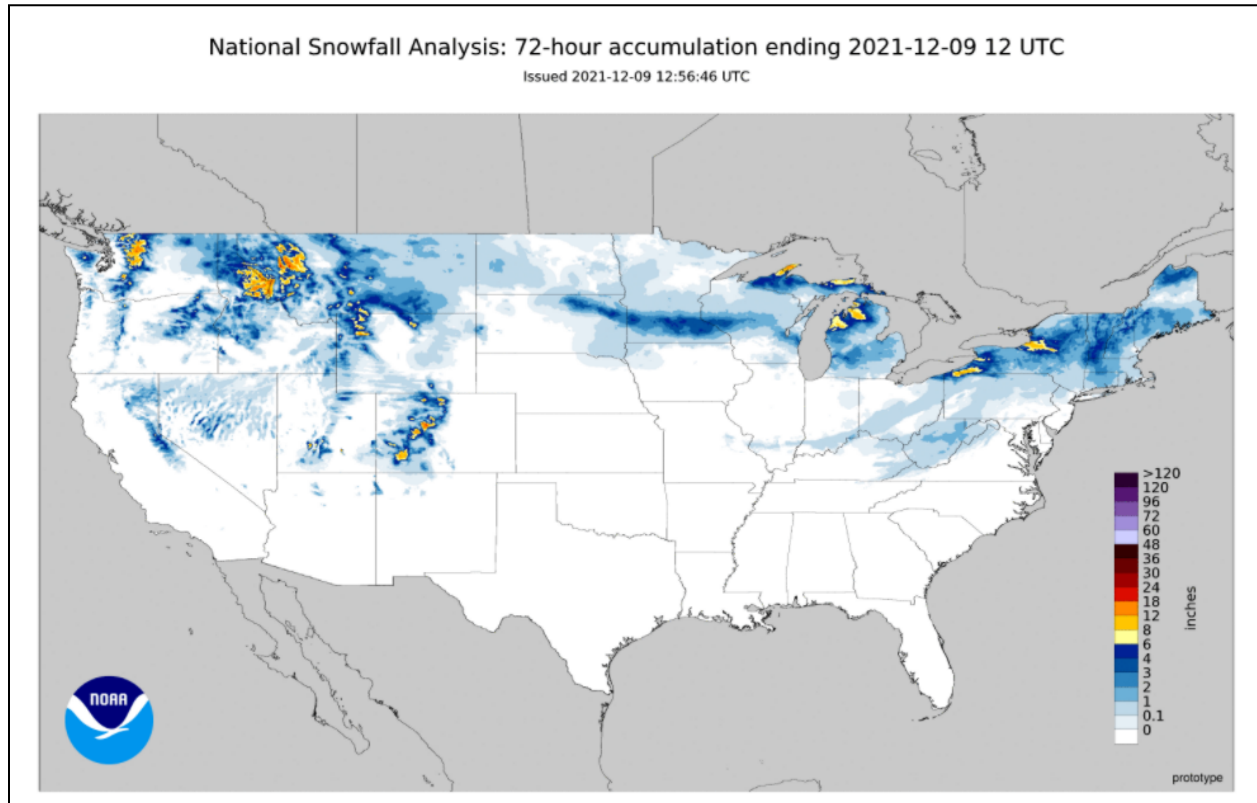


# Product Description Document

## National Gridded Snowfall Analysis

Updated: March 2022



### Part 1 - Mission Connection

**1. Product Description:** The National Water Center (NWC) National Gridded Snowfall Analysis provides an accurate accounting of snowfall totals across the Nation. The National Gridded Snowfall Analysis supports the verification of snowfall forecasts and informs the calculation of Snow Water Equivalents needed for hydrologic assessments. The product provides 6-, 24-, 48-, and 72-hour snowfall accumulations in addition to a seasonal total which resets at the beginning of each water year (October 1).

**2. Purpose/Intended Use:** The National Gridded Snowfall Analysis provides a multiple-timestep analysis of snowfall totals across the conterminous United States. Currently, this product represents the only contiguous U.S. (CONUS)-wide snowfall accumulation data that assimilates observed snowfall data into a background analysis derived from quantitative precipitation estimates with additional guidance from modeled forecast data. This product enhances the NWS's ability to record snowfall accumulations in data sparse regions and areas where radar coverage is poor.

**3. Audience/Users:** NWS meteorologists and hydrologists, national and state partners/customers in water supply, flood and drought forecasting, and various private/public weather data vendors. The National Gridded Snowfall Analysis is used in forecast verification and inclusion in the Unrestricted Mesoscale Analysis.

**4. Presentation Format:** The National Gridded Snowfall Analysis is downloadable in multiple formats including stand-alone images, Geographic Information System (GIS)-compliant datasets (GRIB2, NetCDF, projected NetCDF, GeoTiff), and as an interactive web map. National Gridded Snowfall Analysis is available every twelve hours representing accumulation in four timesteps:

6-Hour Accumulation

24-Hour Accumulation

48-Hour Accumulation

72-Hour Accumulation

Seasonal Accumulation (data resets on October 1 of every year)

**5. Feedback Method:** Opportunities for face-to-face responses will occur routinely through normally scheduled NWC Region Snow Coordination Calls with River Forecast Centers (RFCs), Weather Forecast Offices (WFOs), and local, state, and federal partners.

For further information or questions, please contact:

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## **Part 2 - Technical Description**

**1. Format and Science Basis:** The National Gridded Snowfall Analysis is generated by assimilating observations from Cooperative observers, Community Collaborative Rain, Hail and Snow Network observers and NWS spotter reports into a 24-hour background analysis based on Stage IV qualitative precipitation estimates, with contributions from High Resolution Rapid Refresh quantitative precipitation forecasts, the National Snow Analysis 2-meter air temperature grids, and a novel gridded snowfall-to-liquid ratio climatology. The program that generates the National Gridded Snowfall Analysis is repeated hourly for 5 days following the analysis time to capture any late reported snowfall reports and includes several automated and manual options for Quality Assurance on snowfall reports.

The 24-hour background analysis is conducted using High Resolution Rapid Refresh F003 snow:precipitation ratio, Stage IV Quantitative Precipitation Estimate (QPE; when available), and a climatological snowfall to liquid ratio (SLR) based on Global Historical Climatology Network daily (GHCN-D). GHCN-D snowfall and precipitation, precipitation, and temperature data are used to generate a 30-year snowfall-to-liquid ratio climatology and 15-year

snowfall-temperature thresholds for error detection and correction which are regenerated annually. Two assimilation passes using ordinary kriging are used with the first pass addressing the log-ratio of background to observed snowfall to correct biases and a second pass which addresses the first pass minus observed differences.

All assimilation kriging passes employ spherical semivariogram functions fitted to empirical semivariograms. The system incorporates automated quality control including data consistency and outlier checks during assimilation passes.

**2. Training:** Training is required for personnel responsible for generating Snow-Liquid Ratio climatologies and temperature threshold analyses. Day-to-day Quality Assurance also requires training to recognize issues in the product, how to trace them to the source, and perform manual quality control on observations and gridded input data as needed.

Training for product use is incorporated in the Warning Operations Course - Winter Track in the lesson "Winter Weather Impacts".

**3. Availability:** The National Snowfall Analysis is available 24/7 and is regenerated several times each day for 5 days following each analysis time. 24-hour analyses are generated for 00 and 12 Coordinated Universal Time (UTC), and 6-hour analyses are generated for 00, 06, 12, and 18 UTC. Additionally, 48-hour, 72-hour and seasonal accumulations are aggregated from daily 12 UTC, 24-hour analyses.

The National Gridded Snowfall Analysis is available online. The website URL below is the current National Gridded Snowfall Analysis:

<https://www.nohrsc.noaa.gov/snowfall>

The interactive snow information web map is available at:

[https://www.nohrsc.noaa.gov/interactive/html/map.html?var=snowfall\\_24\\_h&snap=1&bgvar=de m&shdvar=shading&o9=1&o13=1](https://www.nohrsc.noaa.gov/interactive/html/map.html?var=snowfall_24_h&snap=1&bgvar=de m&shdvar=shading&o9=1&o13=1)

This Product Description Document is an update to the 2017 [Technical Implementation Notice](#).