



Wildland Fire and Climate Change

For thousands of years the ecology of the Columbia Basin was influenced by fires caused by lightning strikes and set by indigenous peoples. Fire promotes the growth of plants that are fire-adapted or require bare soil to become established, so the absence as well as the presence of fire results in changes to the natural environment. Mechanical thinning and prescribed burns are used in some UCBN parks to reduce fuel loads, create defensible space around structures, improve tree resistance to disease and insects, and partially replicate fire's role in eliminating diseased trees and natural selection.

Although wildland fires in UCBN parks are generally put out as quickly as possible because of the proximity of private property or the need to preserve historical artifacts, they still have a significant impact. Wildland fire has burned more than a third of Craters of the Moon National Monument since 1970 and about 18% of City of Rocks National Reserve since 1991. (At Craters of the Moon, fires are sometimes allowed to burn where they have little chance of spreading from patches of vegetation isolated by lava flows and cinder gardens.) More than 80% of the 4,351 acres in Hagerman Fossil Beds National Monument burned in a lightning-caused fire that started 30 miles from the park in 2010. In addition to the loss of most of the park's upland sagebrush steppe, the burning of steep slopes increased the risk of erosion and landslides which can damage the fossil beds.

Warmer temperatures in the western U.S. in recent decades have reduced fuel moisture during the summer, promoting easier ignition and faster spread of fires regardless of efforts to extinguish them. The increasing frequency of warm spring and summer temperatures is expected to continue to cause increases in the frequency, severity, and areal extent of fires in the West.

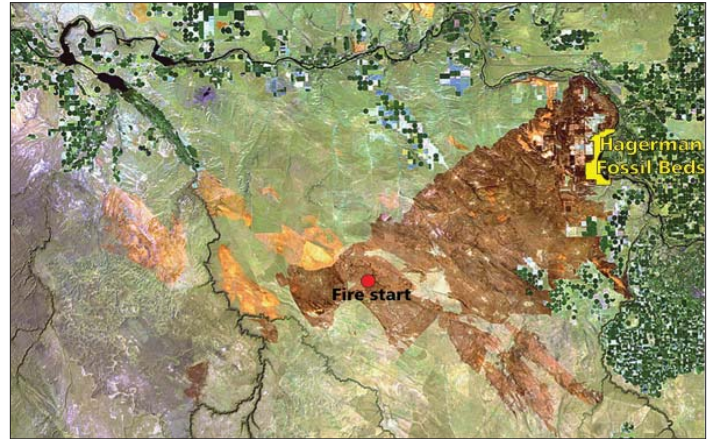
Sagebrush-Steppe Habitat

When sagebrush steppe covered vast expanses of the West, fire helped recycle nutrients from dead biomass into growing plants. Without periodic fire, pinyon-juniper woodlands often spread into upland sagebrush steppe, reducing the understory.



NPS-UCBN PHOTO

Sagebrush steppe at City of Rocks National Reserve.



USGS LANDSAT IMAGERY

UCBN parks are vulnerable to fires that start far from their boundaries; Long Butte Fire, August 2010.

But where fire has become more frequent, it has exacerbated the fragmentation of sagebrush-steppe habitat. A hot surface fire tends to release plant-available nitrogen, creating an environment that favors non-native pioneers such as thistles and cheatgrass (*Bromus tectorum*). Cheatgrass turns brown early in the season, speeding the depletion of soil moisture and driving out native grasses that would provide forage for wildlife later in the summer. Areas infested with cheatgrass, which is highly flammable, become prone to more frequent fire and further degradation because the native seed stock has been reduced.

Forest Communities

Fire-caused injury changes conifers' volatile emissions, increasing their susceptibility to insect infestations. Earlier snowmelt, milder winters, and extended droughts have also made conifers more vulnerable to attacks by bark beetles, which can influence the probability, extent, and behavior of fire events by affecting tree health and mortality. The quaking aspen (*Populus tremuloides*) found in some UCBN parks may benefit from more frequent fire, which can stimulate aspen regeneration and deter the spread of conifers into aspen stands. The thick bark of the ponderosa pine (*Pinus ponderosa*) in Lake Roosevelt National Recreation Area enable the tree to survive ground fires that deter competition from more fire-sensitive species such as Douglas-fir (*Pseudotsuga menziesii*). But without those low-intensity fires, ponderosa pine becomes vulnerable to the high-intensity crown fires expected to become more common in the changing fire regime.

For More Information

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