



## Hazardous Fuel Reduction Project



*Crews place thinned trees and debris through a chipper which allows the biomass to remain on site where the nutrients can be recycled back into the ecosystem.*

### More Than a Carving

Mount Rushmore National Memorial is an icon that is known and recognized around the world. Most visitors to the memorial come to see the carvings, but within the memorial's boundaries is an often overlooked component, the forest.

The entire memorial consists of almost 1,300 acres. Only a portion of this land area is located in the developed area of the memorial. This consists of the visitor facilities; the parking area, amphitheater, visitor center, sculptors studio, and the administrative buildings. Outside of this area is a mature ponderosa pine forest that is part of the larger Black Hills ecosystem.

### Historical Role of Fire

Mount Rushmore preserves one of the largest contiguous stands of old-growth ponderosa pine forest and associated habit remaining in the Black Hills region.

Historically, fire has played a major role in maintaining the ponderosa pine ecosystem and a diversity of wildlife habitat in the Black Hills surrounding the memorial. The ponderosa pine ecosystem historically has a fire regime of frequent, low-severity surface fires (every 3-39 years, with an average fire return interval of 17 years) that resulted in open uneven-aged, park-like stands of ponderosa pine. Smaller trees were killed by the fires, while older, larger and fire-resistant trees survived.

One hundred years of wildland fire suppression in the region has resulted in an increased density of pine stands and abundant ladder fuels (e.g. dead and dry lower limbs, small trees), which create ideal conditions for severe crown fires. Fire suppression activities have also reduced the diversity of forests and grasslands and increased the risk of catastrophic fire. The historic pre-European settlement pattern of frequent, low-severity surface fire, which removed surface fuels, has shifted to a pattern of potential high severity wildfires that may threaten life, property, and memorial resources.

### Restoring Forest Health

With the absence of fire from the landscape, park managers are employing other alternatives to return the forest to a more natural state.

The park has an approved fire management plan which provides the authority and guidance to allow for the reduction of fuels that pose a threat to the memorial in the event of a large catastrophic wildfire.

Tree removal by mechanical means (e.g. cutting, chipping) and by the use of prescribed fire,

all attempt to reduce the amount of hazardous fuels that pose a threat to the safety of visitors and could damage the appearance of the memorial's most iconic feature. By implementing these hazardous fuel reduction measures, firefighters stand a much better chance at suppressing any large wildfire that may start in or move into the memorial.

## Ponderosa Pines

Throughout the Black Hills, ponderosa pine are found on dry, rocky, slopes, especially south facing slopes. Other conifer species like the Douglas-fir, which is a western forest climax tree, cannot tolerate the drier climate here. The ponderosa pine forest community has evolved with cycles of drought and fire to become home to a variety of species.

A typical characteristic of a climax ponderosa pine forest is an open understory. Periodic fires ensure the understory is kept clean of debris. Fires also reduce understory tree growth which left unchecked, would lead to thick, close growing “dog-hair” stands of ponderosa pine.

Fire scars found in the growth rings of trees give researchers a timeline to calculate the dates of a fire in an area. The fire records obtained from tree core samples in this area show that historically within the Black Hills, fires occurred in a particular area about every 15-25 years. These fires were often surface fires that would clean up forest debris. Fires that removed mature tree stands could occur but were uncommon.

The open space in a ponderosa pine forest is important. Each tree needs ample space to collect water and nutrients.

## Techniques

Ponderosa pine stands need to be initially thinned to restore the forest structure to the point that fire severity and intensity can be better controlled during a wildfire or during prescribed burns. Following this treatment, prescribed burning can be used to mimic the historical fire regime of

primarily frequent, low severity surface fires.

In September 2010, a large scale project was implemented to reduce hazardous fuels from 527 acres of the memorial’s forest. Four contractors were awarded contracts to cut, chip and pile four separate units within the memorial’s boundary.

*In areas of the project where chippers are not accessible, crews will cut and stack the debris into piles that will be burned by trained firefighters when the weather conditions permit.*



The cutting and chipping method removes only those ponderosa pines that are less than ten inches in diameter. Trees are cut and then fed into a chipper and the chips are broadcast spread across the forest floor in an even layer. Having the chips remain on-site, allows the nutrients to be recycled back into the ecosystem.

The second method being employed is the cut and pile method. Ponderosa pines six inches in diameter and less, are cut and stacked into tipi-shaped piles that will be chipped at a later time or burned by trained firefighters when the weather conditions are right. Usually these piles will be burned during the winter when sufficient snowfall is present to prohibit fire spread.



*A section of the forest along a trail that has already been treated using the cut and pile method. Before (left) and after (right). Note the reference trees marked with yellow arrows. The resulting thinning has opened up the tree spacing and reduced ground fuels.*

## More Information

For more information about how the National Park Service manages fire in the national parks, please visit: <http://www.nps.gov/fire/>