Hawkins
Josh Kastman
Jim Nelson
Dan Petersen
Jeff Waldstreicher

Links:

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

Local office PWPF page:
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WSSI:
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Hazard Simplification Project Survey:
https://www.surveymonkey.com/r/winterwarning

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