

RESEARCH ABSTRACT

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Study Title: Lakes and thermal environments in the blast zone of Mount St. Helens

Key Words: aquatic microbial lake hot springs chemical
algae bacteria nutrient nitrogen thermal water quality
archives crater

Abstract: Approximately 20 lakes exist in the blast zone of Mount St. Helens. The degree to which they were disturbed on May 18, 1980 ranges from slight to a complete physical, chemical, and biological restructuring. Initially, our research focused on the physical, chemical, and microbial conditions within the lakes. Heavily devastated lakes were markedly changed chemically and all plants and animals eliminated. Recovery took the form of dramatic physical and chemical changes within the lakes which were linked to microbial activity. Rapid recovery occurred the first two years. Once the physical and chemical conditions were ameliorated, further biological succession was possible. Presently, we continue to track these changes.

Newly-created thermal areas provided opportunities to study microbial colonization of new environments with temperature playing an important role in which microorganisms were successful. Microbial activity was present from ambient temperature to near the boiling point of water. Some of the thermal areas were transient, but some of them have persisted. Presently, our interest focuses mainly on the Loowit Hot Springs near the dome. The dominant bacterial and algal forms, major processes, and the chemical composition of these waters through time are our major interest.

Type of Measurement(s): Temperature (degrees centigrade), pH, alkalinity (meq/l), Ca^{+2} , Mg^{+2} , Na^{+} , K^{+} , HCO_3^{-} , CO_3^{-2} , SO_4^{-2} , NO_2^{-} , NO_3^{-} , Si, PO_4^{-3} , Fe, Mn, DON, DOC, DIC, CH_4 , N_2O , H_2 , CO, O_2 , (mM or mg/l), algal primary production, CH oxidation, nitrification, nitrogen fixation, denitrification, chlorophyll a, bacterial number, Mn/S oxidizing bacteria (units of activity per unit volume or area per time). Zooplankton and algal identification and enumeration (numbers/volume).

Frequency of Measurement(s): Sampling was performed once or twice monthly June through October in 1980; monthly April through September and opportunistically in winter months, 1981-1986; presently yearly or less; this program is currently unfunded.

Data Storage: Lotus-based files - microcomputer; energraphics for plots; publications.

Long-term plans: Data available for collaborative efforts: Research presently is minimal, although there is interest in revitalizing the program if funds can be found. A strong set of baseline data is available on both the lakes and thermal springs. Long-term plans include following the chemical and biological patterns within lakes which ranged over a wide variation in total initial disturbance. We are also interested in how temperature structures the biological community over the long-term in newly created thermal environments. In addition, the reintroduction of fish into many of the lakes provides an excellent opportunity to follow how the zooplankton and algal communities respond to the top of the food chain being reestablished.