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The Four Corners Fire: A Fuels Reduction Success Story

In 1903, tree planting began on the Dismal River Forest Reserve in an effort to avoid what, at the time, appeared to be very real prospects of a future timber shortage. One hundred years later, the Forest Reserve is the Nebraska National Forest, and ideas of a national timber shortage have been replaced by a compelling need to thin forests to prevent large, catastrophic fires.

The 2000 National Fire Plan provided the impetus to reduce forest fuels and may have helped save much of the country's largest hand-planted forest.

On January 15, 2006 a human-caused fire started near the west boundary of the 90,000-acre Nebraska National Forest, Bessey Ranger District. Before it was contained, 6,000 acres had been burned, including nearly 800 forest acres.

Unusual winter weather

Weather records revealed that January 2006 was the warmest January since record-keeping began. Prior to the fire, the daytime temperatures had been in the 60s and low 70s for several days. The day of the fire's ignition, winds were blowing from the west, northwest at a consistent 15-20 miles



A view of the Nebraska National Forest from the Scott Fire Lookout Tower.



A 1903 photo taken by the forest's first supervisor, Charles A. Scott. Scott wrote, "At the close of the day's work it was determined that five spadememen, three boys dropping trees and one supply man hand planted 16,000 trees."

per hour with gusts near 40 mph. Relative humidity the day before, and the day of the fire, dipped to 13 percent. The Sandhills prairie grasses were dry and ready to burn.

Following ignition at approximately 11:00 a.m., the fire grew quickly toward the southeast and the 20,000-acre hand-planted forest.

Prior fuels reduction projects

Beginning in 2002, the Bessey Ranger District began a series of fuels treatments to reduce the density of the planted stands, as well as stall red cedar encroachment into the ponderosa pine forested areas and surrounding grasslands.

By the end of 2005, 5,485 acres had been thinned and 5,550 acres had been treated with prescribed fire.

Public Support

National Forest System lands make up only seven-tenths of one percent of Nebraska's land base. The unusual combination of a public forest in the nearly treeless Sandhills makes the forest an important recreation attraction in



a state that boasts the origin of Arbor Day, and was once known as the “Tree Planter’s State.” Nebraskans love trees.

On January 10-11, 2006 (just days before the Four Corners Fire) the District hosted informational meetings to explain future fuels reduction projects proposed under the Healthy Forests Restoration Act. More than 15,000 additional acres are planned for thinning and prescribed burning. Not surprisingly, attendees supported the idea of thinning trees to reduce the fire hazard to the forest.

What role did thinning projects play in the Four Corners Fire?

Following the fires of 2000, it became apparent that forests across the West would be vulnerable to stand-replacing fire events if the unnatural fuel build-up was not addressed. The thinning and prescribed fire projects that treated more than 10,000 acres of the Bessey District between 2002 and 2005 helped set the stage for the outcome of the Four Corners Fire. However, a number of factors contributed to the fact that it did not burn significant timbered areas.

When the fire first hit the thinned timber it was early afternoon, windy and warm. Several trees torched, but the fire did not become a canopy fire where the fire moves to the tree-tops and burns in the forest canopy.

Fire behavior in the thinned stands

A 2002-2003 thinning project, in which the thinned slash was piled and burned, had removed most of the ladder fuels and opened up the canopy. A combination of relatively cool temperatures (high of 66 F), lack of ladder



Pre- (top) and post- (middle) thinning photos of a Ponderosa pine stand in the Bessey Ranger District. This same area was burned by the Four Corners Fire (above). A small group of trees torched during the Four Corners Fire (right).



BAER Team members examine burn intensity and effects to vegetation after the Four Corners Fire.

fuels and an avenue for the heat to escape reduced the fire's ability to gain momentum in the timber.

As the fire reached the second area of thinned stands, the day had become cooler, the winds had diminished somewhat and the relative humidity had risen. Even though the wind-driven fire was able to cross a main forest road, it failed to develop into a canopy fire, instead burning on the ground and torching individual or small groups of trees.

The timber resource specialist on the Burned Area Emergency Rehabilitation (BAER) Team noted that the fire severity over 90 percent of the timbered area burned would best be described as "low," with about 10 percent burned to a "moderate" severity.

Char heights (blackened bark) in the pine stands ranged from two feet to higher than 30 feet, with the majority between two and six feet in height, indicating a low



intensity burn over most of the area.

What if?

The Four Corners Fire occurred at an unusual time of year for a forest fire. Rangeland fires, by contrast, are fairly common in dry winters when grasses are cured.

If the fire had occurred during the normal fire season (summer), would the forest fire behavior have been different? Would more trees have burned? Would the long-term effects have been different?

There are a number of factors that contribute to the behavior and effects of any fire. Four of the leading factors are: (1) temperature, (2) wind, (3) relative humidity and (4) dead fuel moisture.

Typically in the summer, daytime temperatures are in the 90s and relative humidity percentages are in the teens. If low relative humidity persists, fuel moisture readings can be in the single digits. Wind can be just as strong in the summer as winter.

Similar winds coupled with higher temperatures and lower humidity and fuel moisture levels would result in more extreme fire behavior. However, the number of forest acres burned may not have been much different.

Why?

- (1) When thinning slash and forest debris are removed from the forest, they cannot contribute fuel to a fire.
- (2) When trees are spaced farther apart, heat is allowed to escape and does not build up under the canopy, thereby reducing heat build-up and the likelihood of explosive fire behavior.

Less extreme fire behavior usually translates to safer, more easily controlled fires, as well as less damage to both natural resources and structures.

Does thinning help? You bet!

Fuels Reduction Projects— Current and Future

Nebraska Forest Service

Since 2002, the Nebraska Forest Service has distributed more than \$500,000 to help state and private landowners reduce forest fuel loads in the Pine Ridge

Left: An area within a previously thinned ponderosa pine stand that was burned during the Four Corners Fire.

counties of Sioux, Dawes and Sheridan.

Future fuels management efforts will continue in the Pine Ridge and expand to the Niobrara River Valley, east of Valentine. In 2006, the Nebraska Forest Service designated more than \$30,000 for fuels management projects in Cherry County.

US Forest Service

As of March 2006, the Nebraska National Forest has completed nearly 2,000 acres of thinning and prescribed burning in the Chadron Creek area of the Pine Ridge Ranger District south of Chadron. These fuels reduction activities complement thinning projects in Chadron State Park and on nearby private lands.

Future fuels reduction thinning and prescribed burning projects are planned for the Bordeaux Creek and Ash Creek watersheds, southeast of Chadron and southeast of Crawford, respectively.

These projects will ensure that Nebraska's tree and forest resources remain safe and productive habitat for wildlife, as well as a safe place for people to live, work and visit.

To learn more about the information in this brochure or Nebraska's forest resources, contact:

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