

RESEARCH ABSTRACT

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Study Title: Disturbance and recovery of soil, microbial, and plant processes.

Key Words: chemical terrestrial plant microbial upland
inorganic soil recovery carbon nitrogen lupine
pyroclastic flow lahar blowdown zone lahar mudflow
ashfall zone archives subalpine

Abstract: Our work has focused on disturbance and recovery of soil, microbial, and plant processes following volcanic disturbance. Particular emphasis was placed on spatial relationships involving the carbon and nitrogen cycles. Comparative studies have been conducted at six sites that were disturbed to varying degrees by the May 1980 eruption of Mount St. Helens. These sites include Butte Camp, Upper Pine Creek, the Lahar on the Muddy River, the former Timberline parking Area, and Meta Lake.

At large scales of aggregation free-living nitrogen fixation and symbiotic nitrogen fixation are of the same order of magnitude. A lupine patch, however, has more significant effects on recovery as the associated "resource islands" concentrate the flow of resources in both carbon and nitrogen cycles. Lupine patches serve as nodes for ecosystem development on the severely disturbed lahar and pyroclastic flow sites.

Microbial processes and biomass are inversely related to the intensity of disturbance.

Type of Measurement(s): Principle data sets include estimates of nitrogen fixation by free-living soil microbes and by lupines, estimates of soil microbial biomass, and time series of soil C and N pools.

Frequency of Measurement(s): Annually since 1980.

Data Storage: Most data has been or will be published. Eldon Franz has specific information about data sets of interest.

Long-term plans: Data available for collaborative efforts: C and N pools will continue to be estimated at regular intervals for the foreseeable future as an indicator of ecosystem development.