Fire Control to Fire Management: A History of Policy and Program in the National Park and Forest Service

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FIRE CONTROL TO FIRE MANAGEMENT:
A HISTORY OF POLICY AND PROGRAM IN THE
NATIONAL PARK AND FOREST SERVICE

by
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for the degree of
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Fire is an integral part of maintaining the ecological balance of our nation's parks and forests. Scientific studies have proven that fire has long been a force in determining the ecological composition of the North American continent. Both, Native Americans and early Euroamerican settlers used fire as a multipurpose tool in the areas which encompass today's national parks and forests. However, European man's ideal of fire as an ecological evil persisted well into this century.

After the creation of the first national parks and forests, fire suppression activity in these areas began in earnest, and did not cease until it was replaced by fire management which, due in part to the Wilderness Act of 1964, allowed fire once again to play its natural role in newly created wilderness areas. This scenario is seen clearly in the fire histories of Yosemite, Sequoia, Kings Canyon and Yellowstone National Park, and Region One of the Forest Service.

The concept of fire management encountered its largest challenge following the Yellowstone fires of 1988. Fortunately, fire management objectives remained unchanged and only management guidelines for instituting programs and policies had to be revised.

Together, the history of fire suppression and fire management in the National Park and Forest Service reflect man's changing ideals and knowledge concerning the natural environment, and his ongoing attempt to preserve the ecological integrity of our nation's wilderness in an ever changing world.
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INTRODUCTION

"... Behold, how great a matter a little fire kindleth!"

James 3:5

Fire, like air and water, is an important ingredient in maintaining a healthy ecosystem in our nation's parks and forests. However, from the time Europeans first set foot on the North American continent, their idea of fire as evil has persisted until the present environmental movement. Subsequently, fire has been allowed to return to our nation's wilderness areas to play once again its natural role in determining the ecological composition of these lands.

Scientific studies regarding fire's role in the environment prove that for millions of years fire has been a force in determining the ecology of the North American continent.1 Human ignited burns have likewise been part of the environmental history of the landmass as aboriginal peoples have used fire as a multipurpose tool since their

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arrival from Asia.\(^2\) As Euroamerican settlements spread across the country, the pioneers adopted many of the Native American burning practices.\(^3\)

Once our national parks and forests were set aside from the public domain, fire suppression became the order of the day for management personnel. During the first half of the twentieth century, new policies and programs advanced the science of fire suppression. In time, suppression activity began to have a negative affect on the fauna of the nation's parks and forests. Fortunately, managers and research foresters in Yosemite, Sequoia, Kings Canyon and Yellowstone National Parks, and Region One of the Forest Service observed this trend and began incorporating prescribed natural fires and prescribed burns\(^4\) into their new management mission as put forth by the Wilderness Act.\(^5\) Fire suppression had yielded to fire management.

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\(^4\)Prescribed natural fires are "fires ignited by lightning or other natural forces (volcanoes) [which] are permitted to burn under prescribed conditions," and prescribed burns are "fires ignited by trained professionals under prescribed conditions." USDAFS, Symposium and Workshop on Wilderness Fire, foreword.

\(^5\)U.S., Statutes at Large, 78: 890-96.
Fire management activity progressed steadily until the historic 1988 fire season in the Greater Yellowstone Area. The fires raged across park and forest service land and threatened the continuation of fire management practices in both departments. After careful review of the fire policies and programs of the two agencies, fire management plans were revised to include new management criteria. Between 1990 and 1992, both services had again begun using fire as an ecological tool in compliance with their wilderness management objectives.

Together, the history of fire suppression and fire management in the National Park and Forest Service reflect man's changing ideals and knowledge concerning the natural environment, and his ongoing attempt to preserve the ecological integrity of our nation's wilderness in an ever changing world.
CHAPTER I

NATIVE AMERICANS AND FIRE

Fire, either naturally ignited or human caused, has been a key determinant in the ecological composition of vegetation on the North American continent. It is impossible to tell for certain how long fire has blazed across the present day United States. Scientists have discovered a fossil charcoal called fusian "in coal deposits dating to the Mesozoic Era which ended over 80 million years ago."¹ Study of these deposits have lead paleogeologists to believe that the fusian samples originated from forest and grass fires. It is most likely that these fires were ignited by lightning, volcanic eruptions, or "friction from falling rocks."² However, whether these fires played an important role in determining the ecological characteristics of vegetation on the continent at the time cannot be known. The earliest evidence of "fire-adapted ecosystems" scientists have discovered is from the geological record dating to the Miocene Epoch of the Tertiary Period thirteen million years ago.³ These fires, too, were started by natural phenomena. Humans did not become an additional

²Ibid.
ignition source on the North American continent until they crossed the Alaskan land bridge over 12,000 years ago.

Native American fire had a "widespread influence" on the floral species of central and western North America up to the time of European settlement around the mid- to late-1800s. Their use of fire altered many natural ecosystems and performed an important role in "opening the forests and expanding the grasslands." Since the majority of this thesis will focus on the forests of the Northwest, specifically those in Montana, this section will deal mainly with Native American fire practices in the state. However, I must also incorporate the burning habits of the Sierra Nevada tribes so that Park Service fire management policies and programs can be fully understood.

Burning Practices of Native Americans

To date there have been several historical, ethnographical, and oral history studies undertaken to surmise the most common practices in which Native Americans used fire. Thirteen such applications have been documented: improvement of hunting, forest protection (which I will

4 Arno, "Ecological Effects and Management Implications of Indian Fires," 81.

incorporate with the third objective—insect control), enhancement of certain plant species, campsite clearing, agricultural land clearing, trail clearing, communication, rituals and entertainment, warfare, sanitation, improvement of horse grazing, and unintentional fire.6

Many Indian tribes used fire for hunting. "At night torches spotlighted deer and drew fish close to canoes to be speared. Smoke flushed bees from their hives, raccoons out of their dens, and bears out their caves."7 Natives also employed a "fire-ring hunting technique." This type of fire burned toward the center of a specified area, thus forcing all the game within the fire's boundaries to be driven from the circle into the sights of waiting tribal huntsmen.8 Any broadcast burning9 that the native peoples did had a positive effect on future hunting. As the fire historian


8 Calvin Martin, "Fire and Forest Structure in the Aboriginal Eastern Forest," The Indian Historian 6 (Fall 1973): 40-41.

9 A broadcast burn is "intentional burning of debris on a designated unit of land, where the fuel has not been piled or windrowed, by allowing fire to spread freely over the entire area." John D. Walsted, Steven R. Radoevesich and David V. Sandberg, eds., Natural and Prescribed Fire in Pacific Northwest Forests (Corvallis: Oregon State University Press, 1990), 302.
Stephen Pyne noted, all Indians recognized "that new grass sprouting on a freshly burned site would attract grazers by its superior palatability . . . [Hence, they] placed snare traps on small burned plots--in effect, baiting the trap with fired grass."\(^{10}\)

Protecting the forest also meant insect control in many native communities. Large fires could cause devastating destruction to the forest if they became wild fires and burned in areas where heavy undergrowth and downed trees proliferated. For this reason some tribes ignited certain areas during the appropriate time of year (different times in assorted geographic locations) to insure that the undergrowth did not accumulate. The fires also served to prevent insect and disease epidemics.\(^{11}\) For example, in California, native tribes "used smoke to drive off the mistletoe that invaded mesquite and oak."\(^{12}\)

Many Native American hunter-gatherer tribes depended more on gathering than they did on hunting. For this reason, many tribes employed localized fire to enhance edible plant species. This type of fire was restricted to low elevation areas in which natural berries grew in abundance. Fires cleared away the excess underbrush and

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\(^{10}\)Pyne, "Indian Fires," 8.

\(^{11}\)Morris, "Wildfire as a Part of Cultural Prehistory in Montana," 83.

\(^{12}\)Pyne, "Indian Fire," 8.
allowed the berry-producing species to prosper.\textsuperscript{13}

Clearing a campsite prior to pitching a tepee and starting a fire for cooking and warmth provided a measure of safety in the native community. Other reasons for this burning were to enhance visibility and clear away pestilent insects.\textsuperscript{14}

Agricultural land clearing involved more than just burning to increase the production of edible wild plants: it also allowed for the clearing of land to cultivate domesticated plant types.\textsuperscript{15} Not only did the fire clear the land but it replaced lost soil nutrients which had been extracted by the previous season's crop. This practice was described by Lewis Henry Morgan in his journal during his expedition to the Rocky Mountains in May, June and July of 1862. Upon the arrival of the Crow Indians at the ground they planned to cultivate, they "first collect[ed] wood or sticks the size of the finger and lay[ed] it on the old garden beds and the whole is burnt over."\textsuperscript{16}

Hunter-gatherer societies depended upon trails to allow them to follow game swiftly and move from one area to the


\textsuperscript{14}Morris, "Wildfire as a Part of Cultural Prehistory in Montana," 84.

\textsuperscript{15}Pyne, "Indian Fires," 7.

next in search of edible indigenous plant species. For this purpose aboriginal peoples employed broadcast fire.¹⁷

Tribal members did communicate with smoke, but not with the elaborate signals which many believe are the product of small fires and blankets. Signal-fires were large so they could be seen for long distances. "Thus, communication fires certainly had the potential to affect forest ecosystems. However, since they were often ignited at high altitudes, signal-fires may not have consumed large acreages or burned for long periods."¹⁸

Native Americans used fire for rituals and entertainment. Spiritual cleansing to many tribes involved allowing smoke to cover the entire person and carry away any evil spirits.¹⁹ Tribes also believed that smoke from the fires would induce rain from the sky²⁰ or insure fair weather for a journey.²¹

As European expansion extended deeper and deeper into the western regions of North America, Indians used fire in warfare not only against hostile tribes, but white explorers and settlers as well. Most tribes used broadcast fire "both

¹⁷Ibid., 8.
¹⁸Barrett, "Indian Fires," 19.
¹⁹Pyne, "Indian Fires," 8.
²⁰Morris, "Wildfire as a Part of Cultural Prehistory in Montana," 85.
²¹Pyne, "Indian Fires," 8.
as a tactical weapon and as a strategic scorched-earth policy." Fire used in this fashion often proved deadly because a strong wind could drive a fire faster than an enemy might escape. Native Americans also used blazes to destroy specific objectives such as planted fields and grazing grounds. During his travels, Morgan also noted that "Indians have strict laws against firing the prairies in their hunting ranges [during hunting season] as it drives the buffalo out of their country. [But,] a hostile neighboring nation often fire the prairies for this purpose." Of course this fire could escape and destroy more than the intended target.

Sanitation may have been the least common use of fire among Native Americans. One archeologist, the only reference I located that alluded to this application of fire, "speculated that Indians burned the refuse at the base of a buffalo jump when the stench and flies became too intolerable." 

Utilization of fire to improve grazing areas for horses

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22Ibid.


24Martin, "Fire and Forest Structure," 40.

25White, Lewis Henry Morgan, 151.

26Morris, "Wildfire as a Part of Cultural Prehistory in Montana," 85.
did not begin until after the acquisition of horses around 1700. A large number of horses frequently grazing in a small expanse of land quickly depleted the natural vegetation. Burning grazing fields every three-to-five years replenished the soil with nutrients to ensure the continuance of feed.  

At times accidental or unintentional fires had widespread influence on the natural environment. At any time, fire, being employed to achieve any of the objectives above could have escaped the user, either by sparking or high wind, and cause a considerably larger blaze than intended. Camp fires and signal fires were a major cause of unintentional fires. Indians commonly used a downed tree for these purposes, and because many times they were travelling on another tribe's land, they left the tree to burn for days.  

Specific Native American tribes used burning to achieve a variety of these objectives, but not every tribe employed fire in the same fashion. Thus, the different tribal burning patterns modified many natural ecosystems in a unique manner. For the purposes of this paper, I will now examine the specific burning practices of the Indians in the Sierra Nevada and western Montana to determine their influences on the environment prior to the settlement of


28 Pyne, "Indian Fires," 7.
Native American Fire and the Sierra Nevada Mountains

Before settlement of the Sierra Nevada by Euroamericans, about 1850, fire had been widespread and frequent (on the average of two-to-eight years) in the Sierra Nevada. Many conflagrations were deliberately started by Native Americans as well as naturally by lightning. Since these fires were recurrent, they provided little opportunity for the build up of undergrowth before another fire would consume it. "As a result, the fires were light and 'friendly.'" The forty-niners who kept journals as they ventured into this area noted the landscape in which the Giant Sequoias flourished.

29The national parks of the Sierra Nevada lead the way in utilizing prescribed natural fire and prescribed burning in their fire management plans. The parks began experimenting with these types of fire in the late-1950s and began "official" use of fire according to stated wilderness management objectives in 1968. Yellowstone did not begin its fire management program until 1972. Also, Region One of the Forest Service, which constitutes the national forests in western Montana, was the first region to use prescribed natural fire in any Forest Service wilderness area. Both Park and Forest Service fire histories will be discussed in detail in later chapters.


[They] spoke almost to the man of the wide-spaced columns of mature trees that grew on the lower western slope in gigantic magnificence. The ground was a grass parkland, in springtime carpeted with flowers. Deer and bears were abundant.\textsuperscript{32}

This condition was undoubtedly a result of recurrent burning by Native Americans and unsuppressed lightning-caused fires. Let us now examine the burning habits of the tribes in the region and the scientific evidence which confirm this declaration.

In a paper read before the National Forestry Congress in 1887, Joaquin Miller, who grew up among the Indians of Yosemite Valley, related their burning practices prior to discovery by Euroamericans. He stated:

It was my fate to spend my boyhood with Indians. They were the only true foresters I ever knew. In the spring, after the leaves and grasses had served their time and the season in holding back the floods and warming and nourishing the earth, then would the old squaws begin to look above for the little dry spot of headland and sunny valley. And as fast as dry spots appeared they would be burned.

In this way the fire was always under control. In this way the fire was always the servant, \textit{never the master}. And by the time the floods came again there was another coat of grass and leaves stronger and better than the one before, because of the careful and temperate fire of the careful and wise old women. By this means the Indians always kept their forest open, pure, and fruitful and conflagrations were unknown.\textsuperscript{33}


\textsuperscript{33}Biennial Report of the Commissioners to Manage Yosemite Valley and the Mariposa Big Tree Grove, For the Years 1889-90 (Sacramento: State Printing Office, 1892), 14.
Scientific investigations support this statement. By counting the growth rings and examining the fire-scars of trees researchers can date fires centuries after they occurred. This "fire-scar" method of dating has been employed to determine the fire history of the Giant Sequoias. Using this method of dating, foresters have discovered that fires occurred at two-to-eight year intervals in the sequoia forest and the mixed-conifer forests of the area.\textsuperscript{34}

According to anthropological evidence, aboriginal settlement in the areas of the present national parks in the Sierra Nevada began about 1000 A.D.\textsuperscript{35} Anthropologists feel "that Indian burning may have occurred for roughly a thousand years in the ponderosa pine-mixed conifer forests of the California Sierra Nevada."\textsuperscript{36} It has also been determined that "a history of frequent fires extended back at least 1,100 years in an area of the California redwood forest."\textsuperscript{37}

Scientists disagree regarding the frequency of lightning- caused fire in the Sierra Nevada. One suggests that lightning fires occur at an average of one hundred per

\textsuperscript{34}Biswell, "Forest Fire in Perspective," 44.

\textsuperscript{35}Vankat, "Fire and Man," 17.

\textsuperscript{36}Arno, "Ecological Effects and Management Implications of Indian Fires," 81.

\textsuperscript{37}Ibid.
year across the range, while others assert that "lightning fires are uncommon in that [Giant Sequoia forest] area." Despite the occurrence of lightning-caused fires in the area, the fact that Native Americans used fire in the region "as an ecological tool to carefully promote their welfare while preserving that of their natural environment" must account at least partly for the clean, open, and "park-like" conditions in which the early western pioneers found the sequoia groves and mixed-conifer forests of the Sierra Nevada.

Native American Fire in Montana and the Yellowstone Region

Like the fires that burned in the Sierra Nevada prior to the settlement of Euroamericans, the state of present day Montana and Yellowstone National Park were subjected to natural and human caused conflagrations. To get an idea of the frequency and ecological effects these fires had on the environment, I will again examine the scientific evidence and augment these findings with journal entries of early explorers that describe aboriginal fire practices firsthand.

38Biswell, "Forest Fire in Perspective," 45.

39Arno, "Ecological Effects and Management Implications of Indian Fires," 81.

40Martin, "Fire and Forest Structure," 41.
Sandi Morris, a scientist who studied Indian burning habits of the northwestern plains Indians, found that one tribe or another used fire to achieve one or more of the thirteen objectives previously mentioned. She maintains that even though the study "area much exceeds the boundaries of the state of Montana, . . . it should provide information relevant to the fire uses practiced by native Americans living in Montana." 41

Another study conducted to determine the fire-use customs of Montana Indian tribes concentrated on the indigenous peoples of western Montana and northeastern Idaho. The tribes included the Flatheads, Pend d'Oreilles, Kootenais, and Salish. The study area constituted the majority of forest land in present day Region One of the United States Forest Service. Barrett found that "fires were primarily set in valley-bottom grasslands and lower-elevation forests dominated by ponderosa pine, Douglas-fir or western larch. Although relatively rare, some Indian fires occurred in high-elevation forests." 42

In an effort to determine fire history of the Bitterroot Mountains, the Mehringer study analyzed charcoal fragments found in pollen sediment samples collected from the Lost Trail Pass Bog at the head of the Bitterroot

41Morris, "Wildfire as a Part of Cultural Prehistory in Montana," 79.

Valley. The study found that

more charcoal was incorporated in the sediments during the last 2000 yr than during the preceding 9500 yr. . . [However,] the increase in charcoal is not accompanied by evidence for an equally drastic change in vegetation.43

Thus, the members of the study concluded that "perhaps changing patterns of aboriginal land-use and resource management were contributing factors" in producing the increase of charcoal fragments.44

Another study conducted by Stephen F. Arno, a Forest Service Scientist, has employed the fire-scar dating technique to assemble a fire history of the Northern Rockies. Examining the quantity, species, and size of the surviving trees, Arno made a number of conclusions about the "nature" of early fires in several study areas in the Northwest. In this area of the country, "datable" scars from numerous fires on a tree's growth rings can be read as far back as 300 years.45

For instance, using this dating method in the north Bitterroot Valley, Arno found that fire-scars dating to 1500 "seem to represent unusually short fire-free intervals for the northern Rockies" estimated by the recorded number of


44Ibid., 366.

lightning caused fires in recent history. (Lightning caused fires have occurred at longer time intervals in the last eighty years, than the average fire-free periods over century ago.) He attributed this to frequently set Indian fires in the area.\textsuperscript{46}

Arno concluded that these studies "reveal that in some forest types fire maintained many-aged open stands of seral trees. In other types, major fires caused replacement of the stands. Often, however, fires burned at variable intensities, creating a mosaic of stands differing in comparison and structure."\textsuperscript{47} Thus, this mosaic was created and maintained by natural and Native American fire.

One other study conducted in western Montana, which also employed the fire-scar dating procedure, found results analogous to Arno's. Stephen W. Barrett, also a research forester, conducted this study to determine the fire history in lower elevation (2,000 - 6,000 ft.) ponderosa pine/Douglas-fir forests of western Montana. Barrett concluded that overall, the results . . . suggested that Indian fires were very influential in modifying grasslands and lower-elevation forests in habitation zones. Lightning and Indians created a pattern of frequent, usually low-intensity ground fires, and this pattern was in effect for at least 400 years before the 1880s, perhaps as far

\textsuperscript{46}Ibid., 41-42.

\textsuperscript{47}Ibid., 40.
back as 2,000 years ago.48

The journals of early western explorers can give some idea of the ways Indians used fire in Montana. Lewis and Clark noted Native American fire habits in their exploration of the state in 1805 and 1806. As the party travelled westward through the Beaverhead Valley, Lewis made reference to the fire practices of the Indians of the area. Friday, August 23, 1805:

I . . . laid up the canoes this morning in a pond near the forks; sunk them in the water and weighted them down with stone, . . . hoping by this means to guard against both the effects of high water, and that of the fire which is frequently kindled in these plains by the natives.49

Near the Lemhi River, Clark described signal fires set by the Salish Indians. Saturday, August 31, 1805:

This day warm and Sultry, Praires or open Valies on fire in Several places-- The Countrey is Set on fire for the purpose of Collecting the different band . . .

Clark again made note of native fire use in his journal while the expedition was camped near Lolo Pass on their return voyage. Wednesday, June 25, 1806:

last evening the indians entertained us with setting the fir trees on fire. they have a great number of dry limbs near their bodies which when Set on fire create a


50Ibid., 179.
very sudden and emmence blaize from bottom to top of those tall trees. they are a beutifull object in this situation at night. this exhibition remi[n]de[d] me of a display of firewo[r]ks. the nativs told us that their object in Setting those trees on fire was to bring fair weather for our journey.51

During a voyage in 1810, Thomas James, an early western trapper, described the "park-like" conditions of the land bordering the Missouri River in the Rocky Mountains.

The cotton wood trees seemed to have been planted by the hand of a man on the bank of the river to shade our way, and the pines and cedars waved their tall, majestic heads along the base and on the sides of the mountains. The whole landscape was that of the most splendid English Park.52

James did not attribute these conditions to Indian burning, but either natural or human-ignited fires must have occurred frequently to have created the above landscape.

In 1851 the artist Rudolph Kurz wrote, after an adventure on the Missouri River, that

the only service the Indians render for the benefit of the [buffalo] herds is to burn the dried grass every spring in order that the young crop will be more abundant.53

51 Gary E. Moulton, ed., The Journals of the Lewis and Clark Expedition, Volume 8, June 10-September 26, 1806 (Lincoln: University of Nebraska Press, 1993), 50.


53 J,N.B. Hewitt, ed., The Journal of Rudolph Friederich Kurz—Life and Work of a Swiss Artist, trans. Myrtis Jarrell (Fairfield, Washington: Ye Galleon Press, 1969), 229. It is not known where along the Missouri Kurz viewed this practice, but it is safe to say that tribes of Native Americans which inhabited the stretches of the river (including the portion in Montana) would have shared common burning practices in regards to buffalo hunting.
By these accounts and the scientific evidence formerly presented, it is clear that the burning tendencies of the Native Americans tribes which inhabited Montana and the Northwest worked in concert with natural phenomena to produce the floral patterns which early Euroamericans discovered upon their exploration and settlement of the state and region.

Like the Sierra Nevada and the Montana territory, the Yellowstone region was also subject to aboriginal fire. As Alston Chase related, "recent research has established that the Indian practice of burning around Yellowstone was not only widespread, but had been practiced for millennia." Firsthand accounts relate some of the Native American's burning practices in the area.

In August 1834, while camping along the banks of the Madison River in Yellowstone, Osborne Russell and his trapping party were attacked by a band of Blackfeet Indians. Russell wrote in his journal that the party

lay almost silently about 3 hours when finding they could not arouse us to action by their long shots they commenced setting fire to the dry grass and rubbish with which we were surrounded: the wind blowing brisk from the South in a few moments the fire was converted into one circle of flame and smoke which united over our heads.\(^{55}\)


During the Washburn Expedition to Yellowstone in 1870, the party did mention "plenty of Indian 'signs,'" but it did not report any specific references to indigenous burning practices. However, "from the head of a coulee," the expedition travelled "through fallen timber" which covered "a burnt and rocky road." It seems probable, from past information, that the native peoples of the area set fire to the trail to ease transportation through the area.

Even as late as 1886 the Acting Superintendent of the park, D.W. Wear, reported that "a group of Lemhi Indians (a Shoshone tribe), set two fires in the western part of the park." There is no reason given for these fires which could have been set for any number of objectives.

As the above information demonstrates, Native Americans in Montana and the Yellowstone region utilized fire for many reasons. Regardless of the intended purposes of these fires, together they functioned as a determining factor in producing the landscape of the territory as first viewed by Euroamericans.

Implications for Federal Fire Policy

56 Nathaniel P. Langford, Diary of the Washburn Expedition to the Yellowstone and Firehole Rivers in the Year 1870 (N.p.: Nathaniel Pitt Langford, 1905), 14-15.
57 Chase, Playing God in Yellowstone, 96.
As evidenced by the preceding information, aboriginal fires had a widespread influence on the vegetation of the Sierra Nevada and the northwest United States. Their use of fire opened up the forests and expanded the grasslands. Regardless of whether or not fires were started purposefully or not; together, natural and Native American fire created and maintained a healthy and different forest ecosystem.

The history of the Park and Forest Service, in the context of fire, can be viewed as a battle between humans and nature. After eighty years of fire suppression in the Park Service and over sixty years in the Forest Service, fire managers are now striving to return wilderness areas under their control back to the "natural" condition, or at least the conditions as viewed by the first Euroamericans. With the changing attitudes regarding fire and the environment, Stephen Pyne wrote that:

As a child of nature, the American Indian could not have deliberately damaged his environment, and by mid-century fire was generally considered an environmental evil. In more contemporary times, when prescribed fire has again been accepted as an appropriate tool in the management of natural systems, it has been discovered that, indeed, the Indians burned.  

Together, natural fire and Indian land-use practices created a landscape which was more "park-like" and biotically diverse than that which resulted from Euroamerican fire use and suppression. Thus, it is important for fire managers to understand the fire histories

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Pyne, Fire in America, 81.
of their respective forests so they may employ fire in wilderness to recreate, what we Americans today long for, a romantic "vignette of primitive America."
CHAPTER II

FIRE POLICY AND PROGRAM IN THE PARK SERVICE

Today, the symbol of Smokey the Bear as protector of our nation's parks and forests is well known. Since 1945, thanks to the National Cooperative Fire Prevention Program, Smokey has stood at the entrances to our national parks as if to say, "keep fire out of these beautiful areas, it will destroy the natural splendor." This is a cultural message because in reality fire is an important component in the ecological balance of the environment.

Before the Euroamericans entered the terrain the national parks currently occupy, fire had long played a role in shaping the landscape. Like the Indians, early American settlers and pioneers utilized fire to clear the land for raising crops and livestock.1 Before the creation of the first national park, Yellowstone in 1872, fire had earned a reputation as an awesome destructive force, one that needed to be controlled and contained in any way possible. The only beneficial use of fire was believed to be for expansion, clearing land, or capitalistic purposes, insuring healthy trees for harvest and fertilizer for new pasture. This idea was instinctively carried over to the administrative policies of the national parks in the late

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1This idea is superbly documented intermittently throughout Pyne, Fire in America.
nineteenth century. In 1886 the U.S. Cavalry took over administration of Yellowstone National Park from its appointed civilian supervisor. The Cavalry would manage the national parks (Yellowstone, Yosemite, Sequoia, and General Grant, later to be included in Kings Canyon in 1940) until the newly created National Park Service, formed in 1916, began operating in 1918. The Park Service continued a policy of fire suppression until 1968. In 1963 the Leopold Report was published recommending that national parks should "represent a vignette of primitive America." This meant the restoration of fire to the ecological activity in the parks. Prescribed natural fire (PNF), and prescribed burns (PB) would enable park superintendents to meet the managerial directives stated in the Wilderness Recommendations of each park. Some of the first parks to incorporate PNF into their management plans were Yosemite, Sequoia, and Kings Canyon in 1968 (Grand Teton and Wind Cave National Parks are the other parks which incorporated PNF in 1968). Yellowstone followed suit in 1972. Fire history

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in these four parks will be the focus of this chapter.⁶

Pre-1890 Euroamerican Fire in the Sierra Nevada and Yellowstone

Like Native Americans, early Euroamerican settlers in the West also utilized human ignited fire in areas which would subsequently become national parks. With the forced removal of Native Americans from the Sierra Nevada, it became a summer grazing ground for livestock raised by pioneers. The first "ranchers" were of Spanish ancestry and came from Mexico. The Spanish brought with them "their cattle and sheep, their horses and mules, and with them brought their camp followers, the weedy plants that had followed them halfway around the world."⁷ Their range management techniques devastated the countryside. The needle grasses, wild rye, June grass, bluegrass and poppies perished. These native species were replaced by Mediterranean plants such as foxtail, Medusa's head, poverty


⁶Due to the enormous size of the Yellowstone fires of 1988, the number of agencies brought together to fight the fire, and the many national implications concerning fire in wilderness which resulted from the blaze, I will deal separately with the Yellowstone burn in Chapter IV.

grass, tarweed, and thistle. The grazing animals left the range dry and barren causing extreme erosion every time heavy rains fell.8

However ecologically devastating the practice of grazing sheep and cattle by the Spanish in California proved to be, "herders also commonly set fires when driving livestock out of the mountains in the fall of the year." These fires continued to keep the proliferation of undergrowth modest and promote the growth of new grass for grazing in the spring.9 Farmers also used fire to clear valleys for agriculture, and timber owners embraced it as a means of reducing fuel levels among mature timber stands.10

Euroamerican-ignited fires were not as prevalent in the Yellowstone region due to the fact that the environment was not an ideal locale for human habitation or frequent fire. The elevations in the park range from 5,000 to over 11,000 feet, the average temperature at the center of the park is only 55.2 degrees Fahrenheit in July and for January it is 10.7 degrees Fahrenheit. Thus, "the climate in Yellowstone Park is characterized by long, cold winters; short, cool summers; and a resultant short growing season."11 However,

8Ibid., 59-71.
11Robert E. Sellers and Don G. Despain, "Fire Management in Yellowstone National Park," Tall Timbers Fire Ecology Conference Proceedings in Missoula, MT, October 8-10, 1974,
mountain men inevitably used fire, as the Indians did, in the hunting of game.

With the contemporary recognition of Native American and lightning fires, it is obvious that the burning done by the farmers and herders was "an extension of the practice of the Indians. Indeed, the two cultures burned for much the same reasons—to favor certain plant species and to open the forests."12

The noted naturalist John Muir wrote in 1878 that "fire, the great destroyer of Sequoia, also furnishes bare, virgin ground, one of the conditions essential for its growth from seed."13 Muir recognized the regenerative power of fire in the forest, but at the same time he labeled fire as a destructive force. The two sides of the "suppress all fires" v. "let it burn" debate had been drawn. It would take scientists and park officials ninety years to allow fire once again to play its natural role in the national parks.

The Cavalry and the National Parks

no. 14 (Tallahassee: TTRS, 1975), 99-100.

12 Vankat, "Fire and Man," 21.

Yosemite was ceded to the state of California by the federal government in 1864 as a state park. In 1872, Yellowstone became the first national park. Following Yellowstone, Yosemite, Sequoia and General Grant were added to the National Park System in 1890.

Prior to 1886, the national parks were administered by civilian appointees. There was no concrete policy pertaining to fire management. At the turn of the century biological sciences were not fully developed. Scientists did not pay much, if any, attention to the continual cause and effect relationships acting themselves out in the natural world. Instead, researchers were more concerned with cataloging data in field manuals. Thus, the only people to understand fire's relationship to the "tall trees" were the local Native Americans.\textsuperscript{14}

In 1884, a Special House Committee, charged with investigating the affairs of Yellowstone, agreed that "the most important duty of the 'superintendent and assistants in the Park is to protect the forests from fire and ax.'\textsuperscript{15}

At the time, any destructive force in the park, be it nature or human induced, was considered an environmental evil. Thus, when the U.S. Cavalry assumed control of Yellowstone


in 1886, a near hundred year legacy of fire suppression was begun. Administration of Yellowstone, Yosemite, General Grant, and Sequoia National Parks would be the Cavalry's duty until 1918. The Cavalry operated under the "policy of suppressing all fires in all parks... Unfortunately, this was based on the idea that all fires are an unnatural process in the forests."\(^{16}\) One of the first duties undertaken by Captain Moses Harris, the first military superintendent of Yellowstone, was to extinguish the fires that were currently burning in the park upon his arrival.\(^{17}\)

In 1894, the then Acting Superintendent of the park, George S. Anderson, found that with an ever-increasing number of visitors, it was paramount to augment the number of fire patrols "to protect the forest from destruction."\(^{18}\)

Not all of the U.S. Calvary officers believed in a policy of suppressing every fire. This is primarily notable in Yosemite National Park. Captain G.H.G. Gale reported to the Secretary of the Interior in 1894 that "examination of this subject leads me to believe that the absolute prevention of fires in these mountains will eventually lead to a disastrous result." Seasonal fires remove the buildup of fallen trees and seedlings from the forest floor.

\(^{16}\)Agee, "Fire Management," 80.

\(^{17}\)Hampton, \textit{U.S. Cavalry}, 83.

\(^{18}\)Ibid., 107.
preparing "the ground... for next years growth."19 (A light fire would not harm the giant sequoias because they were protected by an "asbestos-like bark." Only severe fires, those resulting from a buildup of ground fuels, would seriously affect the trees.)20 Subsequent acting superintendents noted the necessity of fire for the well-being of the groves. These opinions were based on fires that had been suppressed but, before suppression was complete, enough acreage was thoroughly burned to permit the acreage to return to a "park like" condition. The acting superintendents also noticed that fire did not have an adverse effect on the sequoias. However, like the report written by Gale, their recommendations fell on deaf ears.

In 1904, a small area of General Grant National Park was intentionally burned to remove the "coniferous rubbish" accumulating on the forest floor. This is believed to be the earliest mention of this type of use of fire by park management, and it would be the last mention of "prescribed burning" in the Sierra Nevada parks for sixty odd years.21

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On August 25, 1916 President Woodrow Wilson affixed his signature to the National Park Service Act. The act rested upon the idea that the service's "... purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for future generations." This left the Park Service with a two fold mission, preservation and enjoyment. The act mentioned nothing regarding alteration of the environment, which was exactly what occurs when fire is kept out of the ecological activity of a wilderness area.

Initial fire control expertise in the Park Service came from "forestry and the Forest Service." Foresters brought with them their beliefs about fire. In 1905 the USDAFS published Use of the National Forests. According to the Use Book as it is commonly referred to, "fire was to be prevented as much as possible or extinguished as soon as it was discovered." The foresters saw fire as harmful to the forest because it ruined the value of the harvestable timber.

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23 Pyne, Fire in America, 296.

24 Agee, "Fire Management," 80. I will discuss the Use Book further in Chapter IV which deals exclusively with the Forest Service.
crop. Once in the employ of the Park Service, they continued to perceive fire as an adverse condition affecting the economic well-being of the parks. Scorched areas were unsightly and took away from the aesthetic value of the park; burns were not something visitors paid money to see. This idea was propagated throughout the Park Service by the superintendents.

Funds were not appropriated by Congress until 1928 for general fire suppression in the parks. The amount allocated to the Park Service was $10,000. Previously, Congress had made separate appropriations for specific parks. The new funds were used for "personnel training, equipment, and operation; [which] led to the development of an effective fire suppression program by 1930."26

As more and more people began using the national parks for recreation, fire became the number one enemy of the Park Service. Burned acreage and fire were labeled as ghastly. In 1929, Curtis K. Skinner wrote that "fire is today, without a doubt, the greatest threat against the perpetual scenic wealth of our largest National Parks, which, bereft of their trees and foliage, would become the haunts only of

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26Vankat, "Fire and Man," 23.
those interested in the study of desolation."

In 1935 the USDA Forest Service adopted the "10 A.M." policy. It stated that a fire was to be controlled by 10 A.M. the morning following the report. Suppression tactics were to continue for a twenty-four hour cycle until the fire was put out. This became unofficial policy in the National Park Service until 1968 as evidenced below.

Part of the 1938 National Park Service Manual of the Branch of Forestry objectives were:

To safeguard park visitors, forests, buildings, and property of every character against destruction or injury from fire. [emphasis added]

To make the park fire protection organizations the best trained and equipped and most efficient forest fire protection organizations in the Nation, because of the high scenic and recreational values at stake.

The manual was even more specific as to why forest fires are a menace to life, property, and scenic values. As stated in section B, (1).

Fires within national parks and monuments constitute the greatest menace to the enjoyment of the areas since they not only threaten... the beauty of the parks and monuments but may destroy valuable property, including historic objects of priceless value, and wildlife... This is true whether the fire originates from human carelessness or from natural causes such as lightning. The national parks and monuments preserve remnants of the finest virgin forests known to man, which have been

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28 Evan W. Kelly, "Fire Control Truck Trails and Game Management," unpublished (1926), 1-2, USDAFS Region One, Fire files, box 6100. I will examine of the 10 A.M. Policy will in more detail in Chapter IV.
set aside in order that future generations, as well as the present, may visualize and enjoy the magnificence of these virgin stands.

Therefore, although it is essential to maintain the national parks in their natural conditions so far as use and safety will permit, there can be no compromise with fire, and the Service has established the rule that every fire shall be reached and extinguished as quickly as possible, whether originating in a developed section or in a wilderness area. *Fire suppression, therefore, takes precedence over all other park activities* except the saving or safeguarding of human life.\(^{29}\) [emphasis added]

With allocated money, trained personnel, and state of the art fire fighting equipment, the Park Service was determined to keep fire out of its borders.

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**Experimentation with PNF and PB**

The policy expressed above would not be directly challenged until the Leopold Report was published in 1963. However, in the early 1950s, "experimental" controlled burning was taking place in Everglades National Park. In 1951 Dr. William Robertson, a research biologist, began to study the role fire performs in sustaining subclimax pine forests. "This was followed in 1958 by experimental research into prescribed burning as means of controlling tropical hardwood invasion of such pine forests."

Prescribed burning continued in "low-key" form until a more

"intensive" program was begun in 1972.30

Between 1951 and 1966 two separate but parallel experimental studies concerning prescribed burning were being carried out in and around the vicinity of Sequoia and Kings Canyon National Parks. In 1951 Dr. Harold H. Biswell, professor of range management at University of California, Berkeley, began a study to illustrate that prescribed burning could be used as a fire-hazard reduction tool on the Teaford Forest in the central Sierra Nevada.31 Dr. R. J. Hartesveldt, Sna Jose State University, began a study in 1964 to prove that the "regeneration of sequoias is greatly reduced or prevented in groves approaching the climax stage of plant succession in the absence of disturbance factors" (i.e. fire). Both of these studies were "encouraged" and financed by the National Park Service.32 Both scholars proved their hypotheses. Prescribed burning was found to be useful in removing long-time accumulations of fuel, and fire does, indeed, foster regeneration of sequoias approaching the climax stage.

With the findings of these studies and the publication of the Leopold Report, it was evident that prescribed burning could be used as a fire-hazard reduction tool. However, the Southeast was far ahead of the rest of the country in recognizing the serious consequences of removing the fire process from pine forests.

30 Bruce M. Kilgore, "Fire Management," 47-48. Although it is not the focus of this paper, it should be noted that the Southeast was far ahead of the rest of the country in recognizing the serious consequences of removing the fire process from pine forests.


32 Hartesveldt and Harvey, "Sequoia Regeneration," 66.
burning, or rather the contemporary policy of PNF, was not far from being implemented into the fire management programs of the aforementioned parks. Yellowstone possessed the needed physical size and climatic characteristics, and the parks in the Sierra Nevada contained the desired floral species (most notably the sequoia) and the geological formations (large outcrops of granite rock which would limit fire spread), which are ideal for PNF programs.

Incentives for the Application of PNF in the National Parks

The Leopold Report is without a doubt the main catalyst behind the National Park Service adopting a PNF policy and program as part of its managerial objectives. The report, published in 1963, states that

As the primary goal [of the national parks], we recommend that the biotic association within each park be maintained, or where necessary recreated, as nearly as possible in the condition that prevailed when the area was first visited by the white man. A national park should represent a vignette of primitive America.\(^{33}\)

In contrast to the "park-like" conditions the forty-niners first saw in the Sierra Nevada, the report noted that

Today much of the west slope is a dog-hair thicket of young pines, white fir, incense cedar, and mature brush--a direct function of overprotection of natural ground fires. Within the four national parks--Lassen,

Yosemite, Sequoia, Kings Canyon—the thickets are even more impenetrable than anywhere else. Not only is this accumulation of fuel dangerous to the giant sequoias and other mature trees but animal life is meager, wildflowers are sparse, and to some at least the vegetative tangle is depressing, not uplifting. Is it possible that the primitive open forest could be restored, at least on a local scale? And if so, how?34

To accomplish this and to return the parks to a primitive state was to allow natural forces to "manipulate vegetation." According to the report, "the controlled use of fire is the most 'natural' and much the cheapest and easiest to apply."35 Of course the ever present problem of an abnormal amount of undergrowth on the forest floor would have to be removed. But "once this fuel is reduced, periodic burning can be conducted safely. . . . "36

In order for national parks to represent a "vignette of primitive America," they would have to be managed as inclusive ecosystems. It is clear as many scholars have pointed out (specifically, Alston Chase, Playing God in Yellowstone) that it is impossible for any national park, and for that matter any national forest, to be managed in such a way. The Robbins Report, issued by the National Academy of Sciences, addresses this point. It states that "no national park is large enough or adequately isolated to be, in fact, a self-regulatory unit. . . . " Further,

34Ibid., 33.
36Ibid.
"according to this point of view... controlled burning [is a] necessary function of management if a park is to survive in anything like the condition which meets the purpose for which it was established."  

The Wilderness Act of 1964 was another document to favor restoring fire to the national parks. To reemphasize the growing popular concept of the time of "natural" management of the parks, the act stated that federally designated areas "shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for... the preservation of their wilderness character."  

According to Section 4 (b) the act charged that each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character.  

Management practices concerning the preservation of wilderness areas, according to the act, would be left up to each managing agency respectively, be it the Park Service or

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38 U.S., Statutes at Large, 78: 890-96.

39 Ibid.
the Forest Service. If wilderness should be an area that is "untrammeled by man," none of man's activities must be visible on the land including suppression tactics used to control fire. Hence, fire, a natural force, must be allowed to burn in wilderness if natural forces are the sole agents allowed free and unrestricted activity in such an area.

Publication of these reports, which the then Secretary of the Interior, Stewart Udall, requested, were too provocative to dismiss. The born-again environmental movement, in many ways spurred by Rachel Carson's book, *Silent Spring* (1962) and the Wilderness Act, wanted the parks to be returned to the proposed policy of "natural" management. Fire was part of this concept, and it would only be four years before fire was "officially" restored to the parks in the Sierra Nevada.


Fire management practices, in the 1960s and today, are not covered by explicit Congressional Acts. However, Congress does give direction in the formulation of administrative policies for natural, recreation, and historic areas. It "establishes... broad objectives for park management, and administrative policies prescribe guidelines within those objectives for day-to-day
management" of the above areas.\textsuperscript{40} In September of 1967 the National Park Service reversed its policy of suppression in favor PNF and PB. The new policy stated that

The presence or absence of fire within a given habitat is recognized as one of the ecological factors contributing to the perpetuation of plants and animals native to the habitat.

Fire in vegetation resulting from natural causes are recognized as natural phenomena and may be allowed to run their course when such burning can be contained within predetermined fire management units and when such burning will contribute to the accomplishment of approved vegetation and/or wildlife management objectives.

Prescribed burning to achieve approved vegetation and/or wildlife management objectives may be employed as a substitute for natural fire.\textsuperscript{41}

Fire suppression, according to these guidelines, is still recognized as an integral part of fire management if the fire does not meet fire management objectives for PNF. The 1967 objectives would change little in twenty-six years.

Sequoia and Kings Canyon National Parks became the early leaders in allowing PNF "officially" to run its course on Park Service land. In 1968, after a short period of post-1967 experimentation, the Superintendent of the two parks, John McLaughlin, initiated a three phase fire program

\textsuperscript{40}Agee, "Fire Management," 81-82.

that allowed: "(1) natural fires to burn in higher elevation zones; (2) prescribed burning in middle elevation sequoia mixed conifer forests; and (3) continued suppression in lower elevation and developed areas." This policy was mirrored in Yosemite. As more natural fires were permitted to burn, research scientists were able to gather more information concerning fire regime history, and subsequently the "Fire Management Zone," in which PNF and PB could burn, was enlarged to include more and more acreage.

Yosemite fire managers understood clearly the importance of allowing fire to burn in the park. The Fire Management Policy, written in 1977, stated:

The presence or absence of natural fire within a given habitat is recognized as one of the ecological factors contributing to the perpetuation of plants and animals to that native habitat.

Prescribed burning to achieve approved vegetation and/or wildlife management objectives may be employed as a substitute for natural fire.

By 1981, after thirteen years, Yosemite, Sequoia, and Kings Canyon let 447 lightning ignited fires, and 149 manager ignited fires burn 79,283 acres. This number of fires, and the expanse burned, is second only to Everglades National Park.

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43 "Forest Fire Control," 1977, 1, File Y14, USDI, Yosemite National Park Archives, California.
Yellowstone was a prime candidate for a PNF program due to its climate and size. In 1972 the park began to operate with PNF as part of its fire management plan. (This was the year that the Second World Conference on National Parks was held at Yellowstone, and the same year that the park celebrated its one hundredth birthday.) But Yellowstone's fire management plan permitted only lightning-caused ignitions to burn within park boundaries. There were no manager-ignited fires. The park designated an area of some 340,784 acres as a "natural fire zone." The new policy was based on the following criteria: "(1) The area should be managed as wilderness; (2) Natural fires occurring in the areas must not pose an immediate threat to primary visitor use areas such as Old Faithful; (3) Human life must not be endangered under any circumstances; (4) Lands under the management of other agencies must be protected." Hence, all man- or lightning-caused fires threatening any


45Yellowstone's geological composition and environmental characteristics are examined in detail in Chapter IV.


47Sellers and Despain, "Fire Management in YNP," 102. National Park Service's PNF policies do not differentiate between wilderness and nonwilderness lands as is done in the Forest Service. All natural park lands are managed to "perpetuate natural ecosystems," with the exception of developed areas. The fourth component of this management criteria would not be carried out in 1988.
development would be suppressed. Only seventeen fires, which consumed a total of 2 acres, burned during the fire season (summer-early fall) of 1972.\textsuperscript{48}

In 1976 fire managers in Yellowstone rewrote the fire plan. Included in the plan, the managers cited ecological reasons for allowing fire to burn freely in the park. The plan stated that exclusion of fire in the park had "undesirable effects" such as:

(1) Unnatural plant succession, with reduced wildlife habitats; (2) Unnatural accumulations of fuels and reduced seed germination; (3) Unnatural dense understory of fire susceptible species.\textsuperscript{49}

Park scientists hoped to reverse this environmental wrong and thus, the area in which lightning ignited fires were permitted to burn was increased to 1,700,000 acres. This included all portions of the park being managed as wilderness.\textsuperscript{50}

Between 1972 and 1981, 114 fires ran their natural course in Yellowstone burning a total of only 33,000 acres.\textsuperscript{51} This is considerably less acreage burned than that


\textsuperscript{50}Despain and Sellers, "Natural Fire," 20.

\textsuperscript{51}Bruce M. Kilgore, "Fire Management Programs in National Parks and Wilderness," 72. As will be evidenced Chapter IV, Yellowstone's climate and geological composition does not provide the necessary natural elements for an active PNF or PB program.
in the Sierra Nevada parks, which authorized not only natural fires, but manager ignited fires as well. Since "Yellowstone has the largest natural fire zone [this is still true today] of any park or forest unit in the nation, the natural park staff [felt] fairly confident that most fires would not impact other agency lands." As we shall see, the fires of 1988 that started inside the park would, before ceasing, extend far outside the park's boundaries onto Forest Service land.

NPS-18

As park management objectives changed to blend with national policy (that employed by the FS, BLM, BIA, and FWS), the National Park Service expanded on its policy concerning fire. The result was a service-wide manual called Fire Management Guidelines, better known as NPS-18. NPS-18 was first released in 1968 and has been updated every few years. (There is no specific interval for the renewal of these guidelines.) It contained the first complete instructions for park fire programs. NPS-18 "instructed

52 More than 90 percent of the natural fires in Yellowstone and the Sierra Nevada regions burn out in less than a quarter of an acre. Bruce M. Kilgore, "Restoring Fire to National Park Wilderness," American Forester 81 (March 1975): 16-17.

53 Ibid.
superintendents to build a program commensurate to the needs of the park and provided a detailed policy that was to give all levels of management a consistent point of reference for fire management." The there was little communication between Park Service personnel as to how each individual park was administering its fire management program. Since NPS-18 left fire management policy and program formulation up to individual park personnel, the Sierra Nevada parks and Yellowstone saw little reason to alter their programs since they believed their policies and programs to be "commensurate to the needs of the park."

Agency-wide concerns were more directed toward using fire as an ecological tool. The service recognized that fire, as a "natural phenomena[,] . . . must be permitted to continue to influence the ecosystem if truly natural systems are to be perpetuated." It gave little concern to individual fire management policies and programs.

The last NPS-18 guidelines to be published prior to the Yellowstone fires of '88 were drafted in 1986. The manual specifically stated that PNF, "fires ignited by natural means (commonly lightning), may be allowed to burn naturally

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54David A. Butts, "Fire Policies and Programs of the National Park System," in Symposium and Workshop on Wilderness Fire, 44. The 1978b version of NPS-18 was cited in the article.

if properly planned and monitored. The plan [must] include an approved fire management plan that designates fire management units [number of acres] and the stated conditions when and where the fire may be allowed to burn unimpeded by suppression efforts." \(^{56}\)

Yellowstone fire management personnel did not follow this directive. The 1986 fire management plan was not approved by appropriate Yellowstone and National Park Service personnel, nor did it include burn prescriptions (predetermined weather and fuel conditions during which managers allow fire to burn) for the designated fire management units. \(^{57}\) In ecological terms, would approval of "paper prescriptions" have affected the size and intensity of the fires of 1988? This is just one of the areas of controversy surrounding the historic Yellowstone blaze.

Before one can fully comprehend the cause of the Yellowstone fire and the subsequent implications stemming


\(^{57}\)Information derived from an interview with Ronald H. Wakimoto, 5 and 8 May 1993. Wakimoto is a professor of forestry at the University of Montana and Stephen J. Pyne, *Wildland Fire Management Plan for Yellowstone National Park*, unpublished, 2 August 1985. Copy in possession of the author. It should be noted that Pyne’s plan proposed a means by which to formalize the decision process for allowing PNF, but it did not contain fire prescriptions—Yellowstone would not allow any to be written in. Pyne’s plan was not adopted by Yellowstone. I should also note that I have been unable to examine a copy of the 1986 fire plan, as none are available. I enquired about examining a copy during a visit, but found that there are no copies in Yellowstone’s library or the fire cache.
from post-fire investigations regarding federal agency fire management guidelines, it is imperative to have an understanding of the history of the Forest Service. Forest Service policies and programs did not always parallel the Park Service's, and during the 1988 fire season the discrepancies came to the forefront.
CHAPTER III

FIRE POLICY AND PROGRAM IN THE FOREST SERVICE

During the eighty-seven year history of the Forest Service, fire has evolved, as it did in the Park Service, from an environmental tragedy to an integral part in the creation and maintenance of a healthy forest ecosystem. In the late 1960s fire was no longer depicted as the villain of the forest. At this time, resource managers began adopt the concept of fire management which dictated that fire be allowed to play its natural role in wilderness. Use of PNF allowed fire once again to roam freely across certain tracts of our national forests.

In 1972, Region One of the Forest Service, the northern Rocky Mountains, designated the White Cap Fire Management Area in the Selway-Bitterroot Wilderness as the first area in which a PNF would be permitted to burn on Forest Service land.\(^1\) Natural fire, even if it must stay within prescription guidelines,\(^2\) had once again returned to our

\(^1\)Kilgore, "Fire Management Programs in National Parks and Wilderness," 73. Between 1972-1978, approval for PNF on Forest Service land had to come from the Chief of the Forest Service.

\(^2\)Simply stated, "written prescriptions--spell out conditions under which fire may be allowed to burn." Conditions are such things as the maximum allowable perimeters and blaze intensities for each individual fire. Tom Kovalicky, "Wilderness Fire Management Plan," in Symposium and Workshop on Wilderness Fire, 137.
national forests.

The history of Forest Service fire policy is a detailed account that demonstrates humanity's ever changing attitude toward the land and the peculiar American need to preserve the natural -- wilderness. Today, using historical hindsight, an environmentalist would realize that the fire suppression tactics exercised by early rangers interfered with nature's course; however, the giant leaps that have been made since the 1960s prove that Americans, through ecologically enlightened management principles, are attempting to correct their past mistakes by allowing fire in wilderness to manage itself.

The Founding Years: 1876-1910

Formation of the Forest Service took place over three decades. On August 15, 1876 a rider to an appropriations act which called for a man of "approved attainments" to study "... the annual amount of consumption, importation, and exportation of timber and other forests products, the probable supply of future wants, the best means adapted to their preservation and renewal, ... [and measures] ... for the preservation and restoration or planting of forests ..." was signed into law. Dr. Franklin Hough, "a

physician and naturalist," received $2,000 to conduct the examination. The appointment was termed by one historian as "a modest beginning, for both the Forest Service and professional forestry" in the United States.\(^4\)

In 1880, the Secretary of Agriculture created the Division of Forestry which Congress authorized in an appropriations act approved June 30, 1886.\(^5\) Bernard Fernow assumed control of the division in the same year. Under his auspices the "foundations of professional forestry" were laid, including the application of scientific research.\(^6\) In 1898 Gifford Pinchot succeeded Fernow as head of the Division of Forestry which became the Bureau of Forestry in 1901. Four years later the administration of the forest reserves, which were created by the Forest Reserve Act of 1891,\(^7\) was transferred from the Department of the Interior to the Department of Agriculture.\(^8\) The same year, 1905, Pinchot changed the name once more to the Forest Service.\(^9\)


\(^6\)Robinson, \textit{The Forest Service}, 5.


\(^8\)U.S., \textit{Statutes at Large}, 33 (1905): 628. This statute is commonly referred to as the Transfer Act.

\(^9\)A detailed history of the Forest Service's early years is provided by Robinson in \textit{The Forest Service}, 1-16.
Pinchot wanted to professionalize the service with a corps of expert foresters. As a conservationist, he believed in using the nation's natural resources in a responsible manner for human development. To Pinchot "silviculture and economics were the fundamentals of forestry, and [he], demanding that the national forests be conducted as a public utility, told the nation that the forests would, like any other business, become a paying proposition." He advocated the more modern concept of "sustained yield," which "simply means a yield of forest products that can be sustained in perpetuity." Pinchot visualized the forests as a farmer views a field of corn--each are crops. Like any farmer with an economic mind, Pinchot wanted to protect the forests from any and all dangers. Fire in the forest was Pinchot's nightmare. In his efforts to standardize the rules and regulations of the Forest Service, Pinchot wrote the first official manual for forest rangers in 1905 entitled, The Use of the National Forest Reserves: Regulations and Instructions. In the book

10Pyne, Fire in America, 264.

11Robinson, The Forest Service, 64.

12Preservationists, those who advocate the perpetuation of "virgin" areas, did not let Pinchot's viewpoints go unchallenged. The most popular of the so called preservationist v. conservationist debates, between John Muir and Pinchot regarding Hetch Hetchy, is examined superbly in Roderich Nash, Wilderness in the American Mind, 3rd ed. (New Haven: Yale University Press, 1982), 161-181.
he stated that, "officers of the Forest Service, especially forest rangers, have no more important duty than protecting the reserves from forest fires." With the publication of the Use Book, the duties of the Forest Service and the ranger were clear: fire control had top priority.

A Year that Sparked Action: 1910 and Its Implications

Undoubtedly, the fires of 1910, which burned an estimated 1 million acres in Washington and Oregon and an estimated 3 million acres of Montana and Idaho, were the most widely known fire events in the Northwest prior to the 1988 fire in the Greater Yellowstone Ecosystem. The fires in Montana and Idaho burned mainly within the boundaries that constitute present day Region One of the Forest Service. Slightly over half of the fires of 1910 can be attributed to locomotives or hoboes who travelled the rails since 56 percent of the total fires occurred within [railroad] right-

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13 USDAFS, The Use of the National Forest Preserves: Regulations and Instructions (n.p., 1905), 65. This publication is commonly referred to as the Use Book.

14 Pyne, Fire in America, 243. Pyne also notes that large fires in California, South Dakota (Black Hills), Nebraska (Sand Hills), and Minnesota (Baudette fire) also burned in the 1910 fire season.

15A map of Region One is located at the end of the text.
of-ways." A few of the fires resulted from land clearing and campfires. However, most of the damage from the fires resulted from a scant 15 percent of the fires -- all of them started in remote locations and virtually all ignited by lightning." In all, "eighty-five lives were lost besides the destruction of several towns, mines, ranches and livestock, and millions of acres of forest land left a blackened waste." As Elers Koch, a forester from 1903-1942, stated, the fire "was a complete defeat for the newly organized Forest Service forces..." No matter how these fires started they prompted sixty-five years of intense fire suppression by the Forest Service.

Due to the destruction of private land holdings and the large loss of life during and after the 1910 fire events, "the focus shifted from the fire to the men who sought to contain it; the behavior of the fire fighters and of fire organization was of more interest than that of the fire." Further, the fires "did increase public support [for fire control] which in turn provided financing for the strengthened capability needed during several severe fire

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16 Pyne, Fire in America, 243.
17 Ibid.
18 Elers Koch, "Forty Years a Forester," n.d., 68, USDAFS Region One, Fire files, box 6100.
19 Ibid.
20 Pyne, Fire in America, 246.
years of the teens, twenties and early nineteen thirties."21
These fires occurred in 1914, 1917, 1919, 1925, 1926, 1931, and 1934.22 With this new interest in fire suppression, and the allocation of funds from Congress, fire fighting technology advanced considerably in the next two-and-a-half decades. "Since 1910," and because of the allocation of this money, "much of the history of the Forest Service can be translated into a succession of efforts to get fire fighters on fires as soon as possible--the sooner, the smaller the fire."23

Much of the backcountry, in what is today legislated wilderness, had yet to be opened up by trails and roads in the early third of the twentieth century. As Stephen Pyne noted:

The imperatives of fire control opened up the remote backcountry. Fire control built roads and trails, strung telephone lines, constructed observation towers, influenced the direction of forest research and equipment development, and made the region a national authority on the fire question.24

By 1916-1918 most of the lookouts built after the 1910 fire


22"Fire breeds fire." For several decades after the 1910 fire, the dead and downed timber served as a tinder box for the spread of fire. Koch, "Forty Years a Forester", 69.


24Pyne, Fire in America, 250.
were equipped with telephones. A single wire strung intermittently between trees some fifty feet apart connected each lookout with each district's ranger station. Modern technology had begun its nonstop deployment into the process of forest fire control and later forest fire management.

Up to 1911, the largest sum of federal money for fire control came from the Weeks Act. The act broadened the forestry activities on both the federal and the state level. Overall, "The basic purpose of the act [was] to buy and restore timberlands severely damaged by excessive cutting, fire, disease, or farming." More specifically, Section two of the act authorized "$200,000 to be used as federal matching funds for states having a forest protection agency which met government standards." Any state applying for money had a cap of $10,000 on the amount it could request. The federal money was to be spent for patrolmen's salaries while the state had to allocate the same amount to fire protection. Some of the money spent went indirectly into construction and maintenance of telephone lines and trails. Thus, "federally assisted state agencies... assumed a

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25 John V. Puckett, interview with author, 28 October 1993. Puckett was employed by the Forest Service in Region One for thirty-four years.  
major role in fire protection"\textsuperscript{28} and at the same time the act "marked the beginning of federal-state cooperative fire control.\textsuperscript{29} However, the Forest Service maintained its position as the national leader in the field of fire suppression.

In the spring of 1928, with the backing of the American Forestry Association, Ohio Congressman John R. McSweeney and Oregon Senator Charles L. McNary were able to push their legislation through Congress. The McSweeney-McNary Act "formalized and strengthened" forestry research.\textsuperscript{30} The act established a major branch of the Forest Service, Experimental Forestry. More specifically, the act included allocations for fire research. No longer was the Forest Service charged only with control and suppression of fire. The service had a new mandate, one that called for the study of fire's affects on the forest as well as the development of new equipment to battle the blazes.

In 1930, a "turning point" in fire control policy had arrived with the implementation of the strategy set forth by E. I. Kotok and Stuart B. Show known as the hour control policy. According to this policy the "'objectives in fire control' should be based on considerations of the variations

\textsuperscript{28}Ibid., 130.

\textsuperscript{29}Ibid., 281.

\textsuperscript{30}Ibid., 194.
in fire damage among various forest types."\(^{31}\) In other words, certain types of forest species, such as pine and spruce, were indexed on a scale in relation to their value as marketable timber. The types of trees which brought a higher dollar per board feet would receive greater priority in fire control and suppression than less valuable timber. The concept behind this policy was to be able to be on the scene of a fire as soon as possible; presumably, the sooner one arrived to fight the fire the smaller it would be, and the more marketable trees would be saved. Thus, the fire fighters would be able to have the fire under control within an hour.\(^{32}\) Of course, to be able to locate a fire and control it within an hour, a system of trails and lookouts had to be established in remote backcountry areas. Prior to 1930, funds had been allocated for construction and maintenance of trails and lookouts, but if fires were to be controlled within an hour, a large and cheap labor force needed to be available to increase and improve those structures already in place.

The conservation programs of the New Deal gave the Forest Service the manpower it desired. Army-run CCC camps provided more man power than could often be used. Achieving the goals set by the hour control policy posed no trouble in the Depression Era.

\(^{31}\)Pyne, Fire in America, 273.

\(^{32}\)Ibid.
The New Deal swept away economic objections to an expansive program in fire control. [In fact], the emergency suppression account was enlarged to encompass presuppression activities. . . Roads, trails, telephone lines, lookouts, fuelbreaks, hazard reductions, and guard stations—all appeared overnight.33

For the first time fire crews stood ready for action before fires had started. CCC crews replaced volunteer fire crews and fire guards. However beneficial these programs seemed to have been, the absence of manpower once the New Deal ended, due to America's entrance into WWII, left the Forest Service without the means to meet its goals.34 But, before the CCC camps disbanded, the Forest Service instituted a new policy, one that would last for forty-three years.

Major Evan W. Kelley and the 10 A.M. Policy: 1935-1972

The amount of timber lost to wildfire remained too high for foresters even with new suppression tactics and technologies. Between 1910-1929 close to a million acres a year burned in Region One of the Forest Service. These were unacceptable losses in the minds of foresters at the time.35

In May, 1929, because of his [Evan Kelley's] extensive experience in the West and his familiarity with the

33Ibid., 275.
34Ibid., 275-277.
35Puckett, interview, 28 October 1993.
problems of fire control, he was named Regional Forester at Missoula, Montana, headquarters of the Northern Region--one of the most difficult "fire regions" of the country. As William R. (Bud) Moore stated simply, Major Kelley was "iron fisted" and came to stop the fires in Region One. Kelley designed the 10 A.M. Policy to do just that.

Although Kelley advocated this policy as early as 1926, the Forest Service did not adopt it until 1935 after the 1934 fire season when fires burned an estimated 250,000 acres in the Lochsa and Selway drainages (part of the Northern Region’s forest). The Major expected all of the foresters under his command to follow this policy strictly. Moore, who joined the Forest Service in 1935, wrote that "when it came to fighting fires, Kelley tolerated no mediocre performance. He weeded the less than fully committed from the organization by required investigation of every fire that escaped control." Total fire suppression would become the Forest Service’s trademark until the 1970s.

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38Kelley, "Fire Control Truck Trails and Game Management," 1-2; Moore, "Results from Historic and Contemporary Application of Fire Policies," 2. The 1934 fire was the largest fire in this region until the Yellowstone fires of 1988. The 10 A.M. Policy is explained in Chapter III.

39Ibid.
Kelley's policy, like the hour control ideology, demanded fire fighting resources (manpower, lookouts, and trails) to function. World War Two and the end of the New Deal reduced the means on which the service depended to meet its fire control aims; but nevertheless, the 10 A.M. Policy lived on. The policy incorporated rural fire protection and "acquired new incentives from civil defense. . . . Both gave fire control a further sense of urgency, even a new moral energy." The Cold War also helped fund fire suppression. Both the Office of Civil Defense and the Department of Defense gave money for fire research and surplus military equipment to combat blazes. The Forest Service became a type of "paramilitary" unit of the national defense system. Wildfire appeared to be an enemy of the nation and the Forest Service had the right men for combat. Thus, until 1972, Kelley and his successors tolerated nothing less than total commitment to fire control.

Some foresters did question this policy. Harry T. Gisborne, a forest researcher from 1917 to 1949, advocated prescribed fire as early as 1949. He believed that if the 10 A.M Policy became a permanent part of Forest Service fire fighting philosophy, the policy itself "should be etched in

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40Pyne, Fire in America, 287.
41Ibid.
black granite" because it was detrimental to the forests.\textsuperscript{43} As a proponent of prescribed burning, Gisborne knew that keeping fire from playing its natural role in the forest ecosystem would have damaging effects on the forest in the long run. As this paper will demonstrate, Gisborne's arguments were portentous.

Before commencing a discussion of the new era in fire management begins, it is necessary to understand the condition the national forests were in nearly forty years after the start of the aggressive fire control programs is necessary. Bud Moore, a Region One forester from 1935 to 1974, paints a picture of the forests prior to the 1970s as well as anyone could. By 1969, just thirty-five years after the start of the 10 A.M. Policy,

We [foresters] had reduced burned acreage dramatically on the national forests. By controlling fire, we had in many areas, especially in wilderness and other natural areas, created fuel buildups of large proportions and we had, through fire protection, begun the conversion of forests to unnatural conditions. We had developed within the Forest Service a warlike competency and culture against fire. And we had long passed the point on the cost-benefit scale where it no longer paid, economically or biologically, to further reduce burned acreage on the national forests.\textsuperscript{44}

Many of the foresters in the late 1960s and early 1970s in the Northern Region, and for that matter in the entire U.S., must have been considering developing PNF programs since

\textsuperscript{43}Puckett, interview, 28 October 1993.

\textsuperscript{44}Moore, "Results from Historic and Contemporary Application of Fire Policies," 2.
Sequoia/Kings Canyon and Yosemite National Parks incorporated them into their fire management programs in 1968. And to further spur on the Forest Service in this direction, Yellowstone National Park's PNF went into effect in 1972. The scientific community realized that the human refusal to let fire play its natural role in the forest was having adverse effects on the ecological balance of our nation's wilderness areas.45

Fortunately in 1969, Moore served as Assistant Regional Forester for Fire Control and Air Operations. He intended "to develop and implement the concept of managing fires to help achieve the multiple objectives sought for each of the many unique land units of the National Forests."46 Moore saw that "a new fire policy tied closer to the management of the land, was needed."47 Under Moore's guidance, the first experimental PNF in the Forest Service took place in 1972 in the White Cap drainage of the Bitterroot National Forest in Region One.48 Incentive for this type of experimental fire in the Forest Service, like the Park Service, can be traced

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45Hartesveldt and Harvey, "The Fire Ecology of Sequoia Regeneration," 65-77 and Sellers and Despain, "Fire Management in Yellowstone National Park," 99-113. Both of these articles provide information on the ecological impetus for allowing fire to burn in the National Parks of the Sierra Nevada and Yellowstone, respectively.


47Ibid., 2.

48Ibid.
back to the Wilderness Act.

The Concept of Wilderness and Fire

As the culminating achievement of the growing wilderness cult in the United States, the Wilderness Act served as the catalyst which the Forest Service needed to begin a PNF program. The service found itself in charge of numerous "legislative" wilderness areas after this act passed.

The authority for fire in wilderness areas had been indirectly given in the act. The idea of wilderness and wilderness areas play a pivotal role in the PNF program of the Forest Service.

Many writers have dealt with the concept of wilderness, but few have examined the relationship between fire and wilderness. The fire management aspect of the Forest Service relies heavily upon the wilderness concept in its practical rationalization of permitting fire free passage on the service's land.

Fire management and land management go hand-in-hand in the Forest Service. As Moore stated, the idea is "to manage the fire program in a way that [will] complement the things we [are] trying to achieve on forest land." 49 By allowing

49Moore, interview, 16 October 1993.
fire free reign in wilderness, the service is trying to achieve a stable ecosystem with indigenous floral and faunal species that will be less susceptible to diseases and noxious species. As one of the key initiators of the PNF program in the Forest Service, Moore believes that fire should not be limited to wilderness, but should be applied to any place the above objective is sought: for Moore this constitutes all forest land. Unfortunately, wilderness is the only area where these objectives apply.50

One of the objectives of the White Cap study in 1972 was to allow fire to return to its historic role in affecting the ecological composition of the area. As Robert W. Mutch, a research forester involved with the White Cap study, wrote:

Many plants and animals are adapted to the cyclic occurrence of wildland fires. Different patterns of fire intensities, controlled by differences in fuels, weather, and topography, produce a mosaic of habitats that ensure community diversity.51

The diversity of flora and fauna species continues to be an integral part of Forest Service fire management programs. These simple objectives of the late 1960s and early 1970s buttressed the complex goals of the PNF program from 1978 to the present in the Forest Service.

A shift in Forest Service thinking, from the idea of

50Ibid.

51Robert W. Mutch, "I Thought Forest Fires were Black," Western Wildlands 1 (Summer 1974): 17.
fire as evil to fire as an ecological good, is evident in the titles of the agency's primary in-house publications concerning fire. The first text, *Fire Control Notes*, was published in 1935 after the adoption of the 10 A.M. Policy. After the 1972 fire season and the White Cap study, the title of the work was changed to *Fire Management Notes*.

National Fire Danger Rating System and PNF

The development of the National Fire Danger Rating System (NFDRS) played a major role in the Forest Service's decision to begin a PNF program. From its inception in 1934 to the present, the system has continually developed.

In 1934, Harry Gisborne developed the Fire-Danger Meter (FDM), an early version of the present day NFDRS. Gisborne calculated "fire-danger factors" by integrating fuel moisture percentage, wind velocity, relative humidity, normal or abnormal number of people or lightning storms, and period of land clearing or peak brush burning activity. Taken together, the factors produced six classes of fire danger in terms of both rate of fire spread and administrative action needed to cope with probable danger.52

With this advancement the age of fire related research in the Forest Service jumped off to a running start in 1934.

Gisborne revised the FDM several times during his life

time, but the next significant advance in fire-forecasting technology came in 1961. A new system, now called NFDRS, was ready for testing. It constituted "a four-phase rating system based on ignition, risk, fuel energy and spread. . ." The system underwent upgrading in 1964, 1968, 1972, 1978, and 1988. The revised editions of the NFDRS also incorporated data from past fires, such as acres burned, weather conditions and, drought severity. Studying this historical record allowed foresters to predict the course, size and intensity of current and future fires.

It is not a coincidence that the Forest Service inaugurated an agency-wide policy of allowing PNF in its forests in 1978. The Forest Service felt confident that it would not be relying on "blind faith" in allowing PNFs to burn. Instead it had some scientific knowledge upon which to base its PNF decisions. With this scientific information foresters could (and still do) predict, with some accuracy, the rate of spread and the path of the fire. This is important because, as will be explained later, PNF are only allowed to burn within a certain "maximum allowable perimeter" within the wilderness area. Hence, if it appears that a fire will burn out of prescription, appropriate suppression action can be taken.

53Pyne, Fire in America, 486.
54Ibid.
55Wakimoto, interview, 8 March 1993.
The NFDRS is not one hundred percent accurate. As Robert W. Mutch, now a research forester at the Intermountain Fire Sciences Laboratory in Missoula, MT, stated, the NFDRS is "no replacement for [the] judgement and intuition" of a fire manager.\textsuperscript{56} Science may never replace intuition; nonetheless, further refinement on fire predictability concerning rate and path of spread is presently taking place.\textsuperscript{57}

A Change in Policy: Fire Management and 1978

Four years after the first experiment with PNF in Region One, lightning caused fires, burning within prescribed conditions, were allowed to run their course in parts of the Selway-Bitterroot Wilderness, Bitterroot and Nez Perce National Forests in Idaho; the Gila Wilderness in New Mexico; the Teton Wilderness, Bridger-Teton National Forest in Wyoming; and in two nonwilderness forests in South Carolina.\textsuperscript{58} In 1978 the Chief Forester delegated responsibility to Regional Foresters to decide if a natural

\textsuperscript{56}Robert W, Mutch, interview with author, 5 November 93.

\textsuperscript{57}Robert E. Burgan, a research forester, revised the NFDRS in 1988 and is continuing his work at present. Mark Finney, also a research forester, is developing a fire growth model based on Hygans principal of seventeenth century light wave calculations.

\textsuperscript{58}Kilgore, "Fire Management," 64.
ignition in wilderness was to be labelled a wildfire\textsuperscript{59} or PNF. Official policy which had been "fire control" now was "fire management." The revised policy called for "well-planned and executed fire protection and fire use programs that are cost-effective and responsive to land and resource management goals and objectives. . ."\textsuperscript{60} As noted above, resource management objectives in wilderness call for the preservation of "untrammeled" land which is to be managed in a way which will not alter the natural ecology of the area. Thus, the new policy officially permitted natural fire to return to the land.

Although major policy guidelines changed following the 1988 fire season, the implementation and goals of PNF programs would remain mainly intact. Each separate forest had to have its own fire plan approved by the Regional Forester before it could place its fire management program on-line. If a line officer on a specific forest wanted to allow PNF in his wilderness he had to have a wilderness fire management plan approved by the Regional Forester. Each fire management plan for wilderness, according to William C. Fischer, a research forester at the Northern Forest Fire Laboratory, could be separated into six essential elements:

\textsuperscript{59}Wildfires are "unwanted fires started either by natural forces or people (arson or carelessness). USDAFS, Symposium and Workshop on Wilderness Fire, foreword.

(1) describing fire and ecosystem interactions; (2) describing special resource and use considerations; (3) defining fire management objectives; (4) delineating fire management units and zones; (5) developing fire management prescriptions; (6) devising a fire management plan.61

It is not by happenstance that the first objective in developing a fire management plan for wilderness is "describing fire and ecosystem interactions." According to the Wilderness Act, before implementation of any management plans in wilderness areas, it must be determined that the action to be taken, or in this case, allowed, will not alter the natural condition of the land. Thus, in fire management, the character of the wilderness commands the highest priority.

The wilderness fire management plan is based on the belief that fire should play its natural role in the ecosystem. By doing so fire will:

(1) perpetuate the naturally occurring plants and animals; (2) perpetuate natural vegetative patterns [and]; (3) maintain [the] 'natural' fire regime.62

The use of fire to accomplish these resource management objectives will also further contribute to the wilderness character of the area because it will:

(1) restore fire where suppression has had adverse effects; (2) create, maintain, or enhance habitat for threatened, endangered, or desired plants and animals;


62 Ibid., 140.
(3) prevent or abate undesirable fuel situations. Hence, resource managers who drew up the new policy of fire management in 1978 had the welfare and maintenance of a balanced and healthy ecosystem in mind.

Prior to the 1988, Region One had eighteen approved fire management plans. Between 1978 and 1988, 341 separate fires burned 67,816 acres of designated wilderness. After the historic fires of 1988, all of the Department of Agriculture and Department of Interior agencies canceled their PNF and PB programs and suppressed all fires in 1989. Policies and programs were reviewed and PNF programs began to be brought back on-line in 1990.

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63 Ibid.


CHAPTER IV

THE YELLOWSTONE BURN AND ITS IMPLICATIONS FOR FIRE MANAGEMENT

Not since the fires of 1934 has the northern Rockies witnessed such a fire season as the one Mother Nature provided in 1988. A total of 249 fires burned in the Greater Yellowstone Area. Fifty of these fires originated in the park and spread to neighboring national forests. Of the fifty fires, twenty-two were labeled wildfires, and twenty-eight were initially designated PNFs. Twelve of the PNFs burned out in less than one acre and the rest became wildfires because they were unwanted by park officials. Of the estimated 1.2 million acres which burned in the Greater Yellowstone Area, 800,000 acres burned in the park and a large majority of the rest on Forest Service lands.

After these fires were declared wildfires, Park and Forest

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1The six national forests in the Greater Yellowstone Area are the Beaverhead, Targhee, Bridger-Teton, Shoshone, Gallatin, and Custer Forests. One hundred and eighty fires began in these forests during the fire season of 1988. Grand Teton National Park, which is also a component of the Greater Yellowstone Area, contributed nineteen fires to the 249 total.


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Service personnel not only fought fire on their own lands, but together in and outside the park. The fires became so large that an Area Command center had to be setup to oversee the strategic operation of fire fighting. Troy Kurth, a forester from Northern Region headquarters, was selected to head the deployment of Area Command. He was responsible for coordinating fire suppression in the park and in the surrounding national forests.

When Kurth arrived on the scene 22 July 1988, no organization was in place. An attitude of mistrust had developed between the two services because of the lack of fire coordination in suppressing fires earlier in the season. The Park Service labeled some of its fires PNF and did not suppress them even though they would eventually spread onto Forest Service land. The Forest Service argued that if appropriate suppression action had been taken by the Park Service, the fires of 1988 would not have been as destructive on Forest Service land as they were.

Park Service land and Forest Service wilderness areas are administered alike: management of the land is to be left in the hands of natural forces so that it will appear "untrammeled" by man. Kurth's respect for the wilderness character of the park is reflected in his decision concerning what fire suppression methods to utilize. He authorized chain saws only where appropriate (in defense of

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4 Troy Kurth, interview with author, 29 October 1993.
historic structures and homes). Kurth did not see the necessity of using bulldozers to cut fire lines. The fires were crowning and spotting, and the use of dozers would "not have made a difference in catching the fire." Kurth further justified this position by stating that there was "no economic value for putting the fire out in the park." That is, the fires were not burning any of the historical structures of the park, they were only considered a natural wilderness phenomena. Plus, tractor marks would remain visible for 100 to 200 years. Robert Barbee, the superintendent of Yellowstone, wanted the structures in the park to be saved, but he wanted the land to be managed as wilderness. Kurth agreed and, light-on-the-land-tactics fire suppression were the order of the day.

Since the fires of 1988, there have been numerous critics of fire management programs of both the Forest and Park Service. Are any of these critics justified in their assumptions based solely on the fires of 1988, specifically

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5 A crown fire "is a fire that advances through the 'canopy' of a forest." Spotting results from "a fire producing sparks or embers (fire brands) that are carried by the wind and which start new fires beyond the main fire perimeter." Walstad, Radosevich, and Sandberg, eds., Natural and Prescribed Fire, 302: 309.

6 All of Yellowstone's structures were protected by fire fighters who fought the fires with foam, water and hand tools when they came in close proximity to the buildings' perimeters.

7 Kurth, interview, 29 October 1993. Light-on-the-land-tactics are "fire fighting tactics thought to cause [the] least suppression damage." Morrison, Fire in Paradise, 235.
those in Yellowstone? For the answer one must understand the historic background of the ecology of the area, and the role fire has played there.

The high plateaus which constitute most of Yellowstone Park were caused by ancient volcanic activity. Volcanic rocks produce soil of low productivity. As a result of this feature and "a cool moist climate, [the park is] largely covered by subalpine coniferous forests of lodgepole pine, subalpine fur, and Engleman spruce, with open meadows interspersed through the forest." The major mountain ranges in and around the park have the same terrain. The largest unforested area of Yellowstone is the northern range. This is "a mixed grassland/sageland region making up twenty percent of the park . . . ."9

In the subalpine terrain the natural fire cycle is "300-400 years in which large areas burn during a short period, followed by a long, relatively fire-free period during which highly flammable fuels develop."10 These large

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fires are high-intensity crown stand-replacement fires.\textsuperscript{11} The natural fire regime is considerably shorter on the northern range. The normal interval for fire on the range is from 25-100 years.\textsuperscript{12} These fires can be either low- or high-intensity surface fires depending on the fuel accumulation between burn intervals.

Yellowstone Park, which began fire suppression operations in 1886 under Army administration, did not adopt the concept of fire management until 1972. So, for eighty-six years, fires had been suppressed in the Park. However, fire suppression techniques were not very effective until the mid-1930s. Critics of the 1988 fires believe that as a result of Yellowstone’s previous commitment to fire control, unnatural quantities of fuel such as downed trees and undergrowth were allowed to build up in the park.\textsuperscript{13} Both, it can be argued, took away from the wilderness characteristic of the park. This hypothesis is false in the majority of Yellowstone. As the research biologist William A. Romme writes, the natural fire interval in the subalpine forests, "rather than human fire suppression, apparently is

\textsuperscript{11}Stand-replacement fires are usually crown fires of high-intensity (extreme heat and size) which completely kill a tree. This type of fire allows new trees to grow where the dead trees stood.

\textsuperscript{12}Schullery, "Yellowstone Fires," 45.

the major reason for the small number and size of the fires in the area during the last 180 years,"¹⁴ and the cause of the large fire in 1988. Nevertheless, it appears fire suppression on the northern range, at least, "has been underway long enough to have noticeable effects on plant communities."¹⁵ Therefore, according to scientific investigations, nearly eighty percent of the park (the subalpine region) has maintained a "natural" quality as defined by the term wilderness in respect to fire and its role in the ecosystem.

After the Yellowstone fires, the Departments of the Interior and Agriculture established the Fire Management Policy Review Team in September 1988. The team "was charged with reviewing the current policies governing national park and wilderness fire management . . . and recommending any changes needed to correct problems encountered during the 1988 fire season."¹⁶

The policy review team found that out of all the government agencies, the National Park Service's fire management plans did not meet current federal standards. Yellowstone was a "particularly bad example of this lack of

¹⁴Romme, "Fire and Landscape," 199. Romme reports that the last fire comparable to the 1988 burn occurred in the 1700s.

¹⁵Schullery, "Yellowstone Fires," 45.

¹⁶Wakimoto, "The Yellowstone Fires," 239.
compliance to national fire policy." The team also discovered that the fire management plan used in 1988 had not been approved by Loraine Mintzmeyer, the Regional Director, Rocky Mountain Region, NPS, or the Superintendent of Yellowstone, Robert Barbee, as specified in NPS-18. In fact, the plan park officials presented to the review team was an approximate version, altered by Yellowstone personnel, of the 1986 fire management plan previously submitted by Stephen Pyne. A publication produced in October 1988 by the NPS, Yellowstone National Park, The Yellowstone Fires: A Primer on the 1988 Fire Season, stated that, "in 1986 a new revision of the plan—really just a refinement of earlier plan editions—was completed, and was in the final stages of approval as of the spring of 1988." This does not appear to have been the actual situation in 1988.

The park was operating its fire management program according to the 1976 Yellowstone fire plan and had no hard scientific data on which to base a PNF policy. Some

17 Ibid., 240.
18 Ibid.
19 Stephen Pyne, letter to author, 16 April 1993.
21 Wakimoto, interview, 8 March 1993. Kilgore also goes into some detail concerning the Yellowstone's fire management plan and its need for revision due to a lack of scientific data in "Fire Management Programs," 72. It is important to
Yellowstone Park fire personnel were only "paper trained." That is, "they had taken fire management training courses but lacked actual fire experience along the various levels of command and responsibility."\textsuperscript{22} (After close scrutiny by the Fire Management Policy Review Team, the PNF policies and programs of the Sierra Nevada parks were found to be within current national policy standards.)

Since there was no scientific basis on which the park's PNF program was founded, and due to the fact that only lightning-caused fires were allowed to burn in natural fire management zones (Yellowstone did not incorporate human ignitions into its program), one could argue -- as some have -- that there was an unusually large quantity of ground fuel to feed the fires of 1988. However, the scientific evidence previously stated does not support this assertion.

Following the fires of '88, Romme and Don G. Despain, a Yellowstone research biologist, began a study to analyze tree-ring fire-scars to determine the fire history of the park.\textsuperscript{23} Using this investigating technique, the scientists found "three indications that fire behavior, in terms of heat release, flame height, and rate of spread, was similar

\textsuperscript{22}Wakimoto, "The Yellowstone Fires," 241.

\textsuperscript{23}A previous study by Romme in 1980 determined the fire history of the park. See footnote number 10, Chapter IV.
in 1988 and the 1700s." In reference to previous fire suppression, they established that it "had some influence on the size and behavior of the fires in 1988, but these large fires were a result primarily of drought and wind conditions, as well as normal successional dynamics following the last major fires approximately 280 years ago." Thus, the researchers concluded "that the fires of 1988 should not be viewed as an abnormal event."24

The Yellowstone fires of '88 challenged and threatened the idea of fire management in wilderness. If it had not been for a few men who held firm to their beliefs, the wilderness character of Yellowstone and the concept of fire management could have been severely damaged. The Yellowstone fires initiated a revision of fire management policy and programs in the Park and Forest Service. Even after investigation of the park's policy and program, Kurth supports its past fire management operations. The plans were not "perfect," but "at the time the decisions were made, there was not much information" on which to base a program. Fire management policy and programs have improved since the 1988 fires. But, as Kurth concludes, one "can't change the historical perspective [by] trying to justify

decisions [prior to 1988] on today's knowledge."25

The Public and the Yellowstone Fires

Like the park’s previous fire management programs, the public’s perception of the 1988 fires has changed as time has allowed for more understanding concerning the role of fire in Yellowstone’s environment. Part of the problem with the public’s early perception of the Yellowstone fires was that "the media did a mediocre job of reporting the fires."26 The public did not see the fires as part of an ecological process, only as good or bad for the park. At first there was "a wide gap between ecological reality and public understanding."27 Through education, however, visitors to the park and residents in the surrounding communities began to view the fires in a positive manner within the context of a large natural phenomena. This phenomena, they learned, benefitted all of the flora and fauna species which inhabit the Greater Yellowstone Ecosystem. Thus, in time, attitudes changed and the fires

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27Ibid., 118.
of '88 began to be cast in a favorable light.

This new understanding concerning fire's role in Yellowstone's environment is likely to boost the number of tourists to the park. One study found that projected visitor levels for Yellowstone are likely to "remain the same or increase" in the future. The researchers attributed this trend to "potential visitors [who] do not view the fire damage as a large draw back, but rather an interesting ecological attraction."28

Prescribed Burning In Yellowstone?

Would prescribed burning have helped reduce the fuel levels which were present in 1988? This question too has been raised by critics of Yellowstone's fire management policies.29 Prescribed burning did not take place in Yellowstone prior to the '88 fire season.30 Fire management officials at the park encouraged natural fire and did not believe PB would be feasible due to the parks geological and


29American Forestry Association, "Amending the Let-Burn Policy on Public Lands."

30Prescribed burning has not taken place in Yellowstone since the fires of 1988.
environmental setting. However, after the 1988 fires, managers have been looking into using PB in the buffer zones that the great fire did not burn over. But cost, in terms of resource allocation, is an issue which must be dealt with first. Also, state permits must be issued for PB due to the Clean Air Act and the air quality concerns of nearby communities.\textsuperscript{31}

As previous evidence has shown, PB in eighty percent of the park would not have been compatible with the idea of ecosystem management due to the historic fire regime of the park, and the fact that fire suppression over the past fifty odd years had not severely altered the wilderness characteristic of the park.\textsuperscript{32} Still, one would believe that PB could and should be utilized on the northern range because of its 25-100 year fire interval. According to Phil Perkins, Yellowstone's fire management officer, research PBs have been attempted on the range, but the area would not burn due to overgrazing by the park's large elk population.\textsuperscript{33}

It appears that PB would have helped improve the

\textsuperscript{31}Phil Perkins, interview with author, 2 June 1988. Perkins is the current Fire Management Officer of Yellowstone, and held the position in 1988.

\textsuperscript{32}This idea is explored in detail in Paul Schullery and Don G. Despain, "Prescribed Burning in Yellowstone National Park: A Doubtful Proposition," Western Wildlands 15 (Summer 1989): 30-34.

\textsuperscript{33}Ibid.
ecological balance of the northern range, but it is not an ecologically sound management tool for the vast subalpine territory of Yellowstone National Park. Following the 1988 fires, all of the National Parks with fire management plans have included PB guidelines within them (the plans) whether or not they are used as an ecological tool for maintaining the wilderness conditions within each unit. The fires of 1988 gave new life to PNF v. PB debate, a debate that is currently on going in the Forest Service.

The Natural v. Human Fire Controversy in the Forest Service

Not all wilderness ecosystems operate on the same fire regime time line as Yellowstone. Region One of the Forest Service is comprised of two dominant fire regimes. The first are long-interval crown fires (perhaps 100-300 years) in continuous forests of lodgepole pine mixed with spruce and fir; and [the second are] short-interval (5-60 years), low- to moderate-intensity surface fires in the lower elevation Douglas-fir, aspen, ponderosa pine stands, grassy parklands, and in adjacent open lodgepole stands.\(^{3}\)

Because small fires burn in a mosaic pattern during intervals between stand-replacement fires, some foresters feel that PB should become an official tool in wilderness management.

management practice. Those who support this idea argue that PNFs do not occur frequently enough to return the wilderness to the way it was before viewed by Europeans. Few proponents of PB take into consideration past Native American burning practices, however; some supporters have given consideration to Indian fire and its relation to current fire management implications in their arguments for PB.\textsuperscript{35} After all, Native American fires are just a different category of PB, and both have the same desired result in the ecosystem.

As we have seen, fire has been scientifically proven to be an integral part of the ecological balance of a wilderness area. Nevertheless, some foresters believe that PNF programs should be augmented by manager-ignited fires (prescribed burning). Not all foresters agree. The main issue in this debate is whether prescribed burning should be allowed in wilderness and nonwilderness areas. Scientific papers have been written advocating prescribed burning and opposing it in both areas.\textsuperscript{36} However, most arguments on the subject revolve around personnel opinion mixed with

\textsuperscript{35}See, Phillips, "The Relevance of Past Indian Fires to Current Fire Management Programs," and Arno, "Ecological Effects and Management Implications of Indian Fires."

\textsuperscript{36}William A. Worf opposes prescribed burning in his article "Wilderness Management: A Historical Perspective on the Implications of Human-Ignited Fire." Bruce M. Kilgore supports prescribed fire in his article "Human-Ignited Fires in Wilderness: A Response to Bill Work." Both article are in Symposium and Workshop on Wilderness Fire, 276-282: 283-289.
Bud Moore believes that manager-ignited fires are "okay even in wilderness." He feels that it should not be done to enhance wildlife habitat but, to return the area to a natural state. This, he argues, needs to be done because "fire suppression in the past has caused the buildup of too much kindling for [adequate] fire protection." Further, Moore argues that if one is to use prescribed fire outside wilderness, one must take into consideration the possibility of the fire spreading to surrounding private land. He concludes that no matter what type of fire is permitted to burn, it should be "managed for the good of the forest."

Another supporter of this type of fire is Robert Mutch. He asserts that prescribed burning should be used in "smaller wildernesses that don't lend themselves well to PNF as in larger wildernesses." The major problem with the argument is that some wilderness areas are too small to contain a natural blaze if there are not favorable weather conditions. He advocates the use of human-ignited fires "not for wildlife habitat or visual effect but, for the reduction of [fuels that cause] wildfires." However, Mutch points out that animals and plants have adapted to fire regimes over the years and, as is well known, some flora and fauna depend on fire for their survival.

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37 Moore, interview, 16 October 1993.

38 Mutch, interview, 5 November 1993.
John Puckett does not agree with all of the arguments above. Puckett contends that no one can "make the determination [to use prescribed fire] with a degree of accuracy" because nature too missed stands of trees in her burn mosaic and allowed fuels to build up. Outside wilderness Puckett advocates the use of manager-ignited fire "when it best meets the needs" of the area.\(^3^9\)

Each individual has his own viewpoint concerning the numerous aspects of this debate. Can nature tell the difference between these two types of fire in wilderness and nonwilderness areas? It seems the jury is still out, but both sides of the debate have arguments which support their cause.\(^4^0\)

If fire managers in today's forests and parks are to continue their efforts to create and maintain a thriving forest environment like that which existed prior to the era of fire suppression, managers must consider using PB as an alternative to PNF in wilderness and nonwilderness alike. As this paper demonstrates, natural fires do not occur frequently enough to counter balance the years of suppression. And, when they do ignite, they are not always allowed to burn due to management guidelines and social

\(^3^9\)Puckett, interview, 28 October 1993.

\(^4^0\)It should be noted that the Forest Service approved and began the use of prescribed fire in certain Florida wilderness areas and forests in the mid-1980s.
restrictions. If fire is continually denied its role in both these areas, the ecological equilibrium of the two forest categories will continue to decay, and fire managers will only have that much more work to perform in the future.

Fire Management After 1988: The Forest Service

Once the smoke cleared in the fall of 1988, policy review teams set to work to study and upgrade the fire management policies of both the Forest and Park Service. The Fire Management Policy Review Team, established jointly by the Departments of Agriculture and Interior, consisted of representatives from both departments as well as the academic community. In its review the team "began with the premise that [they] were to focus on fire management policies, not on the overall management direction of national parks and wilderness areas." The team concluded that "fire policies [were] sound, but implementation was not uniform among the different agencies." Forest Service plans fared much better in the investigation than did the Park Service's. It seemed as if the Forest Service's goals

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41 These restrictions will be discussed in the following two sections.

42 Wakimoto, "The Yellowstone Fires," 239.

43 Ibid., 240.
for wilderness fire management would escape change, but this
was not to happen. The team found that

the ecological effects of PNF support resource
objectives, but the social and economic effects may be
unacceptable in some cases. PNFs may affect permitted
uses of... wilderness, such as recreation, and impact
outside areas through such phenomena as smoke and
stream sedimentation.44

Its ecological intentions were sound, but now the Forest
Service had to take into account factors which it once gave
either low or no priority. The Prescribed Fire Management
Criteria Task Force, established by and for the Forest
Service, was already hard at work overhauling its (Forest
Service) policies to correspond with those put forth by the
Policy Review Team.

The Task Force, which comprised eight members from
different Forest Service regions, "found that, for the most
part direction and procedures for implementing a successful
prescribed natural fire program are already in place."45
The Task Force had several recommendations for upgrading PNF
programs. The first one stated that, "Forest Service Manual
[FSM] 5140 [the section on PNF] be revised to address the
requirements of a prescribed natural fire program."46 These
recommendations address those which were mentioned by the
Policy Review Team. The suggestions include understanding

44Ibid.

45USDAFS, Report of the Task Force on Prescribed Fire

46Ibid.
and planning for potential environmental, on/off site, socio-economic, and political impacts of PNF plan implementation. More specifically, the Task Force found that PNF plans must contain risk assessment that portrays the estimation of the possibilities and the consequences of the decision process using the following criteria as a minimum: threat to life and property; smoke management concerns; [and] impacts on visitors, users, cooperators and local communities, etc.

The ecological impetus for PNF was not challenged. The Task Force only recommended a more thorough and broader scope plan in which the residual effects of PNF would be calculated. The ecological necessity of fire stayed intact.

The suggestion of both review teams appear in the latest FSM Amendment dated 12 September 1991. According to Section 5140 of the FSM, each national forest fire management plan must have a segment detailing the risks involved and potential impacts of plan implementation (such impacts include political, socio/economic, on/off site, and environmental), including the trade-off between smoke emissions from prescribed natural fire and the ecological need to

47Ibid., 15.
48Ibid., 16.
49Referring back to the discussion on PNF v. PB, it is interesting to note that one of the recommendations of the Task Force called for the use of prescribed fire "within or adjacent to wilderness boundaries or inholdings where current fuel conditions and hazards prevent managers from utilizing PNF successfully." 6.
The objective of PNF use did not change. The 1991 amendment stated that the objective is to use prescribed fire, from either management ignitions or natural ignitions, in a safe, carefully controlled, cost-effective manner as a means of achieving management objectives defined in the Forest Plan.

As is evidenced earlier in the paper, the main objective of PNF management programs is for the maintenance of the ecological balance of a wilderness area.

All of the wilderness areas within Region One do not currently have approved fire management plans. Fire managers are presently writing plans for areas without them, but until they are ready, suppression tactics are used against each fire. The outline of the plans may have changed after 1988; however, the idea that fire in a natural ecosystem "is as essential as the wind and the rain" did not.

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51 Ibid., 3 of 23.

52 Only 6 wilderness areas have approved plans as of 29 July 1993. Prior to 1988, Region one had 18 approved plans. 4,535,040 wilderness acres and 19,840 nonwilderness acres are covered by approved plans. USDAFS, "Approved Fire Management Plan, Region 1," (n.d.), 40-34.

53 Moore, "From Fire Control to Fire Management," 12.
Fire Management After 1988: Yellowstone

In October of 1988, the Fire Management Policy Review Team suspended all National Park Service PNF programs until it determined that either current policies met federal regulations or, that newly composed plans, in those parks not having adequate PNF guidelines, were up to par. The programs in Yosemite, Sequoia, and Kings Canyon were reinstated in 1990. In Yellowstone, a new PNF program was put on-line in 1992.

The team's review included numerous recommendations in its final report of 5 May 1989. These recommendations strengthened current plans by:

A. Developing joint agency fire management plans, agreements, or addendums to existing plans for those areas where fires could cross administrative guidelines.

B. Including a comprehensive criteria which will be used in deciding whether or not to allow natural ignitions to burn as prescribed fires.  

The criteria recommended for allowing a fire to burn included such scientific items as "energy release components" in area fuels, "1000-hour fuel or duff moisture content," and "indicators of cumulative drought effects on

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55Duff is "the partly decayed organic matter on the forest floor." "Duff," Webster's Ninth New Collegiate Dictionary.
fire behavior." Other recommendations included social or culture considerations such as a fire's "potential impact upon visitors, users, and local communities, both on and off site."

On the personnel side of the recommendations, the team advised that "agencies will ensure the availability of qualified staff and knowledgeable line officers for developing, implementing, and managing prescribed fire programs."

Further, the team suggested that "agencies . . . ensure NEPA compliance for fire management plans," and also incorporate interpretation of relevant information to the public "before and during fires . . . ."56

Most of these directives were aimed at Yellowstone; however, both the Secretaries of the Interior and Agriculture (as the above information has shown) approved the team's recommendations, and required them to be incorporated into the new fire plans that were written in both the Park Service and Forest Service following 1988.57

The basic tenets of the Park Service's fire policy did not change following the fires of 1988. The policy of the Park Service still maintained that "the presence or absence of natural fires within a given ecosystem is recognized as a


potent factor stimulating, retarding or eliminating various components of the ecosystems." With the Policy Reviews Team's affirmation of the use of PNF as a viable tool in maintaining an ecological balance in wilderness, the Park Service, and individual parks, began to revise and rewrite their policies and programs to incorporate the recommendations of the team. As an examination of current fire management plans will prove, the parks did just that.

Due to Yellowstone's lack of compliance with National Park Service fire guidelines prior to the 1988 fire, it incorporated the most changes in its fire management plan of any national park or forest. Yellowstone's new plan allows fire to play its ecological role in the park while protecting human life, developments, and cultural resources. The plan includes specific fire prescriptions, incorporates the use of manager-ignited prescribed fire in predetermined areas, and suppresses all fires declared wildfires.

An outline of the park's new fire management policy objectives demonstrate that park officials incorporated all of the recommendations which the Fire Management Policy Review Team suggested. The policy objectives are as follows:

1. To protect human life, property, and designated resources.
2. To allow fire to play its ecological role in the

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park to the greatest extent possible through the use of appropriate management techniques.

3. To suppress wildfires in a safe, cost-effective, and environmentally sensitive manner commensurate with the values at risk.

4. To maintain an active fire prevention program.

5. To maintain a fully qualified fire management staff to implement the fire management plan.

6. To maintain an interpretive and public information program that will educate the public on the ecological role of fire in the park and provide daily fire danger and situation information.\(^6^0\)

Yellowstone managers also went to great lengths to determine that the park's fire program conformed with environmental compliances put forth by the National Environment Policy Act. The plan details fire's effects on vegetation (the major types found in the park), wildlife, water quality, soil, and air quality (the plan also has a section concerning Air Quality/Smoke Management Guidelines). Managers outlined likely fire behavior in the different fuel types in Yellowstone and the responsibilities of all personnel involved in fire management.\(^6^1\)

Interagency coordination is covered in the plan as well.\(^6^2\) In fact, there is a Greater Yellowstone Area Interagency Fire Management Planning and Coordination Guide which incorporates the six national forests and Yellowstone and Grand Teton National Parks into a cooperative agreement regarding management of PNF and wildfire on the different

\(^{60}\)Ibid., 16.

\(^{61}\)Ibid., 22-26, 37-42.

\(^{62}\)Ibid., 43.
service's lands.\textsuperscript{63}

After three years of total fire suppression in the park, the plan written by the Yellowstone's resource and fire managers was approved, and once again, conditions were established whereby fire could return to its historic role in Yellowstone National Park.

Fire Management After 1988: The Sierra Nevada Parks

Like Yellowstone's fire management plan, Yosemite's plan is also very detailed.\textsuperscript{64} The plan describes policies, goals and objectives for managing fire according to National Park Service guidelines. The park's fire management program is divided into three fire-management zones. Zone one, which constitutes seventy-five percent of the park, allows PNF year-round. Zone two allows PNF part of the year, but is mainly a PB area. This zone constitutes eight percent of the park. Finally zone three, which accounts for the last seventeen percent of park acreage, is a complete fire suppression zone which constitutes the most developed and visitor frequented areas, and a thin stretch of boundary


\textsuperscript{64}It is important to remember that Yosemite and Sequoia/Kings Canyon had, and still have, very active PB programs unlike Yellowstone.
surrounding the entire park.\textsuperscript{65} In addition to PNF, PB is utilized in zones one and two in the hopes of reestablishing a natural fire regime. To help accomplish this objective, the plan details natural fire regimes according to the different vegetative communities that inhabit the park.\textsuperscript{66}

Yosemite resource managers rewrote the fire management plan in accordance with the recommendations set forth by the Policy Review Team. Included in the revised plan are: detailed prescriptions for all zones concerning both PNF and PB, as well as daily certification requirements; cooperative agreements with the Forest Service; qualifications and training guidelines for fire management personnel; smoke management criteria; fuel model maps; and regulations regarding public information and interpretation concerning fire.\textsuperscript{67}

As Ed Duncan, the Prescribed Fire Manager at Yosemite, said, the Yellowstone fires "displayed the magnitude of ecological change" a fire can have on an area, and it proved that fire for an ecosystem is completely positive. No matter what the changes are to NPS-18, the fires have given

\textsuperscript{65}There is only a cooperative agreement regarding fire suppression with Sierra and Stanislaus National Forests which border Yosemite. There is no agreement regarding PNF moving across agencies boundaries. For this reason a quarter-mile-wide area surrounding the park is within the full suppression zone three.

\textsuperscript{66}USDI, NPS, Fire Management Plan (Yosemite National Park, March 1990), 3-45a.

\textsuperscript{67}Ibid., 52-60, 6781, 91, 109, 121, 127, append. A.
fire management a boost with more research funding and personnel.68

Sequoia and Kings Canyon National Parks' fire plans is comparable to Yosemite in that it is divided into three fire management zones;69 however, the parks' fire management policies and programs changed little following the 1988 fires. The main change was in the certification process of declaring a natural fire a PNF or a wildfire, or continuing to manage a PB as such and making sure it had not exceeded prescription limits. The parks have also strengthened previous cooperative fire related agreements with neighboring forest service managers. Prior to 1988, the two services had always had a good relationship concerning joint suppression action, but after 1988, area national forests70 began writing prescriptions for PNF into their fire plans, and now the two are trying to agree on a format for allowing


69USDI, NPS, Fire Management Plan (Sequoia and Kings Canyon National Parks, rev., April 1984), 36-37. Zone three of the above plan is not a full suppression area like Yosemite, both PNF and PB are permitted under "restrictive conditions."

70The national forests which adjoin Sequoia/Kings Canyon are Sequoia, which encompasses the Jennie Lakes Wilderness Area, Inyo, which encompasses the John Muir Wilderness, and Sierra National Forests.
single fires to burn across agency boundaries.\textsuperscript{71}

Resource managers of the two California parks "continue to allow naturally occurring fires to burn unimpaired within the designated 706,800-acre Natural Fire Management Zone," and to continue to monitor "the effects of natural fire on vegetation, fisheries, wildlife, water quality, air quality, and other ecosystem components . . . as needed."\textsuperscript{72}

Prescribed burning has remained an integral part of fire management in the parks. The use of "prescribed burn[ing] to reduce fuel hazards in areas where fuel is unnaturally heavy and wildfire threatens park resources and human safety," continues to be standard operating procedure.\textsuperscript{73}

These parks had long taken in more than just ecological factors when devising their fire policies. Smoke from the fires remained a concern due to the parks' location near the Central Valley of California. The parks' policy regarding smoke states that

\begin{quote}
Burn[ing is to be permitted] only during periods when smoke will be carried away from populated areas, preferably over these Parks where they can dissipate. . . No burning will be done below an inversion layer or in the absence of suitable smoke dispersal. Smoke
\end{quote}

\textsuperscript{71}Mike Warren, interview with author, 20 May 1993. Warren is the Fire Management Officer for Sequoia/Kings Canyon. This decision process is underway every day that a fire burns.


\textsuperscript{73}Ibid.
management will be part of every prescription.\textsuperscript{74} Even with all the planning, heavy smoke continues to be a problem with local communities and visitors. However, most visitors accept the idea of fire management in the park,\textsuperscript{75} and the parks again have an active fire program which benefits the ecology of the area.

Is Wilderness Becoming More "Park-Like"?

With all the advancements in ecosystem management, and the constant revision of fire policies and programs to keep up with the new information, have the managers of America's national parks and forests been able to recreate that "park-like" atmosphere of a "vignette of primitive America?" The answers differ from park to park, but are much the same in the Forest Service.

As the previous information has demonstrated, the Yellowstone fires of 1988 burned in accordance with the past fire history of the park. Thus, today Yellowstone's wilderness areas must resemble closely the forests of the area as they appeared to the Native Americans and early explorers of long ago.

Recreation of natural conditions in the wilderness

\textsuperscript{74}Ibid.

\textsuperscript{75}Warren, interview, 20 May 1993.
areas of the Sierra Nevada parks is not as evident. With the managerial and social constraints previously mentioned, it is difficult for park fire managers to allow fire, either natural or human-ignited, to play its complete role in the ecosystem. As the Fire Management Plan for Yosemite stated:

Interfering with only a few fires out of several hundred natural ignitions may seem like a minor disruption of natural fire regimes, but if such a disruption results in a large percentage reduction in area burned (e.g. 20%-50%) within the context of the natural fire return interval, then there may be subtle but significant long-term changes in the ecosystem. All elements must be present to truly restore a natural ecosystem, not just those elements that present no management problems. A natural process operating under significant artificial restrictions is no longer a natural process.76

Thus, the environmental conditions of the past may never be recreated.

Forest service fire management personnel face the same constraints which are factors in the policies and programs of the park service. Even worse is that not every national forest wilderness area has a fire management program, and accordingly, all fires are suppressed regardless of origin. It is impossible to say when, or even if, the wilderness areas of America’s forests will return to their natural conditions; however, fire managers continue to try.

Hence, following the 1988 fires, officials of the national Park and Forest Service rewrote their fire management plans to correspond to the recommendations of the

76USDI, NPS, Fire Management Plan (Yosemite National Park, March 1990), 90.
review teams; however, both services' rationale for burning, to allow fire to play its historic role in the maintaining of a natural wilderness ecosystem, did not change. There were just more variables added to the fire management equation.

Hopefully, the fire management practices of the Forest and Park Service will not lead people back to believing that fire in wilderness is an evil because it may char or temporarily impair the majestic surroundings they worked so hard to buy for themselves. Nature always has a way of making itself a presence in the life of humankind—fire is no exception. If fire managers are not allowed to perform their duty, and settlements continue to encroach on our nations wildlands the houses of the southern California foothills will not be the only property "up in smoke." Fire managers must be permitted to continue their work so that the wild in wilderness will not escape its confines and wreak havoc in places society says it does not belong.
No one knows for sure when the first fire blazed on the North American continent. Archeological evidence proves that fire has at least been an environmental phenomena for over 80 million years. It is impossible for scientists to calculate the influence these fires had on determining the environmental characteristics of the time. However, researchers have been able to ascertain that Native American fire practices did indeed play a role in creating the natural environment as it was first viewed by Euroamericans. Early explorers and settlers believed most indigenous fire practices to be wasteful, but Indians used fire as they would any rudimentary tool. Nevertheless, the European ideal of fire as a villain of the forest spread throughout the United States as settlements sprawled across the land.

Euroamericans loathed fire for they thought it destroyed the natural resources of the environment. However, they still used it in a controlled fashion to lessen the hardships of frontier life and to produce a desired environment in which crops and domesticated animals could grow and flourish.

Even after the National Parks and Forests were set aside from the public domain, fire maintained its sinister image. It continued to plague the lumber industry and rural
towns. On the nontangible side, fire was accused of turning aesthetically pleasing views into charred moonscapes and ruining the outdoor recreation opportunities for the public at large.

For over ninety years in the Park Service, and seventy in the Forest Service, money and human resources have been pumped into each for the protection and battling of this evil. However, as the environmental movement began to pick up speed in the 1960s, research scientists began to question the ecological consequences of fire suppression in the newly created wilderness areas. Fire control did not coincide with the objectives put forth in the Wilderness Act. New scientific evidence proved that plants and animals depended on fire for regeneration and sustenance. Ecological sciences had finally come of age.

Coinciding with the advancements in ecological understanding, significant improvements in weather forecasting and fire behavior prediction allowed managers to begin experimenting with fire in these wilderness areas during the late 1960s early 1970s. As more research and test programs corresponded with management objectives, the Park and Forest Services formerly recognized the use of prescribed natural fire as an ecological necessity for natural regulation in wilderness. In some areas, the Park Service also utilized prescribed burning to meet its wilderness management objectives. Plans for prescribed
natural fire and prescribed burning in the services were finalized and fire returned to the forest on a modest scale between 1968 and 1978.

The prescribed natural fire and prescribed burning policies and programs came under close scrutiny following the fire season of 1988. Review teams found Park and Forest Service programs in need of slight reworking, especially Yellowstone’s, but overall, they found most to be on target. The ecological need for fire in wilderness had survived its greatest challenge. Revisions to fire polices were completed and new fire plans were approved one to three years following the 1988 fire season. All parks with wilderness areas presently have a fire management plan; however, Forest Service districts with wilderness areas within their boundaries continue to develop and improve fire management programs for their land.

As the rest of the world begins to understand fire’s role clearly in the larger planetary ecosystem, research scientists continue to make advancements in better understanding the role of fire in the ecological balance of the forest. As the population grows and development reaches further into our nation’s woodlands, fire managers have had to take into consideration much more than the ecological integrity of the forest. This can be seen in the newly-composed plans of the Park and Forest Service. What the future will hold for fire management policies and programs
is not clear due to the expansion of human settlements and the continuous evolution of scientific understanding. As the fire historian Stephen Pyne wrote, "One can accurately speak about fire only in conjunction with something else--fire and flora, fire and fauna, fire and earth, fire and water."¹ Fire and humans too, must be spoken together, because humankind has the greatest influence on fire. It must not be forgotten that if we destroy the ecological balance of nature in wilderness, wilderness itself will be destroyed. Humans cannot recreate wilderness--fire must live on! The Park and Forest Service, which had the courage to adapt to the human events and scientific evidence in the past, must maintain and act on that same courage in the future.

¹Pyne, Fire in America, 530.


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