

Upper Columbia Basin Network

Climate Change Resource Brief

Pacific West Region
Inventory & Monitoring
National Park Service
U.S. Department of the Interior



Pika Monitoring

Localized extirpations of the American pika have recently been documented in isolated mountain ranges of the Great Basin. The hypothesized mechanism for these extirpations is increased warming resulting from accelerated climate change. The Upper Columbia Basin Network (UCBN) has completed a three-year inventory of pika at CRMO and has now begun developing a monitoring protocol based on an occupancy modeling approach in which trends in percent of area occupied, local extinction, and colonization rates will be estimated over time. This monitoring protocol will be implemented at CRMO, CRLA, LAVO, and LABE.

Water Quality Monitoring

Freshwater habitats are diverse and productive ecosystems, providing habitat for aquatic plant, invertebrate, and vertebrate species. Water resources in the semi-arid west have been strongly affected by human activity and are projected to be profoundly influenced by climate change. Long term projections for water temperatures indicate a substantial range reduction for some species of salmonids due to changes in water temperature. The five core water chemistry parameters being monitored are dissolved oxygen, pH, specific conductance, temperature, and turbidity. In addition, macroinvertebrates are sampled in reaches within each wadeable stream, since they are good indicators of ecosystem conditions.

Limber Pine Monitoring

Drought stress has increased the vulnerability of limber pines (*Pinus flexilis*), a five-needle pine, to diseases and insect pathogens. For example, white pine blister rust can kill trees or directly leave them susceptible to mountain pine beetles and mistletoe infections. Limber pines are an important ecological resource, and have a mutualistic relationship with Clark's nutcrackers where the pines provide food for the nutcrackers and the nutcrackers help disperse the pines' seeds. In a pilot monitoring study, transects were placed in separate stands of limber pine to evaluate existing methods and record representative conditions of stand health and composition. This monitoring protocol is being developed with other Pacific West Region Networks in 2010.

Aspen Monitoring

Aspen decline in the West has been observed over the past 50 years. This is commonly attributed to a decrease in fire frequency, caused by fire suppression, and also to aspen 'die-off,' which is possibly a result of drought and early snow melt caused by warming climate trends. Aspen stands in CIRO have been identified and mapped via remote sensing, aerial photo interpretation, and field reconnaissance. Each aspen stand is assigned a number of plots along transects, depending on the stand size. At each plot the number of aspen and conifer stems is recorded in five predefined size classes. These data will provide estimates of aspen regeneration, stem density, dead aspen stems, and conifer abundance.

Sagebrush Steppe Vegetation Monitoring

Sagebrush steppe is one of the most threatened ecosystems in the Intermountain West. Substantial portions of the region have been converted to agriculture and heavily grazed rangeland. Much of the remaining sagebrush steppe has been degraded through altered fire regimes and invasion by introduced plants. This year the UCBN measured fundamental steppe community indicators in 2,000 plots at CRMO, HAFO, JODA, and LARO. Describing the composition and structure of these communities is a critical first step to understand park systems, set desired future conditions, and interpret future trends.

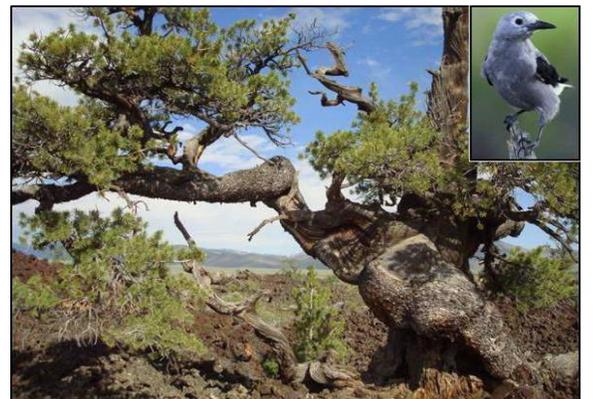
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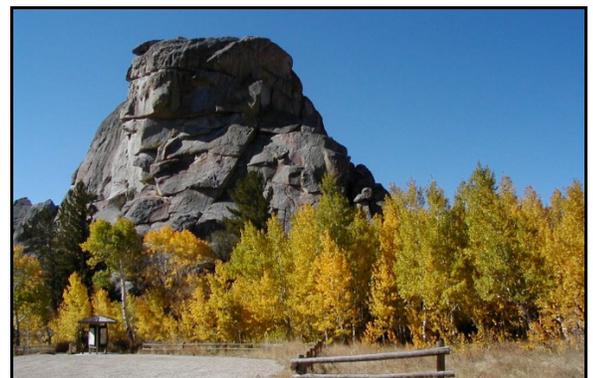
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American Pika (*Ochotona princeps*) on lava flow at Craters of the Moon National Monument and Preserve (CRMO).



Limber pine (*Pinus flexilis*) and Clark's nutcracker (*Nucifraga columbiana*) in Craters of the Moon National Monument and Preserve (CRMO).



Aspen (*Populus tremuloides*) in City of Rocks National Reserve (CIRO).