



The most immediate consequence of wildfire is the potential for soil erosion.

In high severity wildfire the soil is left bare and very vulnerable to erosion.

Investigating the effects of post-fire salvage logging on soils in the southeastern Cascades

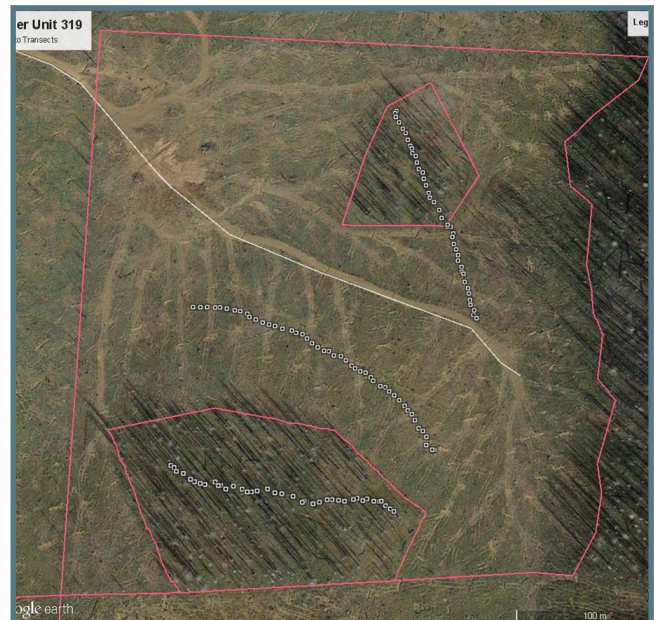
The purpose of this project was to evaluate the impact of salvage logging on soil cover and erosion risk in areas burned by the 2014 Eiler Fire on the Lassen National Forest. Digital photographs of the soil surface, taken along transects that spanned both salvaged areas and unlogged leave islands, were used to determine the degree and extent of detrimental soil compaction, displacement, and erosion.

Key Findings

- Plant cover was higher (average = 37%) in unlogged leave islands than in areas that were salvage logged (average = 18%), 22 months after the fire.
- Conversely, salvage logging added soil cover, in the form of woody debris, increasing the percent cover from 9% in the controls to 31% post-salvage.
- Total soil cover (plant, rock, and woody debris combined) averaged 77% in controls and 75%, in salvaged areas, which is considered sufficient for erosion prevention.



Digital photos were analyzed to determine the percent cover of bare soil, vegetation, woody debris, or rock.



Substantial areas were left as unharvested leave islands within the salvage units. Monitoring transects are represented in white.

Full Report

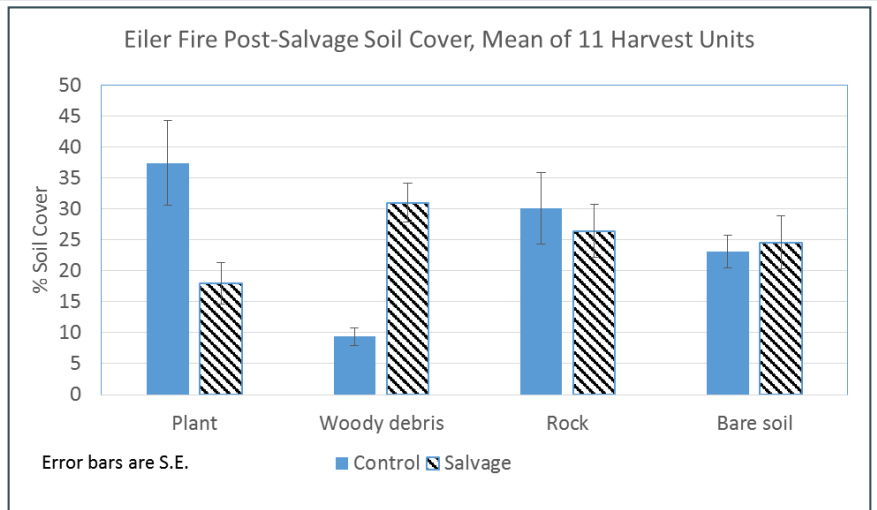
Soil cover following salvage logging of high severity burn area in the southeastern Cascades, Year I. Doug Peters, Forest Soil Scientist, and Cindy Jeffress, Forestry Technician, Lassen National Forest, April 2017



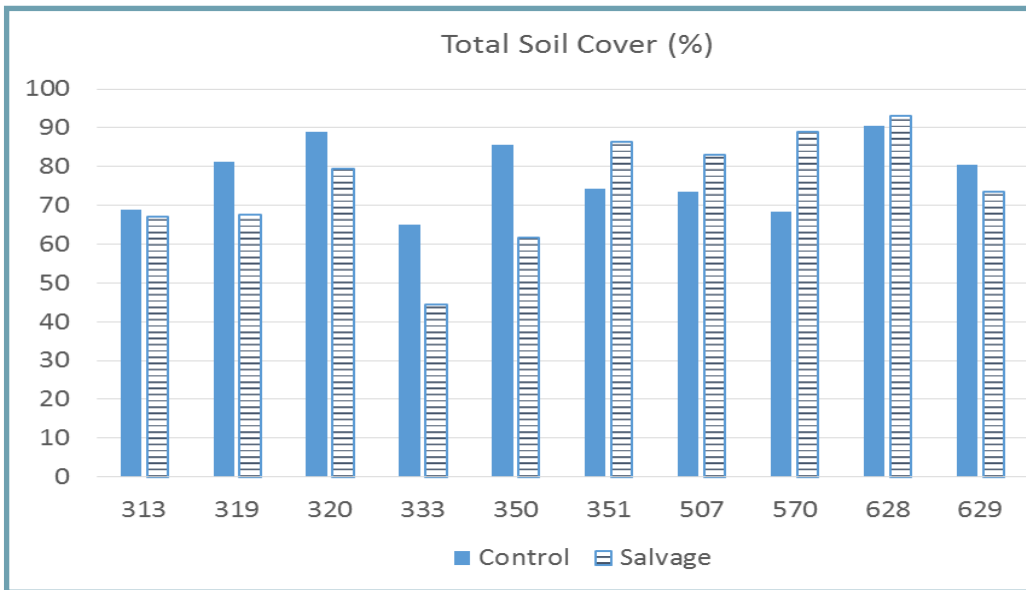
Project Overview

Erosion is the main soil resource concern after a high severity wildfire because the soil is left bare and vulnerable to sheet and rill erosion caused by raindrops directly hitting the soil surface. High heat at the soil surface during the fire can increase the risk of erosion further due to a breakdown of soil structure and increased water repellency. The risk of erosion gradually decreases after wildfire as plants establish and grow, and as limbs break and fall to the ground. Water repellency also diminishes over time.

Post-fire ground disturbing activity such as salvage logging disrupts the soil surface, impacting soil cover additions that have naturally accumulated since the fire. Our comparison between salvaged areas and unlogged controls in the Eiler Fire suggests that post-fire logging may reduce plant cover, but increase the cover of woody debris. In our units, rock cover was an important contributor to total soil cover. After salvage, total soil cover (plant, rock, and woody debris combined) averaged 75%, which is considered sufficient for erosion prevention.



Big reduction in plant cover, big increase in woody debris.



Total soil cover (including rock) was likely adequate in all units except Unit 333 post salvage.

It is important to assess the soil rock cover when planning high burn severity fire salvage projects because it plays an important role in erosion prevention. In the case of non-rocky soils managers should consider leaving some trees in the units, possibly knocking them over, to provide some additional soil cover when salvage logging.

This project addressed the following monitoring question from the Burney Hat Creek CFLRP Ecological Monitoring Strategy:

SOIL 1.3. What are the effects of salvage logging on soil recovery?