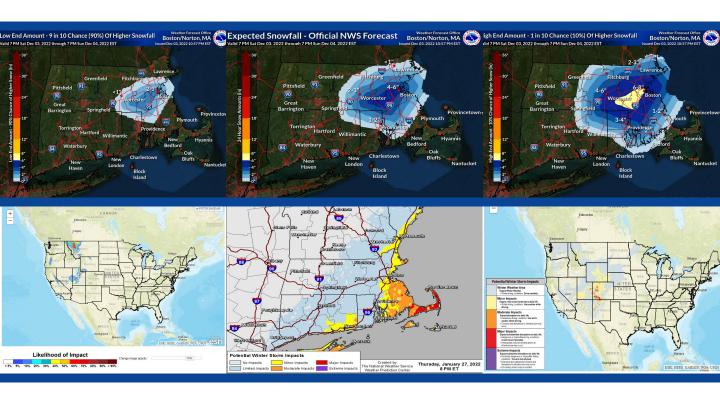


## **NWS Winter Weather Products**

2022-2023

A summary of winter weather products & services available online from the National Weather Service





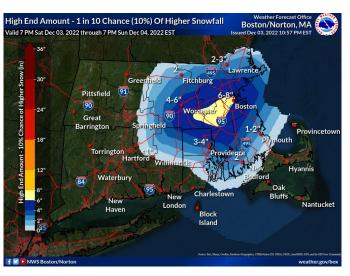
## **Probabilistic Snow Graphics**

https://www.weather.gov/box/winter



# Expected Snowfall Official NWS Forecast

This map is the official NWS snowfall forecast in inches during the time period shown on the graphic. This snowfall amount is determined by NWS forecasters to be the most likely outcome based on evaluation of data from computer models, satellite, radar, and other observations.



#### Low End Amount 9 in 10 Chance (90%) of Higher Snowfall

This map depicts a reasonable lower-end snowfall amount for the time period shown on the graphic, based on many computer model simulations of possible snowfall totals. This lower amount is an unlikely scenario with a 9 in 10, or 90% chance that more snow will fall, and only a 1 in 10, or 10% chance that less snow will fall. This number can help serve as a lower-end scenario for planning purposes.



# High End Amount 1 in 10 Chance (10%) of Higher Snowfall

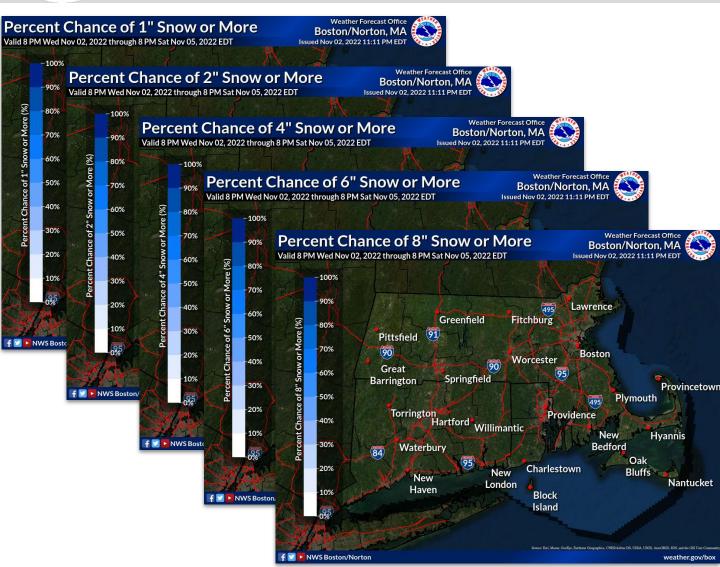
This map depicts a reasonable upper-end snowfall amount for the time period shown on the graphic, based on many computer model simulations of possible snowfall totals. This higher amount is an unlikely scenario, with only a 1 in 10, or 10% chance that more snow will fall, and a 9 in 10, or 90% chance that less snow will fall. This number can help serve as an upper-end scenario for planning purposes.





# Percent Chance That Snow Amounts Will Be Greater Than...

https://www.weather.gov/box/winter



#### Percent Chance That Snow Amounts Will Be Greater Than

This series of maps shows the probability (that is, the likelihood) that snowfall will equal or exceed specific amounts during the time period shown on the graphic. These forecasts are based on many computer model simulations of possible snowfall totals.

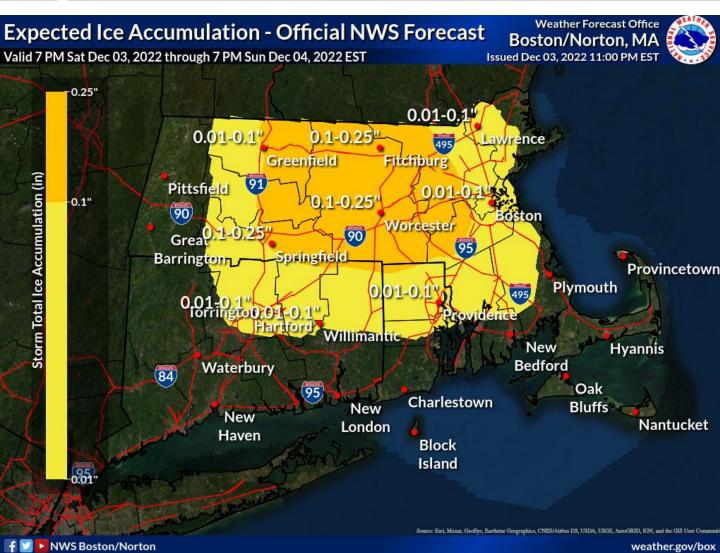






## **Icing Forecast**

https://www.weather.gov/box/winter



#### **Expected Ice Accumulation - Official NWS Forecast**

Represents our official ice forecast in inches within the next one to three days. The ice accumulation amounts are provided in ranges. This is the elevated flat surface ice accumulation. It is not radial/line ice. Radial/line ice is typically 39% of the elevated flat surface ice.

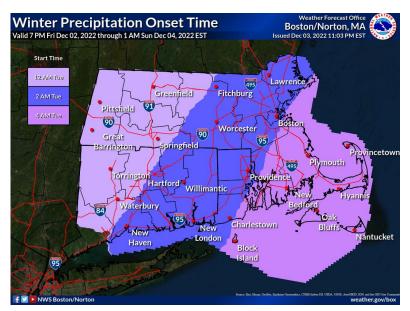






## Precipitation Onset/End Timing

https://www.weather.gov/box/winter

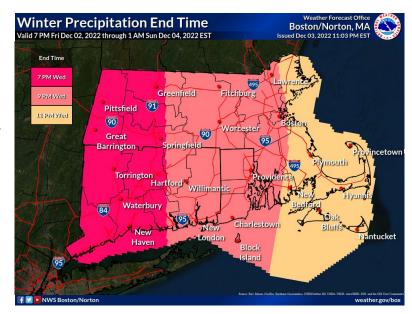


#### **Precipitation Onset Timing**

Most likely time of winter precipitation onset (snow, sleet, freezing rain). Rain is not included here. This information is provided when we issue a Warning or Advisory for expected snow or ice accumulation; typically six to 24 hours in advance. Times are only given for places that are under a Warning or Advisory. They will be blank in areas outside Warnings or Advisories.

#### **Precipitation End Timing**

Most likely time of winter precipitation ending (snow, sleet, freezing rain). Rain is not included here. This information is provided when we issue a Warning or Advisory for expected snow or ice accumulation; typically six to 24 hours in advance. Times are only given for places that are under a Warning or Advisory. They will be blank in areas outside Warnings or Advisories.





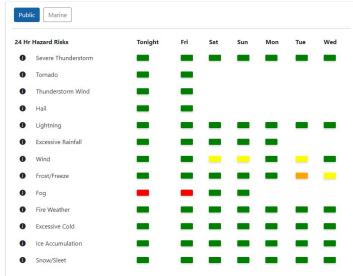




## **Graphical Hazardous Weather Outlook**

https://www.weather.gov/erh/ghwo?wfo=box





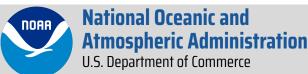
#### **Graphical Hazardous Weather Outlook**

The gHWO is designed to provide decision makers with convenient access to the expected type, severity, coverage, and potential impacts of hazardous weather events by graphically depicting the risk of weather hazards out through seven days.

#### Access it under the Current Hazards tab



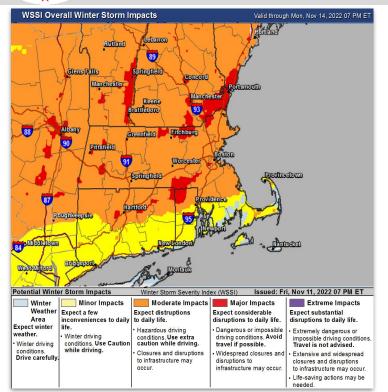






## Winter Storm Severity Index (WSSI)

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



Images are available for the next 3 days. These webpages are updated every two hours at approximately 7 PM EST, 9 PM EST, 11 PM EST, etc. The publicly-shared output is available as static images and in GIS format (KMZ, SHP, REST Service).



Winter Storm Severity Index impact definitions

# Winter Storm Severity Index (WSSI)

The purpose of the Winter Storm Severity Index (WSSI) is to provide NWS partners and the general public with an indication of the level of winter precipitation (snow and ice) severity and its potential related societal impacts. The WSSI does not depict official warnings, and should always be used in context with official NWS forecasts and warnings.

# 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.

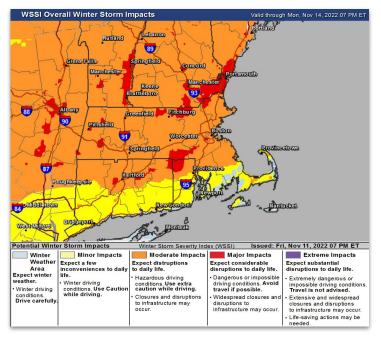
- Extremely dangerous or impossible driving conditions. Travel is not advised.
- Extensive and widespread closures and disruptions to infrastructure may occur.
- . Life-saving actions may be needed.





## Winter Storm Severity Index (WSSI)

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



# The WSSI uses non-meteorological data along with meteorological data to help forecast impacts

The non-meteorological data, or factors used are:

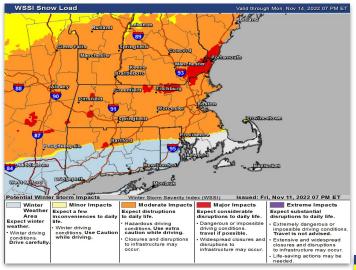
- Urban areas
- Used in the Ice Accumulation Index and Snow Amount Index
- The give a 25% increase to impact
- Defined from US Census Bureau
- Land Use / Coverage
- Decreases impacts for areas of reduced wind (e.g. forests, high density commercial/residential areas) compared to areas without reductions (e.g. cropland, grassland)
- Used in the Blowing Snow Index
- Forest Classification
- Demarks forestland described as conifer vs deciduous
- Conifer trees can handle more snow than deciduous trees
- Used in the Snow Load Index





# Winter Storm Severity Index (WSSI) Sub Components

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

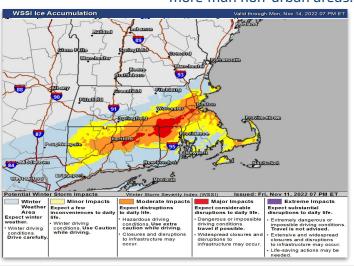


#### **Snow Load**

Indicates potential infrastructure impacts due to the weight of the snow. This index accounts for the land cover type. For example, more forested and urban areas will show increased severity versus the same snow conditions in grasslands.

#### **Snow Amount**

Indicates potential impacts due to the total amount of snow or the snow accumulation rate. This index also normalizes for climatology, such that regions of the country that experience, on average, less snowfall will show a higher level of severity for the same amount of snow that is forecast across a region that experiences more snowfall on average. Designated urban areas are also weighted a little more than non-urban areas.



# Winter driving conditions. Use Caution Winter driving conditions. Use Caution While driving. Winter driving conditions. Drive carefully. Winter driving conditions. Drive carefully. Winter driving conditions. Use Caution while driving. Uniformation while driving conditions use Caution while driving conditions use Caution while driving. Uniformation while driving conditions use Caution while driving caution while driving. Uniformation while driving conditions use Caution while driving caution whil

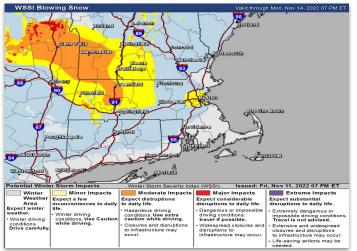
#### **Ice Accumulation**

Indicates potential infrastructure impacts (e.g. roads/bridges) due to combined effects and severity of ice and wind. Designated urban areas are also weighted a little more than non-urban areas.



# Winter Storm Severity Index (WSSI) Sub Components

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

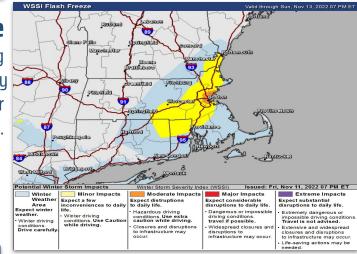


#### **Blowing Snow**

Indicates the potential disruption due to blowing and drifting snow. This index accounts for land use type. For example, more densely forested areas will show less blowing snow than open grassland areas.

#### **Flash Freeze**

Indicates the potential impacts of flash freezing (temperatures starting above freezing and quickly dropping below freezing) during or after precipitation events.



# WSSI Ground Blizzard Wall through Mon, Nov. 14, 2022 07 PM ET Building Bu

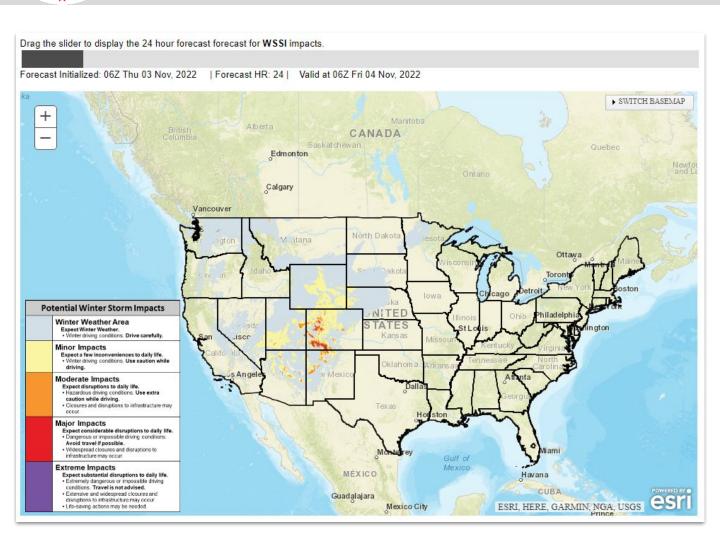
#### **Ground Blizzard**

Indicates the potential travel-related impacts of strong winds interacting with pre-existing snow cover. This is the only sub-component that does not require snow to be forecast in order for calculations to be made. The NOHRSC snow cover data along with forecast winds are used to model the ground blizzard.



# Winter Storm Severity Index (WSSI) Rolling 24-Hour Version

https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi\_rolling\_24h.php



#### **Rolling 24 Hour Winter Storm Severity Index (WSSI)**

This display shows the WSSI for a period of 24 hours. Each time-step forward is 6 hours. As you move forward in time using the slider bar you can see how the WSSI is changing every six hours out to the end of the day 3 timeframe. This can assist the user to better determe when the projected impacts will be at their maximum.

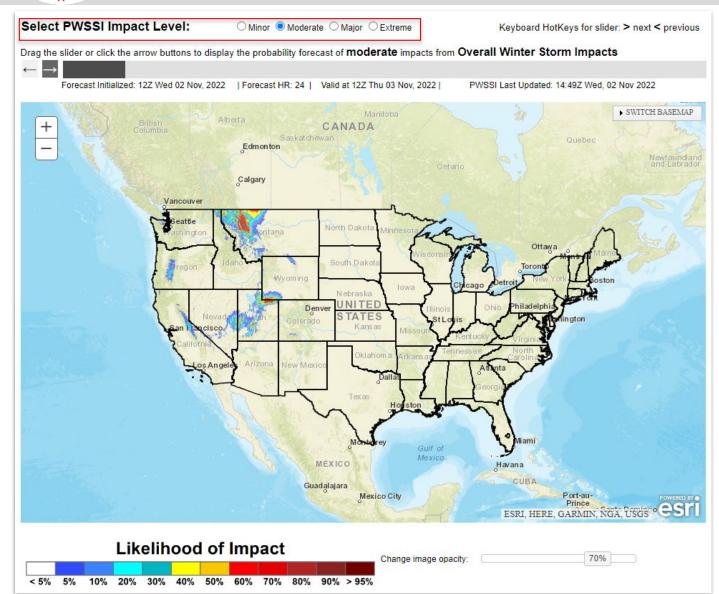






# Probabilistic Winter Storm Severity Index (Prob WSSI) \*NEW\*

https://www.wpc.ncep.noaa.gov/wwd/wssi/prob\_wssi.php



#### **Experimental Probabilistic Winter Storm Severity Index (ProbWSSI)**

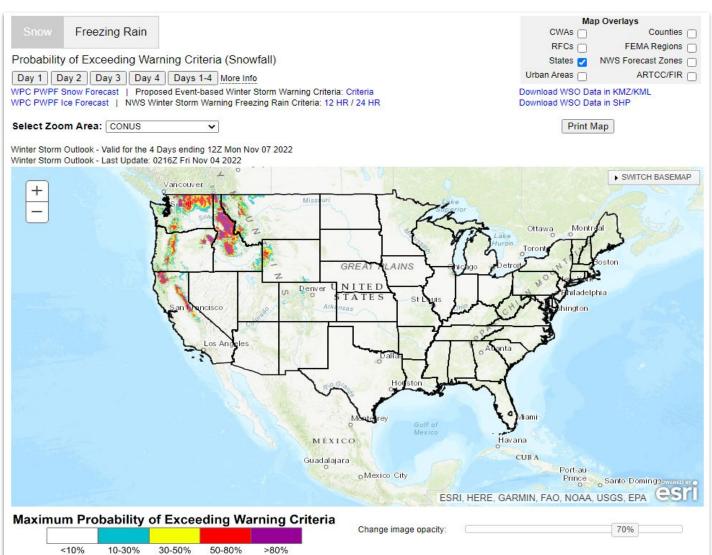
This display shows the Probabilistic WSSI for a period of 24 hours. Each time-step forward is 6 hours starting at 24 hours and extending to 7 days. As you move forward in time using the slider bar you can see how the ProbWSSI is changing every six hours out to the end of the end of day 7. Select the tab with the element name of interest and then select the impact level you are interested in.





### Experimental Winter Storm Outlook (WSO)

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



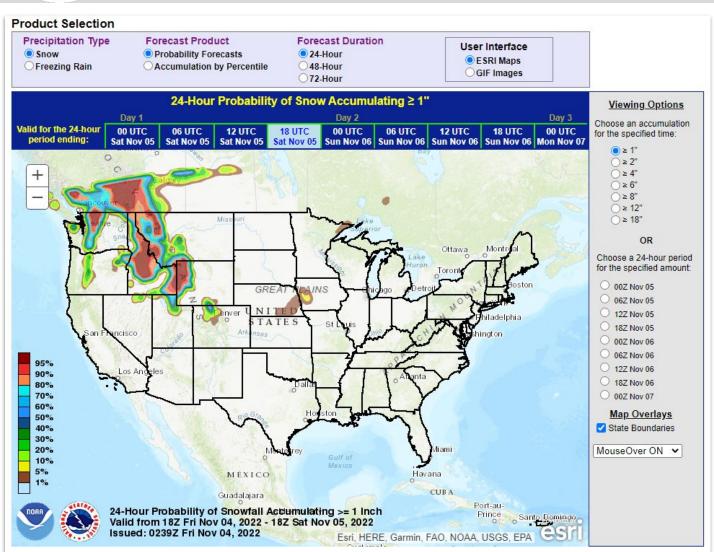
#### **Experimental Winter Storm Outlook (WSO)**

The Experimental WSO is based on a combination of the Weather Prediction Center's (WPC's) Probabilistic Winter Precipitation Forecasts (PWPF) and local National Weather Service (NWS) snow and ice accumulation warning criteria. Therefore, the WSO provides an early alert to hazardous winter weather conditions (out to 4 days).



## WPC's Probabilistic Winter <u>Precipitation Forecast</u> (PWPF)

https://bit.lu/3DE5adZ



#### **WPC's Probabilistic Winter Precipitation Forecast (PWPF)**

The Weather Prediction Center (WPC) creates 24-hr forecasts of snowfall and freezing rain accumulations for each of three consecutive 24-hr periods (days) extending 72 hours into the future. The probabilistic forecasts found on the WPC PWPF page are based on the deterministic accumulation forecasts and are generated automatically using an ensemble of model forecasts together with WPC's forecast.

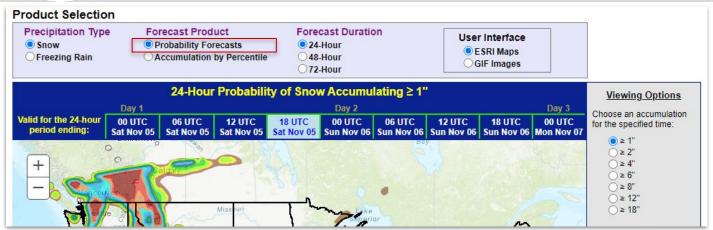






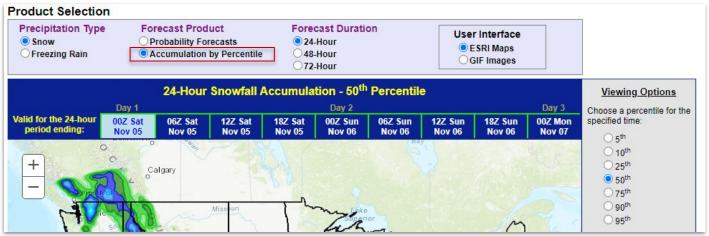
# WPC's Probabilistic Winter Precipitation Forecast (PWPF)

https://bit.lu/3DE5adZ



#### **Probability Forecasts**

Probabilities of exceeding a threshold show filled contour levels of probability that the 24-hour, 48-hour, or 72-hour accumulation of winter precipitation will equal or exceed the given threshold.



#### **Accumulation by Percentile**

Percentile accumulations for 24-, 48-, or 72-hour intervals show filled contours of snowfall or freezing rain amounts for which the probability of observing that amount or less is given by the percentile level. For example, if the 75th percentile map shows six inches of snow at a location, then the probability of getting up to six inches of snow is 75% at that point. Conversely, there is only a 25% probability of snowfall exceeding six inches at the location in this example. Percentile accumulations increase as the percentile level increases.

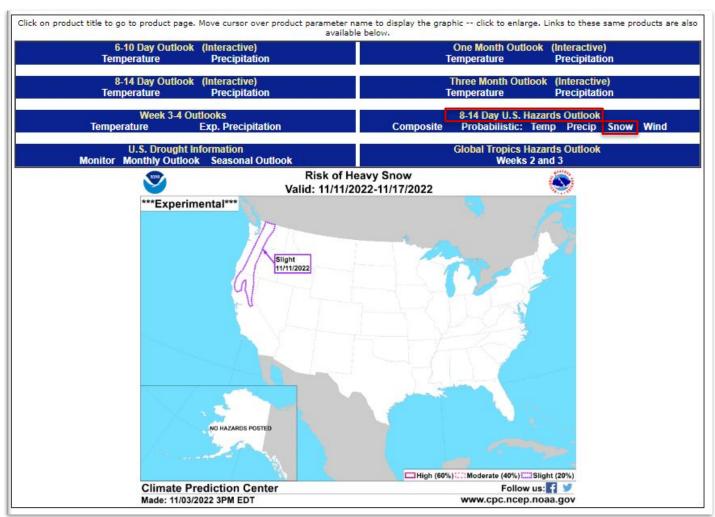






## CPC's 8-14 Day Hazard Outlook

https://www.cpc.ncep.noaa.gov/



#### CPC's 8-14 Day Hazard Outlook

The Climate Prediction Center (CPC) U.S. Hazards Outlook is released every weekday and targets the Day 8-14 forecast period for potential hazardous conditions related to temperature, precipitation, and wind. The forecast is mainly represented in probabilistic format, with the exclusion of a few variables (e.g. frozen precipitation and flooding), which are denoted in categorical format without associated probabilities. Forecasters use statistically post-processed (bias corrected and calibrated) ensemble model forecasts to estimate the likelihood of that event occurring, and indicate a confidence or "risk of occurrence."





## Winter Product Considerations Summary

Winter Product	Works Best When	Use Caution When
Probabilistic Snow	Prior to the event commencing	Once the storm has started, the the 10% and 90% accumulation chances only represent additional possibilities and does not include snow that has already occurred.
Snow Amount Chances	Prior to the event commencing	Once the storm has started, the probabilities depicted are only for additional snowfall.
Ice Accumulation	Prior to the event commencing. Ice accumulation forecast is compared with ice accumulation on flat surfaces.	Once the storm has started, the forecast depicted may only depict future accumulations, not what has already occurred.
Precipitation Onset/Ending	Onset times: prior to the storm commencing. Ending time through the entire storm	Timing can have errors in rain to snow/snow to rain situations. Light precipitation can start prior to onset times and continue past the ending times depicted.
Graphical Hazardous Weather Outlook	Used as a general examination of potential issues during depicted 24 hour periods	Trying to determine specific impacts at a specific time in a specific location.
Winter Storm Severity Index (WSSI)	Prior to the event commencing	Derived from official forecast information created by NWS meteorologists, so errors in the forecast will result in errors in WSSI. Additionally, once a storm has started, previous weather conditions are not accounted for, only forecast conditions
Probabilistic WSSI	Used to determine the relative risk of potential winter weather situations for planning purposes	Strictly based on model guidance, which may not reflect official forecasts. Does not account for previous weather conditions. If winter weather is ongoing, it will not account for what has already occurred.
Winter Storm Outlook	Used as guidance for where Winter Storm Watches may be needed	Other aspects beyond just snow and/or ice totals may have a role in the impact the storm could cause and are not necessarily included
Probabilistic Winter Precipitation	Used as general guidance to assist in awareness of possible upcoming weather	Based on model guidance, which may not reflect official forecasts nor have highly detailed resolution
8-14 Day Outlook	Used as general guidance for potential significant weather events	By default, inherent uncertainty in forecasting weather conditions at this time range means errors can be considerable



#### **NWS Boston Area Forecast Discussion**

https://forecast.weather.gov/product.php?site=BOX&issuedby=BOX&product=AFD

.NEAR TERM /UNTIL 6 AM FRIDAY MORNING/... 930 PM update...



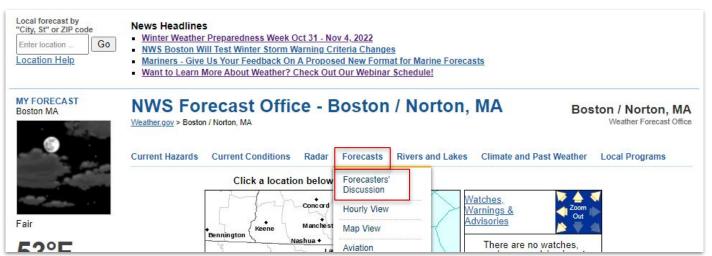
Previous discussion...

Surface high pressure continues to move to our east out across the Gulf of Maine. Guidance has really honed in on the <u>stratus</u> potential this evening as dewpoints increase into the upper 40s and low 50s after about 07Z. Based on <u>bufkit</u> soundings, <u>stratus</u> and <u>mist</u> is favored over <u>fog</u> south of the MA Turnpike.

North of the MA Pike, skies will remain generally <u>partly cloudy</u> to cloud free, which will allow some <u>radiation</u> fog to develop in the typical locations, such as along the CT River Valley.

#### **NWS Boston Forecast Discussion**

The Area Forecast Discussion (AFD) is updated at least every 3 hours and is a fantastic resource to retrieve details not conveyed in graphical products. Things like forecaster confidence, uncertainty, & scientific reasoning behind the forecast are readily available here..







# WPC Probabilistic Heavy Snow and Icing Discussion

https://www.wpc.ncep.noaa.gov/discussions/hpcdiscussions.php?disc=qpfhsd

# Winter Weather Forecast Discussion (Latest Discussion - Issued 1916Z Nov 03, 2022) Version Selection Latest Previous Next Print Discussion Versions back from latest: 0 1 2 3 4 5 6 7 8 9 10

Abbreviations and acronyms used in this product

Geographic Boundaries - Map 1: Color Black/White Map 2: Color Black/White

Probabilistic Heavy Snow and Icing Discussion NWS Weather Prediction Center College Park MD 314 PM EDT Thu Nov 03 2022

Valid 00Z Fri Nov 04 2022 - 00Z Mon Nov 07 2022

...Four Corners and Central Rockies...

Day 1...

Shortwave trough will continue to dig through the base of an anomalous longwave trough centered over the Great Basin through tonight and is expected to close off east of the Four Corners region by Friday morning before taking on a negative tilt and quickly ejecting into the Plains through the end of the Day 1 period. Height anomalies are between -2 and -3 sigma. Strong height falls, downstream divergence with accompanying PVA, and increasing upper diffluence within the left exit region of a 130kt poleward streaking jet will produce strong UVVs, and lead to lee cyclogenesis later today across Colorado. As the lee low develops, moist flow originating from the Gulf will lift isentropically along the 295-300K surface with additional lift due to upslope enhancement. There is the potential for heavier snow rates, on the order of 1-2"/hr rates, across much of Colorado west of the Front Range and into southern Wyoming thanks to the overlap of saturation in the DGZ and stronger lift. Crashing snow levels as colder air seeps south will bring the threat of accumulating snow eastward into the High Plains including the I-25 urban corridor where a few inches may accumulate.

Based on the latest WPC probabilities, the heaviest additional snowfall will be found for the higher peaks with additional accumulations of 2-4 inches likely (isolated higher amounts up to 6-8" possible). Across the Front Range, High Plains, and into Nebraska panhandle, WPC probabilities for 2" remain slight in the 20-30 percent range.

# WPC Probabilistic Heavy Snow and Icing Discussion

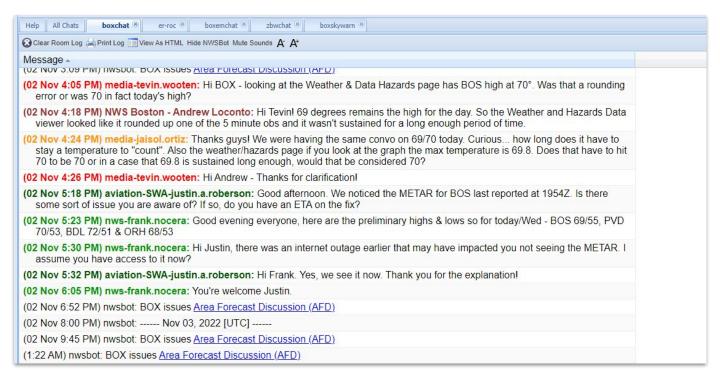
The Weather Prediction
Center's (WPC) Probabilistic
Heavy Snow and Icing
Discussion is yet another
resource to dig deeper into
forecaster confidence and
uncertainty, as well as
digging deeper into the
science behind the forecast.
This discussion is on a
national and regional scale.





### **NWS Chat**

https://nwschat.weather.gov/live/



#### **NWS Chat**

The NWS Chat platform is a valuable communication tool for back-and-forth between the forecasters at NWS Boston and our media/Emergency Management partners. This will be the last winter that we utilize the current version as *a completely revamped and improved NWS Chat 2.0 powered by Slack is set to be implemented during 2023.* This will bring much more functionality and stability to the platform.





# Questions? Reach Out To Us!

#### If you would like:

- Clarification about any forecast products you see online
- Insight into the forecaster confidence in storm magnitude, timing, etc
- To talk about the forecast for your municipality
- To ask any questions about how we can assist your decision making process regarding weather

please don't hesitate to reach out to us via phone (508.622.3280), email (box.operations@noaa.gov), or NWS Chat.

