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| **Project Name** | Road Prescription-Scale Effectiveness Monitoring (Roads BMP Study) |
| **Work Plan Critical Questions Addressed** | Are road prescriptions effective at meeting site-scale performance targets for sediment and water? |
| **Project Elements** | Effectiveness of road maintenance, road surface erosion, sediment production, sediment delivery, hydrologic connectivity. |
| **Responsible SAG and Project Manager** | SAG: Not associated with a SAG – oversight provided by CMER<br>Project Manager: Alexander Prescott |
| **CMER Scientist(s) and Principal Investigator(s)** | CMER scientists: Jenelle Black<br>Principal Investigator: Charlie Luce (USFS)<br>Project Team: Tom Black (USFS), Amanda Alvis (Manaster) (UW), Erkan Istanbulluoglu (UW), and Julie Dieu (Rayonier) |
| **Status/Phase** | • The third data collection season was completed in July 2022 with the tub draining and sediment weighing.<br>• The DNR's Heavy Equipment Crew is expecting to complete the annual road maintenance needs across the sites in November 2022.<br>• West Fork Environmental is under contract to visit each site monthly to download data, collect water samples, and repair minor issues at each platform. Watershed Geo Dynamics is working with West Fork to process data and provide QA/QC. The Department of Ecology's Manchester Environmental Laboratory is under an Inter-Agency Agreement to complete water sample testing.<br>• Data reduction and preliminary data analysis is being completed by the U.S. Forest Service Rocky Mountain Research Station (overarching study) and the University of Washington (modeling and parameterization).<br>• The 2019-2021 plot discharge and fine sediment data for all sites have been summarized. The annual coarse sediment data have been summarized, as have the rainfall data. The USFS is working on the traffic counter data and traffic camera data.<br>• The second year of theDitch Line Hydraulics Parameterization experiment was completed in two phases starting in May 2022 and ending in October 2022. The Short-Time-Scale Parameterization experiment pilot was completed in February 2022.<br>• The Micro-Topography Parameterization experiment is complete with multiple surveys completed in FY22. In February 2022, S&R Sheet Metal Inc. was contracted to fabricate twelve additional troughs for installation across the project sites.<br>• In June 2022 the Project Management Plan and Charter were revised to reflect changes in project team members, revise the project timeline, update project budgets, and refine roles and responsibilities.<br>• Continued work on a tri-layer mass-balance model representing vertical layers of the road prism. In this model, equations were developed for calculating sediment fluxes between layers and production of fine sediment from coarse sediment within layers. Existing equations were used for overland flow sediment transport on the top layer.<br>• A synthesis paper looking at the literature surrounding traffic-induced sediment |

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| | production processes and examine the gaps in this research has been completed and submitted for publishing in Environmental Reviews.<br>• |
| **Project Timeline** | FY23-FY26: Monitoring and data collection at 78 sites, data management and QA/QC, equipment maintenance, start parametrization experiments, continue model development.<br>FY27-FY29: Data analysis and report writing and review. |
| **Expenditures through FY22** | $2,669,221 |
| **Complementary Projects and Project Sequencing** | Road Sub-Basin-Scale Effectiveness Monitoring; Road Surface Erosion Model Validation/Refinement Project; Intensive Watershed-Scale Monitoring to Assess Cumulative Effects. |
| **Project Summary and Purpose** | |
| This project will address surface erosion sediment reductions from site-specific measures. This will be accomplished by empirical sampling of effectiveness of road maintenance, road surface erosion, sediment production, sediment delivery and hydrologic connectivity, coupled with detailed physical modeling to better understand and quantify the interactions of these elements with each other and with rainfall and traffic. | |
| **Project Objectives** | |
| The objectives of monitoring forest roads at the prescription scale are to (1) evaluate the effectiveness of road maintenance categories in meeting road performance targets; and (2) identify sensitive situations where prescriptions are not effective. | |

**Budget***

| FY22 | FY23 | FY24 | FY25 | FY26 | FY27 | FY28 | FY29 | Total Budget |
|---|---|---|---|---|---|---|---|---|
| $461,047 | $496,047 | $616,047 | $596,147 | $596,047 | $351,000 | $75,000 | $25,000 | $3,616,335 |

*M August 10, 2022 Board approved budget. Funding approved for FY22-FY23. Budget beyond FY23 are estimates only.

**Project Phases by FY**

| FY21 | FY22 | FY23 | FY24 | FY25 |
|---|---|---|---|---|
| Data collection, site maintenance for site repairs and final installation, model development.<br>Parameterization studies: Micro-topography (Yr. 1) and Ditch-line Hydraulics (Yr. 1).<br>Completion of Biennial | Data collection, site maintenance, model development.<br>Parameterization studies: Micro-topography (Yr. 2) Ditch-line Hydraulics (Yr. 2)<br>Short-Time Scale (Yr.1) | . Cost vs. Maintenance survey.<br>Data collection, site maintenance, model development.<br>Parameterization studies:<br>Ditch-line Hydraulics (Yr. 3), Short-Time Scale (Yr. 2)<br>GRAIP/WARSEM Survey (Yr. 1) | Ditch line and rock quality BMP change-over (Public Works contract)<br>Sediment trap efficiency experiment<br>Data collection, site maintenance, model development.<br>GRAIP/WARSEM | GRAIP/WARSEM Survey (Yr. 3)<br>Last year of data collection, finalize model. |

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| Report. | | | Survey (Yr. 2)<br>Interim Project Report | |

| FY26 | FY27 | FY28 | FY29 |
|---|---|---|---|
| Field equipment removal.<br>Data analysis (all experiments). | Completion of draft final report. | Final report review and revision.<br>CMER approval of Final Report. | ISPR completed.<br>Final CMER approval.<br>6 questions drafted.<br>Findings Report delivered to Policy<br>Present to Board. |