



Limber Pine Monitoring

Craters of the Moon National Monument and Preserve

White Pine Blister Rust and Stand Health

White pine blister rust, an introduced disease which causes mortality in five-needled pine trees, including limber pine (*Pinus flexilis*) is caused by the fungus *Cronartium ribicola*. The disease is widespread and may be considered the most significant disease affecting five-needled pines, resulting in altered stand structure in infected areas. The fungus must use an alternate host, usually currants and gooseberries (*Ribes spp*), to move from an infected tree to one that is healthy. Infection from white pine blister rust can directly kill the tree, while leaving surviving trees more susceptible to attack from mountain pine beetles and mistletoe infections. The limber pine population in Craters of the Moon National Monument and Preserve is susceptible to these diseases and insects. Predicted impacts of climate change also extend to limber pine woodlands because drought stress can increase their vulnerability to disease and insect infestations.

Limber pine woodlands are a unique and important ecological resource for the park, and widespread infection and mortality from white pine blister rust and pine beetles could be very destructive. Monitoring of limber pine woodlands for white pine blister rust as well as for changes in rates of regeneration and mortality will provide information about the status of the disease in the park and overall stand health, and will support more informed management decision-making.

Preliminary Results

Monitoring was initiated in Craters of the Moon National Monument and Preserve in 2011. Blister rust infection is active in a stand of pine at the northern end of the Monument, but has not been found elsewhere in the park. Mistletoe infections are widespread in park limber pine stands but do not appear to be adversely impacting the population. Evidence of a low-level pine beetle infestation was found in some stands.

Management Applications

- Provide information about the distribution of the fungus *Cronartium ribicola* in the park.
- Increase park managers knowledge concerning limber pine stand health and population dynamics, including impending threats to its long-term persistence, and potential management options.
- Support park resource planning and land health reporting efforts, and inform resource management planning.

Objectives

- Estimate status and trend of *Cronartium ribicola* infection in the park.
- Measure key attributes of stand health, including structure and composition, mortality, and regeneration.



Limber pine in Craters of the Moon National Monument and Preserve contribute substantially to the striking landscape in the park and are important to visitors' experiences.



Craters of the Moon vegetation ecologist, Steven Bekedam, describing management concerns about the limber pine population, during the training of pine monitoring crews in June 2011.