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The Fire Laboratory: Forest Restoration on the Gila

Vast stands of ponderosa pine stretch across the Gila National Forest, a testament to the role of fire in this corner of the Southwest. For decades, fire managers on the Gila have been reintroducing fire back on to the landscape. Since the 1990s, The Gila's Black Range District has been one of the most innovative areas in the country for fire management. We spoke with current and former fire managers on the Black Range District to find out some of the secrets of "The Fire Laboratory."

Open, savannah-like stands of large ponderosa pine stretch for miles among the rolling hills around the remote Beaverhead Work Center at the heart of the Gila National Forest's Black Range District. The blackened trunks testify to the role of frequent, low-intensity fire in shaping these forests. While many ponderosa pine forests across the West are characterized by "dog-hair thickets" of young pines with heavy fuel loads of pine needles and other litter on the forest floor, many of the pine stands on the Black Range contain widely-spaced, large trees with a rich understory of grasses.

The Black Range District is positioned in the southeastern portion of the Gila National Forest and contains significant portions of the Aldo Leopold Wilderness and a slice of the Gila Wilderness. The Black Range Mountains loom over the District, with an elevation of over 10,000 feet. The area is dry; precipitation varies from

12 inches in the southern woodlands to over 20 inches in the higher elevations. Ponderosa pine and pinyon/juniper woodlands dominate in the mid-elevation range, with mixed conifer forests of spruce and fir found above 9000 feet, and desert and arid grasslands found at lower elevations.

For decades, fire managers on the Black Range District have worked to restore the natural fire regime, especially in the ponderosa pine forest ecosystem. Frequent, low-intensity fires are an essential part of the ecology and evolutionary history of ponderosa pine forests. Fires in ponderosa pine forests historically occurred every 2 to 12 years and maintained an open canopy structure and a variable, patchy tree distribution. The open, patchy tree distribution reduced the risk of catastrophic fire. Heavy ground fuels were typically sparse, and fires were traditionally fueled mostly by herbaceous material that accumulated

at the end of the annual drought period. These low-intensity, surface fires reduced ground fuels, thinned smaller trees, and invigorated the understory, which helped to maintain the open forest structure.

The ponderosa pine forests on the Gila, and the Black Range District in particular, are especially suited to restoration work. The area is relatively remote with little wildland-urban interface. Much of the terrain is rolling hills without

the steep slopes that make fire management more difficult in other areas. In addition, there is also a good system of roads that facilitate prescribed burns and wildfire

management. However, the aspect of the Black Range, and the Gila in general, that has contributed most to the success of the forest management program is a strong culture of fire that actively encourages land managers to allow fire to play its natural role on the landscape.

Over the past few decades, leadership on the forest from fire managers such as Steve Servis and Paul Boucher established a vision on the Forest that opened the door to new ways of managing fire.

Robert Morales, a former fire management officer on the Black Range District and current fire staff officer for the Santa Fe National Forest, says that his approach to fire was shaped by that vision.

My passion for prescribed burning and doing what is good for the land all started around 1992 when I spent the day with Steve Servis, who at the time was the Fire Staff here on the Gila. He was also the father of

prescribed natural fire on this forest, even in the country. We drove around for the whole day and he talked about his dream for fire on the Gila. He dreamed that some day we would light a fire in one place, manage a naturally ignited fire in another place, and suppress other unwanted fires – all in the same day. That stayed with me. Well,

one day after I became FMO on the Black Range, we were managing a fire use fire on the south side of the highway [NM Highway 59], we had also just finished burning a 3,000–4,000 acre prescribed fire, and we had just suppressed 5 or 6 fires a few miles away. Then it hit me. We had realized Steve Servis’ dream – we managed, we lit, and we suppressed all in the same day. I don’t know. Some people might think it is kind of corny, but to me it was pretty special, to do that was just amazing.



The Black Range of the Gila National Forest averages 20,000 acres of prescribed fire annually. Photo: Jim Apodaca

The Black Range has not always had such a forward-looking fire management approach. Before the 1990s, fire suppression had disrupted the natural fire regime and created a forest that was choked with small trees and a build-up of fuels. Today, after two decades of prescribed burns and managed wildfire, the forest is much healthier and more resilient to the threats that are seemingly laying siege to all western forests—drought, beetles, catastrophic wildfire, and the accumulating effects of climate change.

Larry Cosper, the District Ranger for the Black Range, says that the fire management work over the last few decades has given the forests a buffer. “The history of fire management on

experiencing. In parts of the District that have had a lot of fire, we have less fuel on the ground, less concern for ladder fuels that allow the fires to crown,” says Cosper.

“We Could Do A Lot of Good Here”

Much of the credit for the strong management of forests on the Black Range District can be attributed to a series of fire management officers (FMOs) that have dedicated themselves to restoring fire on the landscape – Robert Morales, Toby Richards, and Dennis Fahl.

On a recent trip back to the Beaverhead Work Center, Morales (Black Range FMO 1998–2001)

recounted his early days on the District.

I still remember my first trip out to Beaverhead and looking at all this pine. My first question was, ‘How much are you guys burning each year?’ The answer I got was, ‘None. We haven’t burned since we’ve been here – never.’ I said, ‘Are you serious? That is going to change. Look at this. We could do a lot of good here.’”

The first step in the transformation of the Black Range was the Indian Peaks burn plan. The plan covered 89,000 acres of mostly ponderosa pine forests. The area was broken into 20 burn units of between 1,000 and 8,000 acres. The plan was written in 1998 and the first burns were conducted in 1999. Some of the

Community Relations

One of the primary advantages of conducting large-scale prescribed burns is that the Black Range District is sparsely populated with little area that could be classified as wildland-urban interface. Nonetheless, the District has worked hard to develop a good relationship with the scattered ranch inholdings and other residents who live in the Forest. Doug Boykin of New Mexico State Forestry helped the Forest Service establish agreements with some of the area ranches to allow fire to burn on to private property. “Instead of digging line along the Forest Service boundary, we could hold the fire at a better place, like a road on the property,” says Dennis Fahl. According to Robert Morales, the permittees were in favor of the prescribed fire program because it helped grazing. “They could see the results and they knew the benefits,” says Morales. “In fact, some of the permittees would get mad at us and say, ‘When are you going to burn my allotment?’ We would say, ‘Give us time, we’ll get there.’ And eventually we did.”

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units have had up to four entries of fire.

“When we first started doing this, we walked a lot. We would go out two or three days before a burn and walk the land. We watched the weather and got a feel for the land,” says Morales.

“There were a lot of sore feet but we really learned what was out there.”

“The Indian Peaks burn plan taught us a lot,” says Toby Richards, another former FMO on the Black Range

District (2001–2006) and current assistant FMO on the Reserve District. “We started out kind of slow. There was a lot we didn’t know. It allowed us to practice putting some fire on the ground. From there, we moved on to

allowing lightning strikes to burn as naturally as possible, putting some boundaries around it, and allowing them to move across the land. But this prescribed fire plan allowed us the opportunity to get comfortable and to learn how to do it.”

Dennis Fahl, the current FMO on the Black Range, was an engine foreman at the time and says that his approach to fire was shaped by those years of working on the Indian Peaks plan with Morales.

“When Robert arrived on the District we were still working under a 10 AM, suppression-type mentality,” says Fahl. “He really changed the culture here on the Black. He is a big thinker – out of the box, and he wanted to do some really cool things with fire.”

Using the Beaverhead Work Center as a base, the Black Range fire crews began burning the Indian Peaks burn units at an impressive clip. In fact, the Gila began meeting its prescribed fire acreage targets on the Black Range

alone. As the rest of the region began noticing that something different was occurring on the Black Range, it became an informal training academy of sorts. The Fire Use Training Academy in Albuquerque would send 20-30 people per year, and the Black Range fire

managers would plug them into crews. Hundreds of firefighters were trained in prescribed fire techniques during the Indian Peaks burns. “A lot of people got their burn boss ticket punched during the Indian Peaks burns,” says Fahl.

Morales says that the Black Range was doing After Action Reviews (AARs) before they were policy. “We were always asking what we are doing wrong, what we could do better,” says Morales.



Leadership has been key in the success of the Black Range fire program, (From left to right) Jim Apodaca, Toby Richards, Dennis Fahl, and Robert Morales. Photo: Josh McDaniel

Emily Irwin is now the program manager for fuels and fire ecology for the Southwest Region. Before moving to the regional office she was FMO for the Wilderness District on the Gila, to the south of the Black Range District. She and her fire crews spent a lot of time working on Indian Peaks burn plan on the Black Range District.

When I think back on my career that was probably some of the most valuable learning I had. To work with people who had such a high level of professionalism and prescribed fire skills, and who understood the ecology, understood how to put out firing patterns and spread people out to cover a lot of ground and get a lot of good results on the ground. That laboratory – to be a part of that and to watch and participate was probably the pinnacle of my career.

Thinning with Fire

According to Jim Apodaca, a fuels technician on the Black Range, the fire managers on the District take a multi-treatment approach to getting fire back on the land.

In the Indian Peaks burn units, the first entry of fire was often in an area with heavy fuels, a “dog hair thicket, with

lots of regeneration and encroachment by small trees, For these types of areas, the objective on the first entry was to remove some of the heavier

fuels off the ground, the small and mid-level trees, and the regeneration. In the Indian Peaks units, some areas had 4-6 inches of pine needles under the trees and the prescribed fires reduced that to allow some of the grasses and

herbaceous vegetation to begin growing again in the understory.

Apodaca says that they often burned on the hot side of their prescription to get single and group tree torching. They wanted to burn a few holes or pockets in the forest of anywhere from 1/10 to 10 acres in the forest to create a mosaic pattern of meadows and open forest.

The next treatment would come between 3 and 10 years later. By that time, some of the trees killed in the first entry would have fallen down. Their objective in the second entry was to again reduce the heavy fuels (1000 and 100 hour fuels) on the ground, raise the live low limb height to reduce the chance of crowning, and to continue removing the smaller trees.



Using prescribed fire to maintain fuels. Photo: Jim Apodaca

Fire and Spotted Owl Habitat

The Mexican spotted owl occurs in forested mountains and rocky canyonlands, ranging from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into Mexico. However, within this broad area, the owl mostly lives in isolated mountain ranges and canyon systems, usually in relation to older forests. A centerpiece of management of Mexican spotted owls is the establishment of a protected activity center, which covers roughly an area of 600 acres of known territory around owl roosting sites and nests and corresponds to the best possible owl habitat. Forest management activities are not completely restricted in these areas, but are limited to mainly fuel reduction activities. In the core, 100-acre nest/roost zone, also called the “no touch” zone, all forest management activity is restricted, especially during the breeding season.

Wildlife biologists on the Black Range District work closely with the fire management team to integrate fire into habitat management. Rene Guaderamma, the wildlife biologist for the Black Range, says that managing fire around owl habitat, be it wildfire or prescribed fire, takes a great deal of planning and communication. He says that the fire staff on the Black Range is very willing to put forth the extra effort and try new things.

“I feel, and I think a lot of the fire folks here feel that it is important to get fire into some of these areas that historically had fire, whether there is an owl there or not,” says Guaderrama. “If it is good for the land it should be good for the wildlife.”

During prescribed burns, the wildlife teams try do some monitoring before the burn to see if the owls are nesting. If the owls are nesting during a burn, the crews work to minimize the impacts to the owls by reducing the amount of personnel working in the PAC, and by re-routing engines and other vehicles away from the nests.

Guaderrama says that low-intensity surface fires are good for the owl habitat, but they try to preserve the denser vegetation in the “no touch” nest/roost zone to maintain the cooler microclimate.



200 trees per acre and we would reduce it down to 100 or even 50 trees per acre," says Apodaca. "We would get almost everything in the 0-6 inch diameter range, and maybe 50% mortality in the 6-10 inch range, and about 10% of everything bigger than 10 inches."

One result of the successful reintroduction of fire back on the landscape in the Black Range is that it is much quieter on the District during fire season. In fact, the District often sends fire crews off the District to gain experience fighting wildfires. "With the amount of fire we have put back into the ecosystem, the starts have gone from 10-15 per year to maybe 1-2 per year," says Dennis Fahl. "We say we worked ourselves out of a job by putting fire in here."

Bringing Wildfire Out of the Wilderness

The Gila National Forest had been experimenting with prescribed natural fire and wildland fire use in the wilderness portions of the Forest since the 1970s. Along with Sequoia-Kings Canyon and Yosemite National Parks, and the Selway-Bitterroot National Forest, the Gila was one of the first forests or parks in the U.S. to allow naturally-ignited wildfires to burn across the land. Eventually, some of the first wildland fire use fires to be allowed to burn outside of wilderness occurred on the Black Range District. The District started with some small events in the early 2000s, but as the Black Range fire managers got more comfortable, the acreage grew annually.

While other forests are able to treat an average of 20,000 acres a year with mechanical treatments and prescribed fire, in years past the Gila National Forest has treated on average 50,000 acres with managed wildfire alone, and another 20,000 using prescribed fire (Hunter 2007). The Gila has been also able to treat its forests at a cost per acre that is a fraction of that of other forests. Mechanical treatments cost on average between \$200 and \$500 per acre. Prescribed burns generally cost between \$25 and \$100 per acre on average. However, both of these types of forest treatments require planning processes that can be very expensive and are not reflected in these costs. The Gila National Forest is able to use naturally ignited fires at an average cost of about \$25 per acre (Hunter 2007).

The 2003 Boiler Fire provides a great example of benefits of managed fire. The fire ignited in April, 2003. The Black Range District decided to manage it as a fire use fire (using the terminology of the time). They were able to manage it through the heat of the summer and due to the previous work that had been done with prescribed fire, the Boiler Fire ended being about a 59,000 acre backing fire covering roughly 90 square miles. The fire reduced ground fuels and smaller trees. Post-fire monitoring showed that the fire reduced ground fuels from 10 tons per acre in some areas down to as low as 2 tons per acre – all at a cost of \$1.30 per acre. The result is miles and miles of open, healthy forest that is more resistant to drought and beetles, as well as the potential for impact from a catastrophic wildfire event.

According to Emily Irwin, the management of wildfire outside of wilderness was precedent setting for the Southwest. "I think it really set the stage for other forests in our region to look at that program and realize that could be them. They opened that door," says Irwin.

Conclusion

Over the last few years the Southwest has been hit with some of the largest fires in its history. Some of these fires such as the Los Conchas Fire near the town of Los Alamos have done immeasurable damage to forests, watersheds, and other ecosystems. As the history of fire management on the Black Range District shows, we can

invest our resources long-term in preparing our forests for the changing conditions or we can react when the annual monster fires comes charging down the mountainside, leaving charred forests and forever altered ecosystems. The fire managers on the Black Range District have proven that there is another path, and that with patience, fierce determination, and leadership, we can do what is right for the land and work with fire rather than having to simply fight it, or worse, watch as it devours our forests.

Written by Josh McDaniel, July 2013

References

Hunter, M. 2007. Wildland Fire Use in Southwestern Forests: An Underutilized Management Option? *Natural Resources Journal* 47(2): 257-266.

The Southwest Fire Science Consortium is a way for managers, scientists, and policymakers to interact and share science in ways that can effectively move new fire science information to management practices.

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