**TRANSPORTATION POOLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

Lead Agency (FHWA or State DOT): \_\_\_**FHWA**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INSTRUCTIONS:**

*Project Managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.*

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| **Transportation Pooled Fund Program Project #**TPF-5(475) | **Transportation Pooled Fund Program - Report Period:**□ Quarter 1 (January 1 – March 31) X Quarter 2 (April 1 – June 30) □ Quarter 3 (July 1 – September 30)□ Quarter 4 (October 1 – December 31) |
| **Project Title:**Update Precipitation Frequency Estimates for Delaware, Maryland, North Carolina, Virginia, Pennsylvania, and South Carolina (NOAA Atlas 14, Vol. 13) |
| **Name of Project Manager(s):**Megan Frye | **Phone Number:**(303) 396-9847 | **E-Mail**megan.frye@dot.gov |
| **Lead Agency Project ID:**FHWA | **Other Project ID (i.e., contract #):** | **Project Start Date:**March 19, 2021 |
| **Original Project End Date:**June 2024 | **Current Project End Date:**March 2026 | **Number of Extensions:** |

Project schedule status:

□ On schedule □ On revised schedule □ Ahead of schedule X Behind schedule

Overall Project Statistics:

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| **Total Project Budget** | **Total Cost to Date for Project** |  **Percentage of Work**  **Completed to Date** |
| $1,802,000 | $1,209,928 | 67% |

***Quarterly*** Project Statistics:

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|  **Total Project Expenses**  **and Percentage This Quarter** |  **Total Amount of Funds**  **Expended This Quarter** |  **Total Percentage of**  **Time Used to Date** |
| $188,100 / 10% | $188,100 | 89% |

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| **Project Description**:The purpose of this project is to update precipitation frequency estimates for Delaware, Maryland, North Carolina, Virginia, Pennsylvania, and South Carolina published in NOAA Atlas 14 Volume 2. Like previous NOAA Atlas 14 volumes, the estimates and associated bounds of 90% confidence intervals will be provided at 30 arc-sec resolution for durations of 5-minute through 60-day at average recurrence intervals (ARIs) of 1-year through 1,000-year. The study results will be published as NOAA Atlas 14 Volume 13, a wholly web-based publication available at Precipitation Frequency Data Server (PFDS). The publication will include the artifacts provided in previous NOAA Atlas 14 Volumes, including access through the PFDS, base grids in standard formats together with error estimates, electronic copies of maps, charts of seasonal distributions and probabilistic temporal distributions of heavy precipitation, and detailed documentation. Updated areal reduction factors, which are needed to calculate analogous areal precipitation frequency estimates, will not be developed as a part of this project. |

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| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**In this reporting period, NOAA completed review of mean annual maximum grids for 1-hour, 6-hour, 24-hour and 10-day durations as well as precipitation frequency estimates for 2-year and 100-year return periods for the publication of the Peer Review.Additional information on the status of the Atlas 14, Volume 13 work is available at: https://www.weather.gov/owp/hdsc\_current\_projects |
| **Anticipated work next quarter**:In the next quarter, the peer review of NOAA Atlas 14 Volume 13 will be published. NOAA will be adding new data from recently acquired stations from various data archives to data sparse areas in the Appalachian Mountains. MAM maps will undergo a review for all base durations from 60-minute through 60-day.  |

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| **Significant Results:****Data Collection and Screening** - NOAA continues to quality control the identified precipitation networks that are considered for the development of the Atlas 14 Volume 13 estimates. As with all NOAA Atlas 14 Volumes, the primary source of data is the NOAA’s National Centers for Environmental Information (NCEI). The NCEI is the most reliable data source network in the United States. All data were formatted to a common format (station type) at base durations: 1-minute (01M), 5-minute (05M), 15-minute (15M), 1-hour (HLY), or 1-day (DLY). Where available, records were extended through December 2024. In areas with sparse gauge data coverage, NOAA are currently investigating data from the U.S. Geological Survey (USGS) and various archives of the National Water Information System (NWIS).**Mean Annual Maxima (MAM) grids for base durations -** During this reporting period, NOAA finalized the MAM grids for several durations using the modified PRISM-based in-house approach (60-minute, 6-hour, 24-hour, and 10-day).**Development of precipitation frequency estimates -** During this reporting period, estimates were generated and reviewed for 60-minute, 6-hour, 24-hour and 10-day base durations at 2-year and 100-year average recurrence intervals ARIs). Presently, NOAA is reviewing maps of the resulting estimates for the 2-year and 100-year ARIs. Inconsistent estimates or unreasonable patterns are resolved on a case-by-case basis in various ways: by manually adjusting the value to reflect expected patterns, omitting the station from the analysis, or by adding anchoring estimates at critical ungauged locations. **Development of Peer Review –** During this reporting period, NOAA began work on the data and webpage for the peer review process. All NOAA Atlas 14 Volumes are subject to peer review which provides critical feedback on the reasonableness of DDF curves and spatial patterns in interpolated precipitation frequency estimates across durations and frequencies, and accuracy of station metadata. The peer review is expected to start in August 2025.  |
| **Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that** **might affect the completion of the project within the time, scope and fiscal constraints set forth in the** **agreement, along with recommended solutions to those problems).**Delay in finalizing the IAA with NOAA. Estimated timeline to complete the work is early 2026 now.Current schedule:* *Data collection, formatting, and initial quality control [Q4 2024; 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)] [Q1 2025; In Progress]
* *Regionalization and frequency analysis [Q1 2025; Completed]*
* Initial spatial interpolation of precipitation frequency (PF) estimates and consistency checks across durations [Q2 2025; In Progress]
* Peer review [Q3 2025; In Progress]
* Revision of PF estimates [Q3 2025]
* Remaining tasks (e.g., development of precipitation frequency estimates for partial duration series, seasonality, temporal distributions, documentation) [Q4 2025]
* Web publication [Q1 2026]
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| **Potential Implementation:** All deliverables will be accessible through the Precipitation Frequency Data Server (PFDS). That includes:* Interactive map of the United States. Via this map, IDF/DDF tables and curves will be available for any location in the project area.
* Precipitation frequency grids in GIS compatible formats.
* Metadata in Federal Geographic Data Transfer Standard format.
* Cartographic maps of precipitation frequency estimates.
* Charts of the seasonal distribution of annual maxima
* Probabilistic temporal distributions for 6-hour, 12-hour, 24-hour, and 96-hour durations in both chart and digital form
* Rainfall frequency estimates with corresponding upper and lower bounds of 90% confidence intervals will be available at 30-arc sec grid for durations of 1, 2, 3, 6, 12 and 24 hours.
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