WSSI™

The Winter Storm Severity Index

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 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.

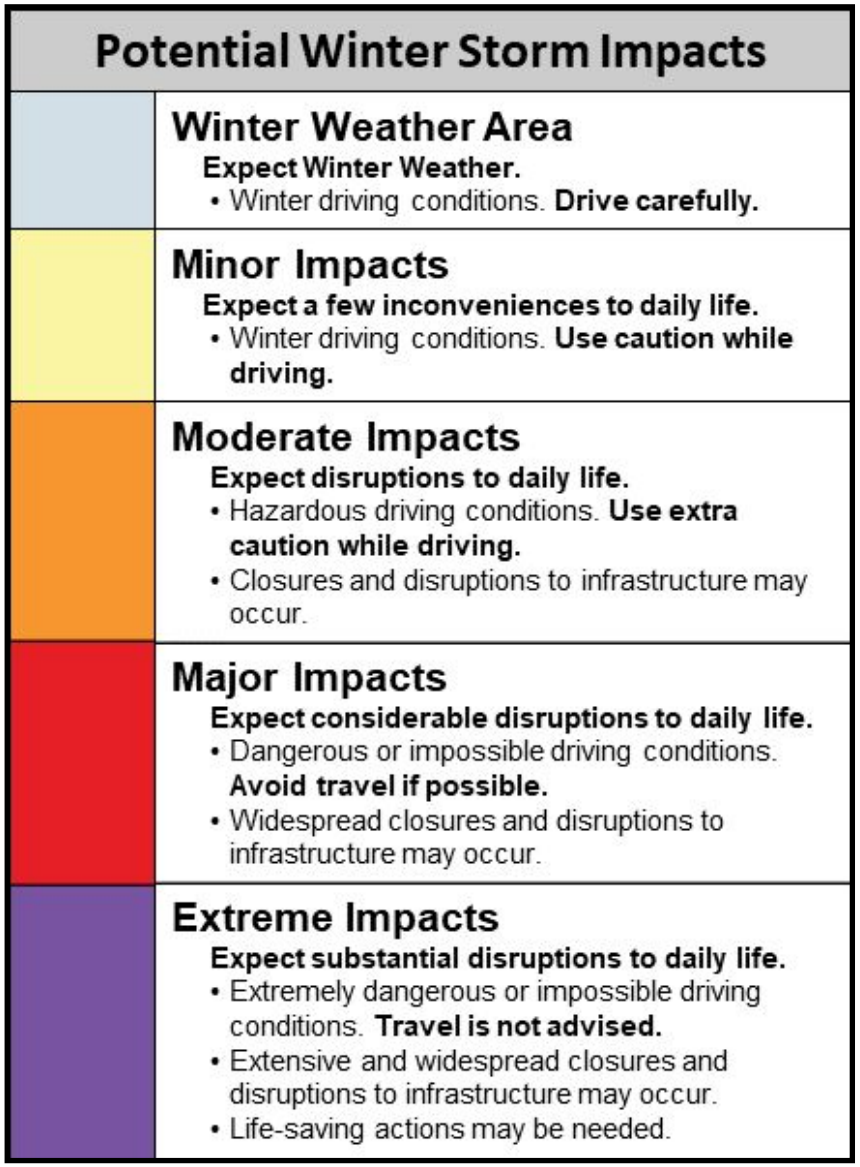
What The Winter Storm Severity Index Is NOT

- 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 addresses impacts resulting from forecasted snowfall. Higher snow totals can inundate all forms of transportation and limit mobility, disrupt infrastructure (e.g., utilities, transportation systems, schools, businesses, delivery and medical services), and result in damage to vegetation or property.

Snow climatology is accounted for as areas of the country less accustomed to snowfall may be less prepared to deal with snow, and thus may experience more severe societal impacts. Population and road network data are also considered in this component, as densely populated or heavily traveled areas are more susceptible to cascading impacts from snow.

Snow Load Index

PURPOSE: This component addresses impacts resulting from the accumulated weight of snowfall accumulations. Increased snow loading can include significant damage to trees, vegetation, built structures, and infrastructure such as power or utility lines. Impacts associated with the physical exertion to remove wet, heavy snow are also accounted for, such as musculoskeletal strains or cardiovascular injuries. Tree type and density, the amount of leaves on deciduous trees, and wind speed are all considered in this component, in addition to snow load climatology.

WSSI Components

Ice Accumulation Index

***PURPOSE*:** This component addresses impacts resulting from ice accretion on flat surfaces (e.g., roadways, sidewalks) and/or elevated surfaces (e.g., tree limbs, overhead wires). These impacts can include widespread disruptions to surface transportation, pedestrian slips, falls, or injuries on icy surfaces, and physical damage to property, vegetation, and infrastructure. Tree type and density, the amount of leaves on deciduous trees, and wind speed are all considered in this component, in addition to population and road network data.

Blowing Snow Index

***PURPOSE*:** The blowing snow component addresses impacts resulting from visibility reductions during active snowfall and impacts resulting from visibility reductions and snow drifts that can occur when pre-existing snow is blown or drifted by strong winds. Low visibility in snowfall can impact surface transportation and be disorienting to anyone caught outside in those conditions. Land cover is considered for this component, in addition to the duration of visibility reductions.

Using Non-Meteorological with Meteorological Data

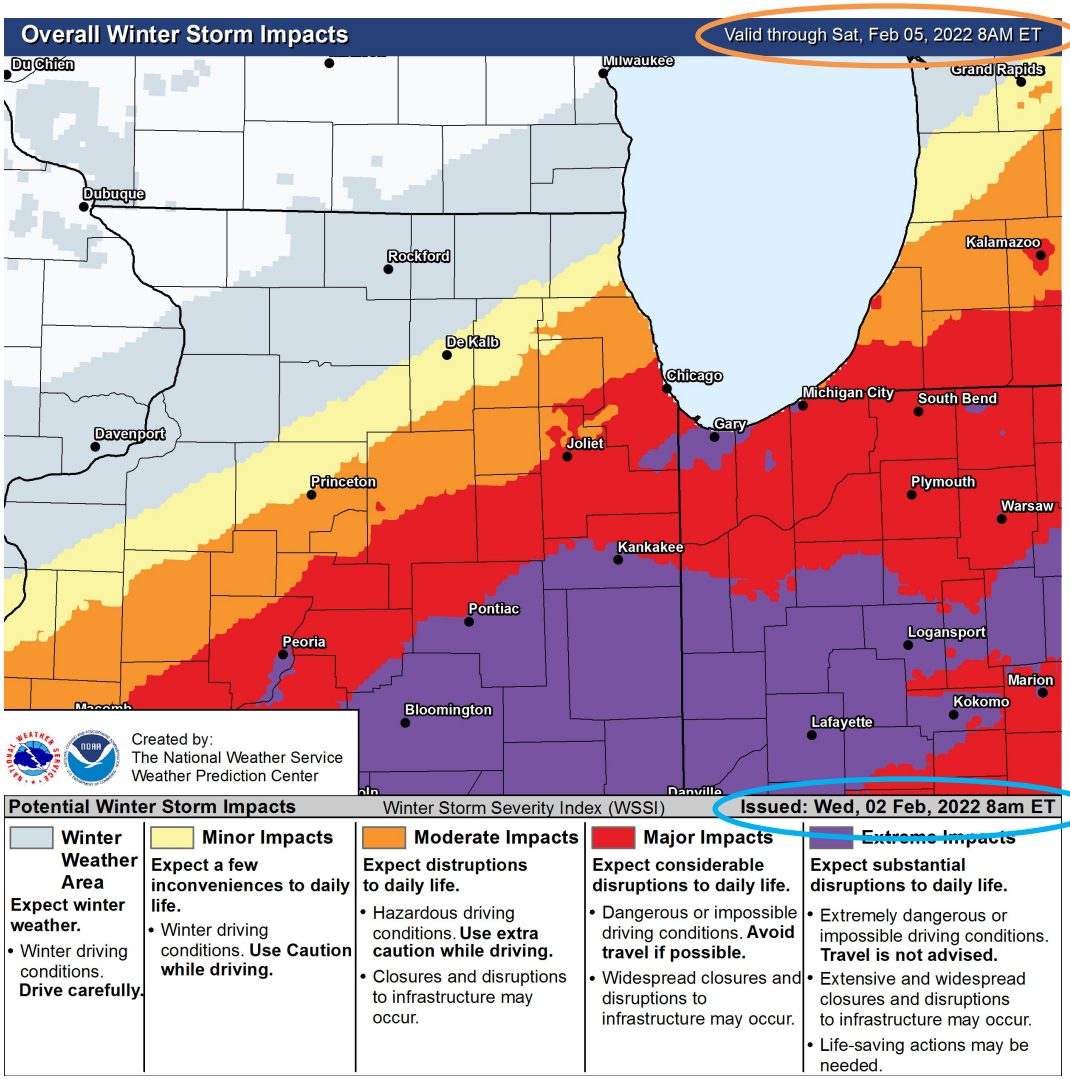
The WSSI uses non-meteorological data along with meteorological data to help forecast impacts

- Elevation data from the Parameter-elevation Regressions on Independent Slopes Model (PRISM)
- Population density data from the NASA Socioeconomic Data and Applications Center (SEDAC)
- Estimated annual average daily traffic (AADT) data from the U.S. Department of Transportation (DOT)
- Land cover data from the U.S. Geological Survey (USGS)
- Tree type and density data from the U.S. Forest Service (FS)
- Vegetation health data from NOAA NESDIS Center for Satellite Applications and Research (STAR)

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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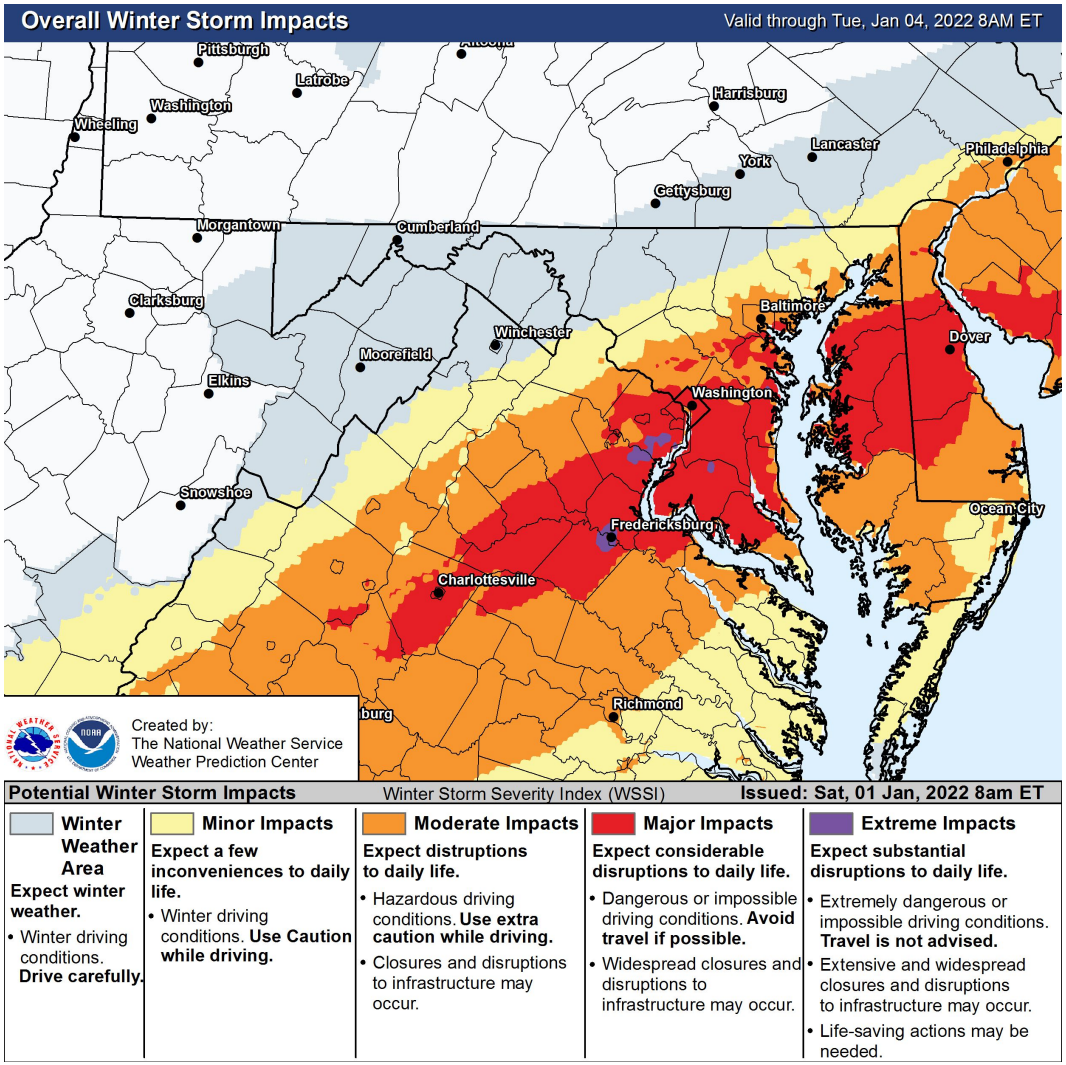
WSSI – How to Interpret

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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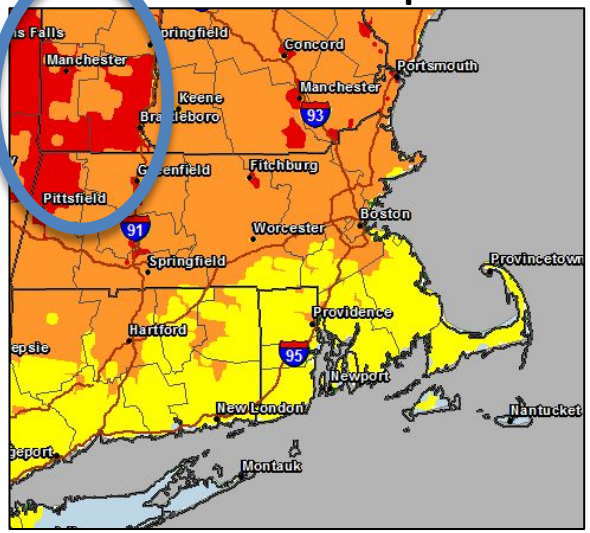
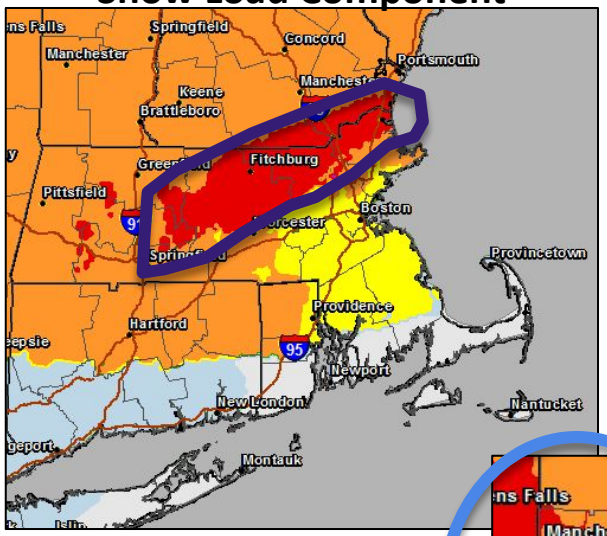
WSSI – How to Interpret (Example)

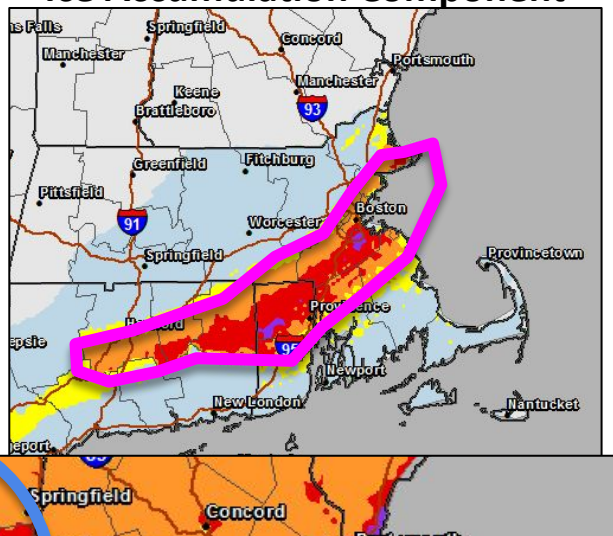
Snow Amount Component

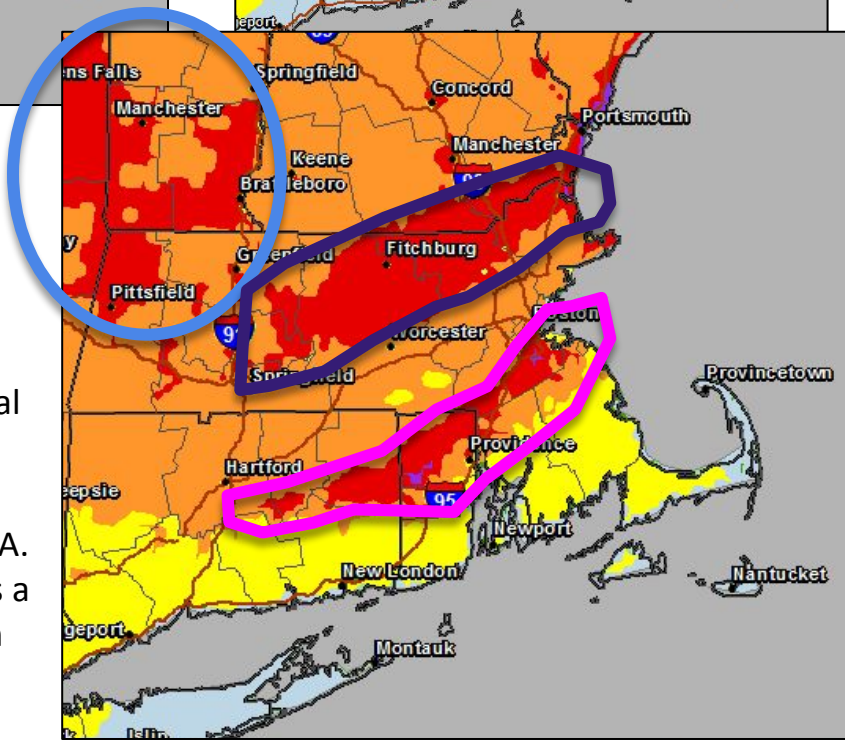


Snow Load Component



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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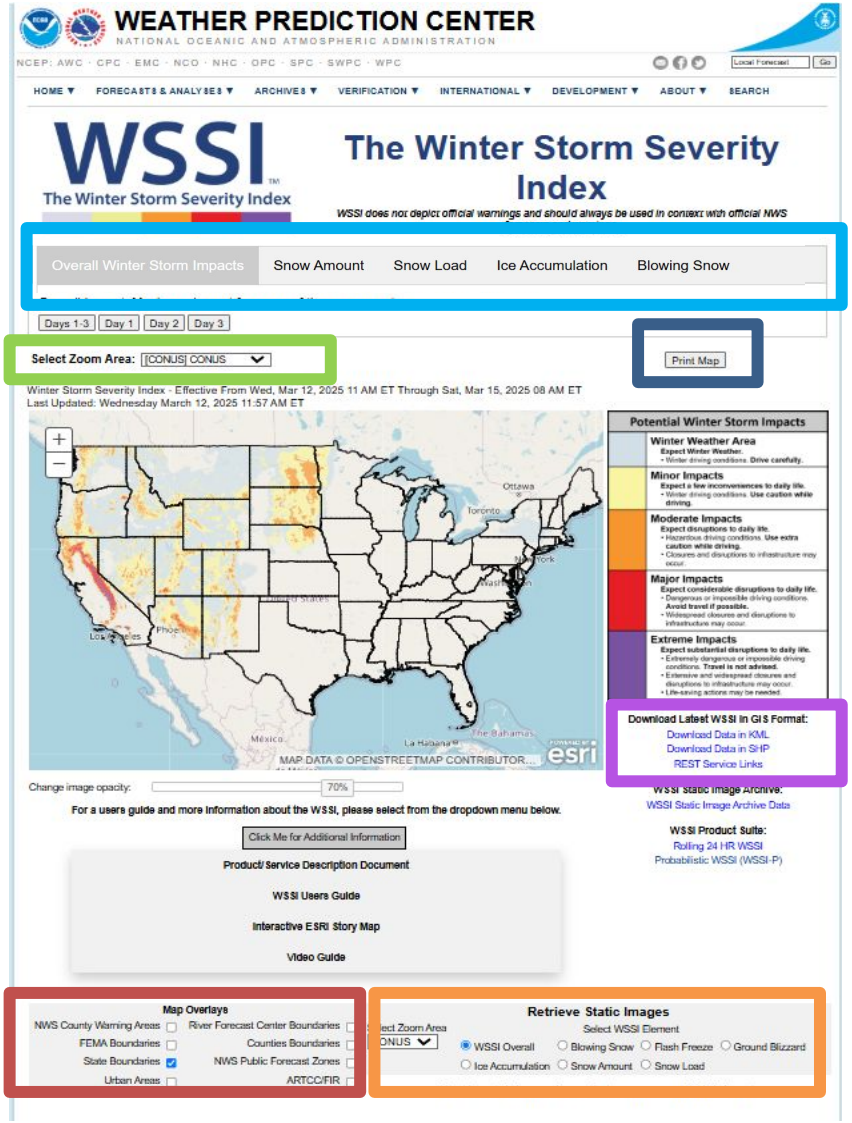
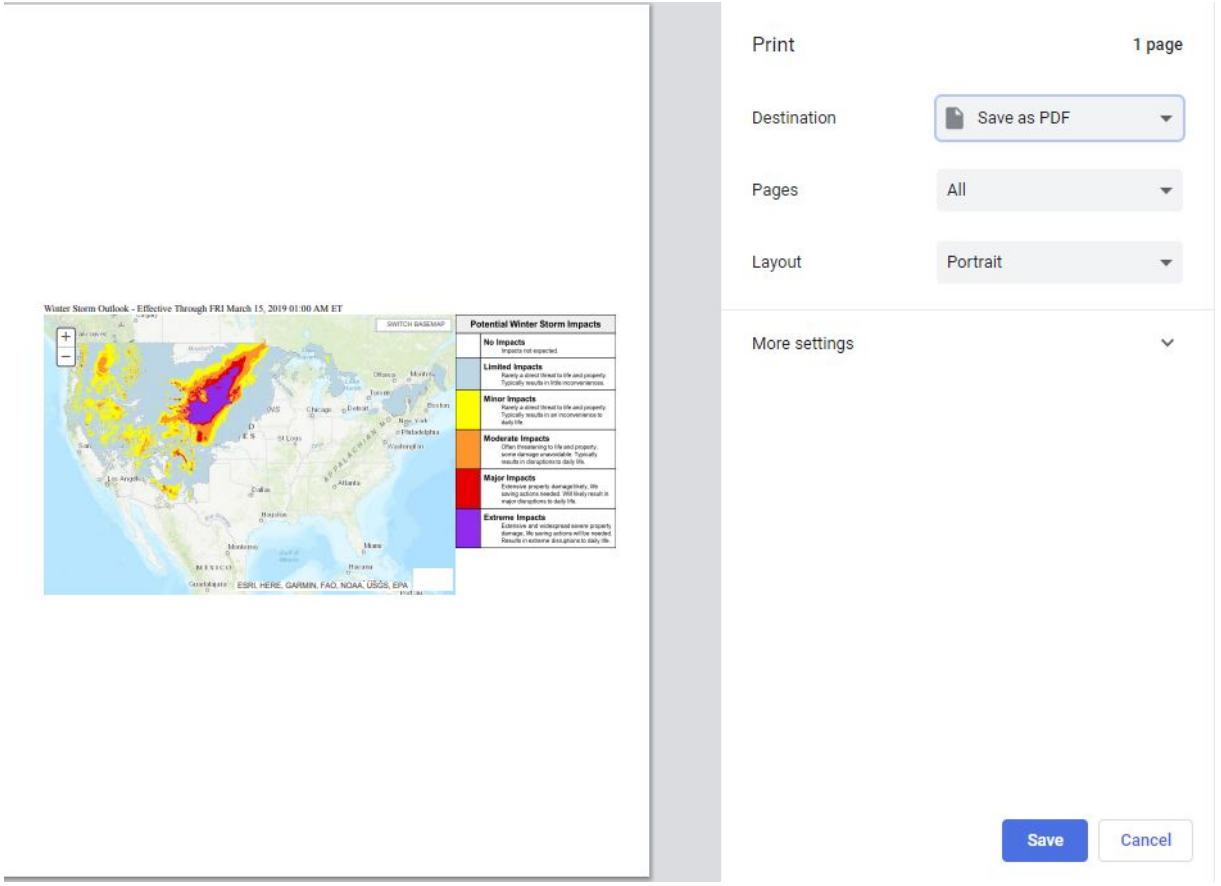
WSSI – Website Overview

- 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
- Links to GIS data
- Map overlay options
  - Toggled via checkbox
- Static images
  - Select location and component

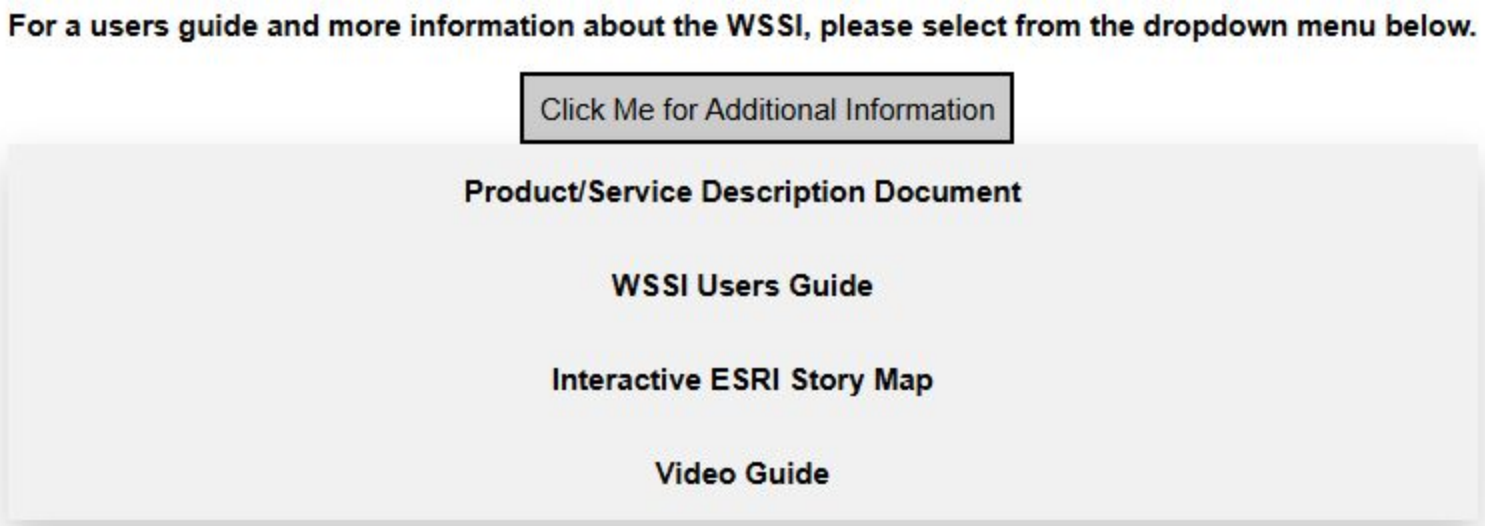


WSSI – Website Print Button

- 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

Summary

The Winter Storm Severity Index (WSSI) is an operational forecast tool available from the National Weather Service (NWS) Weather Prediction Center (WPC). It uses Geographic Information Systems (GIS) to combine meteorological data (e.g., from the National Digital Forecast Database, NDFD) with climatological and non-meteorological (e.g., population density, land cover, tree type and density) data to produce an easily consumable graphic

The WSSI produces impact ratings of Minor, Moderate, Major, and Extreme. A Winter Weather Area is shown for where winter-weather conditions are expected but are not expected to be impactful. Definitions for each impact level are shown in Figure 2. WSSI consists of output for four individual components – Snow Amount, Snow Load, Ice Accumulation, and Blowing Snow – in addition to an overall winter storm impacts summary that shows the maximum impact from any component.

Contact Information

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