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Principal Investigator:

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Study Title: Effect of herbivores on Sitka willow and associated plant and animal communities and soils.

Key Words: terrestrial plant animal invertebrate insect
herbivory competition population dynamics

Abstract: The invasion of trees and shrubs in early succession is often transformative because of their potential to outcompete early pioneers, provide animal habitat, influence nutrient cycling, and occupy sites over long time spans. The extent to which insect herbivores influence such successional transitions is unknown. We are investigating whether herbivory by a pair of stem-boring insects may substantially impede the structural dominance of *Salix sitchensis*, the first abundant woody colonist on a large primary successional site at Mount St. Helens volcano, Washington, USA. We also quantify vegetation and soil development at these same sites. Our collaborator Charlie Crisafulli (USFS) quantifies bird use of these sites, eventually allowing us to link herbivore effects on vegetation to bird habitat.

Herbivory surveys were conducted annually for 7 years in approximately 165 100m² plots along 9km of transects and in 6 pairs of wetland and upland plots. Surveys will continue at least through 2018. The same plots were used for surveying vegetation at 3 year intervals (2007, 2010, 2013). Larger 25m radius plots centered on these same transect points were used for annual surveys of willow and alder density and surveys of conifers at 3 year intervals (2002, 2007, 2010) and will be sampled in 2013 and 2016. These surveys are complemented by experimental exclusion of insect herbivores in several experiments currently comprising 18 plots in 6 distinct locations.

For study site locations, see biological studies map.

This map of the Mount St. Helens Pumice Plain indicates the location of transects B-F, paired riparian (or wetland) and upland plots (surveyed by Charlie Crisafulli, USFS), and borer removal experiments. Bar heights indicate the $\log_{10}(\text{count} + 1)$ of willows m⁻² within 25m of the transect point in 2011. "a" denotes

(Data Current: May, 2013)

willows are absent at this point. Black bars or squares denote wetland/riparian sites, and open bars denote upland sites. The base of each bar is located at a GPS measured transect point.

Type of Measurement(s):

Numerous measurements are made. See <http://www.fsl.orst.edu/msh/datafr.htm> and <http://directory.vancouver.wsu.edu/people/john-bishop> for a description.

Metadata and data sets TS019, TS020, TS021 and TV076 at <http://www.fsl.orst.edu/msh/datafr.htm> contain complete metadata for this and several other studies conducted by my lab. Metadata includes sampling locations, sample dates, and description of measurements.

Frequency of Measurement(s):

Variable, depending on objective. Many measurements are made annually, some at 3 year intervals.

Data Storage: Computer hard disk with back up hard disk at researcher's WSU office.

Long-term plans, Data available for collaborative efforts? Long term data sets are archived at <http://www.fsl.orst.edu/msh/datafr.htm> and are publically available.