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

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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.

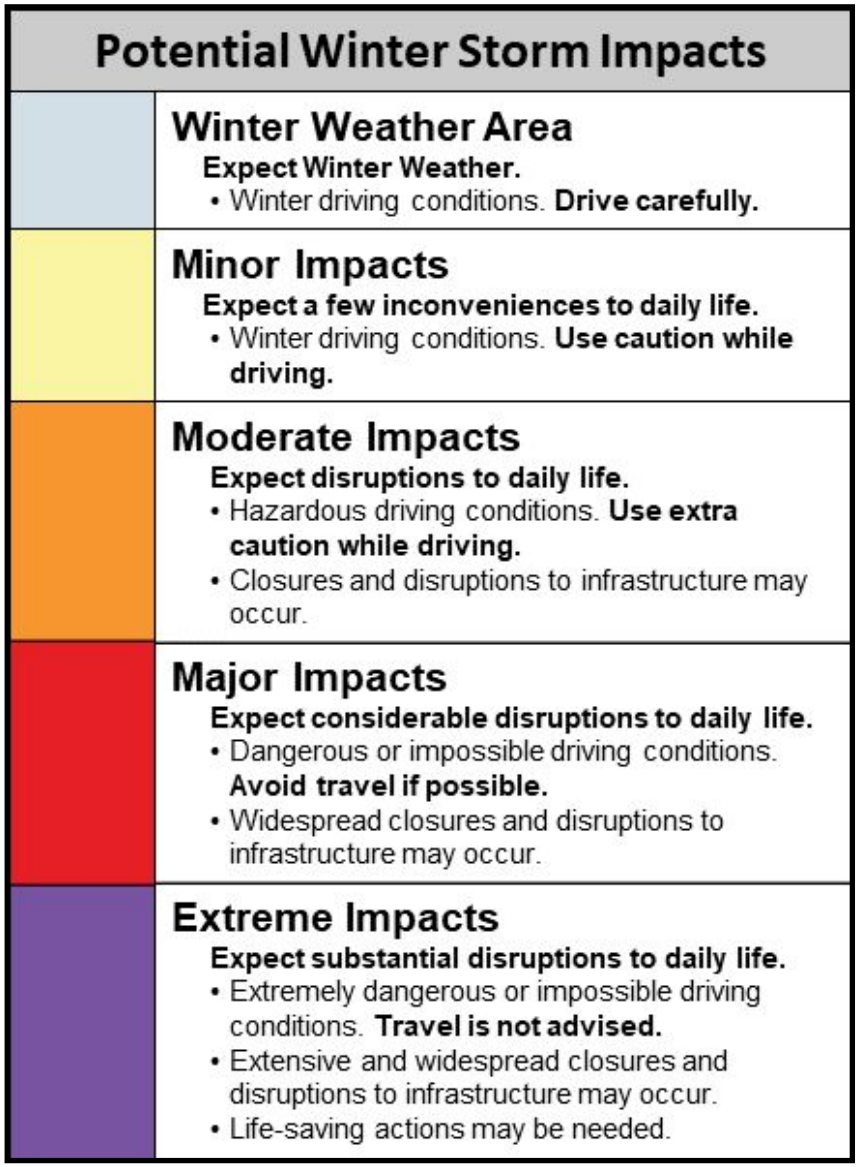
What The Winter Storm Severity/Impact Index Is NOT

- 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.

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



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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 the total amount of snow.

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.

Using Non-Meteorological with Meteorological Data

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

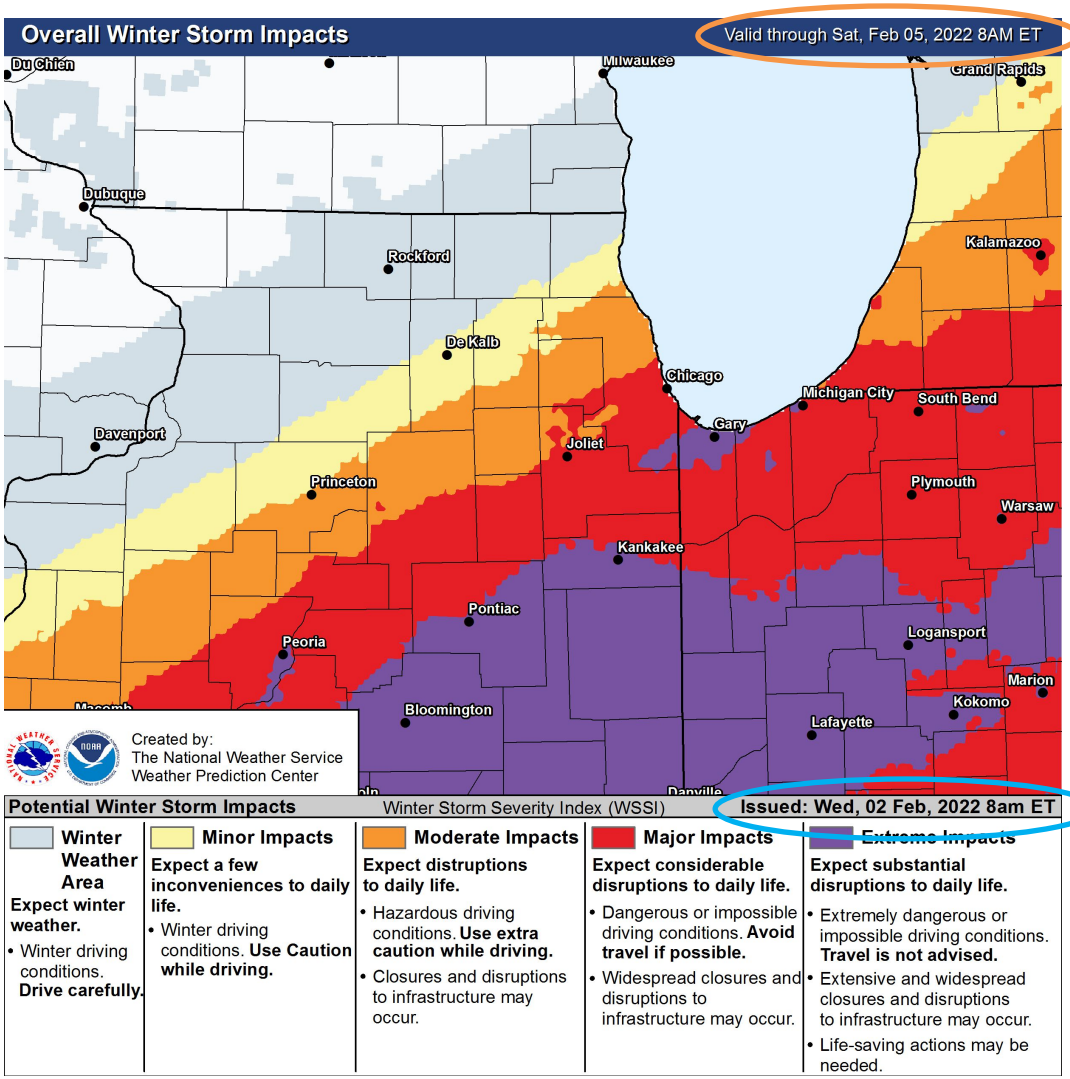
The non-meteorological data, or factors used are:

- Urban areas
  - Used in the Ice Accumulation Index and Snow Amount Index
  - 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 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 **8 AM ET Feb 2** (time stamp at the bottom) to **8 AM Feb 5** (valid time at the top).

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



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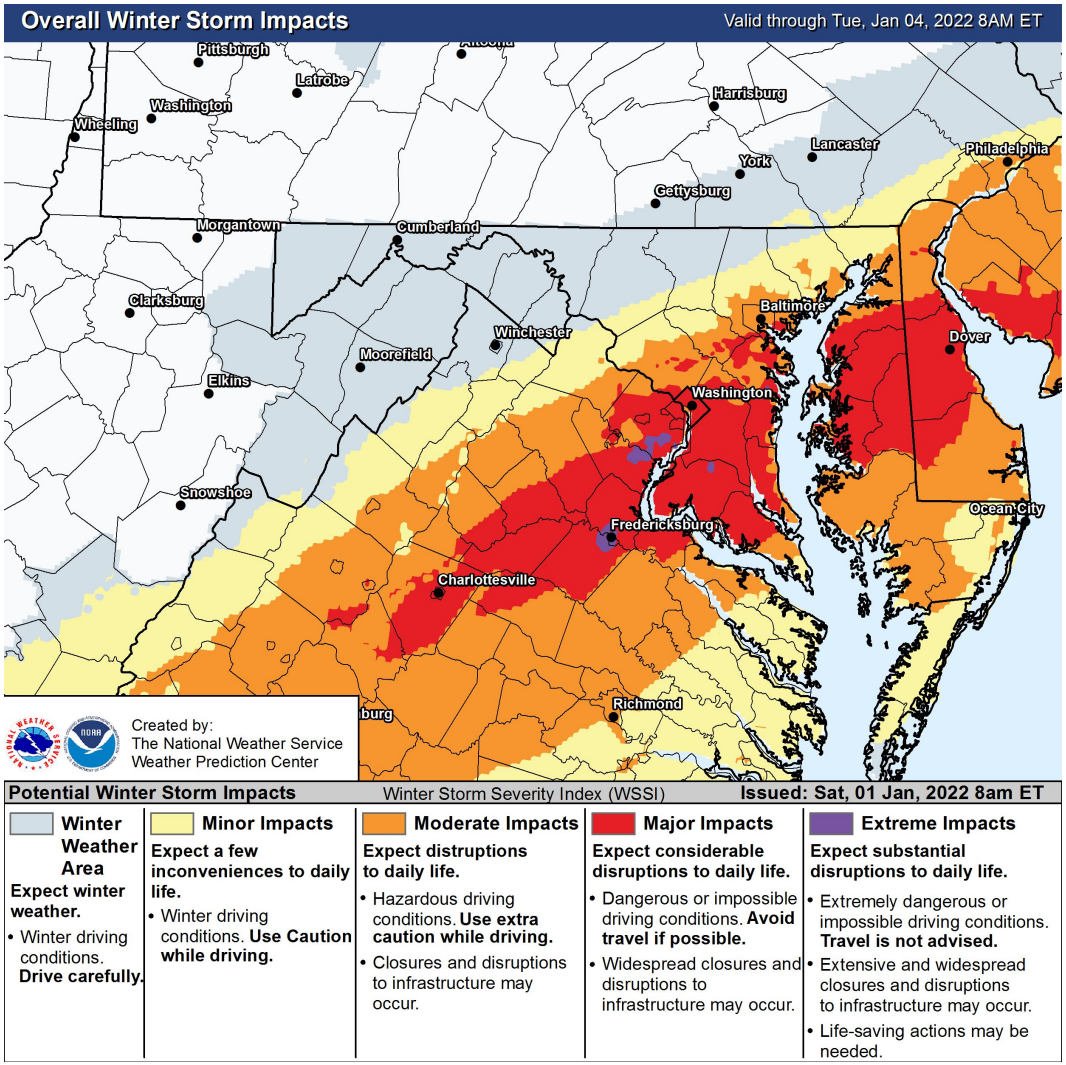
WSSI – How to Interpret

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



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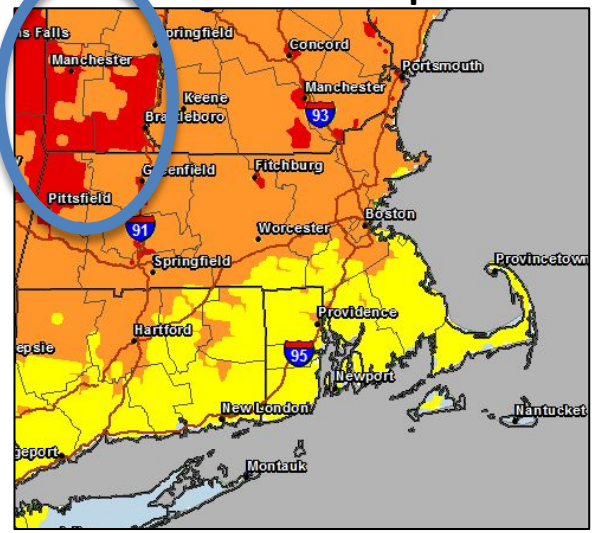
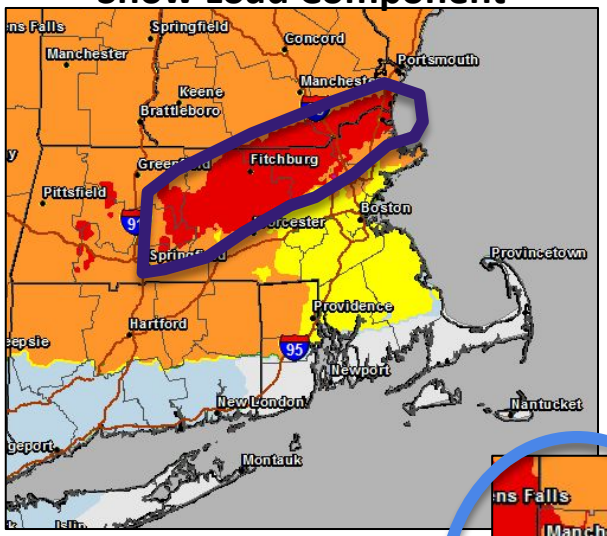
WSSI – How to Interpret (Example)

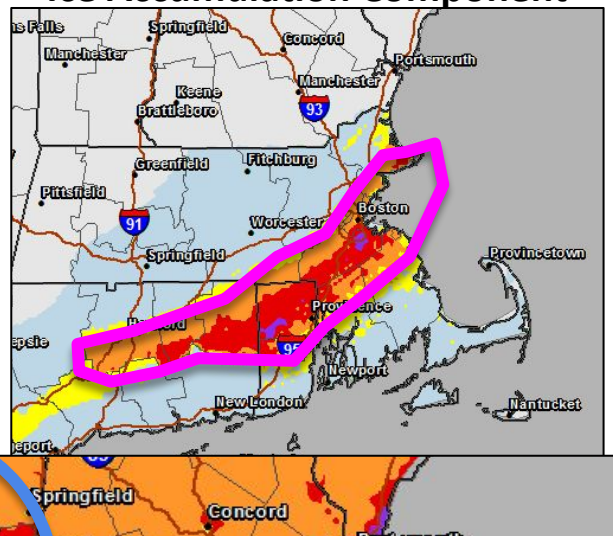
Snow Amount Component

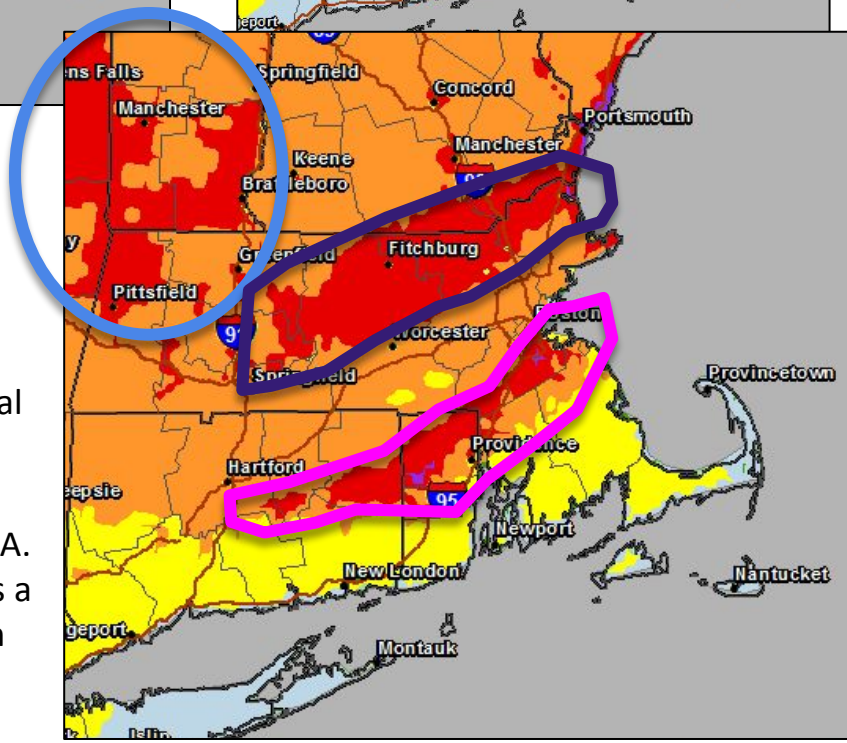


Snow Load Component



Ice Accumulation Component





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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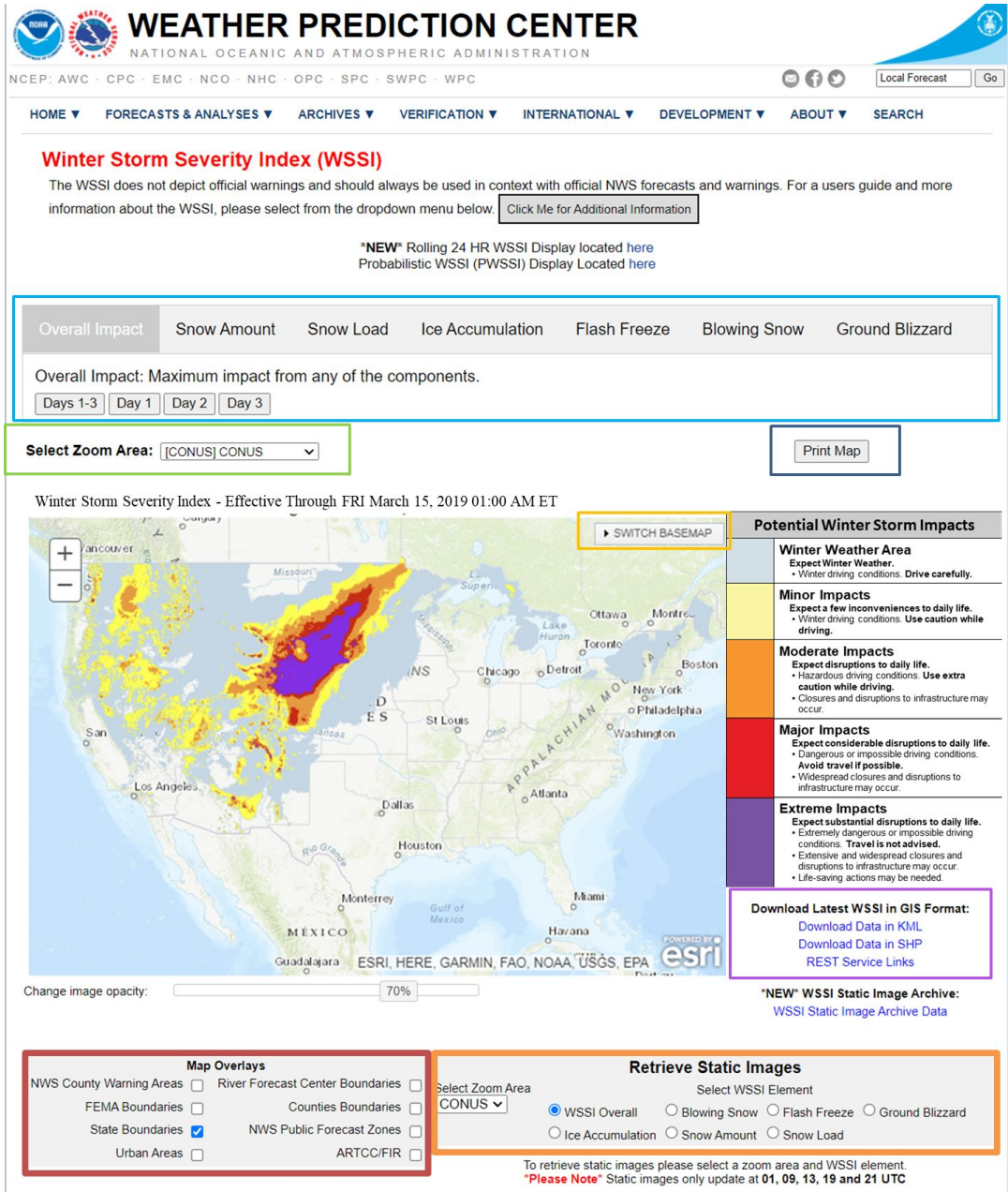
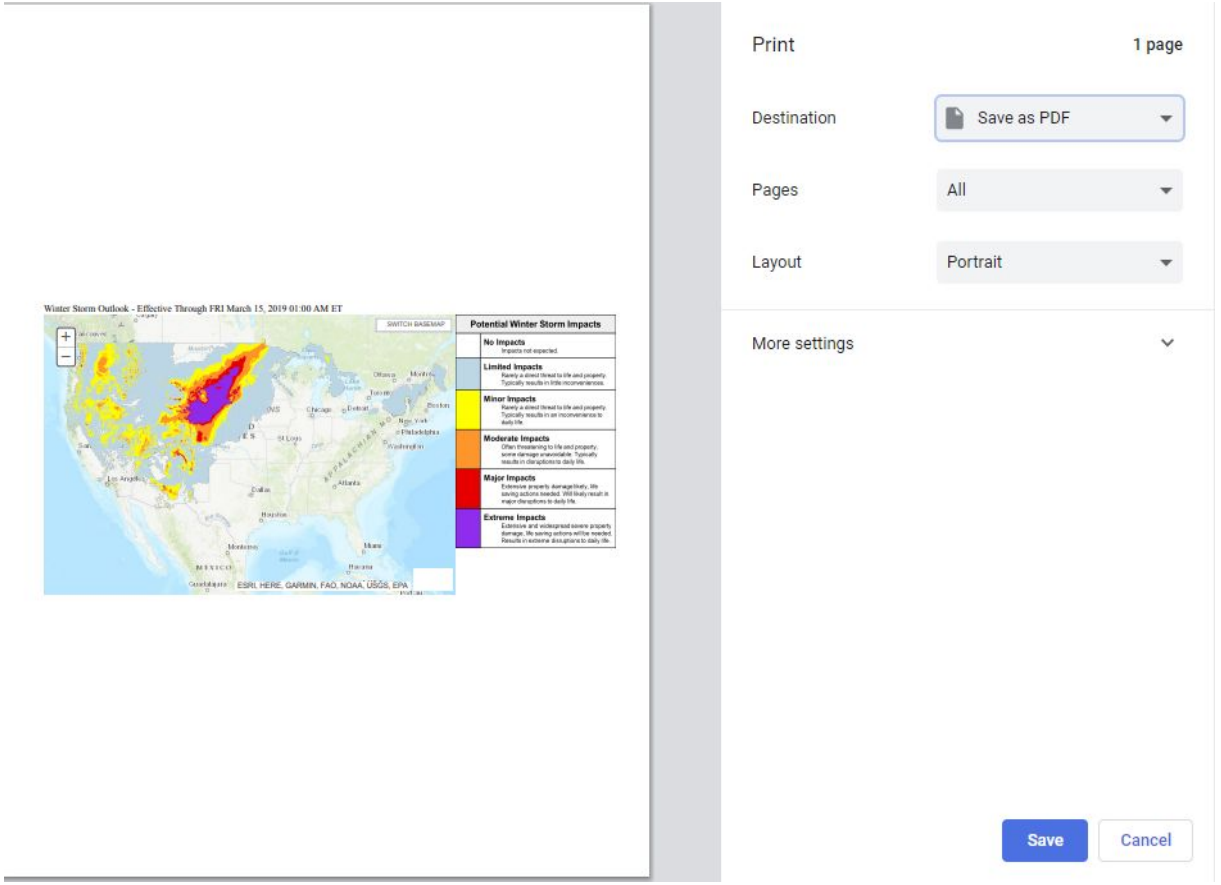
WSSI – Website Overview

- Clickable Tabs
  - Loads WSSI components upon click
  - Day period buttons
- Zoom to WFO
  - Dropdown Box
- Print Image button
  - Create a PDF of the map with your specifications
- Variety of basemaps
  - Switch basemaps dropdown button
- Links to GIS data
- Map overlay options
  - Toggled via checkbox
- Static Images
  - Select location and component

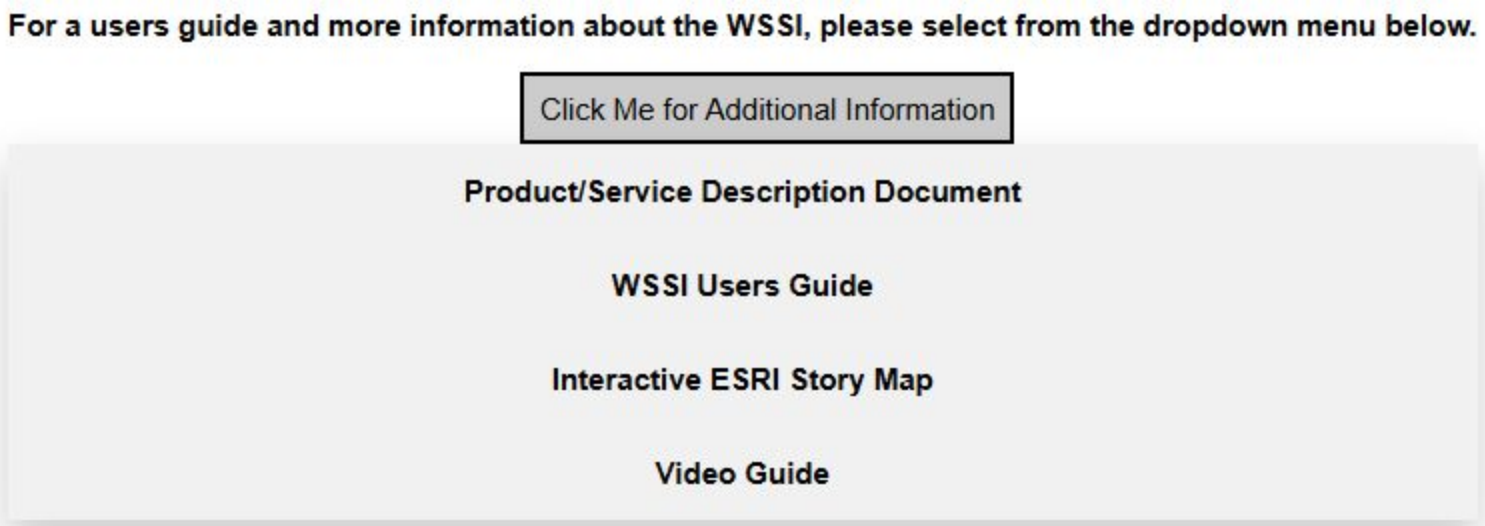


WSSI – Website Print Button

- 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



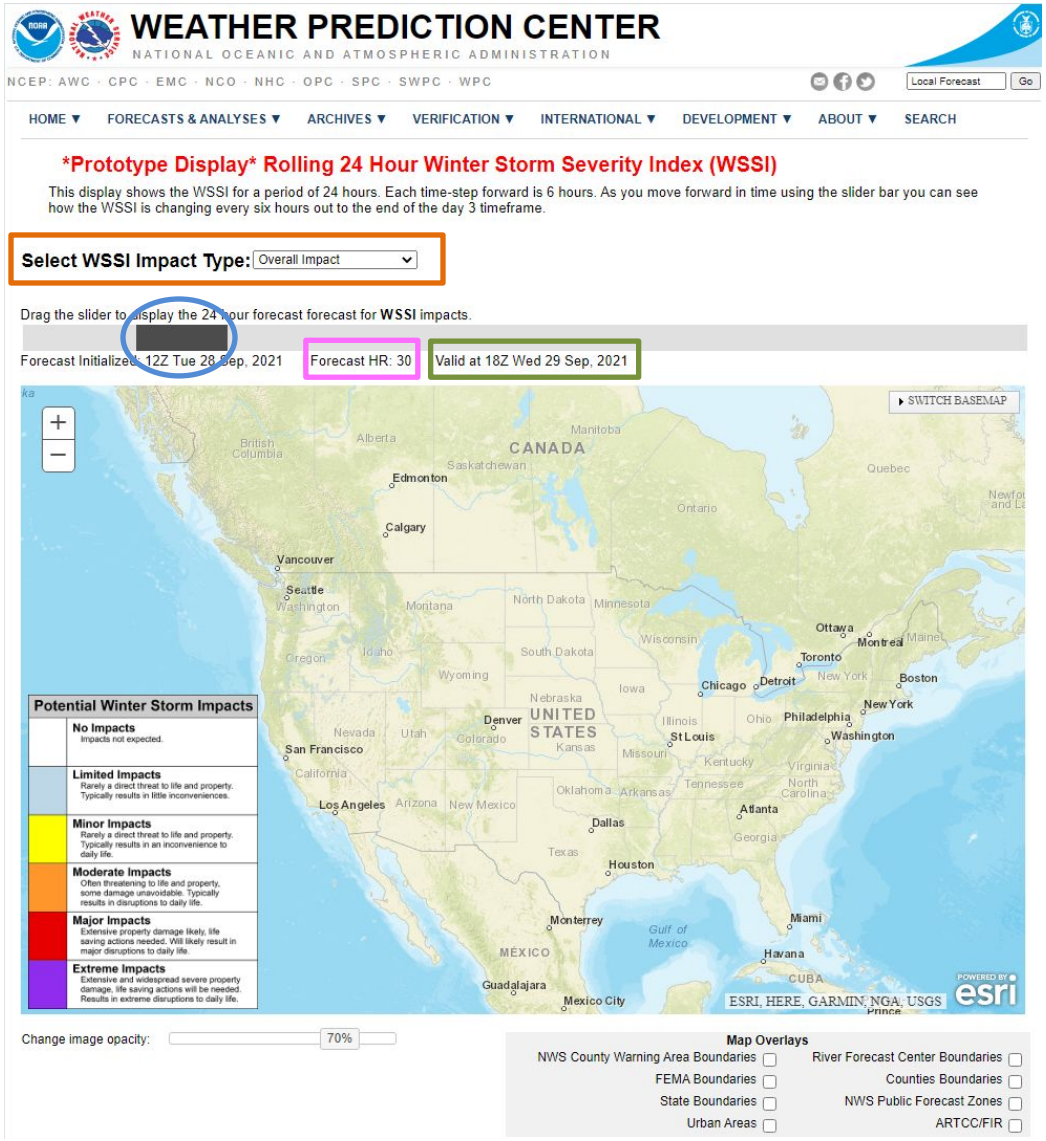
WSSI – Additional Information Menu



- The ‘Click Me for Additional Information’ button open a drop down menu with several options.
  - For technical information and a more in depth description of the WSSI select the Product/Service Description Document
  - For an interactive exploration of the WSSI choose the Interactive ESRI Story Map option
  - For a guided video explanation of the WSSI select the Video Guide

WSSI – Rolling 24 Hour Winter Storm Severity Index (WSSI)

- The Rolling 24 Hour display is controlled by a slider bar (blue circle). Dragging this bar to the right (left) will move the forecast forward (backward) with time.
- You can change the WSSI impact type (Overall, Snow Amount , Snow Load, Ice Accumulation, Flash Freeze, Blowing Snow, Ground Blizzard) via the dropdown menu (orange box).
- The Rolling 24 hour display shows the WSSI forecast for a 24 hour period update 6 hour cadence.
  - The forecast HR indicator (pink box) shows the initial forecast hour for the current 24 hour block. The 'Valid at' time indicator (green box) shows the end time of the current 24 hour block in UTC time. For example the image to the right is showing the 24 hour forecast starting at hour 30 and valid 18Z. The next time step forward would be Forecast HR 36 with a valid time of 00Z



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:
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