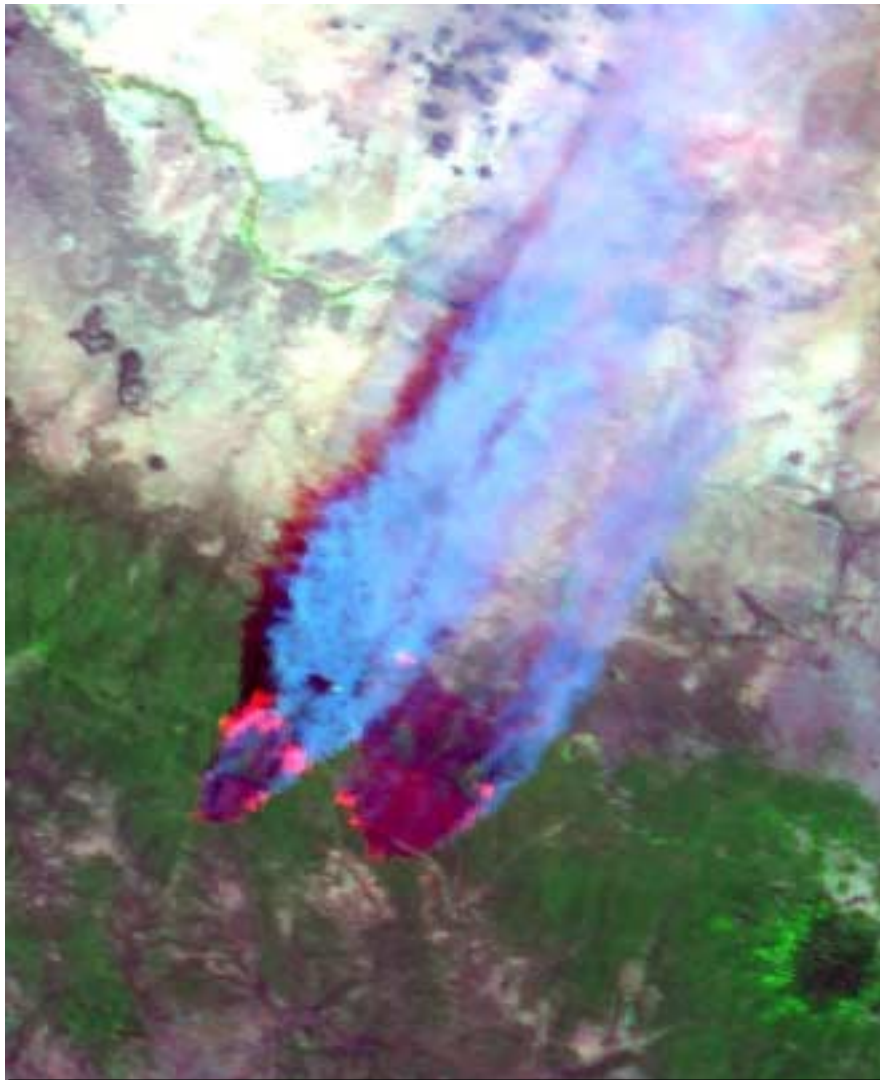


Analysis of Land Ownership And Prior Land Management Activities Within the Rodeo & Chediski Fires, Arizona



Rodeo-Chediski Fire

June 22, 2002

MODIS Satellite Image

**July 7, 2002
Pacific Biodiversity Institute**

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Introduction

The Rodeo and Chediski Fires are human caused fires that started on the White Mountain Apache Indian Reservation in Arizona on June 18 and June 20, 2002. As of July 2, 2002 the fires have burned over 467,000 acres of ponderosa pine forest, pinyon-juniper woodlands, and some non-forested areas. The fires started during a very hot and dry summer after an extended drought. There has been considerable political debate about the circumstances that led to these severe fires. Some local and national politicians have been quick to blame environmentalists for appealing logging programs on National Forest land. The politicians claim that logging might have prevented the widespread effects of the fires.

We conducted this study to determine the previous management history of the land that has burned in the Rodeo and Chediski Fires and to determine if it was in fact affected by the actions of environmental organizations. We also looked at whether better management of the National Forests could have prevented the circumstances that led to these severe fires. In our conclusions and recommendations we address how the effects of these fires could have been reduced through better forest management and actions of private homeowners.

Methods

We conducted our study using state-of-the-art spatial analysis tools including geographic information system (GIS) software and image analysis techniques. The study followed a similar methodology to that developed in two previous studies (Morrison et al 2000, 2001).

We obtained GIS data of the fire progression, fire boundaries and hot spots and other information from the US Forest Service and Bureau of Land Management (BLM). We obtained historical aerial photography (1972 & 1973) from the University of Arizona and Arizona State University and more recent aerial photography (1997) from the Terraserver Internet website (www.terraserver.com). Two Internet websites provided recent and historical Landsat TM7, TM5 and MSS satellite imagery. Land ownership data was obtained from the State of Arizona.

We examined the fire perimeters and the fire progression polygons in relationship to land ownership, locations of logging roads, aerial photographs and satellite imagery. We then examined the pre-fire condition of the forest within the fire area using standard GIS and image analysis techniques.

Fire Progression and Land Ownership Within Fire Boundary

Both the Rodeo and Chediski Fires started on the White Mountain Apache Indian Reservation. The Rodeo fire began on June 18, 2002. During the first two days, it spread rapidly to 55,000 acres, all within the White Mountain Apache Indian Reservation. The Chediski Fire started on June 20 and also spread rapidly for the first two days entirely within the White Mountain Apache Indian Reservation. Only on the third day (June 20), did the Rodeo Fire start burning into National Forest land, over 12 miles east of the ignition point. By then, the two fires had burned nearly 137,000 acres, but only 33% of this was National Forest land. The two fires merged by June 23 to form the Rodeo-Chediski Fire Complex (Figure 1).

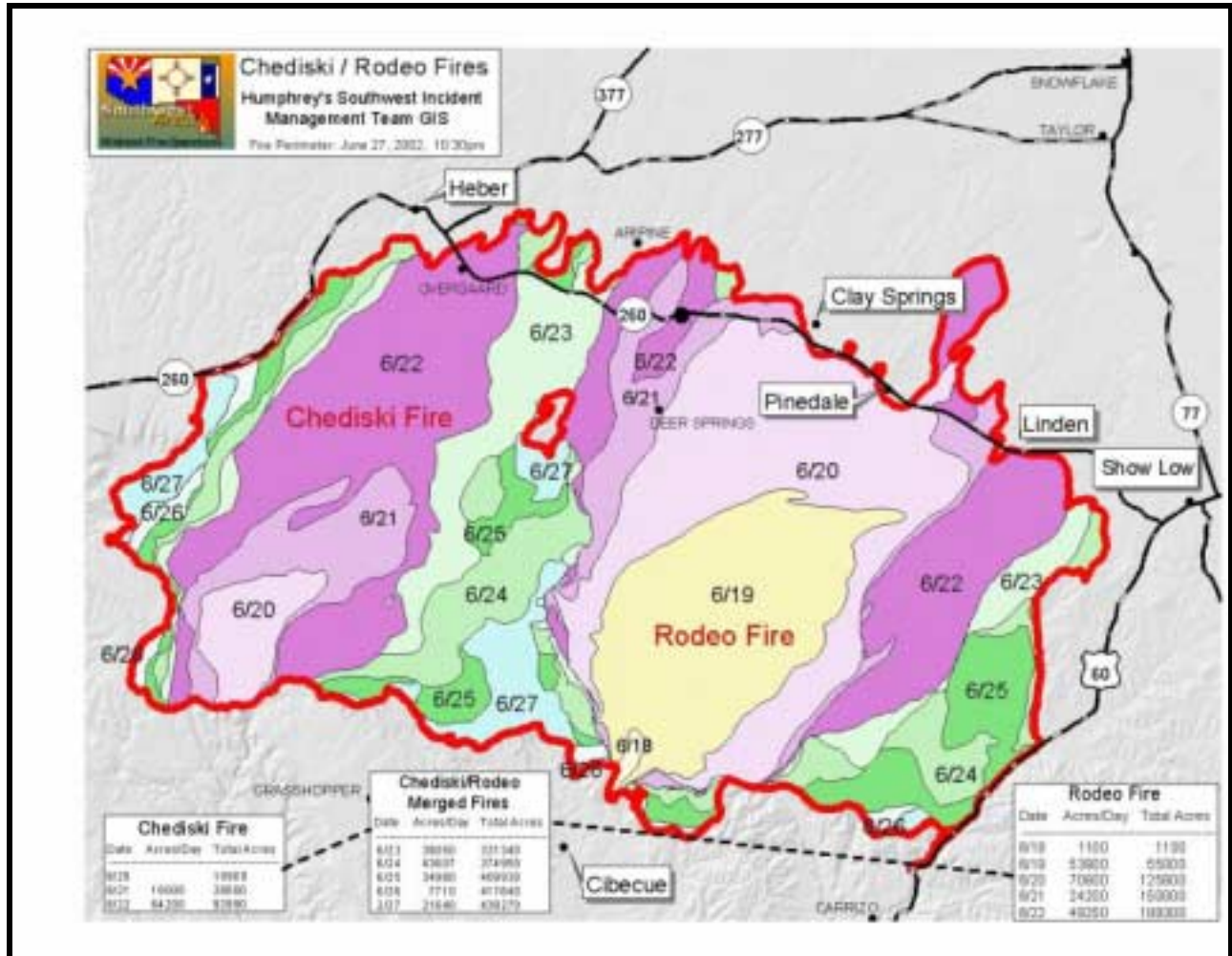


Figure 1. Fire Progression of the Rodeo-Chediski Fire Complex (Bureau of Land Management)

By June 30, the combined Rodeo-Chediski Fires had burned over 465,000 acres of land. About 38% of this was on the Apache-Sitgreaves and Tonto National Forests (Figure 2 and 3). Most of the fire occurred in the White Mountain Apache Indian Reservation (279,825 acres or over 60% of the fire area).

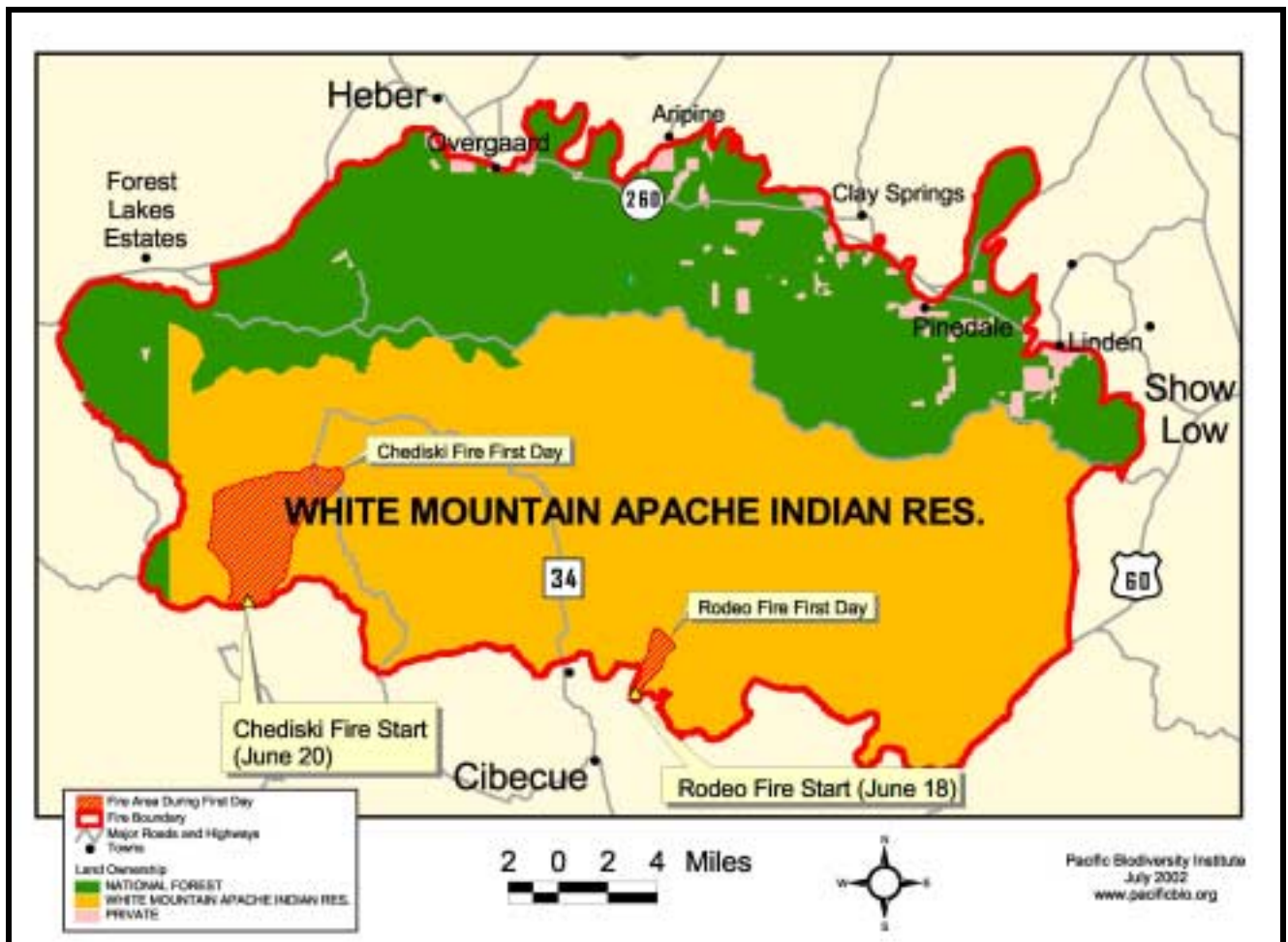


Figure 2. Land ownership within the Rodeo-Chediski Fire Complex Boundary as of June 30, 2002.

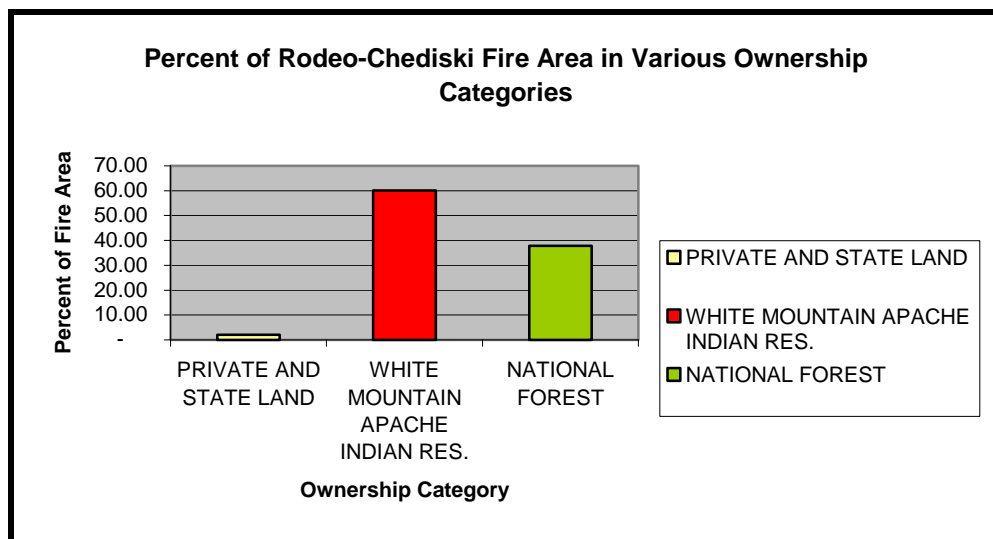


Figure 3. Land ownership in the Rodeo-Chediski Fire Complex, June 30, 2002.

Prior Land Management Activities Within the Rodeo-Chediski Fire Area

Most of the Rodeo-Chediski Fire area has a long history of logging and associated road building. The extensive network of logging roads and other roads that is present on both the White Mountain Apache Indian Reservation and the National Forest lands attest to this activity (Figure 4.) **Within the fire area, there are over 2145 miles of logging roads and other roads.** Some minor logging roads are not included in this total. This amounts to an average road density of nearly 3 miles of road per square mile. In many places the fire crossed over 25 roads before reaching its current perimeter. These roads were not effective firebreaks.

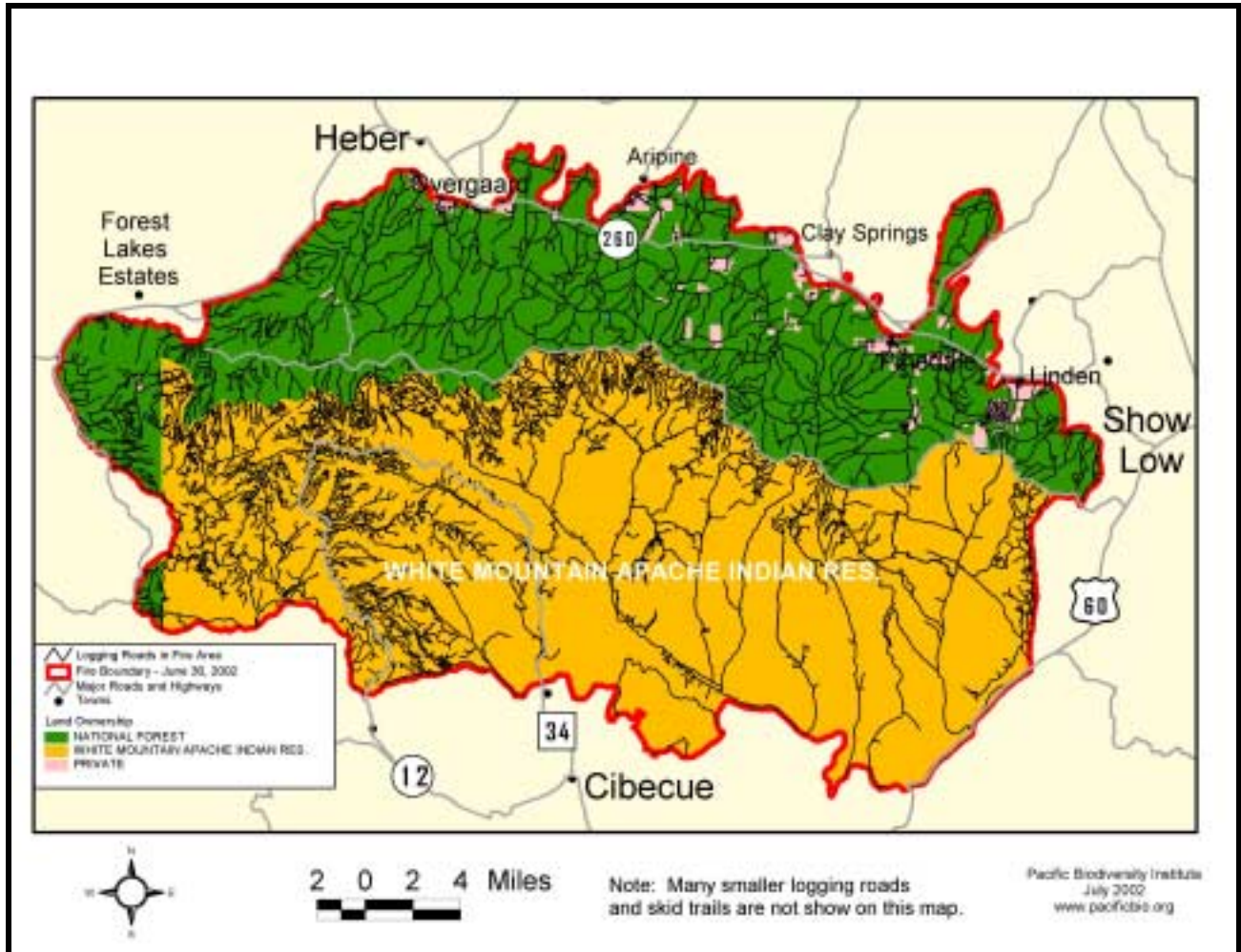


Figure 4. Network of logging roads and other roads in the Rodeo-Chediski Fire Area, Arizona, as of June 30, 2002.

Although of many National Forests in Arizona contain Wilderness Areas and roadless areas, no roadless areas or Wilderness occurs within the Apache-Sitgreaves or Tonto National Forest portions of the Rodeo-Chediski Fire Complex. The National Forest land within the fire area was not protected by Congressional or administrative actions. Several small, de-facto roadless areas occur on the White Mountain Apache Indian Reservation within the fire boundary.

The Chediski Fire started in an area of the White Mountain Apache Indian Reservation that was heavily logged about 50 years ago. Historic logging activity is evident in aerial photos taken about 30 years ago. Those photos show high logging road density, logging scars, open areas and dense young stands that resulted from earlier logging (Figure 5). Examination of recent aerial photography indicates that little attempt has been made to thin the dense stands on the White Mountain Apache Indian Reservation that grew back after the logging operations.

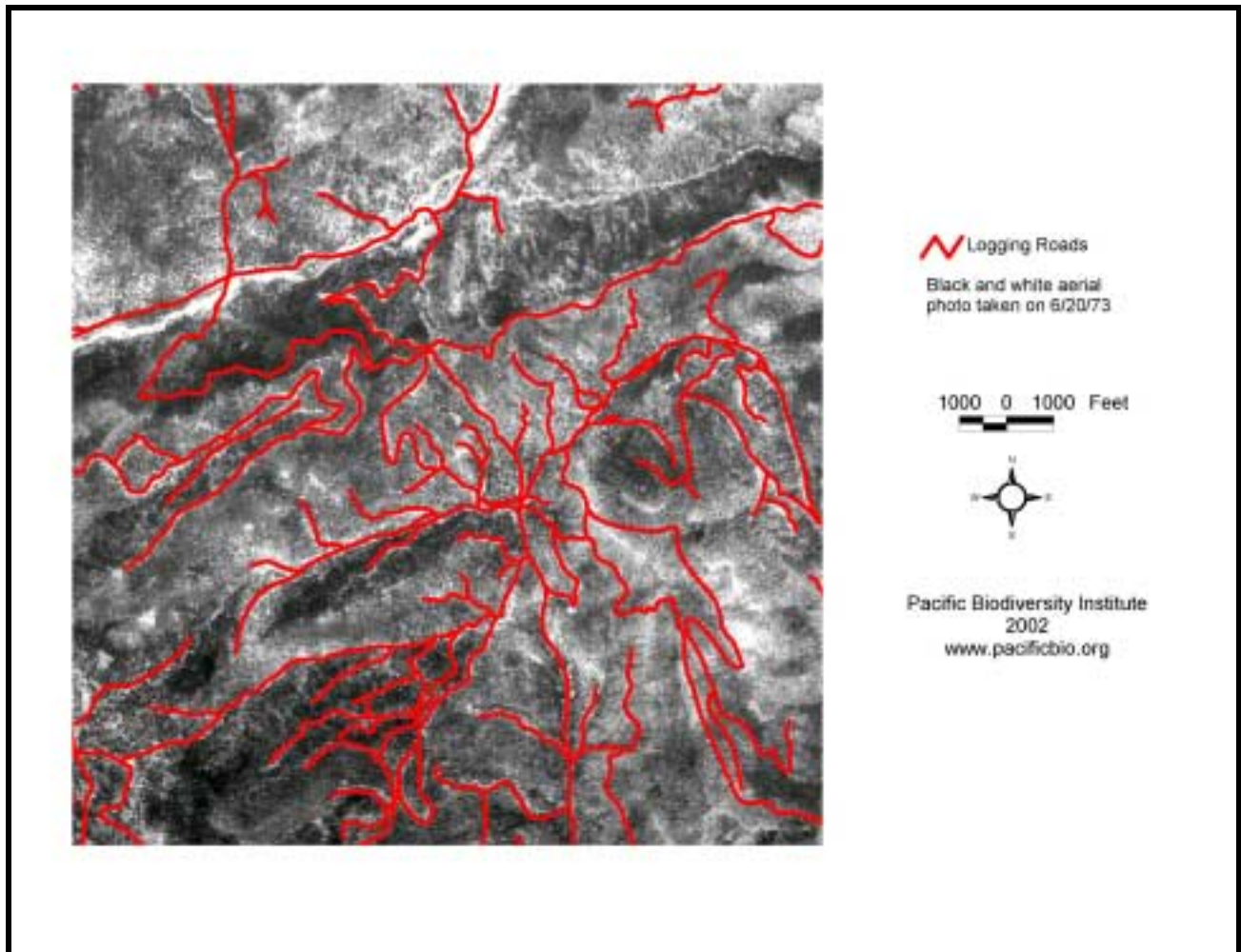


Figure 5. Logging roads and dense young stands (light gray areas) resulting from logging about 50 years ago in the White Mountain Apache Indian Reservation. This area was burned severely by the Chediski Fire on June 21, 2002.

The stage for the Rodeo and Chediski Fires was set over the last 50-60 years. Signs of logging, which occurred throughout the last 50 years, are evident throughout the Rodeo-Chediski Fire Complex area (Figure 6). Some sites that were not logged in the first round of logging were logged later in the 1980's and 1990's. Generally, these previously logged areas grew back into dense young forests that were never thinned. Most of the large fire-resistant old trees removed during the logging operations were replaced by dense young forest that is highly susceptible to high intensity crown fire. Initial examination of satellite imagery taken during the fires indicate that most of the area in the Rodeo-Chediski Fire Complex was severely burned.

Logging of the forests in the area burned by the Rodeo and Chediski fires has continued to the present. Recent logging is evident in both the National Forests and in the Indian Reservation. A comparison of aerial photography taken in 1972 and 1997 reveal areas where logging roads were built in the 1950-1972 period to allow for selective logging of old-growth ponderosa pine (Figure 7). Then more extensive logging was undertaken in a series of more recent timber sales where the remainder of the old-growth and some younger trees were cut (Figure 8). Many areas throughout the fire area exhibit a similar pattern of a sequence of timber sales focused primarily on the removal of large trees (Figures 9 and 10) – not on the reduction of hazardous fuels.

Not all the Rodeo-Chediski Fire Complex was logged. The south eastern portion of the fire area that lies within the White Mountain Apache Indian Reservation appears to have burned in a wildfire in the first part of the 20th century and has regrown into a mature forest that has not yet been logged (as of 1999). Several significant

portions of the fire area burned during the last 50-60 years in fairly extensive wildfires. Some salvage logging may have been done in some of these older burns, but it is hard to decipher from the imagery that was accessible to us.

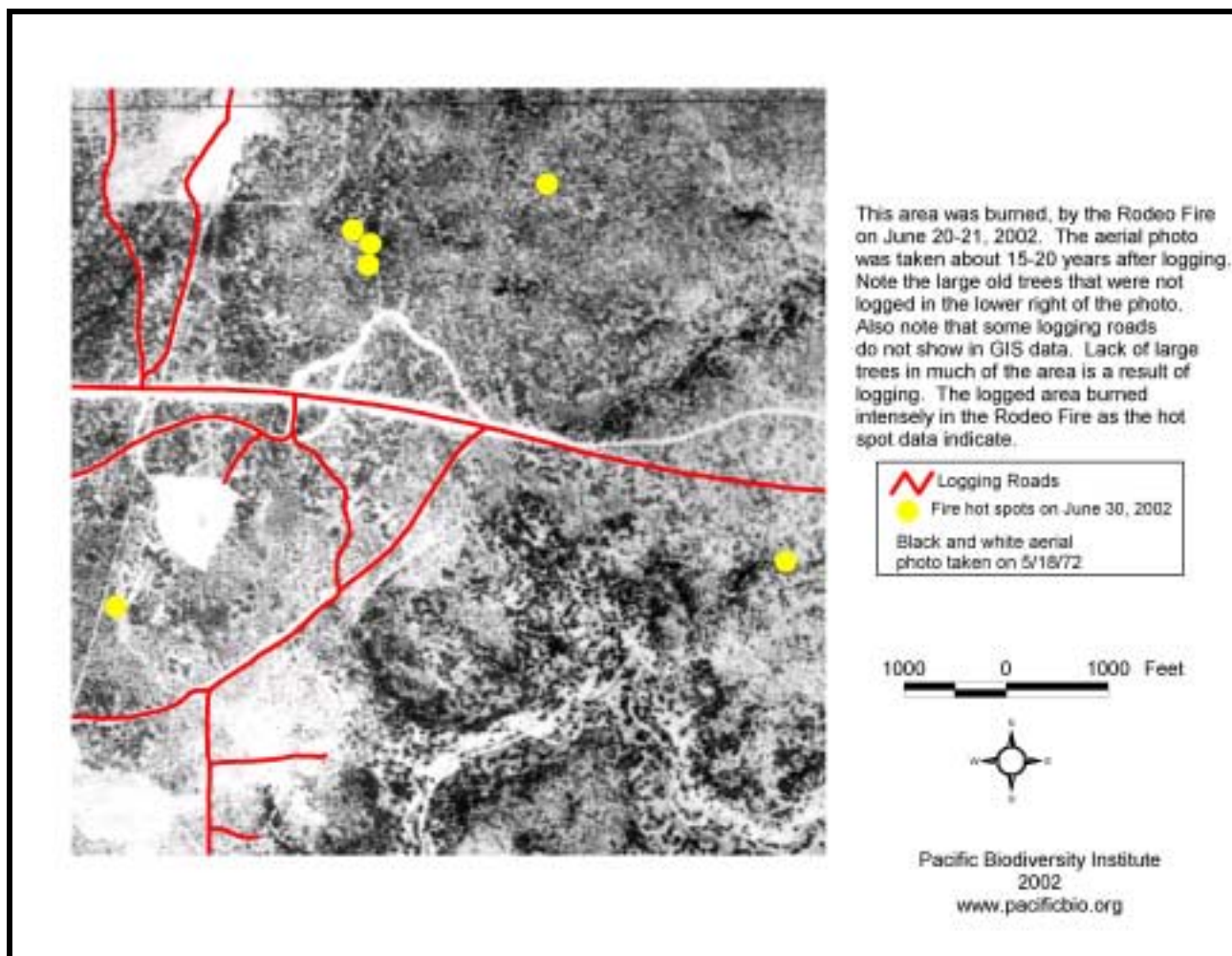
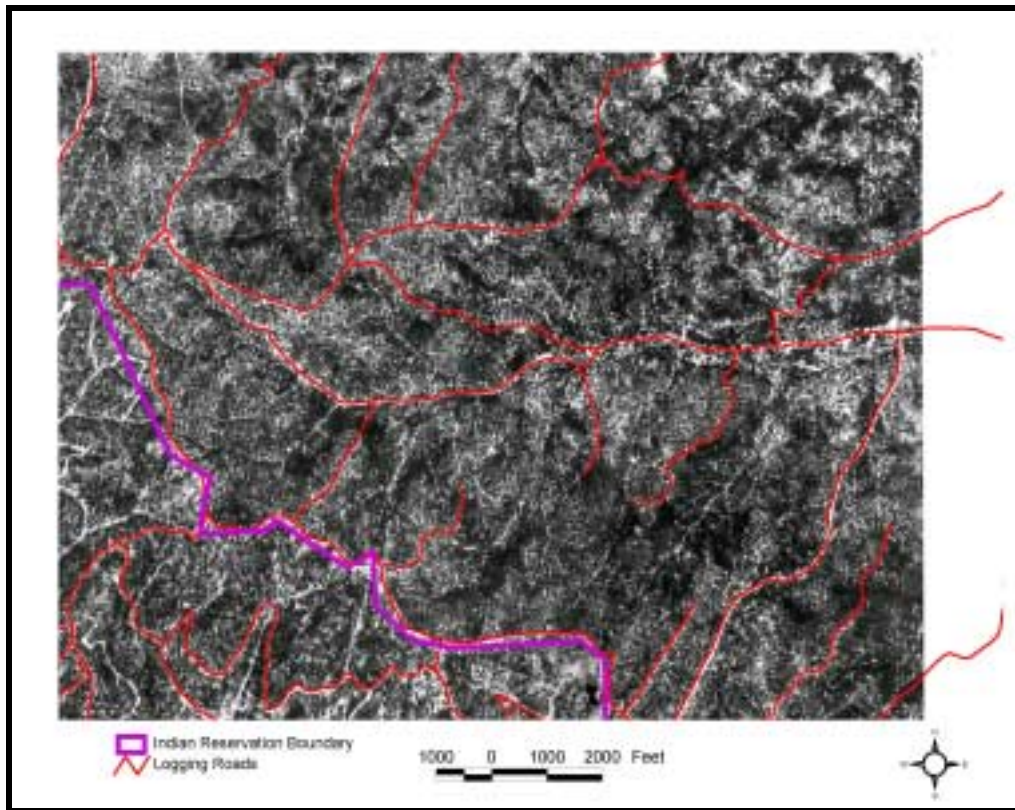
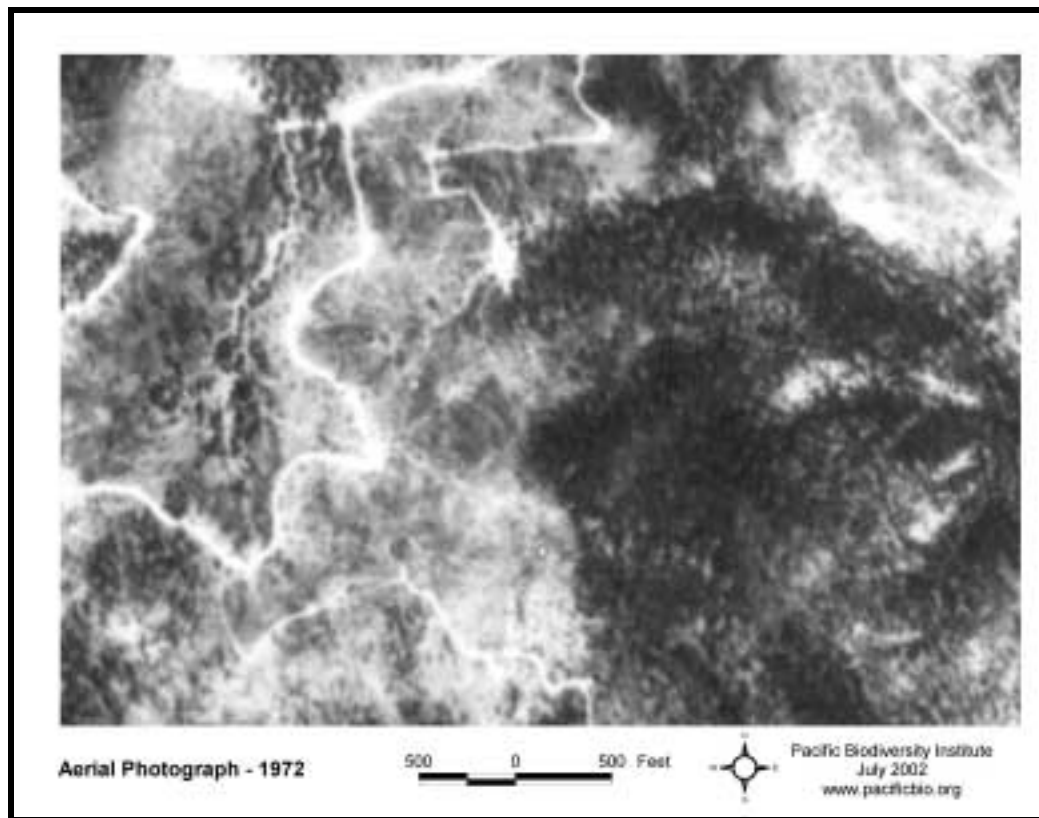


Figure 6. Logging roads and dense young stands developing after logging about 40 to 50 years ago in the Apache-Sitgreaves National Forest about 3.5 miles west of Clay Springs, Arizona.

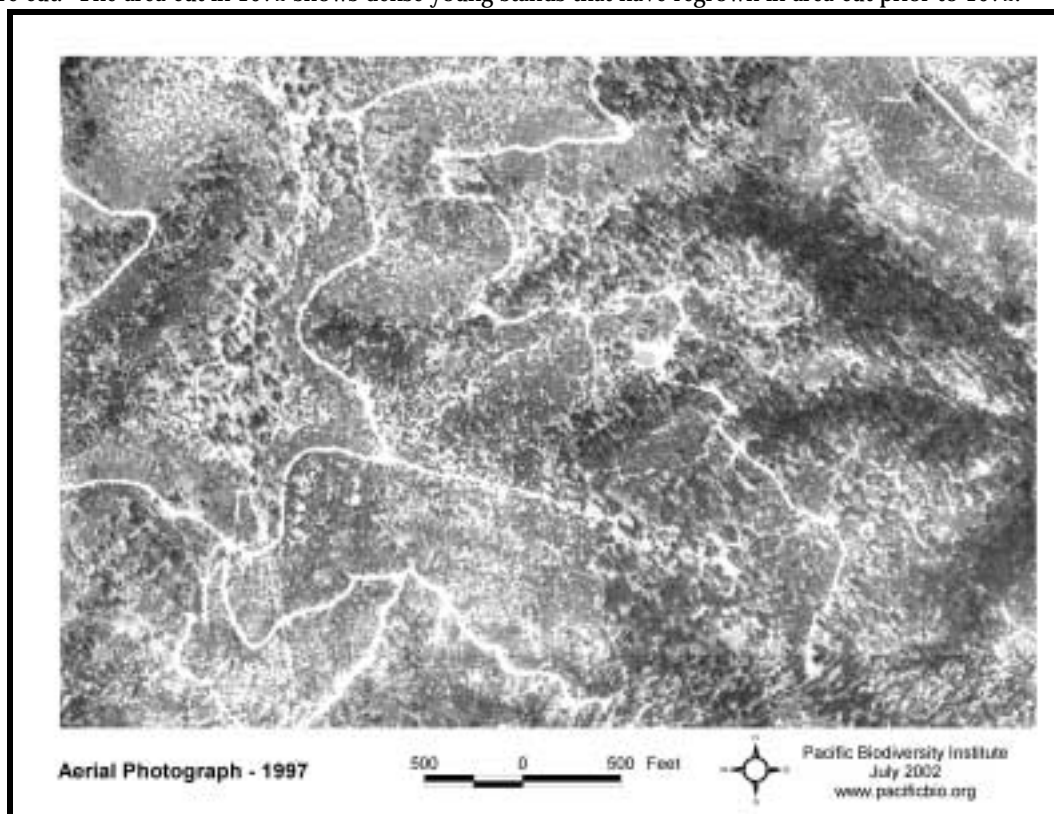


Figures 7 (above) and 8 (below). Aerial photos of the same area on the Apache-Sitgreaves National Forest and the White Mountain Apache Indian Res. from 1972 (above) and 1997 (below). Recent logging units on the Apache-Sitgreaves National Forest show in the 1997 photo below as light areas without large trees. Compare this to the 1972 photo above where logging roads are in place and some logging of large trees is evident but many old-growth pines remain.





Figures 9 (above) and 10 (below). Aerial photos of the same area of the White Mountain Apache Indian Res. from 1972 (above) and 1997 (below) burned in the Rodeo-Chediski Fire Complex. By 1972 much of the left side of this area had been cut (light areas above). By 1997, most of the remaining old trees (dark areas in 1972 photo, but light in 1997 photo) were cut. The area cut in 1972 shows dense young stands that have regrown in area cut prior to 1972.



A National Perspective

Despite the widespread belief that most wildfires occur on National Forests, only a small percent of the total amount of land burned across the nation lies with the National Forests. Over the past decade, only 17.7% of area burned by wildfires across the nation has been in the National Forests (Figure 11). This year, 2002, is slightly higher than the ten-year average, but as of July 2 only 27% of the area burned by wildfires is in the National Forests (Figure 12).

The percent of total burn area on National Forest this year is also slightly higher than the last two years (year end). In 2000 (year end) 25% of the total burn acreage was on National Forest and in 2001 (year end) 17% of the total burn acreage was National Forest (Figure 11). Some years experienced very little burn on National Forest. In 1998 and 1997 the lowest total acres of National Forest burned. These years also had the lowest proportion of burn on National Forest; in 1998 only 9% was on National Forest and in 1997, only 5% was on National Forest. ***These figures from the past decade clearly demonstrate that National Forests are only a small part of the land burned in wildfires.***

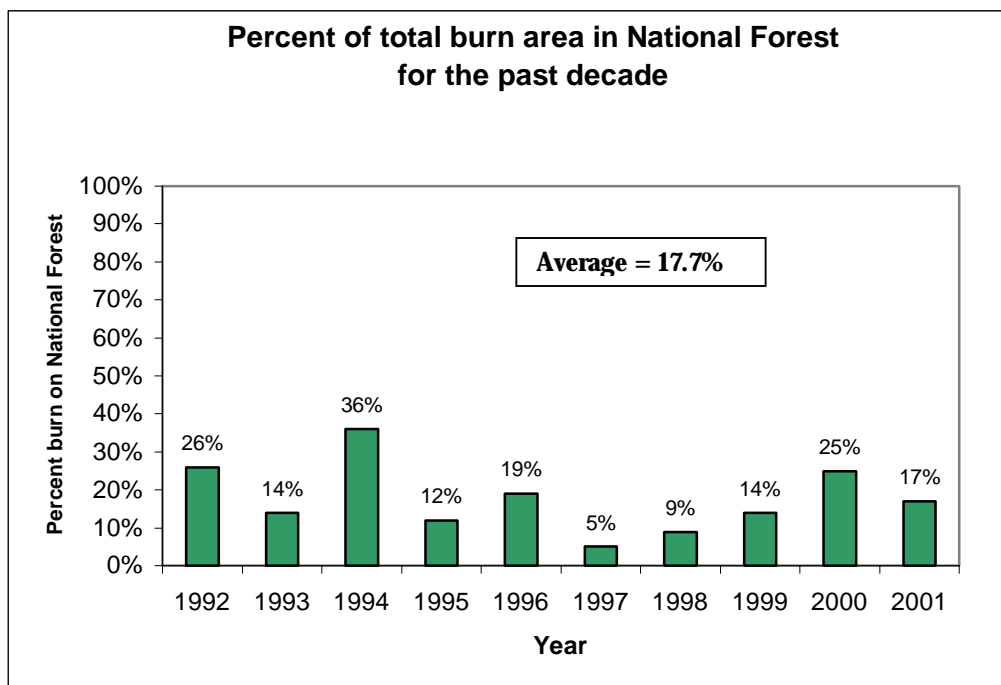


Figure 11. Percent of total burn area in National Forest for the past decade.

Includes mainland United States and Alaska. 10-year average area on National Forest = 17.7%.

Data from the National Interagency Coordination Center (<http://www.nifc.gov/news/nicc.html>)

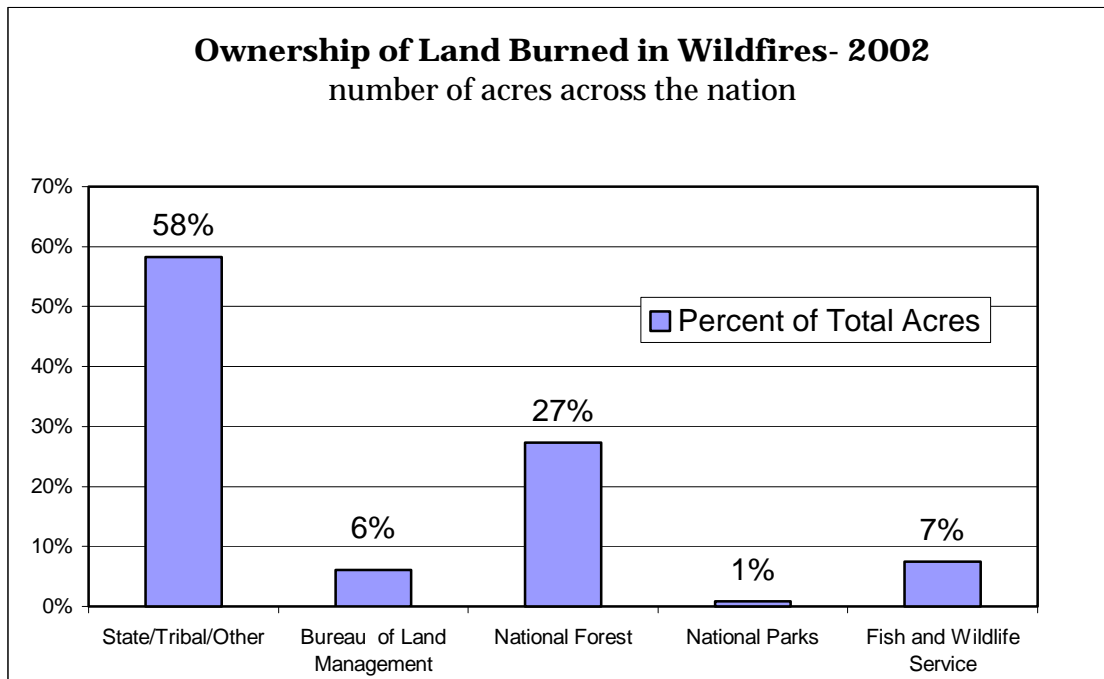


Figure 12. Ownership of land burned in wildfires, year-to-date as July 2, 2002 by number of acres. Acreage figures include the mainland United States and Alaska. Data from the National Interagency Coordination Center (<http://www.nifc.gov/news/sitreprt.rtf>).

The condition of the landscape in the Rodeo-Chediski Fires is typical of many landscapes burned by large wildfires in the west in the past two years. The Valley/Skalkaho Fire Complex in western Montana was the largest fire complex during the year 2000 in the United States, burning over 282,000 acres. These fires started in an intensely roaded landscape managed for grazing and timber production. They blazed across hundreds of roads and extensively logged areas before the fires stopped (Morrison et al 2000). Likewise, the 83,500-acre Jasper Fire grew into a huge firestorm in an extensively logged and roaded landscape (Morrison et al 2000). Of the eight largest wildfires (over 50,000 acres) that burned across the western United States in 2001, **five burned primarily through shrub and grassland**, and three were in forested areas (Morrison et al 2001). **Of those fires that burned through forested areas, two ignited and burned primarily through lands that were heavily logged.**

Discussion

The cause of the Rodeo-Chediski Fire Complex and the conditions that led to its extensive spread and severity were not the result of environmental protection of National Forest land. These fires started and quickly became a large firestorm on the White Mountain Apache Indian Reservation, before even entering National Forest land. Therefore, National Forest land management activities and **National Forest fire policy had little to do with the development of these fires.**

The Rodeo & Chediski fires spread through a landscape with extensive evidence of prior logging and road building. Although parts of the area were less heavily managed, little evidence of environmental protection is present in this landscape. The logging road density in parts of the Rodeo-Chediski Fire area is one of the highest in the nation. **With over 2100 miles of roadway within the fire perimeter, there was certainly adequate road access for fire suppression activities.** These roads did not serve as effective firebreaks, but they did provide access to the people who started both fires. Across the nation, over the last decade nearly 90% of all wildfires were human-caused (National Interagency Fire Center), and the vast majority of these fires start on or adjacent to roads. The circumstances surrounding the Rodeo-Chediski Fire Complex add to the overwhelming evidence that building more roads through our forests will not help prevent wildfires.

Land management decisions were made on both tribal and National Forest land to log the larger trees in much of the area that was eventually burned in these fires and to manage it as commercial forestland. Most of the old, large, fire-resistant, ponderosa pines were removed during logging operations. Small trees were left and many more small trees grew up to fill the gaps created by removal of the large trees. The White Mountain Apache tribe and the US Forest Service often did not follow through with optimal forest management activities after logging the old-growth pines. In most cases, they appear to have failed to conduct precommercial and commercial thinning operations to reduce the stand density of the dense, young forest that resulted. The US Forest Service should have initiated extensive pre-commercial thinning operations and prescribed fire 20 to 30 years ago in its young second-growth forests. Rather than focus on prescribed burns and thinning of small, densely packed trees to maintain the health of this young second-growth forest, the US Forest Service continued to prepare timber sales that largely focused on removal of large trees. The White Mountain Apache tribe had an active prescribed fire program for many years on its forestland, but this program appears to have been largely discontinued. In both case, forest managers could have developed a forest management plan that used thinning of small trees and prescribed fire to help create a forest structure that would more likely survive and rapidly recover following forest fires.

The wildfire exclusion policy that has dominated management of both tribal and federal forestland for the last century also is responsible for setting the stage for the Rodeo and Chediski Fires. There are some notable exceptions to this rule (e.g. the Spokane Tribe which manages its forests with active thinning and prescribed fire). Many events set the stage for the Rodeo and Chediski fires over the last century – but environmental protection activities were not part of this mix.

Although some politicians have tried to blame environmental groups for this fire, we find no evidence for this claim. The Rodeo-Chediski Fires burned primarily through Native American land, where environmental activist organizations have had no influence on forest management activities.

In both the tribal land and the National Forest, the evidence from historical aerial photography and current satellite imagery indicates that the timber interests cut many of the large trees but did not undertake adequate measures to reduce fire potential within the young stands that resulted. Before the Rodeo-Chediski Fires swept through, much of this landscape suffered from intensive logging, road building and then neglect by forest managers for 15 to 30 years.

We hope that our rapid assessment of the Rodeo-Chediski Fire Complex and the conditions that led to this conflagration will be followed by more comprehensive studies of these fires once the smoke has cleared and more information is available. These fires adversely affected many people and they deserve a more thorough study, which hopefully will shed more light into how to prevent similar damage in the future.

Recommendations and Conclusions

1. It's critical that policymakers and local communities impacted by wildfires understand the facts about severe wildfires like the Rodeo & Chediski fires before jumping to conclusions or laying blame. ***Initial political commentary on the Rodeo-Chediski Fire Complex presented a rather incomplete picture of the situation to the general public.*** Those analyzing and commenting on the wildfires need to take a hard look at the data, where these fires started, where they spread, and historical management practices that shaped the condition of the lands before forming their opinions of the cause and solutions.
2. The conditions that lead to severe wildfires are complex. There is widespread agreement among fire managers, scientists, many environmental groups and even some in the timber industry about some obvious places to start in crafting an economically and ecologically sound wildfire policy. This policy would center on three key action steps: first, create fire-resistant rural communities by creating fire-safe homes; second, create fuel-free, defensible space around homes in rural, fire prone areas; and third, conduct regular prescribed burning in forests, shrublands and grasslands as the most cost-effective way

to reduce the fine fuels that dry out easily and often are responsible for carrying a fire through the landscape.

3. There is a need for significantly more federal fire money, but it should be allocated to local, state, tribal and private sectors of our society, not just the Forest Service. Over the last ten years, only 17% of the area burned by wildfires was in the National Forests. Most of the land burned was in tribal, private and state managed land. We recommend putting most of the fire money where the fires occur, where it will do the most good.
4. Managers of commercial forestland in southwestern ponderosa pine forests need to do a better job of following through after logging operations have been completed. First, prescribed burning of slash created by the logging operation is essential. Later, pre-commercial thinning (hand thinning of small trees – usually less than six inches in diameter) and then commercial thinning (thinning of somewhat larger trees of sufficient size to have commercial value) of the young stand that develops following logging is necessary. Finally, regular prescribed fire needs to be an integral part of any commercial forest management plan in southwestern forests. Logging that focuses on the removal of large trees will lead to situations similar to what developed in the much of the area burned by the Rodeo and Chediski Fires.
5. The issues involved with management of wildfires and preparation for wildfire are exceedingly complex and there are no easy answers. There are many issues and factors to consider – and most “solutions” have not been adequately tested. More research and experience is needed before our society finds the optimal approach to living with the inevitability of wildfire in the western United States.

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