

The Winter Storm Severity Index (WSSI)

A Guide for Users

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Website: <https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php>

The National Weather Service
Weather Prediction Center

What The Winter Storm Severity/Impact Index Is

- **A tool** to assist NWS operational forecasters in maintaining situational awareness of the possible significance of weather related impacts based upon the current official forecast.
- **A tool** to help communicate a general level of potential societal impacts and their spatial distribution.



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What The Winter Storm Severity/Impact Index Is NOT

- It is not a specific forecast for specific impacts.
 - For example, a depiction of “moderate” severity does not mean schools will or have to close.
- It is not meant to be the sole source of information about a Winter Storm. It should always be used in context with other NWS forecast and warning information.
- The WSSI does not account for conditions that have occurred prior to the creation time. It only uses forecast information. Therefore during an ongoing winter weather situation, the WSSI will not be representative of the entire event.



Motivation – To Better Depict Aspects of Winter Storms

- Current NWS Procedures:
 - Winter weather Watches/Warnings/Advisories are raised based primarily on “yes/no” thresholds of accumulation and generally at the level of individual counties.
- Reality of Winter Weather:
 - Severity/impacts from winter weather are due to more than just amounts (one 5” snowstorm is not like the next 5” snowstorm) Great variation in weather conditions frequently occur with individual counties.



WSSI Scale

Potential Winter Storm Impacts	
	No Impacts Impacts not expected.
	Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.
	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. Will 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.



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WSSI Components

Snow Amount Index

PURPOSE: This component is designed to highlight areas in which impacts, especially transportation, could become overwhelmed due to either:

- 1) The total amount of snow.
- 2) The rate at which the snow is falling.

Prior to making calculations based upon the amount or rate of snow, climatology based factors are determined. Climatology is an important aspect to the level of impacts a winter storm brings. Those areas of the country less accustomed to snowfall will be less prepared to deal with snow, resulting in higher level of impacts compared to the same amount of snow in a snowier part of the country.

Snow Load Index

PURPOSE: This component is to highlight areas where the weight of the snow could result in damage to trees and powerlines. In general, the lower the snow-liquid ratio (SLR) is and the greater the total snow accumulation, the higher the index.

Blowing Snow Index

PURPOSE: This component highlights areas where blowing/drifting snow is expected to occur and result in transportation related problems. In general, the blowing snow significance increases as the SLR and winds both increase. Prior blowing snow research indicates that in general it takes just under 20 mph of wind to start to move snow around.



WSSI Components

Ground Blizzard Index

PURPOSE: This component is to highlight areas where pre-existing snow combined with very strong winds results in ground blizzard conditions, which result in a significant impact to transportation.

Flash Freeze Index

PURPOSE: The component depicts severity primarily to transportation of situations where temperatures rapidly fall below freezing during or just after precipitation.

Ice Accumulation Index

PURPOSE: This component was developed to account for the combined effects of ice accumulation and wind which can produce widespread tree damage, transportation shutdowns and utility problems.

NWS has implemented the WSSI to provide the public with a tool that attempts to convey the complexities and hazards associated with winter storms as they relate to potential societal impacts. NWS acknowledges contributions to the field of ice impact forecast graphics made by Sidney Sperry (Oklahoma Association of Electric Cooperatives) and Steven Piltz (NWS) in the development of the “Sperry-Piltz Ice Accumulation Index” or SPIA® Index.



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Using Non-Meteorological with Meteorological Data

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

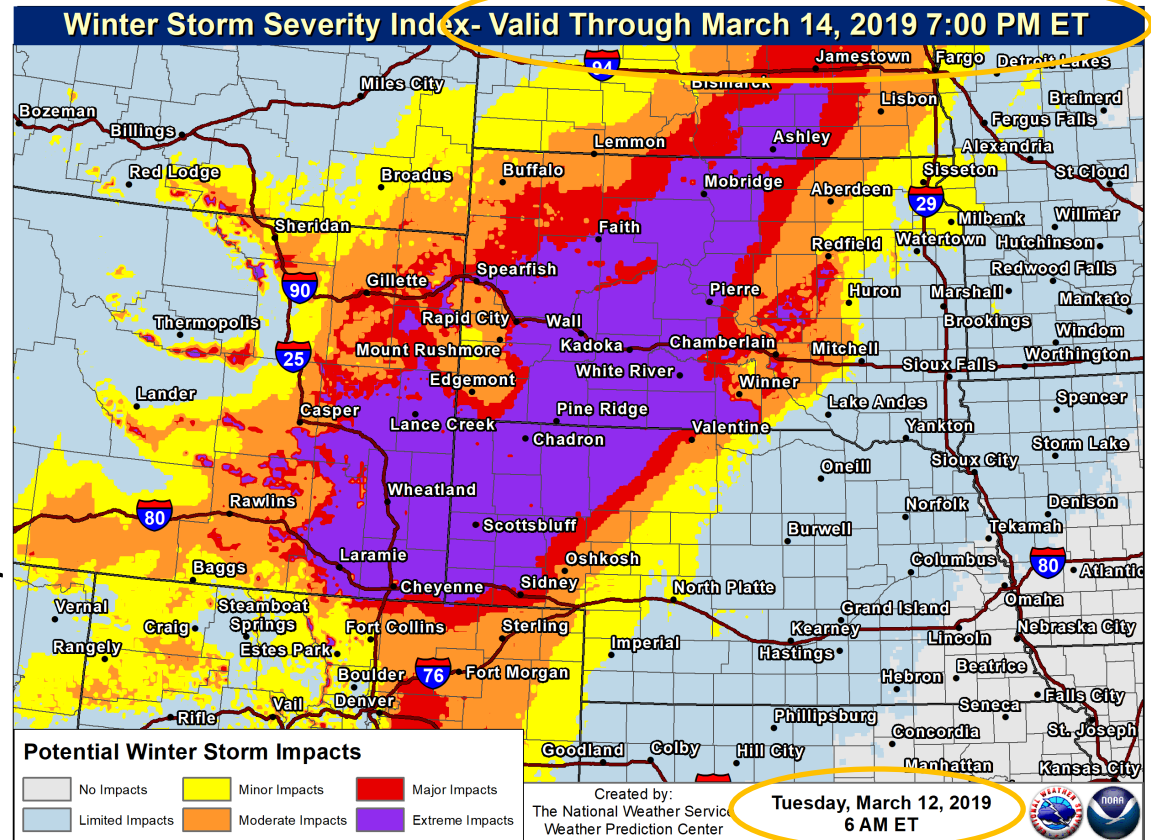
The non-meteorological data, or factors used are:

- Urban areas
 - Used in the Ice Accumulation Index and Snow Amount Index
 - They 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 and Ground Blizzard 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

WSSI – How to Interpret

The map on the right depicts the WSSI for expected winter weather occurring between 6 AM ET Mar 12 (time stamp at the bottom) to 7 PM Mar 14 (valid time at the top)

It does NOT indicate specifically when the weather will occur during the period. Refer to other NWS forecast data for that information



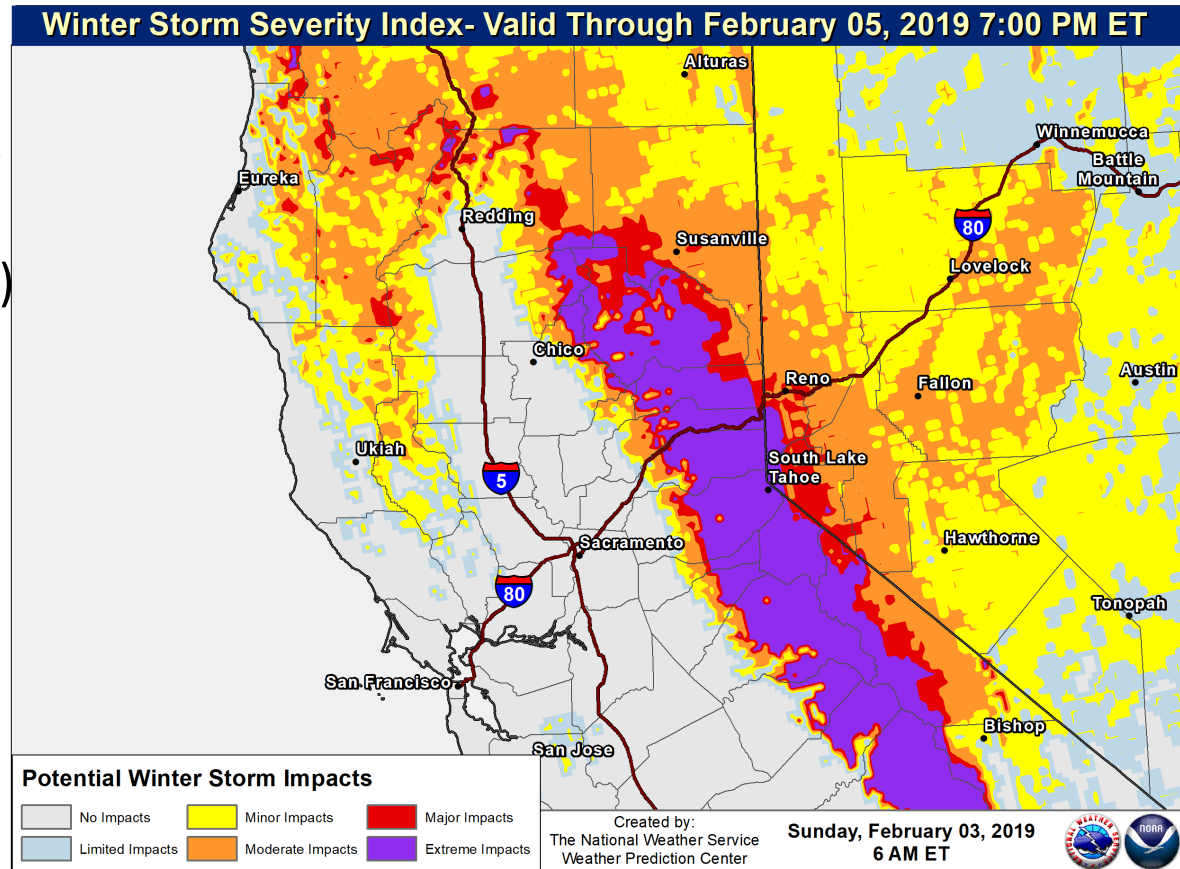
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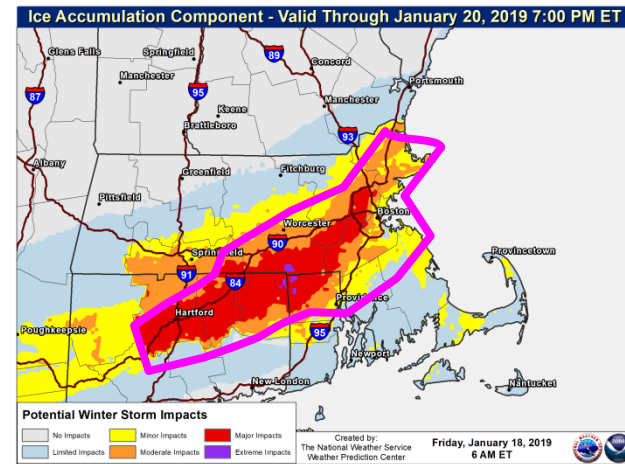
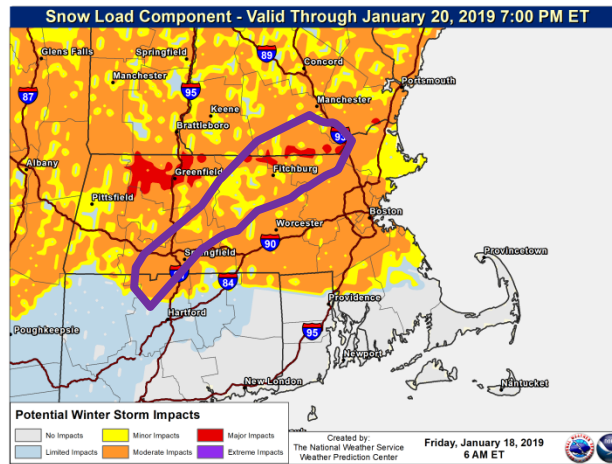
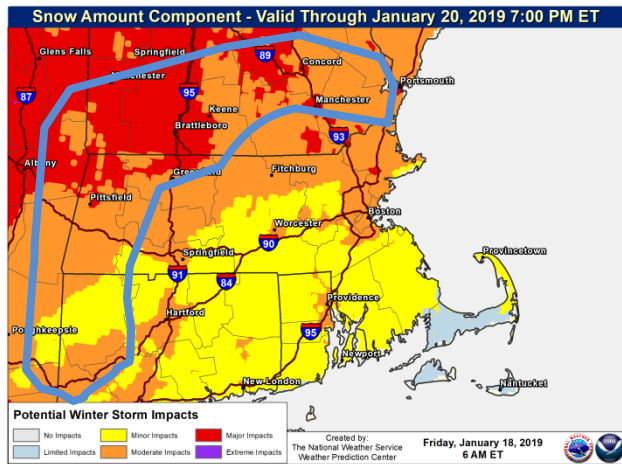
WSSI – How to Interpret

The areas where the most significant winter weather is expected are denoted by the orange (Moderate), red (Major) and purple (Extreme) colors.

To understand what is the underlying cause of the final severity depiction, refer to the individual WSSI component maps



WSSI – How to Interpret (Example)



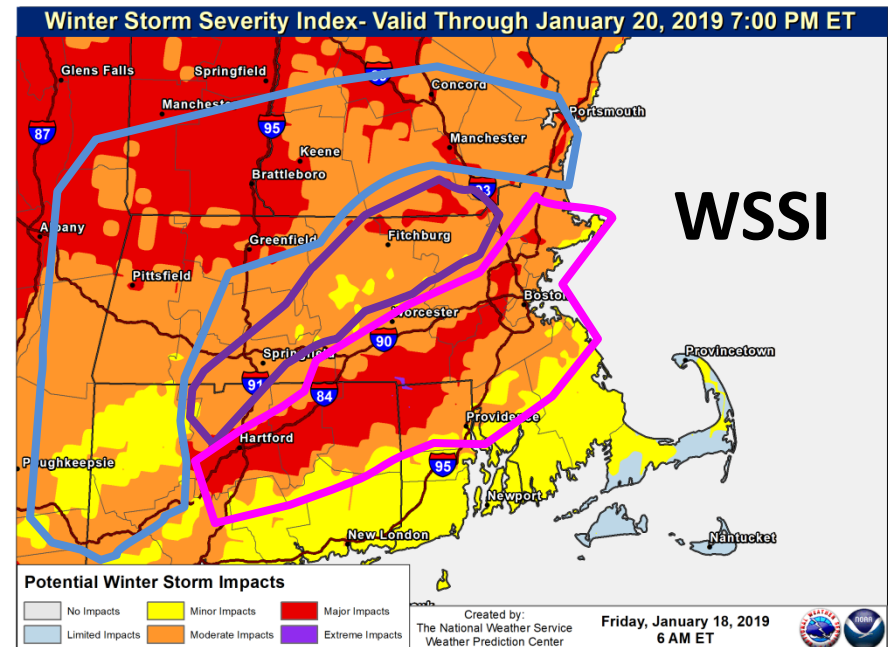
Bottom Right: WSSI depiction of all threats.

Top Left: The snow amount component matches the total WSSI around southern VT, western MA and NY.

Top Right: The ice accumulation component matches the WSSI for southeastern MA and northern RI.

Top Middle: The snow load component matches the WSSI for central MA and southeast NH.

Final interpretation: Expect the primary impacts to come from ice accumulations across northern RI northeastward toward Boston, MA. Expect impacts to come from heavy snowfall for VT and NY. There is a major threat for impacts from snow load across central MA through southeast NH.



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WSSI – Please Provide Feedback

We want to hear from you regarding this experimental product. Does it meet your needs? Does it need improvements? Please click on the survey link (as highlighted) on the WSSI webpage.

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Please provide us your feedback [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

Select Zoom Area: [CONUS] CONUS [Print Map](#)

Winter Storm Severity Index - Effective From Fri, Sep 25, 2020 09 AM ET Through Sun, Sep 27, 2020 08 PM ET
Last Updated: Friday September 25, 2020 09:16 AM ET

Potential Winter Storm Impacts

No Impacts	Impacts not expected.
Limited Impacts	Rarely a direct threat to life and property. Typically results in little inconveniences.
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. Will 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](#)

Change image opacity:

Map Overlays

NWS County Warning Areas <input type="checkbox"/>	River Forecast Center Boundaries <input type="checkbox"/>
FEMA Boundaries <input type="checkbox"/>	Counties Boundaries <input type="checkbox"/>
State Boundaries <input checked="" type="checkbox"/>	NWS Public Forecast Zones <input type="checkbox"/>
Urban Areas <input type="checkbox"/>	ARTCC/FIR <input type="checkbox"/>

Retrieve Static Images

Select Zoom Area:

Select WSSI Element

☒ WSSI Overall ☐ Blowing Snow ☐ Flash Freeze ☐ Ground Blizzard
☐ Ice Accumulation ☐ Snow Amount ☐ Snow Load

To retrieve static images please select a zoom area and WSSI element.
Please Note Static images only update at 01, 09, 13, 19 and 21 UTC

WSSI – Website Overview

- Clickable tabs
 - Loads WSSI components upon click
 - Day Period tabs
- Revised definitions
- Zoom to WFO
 - Dropdown Box
- Print Image button
 - Creates a PDF of the map with your specifications
- Variety of basemaps
 - Switch basemap dropdown button
- Links to GIS Data
- Retrieve Static Images
 - CONUS & WFO

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Select Zoom Area:

[Print Map](#)

Winter Storm Severity Index - Effective From Fri, Sep 25, 2020 09 AM ET Through Sun, Sep 27, 2020 08 PM ET
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[SWITCH BASEMAP](#)

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[Download Data in KML](#)
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Change image opacity:

Map Overlays

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FEMA Boundaries <input type="checkbox"/>	Counties Boundaries <input type="checkbox"/>
State Boundaries <input checked="" type="checkbox"/>	NWS Public Forecast Zones <input type="checkbox"/>
Urban Areas <input type="checkbox"/>	ARTCC/FIR <input type="checkbox"/>

Retrieve Static Images

Select Zoom Area:

Select WSSI Element

☒ WSSI Overall ☐ Blowing Snow ☐ Flash Freeze ☐ Ground Blizzard
☐ Ice Accumulation ☐ Snow Amount ☐ Snow Load

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WSSI – Website Interactive Layers

- Map overlay options
- Toggled via checkbox

- CWA
- FEMA
- State
- RFC
- Counties
- Public Forecast Zones
- ARTCC
- Metro Areas

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

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Days 1-3 Day 1 Day 2 Day 3

Select Zoom Area: [CONUS] CONUS Print Map

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[Download Data in SHP](#)

Change image opacity: 70%

Map Overlays

NWS County Warning Areas	<input type="checkbox"/>	River Forecast Center Boundaries	<input type="checkbox"/>
FEMA Boundaries	<input type="checkbox"/>	Counties Boundaries	<input type="checkbox"/>
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Urban Areas	<input type="checkbox"/>	ARTCC/FIR	<input type="checkbox"/>

Select Zoom Area: [CONUS] CONUS

Retrieve Static Images

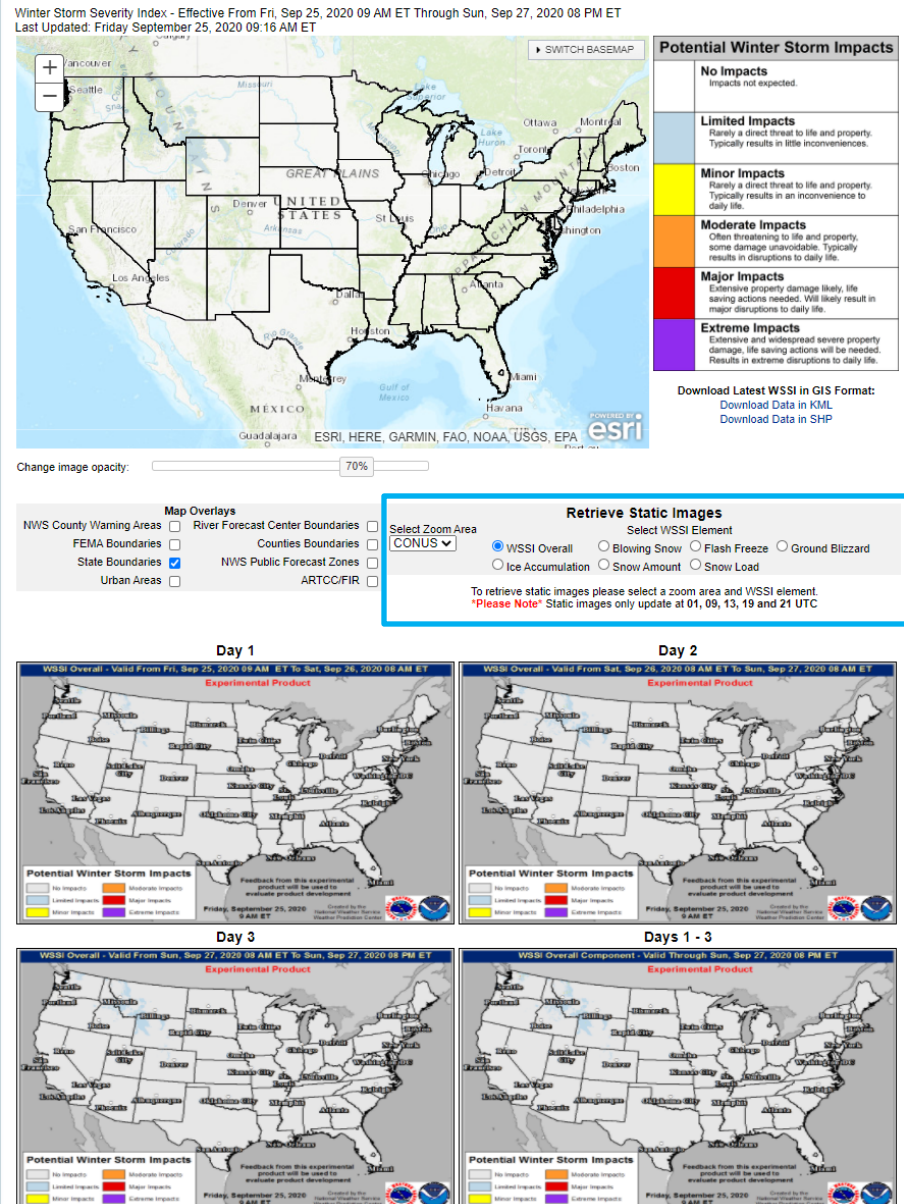
Select WSSI Element

☒ WSSI Overall ☐ Blowing Snow ☐ Flash Freeze ☐ Ground Blizzard
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To retrieve static images please select a zoom area and WSSI element.
Please Note Static images only update at 01, 09, 13, 19 and 21 UTC

WSSI – Website Static Images

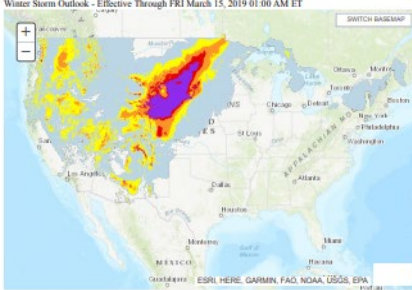
- Retrieve Static Images
 - Select the area of interest
 - CONUS, WFO or IL,MI,NE,NY State perspectives
 - Select WSSI element
 - Clicking the radio button loads the images for the selected element
 - Click the image for an enlarged version
- Downloadable static PNG file
- Static images only update 01, 09, 13, 19 and 21 UTC



WSSI – Website Print Button

- When you click the print button the image on the right will be displayed.
- Make sure to change destination to 'Save as PDF'
- Portrait layout option works better than landscape

Winter Storm Outlook - Effective Through FRI March 15, 2019 01:00 AM ET



Potential Winter Storm Impacts

Impact Level	Description
No Impacts	Impacts not expected.
Limited Impacts	Rarely a direct threat to life and property. Typically results in little inconvenience.
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 moderate disruption to daily life.
Major Impacts	Extensive property damage likely, life threatening actions needed. Will likely result in major disruptions to daily life.
Extreme Impacts	Extensive and prolonged severe property damage. Life saving actions will be needed. Results in extensive disruption to daily life.

Print 1 page

Destination Save as PDF

Pages All

Layout Portrait

More settings

Save Cancel

Summary

- The WSSI tool is designed to help maintain situational awareness and to help communicate a general level of potential societal impacts and their spatial distribution for winter weather.
- This tool uses both meteorological and non-meteorological data to forecast impacts for Snow Amount, Snow Load, Ice Accumulation, Blowing Snow, Ground Blizzard, Flash Freeze and a Summary graphic, which is a composite of the maximum impact from any of the six components.



Contact Information

- Questions or Comments? Please Reach out to:
- NWS WSSI Project Lead:
 - Jim Nelson (james.a.nelson@noaa.gov)
- NWS Winter Weather Service Program Lead
 - Stephen Baxter (stephen.Baxter@noaa.gov)
- WSSI Lead Scientist and Developer
 - Josh Kastman (joshua.kastman@noaa.gov)

