Website: *https://www.weather.gov/owp/hdsc*
Email: *hdsc.questions@noaa.gov*
Locations: *Tuscaloosa, AL – Silver Spring, MD – Chanhassen, MN*

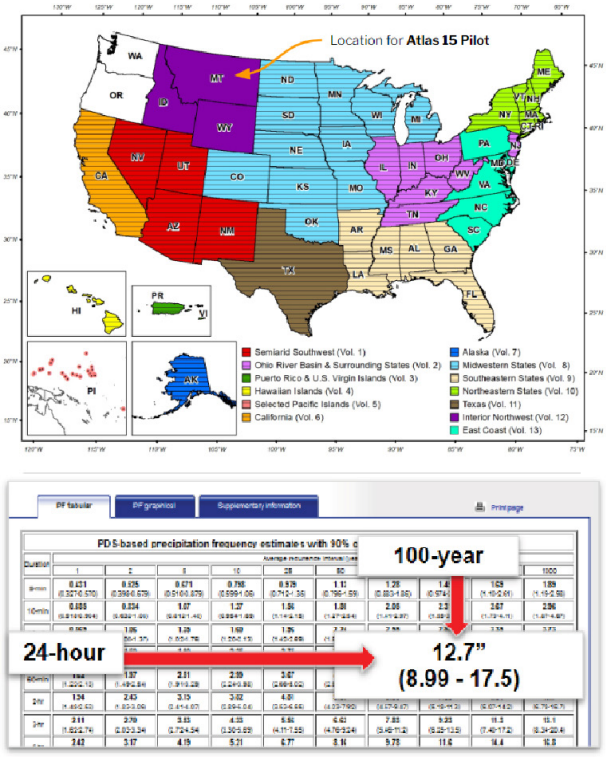
OWP | OFFICE OF WATER PREDICTION

NOAA ATLAS 15:

Update to the National Precipitation Frequency Standard

NOAA is recognized by the engineering and floodplain management communities as the authoritative source of precipitation frequency data, and has a long history of generating these data that serve as the foundation for built infrastructure nationwide.

The National Weather Service (NWS) Office of Water Prediction (OWP) has produced an authoritative atlas of precipitation frequency estimates, published as volumes of the NOAA Atlas 14 Precipitation-Frequency Atlas of the United States. These estimates are currently posted on the NOAA Precipitation Frequency Data Server (PFDS), with interactive tables and charts. Precipitation frequency estimates are defined as the precipitation depth at a particular location, for a given storm duration, that has a statistically-expected 1-in-YY chance of being exceeded in any given year, where YY is the statistical annual recurrence interval.



States and territories associated with each NOAA Atlas 14 volume

The generation of authoritative precipitation frequency information requires a rigorous development process and extensive quality control with significant stakeholder interaction.

NOAA Atlas 14 estimates are used to design, plan, and manage much of the Nation's infrastructure for a wide variety of purposes under federal, state, and local regulations. NOAA Atlas 14 estimates replace estimates previously published by NOAA in the early 1960s and '70s and cover a range of storm durations from 5-minutes through 60-days, for average recurrence intervals of 1-year through 1,000-year. Compared to previous volumes, Atlas 14 estimates benefit from use of better-quality data (e.g. precipitation stations with longer period of record, increased station density, etc.), enhanced quality control methods, consideration of uncertainties, and improved frequency analysis and spatial interpolation methods that account for variation in terrain, proximity to the coastline etc.

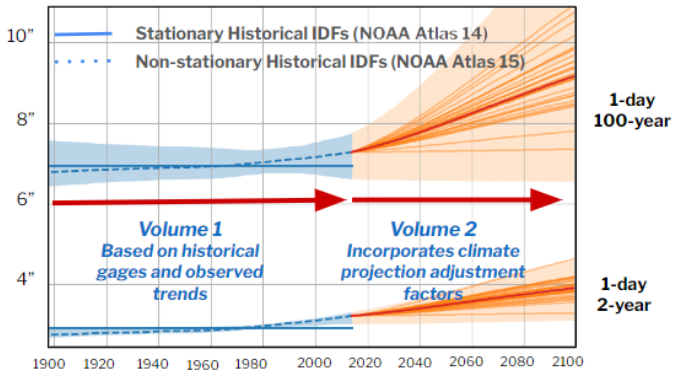
First National Precipitation Frequency Analysis Accounting for Climate Change

Historically, NOAA precipitation frequency estimates have been funded by states and other users, on a cost-reimbursable basis, for individual subsets of the U.S. However, with the 2022 Bipartisan Infrastructure Law (BIL), OWP received first-ever direct Federal funding to (1) update the NOAA Atlas 14 precipitation frequency standard while accounting for climate change, and (2) develop precipitation frequency estimates for the entire U.S. and its territories.

These updated precipitation frequency estimates will be referred to as NOAA Atlas 15 and will be presented in two volumes. **Volume 1** will account for temporal trends in historical observations, and **Volume 2** will use future climate model projections to generate adjustment factors for Volume 1. To account for a changing climate, NOAA worked with the Federal Highway Administration (FHWA) and the academic community to develop a new methodology for Atlas 15, which has undergone broad review by stakeholders and Federal partners over the past year, leveraging state of the art research in extreme value theory and climate model outputs and projections. The Atlas 15 estimates will provide critical information to support the design of state and local infrastructure nationwide under a changing climate.

NOAA Atlas 15

New National Precipitation Frequency Standard



Historical and future intensity-duration-frequency estimates (IDFs)

The NOAA Atlas 15 update enhances the production and provision of rigorously produced, authoritative precipitation frequency estimates by:

- Leveraging the results and recommendations from the "Analysis of Impact of Nonstationary Climate on NOAA Atlas 14 Estimates" assessment report.
- Developing a seamless national analysis based on historical data and a non-stationarity assumption using the latest precipitation observations and future climate model projections. Storm durations will range from 5-minutes to 60-days and span average annual recurrence intervals of 1 to 1,000 years.
- Enhancing Web visualizations and data services, through NOAA's Service Delivery framework initiative, to better engage stakeholders and users.

Timeline for the Development and Deployment of Updated Authoritative Precipitation Frequency Estimates Nationwide

2022/2023

- **Feb. - Aug 2022** - Published methodology and briefed stakeholders.
- **Sept. 2022** - Distributed Public Notification Statement (PNS) and collect public feedback.
- **Jan. 2023** - Hosted technical workshop with federal partners.
- **Apr. 2023** - Award contracts and grants and initiate product development.

2024

- **Development** - Evolve framework. Create Quality Controlled National Precipitation Database. Evaluate Climate Model Projections.
- **Pilot** - Deliver Atlas 15 Vol. 1 and Vol. 2 pilot over Montana.

  Collect and adjudicate feedback on preliminary estimates and Web dissemination strategies.

2025

- **CONUS** - Initiate 60-day peer review for Atlas 15 Vol. 1 and Vol. 2 for CONUS (lower 48 states).

  Collect feedback and adjudicate comments on product.

2026

- **CONUS** - Complete Atlas 15 Vol. 1 and Vol. 2 and deliver estimates, documentation and supplementary products to stakeholders.
- **oCONUS** - Initiate peer review for oCONUS (e.g. Hawaii, Alaska, Puerto Rico, U.S. Virgin Islands, Guam).

  Collect feedback and adjudicate comments on product.

2027

- **oCONUS** - Complete Atlas 15 Vol. 1 and Vol. 2 and deliver estimates, documentation and supplementary products to stakeholders.

The **FLOODS Act** signed into law in December 2022 and known as Public Law No: 117-316, authorizes NOAA to establish a program, to be known as the *NOAA Precipitation Frequency Atlas of the United States*. This program would compile, estimate, analyze, and communicate the frequency of precipitation in the United States and update these precipitation frequency estimates no less than once every 10 years.

For additional information, please contact OWP at hdsc.questions@noaa.gov.