

WHITE PAPER

ENVIRONMENTAL FACTORS IN THE CERRO GRANDE FIRE :

A SMOKEJUMPERS PERSPECTIVE (C) 2000

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The wildfire that devastated nearly 50,000 acres of the Jemez mountains near Los Alamos, New Mexico in May 2000 is a major demonstration of the fallacy of using prescribed burning as the sole forest fire management tool. The policy of relying on prescribed burning is part of a larger policy in the management of government controlled land. The emphasis has shifted from a multiple use concept to one of conservation and preservation. Under the multiple use concept the US Forest Service (FS) controlled lands were managed in a way to attempt to bring a balance between Recreation, Timber, Resources, Watershed and Range. The balance, in a given area, between these factors was dependent on the forest and land.

The argument that the Cerro Grande fire is the result of over zealous fire suppression is vacuous. In the past 100 years there have been relatively few fires to suppress in the Los Alamos area other than major fires. Except for a brief high fire danger season in May and early June it is difficult to get material to burn in the Jemez mountains. In my years of hunting and hiking in the Jemez mountains I have only found the remains of two small fires that had fire lines. I have seen occasional small smoke plumes after thunderstorms but it appears that these fires have gone out without human intervention. There were charred stumps that indicated that there have been fires in the past; however, I know of no studies that indicate the time and scale of those fires. There have been a number of wild fires on the Pajarito plateau such as the recent one in Guaje Canyon. With the exception of the canyon bottoms, the vegetation on the Pajarito plateau is sparse and the potential for spread of fires is small under normal conditions.

In the late 1800's and early 1900's there was extensive logging of the Ponderosa Pine forests of the Pajarito Plateau. The logging technology of that period did not allow logging in the steep canyons of the Pajarito Plateau and in the mountains of the Jemez cauldrea. In the 1970's there was extensive logging in parts of the Baca Land and Cattle Company holdings. This logging took place because the Baca Company did not hold the rights to the timber on their land and a lumber company was able to obtain those rights. The lumber company heavily logged the north rim of the cauldrea and Redondo Peak. The forests on the eastern boundary of the Baca Company were not logged due to the limited access by road and by the steep terrain. In particular, the forests on Cerro Grande Peak, within the Baca holdings, were not logged during that period. It is doubtful if these lands have ever been logged except for small areas near State Road 502.

In the 1980's the Baca Company made overtures to transfer the Baca holdings to the Federal Government. These overtures were first led by Mr. Dunnigan and later by the heirs of Mr. Dunnigan. The land on the south slope of Cerro Grande (Rio Frijoles watershed) was transferred to the National Park Service (NPS). The argument that these lands should be controlled by the NPS had some validity as this land was the source of the Rio Frijoles (the center piece of the Bandelier National Monument). After nearly 20 years of discussions, it

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There have been two recent, major fires in the Los Alamos area that burned parts of the Bandelier National Monument, Santa Fe National Forest and Los Alamos National Laboratory (LANL). The La Mesa fire, in 1977, burned onto LANL property and caused much concern about fireproofing the western boundary of LANL and the Los Alamos townsite. An improved road was built past Armstead Spring to the plateau on the north side of Water Canyon. A second road was improved in Valle Canyon onto the Plateau on the north side of Valle Canyon. A series of small logging operations along these roads, as well as cutting operations on the lower reaches of Pajarito Mountain, significantly thinned some of the forest. In addition, thinning operations were conducted along State Road 502 between the Lab and the forest and along the western boundary of the townsite. A small selective cut logging operation on FS land, next to the NPS boundary on the lower end of the ridge leading to the South from Cerro Grande created a series of meadows on the part of the ridge under FS control. Extensive thinning of trees along SR 502 was also conducted on LANL lands. The felled trees were made available to the public for firewood. A caterpillar tractor fire line between the north end of the Cerro Grande ridge logging operation and the Armstead Springs road figured in the early stages of the Cerro Grande fire. The thinning operations along SR 502 stopped at the bottom of Water Canyon. The few acres of unthinned forest on the south side of Water Canyon may also have contributed to the spread of the Cerro Grande fire onto LANL property.

GEOLOGY OF THE JEMEZ MOUNTAINS

The Jemez mountains are the remnant of a series of major volcanic eruptions that occurred about one million years ago. The volcanic activity in the Jemez complex probably began in the Eocene era and has continued to about 50,000 years ago. Redondo Peak, nearly 12,000 feet above sea level, is a remnant of the original peak. The peaks on the rim of the cauldера are between 10,000 and 11,000 feet above sea level.

The eruptions of 1 million years ago ejected around 100 cubic miles of ash leaving a cauldера 20 miles across. The tuff deposits on the outside of the cauldера are nearly 1000 ft deep in some places. Erosion has cut steep canyons through the tuff. These canyons include Frijolis, Water, Valle, Pueblo, Los Alamos, Guaje and San Juan. Small streams are found in some of these canyons.

The tuff deposits on the eastern edge of the Cauldера are called the Pajarito (Little Bird) Plateau. The Pajarito plateau slopes gently downward to the East toward the Rio Grande river at a rate of about 1.5%. The Rio Grande river, near Los Alamos, is at an elevation of about 6000 ft.

The Dome Fire in 1996 was further to the South and burned mainly in the Santa Fe NF and Bandelier NM. This fire should have rekindled interest in forest thinning operations. However, pressure from environmental groups as well as conservation policies set in Washington DC had essentially stopped any attempts at thinning the forests by means other than controlled burns.

In 1998, a man caused fire burned several hundred acres on the north side of the ridge north of Santa Clara Canyon. This fire should have caused more concern to the Los Alamos citizens and government agencies but it was too far away to create much public interest. A man caused forest fire occurred in the area between Water Canyon and Pajarito Canyon in the late 1950's or early 1960's. It burned about 500 acres on the mesas west of LANL between Water Canyon and Pajarito Canyon. This fire resulted in a fire break that provided some control over the Cerro Grande fire.

Another factor that had some effect on the spread of the Cerro Grande fire was the Pajarito Mountain Ski area. Strong efforts were made to protect the ski area during the fire. The combination of the fire control efforts and the fire breaks formed by the ski runs seems to have been effective in controlling the fire in the ski area and the area around Camp May.

By the spring of 2000, the forests of the Jemez mountains were not in a healthy state. In the upper reaches of many of the canyons, thickets of fir reproduction had developed, were killed by insects and then new reproduction had grown in the insect killed areas. In places, the thickets were nearly impossible to penetrate off the game trails. The "old growth" timber was far past maturity and beginning to die. Most of the areas that had been thinned after the Dome Fire were beginning to regrow in brush and conifer reproduction.

The Cerro Grande fire had a complex pattern of spread over the two week period of its growth. This fire was driven by two main factors. The predominant factor was the wind. The second main factor was the pattern of thick forest and previous fire barriers. The fire was started on May 5 by the NPS against the advice of the FS, Los Alamos Laboratories and the Weather Service. The objective was to clear the thick forestation on the South Slope of Cerro Grande Peak.

The fire burned downhill and upwind until early in the morning of May 8. On May 8 the wind increased and the fire began a run through thick timber, toward the NPS - FS boundary. The fire jumped over a ridge into the thickets at the head of Water Canyon and made a run directly toward the Los Alamos townsite. The fire was temporarily contained on the southeast side by the roads and previous thinning operations near Armstead Spring and

on the mesa north of Water Canyon. The caterpillar tractor fire line between the Armstead Spring road and the top of the ridge helped to prevent the fire from spreading to the South. The previous thinning operations along SR 502 and the LANL boundary held the fire while burning out operations could improve that area of the fireline.

On May 9 the winds abated and the burnout operations along SR 502 continued. An attempt was made to improve the thinning and clearing along the western boundary of the townsite. There are reports that these efforts were resisted by some citizens who wanted to preserve the green boundary of the community. The fire burned slowly through the thinned area on the mesa north of Water canyon and moved toward the top of Pajarito mountain. Had the weather been favorable, the fire would probably have been contained at this point.

VEGETATION OF THE JEMEZ MOUNTAINS

The Jemez mountains span a wide range of ecological types ranging from arid desert to sub-alpine. Near the Rio Grande river the climate is arid. The annual precipitation is around 8 inches per year. The general vegetation description of the lower elevations of the Pajarito Plateau is Pinon - Juniper forest. At an elevation of around 7000 feet, the forest type transitions to Ponderosa Pine. A second transition in forest type begins at an elevation of around 9000 feet to sub-alpine forest. Above this level, various species of fir are found along with large groves of Aspen.

The highest elevations receive around 25 inches of precipitation per year. Much of the precipitation in the Jemez mountains occurs during the summer monsoon season. The mountains of New Mexico have thunderstorms nearly every afternoon. During the thunderstorm season the high humidity and heavy rainfall reduce the danger to very low levels and induce heavy vegetation growth in the vicinity of the mountains and the canyon bottoms.

The driest season in the Jemez mountains is in the period from April to mid June. In this season the weather patterns are generally shifting from domination by North Pacific weather (winter) to Gulf of Mexico weather (summer). Dry, cold front penetration from the North leads to high wind conditions. As these cold fronts pass into the Midwest they often tap moisture from the Gulf of Mexico resulting in the tornado problems associated with the mid west. Continuous winds of 35 to 40 mph with gusts to 75 mph are common during the dry season.

On May 10 the winds increased. At this time the fire was held along SR 502 and the Camp May road. On May 10 and 11 the wind speed was more than 50 mph. Wind gusts to 75 mph were recorded at the Los Alamos Airport. Three elements must be present for a fire to burn. These elements are: fuel, oxygen and heat. A fire spreads by three main means: conduction, radiation, and convection. In a no wind situation, convection carries heat upward and creates winds into a fire area. If the rate of burning is not too high, due to fuel concentration, then the effect of radiation will be to dry the surrounding fire area but conduction in forest floor fuels will be the prime means of fire spread. A strong wind changes the balance of fire behavior. The convection column is brought nearer the unburned fuels and increases the chance of fire spread by flames coming in direct contact with unburned fuel. The combination of steep terrain and strong wind reduces the chance of fire control to nil. The flow of oxygen is increased and at sufficiently high wind speeds there is little that can be done to check fire spread. In the extreme conditions that developed in the Cerro Grande fire, burning branches were torn from trees and cast at least a mile ahead of the fire. The energy release may have been in the multi-Megaton per hour range. Large wind swirls, induced by the terrain, may have helped to spread fire into the western area of the townsite. There is virtually nothing that can be done under these conditions except to attempt to control the direction of fire spread. Even this attempt at fire control is extremely hazardous. In the unstable spread conditions, fire fighters can become trapped in a few seconds and their chance of survival would be very small. Only heroic action on the part of both structure and wildland fire fighters kept the fire from spreading down Los Alamos Canyon and the deepest reaches of Pueblo Canyon. Had the fire advanced into these canyons the entire Los Alamos townsite would probably have been lost.

On the May 25, I flew a member of the Ski Club over the Pajarito ski area to photograph the ski area for assurance purposes. My comments on the first stages of the Cerro Grande fire are, in part, based on my observations from the air. The forest canopy in the mesa area above SR 502 is still green and the trees may survive the fire. In the fir forest above the mesas where there are no roads and where there has never been any logging, the devastation is nearly complete.

"Controlled Burning" is a viable tool among several other tools that can be used to control wildfires in forests and communities. Most of my fire fighting experience is in the forests of western Oregon. In those forests the time of greatest fire danger generally includes the months of June, July and August. Controlled burning would not even be considered in those forests during the summer months except in rare summers with low fire

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Dr. Mansfield grew up in the mountain west. His father was a career US Forest Service officer. During his formative years, Dr. Mansfield lived at Bear Valley Ranger Station in the Malheur National Forest in northeastern Oregon. He received his first training in forest fire control at the age of 7 when his father took him to two small forest fires. His father showed him some of the techniques for fighting forest fires.

In 1948, his father was transferred to the Siskiyou National Forest, headquartered at Grants Pass, Oregon. While attending college, Dr. Mansfield spent two summers working in forest engineering doing preliminary road surveys. He then became a Smokejumper and spent 11 seasons fighting forest fires. He parachuted to 63 forest fires and traveled to 10 other fires on the ground. His fire experience ranged from small fires, only a few feet across, to major project fires that ranged up to 25,000 acres.

Dr. Mansfield and his family moved to Los Alamos in 1973. He worked at the Los Alamos National Laboratory from 1976 to 1993. Since his retirement in 1993 from the University of Californian, he has continued his work in high technology research and development.

Dr. Mansfield is an avid outdoorsman and pilot. He has hunted extensively in the area of the Cerro Grande fire from the Bandelier National Monument boundary to Pajarito Mountain. He is intensely familiar with the terrain, ground cover and forest that existed in this area before Cerro Grande fire.

conditions. The time of greatest fire danger in New Mexico and Arizona is in the months of May and June. For many years the Smokejumper base at Silver City, New Mexico is activated in April and its operations nearly cease in July with the arrival of the Monsoon season.

Other tools that can and should be employed, in a balanced manner, include logging, thinning by various means including firewood gathering by the public, road and trail construction, brush removal and grazing by livestock. Aggressive fire suppression must be employed during the times of greatest fire danger whether the land is maintained by the NPS or USFS. The charters of the NPS and FS differ greatly. The NPS mission is to preserve a few areas of especially scenic and or cultural value. This mission for the NPS should be maintained

as such and not used as a means of conserving land that would be better managed by the Forest Service (US Department of Agriculture) or Bureau of Land Management (US Department of the Interior). The FS should be allowed to carry out its traditional mission of managing the FS lands under a multiple use plan that makes the resource of wild lands available of all US Citizens. Reasonable people may disagree on the balance of usage of FS lands but the needs for timber, grazing, watershed, minerals and recreation have been a part of the American culture in the past and will be felt in the future. The FS has set some of its lands aside for many years as Wild or Wilderness areas to be used primarily for recreation. There are other areas that, although they have some scenic value, are primarily

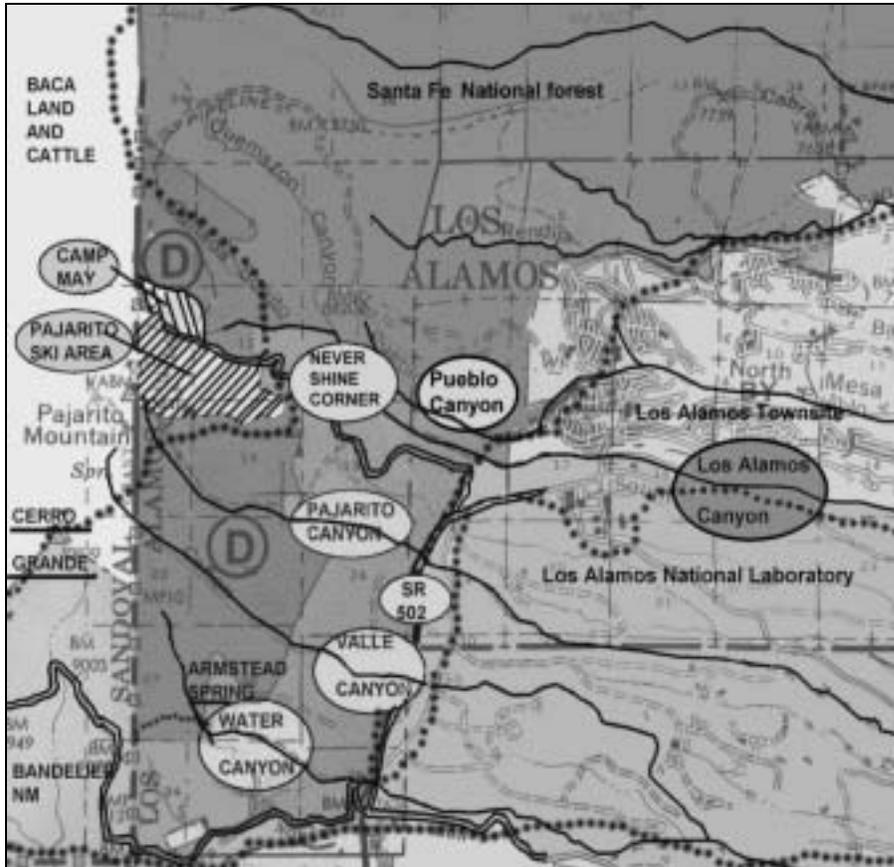


Figure 1 Southern portion of the Cerro Grande Fire. Landmarks mentioned in this paper are enclosed in ellipses. Cerro Grande Peak is shown in the center left. The areas marked with a circled “D” are areas set aside as endangered species refuges.

suitable for timber and watershed management.

The fire control planning in Los Alamos County was basically good; but, in some respects it did not go far enough. Given the weather preceding and during the Cerro Grande fire it might have been difficult to contain the fire even if stronger measures in fireproofing the forests of the Jemez Mountains had taken place. From one's armchair it is easy to point out that there were weak spots in the defense such as the thickets on the south side

of water canyon and near "Never Shine Corner" on the Camp May road. The thinning of the Ponderosa forests west of the LANL property appears to have done some good in delaying the fire but thinning in the sub-alpine fir forests was not done for a multitude of reasons. A considerable source of danger to the community remains. The vegetation in Los Alamos canyon Pueblo canyon and the side drainages such as Deer Canyon is far too dense. A prime example is the pine reproduction near the Airport Fire station. While a green area on the approach to the community is attractive, the loss of this fire station during a major fire would be catastrophic. As the forests of the Jemez mountains regrow, management of those forests from the standpoint of fire control must be a major consideration. A balance must be struck between the desire of having a beautiful wilderness setting for the community and having a community.

The National decisions that have lead away from a balanced multiple use policy in forest management to a policy of preservation must also be examined. The cornerstone of the preservation movement has been the use of "Controlled Burns" to remove excess materials from the forest. As we have seen in the case of the Cerro Grande fire as well as the cases of the recent fire near the Grand Canyon, the fire near Redding, California last year and even the Yellowstone National Park fire these fires can rapidly become uncontrolled. An uncontrolled fire can do far more ecological damage than the use of other forest management tools.