**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(454) | **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 the Northwest (NOAA Atlas 14, Vol. 12) |
| **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:**June 3, 2020 |
| **Original Project End Date:**December 2023 | **Current Project End Date:**June 2024 | **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** |
| $640,894 | $523,375 | 82% |

***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** |
| $73,500 / 11% | $73,500 | 77% |

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| **Project Description**:The purpose of this study is to determine precipitation frequency estimates for Idaho, Montana and other the Northwest States for durations of 5-minute through 60-day at average recurrence intervals (ARIs) of 1-year through 1,000-year. The estimates and associated bounds of 90% confidence intervals will be provided at 30 arc-sec resolution (approximately 800 x 800 m; varies with latitude). The study results will be published as volumes of NOAA Atlas 14, a wholly web-based publication available at www.nws.noaa.gov/ohd/hdsc. The publication will include the artifacts provided in previous NOAA Atlas 14 Volumes, including access through the Precipitation Frequency Data Server, 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 be developed as a separate appendix to NOAA Atlas 14 for the entire U.S. They include regional frequency analysis based on L-moments including error estimates, a combination of PRISM based techniques and CRAB for spatial interpolation, techniques for the analysis of climatic trend, temporal distribution and seasonality, internal consistency checks and variety of automated processes designed to enhance productivity. Intermediate results in the form of hourly and daily estimates at several ARIs will be distributed for peer review as will the final documentation. |

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| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**NOAA conducted quality control checks for 15-minute stations for all durations, spatial review of mean annual maximum grids, regionalization, and development of precipitation frequency estimates for 2-year and 100-year as well as the peer review webpageAdditional information is on the status of the Atlas 14, Volume 12 work is available at: https://www.weather.gov/owp/hdsc\_current\_projects |
| **Anticipated work next quarter**:A large portion of the work in the next reporting period will plan on completing the regionalization task and completing the review of spatial patterns of precipitation frequency estimates for Peer Review. We will derive and investigate depth-duration-frequency curves at gauged locations and interpolate estimates at a high-resolution grid. We will complete the analysis of spatial patterns in 2-year and 100- year precipitation frequency estimates in preparation for the peer review of initial estimates that is expected to take place in September. |

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| **Significant Results:**AMS Quality Control: NOAA completed work on the 15-minute AMS quality control task for 15-min, 30- min, 45-min, 60-min, 90-min, and 120-m. Overall, all 15-minute with more than 15 years of data were reviewed, including 369 high outliers. A total of 475 data corrections were implemented.Spatial Analysis of Mean Annual Maximum data: two additional iterations were done with the PRISM group to ensure realistic spatial patterns and consistency in gridded MAMs for 1-hour, 6-hour, 1-day and 10-day durations. In the process, we reviewed MAM spatial patterns for each station looking for inconsistencies relative to MAMs at nearby stations to identify locations where MAMs are affected by short periods of record, missed winter events, or missed several extreme events. We also investigate any inconsistent areas that are unduly influenced by the interpolation process or a lack of stations. Flagged MAMs were investigated and either adjusted or removed from the analysis.Development of gridded PF estimates: NOAA developed gridded precipitation frequency estimates for durations between 1-hour and 10-days and for up to 100-year average recurrence intervals (ARIs) |
| **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. NOAA has faced delays in the availability of existing personnel to commit to the project. The project milestone schedule has been updated and completion of the project has been delayed from Q4 of 2023 to Q2 of 2024. |

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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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