

RESEARCH ABSTRACT

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Study Title: Mortality and revegetation of an old-growth forest buried by the Muddy River mudflow

Key Words: terrestrial plant vegetation succession mudflow
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riparian archives

Abstract: Natural revegetation was studied in an old growth terrace forest buried by 25 to 150 cm of sand to boulder sized material from the Muddy River mudflow. Objectives were: 1) examine patterns of mortality, growth and revegetation along a gradient of mudflow deposition; 2) provide baseline data for future estimates of fragmentation and decay of mudflow killed trees and assess the influence of the dead trees on revegetation processes; 3) establish a 2.5 hectare grid of stem mapped forest to track ecosystem recovery and describe important processes through time.

Results indicate that 50% of overstory trees died within 16 months after burial with 57% and 68% dead two and five years after the eruption, respectively. The principal factor influencing mortality was mudflow thickness. Species differed with respect to susceptibility to burial, with the high rates of mortality observed among red alder and Pacific dogwood (the only common hardwoods). Of the major conifers initial mortality of Pacific silver fir and western hemlock was highest. Five years after disturbance substantial delayed mortality of Douglas fir and western red cedar brought those species in line with the mortality observed for Pacific silver fir and western hemlock. Small western hemlock saplings that were rooted on floating logs escaped burial and, thus, exhibited little mortality. Total cover of residual shrub and tree species was highest ($P=0.05$) where deposits were less than 40 cm thick. Total cover of colonizing plant species did not differ significantly with depth ($P>0.25$).

Type of Measurement(s): All trees greater than 5 cm dbh (breast height = 1.37 m.) were mapped, marked with a numbered tag, measured at dbh, and assigned a pre-determined condition class. A total of twenty 5 x 5 m vegetation subplots were distributed along the center line of each of the two mapping grids and total vascular plant cover estimated to nearest 0.5%. Total cover of bryophytes, logs, branches and litter was also estimated.

Frequency of Measurement(s): Trees were measured and locations noted on a stem map in 1981, with each tree checked for mortality in 1982 and 1984. In 1991 mortality was checked and the diameter of all living trees remeasured. Vascular plant cover was measured in 1981, 1982 and 1984.

Data Storage: Field notes are stored at the USFS Forestry Sciences Laboratory, Corvallis, OR with copies stored at the College of Forest Resources, Univ. Washington.

Electronic data (IBM compatible ASCII files) and accompanying documentation are stored in the Forest Science Databank at Oregon State Univ. with copies at Univ. Washington (Dr. J. Franklin) and in the Monument Scientist's office, Mount St. Helens National Volcanic Monument, Amboy, WA.

Long-term plans: Data available for collaborative efforts: Transects will be resurveyed periodically as resources are available; frequency of remeasurement is expected to vary with resource availability. Data are available to bona fide investigators for collaborative research.