S The New York Times Science July 22, 2003

How a Forest Stopped a Fire in Its Tracks

By JAMES GORMAN

SUSANVILLE, Calif. — Where the fire came through Blacks Mountain Experimental Forest last September, the ground is ash and the trees are charcoal. Black and gray are the colors, lightened only by small mounds of red dust at the base of some of the charred trunks — the leavings of bark beetles — and flecks of green where new growth pokes above the ash.

Through the tall, ravaged columns, however, a living pine forest is visible. And as visitors inspecting the fire damage walk toward the living forest, they come to an abrupt transition.

September's blaze was named the Cone Fire, for the hill where it was first thought to have begun. It burned 2,000 acres of Lassen National Forest, and 1,600 of those were in Blacks Mountain Experimental Forest, a 10,000-acre area within Lassen set up in 1934 for ecological study by the Forest Service.

When the Cone Fire swept through these woods it came to a patch of forest that was different from the rest, and stopped dead, like a mime at an invisible wall. What stopped the fire was an experimental plot that had been selectively logged to thin it, and had been burned in controlled fashion. The result was an open forest, much the way it might have been 500 years ago when regular forest fires swept through the high dry country and no one tried to stop them.

"It just stopped," Carl N. Skinner said, looking satisfied but almost surprised. Mr. Skinner, a geographer with the Forest Service at the Redding Silviculture Laboratory in Redding, Calif., and Dr. Steve Zack, a conservation scientist with the North American Program of the Wildlife Conservation Society, along with other Forest Service colleagues, are showing a reporter the results of an accidental experiment that still impresses them each time they visit it.

"Night and day," Dr. Zack said.

"If we hadn't treated this it would have just blown right through this area," Mr. Skinner said.

The members of the group are part of a cooperative research project involving different parts of the Forest Service and the Wildlife Conservation Society.

The researchers have been trying different forest management plans on 12 250-acre research plots for about seven years. The point was never to find out how best to stop fires. Instead the research was meant to develop a general picture of how different management techniques affect forest ecosystems.

In the past, many forests were either cut down for timber or left alone. A century of fire suppression resulted in the accumulated underbrush and thick tree growth that can fuel catastrophic wildfires. Parts of Blacks Mountain and the surrounding Lassen National Forest have had enough time to grow thick and brushy.

In the experimental plots, some were selectively logged, either to remove bigger trees, to mimic one lucrative logging approach, or to leave a wide range of tree sizes. The plots that had the large trees removed were so-called low diversity plots.

"So much of this kind of forest has had the large trees removed over the years," Mr. Skinner said, and now "we have very dense forests that need thinning now from a fire hazard perspective. This is what many of them are going to end up looking like."

Other plots were both thinned and subjected to prescribed burns — fires set by the researchers, a management policy that is followed in many national forests.

Finally, some areas were subjected to prescribed burns only. The researchers — fire ecologists, wildlife specialists, botanists — have followed the changes in plant growth, tree growth and wildlife populations in all the different situations.

Ponderosa pine forests are no strangers to fire. Mr. Skinner has taken samples of trees up to 700 years old to find out their fire history. Most trees showed evidence of some sort of fire about every 7 to 10 years. And big, intense fires occurred every 20 years or so, up until a century ago when the idea of fighting forest fires took hold.

How a Forest Stopped a Fire in Its Tracks

Once the natural fires were stopped, Dr. Zack said, the Ponderosa and Jeffrey pine forests from Baja California to British Columbia grew thick. Underbrush, fallen limbs and dry needles accumulated to make fuel to feed fires that would consume the large trees and destroy whole stands of timber.

When the Cone Fire hit, it created a controlled experiment on how different management techniques, at least in this area, affected a big forest fire.

The results are clear to the naked eye. The fire started in an area where the woods were thick, and quickly became intense enough to consume the woods that it went through. It was blown south and west, but it was turned away first by a mechanically thinned plot, which it scorched before dying out, and then by a plot that had been subjected to thinning and prescribed burning. The fire did not penetrate that patch at all.

In the thinned area that had no controlled burn, Mr. Skinner pointed to the effects of the Cone Fire. "We definitely changed the fire behavior and made it so the fire dropped to the ground and made it so that from a point of view of putting out fires it's easier to put out," he said, "but still there's sufficient fuel here to cause a lot more damage to the stand that was left here."

Doing controlled burns, with no thinning, worked better. But the best of all was a combination of thinning and controlled burns. The stands of moderate-size trees, what the researchers call "low diversity," stopped the fire cold.

The high diversity stands, which included more large trees, showed some scorching for 30 yards or so, as the fire burned the needle bed that had accumulated over five years since the last controlled burn. Then the fire died out.

Dr. Scott Stephens, director of the Stephens Laboratory for Wildland Fire Science at the University of California at Berkeley, has been to Blacks Mountain Forest and seen what happened when the Cone Fire hit. He said in an interview that this kind of accidental research with rigorous data was very rare.

He would have predicted, he said, that thinning and burning together would stop a fire, but was surprised that the plots that were thinned but not burned survived as well as they did. Many trees died, but enough lived for the stand to recover.

The key, he said, was that when the small trees were cut, they were completely removed, rather than leaving remnants on the forest floor, as was done with the larger trees. That reduced the fuel on the ground.

"It really points to surface fuel reduction," he said, as the most important step to prevent big fires.

Dr. Stephens said the Bush administration's current Healthy Forest Initiative was mainly about reducing regulation and does not specify fire management regimens. He also said he thought that not enough emphasis in the initiative was placed on reducing surface fuels by prescribed burning or other means. Whether large trees were removed or left made a big difference for wildlife, Dr. Zack said. Large trees, and large dead trees, are attractive to woodpeckers and other creatures.

Although prescribed burns are common, they are also controversial, partly because of a fire in New Mexico in 2000 that destroyed 200 buildings in Los Alamos, leaving hundreds of people homeless. That fire resulted from a prescribed burn by the National Park Service that got out of control.

Cost is also an issue. In plots where large trees were removed, timber sales were lucrative enough that the net gain was $1,400 an acre. Where only smaller trees were cut, the Forest Service suffered a net loss of $200 an acre.

Dr. Zack and Mr. Skinner and their colleagues agree that no single panacea will solve the problems resulting from a century of fire suppression. Still, they can point to the evidence on the ground, where you can stand on a line between charred trees and healthy ones.

Mike Jablonski/Lassen National Forest

Last fall, fire roared through Blacks Mountain Experimental Forest in Northern California. But specially managed plots, below the burned area at top, resisted the blaze.

http://www.nytimes.com/2003/07/22/science/earth/22FIRE.html?ex=1059879003&ei=1&en=418bbf4d07bc57f8