



Climate Change at Craters of the Moon

With 80% of Craters of the Moon National Monument and Preserve (CRMO) covered by lava rock that can reach 170°F and quickly drain away rain and melting snow, a slight shift in long-term temperature and precipitation patterns can affect plants and animals that have persisted in the area for centuries. Although trends in annual precipitation for southern Idaho are uncertain, warmer temperatures will almost certainly mean reduced snowpack, faster evaporation, altered vegetation communities, and the spread of plants such as Dyer's woad which the state of Idaho has designated noxious weeds. These changes will also make monitoring of the park's resources even more important.

Sagebrush Steppe

The sagebrush and other native shrubs, grasses, and perennial forbs of CRMO's extensive sagebrush steppe communities are used by wildlife including sage-grouse (*Centrocercus urophasianus*) and sagebrush steppe obligate songbirds such as Brewer's sparrows and sage thrashers. Wildfires are occurring here more frequently and at greater intensities, burning over a third of the lands surrounding the lava fields. This encourages the spread of nonnative cheatgrass (*Bromus tectorum*), which is highly flammable and alters fire regimes, preventing the recovery of native vegetation. A loss of biodiversity results from this "cheatgrass-fire cycle" and this dynamic is likely to accelerate with climate change.

Aspen

Quaking aspen (*Populus tremuloides*) may benefit from occasional fires, which can stimulate their regeneration and deter the spread of conifers into aspen stands. Aspen may also be helped by rising CO₂, but how aspen will react to a changing climate is uncertain. Most aspen in CRMO are limited to high elevation sites where melting snowpack and subsurface run-off keep the soil sufficiently moist. Increased aridity from elevated temperatures and evapotranspiration will further stress these trees. Management actions to help the park's aspen cope with climate change could include prescribed fires and mechanical removal of conifers from aspen stands.



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The direct and indirect effects of climate change may contribute to declining numbers of sage-grouse and pika.



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Limber pine (*Pinus flexilis*) are the most common tree in the park.

Limber Pine

Limber pine (*Pinus flexilis*) can survive in places too arid for tree species that would otherwise out-compete it, and the flexibility of its branches can withstand high winds and heavy snowfall. It grows slowly in scattered stands in the park where water collects on north-facing cinder fields and lava flows in the north end of the park. However, many limber pines in the Northern Rocky Mountains have been killed by white pine blister rust, an introduced Eurasian fungus that was first observed at CRMO in 2006. Blister rust has spread in varied climate conditions across the West, but drought-stressed trees are more susceptible, and infected trees become more vulnerable to mistletoe infections and mountain pine beetle infestations, which may intensify in milder winters. The park's monitoring program may be able to help in the nation-wide effort to determine whether some limber pine are genetically resistant to blister rust.

Pika

Extended exposure to temperatures above 80°F can be fatal to the pika (*Ochotona princeps*), whose range is contracting and shifting to higher elevations across the West. Pikas in CRMO survive by using deep crevices in the lava flows to escape from heat on the surface. Recent surveys indicate that these pikas are restricted to the highest elevation lava flows at the north end of the park in a pattern similar to that exhibited by aspen and limber pine. Therefore, increased warming could further limit the capacity of the lava habitat to provide long-term refugia for pika. The UCBN is participating in a National Park Service program to monitor trends in pika occupancy of sites in eight parks.

For More Information

Upper Columbia Basin Inventory and Monitoring Network
<http://science.nature.nps.gov/im/units/ucbn/>