

RESEARCH ABSTRACT

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Study Title: Mechanisms of vegetation change following burial by volcanic tephra

Key Words: terrestrial plant herbs upland shrubs
survival conifers 1980 deposits ecology recovery seedling
ashfall zone long-term studies

Abstract: This project continues detailed study of forest understory vegetation change after burial by tephra from Mount St. Helens in 1980. Objectives are to provide a detailed record of pathways of change; to record spatial and temporal variation in soil properties; to determine species characteristics important for recovery from burial; and to use these data to determine the mechanisms of succession. Data will be analyzed to compare responses of different growth forms, species and communities in different conditions of tephra depth, seral age, and time of tephra removal. This study will provide a long-term set of consistent, detailed data about vegetation recovery from an important, widespread disturbance.

Vegetation recovery in many ways has not been predictable from the species' behavior that we observed where plants were not buried or from knowledge of the effects of common forest disturbances in the region. Survival was best for plants with large size or plastic below ground morphology. Vegetation recovery reflected primarily vegetative spread of surviving individuals.

Forest understory species composition is responding to differential ability of plants to survive long-term burial. Major shifts in understory species composition have rarely been observed in this study to date. However, tree seedlings at our study sites have established and survived with high density, which may yet produce a major shift in forest understory structure.

Examination of soil properties has revealed that tephra chemistry changed rapidly with time.

Type of Measurement(s):

- Vegetation cover and shoot density by species in 1 meter square plots
- Litter cover by category
- Tephra and buried soil chemistry (Ph, organic matter, macronutrients)
- Tephra texture
- Conifer seedling morphology & size
- Substrate temperature

Frequency of Measurement(s):

- Vegetation and litter - 1980-1983 annually; sporadically since (1984, 1987, 1989, 1990 at some plots)
- Tephra - 1980, 1982, 1987
- Seedling morphology - 1987-1988 (completed)
- Temperature - 1980-1983 (completed)

Data Storage: All data on paper, Oregon State University; selected permanent vegetation plot data (major species, total by growth form) is on computer disks at OSU and University of Victoria.

Long-term plans: Data available for collaborative efforts:

- We hope to resample vegetation on all plots at least once more, and that in deep tephra 2-3 more times.
- We hope to sample tephra chemistry once more.
- We hope to do work on autecology of the dominants in recovering vegetation on deep tephra.
- Temperature records have not yet been analyzed.
- Future desired activities are in jeopardy due to our failure to receive funding for further work.
- Our plots are marked with USFS signs, plastic pipe, and stake flags. These were last renewed in 1990.

Data have been published. Antos and Zobel are interested in future collaboration.