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Restoring Bighorn Sheep to their Native Ranges in Texas, and Ensuring the Viability of their Habitat

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# Out of the Ashes: The Rockhouse Fire and Its Aftermath

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Fire approaching across the grasslands south of Fort Davis on the night of April 9, 2011.

*A spark. A dry blade of grass.  
A gust of wind.*

Thirty-four days and 314,444 charred acres later, exhausted fire-fighters report that the Rock House Fire is finally contained. The devastation is hard to describe. Homes are gone. The grasslands are black. Pronghorn and cattle snuffle through the ash, looking for something to eat. But was all lost? Or was this just nature's way of hitting the ecological reset button?

The Rock House Fire started in Marfa, Texas, on a windy, April day in 2011. Spring fires weren't unexpected. The Davis Mountains region of West Texas received very little precipitation during the winter months, so the grasses were dry and ready to burn. A spark from the railroad, someone burning trash, or a careless smoker's

cigarette flicked out a window could easily start a fire that would spread with the help of relentless spring winds. But the Rock House Fire was different—bigger and faster than anyone had ever seen before.

## *Conditions for a fire*

For a fire of this magnitude, three conditions must be met: First, there has to be an ignition source. Following the Rock House Fire, investigators reported that a shower of sparks ignited the surrounding vegetation when electrical lines snapped together during the 60 mph winds that blew that day.

Second, there has to be adequate fine fuels—plant material that is less than ¼ in. in diameter—to carry the fire. The foothills of the Davis Mountains are blessed with fine

fuels—miles and miles of grass. These grasslands were particularly luxurious in 2011 due to the abundant spring and summer rains that occurred in 2010.

And finally, for a wildfire to travel, the fuel has to be dry enough to burn. This last condition was met with a vengeance: not only was the humidity low that day, but the vegetation was crisp from record-breaking low temperatures and high winds, which literally freeze-dried plants in February.

The Rock House Fire roared through the grasslands and up into the mountains northwest of Fort Davis, leaving little more than smoldering fence posts. Could anything survive a wildfire this intense? Yes. Only a few days after the fire, green leaves began to appear around the clumps of grasses; and within weeks herbaceous plants such as nightshades, milkweeds, and tiny legumes were flowering.



## The (Slow) Road to Recovery

It's been 3.5 years since the Rock House Fire. To a keen observer, evidence of the fire still exists—the shell of a house never rebuilt, skeletons of juniper trees, and miles and miles of new fencing (constructed with fire-proof metal posts). But the rest seems pretty much business as usual with grasses glowing golden in the morning light and pronghorn sentinels standing watch over the herd.

Has everything recovered? Well, not quite, say regional biologists and range managers.

The plants and animals of the Davis Mountains are fire-adapted. In fact, many benefit from periodic wildfire. Large animals such as pronghorn and mule deer flee, running from the flames or escaping to sheltering canyons, while the fleet-of-wing take to the air. Smaller animals scurry into burrows protecting them from the flames and extreme temperatures.

Even so, 2011 saw a significant drop in mule deer, pronghorn, and quail populations, says James Weaver, Texas Parks and Wildlife biologist. But he doesn't attribute this drop in numbers to the fire. "It was most likely due to drought," he says, "since numbers were down across the region—even in places that didn't burn."

Drought is the wild card in the game of ecosystem recovery. With no measurable precipitation in the 6 months preceding the fire and less than 5 inches of precipitation during the 12 months following the fire, recovery was painfully slow the first couple of years.

However, even without benefit of rain, the ability of a plant to recover quickly after a wildfire depends on many factors. One of the most important is whether a plant's growing points are above or below ground. Growing points are where the plant's new cells develop.

Although grassland fires can burn at temperatures over 1000 ° F, the soil is a wonderful insulator. Just a few inches below ground, soil temperatures barely rise as the fire passes over. Soil microbes, seeds, and roots insulated by a shallow blanket of soil can survive.

In a study of vegetation recovery at the Mimms Ranch just north of Marfa, researchers from the Borderland Research Institute found that blue grama (a rhizomatous grass with growing points that occur on underground stems) was the first to show new growth. Without adequate moisture, however, the plants were diminished in both size and number. Bare ground between clumps of blue grama was rapidly filled in by a variety of herbaceous plants and two species of short-lived perennial grasses (three-awn and Hall's panicum).



Just weeks after the fire, forbs such as this silverleaf nightshade were beginning to bloom.



Sul Ross State University student, Mark Foreman, conducts a study of vegetation recovery in the burned and unburned portions of the grasslands at the Chihuahuan Desert Nature Center.





Pronghorn in the Marfa grasslands.

Black grama, another important grass of the semiarid grasslands, did not fare so well. Because they reproduce vegetatively by sending out aboveground stems, black grama can be extremely vulnerable to fires. The black grama monoculture found on rocky slopes on the Mimms Ranch showed no evidence of recovery even 18 months after the fire.

The abundance and diversity of forbs (basically everything that's not a grass or woody tree or shrub) made a dramatic difference in the appearance of the grasslands. Milkweeds, nightshades, spurges, chocolate flowers, rushpeas and many other species dotted the black soil. The rapid growth of these "weedy" forbs was critical to holding exposed soil in place, and providing nectar and food sources for game and nongame animals.

"The forb growth was good for the pronghorn," says Dr. Louis Harvison, director of the Borderlands Research Institute. "They were back in the burned area before the ground quit smoking."

The forb growth was also beneficial to wildlife such as butterflies and birds. In a side-by-side study of burned and unburned grassland at the Chihuahuan Desert Nature Center, researchers documented twice as

many butterflies and birds utilizing the burned area than the unburned area.

The impact of the Rock House Fire extended beyond the grasslands. Tens of thousands of acres of pine-oak forest were also burned. Although pine and oak trees tend to be well adapted to wild fires, the combination of fire, followed by drought and pine beetle infestations resulted in high tree mortality.

Bill Oates—of the Texas Forest Service—spent two days surveying ponderosa pine trees at The Nature Conservancy's Davis Mountains Preserve recently. Although the Preserve did not burn during the Rock House Fire, it did burn almost exactly a year later during the Livermore Complex Fire and what was found there is probably representative of the region. "I'd estimate that about 60% of the ponderosa pines we looked at were dead," says Oates. "The sad thing is that there's little regeneration. I could only find one seedling in the entire area we surveyed."

The Texas Forest Service is so concerned about this situation that they've launched a project to collect seeds from healthy ponderosa pines in Fort Davis, grow out seedlings, and restock the forests of the Davis Mountains.





## Benefits of the Fire

While difficult for those of us that lost our homes, and for the ranchers who lost stock and couldn't use their land for grazing for over a year, ecologically, grasslands and forests need to burn. Fire is good for the land is the mantra repeated over and over.

In a study of plant recovery at the Chihuahuan Desert Nature Center, researchers found that for a year post-fire the amount of plant material on the burned and unburned portions of the grassland was almost exactly the same when expressed in kilograms per hectare (kg/ha). The difference lay in the proportion of grasses to forbs. On the burned side of the grassland, forbs accounted for 569 kg/ha while grasses weighed in at 1179 kg/ha. On the unburned side, forbs only accounted for 155 kg/ha while grasses dominated at 1665 kg/ha.


Basically, the fire has resulted in increased plant diversity in the grasslands—a diversity that is critical for the nutritional health of pronghorn and other grazers. The increased abundance of forbs also ensures a greater diversity of invertebrates, small mammals, and birds.

The fire provided the opportunity to rebuild fences in the region. Prior to the Rock House Fire, many of the ranches were enclosed in netwire—a legacy from the days of sheep and goat raising. But netwire prohibits the movement of pronghorn across the landscape. Dr. Harveson seized the moment to distribute information to ranchers about the importance of pronghorn-friendly fences, and the Natural Conservation Resource Service jumped in with programs to help fund fence replacement. "About 80% of the new fences are now pronghorn friendly," says Dr. Harveson with pride.


Good rains during the growing season in 2014 have resulted in lush grasses and the recovery of many game and nongame species. "But what will happen next spring?" is a question raised over and over. Things may be looking better, but the threat of another wildfire is something that residents will not soon underestimate.



One week after the fire, the grasslands are black and smoke fills the air as the fire continues to burn in the mountains.



Three years after the fire, the grasslands are beginning to recover. Photo taken October, 2014, from the same point as the above image.



Approximately 90% of the Mimms Ranch burned in the Rock House Fire. Three years later, the grasslands are beginning to recover.