CONTACT

Southwest Region Interpreter's Newsletter

Oct. - Dec., 1994 Vol XIX

Fire in National Parks

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In this issue of **CONTACT** we explore one component of "thinking like an ecosystem" – that of the role of fire in parks. The subject may be familiar to many, but it brings home again in a compelling way the lessons of the past; parks cannot be managed merely by legislative fiat or building fences around them. They are dynamic, complex, and changing. When it comes to fire, the lesson is clear. We can pay now or we can pay later. Managing parks, then, is an active process - not a passive one. Research, interpretation, and resources management must be combined so that we know what to do, have public support for those actions, and know how to do it.

1994 Garrison Gold Award Nominations

Nominations for the Garrison Gold Award for 1994 are now invited from the Southwest Region parks. This is your opportunity to share with others you park's accomplishments in interpretation during the past year.

Interpretation is important to what we do. We need to recognize the park within the Southwest Region with the outstanding interpretive accomplishments each year, and of course reward it. The award also commemorates Lon Garrison, one of the leading proponents of interpretation in the Service.

The recipient park will receive a ceramic storyteller figurine by the Pueblo potter Maria Romero for permanent display in the park, and receive a special one-time supplement to their park's budget to support interpretive efforts.

The park-generated nominations are to consist of a narrative and any supporting materials describing the tangible and intangible accomplishments of the past year. These may consist of enhanced public relations, a creative turn-around of a thorny problem, exceptional cross-divisional teamwork, or creative solutions to budgetary problems.

Send your nominations directly to the Division of Interpretation, Southwest Region by **January 6, 1995.**

CONTACT is a quarterly publication of the Division of Interpretation & Visitor Services, Southwest Regional Office, National Park Service, PO Box 728, Santa Fe, New Mexico 87504-0728

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Produced with PageMaker 4.0
WordPerfect for Windows
HP LaserJset 4P

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Keeping Fire Out of the National Parks

When Sequoia National Park was established in 1890 to preserve the magnificent "Big Trees," the National Park Service (NPS) began to eliminate forest fires from the sequoia groves. Wouldn't fire destroy the very scenery and natural objects that were supposed to be protected? But after many decades of suppressing forest fires, some disturbing things were noticed. In 1890 the groves had been open and one could see through the trees. There were sequoias of many ages, but the floor became a tangle of shrubs, pine, and white fir, and it was covered with dangerously flammable needles, branches, and dead undergrowth. Most alarming, almost no seedlings or saplings were coming along to replace the old giants. The giant sequoias were not reproducing.

The Forests as Europeans Found Them.

The forests and grasslands found by the earliest humans in the Americas were the result of the interplay of all natural conditions, including climate, soil, topography, and fire. Fire, happening sporadically and in random places, was a part of the natural regimen. It helped produce the great patchwork of variously aged and composed forests, grasslands, and woodlands. Fire, like rain, happened. It was part of nature.

Those first people must have recognized fire's effects on the landscape, and they saw that some of those effects benefited them. Some of the foods they gathered, like berries and wild rice, seemed to thrive in recently burned areas. The animals they hunted, like deer, seemed to avoid the dense forest and browse the fire-cleared openings. They realized that they could encourage the beneficial results by purposefully setting fires.

By the time Europeans arrived, the Indians had been altering the land with intentional and accidental fire for thousands of years. The results were widespread. Everywhere were openings the results of burning. Early European accounts are replete with descriptions of barrens, balds, and meadows. These places, so important in European settlement and present-day agriculture, were usually caused or maintained by lightning and Indian-caused fires.

During the 18th and 19th centuries many farms were developed on existing openings and in newly felled forests. But they remained cleared land only as long as the farmer plowed, planted, and burned them. The humid half of the U.S. is full of "old fields" that gradually grew back to forest once they were abandoned.

An Era of Misuse and Waste.

The Europeans had never seen anything like the immense North American forest they encountered on the east coast. It seemed to go westward forever, inexhaustible.

But as the new Americans rapidly increased in population and employed their modern technology, what they did to the eastern forests in three centuries dwarfed anything that the Indians and lightning had done before them. The 17th and 18th centuries encompassed an era of expanding settlement, with extensive forests cut for farms and lumber. More trees were cut than could possibly be used, so they were burned. Forest clearing on an unprecedented scale moved out of New England and the Appalachians, through New York and Pennsylvania, and into the Midwest, always accompanied by wildfire.

America's industrial and urban growth after the Civil War created a great demand for lumber, so loggers moved into the Lake States pinery. There had never been anything like the destruction that followed. Tremendous amounts of logging debris were left in the woods, and it became tinder in the fall. Beginning with the disastrous forest fire that destroyed Peshtigo, Wisconsin in 1871, first Michigan, then Minnesota and Wisconsin were repeatedly swept by disastrous town-destroying fires for the next 50 years. When the Lake States were finally cut and burned to exhaustion, the loggers moved into the southern pine forests.

If the colonists of the 17th and 18th centuries thought that the American forests were inexhaustible, the rapid removal of forests from the Lake States and South in the 19th and 20th centuries proved them wrong. It was this unprecedented cutting of the forests that helped lead in the 1870s to the emergence of the conservation movement, a fundamental rethinking of our relationship to the land. It was stimulated by the recognition that forests were not unlimited, and that the remaining ones should be protected.

From its beginning, conservation took two distinct directions. One, beginning with Yellowstone National Park in 1872, was the idea of setting aside outstanding natural areas that would be held for the people's enjoyment, removed from settlement and commercial exploitation. In these special places, the forest and waters and animals would be preserved as places of undeveloped nature. Conservation's other direction was the idea of protecting extensive forests so they could be scientifically managed for their forest products and watersheds. This marked the introduction into the United States of the European practice of forestry, and resulted in 1891 in the establishment of federal forest reserves, later to be called national forests.

The Era of Fire Suppression in the National Parks

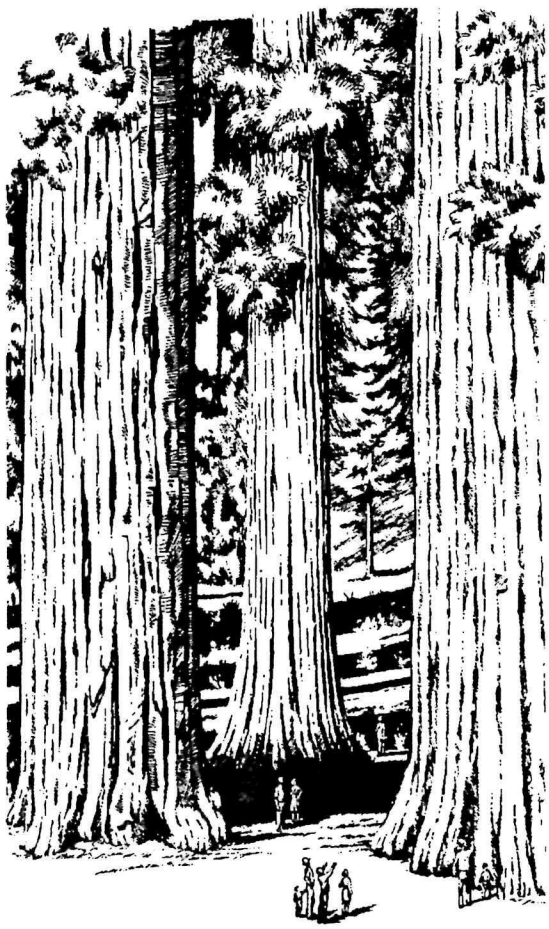
In light of American experience with the waste caused by forest fires, the early managers of the national parks and national forests concluded that one of their responsibilities was to prevent their reserves from being destroyed by fire. Fire was bad and was to be suppressed.

So, in 1886 the U.S. Cavalry was sent to Yellowstone to protect it from poachers and fire. It remained there for 32 years. A major job was to spot lightning-caused fires and try to extinguish them. Another was to prevent human-caused fires. The soldiers, for example, required campers to stay in public campgrounds in order to concentrate the hazard of campfires in easily watched areas. The Army's work in Yellowstone, and later in succeeding national parks, was the beginning of effective federal fire suppression work.

From the start, national park administrators recognized the obvious: the areas being designated by Congress as national parks were among the scenic and awe-inspiring places on the continent. The reason for setting them aside as national parks was to preserve them. Were those natural treasures to be destroyed, there would be no replacements. Nationally significant treasures would be lost. Logically, the NPS established a policy that fires – all fires – were antithetical to the purpose of parks and would be suppressed to the utmost of its ability. This became NPS policy and practice.

The Unintended Effects of Fire Suppression

For some time, two issues had been concerning the NPS. Both came to a head in the early 1960s. First, the NPS had often killed "bad" animals, like wolves, mountain lions, and coyotes, and had fed "good" ones, like bears and elk. This intervention in park ecosystems, for very subjective reasons, contravened emerging ideas of how national parks were to be managed. This issue of wildlife and ecosystem management was articulated by the landmark Leopold Report written by the Secretary of Interior's Advisory Board on Wildlife Management in 1963. The board's emphasis was on wildlife management, but it logically tied that to habitat management. The report pointed out that simple protection of the parks was adequate to maintain climax vegetation (the final, self perpetuating stage of ecological succession), but the maintenance of successional stages of vegetation (those which if left alone would give way to the next stage), requires active management. Successional communities, such as grasslands and aspen groves, are maintained in nature by forces like fire, flood, and storms. The report recommended that the NPS reintroduce fire into the management of such communities. It opened the door to a new way of thinking about the preservation of park features, and it created a climate in which resource management was more closely tied to ecological knowledge.



The second bothersome issue was that occurring in such places as the giant sequoia groves. By the 1960s, fire had been suppressed in the groves for 50 years, yet something was wrong. When the parks were first established, the floor of the sequoia groves was open and mostly clear of undergrowth. One could walk freely among the giants and have unobstructed views of them. Now, the floor was a

tangle of brush and groundcover plants, and the trees growing toward the canopy were incense cedar, sugar pine, and ponderosa pine. There were almost no young sequoias. Also, during those fire-free decades, needles and falling limbs had been collecting on the forest floor, dangerously flammable and in some places piled to several feet deep. Park managers were increasingly uneasy about these deep layers of dry fuel gathered at the bases of the very trees they were supposed to protect.

Just as the Leopold Report was calling for more ecological research to support park management, ecologists studying the sequoias began to understand the observed changes.

Prior to the imposition of fire protection, fires had periodically swept through the groves, burning the fuel on the ground. Because of this, the recurring fires were low ground fires, almost never ascending into the tree crowns. A thick, fire-resistant bark protected the larger sequoias, so they might be scorched at the base but generally not seriously damaged. The fires provided two other critical services. First, the sequoias have green cones that will hang on the branch for many years, tightly closed, until a fire occurs. Then, the rising heat dries and opens the cones, releasing large numbers of seeds. Second, sequoia seeds germinate and grow only where they fall on bare soil, such as where the needles and litter have been burned away by a ground fire. If the seeds fall on a layer of needles and litter, they almost certainly will not become established. That is why there were no young sequoias.

By preventing fires, the NPS had eliminated the very seed bed that the sequoias need to reproduce. Additionally, the lack of burning was allowing incense cedar and pine to grow and shade out what few sequoias might germinate. Given time, they would replace the sequoias. Finally, the accumulation of fuel from the absence of burning had made it almost certain that any fire would become a conflagration, likely to explode into the crowns and kill the mature sequoias.

As the ecologists learned, protecting the sequoia from fire was self-defeating; it precluded the very natural forces essential for its existence. The sequoia, it turns out, is a successional stage of vegetation dependent on fire. Removing fire permitted the slow, yet relentless process of ecological succession that would eventually replace the Big Trees.

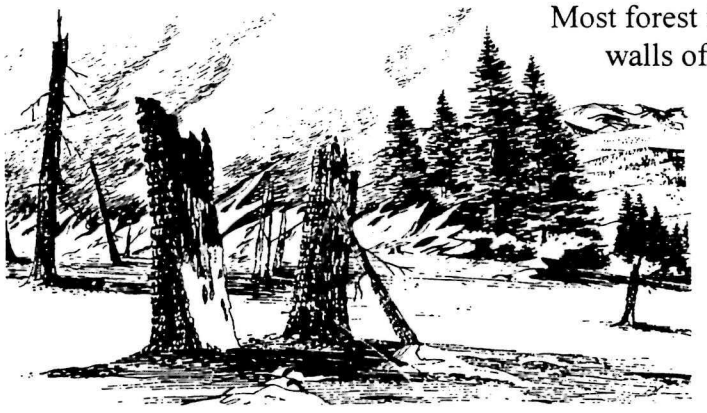
The lesson learned in the sequoias was a profound one – and it extended far beyond that one species. It reinforced the Leopold Report's philosophical and policy recommendations with a case history. The lesson to the NPS was that enlightened fire management must replace the blanket fire-suppression policy.

Fire Kills Trees, Not Forests

Forest fires are exciting and dramatic, so they are news. Often ignored in the excitement is that fire is only one aspect of what is happening in the forest. The fire is a result of processes that have been occurring for decades, and its effects will help determine the forest of the future. If fire is suppressed, the things it causes to happen do not happen, and the things it prevents from happening will happen. The result is often just the opposite of what is intended.

A forest fire is a dramatic event with bright flames and billowing smoke. It is a scene of bulldozers, exhausted firefighters, bustling command centers, and airplanes dropping slurry. It is sensational and attention grabbing. It is news! TV news shows grimy firefighters digging firelines and fire bosses shouting orders. Newspaper headlines declare that 10,000 acres were "lost" or "destroyed" or "ravaged by the flames," that the forest or park is a "scorched ruin."

When it's over, we see blackened trees and bare ground, and the ominous news accounts seem to be validated. Because trees died, observers tend to think the forest died. But it didn't.



Most forest fires are not a uniformly advancing, all-consuming walls of flame. They burn some parts of the forest and skip others. Some areas will be burned only lightly at the ground, whereas others will have large trees burned to their crowns. Islands of green forest will be surrounded by burned areas, and vice versa. In other words, a fire does not usually result in total consumption of fuel or life. It is a very spotty result, a forest with some areas totally burned, others partially burned, and some not burned at all.

A forest fire holds everybody's attention until it burns out. But from the standpoint of the forest as an ecosystem, the fire is a normal and expected part of forest life cycles, except for some systems such as tropical rain forests. The stage was set for it over many decades, and its effects will cause change for many decades. It is one of the many natural influences and conditions that produce the forest. The real story, of which the fire is a part, began hundreds of years ago, and will continue for hundreds of years after the fire is out.

A growing and changing forest is not dramatic, so it's not news. It is a very slow, largely invisible process. But a dead tree falling, a storm breaking branches, a flood depositing new soil, and a squirrel burying acorns are all happening, and each is a part of the process that makes the forest. Fire is, too; if not today, soon.

How Does a Forest Grow?

To our eyes, a forest is an unchanging part of the world. It is much the same this year as it was the year before. In reality, it is a dynamic, constantly changing association of plants and animals shaped by all the elements of its environment, including, in most North American forests, fire.

A forest, like any ecosystem, can evolve from an initial stage, through intermediate ones, to a mature stage known as the climax. At the beginning, pioneer plants that need full sunlight grow on bare soil that has been recently exposed by fire, a landslide, erosion, or uprooted trees. Those new plants send down roots, drop leaves, cast shade, provide shelter and nesting material, and become food for animals. In so doing, they subtly change their environment, and create conditions more suitable to other species, which become their successors in the ecosystem. So it goes, through stages, until this progression is interrupted. Sometimes a climax is reached, a species or group of species that dominates the forest and is able to maintain itself for long periods.

Consider a 100 year old forest where a storm flattens the trees on one hillside. There, in the full sun and newly bared soil, the process starts over again with pioneer plants, while the rest of the forest, undisturbed, continues its process of growth and change. Twenty years later a lightning fire burns a nearby hill, and there, too, there is a beginning. On the storm-damaged hill the vegetation is at a 20 year-old stage, and the remainder of the forest, still undisturbed, is 120 years old. Thirty years later an infestation of insects kills a large stand of trees, and the process repeats there. Now most of the forest is 150 years old, but two scattered hillsides are at 30 and 50 years of development, and a third stand is just starting over.

So it goes, with random natural events causing scattered parts of the forest to start ecological succession anew. Those parts of the forest not disturbed by these events will eventually reach the climax form. But the climax, too, is susceptible to disturbance.

It is an endlessly repeating cycle, and every part of the forest is at some stage of the cycle. Whatever its stage, the forest is a dynamic, evolving thing. Whatever it is now, sooner or later it will be different.

That is why a natural forest is not uniform throughout. It is a mosaic of patches of different ages and species, each of which looks different and provides shelter and food for different animals.

The Role of Fire

What if one of those burned patches in the mosaic were to re-burn periodically, by either natural or human-caused fires? In some ecosystems an intermediate stage of vegetation would stay for long periods. In such a situation, the periodic fires provide the conditions necessary for the vegetation to reproduce itself. The system provides enough fuel to produce fires that remove competition and litter, but the fires are of low enough intensity so that the dominant vegetation is not destroyed. Many grasslands and meadows, the southwestern ponderosa pine forests, and a number of other "permanent" plant associations are the results of this interplay of fire and plants.

Leaves and branches and dead trees fall to the floor, and lower vegetation lives and dies. There is a continual accumulation of dead, flammable material. If fire enters the forest periodically, this fuel is burned off before there is a heavy accumulation. The fire is of low heat and intensity, so it does not climb the trees and burn their crowns. The result is that the trees are scorched around the base, but not seriously injured, many bushes and competing saplings are burned, much of the dead fuel is removed, and the forest floor retains an open appearance. In lodgepole pine forests, intense fire may kill everything – except their own cone-protected seeds.

The germination "strategy" of some trees is also proof that they evolved with fire. For example, the seeds of some trees will not germinate if they fall on the litter of needles or leaves that normally surrounds them. They only germinate and grow when they fall on bare, exposed soil. Fire is the pervasive way for the forest floor to be bared.

Additionally, the forest depends on the recycling of its minerals and nutrients. Much of the fuel that is burned in the periodic low intensity fires is returned to the soil as ash, a form of fertilizer that is readily percolated into the soil by rain and melting snow.

In one action, then, the fire prepares the ground as a seed bed, fertilizes it with ash, and causes the seeds to be spread upon it.

If Fire is Eliminated

Simply stated, if fire is eliminated from the forest, there is nothing adequate to take its place; its ecological role is not performed. The things it causes to happen do not happen. Conversely, the things it prevented from happening will happen.

A species or association that remains more or less permanently a part of the ecosystem because of occasional fires, as those described above, is referred to as a fire sub-climax; that is, it depends on fire for its continued reproduction and the removal of its competitors. The process of ecological succession proceeds no further than that stage – so long as fire is a part of the environment. Absent the occasional fires that sweep those plant associations, their competitors would no longer be removed. The competitors would thrive in the conditions created by the fire climax species, and would gradually grow to shade them out. The fire climax associations would gradually give way to succeeding stages. It would become a very different place.

Without occasional fires, leaves and wood accumulate in large amounts. This is especially true in the Southwest, where dryness makes decay a slow process. As the dry fuel piles up it produces an ever-increasing fire hazard, especially when combined with high temperatures, low humidity, and wind. A8

small accumulation of fuels burned periodically can be beneficial to the forest, but long-term accumulations are likely to eventually burn as a conflagration. It doesn't merely sweep the floor and scorch the trees; it burns with a heat that can burn all organic material, including the components of the soil, and leave a sterile environment isolated from seed sources and vulnerable to erosion.

For many years the NPS tried to keep fire out of parks. By the 1950s, increasing ecological research disclosed fire's essential role, and the policy of reflex fire suppression began to yield to a more balanced policy of fire management. But it will take many years of careful management to eliminate the fuel hazards that accumulated during the decades of fire suppression.

This was shown dramatically in the Yellowstone fires of 1988. Yellowstone was the first national park to receive systematic fire prevention, and although some naturally caused fires had burned since the 1970s, the accumulation of fuel by 1988 was great. That year had the extreme fire weather of record. When numerous lightning strikes and several human-caused fires coincided with low humidity, high temperatures, and high winds, the result was a complex of fires that was beyond any possibility of being extinguished.

What people saw on their TV and read in their papers in the summer 1988 was an arresting scene of flames and apparent destruction. Yellowstone, the first national park, "was burning up." The NPS tried to calm public apprehension, but it was futile while trees were burning. But the park did not burn up. The spring of 1989 was like all springs in Yellowstone, only more so as grasses and flowers emerged in abundance in the burned areas. Significantly, studies showed that Yellowstone has had periodic conflagrations like this every 500 years or so. Ironically, in this ecosystem, fire suppression practices of the past had relatively small impact on the nature of the fire.

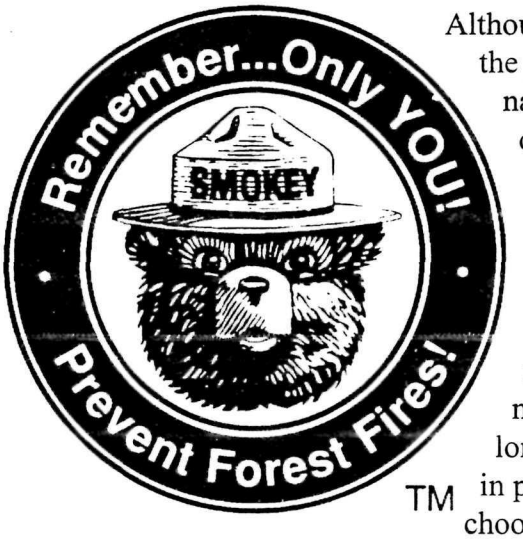
Putting Fire Back In The National Parks

The visitor to a park comes with a degree of excitement and anticipation. The park was established to preserve some outstanding feature or landscape, and its reputation for having beautiful scenery is well known. That is why the visitor came. Furthermore, the park might be far from home, and travel costs time and money. This might be the only time the park can be visited. Clearly, the visitor is not coming to see a fire-blackened forest.

The disparity between the reality of forest dynamics and what the visitor expects is a paradox. But experience has proven, and the 1988 Yellowstone experience emphasized, that fire cannot be permanently eliminated from a forest. Fire is a part of it just as is rain, drought, and other perturbations.

A Restatement of Smokey's Message

One of the more successful public relations campaigns was the one to educate the public about the waste caused by forest fires. It was supported by the U.S. Forest Service, and its star was Smokey Bear. This friendly bear, dressed as a forest ranger, urged fire prevention to keep the woods safe and productive. The combination of Smokey and his unambiguous message, "Only you can prevent forest fires," convinced successive generations that fire was unquestionably bad.



Although Smokey's message was aimed at the prevention of human-caused fires in national forests, the public drew no distinction between national forests and national parks. They understood that fire did not belong in any forest.

Now, since the NPS has instituted prescribed fire programs, it is necessary to restate Smokey's message as it applies to parks: No longer are all fires bad; now, some fires in parks are good – but let the NPS choose which ones, and manage them according to detailed resource management plans based upon research and an understanding of the fire ecology of each ecosystem. The "You" of Smokey's message should still be very careful with fire!

Preservation Through Active Management

The climax of the battle at Gettysburg occurred when General Pickett's Confederate army charged at the Union forces on Cemetery Ridge across open fields. Today, Gettysburg National Military Park is visited by thousands of people who want to see where a part of their history took place. Their visit to the scene of Pickett's Charge makes sense only if they see that field as it was in July 1863. Had the NPS decided to preserve that scene by leaving it alone, nature would not have left it alone. Today, like abandoned fields throughout the east, it would have been a thicket of trees, totally unlike the original battlefield. It has taken active management of that field to retain the historic scene that the park is intended to preserve.

And so it is in many parks. In some places fire has been eliminated indirectly, as a result of grazing. The ponderosa forests of the west used to be open and park-like, with low herbaceous vegetation. One could walk freely through the trees because occasional ground fires burned off the light fuels of needles, grass, and fallen trunks. On their arrival in the 1880s, stockmen grazed their animals in and around the forests, and soon the grass and herbaceous plants, which had carried the fires across the ground, diminished. As a result, the fires diminished too, and the forests changed. In the absence of fire, more seedlings survive, so many ponderosa forests have become thickets of saplings. The open aspect is gone, and there is a dangerous accumulation of flammable dead material.

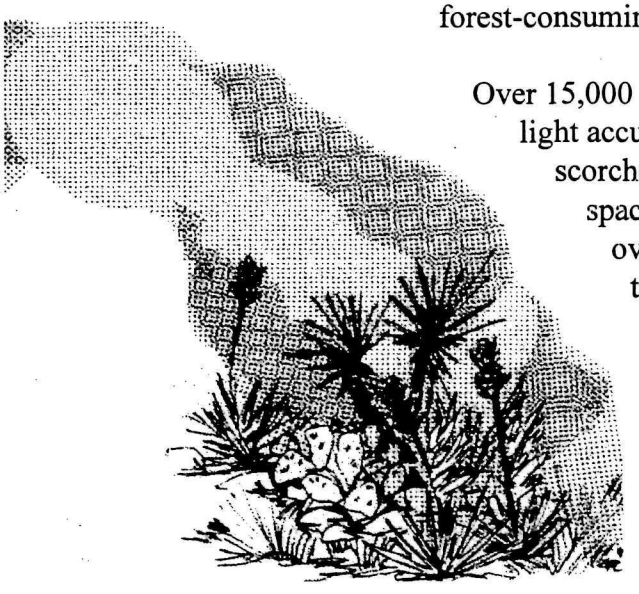
A similar situation exists in the grassland-piñon-juniper association in such units as Carlsbad Caverns and Guadalupe Mountains national parks. There, overgrazing of the grasses and the resultant decrease in ground fires permitted cactus, mesquite, and brushy growth to invade. Now it will take the careful reintroduction of fire to recreate the ecosystems that existed prior to modern human intervention. We are to preserve the ecosystem – not individual species.

A major purpose of modern NPS fire management policy is to undo the results – one might say damage – of the elimination of fire from places where it belongs.

After the Flames are Out

On the mountains above Santa Fe, New Mexico, otherwise covered by a spruce and fir forest, is an extensive grove of aspen. Every October it becomes a spectacular display of yellow and orange, and the road is jammed with gazers. Not many of those people realize that this beautiful annual display is the result of a forest fire about 85 years ago. The aspen is a pioneer species that thrives in burned sites where it uses full sunlight to germinate and grow. In growing to maturity, the aspen cast shade, just the environment needed by the shade tolerant spruce and fir. These species have thrived in the shade, and here and there one can already see conifers poking through the aspen crowns. It is only a matter of time before they out-compete the aspens and reestablish their dominance. As visitors enjoy the aspens this fall, it is important to remember that this temporary source of beauty and public enjoyment was once a charred forest, and that the beauty is a direct outgrowth of the charring.

A more recent example is the La Mesa Fire in Bandelier National Monument, New Mexico. By 1977 the monument had been protected from fire for many years, and early grazing had depleted herbaceous plants. The periodic ground fires that used to be common in the ponderosa forest were eliminated. Rather than an open forest of pine and a grassy floor, parts of the monument had become a thicket of stunted trees with the floor covered by dead branches and a thick layer of needles. In June 1977 a fire swept into the park, and the pine thickets and heavy accumulation of fuel provided the conditions for a major, forest-consuming fire.



Over 15,000 acres burned. Where there had been recent burns, and only a light accumulation of fuel, the fire stayed on the ground. The trees were scorched, but they survived. Elsewhere, the ground litter and closely spaced trees led the flames into the crowns, and trees were killed over large areas. The ground vegetation was destroyed, and the trees either fell or stood as dead, blackened snags. Today, the burn area is no longer desolate. Most of the blackened snags have fallen. Pines that survived have spread their seeds. Today there are many ponderosa five and six feet highs. The ground, once black, is now green with grass, Gambel oak, mountain mahogany, Apache plume, and chamisa. It is not yet a forest, but it is clearly on its way. Park visitors attend interpretive programs and walk the interpretive trails through

the La Mesa burn, learning what has and is happening there. They see that the forest didn't die, that it is still a dynamic, growing thing.

National Park Service Fire Management Policy

Because of studies begun in the 1950s and 1960s, the knee-jerk reaction that "fire is bad" began to yield to new knowledge of fire's ecological role and the unwanted changes its elimination was causing. Studies conducted in various ecosystems showed that in many parks fire suppression was diminishing the very values and resources that were intended to be protected.

After decades of fire suppression and the resultant buildup of fuels, reintroducing fire in the parks was like climbing off the proverbial tiger. It is being done gradually, and very carefully. Fire was reintroduced as a resource management tool in 1968 in Sequoia and Kings Canyon national parks and later instituted in many other parks. It is based on ecological information, a knowledge of fire behavior, and the attitudes and opinions of the public. Mistakes have been made, but fire is a powerful agent, and properly managed the results are beneficial.

Where vegetation capable of burning, sooner or later it is going to burn. Therefore, every park with such vegetation must have a Fire Management Plan. This plan is designed to achieve the resource management policies and purposes of each park. It is based on the protection of life, the protection of built facilities and cultural resources, and the perpetuation of the park's natural resources and their associated processes.

Prescribed Fires and Wildfires

The heart of a park Fire Management Plan is the concept that in some places and under carefully defined conditions, fire should play a role as close to its natural role in the ecosystem as is possible. Resource management goals are defined for the park, and the plan states if fire will be used to accomplish them. If so, then the plan states where, when, how much, and under what conditions it will be used. This is not a "let burn" policy. All of the elements are spelled out in a "prescription" that defines the limits within which fire will be permitted to burn. It describes the essential environmental conditions, geographic limits, management actions, and legal restrictions that apply. A prescription details such environmental parameters as temperature, humidity, wind, and fuel conditions, and it defines such NPS responsibilities as air quality, the protection of threatened and endangered species, and the preservation of historic and archeological resources.

The prescription has two applications. First, when lightning starts a fire, and if all the prescribed conditions are met, it will be permitted to burn under constant monitoring and with adequate fire suppression teams standing by. These are referred to as "prescribed natural fires." If weather conditions or the fire behavior change so that the prescription is no longer met, suppression actions are to begin immediately. Second, qualified park personnel can purposefully ignite fires when all prescribed conditions are met in order to achieve the purposes articulated in the Fire Management Plan. These are referred to as "management ignited prescribed fires." Extensive precautions are taken and fire suppression teams are ready to extinguish the fire if the prescription is exceeded in any way.

All other fires that do not meet a prescription, whether started by lightning or human action, are considered "wildfires" and are suppressed.

Today, fires in the parks are either prescribed fires that are helping to restore or preserve a particular ecosystem, or they are wildfires that are suppressed.

Conclusion

Fire is back in the parks because it is essential there. Each park was established because Americans were attracted to a natural scene. We didn't realize until recently that fires were part of the environment that caused the unplanned, patchwork landscapes that so enchanted us. We embraced the natural scene and attempted to preserve it, but we unwittingly eliminated one of its essential parts. That missing part is now being replaced.

It is not a simple matter of "nature knows best." If a park is for the preservation of a natural scene, we can't pick and choose among the natural forces and processes that will be permitted. They all work together, and they are together responsible for the incredible beauties of North America that we Americans set out to preserve in 1872. ❀

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Prometheus, Pandora, the Phoenix, Hope, and the Great Saguaro Fire

Remember Prometheus? He was the god who gave mankind fire. According to the myth, he shaped mankind. Taking some mud, he molded it into animals and man. Upon seeing his creations, he had compassion for them. Zeus had hidden fire from mankind. Prometheus, the trickster, outwitted Zeus, stole fire from Mt. Olympus, the holy place, and brought it to earth. Seeing what Prometheus had done, Zeus decided to punish him. Seething with anger, Zeus did not appreciate that once man got fire, he became strong and repudiated superstition and ignorance. Consequently, Zeus punished Prometheus for giving mankind fire by exiling him to one of the highest mountains in Greece. There, he was chained to the mountain. Because he was a god, his punishment was eternal. To add to Prometheus's misery, Zeus sent his bird, the eagle, to tear away at Prometheus's liver. But, the liver has regenerative powers, and Prometheus was able to regain his strength daily. Thus, it was not easy to destroy him. Similarly, fire with all of its destructive forces, has restorative powers. Like the powers of fire, Prometheus was eventually unchained, no thanks to Zeus, who, of course, had his reasons.

But the story is not without its complication, for Zeus *punished* mankind in general for its complicity with Prometheus by creating woman *to their confusion.* [Editor's note: *El Mitotero* is not responsible for that historically awful and unsubstantiated opinion voiced in Edith Hamilton's *Mythology*]. According to mythology, nonetheless, the first woman was named Pandora, which means "the gift of all." *A lively curiosity was her weakness* [Please see editor's note above, it's not *El Mitotero's* fault]. The gods gave Pandora a box filled with things harmful to mankind and forbade her to open it. Alas, curiosity overtook beautiful Pandora and she opened the box and out flew innumerable plagues, sorrow and mischief for mankind. In terror Pandora slammed down the lid, but it was too late. Only one good thing was found in the box amid all the evils released by Pandora: hope. Alas, it is mankind's sole comfort in misfortune. There is more to the story, but, suffice it to say, from Prometheus's travails came fire, Pandora, rebirth, and hope.

Our Greco-Romano-African mythological roots provide yet another story of the relationship between fire and hope. The resurrection story of the Phoenix, the mythological bird, reminds us that from the destructive power of fire, life is reshaped and restored. As legend has it, every 500 years the Phoenix builds a funeral nest, and then it consumes itself in a fire from which it is reborn into a new and beautiful Phoenix. The Phoenix is a symbol of rebirth and hope.

Dateline: Saguaro National Monument, Mother's Day 1994, Tucson, Arizona. A wildfire, caused by a burning truck, swept through the east unit of Saguaro National Monument, Arizona, leaving many cacti charred dark brown, with the skin of some of them hardened like wood, ready to topple. However, as Tucsonans know, saguaro can live 200 years or longer, grow 50 feet tall, and weigh a few tons - almost all in water.

What Pandora could not have known is that saguaros do not blacken like a tree, and that could be a saving grace. Hope springs eternal - because the cacti have such high moister content, they don't burn like wood. Instead, the water heats up inside the pleated, accordion-like cavities and cooks those tissues. The cacti that survived face one more threat: a hard frost this winter could be harmful to fire-stressed saguaros that could allow bacterial necrosis to rot their tissue. There is no known antidote. One lucky note for southern Arizonans is that Jack Frost rarely makes it that far south, and when he does, hard frosted nights are few and far between.

The fire at Saguaro was very serious, representing a substantial loss. It is feared that in the 600 acres that burned, there were an estimated 13,700 saguaros of all ages. A good many saguaros received burns of 40% to 50%. Most plants in the fire that were less than a meter tall are probably gone. The surviving saguaros have been tagged - about 1,000 of them, for future study. The hope, that Pandora left us with, is that the strongest and fittest of the saguaro will survive the trauma of that rare, searing fire that struck like lightning. Fortunately, too, the fire in the 67,000-acre east unit of Saguaro National Monument was isolated and contained.

Perhaps that it happened on Mother's Day, 8 May 1994, raises the hope that Mother Earth was reclaiming what is hers only to offer it again in some unknown future. Perhaps, Mother Earth will one day restore the charred desertscape near Tucson with a beautiful stand of saguaros to show mankind, once again, that land made fertile by ashes and rain can reproduce itself. Perhaps the great Saguaro fire reminds us that it is hope that keeps our dreams alive.

History and legend offer us countless other examples of hope in the face of the tragic and destructive powers of fire. Thousands of years after Prometheus, Pandora, and the Phoenix, occurred another great fire story with the promise of a happy ending. It happened on Mrs. Patrick O'Leary's property on 8 October 1871. According to legend, Mrs. O'Leary owned a cow that kicked over a lighted lantern in a barn in the southwest side of Chicago. Fanned by high winds, the flames leaped from one building to the next racing north and east throughout the city. Jumping across the Chicago River, the fire chased thousands of panic-stricken residents in that city. The fire raged for over 24 hours, killing nearly 300 people, leaving 90,000 homeless and destroying nearly $200 million worth of property. From the ashes of the Great Chicago Fire, emerged a beautiful city, graced with charm and hope. Betwixt Prometheus, Pandora, the Phoenix, and the paradox of the Great Chicago Fire, El Mitotero leaves you with one hopeful thought to ponder: Coincidence? or, not? ❀