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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

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Research Notes

Determine Regional Sediment Bulking Methods for Northern California in Support of Wildfire Mitigation

Create regional specific sediment bulking methods to design resilient facilities and performance measures regarding climate change.

Design/ Construction

MAY 2023

Project Title:
Determine Regional Sediment Bulking Methods for Northern California in Support of Wildfire Mitigation

Task Number: 3911

Start Date: June 30, 2022

Completion Date: June 30, 2024

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WHAT IS THE NEED?

Currently the California Department of Transportation (Caltrans) is searching for a methodology to determine sediment bulking specific to Northern California, In Southern California, there are specific, existing methods and equations in use by Caltrans. Due to increased wildfire occurrence and severity in northern California, a regionalized sediment bulking method for Northern California watersheds would allow Caltrans to design better hydraulic and stormwater facilities. This prepares Caltrans for climate change and the resulting increase wildfire potential to create a more sustainable roadway design.

WHAT ARE WE DOING?

Firstly, a literature and scientific review will be performed of current sediment bulking methodologies applied within similar geomorphic and climatological areas to Northern California watersheds. Next, a standardized regionalized method with supporting equations for each region to determine sediment bulking will be developed. The result will be a sediment bulking method that will be applicable in Northern California that will aid in creating better facilities that require less maintenance.

Caltrans

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WHAT IS OUR GOAL?

The goal of the project is to create regional specific sediment bulking methods for Caltrans to design resilient facilities and performance measures regarding climate change stated in Streets and Highways Code (SHC) 2030(e).

WHAT IS THE BENEFIT?

The research will benefit Caltrans by having roadways that are more resilient and safer. The methodology can be used by local and state agencies to create safer and more sustainable infrastructure. Also, this research will provide a defensible justification and method for sizing drainage facilities that account for sediment bulked associated with wildfires.

WHAT IS THE PROGRESS TO DATE?

- Held quarterly meeting to discuss the deliverables.
- Held first full Technical Advisory Committee meeting.
- Review of Caltrans hydrology manual methods for bulking.
- Review of relevant peer-reviewed literature on predicting post-fire debris flow hazard (e.g., Staley et al 2018).
- Further review of literature on floods after a fire in general, with a specific focus on increased runoff volume due to high sediment loads from burned-area runoff.
- Conducted pilot study of wildfire modeling and prediction of burn intensity and runoff.
- Set up the first fire model run in the Sonoma study area.
- Investigated areas to expand the pilot study: focusing on California Department of Forestry and Fire Protection (CAL FIRE) footprint.

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