RESEARCH ABSTRACT

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Study Title: Natural establishment of conifers at Mount St. Helens

Key Words: terrestrial plants trees conifers seedlings reestablishment pyroclastic flows mudflow lahar archives

Abstract: This study tracks the establishment, survivorship, and growth rate of colonizing conifers on substrates deposited during the 1980 eruption of Mount St. Helens. Two 50 x 50 meter plots were installed at sites on the pyroclastic flow north of the crater and the upper portion of the Muddy River mudflow during 1989 and 1990. Two 50 x 50 meter plots were installed on the debris avalanche in 1993 and 1994. In each plot all individual trees are identified to species, measured (total height and stem diameter at ground level), and tagged.

On the Pumice Plain primary succession is taking place on pyroclastic flow deposits with establishment of a variety of conifer species along with herbaceous plants and shrubs. Although growing conditions appear to be harsh (coarse pumice with summer surface temperatures exceeding 50^{o}C and drought) recruitment of conifer seedlings is high. Likely seed sources are small, isolated stands of forest located several kilometers away.

On the upper Muddy River mudflow few plants survived the deposition of one meter of boulder to sand size material. Organic materials were incorporated into the flow, but nutrient levels of the deposits remain low. One plot is located approximately 100 meters from the forest edge where an abundant seed source exists. This has resulted in a rapid rate of recolonization by conifer species, particularly western white and lodgepole pines. The other plot is located in the middle of the mudflow deposit, about 0.5 kilometers away from the forest edge. The more distant plot has experienced a much slower rate of conifer recruitment than the edge plot.

On the debris avalanche establishment of alder, willow and cottonwood is vigorous, especially where groundwater springs provide a moist substrate throughout the growing season. Seasonal browse by elk appears to be influencing the establishment and growth form of some species. The influence of elk and deer on succession is being investigated in the adjacent elk exclosure study (please see 57A).

Type of Measurement(s): Individual trees identified to the species; height(cm); stem diameter at soil level(mm); living or dead.

Frequency of Measurement(s): Plots were sampled in 1991-1992 and 1993. Plots are sampled at the end of the growing season. Frequency of remeasurement is to be determined by resource availability.

Data Storage: Field notes and data sheets are on file in the Monument Scientist's office.

Long-term plans: Data available for collaborative efforts: Frequency of remeasurement to vary depending upon available resources. Additional plots may be established on the debris avalanche and in the blowdown zone in the future. Data are available for future collaborative efforts.