**TRANSPORTATION POOLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

Lead Agency (FHWA or State DOT): \_\_Washington State Department of Transportation\_\_\_\_\_\_

**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 #***(i.e, SPR-2(XXX), SPR-3(XXX) or TPF-5(XXX)*TPF-5(386) | **Transportation Pooled Fund Program - Report Period:**□Quarter 1 (January 1 – March 31)□Quarter 2 (April 1 – June 30)□XXQuarter 3 (July 1 – September 30)□Quarter 4 (October 1 – December 31) |
| **Project Title:****Gravel-Bed River Assessment Tool for Improved Resiliency of Engineering Design** |
| **Name of Project Manager(s):****Cygnia Rapp – Technical Monitor****Jon Peterson – Research Manager** | **Phone Number:****(360) 705-7415****(360) 705-7499** | **E-Mail**rappcyg@wsdot.wa.govpeterjn@wsdot.wa.gov |
| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):** | **Project Start Date:**September 2018 |
| **Original Project End Date:** | **Current Project End Date:****December 31, 2023** | **Number of Extensions:** |

Project schedule status:

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

Overall Project Statistics:

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|  **Total Project Budget** |  **Total Cost to Date for Project** |  **Percentage of Work**  **Completed to Date** |
| $365,000 |  |  |

***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** |
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| **Project Description**:**Background:**The world’s rivers and streams are adjusting to changes in climate. In Washington State, stream channels are becoming more dynamic – especially in the vicinity of gravel-bed rivers. Federal, state, tribal and private roads are increasingly compromised or destroyed due to progressively more dynamic channel processes. A river’s bedload (sediment transported along the channel bed) drives how rivers move into – or away from – road infrastructure. In order to design durable roads and bridges, we need high quality information on how the natural material in the river system will move and deposit in the vicinity of road infrastructure. Widely available methods for assessing channel dynamics and hazards are based on sand-bed rivers, like the Mississippi River, that do not apply to gravel-bed rivers found throughout the United States. We need a gravel-bed river assessment tool that accounts for changes in gravel-bed rivers from glacial melt and extreme flooding associated with projected future climate change. In this pilot, WSDOT proposes to develop practical guidance and methods for assessing bedload transport in gravel-bed rivers for more resilient road infrastructure. This guidance will inform engineering design, hazard assessment, and maintenance strategies of roads along or near gravel-bed rivers. Other federal and state agencies support the pilot, and are willing to assist in the development and review process. WSDOT anticipates that US Forest Service, US Fish and Wildlife Service, Oregon DOT, Caltrans and other public works agencies will use the gravel-bed assessment tool developed by this pilot project. **Objectives:**This pilot will consist of three parts: 1. A technical workshop to define the framework, goals, and criteria for developing the guidance and case studies. 2. Data collection and case study development. 3. The guidance write-up and finalization  |

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| **Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):**Contract with the University of Idaho to create 1-dimensional model in Python using Bakke et al (2017) and Wilcock and Crowe (2003) for sediment transport modeling has been executed. Dialogue with Yong Lai for incorporating Bakke et al (2017) into SRH2D has been initiated. We have finalized our decision on the consultant who will conduct bedload sampling on the Methow and Big Wood Rivers. Dates have been scheduled for installing hydrophones on the Methow and Big Wood Rivers in October. A modified tracer study is under development to be implemented on Glacier Creek in cooperation with the Nooksack Tribe. The Nooksack Tribe has committed $10K towards the $21K maintenance fees for the stream gage installed on Glacier Creek for the 2019-2020 water year, which are due in October. The work plan is under development but close to a first complete draft. A new contract with the USGS has been executed for the installation, data collection/ analysis/ write up for acoustic and seismic data on Glacier and Methow Rivers. Also included in the new contract is a task for capturing methods of repeat topographic analysis. An addendum to the contract with the University of Idaho was executed for working with the USGS to install hydrophones on the Big Wood River and perform maintenance activities (the USGS is providing the equipment). Drone flight for Glacier River is scheduled in October to collect data for use in creating a DEM from Structure from Motion to augment topographic datasets. |
| **Anticipated work next quarter**:The amendment with the University of Idaho will be executed. Field work will commence at the sites |

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| **Significant Results:**Contracts have been executed and the  |
| **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).** |

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| **Potential Implementation:** The final product of the pilot study will be the publication of WSDOT’s guidance and methods. These will be applicable to state DOTs and other highway asset managers across the nation wherever gravel-bed riversare found.  |