

## **Modeling Post-fire Erosion in the Western US**

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**Abstract.** Land managers have turned to relatively expensive fuel reduction treatments as one means of mitigating risk from high severity wildfires. Large areas of forest lands are believed to be at increased risk from wildfire because of past fire suppression and resulting fuel accumulations, but limited funding allows only a small proportion of these areas to be treated. The objective of this project was to predict and map post-fire erosion rates for forest and shrub lands in the western U.S. in order to help determine which areas should have the highest priority for fuel reduction treatments. In order to minimize bias and ensure comparability, we used nationwide datasets and consistent model parameters. The Geographical interface for the Water Erosion Prediction Project (GeoWEPP) was used to predict post-fire erosion rates. The model can be readily applied across large areas and recent studies indicate WEPP predicts post-fire erosion rates better than the Revised Universal Soil Loss Equation. Post-fire ground cover was predicted using historical fire weather data and the First Order Fire Effects Model.

Predicted median annual erosion rates were from 0.1-2 t ha<sup>-1</sup> yr<sup>-1</sup> for most of the intermountain west, the predicted values for the Colorado Front Range were generally lower than measured values but within the same order of magnitude. Predictions of median erosion rates for wetter regions along the Pacific Coast were around 10-40 t ha<sup>-1</sup> yr<sup>-1</sup>, while the median value for northwestern California was over 100 t ha<sup>-1</sup> yr<sup>-1</sup> despite predictions of low burn severity. Sensitivity analyses showed the predicted erosion rates were primarily controlled by the amount of precipitation rather than the amount of bare soil, and this explains some of the excessively high erosion rates along the Pacific Coast. These results indicate predicted erosion rates should be most useful for prioritizing fuel treatments on a regional scale rather than between regions.