

FOREST DISTURBANCES TRIGGER EROSION CONTROLLED FLUXES OF NITROGEN, PHOSPHORUS AND DISSOLVED CARBON

Marek Matyjasik¹, Gretchen Moisen², Todd A. Schroeder², Tracy Frescino², Michael Hernandez¹

Abstract—The initial phase of the research that addressed correlation between annual forest disturbance maps produced from LANDSAT images and water quality and flow data indicate that forest disturbances in conjunction with intense atmospheric precipitation commonly trigger fluxes of several chemical constituents, such as nitrogen, phosphorus carbon. These fluxes appear to be correlated with intense soil erosion. While concentration on N, P and dissolved C do not significantly fluctuate, their total fluxes vary by five to twenty times when flow volumes increase by on order of magnitude during peak flow rates. These large fluxes of N, P and dissolved C are transferred to downstream watersheds affecting effectively environmental ecosystems of upstream and downstream areas. These fluxes are also highly correlated with wild fire triggered erosion. Erosion has been modeled using ERMiT: Erosion Risk Management Tool, developed specifically for post-fire assessments that predicts the probability associated with a given amount of single-storm soil erosion in tons/acre for a given hillslope topography in each of five years following forest wildfire. Erosion modeling allows changing vegetation cover as the function of severity of forest disturbances. Input data in erosion modeling include types of soils, types of vegetation cover, slope angle, burn severity level, and hydrologic conditions for the modeled area. Nitrogen fluxes from two study area have been correlated with ERMiT modeled erosion. Both areas display high correlation between erosion and nitrogen fluxes, with correlation coefficients higher than 0.7.

¹ Weber State University, Ogden, Utah

²FIA, Ogden, Utah