

Hydrometeorological Design Studies Center
Progress Report for Period
1 January to 31 March 2026

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

May 20, 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.

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 for any inquiries regarding NOAA Atlas 15.

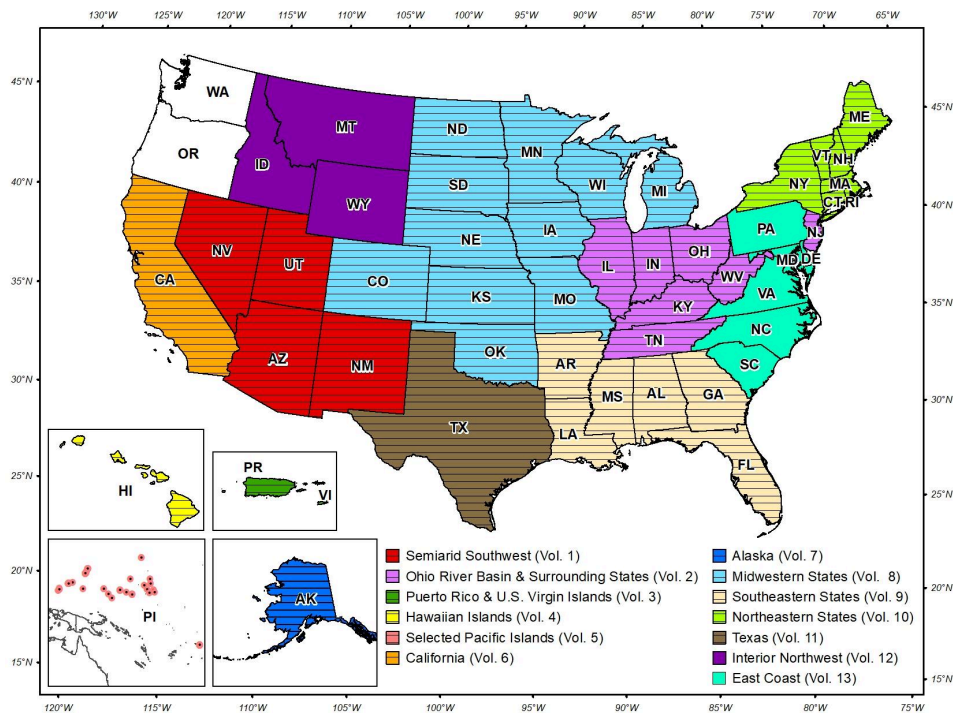


Figure 1. States or territories associated with each of the volumes of the Atlas.

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 summer of 2026.

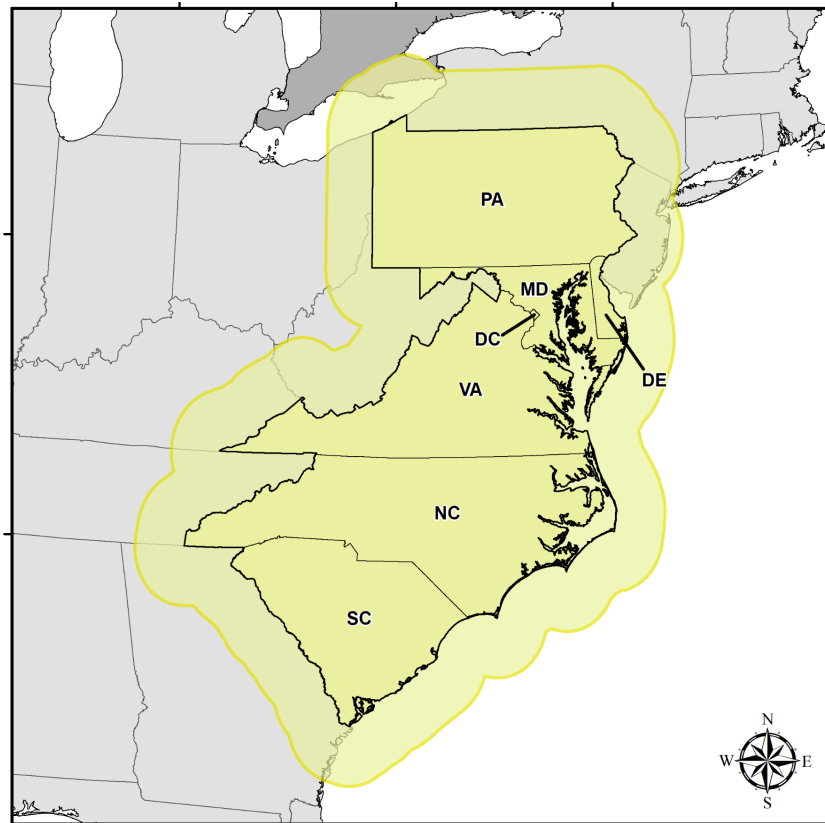


Figure 2. NOAA Atlas 14, Volume 13 extended project area (shown in yellow).

1.1. PROGRESS IN THIS REPORTING PERIOD (Jan. - Mar. 2026)

In the reporting period, we continued consolidating and reviewing the peer review responses, continued to review and refine mean annual maximum (MAM) grids. We identified and formatted the Virginia Coast Reserve LTER hourly dataset. A literature and data review began to look for and add back extreme events missing in the current archived datasets. Work was done developing documentation and website updates. Templates were also created for final cartographic maps.

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

1.1.1. Public Feedback on the preliminary precipitation frequency estimates

During this reporting period, we continued to address comments received 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 federal, state and local/city government agencies, academia, private companies, and private citizens.

1.1.2. Mean annual maximum precipitation development

We continue to refine the MAM grids, which are utilized for high-resolution spatial interpolation of precipitation frequency estimates. The MAM 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. The development of final gridded MAM estimates will require several iterations with the Atlas 15 contractor. In this reporting period, 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, missed extreme amounts, or lack of station coverage. Flagged MAMs were investigated and either adjusted or removed from the analysis. Significant discrepancies between observed and predicted MAMs are analyzed to determine if further data refinement is required. For example, the observed 1-day MAM is notably lower than the model's estimate (Fig. 3). A closer review revealed that the station lacked recent data (blue), which was subsequently recovered via Standard Hydrometeorological Exchange Format (SHEF) encoded products and storm reports in the local weather forecast office's (WFO) Public Information Statements (PNS) (Fig. 4).

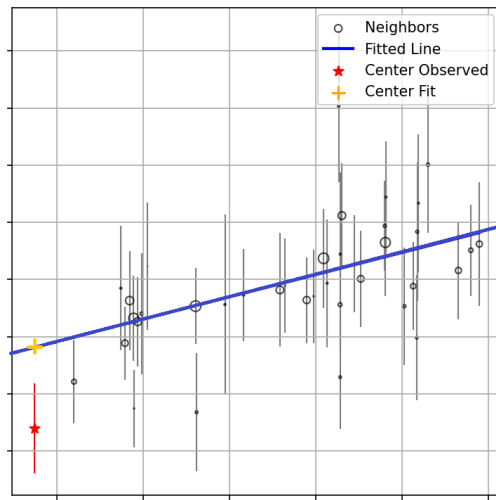


Figure 3. A station with significantly lower observed (red star) 1-day MAM precipitation compared to cross-validation prediction (gold cross) for a fit (blue line).

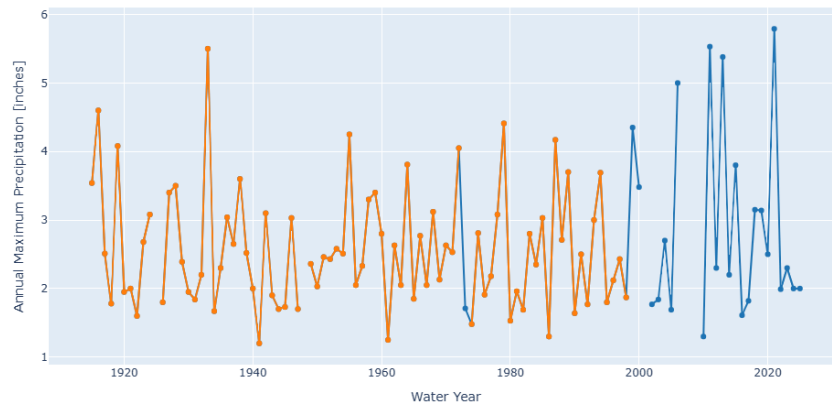


Figure 4. Data for a station with low 1-day MAM compared to prediction. The original data (orange) was supplemented by data acquired from SHEF products and NWS WFO PNS (blue),

which increase the observed MAM closer to the model's prediction and give the station a longer record length.

1.1.3. Additional data formatting and AMS quality control

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 the previous reporting period, this data was auto-merged to extend the record at the locations where we lack the data, and this period, the annual maxima time series was manually quality controlled.

Additionally, in this reporting period 7 stations were added from the hourly meteorological data for the Virginia Coast Reserve LTER 1989-Present ([vcr/iter](#)).

1.1.4. Literature search for missing extreme events

Precipitation frequency estimates can be significantly affected by an incomplete data record, particularly if one of the highest observed amounts is missing, either because it occurred outside a station's operational period, or due to data that was never archived, digitized, nor was otherwise lost over time. Less commonly, the rainfall amounts were misread from the observation forms, errors occurred during digitization of the data, the gauge malfunctioned, or equipment was impacted during a flood so measurements could not be made.

During this reporting period we started to document and add back significant events that were either missing, underestimated, or recorded erroneously in various stations' records, if they were well documented and/or recorded at nearby stations. An example of this can be seen at GHCNDAILY USC00315996 Murfreesboro, NC (Fig. 5). A value of 11.10" was incorrectly digitized / archived as 1.10" on September 16, 1999 during Hurricane Floyd (Fig. 6). A table of notable changes similar to this will be provided in the final documentation.

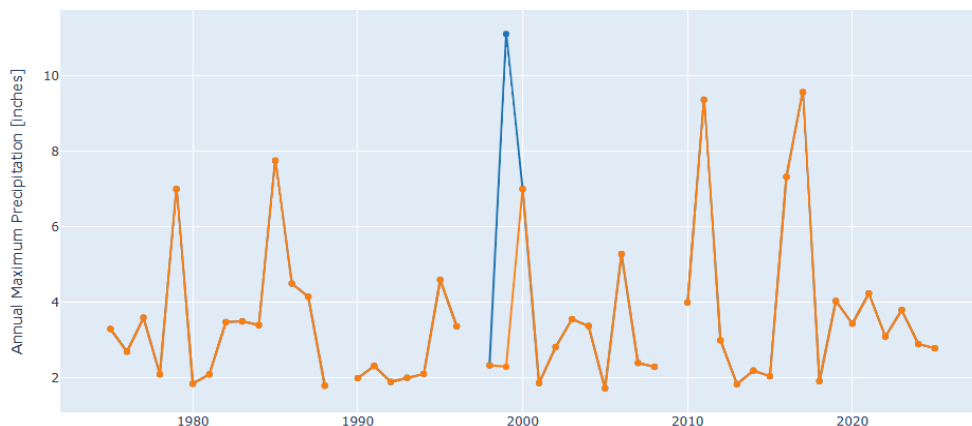


Figure 5. The original (orange) 1-day time series incorrectly digitized a 11.10" as 1.10" during Hurricane Floyd, which is represented by the blue part of the time series.

12	79	54	66	0.00		
13	78	54	57	0.03		
14	80	57	70	0.12		
15	74	70	72	1.00		
16	73	66	66	11.10		
17	71	58	62	1.65		
18	77	53	57	0.02		
19				0.7		

Figure 6. Hand-written observation form during Floyd, showing 11.10" observed on September 16, 1999, which was incorrectly archived as 1.10".

1.1.5 Documentation and Website Publication

During this reporting period documentation was drafted for the final publication. This documentation will include responses to the peer review feedback as well as changes to the precipitation frequency framework from previous NOAA Atlas 14 Volumes. Documentation will be published with the final estimates.

We also worked on the development of updated PFDS web pages for the new project area of Volume 13. In addition to this we also developed templates for all PFDS cartographic maps.

1.2. PROJECTED ACTIVITIES FOR THE NEXT REPORTING PERIOD (Apr. - June 2026)

During the next reporting period, we will work on completing the final gridded MAM, AMS-based and partial duration series (PDS)-based estimates, gridded upper and lower confidence limits for 90% confidence interval for all durations and frequencies, final cartographic maps, documentation, and web publication. 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, and documentation) [Q3FY2026; In Progress]
- Web publication [Q4FY2026; Revised]
- Supplemental Information (e.g. Seasonality, temporal distributions and rainy seasons) [TBD; Forthcoming]

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.

The release of preliminary estimates over the CONUS is anticipated by September 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 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

4.1 PRESENTATIONS, WORKSHOPS, AND CONFERENCES

Dr. Fernando Salas gave an Atlas 15 update to the NOAA/ASCE Task Force on January 13, 2026.

Debbie Martin, Ken Kunkel, Michael StLaurent and Lynne Trabachino gave four presentations on NOAA Atlas 14 and Atlas 15 development at the 106th American Meteorological Society Annual Meeting on January 26, 2026 in Houston, Texas.

Dr. Janel Hanrahan gave a virtual presentation on NOAA Atlas 15 to Minnesota's Vermillion River Watershed Joint Powers Organization (VRWJPO) on March 12, 2026.