

Hydrometeorological Design Studies Center  
Progress Report for Period  
1 October to 31 December 2025

Office of Water Prediction  
National Weather Service  
National Oceanic and Atmospheric Administration  
U.S. Department of Commerce  
Silver Spring, Maryland

February 16, 2026



#### DISCLAIMER

The data and information presented in this report are provided only to demonstrate current progress on the various tasks associated with these projects. Values presented herein are NOT intended for any other use beyond the scope of this progress report. Anyone using any data or information presented in this report for any other purpose does so at their own risk.

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## I. INTRODUCTION

The Office of Water Prediction (OWP) of the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) updates precipitation frequency estimates for parts of the United States and affiliated territories, in coordination with stakeholder requests. Updated precipitation frequency estimates, accompanied by additional relevant information, are published as NOAA Atlas 14 and are available for download from the [Precipitation Frequency Data Server \(PFDS\)](#).

NOAA Atlas 14 is divided into volumes based on geographic sections of the country and affiliated territories. Figure 1 shows the states or territories associated with each of the volumes of the Atlas. To date, precipitation frequency estimates have been updated for AZ, NV, NM, UT (Volume 1, 2004), DC, DE, IL, IN, KY, MD, NC, NJ, OH, PA, SC, TN, VA, WV (Volume 2, 2004), PR and U.S. Virgin Islands (Volume 3, 2006), HI (Volume 4, 2009), Selected Pacific Islands (Volume 5, 2009), CA (Volume 6, 2011), AK (Volume 7, 2011), CO, IA, KS, MI, MN, MO, ND, NE, OK, SD, WI (Volume 8, 2013), AL, AR, FL, GA, LA, MS (Volume 9, 2013), CT, MA, ME, NH, NY, RI, VT (Volume 10, 2015), TX (Volume 11, 2018), and ID, MT, WY (Volume 12, 2024).

OWP is currently working on Volume 13. The Volume 13 project area covers the states of Delaware, District of Columbia, Maryland, North Carolina, Pennsylvania, South Carolina, and Virginia with an additional approximately 1-degree buffer around these states. Figure 1 shows the new and updated project areas included in NOAA Atlas 14, Volumes 1 to 13. For any inquiries regarding NOAA Atlas 14, please email [hdsc.questions@noaa.gov](mailto:hdsc.questions@noaa.gov).

OWP is developing and implementing NOAA Atlas 15, the future authoritative source and national standard for precipitation frequency information. For more information on the NOAA Atlas 15 development, please visit the [NOAA Atlas 15 Informational Page](#) or email us at [atlas15.info@noaa.gov](mailto:atlas15.info@noaa.gov) for any inquiries regarding NOAA Atlas 15.

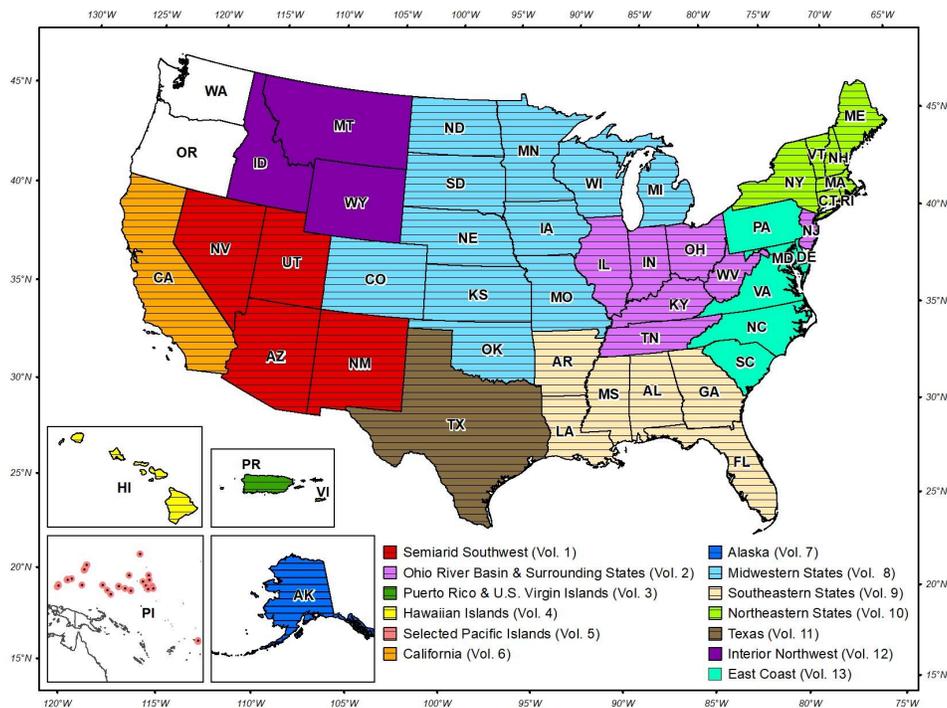


Figure 1. States or territories associated with each of the volumes of the Atlas.

## II. CURRENT NOAA ATLAS 14 PROJECTS

### 1. VOLUME 13: EAST COAST STATES UPDATE

OWP commenced work on NOAA Atlas 14 Volume 13 on July 28, 2022. The precipitation frequency estimates for this volume include the states of Delaware, District of Columbia, Maryland, North Carolina, Pennsylvania, South Carolina, and Virginia and approximately a 1-degree buffer around these states (Figure 2). This project's expected completion date is the end of Q3 in fiscal year 2026.

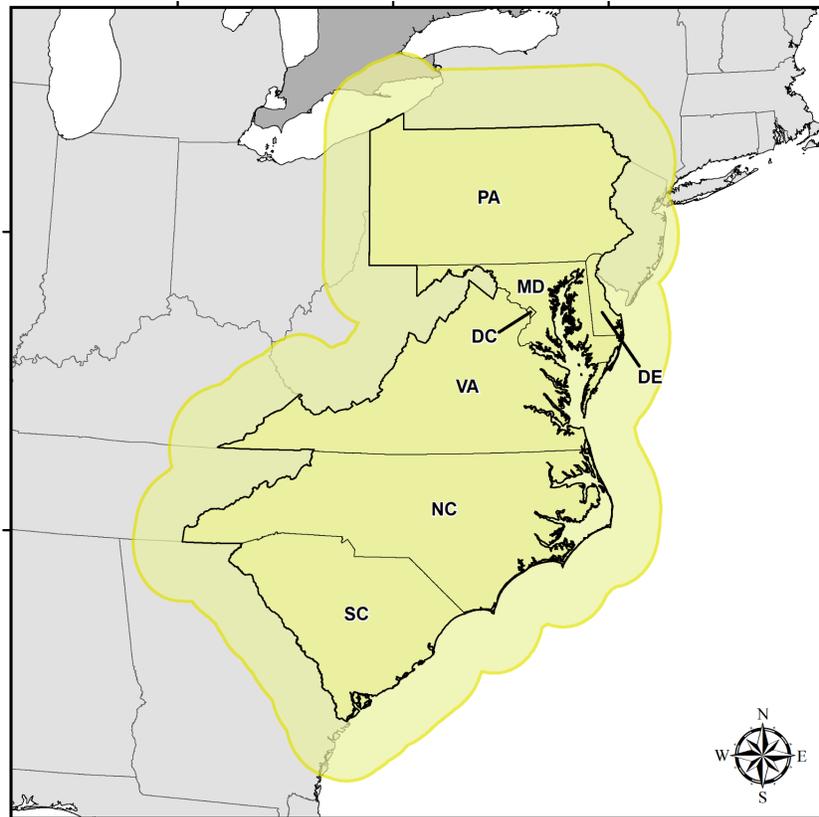


Figure 2. NOAA Atlas 14, Volume 13 extended project area (shown in yellow).

#### 1.1. PROGRESS IN THIS REPORTING PERIOD (Oct. - Dec. 2025)

In the reporting period, we began consolidating and reviewing the peer review responses. As a result of the public feedback, we have identified additional datasets to enhance mountains and coastal areas spatial patterns and data reliance, such as IFLOWS/HADS and the [Duke University Great Smoky Mountain Rain Gauge Network](#). In this reporting period, IFLOWS/HADS outliers have been manually quality controlled and the data was added to the analysis.

For the sources of datasets considered, contacted, downloaded or formatted for the precipitation frequency analysis for NOAA Atlas 14 Volume 12, please see [April - June, 2025 Progress Report](#).

##### 1.1.1. Public Feedback on the preliminary precipitation frequency estimates

During this reporting period, we consolidated all comments, reviewed them and we started to address

them accordingly and to respond to reviewers. The (anonymous) reviewers' comments with our responses and resulting actions will be published as an Appendix 4 in the Volume 13 document. We received comments from 15 from federal, state and local/city government agencies, academia, private companies, and private citizens. Some reviewers commented on decreases in estimates especially in the mountains for 100-year precipitation frequency estimates compared to Atlas 14 Volume 2 estimates. We investigated the causes and ways to mitigate this effect for the final grids. We reviewed information at co-located daily and hourly stations with shorter records and re-examined AMS data at selected stations in station-dense areas. Follow-up decisions about stations' exclusions or revisions were done on a case by case basis. Since we use regional frequency analysis approach to support estimation of the frequencies of rare events by using data from several stations to calculate estimates at one station, we also revisited regions defined before the peer review to accommodate the addition and deletion of stations and to investigate if additional modifications were needed to improve the spatial smoothness and reliability of estimates in mountainous regions.

### **1.1.2. Mean annual maximum precipitation development**

We continue to refine the mean annual maxima (MAMs) grid which are utilized for high-resolution spatial interpolation of precipitation frequency estimates. The mean annual maxima (MAMs) grids are created by the Atlas 15 contractor, IBSS corporation in partnership with LAGO LLC, and RTI, and are utilized in the NOAA Atlas 14 Volume 13 study. In this reporting period, we started carefully reviewing for inconsistencies resulting from stations that may have had less reliable sampling (shorter record or missed several heavy events) relative to nearby stations or any inconsistent areas unduly influenced by the interpolation process or a lack of stations. The development of final gridded MAM estimates will require several iterations with the Atlas 15 contractor. In the process, we reviewed MAM data for each station for inconsistencies relative to MAMs at nearby stations in order to identify locations where MAMs are affected by short periods of record or missed extreme amounts. Flagged MAMs were investigated and either adjusted or removed from the analysis.

### **1.1.3. Additional data formatting and AMS quality control**

Additional observational networks, the Hydrometeorological Automated Data System (HADS) and Integrated Flood Observing and Warning System (IFLOWS), located along the Appalachian Mountains were investigated, collected, and formatted to enhance the accuracy of estimates in areas where preliminary hourly data has been scarce.

In this reporting period, this data was auto-merged to extend the record at the locations where we lack the data. There is no standard archive for these datasets for their full records. Figure 3 shows the combination of multiple sources used to construct this new dataset, which included:

- The Office of Hydrology (OH) offline archives of various decoded Standard Hydrometeorological Exchange Format (SHEF) files.
- SHEF data embedded within text products archived in the NCEI Service Records Retention System ([SRRS](#))
- Iowa Environmental Mesonet (IEM) GOES/HADS/DCP SHEF [archive](#)

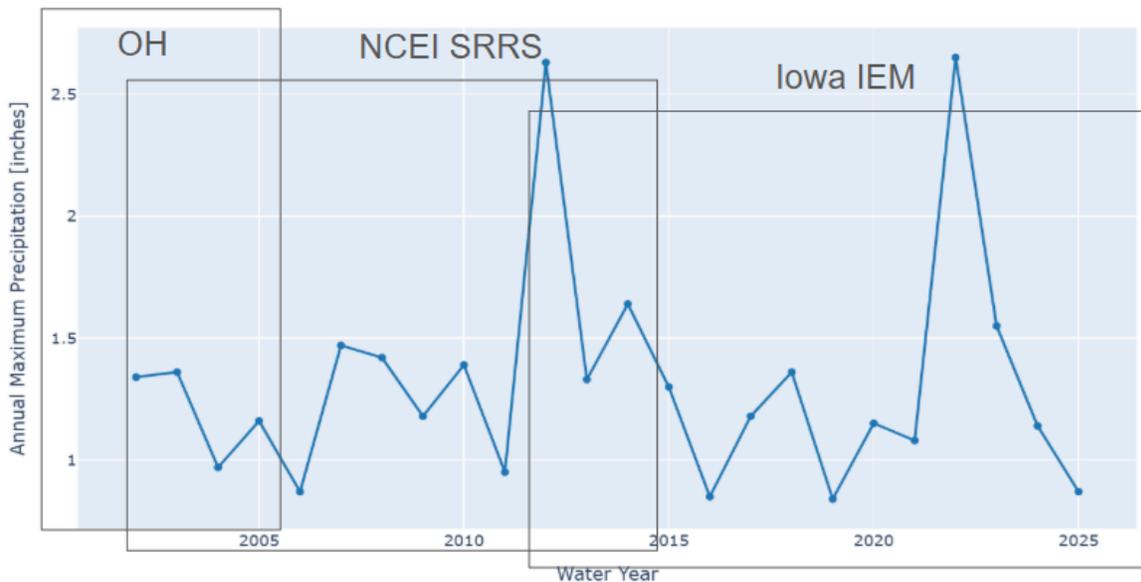


Figure 3. Assembly of different datasets into a single time series. Sources of data are from offline Office of Hydrology backups of SHEF data (OH), SHEF data embedded within text products archived in the NCEI Service Records Retention System (SRRS), and the Iowa IEM GOES/HADS/DCP SHEF archive (Iowa IEM).

## 1.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Jan - Mar 2026)

A large portion of the work in the next reporting period will plan on finalizing quality control of AMS data for all durations, completing the spatial review of mean annual maximum grids and beginning the revision of the final PF estimates for all durations. We will address comments received from reviewers and work on developing the final precipitation frequency estimates and documentation. The project milestone schedule has been revised to align with the availability of funds and personnel (current and projected).

## 1.3. PROJECT SCHEDULE

- Data collection, formatting, and initial quality control [Q1FY2025; Completed]
- Extraction of annual maximum series (AMS); additional quality control and data reliability tests (e.g., outliers, independence, consistency across durations, duplicate stations, candidates for merging) [Q2FY2025; Completed]
- Regionalization and frequency analysis [Q2FY2025; Completed]
- Initial spatial interpolation of precipitation frequency (PF) estimates and consistency checks across durations [Q3FY2025; Completed]
- Peer review [Q4FY2025; Completed]
- Revision of PF estimates [Q2FY2026; In Progress]
- Remaining tasks (e.g., development of precipitation frequency estimates for partial duration series, seasonality, temporal distributions, documentation) [Q3FY2026; In Progress]
- Web publication [Q3FY2026]

### III. ATLAS 15: PRECIPITATION FREQUENCY STANDARD UPDATE

NOAA is developing and implementing NOAA Atlas 15, the future authoritative source and national standard for precipitation frequency information. When published, NOAA Atlas 15 will have nationwide coverage and account for temporal trends, and represents a shift from a stationary assumption (i.e. extreme precipitation patterns do not change over time) to a nonstationary assumption.

In order to collect feedback early in the development process on the structure of NOAA Atlas 15 and the accompanying web dissemination strategy, [OWP released the NOAA Atlas 15 Pilot](#) over the state of Montana on September 26, 2024. After the NOAA Atlas 15 Pilot, NOAA plans to release preliminary NOAA Atlas 15 estimates for CONUS to initiate the peer review process of data methodology and web dissemination strategy.

In this reporting period, the technical team finalized the preliminary estimates and documentation over CONUS. The release of preliminary estimates over CONUS is anticipated in the first quarter of 2026. For more information on NOAA Atlas 15 development, please visit the [NOAA Atlas 15 Informational Page](#) or email us at [atlas15.info@noaa.gov](mailto:atlas15.info@noaa.gov) for any inquiries regarding NOAA Atlas 15.

When published, the NOAA Atlas 15 data and user interface will be available on the National Weather Service's new gateway for water information, the National Water Prediction Service (NWPS) (<https://water.noaa.gov>). See *Extreme Precipitation Estimates*, along the navigation bar towards the top of the NWPS homepage, for more information.

## **IV. OTHER**

### **4.2 PRESENTATIONS, WORKSHOPS, AND CONFERENCES**

Dr. Janel Hanrahan gave a presentation titled, "NOAA Atlas 15 Update: Preliminary Precipitation Frequency Estimates for CONUS" for AGU Annual Meeting (New Orleans) on December 17, 2025

Dr. Lynne Trabachino gave a presentation titled, "NOAA Atlas 15 Overview" for American Water Resources Association on November 10, 2025

Dr. Janel Hanrahan gave a presentation titled, "NOAA Atlas 15 Update: Preliminary Precipitation Frequency Estimates for CONUS" for Minnesota Department of Natural Resources Monthly Local Governments Forum on October 8, 2025