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CERRO GRANDE FIRE ASSESSMENT PROJECT: An Assessment of the Impact of the Cerro Grande Fire on Cultural Resources at Los Alamos National Laboratory, New Mexico

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ABSTRACT

This report represents nearly two years of the Cerro Grande Fire Assessment (CGFA) Project. The project included the survey and assessment of cultural resources at Los Alamos National Laboratory (LANL), New Mexico, the need for which was brought about by the Cerro Grande Fire in May of 2000.

On May 4, 2000, the National Park Service ignited a controlled burn on the summit of Cerro Grande Peak in the Bandelier National Monument. That night, strong winds blew the fire out of control, and on 5 May the controlled burn was officially declared a wildfire. The town of Los Alamos and surrounding communities were quickly evacuated as the fire moved dangerously close to homes. As wind speeds increased and fire fighters were unable to impede the progress of the fire, it continued to grow and rage uncontrollably. The Cerro Grande Fire was not contained until 6 June, more than one month after it had started.

A total of 47,650 acres was consumed by the Cerro Grande Fire, and more than 200 structures in the town of Los Alamos and 100 structures on LANL land were damaged or destroyed. Also, a wide variety of LANL projects and scientific records were destroyed in the fire. When the fire was finally contained, it had caused more than one billion dollars in damage. Four hundred and eighty archaeological sites, both ancient and historic, were located within the burn area. Cultural Resources Management Team archaeologists assessed 470 of the sites and found fire related damage to 340 of them. This report details the damage to these sites and the subsequent mitigation and rehabilitation resulting from the CGFA Project.

While the causes, nature, chronology, and consequences of the Cerro Grande Fire have been well documented in a number of reports (DOE 2000; LANL 2000, 2001a, 2001b). The impacts of the fire on the cultural resources of LANL and other agencies are just beginning to be understood and summarized (e.g., Masse et al. 2001); our volume is a contribution to this task.

Chapter 1

Introduction

W. Bruce Masse and Jennifer E. Nisengard

The Cerro Grande Fire was ignited as a controlled burn on May 4, 2000, and the next day was officially declared a wildfire. The fire lasted for slightly more than a month and its impacts continue to be felt today throughout Los Alamos County and surrounding areas. When the fire was officially contained on 6 June 2000, it had caused more than one billion dollars in damage. In addition, buildings associated with the Los Alamos National Laboratory (LANL) were destroyed or damaged; the impacts on the Laboratory's natural and cultural resources are only beginning to be understood. Several projects have been, and continue to be, conducted to assess the damage to these resources; the Cerro Grande Fire Assessment (CGFA) Project is one of these projects. The primary goal of the CGFA Project is to determine the degree and extent of fire damage (Figure 1.1) sustained by cultural resources on LANL lands.

To date, there are more than 2,000 known archaeological sites managed by LANL. While a few sites date to as early as 8000 BC, the great majority of these sites represents the ancient Ancestral Puebloan peoples that inhabited much of the Pajarito Plateau from AD 600 to 1500. Some of the archaeological sites belong to the Homestead period (ca. 1890 to 1943). In addition, LANL manages several hundred buildings and structures that have historical significance in relation to the Manhattan Project (1943 to 1946) and the Cold War (1947 to 1989). Because the Cerro Grande Fire burned so intensely, extensively, and for such a long period of time, many archaeological and historic cultural properties were impacted.

This is not the first time that archaeologists have sought to understand the impact of fire on archaeological resources at LANL. After the June 1977 La Mesa Fire, LANL archaeologist Charlie Steen conducted surveys on LANL lands that included burned portions within Technical Areas (TA) 49 and 37 near LANL's southern boundary. Steen [1982:2] notes: *"Most of the Indian house sites were found after the severe June 1977 forest fire—La Mesa fire. Hundreds of acres of Los Alamos lands were burned over during that blaze and I later searched the area to learn whether the intense heat had damaged ruins. The answer to the question was no. The unconstrained heat of the fire had passed into the air and there was no apparent damage to remains that laid below the duff/humus zone of the forest floor.*

It is difficult to understand the basis for Steen's claim of "no impact" by the La Mesa Fire on archaeological resources at LANL. He presumably based his remarks on the survey and on his excavation of a single burned pueblo roomblock (LA 15866A) in TA-49. However, even his photographs of this excavation (Steen 1982:Figs. 44, 46) suggest that the surface stones of the roomblock had been altered by the fire. He curiously also fails to note that a nearby Homestead period cabin structure (LA 15866B) had its wooden elements totally destroyed by the fire, a fact that is evident in photographs of the cabin location (Steen 1982:Fig. 6). Likewise, our current study of TA-49 and TA-37 suggest that erosion is now somewhat rampant in those very archaeological site areas most severely burned by the La Mesa Fire.

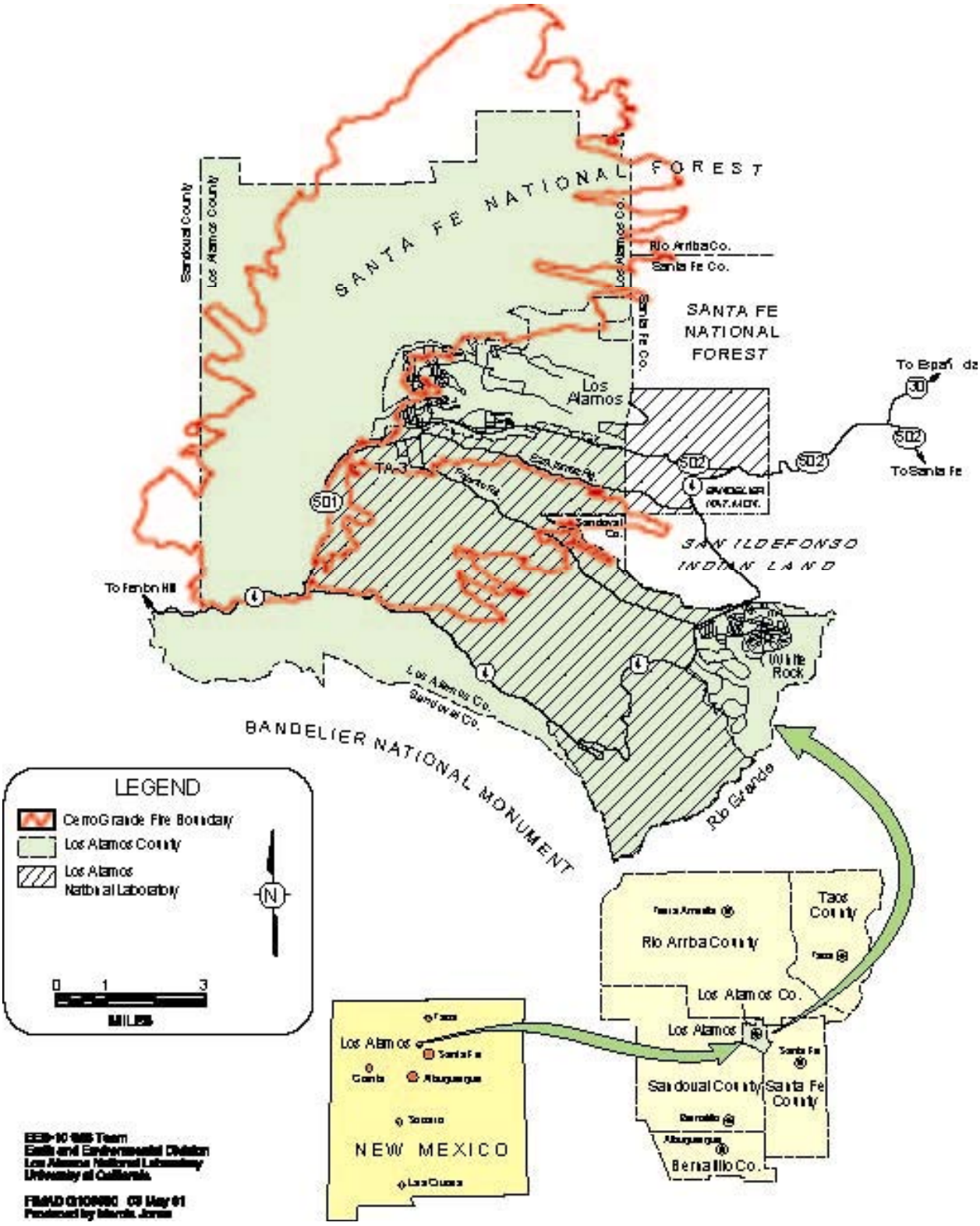


Figure 1.1. Map of Los Alamos, LANL, and the extent of the Cerro Grande Fire.

Indeed, our present study of the impacts of the Cerro Grande Fire indicate that Steen was simply wrong in his conclusion about the damage that wildfire can do to archaeological sites in heavily wooded areas.

Beginning in October 2000, the goal of the CGFA Project was to gather baseline data on the impacts of the fire to all of the 480 sites within the Cerro Grande Fire burn area. Of these, 470 sites were assessed; of these 340 had some type of fire related damage. Field crews consisting of two to four people were employed in the burned areas of the Laboratory equipped with assessment forms, digital cameras, and geographic positioning system (GPS) equipment to locate, map, and record the condition of these sites.

This report presents the results of the 18-month field project associated with the effort. While parts of the CGFA Project are ongoing (e.g., site recording in areas of limited access and the rehabilitation and monitoring of severely damaged sites), the majority of the work is complete. At the same time, all of the sites impacted by the Cerro Grande Fire will continue to be subject to monitoring for many years to come to determine the long-term effects caused by wildfires to cultural resources. For example, the loss of ground vegetation and duff will continue to pose increased threats from erosion to sites within the burn area. Although site rehabilitation can help to mitigate this problem, the effects will indeed be long term. This issue is discussed in greater depth in subsequent chapters.

From the outset, the CGFA Project was intended to provide both a source of data regarding the effects of the Cerro Grande Fire and to assist LANL in its long-term management of its cultural resources. However, it is also hoped that the level of detailed analysis and reporting in this volume can serve as an aid to other land-management agencies and Native American tribes who are themselves concerned about the potential for and effects of wildfire on cultural resources.

Chapters 2 and 3 provide information on the physical and environmental setting of LANL and also provide a general culture historical overview of the Pajarito Plateau. Chapter 4 presents a brief summary of the Cerro Grande Fire itself, in particular, on those days that it burned through various portions of LANL.

Chapter 5 details the data collection methods of the CGFA Project, candidly discussing the logistics of our attempts to record a variety of fire effects on cultural resources, including some of the difficulties and limitations we experienced in creating and applying standard recording procedures. Specific information about the characteristics of archaeological sites is also provided in this chapter.

Chapter 6 presents an analysis of the data, particularly as they relate to the direct effects of the Cerro Grande Fire and fire-suppression activities on cultural resources at LANL. Preliminary analyses were presented on November 10, 2001, at the Conference on Wildfires and Cultural Resources, hosted by the New Mexico Archaeological Council, the Department of Energy Los Alamos Area Office, the United States Forest Service (Santa Fe National Forest), and Bandelier National Monument (Harmon et al. 2001). A slightly revised version of this paper was presented on March 21, 2002, at the Society for American Archaeology Annual Meetings in Denver, Colorado (Nisengard et al. 2002). The data in the present volume have been revised and expanded from these two earlier presentations.

Chapters 7 through 10 describe in considerable detail the damage sustained by individual archaeological sites in the four separate management units that constitute our study area. These four areas include Rendija Canyon north of the Los Alamos town site, the Engineering Sciences and Applications (ESA) Division, including four technical areas, the Dynamic Experimentation (DX) Division, 10 technical areas, and Facility Management Unit (FMU) 80, 18 technical areas. These four chapters present general lists of all investigated sites, as well as more detailed data on impacts to ancestral (ca. before AD 1800) Native American sites. The details of our study of Homestead period (ca. 1890s to 1942) archaeological sites and Manhattan Project and Early Cold War period archaeological sites are presented in Chapter 12.

Chapter 11 addresses the general impact of the Cerro Grande Fire on historic non-Native American resources. This includes an overview summary of Homestead Period sites, as well as a brief summary of impacted Laboratory buildings and structures dating to the Manhattan Project period (ca. 1943 to 1946), the Early Cold War period (ca. 1947 to 1963), and the Late Cold War period (ca. 1964 to 1989). This chapter also includes a discussion of the management issues related specifically to the impacts of the Cerro Grande Fire on these types of cultural resources. As previously noted, Chapter 12 presents the results of the detailed field analysis of historic non-Native American archaeological impacted by the Cerro Grande Fire.

As part of the CGFA Project we have been very fortunate to work with the staff of LANL's Facility and Waste Operations Division's Cerro Grande Rehabilitation Project (CGRP). The CGRP contracted with the Cultural Resources Assessment Team (CRAT) of the Pueblos of San Ildefonso and Santa Clara to directly assist LANL in the rehabilitation of Ancestral Pueblo archaeological sites (CRAT 2002). This rehabilitation program is briefly outlined in Chapter 13. It is hoped that one or more future reports, written in conjunction with the members of the Pueblo cultural resources assessment team, will be eventually issued that details the long-term results of the rehabilitation project. In addition to the archaeological site rehabilitation efforts, the CGRP has notably embarked on an extensive program of forest rehabilitation and tree thinning that involves not only the Pueblos of Santa Clara and San Ildefonso, but also those of Cochiti and Jemez. The degree to which the Pueblos are involved in all aspects of the rehabilitation effort may be unique in the history of the relations between federal agencies (and universities) and Native American tribes. At the very least, it is certainly a unique endeavor for LANL, the Department of Energy, and the University of California.

Chapter 14 presents several recommendations based on the results of the Cerro Grande Fire Assessment project. These treat the long-term management of cultural resources at LANL including those sites damaged by the Cerro Grande Fire itself, along with general planning considerations to avoid similar fire damage to cultural resources in the future.

Appendix I, prepared from a letter report by Jeffrey S. Dean of the Tree Ring Laboratory of the University of Arizona, summarizes the results of the dendrochronological dating analysis of tree-ring specimens collected during the CGRP from burned or otherwise threatened homesteads at LANL. These samples were collected in the attempt to salvage some useful information…typically from burned fence posts and structural timbers, that might provide a better chronological picture of the Homestead period at LANL than previously available. Appendix I also summarizes dendrochronological data from previous homestead projects.

Our hope is that this report not only serves as an aid to resource managers at LANL, but that it may also be of use to other agencies and Native American tribes in their attempts to deal with, understand, and analyze their own fire issues.

Chapter 2

Physical and Environmental Setting

Alan L. Madsen

Although only 9,000 acres on LANL lands burned, the Cerro Grande Fire has some impact on virtually all portions of the Laboratory, an area that encompasses a broad range of ecological, geographic, vegetative, and topographic components.

LANL is situated on the Pajarito Plateau. The Plateau consists of a series of narrow mesas and deep canyons that trend east-southeast from the Jemez Mountains to the Rio Grande Valley. The defining feature of the Plateau is that of the Tsirege Member of the Bandelier Tuff, a massive series of ignimbrites or "ash-flow tuffs" that are the result of a series of large eruptions from the Valles and Toledo volcanoes, about 1.4 and 1.1 million years ago, respectively. The Tsirege Member buried much of the former topography between the mountains and the Rio Grande, which ultimately created a new landscape. The subsequent erosion of this relatively recent formation has resulted in the distinctive appearance of the topography of the Plateau, an appearance that is characteristic of LANL (LASL 1976:4–6; Reneau and McDonald 1996:3).

LANL contains several distinct environmental zones. The elevation gradient at LANL is quite substantial at approximately 800 m (2,400 ft), ranging from the Rio Grande Valley (1,620 m or 5,400 ft) to the base of the Jemez Mountains (2,340 m or 7,800 ft). This elevation change and the complex geological history have created several different climatic zones, soil types, vegetative zones (Figure 2.1), and animal habitats (Balice 1998:4–6; Burton 1982:1–6; LASL 1976:2–6; Reneau and McDonald 1996:1–3).

The topography associated with the CGFA Project is typically rugged and undulating, the area contains a number of mesa tops and canyon bottoms and associated steep talus slopes and cliffs. The damage that resulted from the fire is concentrated in the lower elevations in the piñon-juniper woodland as it transitions to ponderosa pine forest, and in the upper elevations, which contain sizable stands of ponderosa pine, such as the Rendija Canyon Tract area. Soils in the canyon bottoms and on the mesa tops of the south and southeastern parts of LANL are mostly Aridisols and Entisols. Throughout the areas affected by the fire there is an abundance of alluvium on the steep slopes, large tuff rock outcrops, volcanic rock outcrops, talus slopes, and gravelly and sandy loams. Several of the impact areas are located on soils with a high agricultural potential, an important asset to the ancient inhabitants of the Plateau.

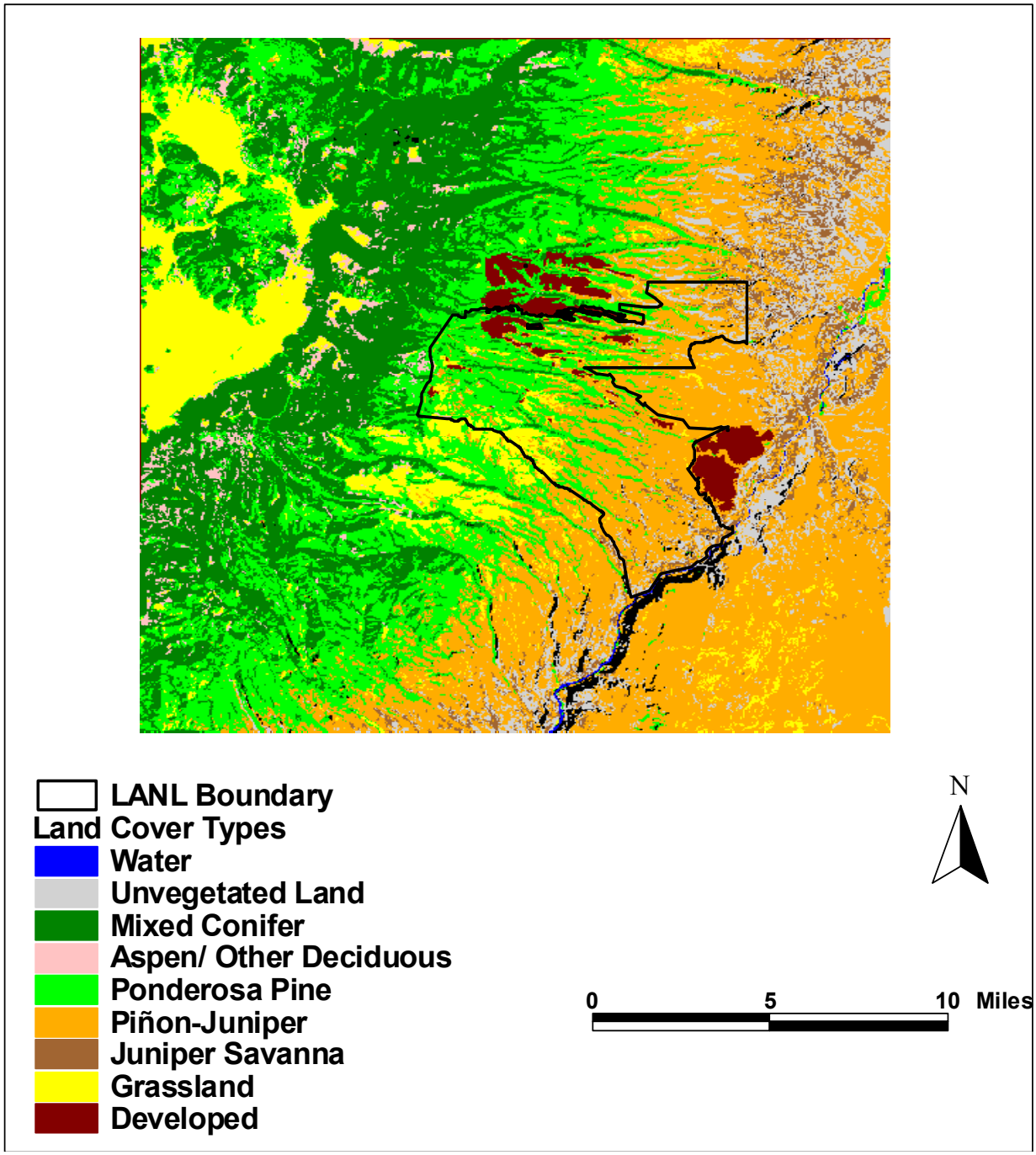


Figure 2.1. The distribution of land cover types at LANL.

GEOLOGIC HISTORY

The Pajarito Plateau is located along the western part of the Rio Grande Rift, a structural depression formed by faulting, extending from southern Colorado to northern Mexico. In the LANL area, the Rift is approximately 60 km wide and includes the Española Valley, the Pajarito Plateau, and the Jemez Mountains (Reneau and McDonald 1996:1-3; LASL 1976:5-7; Nyhan et al. 1978:4–14; Burton 1982:1–

10). The Rift is bounded by the Sangre de Cristo Mountains to the east and the southern extension of the Rocky Mountains, the Sierra Nacimientos, to the west.

The geologic formations at LANL were created by volcanism and sedimentation that began in the late Oligocene or early Miocene (18 to 25 million years ago) (Burton 1982:3–6; Reneau and McDonald 1996:1–5). The oldest rocks in the Los Alamos area are the siltstones and sandstones of the Tesuque Formation. The formation was deposited on a broad floodplain of the Rio Grande Rift. The formation underlies the Española Valley and outcrops along the lower edges of the Puye Escarpment and White Rock Canyon.

The Tschicoma Formation overlies the Tesuque Formation in the western part of the Los Alamos area and forms the volcanic highlands of the Sierra de los Valles. This formation consists of andesites, dacites, rhyodacites, and quartz latites. Radiometric dates of the flow rocks range from 3.7 to 6.7 million years ago. The thickness of this formation is estimated to exceed 800 m (LASL 1976:5; Nyhan et al. 1978:13–15).

The Puye Formation is a fanglomerate, made up of volcanic debris, which has eroded from the volcanic pile. The formation is exposed in grayish-buff cliffs primarily along the Puye Escarpment and in White Rock Canyon. This formation is also exposed in deeper canyon cuts on the eastern edge of the Plateau. The Puye Formation consists of angular to sub-rounded boulders and cobble rocks that rest in a matrix of sand and gravels. Thin beds of ash and pumice are commonly associated with this formation. At its greatest thickness, the conglomerate exceeds 200 m near the center of the Pajarito Plateau.

The basalt rocks characteristic of Chino Mesa are present in outcrops along White Rock Canyon, particularly in Technical Area (TA) -70, -71, and -54. Basalt overlays the Tesuque Formation and interfaces the Puye Formation to the west. The dark gray basalts originated as a series of flows and intrusive sediments; these deposits exceed a thickness of 350 m (LASL 1976:8).

The Bandelier Tuff forms the upper surface of the Pajarito Plateau. The lower Guaje Member is an air-fall pumice with a thickness that ranges up to 10 m. The middle Otowi Member is a massive non-welded rhyolite tuff that was laid down as an ash-flow. Its thickness is as much as 80 m. The upper Tshirege Member is a series of ash flow and ash fall, which includes non-welded to welded units of rhyolite tuff. The Tsirege Member is a cliff-forming unit that is found in canyons that are cut into the Plateau. The Member is quite substantial, and the thickness of it in the western part of the Plateau exceeds 250 m (LASL 1976:8; Reneau and McDonald 1996:7–16).

SOILS

In the LANL area there are several different types of soils and unconsolidated materials that overlay the natural bedrock. Of the 10 different soil orders, only five exist on LANL property: Alifisols, Aridisols, Entisols, Inceptisols, and Mollisols. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings to pedogenic processes. The Entisols are an exception to this and can form in many different climates (LASL 1976:14, Nyhan et al. 1978:14–25). The Inceptisols and Mollisols are generally confined to the higher elevations at LANL. As they make up only a small portion of LANL soils, they will not be further considered here.

Approximately 80% of Los Alamos County soils can be grouped into the Alfisol, Entisol, and Aridisol soil orders. Aridisols are soils that form in arid climates that commonly go through prolonged dry periods–greater than 90 consecutive days–in which there is no available water. Aridisols primarily occur at the lower elevations in the southeastern portion of the Laboratory. Plant communities found in

association with Aridisols at LANL consist primarily of piñon-juniper woodlands, with ephemeral grasses, forbs, and other scattered plants such as cacti.

Alfisols develop where water is available for plants during at least 90 days when it is warm enough for plant growth. These soils occur at higher elevations along the base of the Jemez Mountains. They have significantly more clay and develop in forested areas (for example, ponderosa pine).

The Entisols have little or no evidence of development, in contrast to the Alfisols. The Entisols are found intermingled with the Aridisols and Alfisols on several low-elevation areas in the southern and southeastern portions of LANL mesa and canyon landscapes. Entisols are found on the erosional surfaces of steep slopes, or on floodplains that frequently receive new deposits of alluvium (Nyhan et al. 1978:14–25; LASL 1976:14–16).

There are several different soil series at LANL. Because of topographic location, it is noteworthy that some of these soils have a greater agricultural potential than others. The agricultural potential is based on soil depth, water capacity, and slope. This soil information comes from two different studies, one for Los Alamos County and one for Santa Fe County. As is common for Soil Conservation Service reports for adjacent counties, the names of soil series differ. Because of these differences in nomenclature, it is difficult to correlate the series in each study. All of the different soil types are discussed in detail in Hoagland et al. (2000:2.3–2.5).

CLIMATE

Los Alamos is characterized by a semiarid, temperate mountain climate. Mean temperatures vary with altitude, averaging 5°F (3°C) hotter in and near the Rio Grande Valley (1,980 m; 6,500 ft) and 5°F to 10°F (-3°C to -5.5°C) cooler in the nearby Jemez Mountains (2,600 to 3,050 m; 8,500 to 10,000 ft) (Bowen 1990:3–17).

In general, winter temperatures range from 15°F to 25°F (-9°C to -4°C) during the night and from 30°F to 50°F (-1°C to 10°C) during the day. Cold arctic air masses occasionally invade the Los Alamos area from the north and east, but often the shallow layer of coldest air is dammed to the east by the Sangre de Cristo Mountains. Temperatures in the Los Alamos area occasionally will drop to 0°F (-18°C) or below. The freeze-free growing season of 157 days in Los Alamos is relatively short. The average normal growing season in White Rock is even shorter at 145 days. Above 2,743 m (9,000 ft), frost can occur at any time of the year, which makes these areas unsuitable for agricultural pursuits (Bowen 1990:3–17; Reneau and McDonald 1996:2–3; Nyhan et al. 1978:9).

The mean average annual precipitation in Los Alamos, including both rainfall and snowfall, is approximately 46 cm (18 in.). Average annual precipitation decreases rapidly as you move toward the valley; the mean average precipitation in White Rock is 33 cm (13 in.). Annual precipitation in the Jemez Mountains is normally higher than either White Rock or Los Alamos at a minimum of 51 cm (20 in.). The precipitation in the area is characteristic of a semiarid climate where variations in precipitation are quite large from year to year. The annual precipitation extremes range from 17.77 to 77.06 cm (6.08 to 30.34 in.) over a 69-year period, the majority of which falls during the summer monsoon season (Balice 1998:1–12; Bowen 1990: 3–17; Nyhan et al. 1978:9–12).

Monsoon rains fall during the months of July and August. At these times, the convection of warm air over the Jemez Mountains causes thunderclouds to develop in the afternoon and early evening; these storm fronts drift out over the Pajarito Plateau, causing brief, but intense rainstorms (Bowen 1990:3–17). Westerly winds, common at this time of year, push the thunderstorms up and over the Jemez Mountains

towards Los Alamos. Up to 40% of the annual precipitation falls during these two months. Winter precipitation falls primarily as snow, with accumulations of approximately 130 cm (51 in.) seasonally; as is the case with the rains in the area, snowfall levels vary considerably from year to year.

PLANT COMMUNITIES

LANL's ecosystem is diverse due to the dramatic 1,500-m elevation gradient between the Rio Grande Valley to the east and the Jemez Mountains and to the presence of many steep canyons. Mesa orientation, solar radiation, and differences in soils and moisture levels contribute to the presence of highly varied ecotones found throughout the Pajarito Plateau. The elevation gradient and the corresponding variable climatic conditions in the LANL region are reflected by the presence of five major vegetation types. These major types are defined by their dominant tree species and by their structural characteristics. These types are juniper savannas, piñon-juniper woodlands, ponderosa pine forests, mixed conifer forests, and spruce-fir forests. Figure 2.1 illustrates the distribution of these vegetation types across LANL.

Within these five general vegetation types, there are several specific vegetation communities, which are not primarily influenced by elevation or climatic gradients. These communities are the aspen forests, grasslands, scrublands, floodplains, open water, and non-vegetated lands. These communities are influenced by a variety of topographic features, including soils, geologic structures, and moisture conditions (Balice 1998:4–29; Balice et al. 1997:3–29; LASL 1976).

Juniper savannas are common between elevations of 1,768 m (5,800 ft) and 1,951 m (6,400 ft). One-seed juniper is typically the only overstory species in the juniper savanna. Grama grasses dominate the understory, but blue grama grasses, hairy grama, and false buffalo grass are also widely distributed as co-dominant species. The average annual precipitation in this zone is approximately 25.4 cm (10 in.) (Balice et al. 1997:17).

Piñon-juniper woodlands are found between 1,890 m (6,200 ft) and 2,195 m (7,200 ft) in Ancho, Water, Sandia, and Los Alamos Canyons. On mesa tops these woodlands are the predominant vegetation type. Juniper is co-dominant with piñon in this community particularly at lower elevations. Piñon increases in importance at higher elevations. The average annual precipitation in this area is approximately 30.5 to 35.5 cm (12 to 14 in.) (Balice et al. 1997:18).

Ponderosa pine forests extend to as low as 1,890 m (6,200 ft) in some of the topographically protected canyons such as Ancho and Water. In more open canyons, like Sandia and Los Alamos, ponderosa pine is not normally found below 1,921 m (6,300 ft). On the mesa tops and the lower slopes of the Sierra de los Valles, ponderosa pine forests extend to 2,378 m (7,800 ft) in elevation. The ponderosa pine is the only overstory species found throughout most of the higher elevation range. However, at lower elevations juniper is also present, and at higher elevations an occasional Douglas fir may be found. The understory characteristic of this community commonly consists of kinnikinnik, Colorado barberry, and Gambel's oak in addition to numerous species of herbs and grasses in the forb layer (Balice 1998:14–18; Balice et al. 1997:19).

Mixed conifer forests appear at higher elevations in the mountains and consist of trees that are at least 5 m (16 ft) tall. Douglas fir, also known as white fir, is the dominant overstory species, although other tree species may also be present in the overstory or mid-story. On north aspects of canyons and on the canyon bottoms above 2,104 m (6,900 ft), the mixed conifer forest intergrades with ponderosa pine communities. In flat areas or on eastern exposures the mixed conifer forest extends to 2,591 m (8,500 ft). In protected drainage bottoms and on southern exposures, mixed conifer forests extend to 2,744 m (9,000 ft). Some limber pine may be present sporadically. The understory may consist of several shrubs, including

ninebark, wild rose, cliff bush, and dwarf juniper along with numerous species of herbs and grasses. The average annual precipitation ranges from 51 to 76 cm (20 to 30 in.) (Balice 1998:14–18; Balice et al. 1997:19).

Spruce-fir forests are widely distributed throughout the highest elevations in northern New Mexico. They can be found on northern aspects as low as 2,439 m (8,000 ft) and on more exposed slopes as low as 2,591 m (8,500 ft). The spruce-fir communities continue to the highest elevations in the Los Alamos region, approximately 3,138 m (10,441 ft). Engelmann spruce and Douglas fir are the dominant tree species in this community. Aspen is also a major overstory species on exposed slopes above 2,683 m (8,800 ft) that have been burned in recent decades (Balice 1998:14–18; Balice et al. 1997:19).

Aspen forest communities are common at mid-elevations in the mountains. They range in elevation from approximately 2,700 to 3,030 m (8,900 to 9,950 ft). Below 2,820 m (9,250 ft), aspen stands occupy the northern and northeastern aspects; whereas, above this elevation, they are mostly found on southeast- to southwest-facing positions. Aspen is present in the overstory with at least 20% ground coverage. Combinations of Douglas fir, ponderosa pine, white fir, or Englemann spruce are also present, but do not dominate the overstory, either as an individual species or together (Balice 1998:14–18; Balice et al. 1997:19).

Scrublands are identified by the presence of shrub species that are greater then 0.46 m (1.5 ft) in height and with at least 15% ground cover. Trees are largely absent within scrubland communities, and when they are present occupy less then 10% of the ground coverage (Balice et al. 1997:31).

Grasslands are identified as areas dominated by grama grasses and other grass-like plant species. Forbs and other non-shrubby species may be co-dominant in these communities. Trees and shrubs taller then 0.46 m (1.5 ft) or equal to less then 15% coverage are absent. Sub-alpine grasslands occur above 2,743 m (9,000 ft) on steep, southerly and southwesterly slopes. Sub-alpine grasslands occur in stony or boulder soils that create conditions that are not wet enough to support the establishment of tree species. Grasslands may also be perpetuated as a result of wildfires (Balice 1998:26; Balice et al. 1997:32).

FAUNAL COMMUNITIES

Several animal communities of both invertebrates and vertebrates are represented at LANL. Many species of small mammals such as mice, wood rats, moles, squirrels, and chipmunks occur in the area, some of which inhabit specific elevation gradients. At least 15 species of small mammals, such as cottontail, jackrabbit, and bats, are also present within the boundaries of LANL (Biggs et al. 1997:1–3; LASL 1976:24–27). This part of the Pajarito Plateau is also home to a number of large game animals, including mule deer and elk. Little is known about other large and medium size mammals in the area, but based on observations and several studies, a minimum of 12 carnivore species are present; among these are black bear, mountain lion, bobcat, fox, and coyote (Biggs et al. 1997:1–3; LASL 1976:24–27).

Cold-blooded animals in the area include several species of fish that inhabit the Rio Grande. The carp, chub, white sucker, and carp-sucker are abundant in the waters of the Rio Grande on the eastern boundary of LANL. Small numbers of brown trout have been reported in the area, but not enough to represent a significant population, a fact likely due to the turbidity of the river (LASL 1976:25). In addition to fish species, there are approximately nine species of reptiles found within the LANL area, including several types of small lizards and king, bull, garter, and rattlesnakes. The Jemez Mountains salamander is a rare amphibian also found in the area (LANL 1998).

Some 187 species of birds, representing about 44 families are reported in the area, some of which are permanent residents while others are transients. Observed permanent residents include the common raven, pygmy nuthatch, western bluebird, gray-headed junco, several owl species, and rufus-sided towhee. Summer birds include the turkey vulture, red-tailed hawk, American kestrel, peregrine falcon, chipping sparrow, and violet-green swallow (Travis 1992).

There is an obvious relationship between the ecological and topographic characteristics of the area, these relationships impact the kinds of species inhabiting various areas of the Laboratory. Coyote, rattlesnake, bobcat, gray fox, red-tailed hawk, spiny lizard, mule deer, deer mouse, and the desert cottontail are all found in the lower elevation zone (1,700 to 2,000 m; 5,610 to 6,600 ft). In the middle elevation zone (2,000 to 2,400 m; 6,600 to 7,920 ft), particularly in the canyons, coyote, raccoon, mountain lion, American black bear, turkey vulture, American kestrel, golden eagle, gopher snake, rock squirrel, and mule deer can be found. In the same elevation zone (2,000 to 2,400 m; 6,600 to 7,920 ft) on the mesa tops are the American black bear, mountain lion, common raven, pygmy nuthatch, Colorado chipmunk, pine squirrel, and mule deer. The upper elevations (2,400 to 3,200 m; 7,920 to 10,560 ft) are inhabited by the American black bear, mountain lion, green-tailed towhee, hairy woodpecker, Rocky Mountain elk, mule deer, western bluebird, and gray-headed junco (LASL 1976:24–26).

Chapter 3

Culture History Overview

Alan L. Madsen and Jennifer E. Nisengard

Cordell (1979a, 1979b, 1984, 1997), Stuart and Gauthier (1981), and, most recently, Riley (1995) have all presented the regional culture histories for northern New Mexico in general, and the Pajarito Plateau specifically. Occupation and use of the Plateau began as early as 10,000 BC, as hunter-gatherer groups used the area for hunting large game animals. The chronological sequence associated with the culture history for the northern Rio Grande was first developed by Wendorf (1954) and later modified by Wendorf and Reed (1955). Table 3.1 illustrates the regional chronologies as defined by Cordell (1979a), Irwin-Williams (1973), and Wendorf and Reed (1955). What follows is a brief outline summarizing each cultural time period, as it is understood for the central portion of the Pajarito Plateau.

It is noted that a slightly modified version of this chronology is applied to the area due to the nature and timing of homesteading on the Plateau, and especially due to the development of LANL. The "Homestead Period" is used to define a period of time from the 1890s to 1942. The Recent Period is subdivided into the "Manhattan Project Period" (1943 to 1946), the "Early Cold War Period" (1946 to 1956), and the "Late Cold War Period" (1956 to 1990). The distribution of all archaeological survey areas and recorded archaeological sites at LANL (as of July 2002) are depicted on Figure 3.1.

Table 3.1. Culture Historical Chronology for the Northern Rio Grande

Culture	Period	Dates
Paleoindian	Clovis	9500 to 9000 BC
	Folsom	9000 to 8000 BC
	Late Paleoindian	8000 to 5500 BC
Archaic	Jay	5500 to 4800 BC
	Bajada	4800 to 3200 BC
	San Jose	3200 to 1800 BC
	Armijo	1800 to 800 BC
	En Medio	800 BC to AD 400
	Trujillo	AD 400 to 600
Ancestral Pueblo	Early Developmental	AD 600 to 900
	Late Developmental	AD 900 to 1200
	Coalition	AD 1200 to 1325
	Classic	AD 1325 to 1600
Native American, Hispanic, and Euro-American	Spanish Colonial	AD 1600 to 1821
	Mexican	AD 1821 to 1846
	United States Territorial	AD 1846 to 1912
	Statehood to World War II	AD 1912 to 1945
	Recent	AD 1945 to present

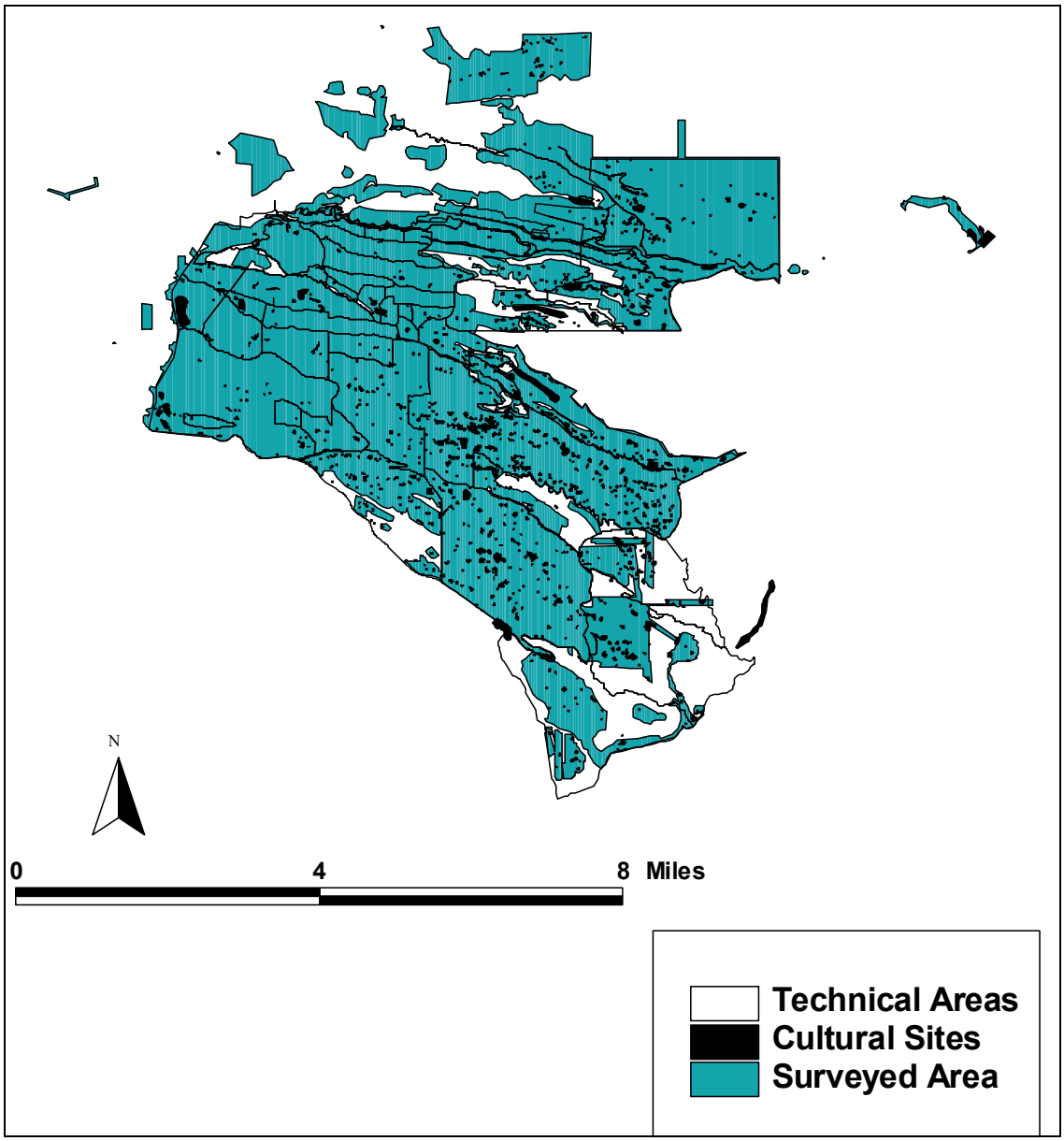


Figure 3.1. Distribution of cultural resources and survey areas at LANL.

THE CULTURAL SEQUENCE OF THE PAJARITO PLATEAU

Paleoindian Period: 9500 BC to 5500 BC

During this early time period, small groups of highly mobile Paleoindian hunter-gatherer populations may have followed bison herds up and down the Rio Grande, making frequent trips onto the Pajarito Plateau where they were able to procure obsidian and a variety of subsistence resources. The time period is represented on LANL lands by a single Folsom point identified by Steen (1977:7) on a mesa north of Ancho Canyon. Clovis, Folsom, and Planview points have also been found at other locations on the Plateau (Acklen 1993, 1997; Lent et al. 1986; Traylor et al. 1990; Wiseman 1992). Obsidian procured

from Jemez Mountains sources has been found on Paleoindian sites located as far away as northern Colorado (Wilmsen 1974:114).

Archaic Period: 5500 BC to AD 600

Archaic hunter-gatherer groups relied on a wide variety of small game and plant species, while hunting primarily with the spear and atlatl. The piñon-juniper woodlands on LANL land contain evidence of the temporary campsites left behind by these groups as they moved across the landscape. Remains representing these campsites are in the form of lithic scatters, consisting of obsidian tools, chipping debris, and diagnostic projectile points (e.g., Baker and Winter 1981; Biella 1992; Moore et al. 1998). These sites presumably reflect the seasonal use of upland settings during the fall months for pine nut collecting, hunting, and lithic procurement activities. Winter sites with makeshift structures have been excavated at lower elevations near the Otowi site, along the Rio Grande (Lent 1991), and at the Abiquiu Reservoir (Stiger 1986).

Changes to northern Rio Grande subsistence strategies have been documented during the Late Archaic period. Although foraging continues to be an important component of the subsistence system, maize and other cultigens are incorporated into the diet at this time. Maize from Jemez Cave, located near the Soda Dam along State Road 4, has been directly dated to 2440±250 BP (uncorrected; M-466; Crane and Griffen 1958) and 2410±360 BP (Austin Long cited in Ford 1985:350). Although cultigens did not become the dominant food resource for quite some time, the introduction of domesticates into the area had a profound effect on the inhabitants of the Pajarito Plateau.

Developmental Period: AD 600 to 1200

In the northern Rio Grande, maize horticulturists lived first in semi-subterranean pit structures and then in adobe surface structures. They began to make painted pottery with simple designs (e.g., Lino Gray, Kwahe'e Black-on-white, and Kana'a Gray), and continued to pursue hunting and gathering relying on the bow and arrow. Most habitation sites dating to this time period are located at lower elevations near the Rio Grande, although the Plateau certainly continued to be used on a seasonal basis.

There is minimal evidence for the presence of occupation during this time period on the Plateau or on LANL lands. As part of the Cochiti Reservoir Project, two Developmental sites were excavated (LA 6461 and LA 6462), these are interpreted as single household winter residences, although there is some evidence of year-round habitation (Biella and Chapman 1977, 1979; Lange 1968).

LA 82601 is located on the southeastern side of the Jemez Mountains in Water Canyon; the site is one of the few Developmental period sites subject to testing on the Plateau. LA 82601 has been dated to the later portion of the period (AD 1125 to 1225) based on the presence of nine Kwahe'e Black-on-white ceramics (a mineral painted pottery) (Acklen 1993:301; 1997:58). While there are several other pit structures, or potential pit structures, on the Plateau that may date to the Developmental period, there is no substantial evidence for this time period due to a lack of clearly defined archaeological remains.

The lack of recorded Developmental period sites may be indicative of a depopulation of the Plateau at this time. Fluctuations in population size and periods of aggregation are quite common throughout many areas of the desert borderlands (Cordell 1984, 1997; Cordell et al. 1994; Crown 1991; Crown and Kohler 1994; Fish et al. 1993; Kent 1989; Nelson 1999; Nisengard n.d.; Preucel 1987).

Coalition Period: AD 1200 to 1325

During the Coalition period there was a substantial increase in the number, size, and distribution of aboveground habitation sites, with year-round settlements expanding into upland areas on the Pajarito Plateau. A long-term process of site aggregation begins at this time, with early sites containing adobe and masonry rectangular structures with 10 to 20 rooms. The remains of these sites are present in the small mounds of shaped tuff blocks and dense artifact scatters commonly found throughout LANL. In contrast, later sites of this period consist of large masonry plaza pueblos that contain more than 100 rooms. Figure 3.2 provides illustrations of a Coalition period roomblock and a Classic period plaza pueblo.

The construction of agricultural features, including terraces, gravel mulch gardens, and dams, associated with these sites suggests an even greater reliance on horticulture than previously evidenced in the region. Most researchers attribute the increase in site density to population migration (Cordell 1979b, Hill and Trierweiler 1986; Hill et al. 1996; Wendorf and Reed 1955), others see the rise in site numbers as a result of local population growth (Steen 1982); it is likely that the increase is the result of a combination of both of these factors. In terms of artifacts, the beginning of the Coalition period coincides with a shift from mineral to organic painted pottery, including Santa Fe Black-on-white, the most prolific ceramic type associated with the Coalition period. Ceramic cooking and storage vessels are produced using a smeared-indented corrugated style.

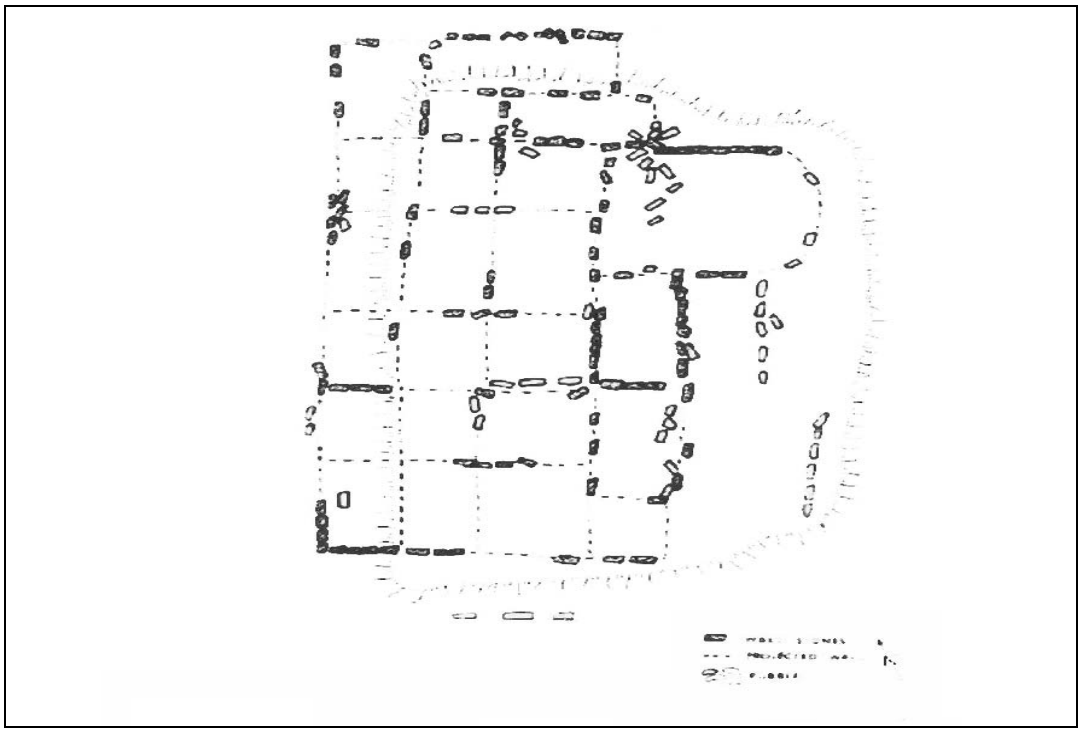
Classic Period: AD 1325 to 1600

The Classic period is characterized by intensive maize agriculture. Ancestral Pueblo settlements on the Pajarito Plateau became increasingly aggregated into three large population clusters with associated outlying one- to two-room fieldhouses. The central site cluster consists of four temporally overlapping sites: Tsirege, Navawi, Tsankawi, and Otowi pueblos (Hoagland et al. 2000). Mera (1935) suggested that the initial occupation of these pueblos occurred during the 14th century. Tsirege, Tsankawi, and Otowi continued to be occupied during the 15th century, with only Tsirege and Tsankawi remaining occupied by the beginning of the 16th century. Oral traditions from the contemporary Pueblo of San Ildefonso indicate that Tsankawi was the last of the Pajarito Plateau pueblos to be abandoned.

The introduction of glaze-painted ceramics to the south of Frijoles Canyon and the production of biscuitwares in the northern Rio Grande area mark the beginning of the Classic period. Biscuitwares include a temporal sequence from Biscuit A (Abiquiu Black-on-gray), Biscuit B (Bandelier Black-on-gray), to Biscuit C (Cuyamungue Black-on-tan). Sankawi Black-on-cream, Potsuwi'i Incised, and plainware cooking vessels are also produced during this time period; the latter utility pottery includes micaceous types. This central group of four Classic period communities is ancestral to the Tewa speakers of San Ildefonso Pueblo.

Spanish Colonial Period: AD 1600 to 1821

Due to a series of droughts, the Pajarito Plateau was eventually abandoned as a residential area during the mid-1500s. At this time, new pueblos were constructed and occupied along the Rio Grande Valley. Although the historic period begins with Coronado's exploratory expedition up the Rio Grande in 1540-1541, most researchers date the period beginning in AD 1600. This date corresponds with Oñate's settlement in New Mexico and imposition of the Spanish encomienda/estancia system into Rio Grande communities (Riley 1995). At this time, the Spanish enforced strict controls on Pueblo pottery production and began to require the manufacture of European vessel forms and "taxation jars." These jars were very



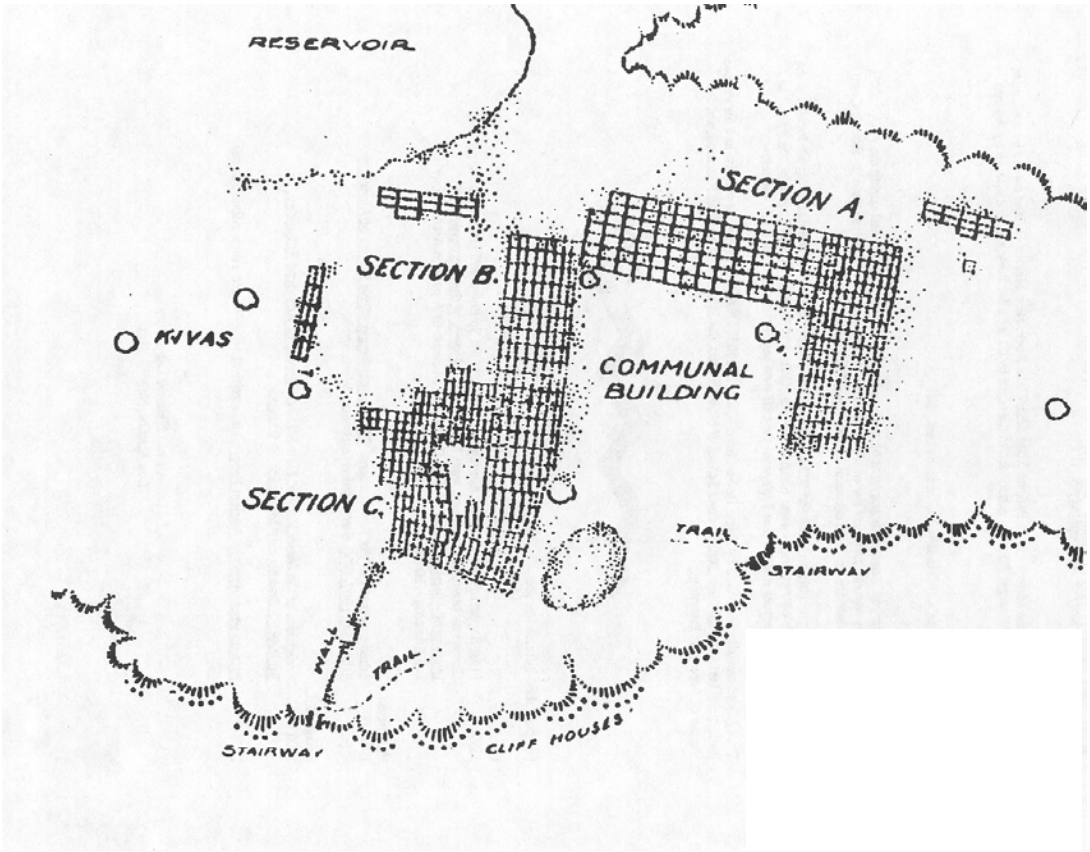


Figure 3.2. Site sketches of a Coalition period site (above) and a Classic period site (below).

large in size to provide specific volumes for grain taxation. The style of the jars often exhibited a distinctive shoulder at the mid-point of the vessel, which facilitated transport of the vessels. Historic ceramic types include Tewa Polychrome, Kapo Gray or Black, and Ogapoge Polychrome. In 1680, the Pueblo Indians revolted against the Spanish, at this time, several Ancestral Pueblo sites situated on the topographically isolated and elevated Pajarito Plateau were reoccupied, as they offered natural protection and defense for groups of refugees.

With the conquest and resettlement of this area by de Vargas (1693 to 1696), the economic and settlement systems of the pueblos were completely overhauled and revamped (Simmons 1969). The large mission communities, characteristic of the earlier time period, disappeared, as did the estancias of the encomienderos. Instead, lands were granted to dozens of Hispanic families and other individuals who had worked the lands during previous years. Hundreds of these small land holdings were scattered throughout the Rio Arriba and Rio Abajo areas.

Athabaskan groups from northern and western areas have occupied portions of northwestern New Mexico since the 15th century; however, ethnohistorical evidence for Navajos and Jicarilla Apaches in the northern Rio Grande begins with the Spanish Colonial period (Forbes 1960; Friedlander and Pinyan 1980; Marshall 1995; Marshall and Hogan 1991; Opler 1936, 1971; Tiller 1992). The Navajo primarily resided in the Gobernador region, but made periodic visits to the Rio Grande Valley and Jemez Mountains. The presence of Tewa Polychrome and Jemez obsidian at Pueblito sites attests to these trips and ties to the region. Some Jicarilla groups wintered in the area of Abiquiu and made seasonal hunting and gathering trips to the nearby Jemez Mountains.

Two rock rings, that may represent the remains of an Athabaskan tipi or wickiup, were recorded in Rendija Canyon (Peterson and Nightengale 1993). Test excavations at this site identified the presence of a hearth inside one of the structures, which yielded a radiocarbon date of 130±60 BP (Beta-58428). This reflects a calibrated date for the feature within the 18th or 19th centuries. A single obsidian flake was the only artifact recovered from the site. Several possible Jicarilla rock ring sites with associated micaceous pottery have been reported for the Rio del Oso valley near Española (Anschuetz personal communication 1999) and at Pecos National Monument (Gunnerson and Gunnerson 1970; Schaasfma 1977, 1992). The presence of these sites may suggest a Navajo affiliation for Piedra Lumbre sites in the Abiquiu area, although some researchers suggest that some of these sites are associated with local Tewa peoples (Carrillo 1992).

Mexican Period: 1821 to 1846

Mexico declared its independence from Spain in 1821, which brought about a more lenient land grant policy and an expansion of existing trade networks (Levine et al. 1985). Trade between Missouri and Santa Fe along the Santa Fe Trail began soon after independence and dominated many of the events in the area for the next quarter-century (Connor and Skaggs 1977). Increased trade brought many comparatively inexpensive Euro-American goods into the northern Rio Grande region, a fact that is reflected in the increase of manufactured items identified at sites dating to this period (Moore 1993).

United States Territorial: 1846 to 1912

The lands that eventually came to be New Mexico remained a part of Mexico until the United States – Mexican war began in the mid-1800s. Troops led by Colonel Stephen W. Kearny raised the American flag in Santa Fe and took possession of these lands for the United States on August 18, 1846. Grazing and seasonal use of the Pajarito Plateau by non-Indians was common during the early historic period, and the

first homesteads were established on the Plateau during the early 1880s (Scurlock 1981:138). New Mexico was provided with a territorial government in 1850, and it remained a territory until being granted statehood in 1912.

Statehood To World War II Period: 1912 to 1945

During the early 1900s, New Mexico saw a continuation of traditional farming strategies, cattle grazing, timbering, and a wide variety of cultural practices. Seasonal homesteading continued to be prevalent on the Plateau, though the area was primarily used in addition to established year-round residences. Wooden cabins and corral structures as well as rock or concrete cisterns characterize Hispanic and Anglo Homestead Era sites. Artifact scatters, consisting of historic debris associated with household and farming/grazing activities, are also commonly found at this time period. In discussing the homestead occupation of current LANL lands in this report, it is noted that nearly all of the evidence for homesteading dates between 1912 and 1945, this is likely a reflection of changes relating to both the Enlarged Homestead Act of 1909 and the Grazing Homestead Act of 1916 (Scurlock 1981). Increases in the use of railroad and automobile transportation allowed for an increase in commerce and tourism; by the 1940s, New Mexicans began to leave rural villages for opportunities in larger cities, both in and out of the state (Simmons 1993:182).

In 1942, Franklin D. Roosevelt gave his approval for the development of the world's first atomic bomb. The geographic and topographic isolation of the Pajarito Plateau that had been a benefit to Ancestral Pueblo peoples during the Pueblo Revolt was attractive to project developers, and Los Alamos, New Mexico, was selected as the site for design and construction of the atomic bomb. The project came to be known as Project Y, which was a subset of the Manhattan Project. The creation of a modern town in Los Alamos impacted and influenced surrounding northern Rio Grande communities. Lands previously owned by the Los Alamos Ranch School and a majority of Hispanic homesteaders, as well as those used seasonally by Native American populations still occupying the region, were appropriated for use in the Manhattan Project in 1942. Project Y effectively ended the homesteading era on the Pajarito Plateau (LANL 1997).

Homestead Period: 1890s to 1942. As previously noted, those portions of the U.S. Territorial and Statehood to World War II periods during which homesteading was known to have existed on the Pajarito Plateau are collectively referred to as the Homestead Period. Based on a review of historic documents and on dendrochronological dating of homestead features, the Homestead Period in the central Pajarito Plateau likely begins in the early or middle 1890s, and at the latest by 1899. Foxx and Tierney (1999:8) indicate that the first patented homesteads on the Pajarito Plateau were established in 1893.

Most of the central Pajarito Plateau homestead patents seemingly were filed by Hispanic peoples who maintained permanent homes in the Rio Grande Valley, using the Pajarito Plateau sites for seasonal farming and resource gathering (Foxx and Tierney 1999). Notable exceptions to this pattern included the establishment of a few permanent Anglo homesteads such as the Anchor Ranch and the creation of the Los Alamos Ranch School, the latter of which was in operation from 1918 until the late spring of 1943.

The end of the Homestead period coincides with the appropriation of lands on the Pajarito Plateau for the Manhattan Project in 1942–1943.

Recent Period: 1945 To Present

The Recent Period is defined as beginning with the end of World War II and continuing until present times. Because of the vital importance of the Manhattan Project and Cold War to the history of LANL and for the central Pajarito Plateau, these are here treated as distinct historical periods (McGehee and Garcia 1999:11–16).

Manhattan Project Period: 1942 to 1946. The Manhattan Project Period for LANL and for the central Pajarito Plateau officially began with the closure of the Los Alamos Ranch School after the end of the graduating class of 1943, which had an accelerated graduation in February (the school was officially notified of the upcoming forced closure on December 7, 1942). At the same time, additional lands were secured from government agencies, such as the Forest Service, and from the predominantly Hispanic homesteaders. Construction of Project Y immediately began at the Los Alamos site (Hawkins et al. 1983).

The atomic age was ushered in with the detonation of the first atomic bomb at the Trinity test site on the Alamogordo Bombing and Gunnery Range on July 16, 1945. The explosion of "Little Boy" rapidly followed; on August 6, 1945, this uranium "gun" device was exploded over the Japanese city of Hiroshima. The subsequent explosion of the "Fat Man" plutonium "implosion" device over Nagasaki on August 9, 1945, led to the official surrender of Japan on August 14, 1945.

During the period between the surrender of Japan and the middle of 1946, Project Y was downsized, with many Los Alamos scientists returning to their pre-Manhattan Project academic jobs. The primary mission of the Laboratory at that point became that of the stockpiling and the development of additional atomic weapons.

The Manhattan Project officially came to an end at Los Alamos with the beginning of the atmospheric testing program in the Pacific (referred to as "Operation Crossroads") and the development of the civilian U.S. Atomic Energy Commission (AEC). The AEC officially took over the operation of the Los Alamos site in 1947.

Early Cold War Period: 1946 to 1956. The AEC made a commitment to retain Los Alamos as a permanent weapons facility. Research at the Laboratory during the period of 1946 to 1956 focused on the development of advanced fission weapons. In 1952, the first thermonuclear device was detonated at Eniwetok atoll in the Pacific. Other key research themes at Los Alamos during the Manhattan Project/Early Cold War period included supercomputing, biomedical and health physics research, explosives research and development, early reactor technology, pioneering physics research, and the development of high-speed photography.

Late Cold War Period: 1956 to 1990. The Early Cold War Period at Los Alamos ends around 1956, a date that marks the completion of all fundamental nuclear weapons design at the Laboratory. In 1957, the gates into the Los Alamos townsite came down, thus ending the 14-year status of the Los Alamos Atomic Energy Community as a closed facility. In 1961, the tensions of the Cold War were exacerbated by the sealing of the border between East and West Germany in preparation for the construction of the Berlin Wall. After 1964, the Laboratory research focused on the engineering of nuclear weapons to fit specific delivery systems. Many significant historical events occurred over the four decades of the Late Cold War period, including important research at Los Alamos. The Cold War is thought of as coming to its end around 1990. This represents the period between the 1989 opening of the borders between East and West Germany and the subsequent tearing down of the Berlin Wall, and that of the 1991 creation of the Commonwealth of Independent States in the former Soviet Union and the signing of the Strategic Arms Reduction Treaty (START) that began the process of reducing the size of strategic nuclear arsenals in Russia and the United States.

Chapter 4

The Cerro Grande Fire

W. Bruce Masse and Brian C. Harmon

The cause, nature, chronology, and consequences of the Cerro Grande Fire have been documented in a variety of reports (e.g., DOE 2000; LANL 2000, 2001a, 2001b). In brief, the fire began as a controlled burn on Cerro Grande Peak in Bandelier National Monument on May 4, 2000; the fire was not contained until June 6, 2000 (Figure 4.1). By May 5, the controlled burn was declared a wildfire. A state of emergency closure was declared May 7 for the Los Alamos town site and LANL; it became effective on Monday, May 8. On May 7, fire suppression efforts were initiated at LANL; and by May 8, the first spot fires were observed on LANL property, and businesses in the Los Alamos town site were ordered closed. Although spot fires at LANL were still igniting on May 9, cooler temperatures, brought on by the passage of a weak weather front, brought increasing hope for the containment of the fire.

On May 10, increasing winds gusted more than 50 miles per hours (80 kph) and led to spot fires occurring more than 1,100 m (0.75 miles) ahead of the main fire front. Wind speeds coupled with extremely low humidity led to a 100% probability of ignition, that is, the probability that an ember would ignite combustible material. The Los Alamos town site was evacuated that afternoon, and the community of White Rock was evacuated shortly after midnight. President Clinton soon declared the fire a national disaster.

In the 24 hours between noon on May 10 and noon on May 11, the fire consumed nearly 20,000 ac (8,100 ha), which included homes in the Los Alamos town site and more than 5,000 ac (2,025 ha) of LANL lands. Between May 11 and 12, the fire consumed an additional 2,400 ac (970 ha) of LANL lands, which included burning through TA-6 and an advancement of the fire across Two-Mile Canyon into the TA-50/55 area. The fire also advanced north of the Los Alamos town site into Rendija and Santa Clara Canyons. After May 14, the fire was no longer advancing onto LANL lands and the Los Alamos town site and began diminishing in the areas north of Los Alamos. On May 15 the White Rock and Los Alamos town sites were reopened to residents. Occasional spot fires were still observed in many areas during the next couple of weeks, but by June 6, the Cerro Grande Fire was declared fully contained.

When it was over, the Cerro Grande Fire had consumed approximately 47,650 ac (19,300 ha) of land, including 7,650 ac (3,100 ha) of LANL property and approximately 480 ac (195 ha) of land in the Rendija Canyon tract, an area owned by the Department of Energy (DOE) and administered by LANL. The Cerro Grande Fire caused more than one billion dollars in damage and destroyed more than 200 structures and homes in the town of Los Alamos and more than 100 structures on LANL lands. Fortunately, although the fire was extensive and intense, no lives were lost.

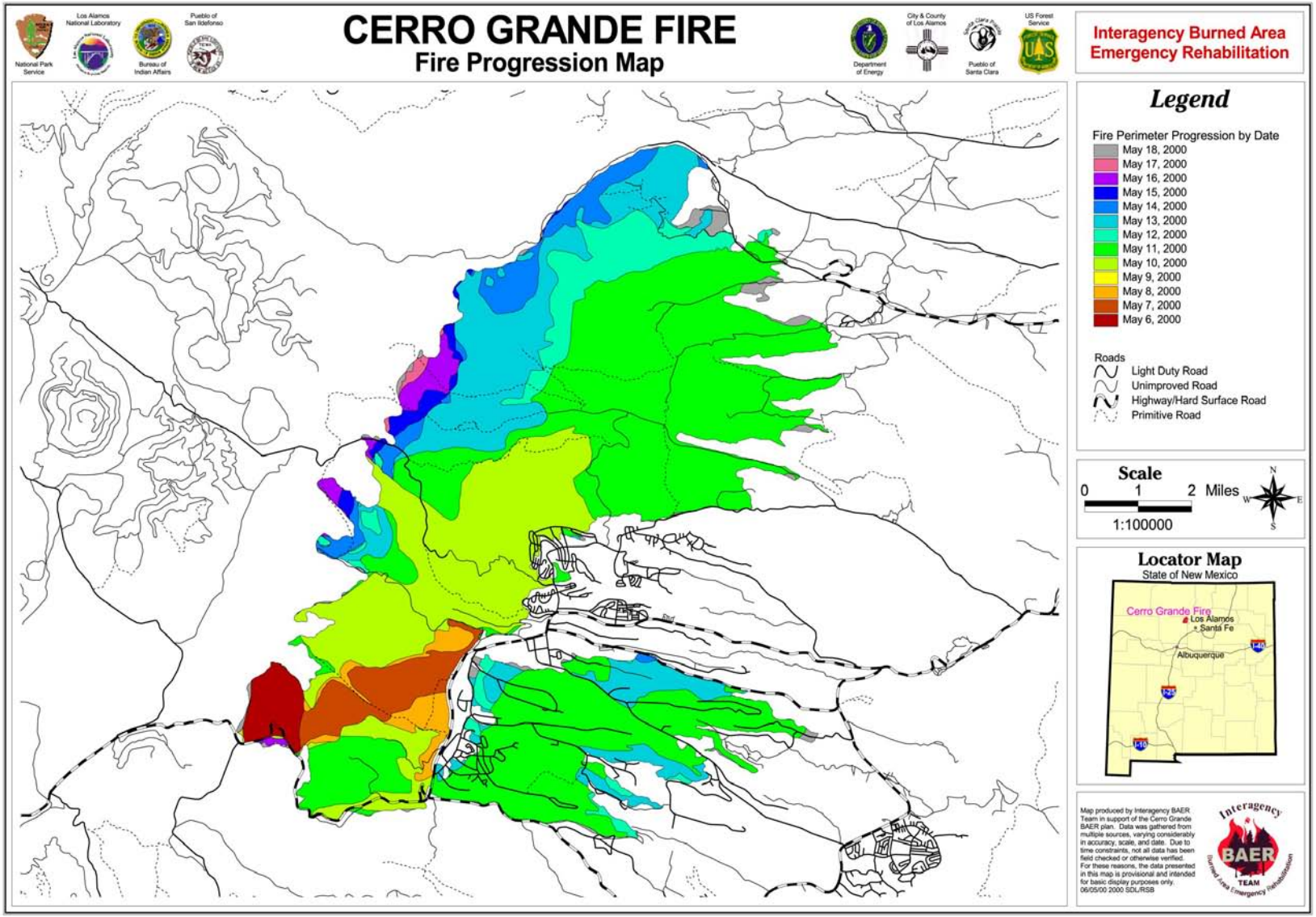


Figure 4.1. Daily progression of the Cerro Grande Fire after it was declared a wildfire on May 5.

Figure 4.2 depicts the extent of the fire on LANL lands and the burn severity distribution. The burn severity data represent averaged information based on an analysis of infrared aerial photographs taken of the fire at night. The important fact to stress about Figure 4.2 is that it represents averaged values, and does not necessarily reflect the reality of the actual on-the-ground fire severity at any specific location. The actual burn severity for individual locations was subject to a host of internal variables, including fuel availability and topography, as well as wind direction and speed, and the duration of the fire in specific areas. For these reasons, one aspect of the assessment project was to ground truth the burn severity data, the results of this analysis are presented in subsequent sections.

As of June 1, 2000, there were about 400 previously recorded archaeological sites within the fire-affected area of LANL and DOE lands (a total of 3,300 ha; 8,100 ac). During the course of the CGFA Project, approximately 50 previously unrecorded sites were identified. The Cerro Grande Fire impacted at least 300 sites. In addition, buildings associated with the Manhattan Project and Cold War periods were damaged or destroyed. Chapters 7 through 11 provide an overview of all of the impacted cultural resources at LANL.

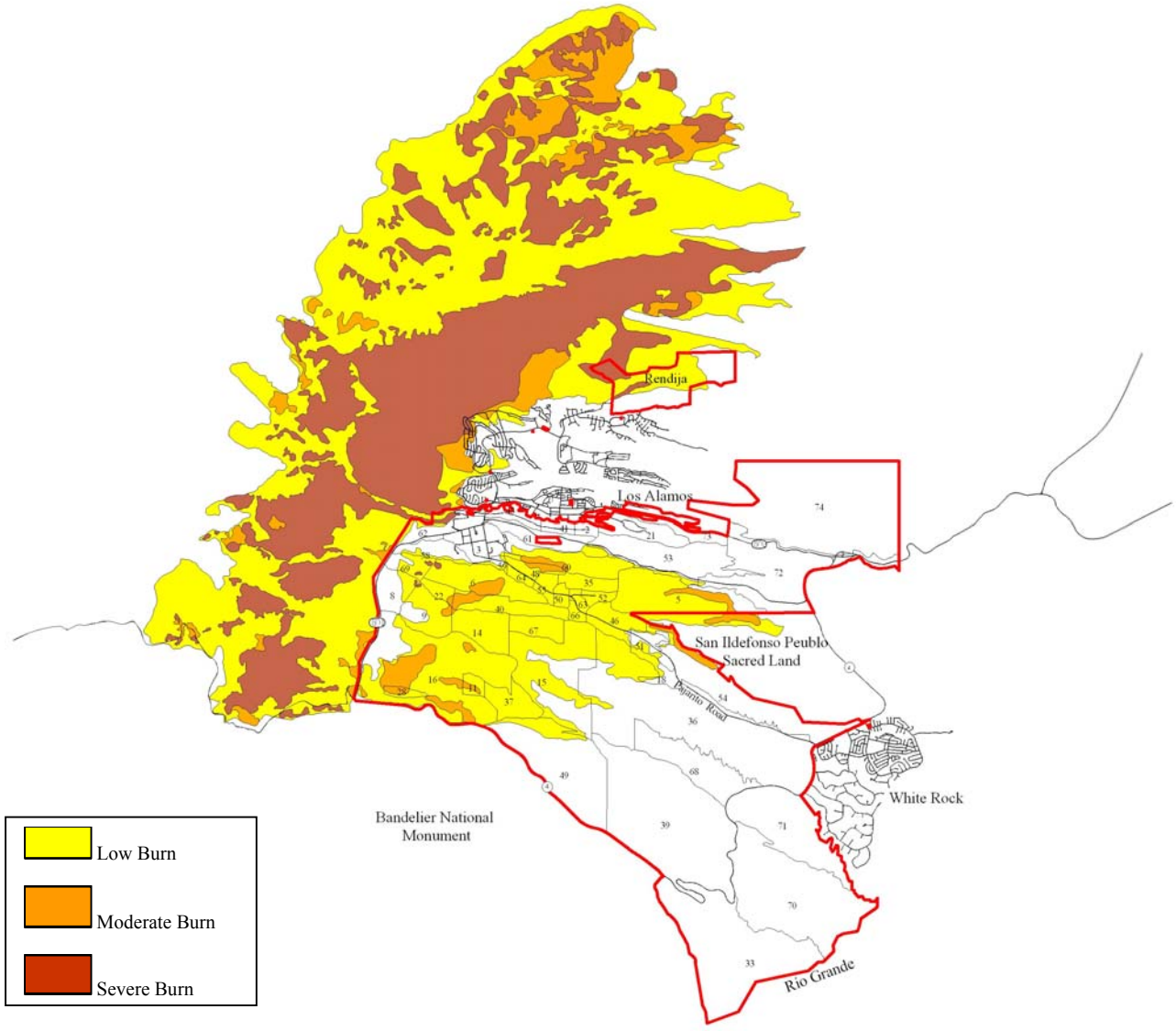


Figure 4.2. The extent of the Cerro Grande Fire and its burn severity.

Chapter 5

Data Collection Methods

Brian C. Harmon, Jennifer E. Nisengard, Kari M. Schmidt, and W. Bruce Masse

FIELD PROCEDURES

To document the fire, fire suppression, and rehabilitation impacts and to record rehabilitation recommendations, archaeologists from the Cultural Resources Management Team (CRMT) visited all known archaeological sites on DOE/LANL lands within or near the burn area (Figures 4.2 and 5.1) and within the staging areas used for fire suppression efforts (it should be noted that about 5% of the sites could not be relocated during the study). Before the fire, some of the areas that were subject to burning had not been subject to archaeological survey. Fortunately, we were able to survey these areas as part of the Wildfire Hazard Reduction Project (Vierra 2002). The size of the assessment and survey crews was an average of four to five people, although crew size did vary from week to week. Surveyors were spaced at 20-m intervals and, during the course of the CGFA Project, all areas within the burned zone were intensively surveyed; all previously unrecorded cultural sites were documented.

The project areas were divided into four sections, DX, ESA, FMU-80, and the Rendija Canyon Tract (Figure 5.1). Some of LANL's technical areas straddle these sections and cultural sites were evaluated based on GPS data. Some of the technical areas did not have sites situated within their boundaries; the locations of all of the technical areas are included in the specific maps of the management areas even if there were no sites assessed within them.

Field crews assessed the damage caused by the fire to these sites, as well as damage caused by fire suppression and rehabilitation activities. The CGFA Project form was used by the CRMT to guide site fire assessments. The data gathered from this assessment are currently being used to plan rehabilitation and mitigation for impacted sites and to create a baseline for future monitoring. In the following sections, we discuss the methods used to conduct site assessments, our findings about the impacts, and our plans for future rehabilitation and mitigation (Harmon et al. 2001; Nisengard et al. 2002).

Four techniques/tools were used to document fire impacts, including GPS equipment, photography, existing site forms, and the CGFA Project form. The perimeter of the majority of revisited and newly recorded sites was recorded using a Trimble GPS backpack unit (model number 33302-51). Small sites consisting of very few artifacts were recorded as points, and trails, stairs, and cavates were recorded as linear features. There were a small number of sites that could not be recorded with the Trimble units because they were too close to cliff faces or were in dense ponderosa pine forests.

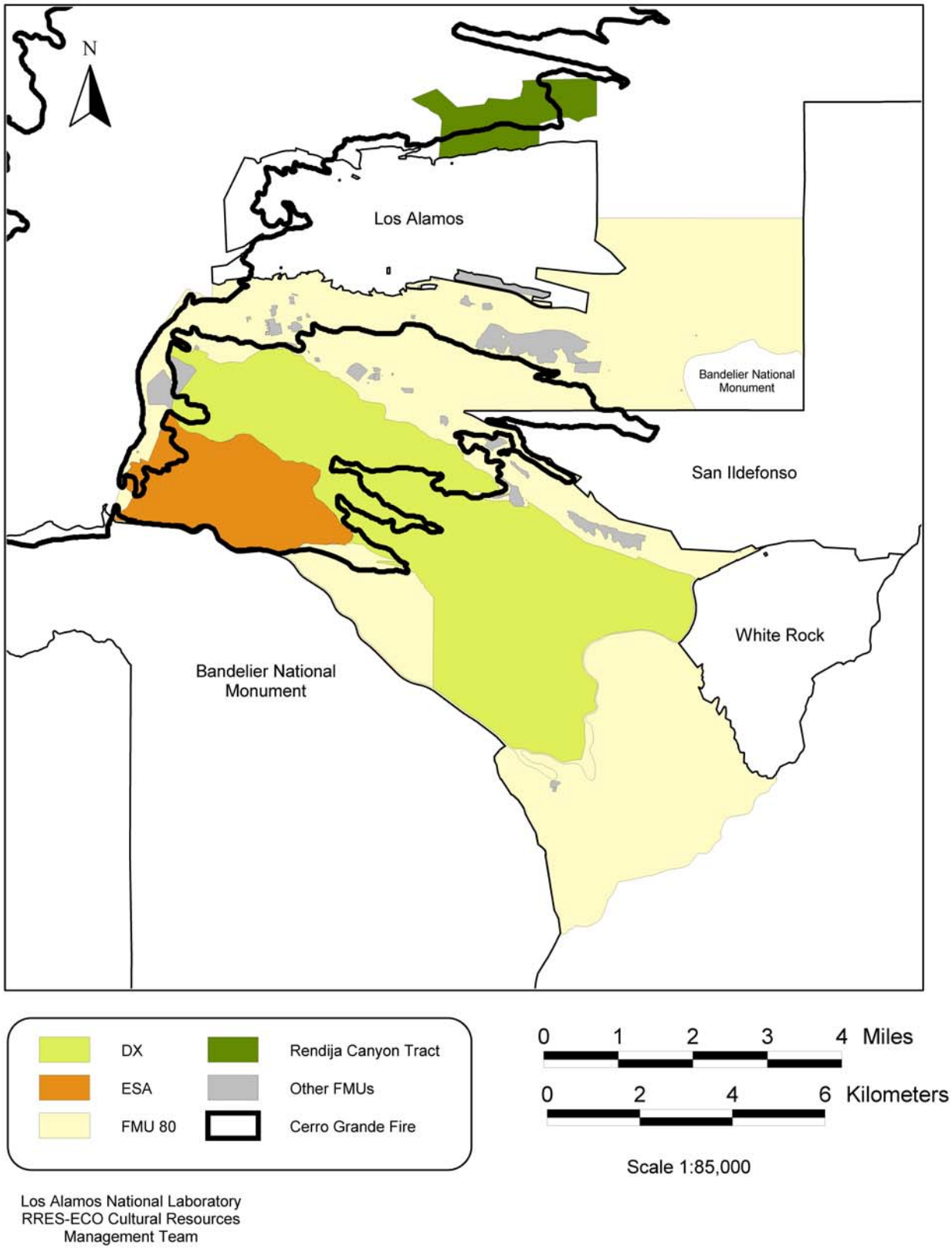


Figure 5.1. Map of areas included in the CGFA Project.

Digital photographs were taken at each of the sites to create a visual record of the damage caused by the fire. These photographs will allow for a visual baseline for comparison as site monitoring begins. At the onset of the project, assessment teams took only one photograph of each site, but it was later decided that there should be two shots of each site, taken from different perspectives.

Existing site forms and their associated site maps were used in the field when they were available. The maps were particularly important when visiting sites that were subject to moderate and severe burning. Impacts to the site were noted on the existing maps (i.e., the locations of stump holes and snags).

The CGFA Project form (Figure 5.2) was the primary tool used to guide the assessment. The form was based on one originally created for the same purposes and used by the Burned Area Emergency Response (BAER) Team. Some modifications to the form were made to meet our specific needs. Such changes included more specific cultural affiliation choices, specification of site types, and the addition of more places to include comments for specific observations and recommendations. The form breaks cultural affiliation into specific dates and periods associated with this area of the Pajarito Plateau. Site type can be broken into 20 categories; definitions for these categories are detailed in the final section of this chapter.

The core of the form consists of a checklist, largely unmodified from the original BAER form, for evaluating the burn severity in the immediate site vicinity, damage to the site caused by the fire, and the kinds of suppression and rehabilitation impacts present at sites. Fire severity was judged using the list of criteria shown in Figure 5.2. For example, partially burned duff, a lack of ladder fuel consumption, and no canopy burning characterize a low-burn area. A moderate-burn area is characterized by consumption of duff and ladder fuels, as well as isolated instances of crown burns. Severely burned areas were locations in which the duff, crown, and canopy were completely consumed. Figures in Chapters 7 through 11 provide examples of low, moderate, and severely burned sites.

Fire impacts to sites consist of cracking and/or spalling of masonry, smoke or soot staining on masonry, stump and/or root holes on or adjacent to masonry, stump and/or root holes elsewhere on the site, loss of architectural wood due to the fire, fallen trees on masonry, dead but standing trees (snags) that have the potential to damage structures, and snags present elsewhere on the site. Some of these impacts can be easily mitigated, while others represent threats that may result in future damage to site features. Still others are useful in documenting the specific areas of the site that were exposed to fire.

Cracked or spalled masonry results in an increased susceptibility to erosion and deterioration. Although there is little that can be done to mitigate this impact, it is important to document the presence of such damage for two reasons. First, it creates a baseline for future site monitoring, and second, it provides information on the location and intensity of the fire at a given site.

Smoke or soot staining is largely a temporary effect; in fact, visits to several sites one year after the initial fire assessment revealed that a great deal of soot and smoke staining had been washed away by rain and snow. The utility of recording smoke and soot staining lies in its potential, like that of spalled masonry, to indicate the distribution and intensity of fire on a site.

Stump holes are the casts of tree trunks and root systems that are left in the ground when a tree is totally consumed by fire. Stump holes create avenues for erosion and present a potential for the mixture and contamination of surface and subsurface deposits. The filling of stump holes can easily mitigate these impacts.

The danger of snags or partially burned trees on most sites is not so much that they will fall onto the remains of structure; in the few instances in which this was observed there was no, or minimal, damage.

CERRO GRANDE FIRE
LOS ALAMOS NATIONAL LABORATORY POST-FIRE SITE INSPECTION RECORD

SITE: No: LA_____Temp or other No: _____Bldg. #_____TA # _____
Recorder(s)_____ Date of Inspection _____
UTM (GPS) Z13 _____E _____N Elev.: _____ USGS Quad:_____
SITE DESCRIPTION
Site Period: Unidentified____: Archaic____; Pueblo____; Homestead____; Manhattan/Cold War____
Site Type: Roomblock____; 1-3 Room Structure____; Artifact Scatter____ ; Agriculture____; Homestead____;
Road/Trail/Stairs:____; Historic Trash____; Manhattan/Cold War Structure____; Other:____
Features Present:_____
Previously Unidentified Features Present:_____
List wood/organics (if known to be present): _____
Were they burned? Yes___; No___; Partial___
Comment_____
Physical/environmental hazards, if any:_____
VANDALISM PRESENT: YES___ NO___ If yes, RECENT___ OLD___ UNKNOWN___
SITE BURN SEVERITY [Note: Map, photograph and describe affected areas of site]
___ None
___ Low (duff partially consumed, none to little ladder fuels burned, no canopy burned)
___ Moderate (duff consumed, ladder fuel burned, isolated crown burn or torching)
___ Severe (duff, ladder and crown completely consumed)

FIRE EFFECTS AT SITE	**YES**	**NO**	**# or %**	**COMMENT**
Cracking/spalling on masonry….....	___	___	_____	_____
Smoke/soot damage on masonry	___	___	_____	_____
Stump/root holes on or adjacent to masonry.....	___	___	_____	_____
Additional Stump/root holes in site area….....	___	___	_____	_____
Loss of architectural wood/features.....	___		_____	_____
Fallen tree(s) on walls or rubble..... .	___	___	_____	_____
Snags/partial burned trees that can damage structures	___	___	_____	_____
Additional snags/partial burned trees in site area	___	___	_____	_____
Other _____	___	___	_____	_____

SUPPRESSION IMPACTS TO SITE: YES___ NO___ Handline___; Dozer line/firebreak:___; Tree falling:___; Drop point/safety zone___; Retardant drop impact/staining___; Cache/Camp ___; Vehicle ruts ___; Other_____; Comments_____
EROSIONAL THREATS TO SITE : None_____ Low_____ Moderate to High_____ SLOPE _____%
Erosion threat: Active gully/rilling/scouring (depth and extent) _____ Stumphole/burned log erosion ____
Pedestalling ___ Duff absent _____ Other (describe)_____
Comments_____
REHABILITATION AT SITE: YES _____ NO_____ Describe:_____
_____
RECOMMENDED PRESERVATION TREATMENT AND/OR DATA RECOVERY
____ NO TREATMENT ____MONITOR ____TREATMENT ____DATA RECOVERY
Describe recommended treatment (Directional falling; straw bale; root hole filling; Excelsior matting; wattles; etc.):
_____
Describe recommended data recovery _____
_____
Estimated Cost of Treatment/Data Recovery $_____
PHOTOS: _____**GPS**:_____ **Additional comments on back ?** Yes___ No___

Figure 5.2. CGFA Project form.

The fact that there are only a few Ancestral Pueblo sites with standing masonry means that snags pose a significant threat at these sites. The greatest potential for damage from snags arises from these trees falling over and pulling up their roots, which can displace masonry, disturb subsurface deposits, and create avenues of erosion. Finally, if snags are left in place, they remain potential fuel for future fires. Removing snags from the vicinity of sites eliminates their threat to masonry and site stability.

The increased potential for erosion (due to the burning off of duff and vegetation) is a significant impact for fire-damaged sites, and an attempt was made to qualitatively assess such potential. Ultimately, this category proved to be one of the most difficult evaluative tasks, in that it was not possible to develop a set of measures that could be consistently applied by the various field teams. Based on several factors, including general degree of slope and the degree of overall vegetation loss, we divided erosional impacts into three categories: none, low, and moderate to high.

Cultural resources were also potentially impacted by fire suppression and rehabilitation activities, such as dozer lines cut for firebreaks, tree felling, and staging area activities. Evidence of these disturbances was recorded. Finally, if the fire or other impacts revealed previously unrecorded artifacts or features associated with a site, these were noted.

Taking all of the above factors into account, the team then made an in-field assessment of what kind of treatment, if any, would be recommended at a particular site. These recommendations included such things as directional tree felling, root hole filling, snag removal, straw wattle placement to reduce erosion, future monitoring, and data recovery. These recommendations are subject to continuing re-evaluation.

In the course of conducting fire assessments and performing other projects in burned areas, new sites were discovered. Some of these sites were in previously non-surveyed areas, and others were revealed when the fire burned away duff and dense vegetation. These newly identified sites were assessed in the same manner as the previously recorded sites, although some additional data were collected. A short site form was created to facilitate recording of new sites in the burn areas (Figure 5.3). The form allowed for a site sketch to be drawn and for a brief description of the site. These sites will be recorded fully using official New Mexico Laboratory of Anthropology forms in the future; the data will be subsequently submitted to the New Mexico Cultural Resources Information System.

There was no attempt to address the issue of fire damage to surface artifacts, such as pottery and chipped stone, although severe damage to artifacts was sometimes noted on the assessment forms. Our general impression is that noticeable alteration of artifacts was restricted to a small number of sites in areas of moderate- or severe-burn intensity.

ARCHAEOLOGICAL SITE TYPES

The following section provides detailed descriptions of each of the site types used during the CGFA Project. There are 20 categories, although some of them were lumped together on the assessment and new site forms. Categorical divisions between sites are made on the basis of site size, morphology, and the nature of the associated artifact assemblages. Chapters 7 through 11 include data tables and discussions that relate to these terms, some of which are used interchangeably (e.g., fieldhouse and one- to three-room structure).

Lithic scatter: Limited to clusters of chipped stone tools and/or pieces of chipped stone produced during the manufacturing of chipped stone tools.

CERRO GRANDE FIRE ASSESSMENT PROJECT
NEW SITE RECORDING SHORT FORM

SITE: No: LA_____ Temp or other No: _____ Bldg. #_____ TA # _____
Recorder(s)_____ Date of Inspection _____
UTM (GPS) Z13 _____E _____N Elev.: _____ USGS Quad: _____
TOPOGRAPHIC SETTING: Mesa top: ___; Mesa slope: ___; Ridge Top___; Ridge Slope: ___; Cliff/Talus Slope: ___; Other: ___ Comments on topographic setting: _____
_____
VEGETATION: Piñon/Juniper: ___; Ponderosa Pine: ___; Open: ___ Comments on vegetation: _____
_____
SITE DESCRIPTION
Site Period: Unidentified Prehistoric____; Archaic____; Unid. Pueblo____; Coalition__; Late Coalition/Early____ Classic____; Classic____; Unid. Historic____; Homestead____; Manhattan____; Cold War____; Unidentified____; Other_____
Site Type: Small Roomblock____; Complex Pueblo_____; 1-3 Room Structure____; Lithic Scatter____; Artifacts Scatter_____; Cavate____; Road/Trail/Stairs:____; Historic Structure____; Historic Trash____;
Other:_____
Features Present:_____
Previously Unidentified Structures:_____
Comments:_____
_____
Physical/Environmental hazards, if any:_____

VANDALISM PRESENT: YES___ NO___ If yes, RECENT___ OLD___ UNKNOWN___
SITE BURN SEVERITY ___ None; ___ Low (duff partially consumed, none to little ladder fuels burned, no canopy burned); ___ Moderate (duff consumed, ladder fuel burned, isolated crown burn or torching); ___ Severe (duff, ladder and crown completely consumed).
Comments on site burn severity:_____

FIRE SUPPRESSION IMPACTS TO SITE: YES__ NO__ Handline___; Dozer line:___; Tree falling:___; Drop point/safety zone___; Dozer line___ ; Retardant drop impact/staining___; Cache/Camp ___; Vehicle ruts ___; Other_____; Comments_____

EROSIONAL THREATS TO SITE : None____ Low___ Moderate to High ___
Erosional Threat: Duff absent:____; Pedestalling:____; Active gully/ rilling/scouring (depth and extent) _____
Stump hole/burned log erosion ____ ; Other:_____
Comments on Erosional Threats:_____

Photos: _____ GPS: _____ Additional Comments on Back? Yes ____ No____
Sketch Map:

Figure 5.3. CGFA Project new site recording form.

Artifact scatter: Includes a combination of ceramic sherds, chipped stone, and/or ground stone artifacts, but lacks identifiable surface structural remains or evidence of pit structures.

Pit structure: Presumed habitation sites with evidence (e.g., depressions) of one or more structures built entirely or partially underground.

One- to three-room structure/Fieldhouse: The remains of a small surface structure constructed of adobe, jacal, or masonry. This site typically consists of square to rectangular-shaped rock alignments, with individual units being no more than 3 m in length. The majority of these sites are identical to what many researchers term fieldhouses. Also included in the one- to three-room structure category is one example of a single unusually large rectangular structure, along with several smallish structures that are unusual due to the presence of upright stones or because of their location. Some of these "unusual" structures may represent shrines or other purposes not directly related to agriculture.

Pueblo roomblock: The remains of a contiguous, multi-room habitation structure (four or more rooms with no enclosed plaza) constructed of adobe, jacal, or masonry. In several cases, somewhat amorphous mounds containing evidence of stone rubble but no distinct alignments were included in this category.

Plaza pueblo: Contains one or more pueblo roomblocks that partially or completely enclose a plaza. Plaza pueblos typically are much larger (in both room numbers and site size) than single pueblo roomblock sites.

Cavate: Consists of a room carved into a cliff face within the Bandelier Tuff geological formation. The category includes isolated cavates, multi-roomed contiguous cavates, and groups of adjacent cavates that together form a cluster or complex.

Rockshelter: An overhang, indentation, or alcove formed naturally in a rock face or large boulder, or alternatively, a partly enclosed area created by rock falls leaning against a rock face or large boulder, and which exhibits evidence of human use. Rockshelters generally are not of great depth, in contrast to caves.

Water control feature: A device (e.g., stone check dams) that controls the flow of water, particularly runoff.

Garden plots: Small, formal agricultural areas, often bounded with cobbles and containing gravel mulch (e.g., grid gardens and/or terraces). This site category typically consists of square to rectangular-shaped rock alignments, with individual units being more than 3 m in length (in contrast with one- to three-room structures, defined above).

Rock feature: Includes typically isolated examples of rock piles, amorphous rock concentrations, and/or upright stones.

Tipi/wickiup ring: A circular arrangement of rocks representing the residue from a dismantled tipi or wickiup.

Rock/log enclosure: A small area enclosed by loosely stacked rock or log alignments (e.g., corral or lambing pen). These are distinguished from one- to three-room structures by the nature of the stacking methods and often by the presence of historic artifacts in and around the enclosure.

Petroglyph/rock art: A design or set of symbols scratched, pecked, or scraped into a rock or plastered surface. Petroglyphs are distinguished from historic and modern graffiti.

Stairway: A set of two or more steps carved into a steep section of tuff bedrock, typically associated with trails.

Trail: Prehistoric or historic path defined by use-wear or cutting into bedrock or soil surfaces.

Game pit: Cavity dug down into the tuff bedrock presumed to have been used as a passive hunting drop site for larger game animals (e.g., deer) or as concealment from which to lure and trap birds.

Wagon trail: Rutted trail formed as a result of historic wagon use.

Historic structure: A building or other structure constructed after AD 1593 (but most typically in the Los Alamos area constructed after about AD 1900).

Historic artifact scatter/trash scatter: A concentration of items produced and deposited after AD 1593 (but most typically in the Los Alamos area deposited after about AD 1900).

Chapter 6

General Results of the Cerro Grande Fire Assessment Project

Brian C. Harmon, Kari M. Schmidt, Jennifer E. Nisengard, and W. Bruce Masse

As of August 1, 2002, almost 500 sites, both ancient and historic, have been assessed for fire and non-fire related impacts. Table 6.1 provides a summary of all of the sites assessed as part of the CGFA Project. This table does not include the 12 historic buildings discussed in Chapter 11 by McGehee et al. Table 6.2 summarizes the damage to all of the sites in the burn area; the numbers in the table are greater than 500 (n = 566) because some of the sites in the study have multiple kinds of damage (i.e., some sites have both fire damage and threats from erosion and others are threatened by erosion, and have damage from suppression activities).

Ten percent of the sites in the CGFA Project survey were previously unrecorded; some of the new sites were located in previously unsurveyed areas; while others became visible when the fire burned off duff and dense vegetation that had previously obscured the site. Not all of the sites visited by assessment teams had fire damage even though they were located within the existing geographic information system (GIS) maps of the burn area (see Figure 4.2); the discrepancy is largely due to the natural movement of fire across the landscape. One hundred and forty sites, or approximately 35% of all of the assessed sites, fall into this category; most of these sites are located in areas that were impacted by a low burn according to fire intensity maps (Table 6.3). In reality, these 140 sites were located in unburned areas as assessed by field crews.

Of course many sites did not escape unscathed, as documented in Table 6.2 and in subsequent chapters, and fire impacts to sites were quite varied. The degree of impact and the kinds of damage a site sustained were affected by site type, location, and the kind of vegetation present within a given area. Historic wooden structures and other sites that had had intact architectural wood before the fire suffered a great deal of damage, while other kinds of sites located in the most severely burned areas managed to survive unscathed. Unfortunately, in several cases, fire impacts at some sites will continue for the next several years, in the form of erosion and the mixing of surface and subsurface deposits resulting from the collapse of burned trees and snags. Fortunately, some of these impacts will be mitigated naturally as duff replacement begins, and purposefully as rehabilitation efforts aid in site protection. This chapter presents a summary of the results from the analysis of the fire impacts recorded during the CGFA Project; more detailed information on specific sites is provided in Chapters 7 through 10 and on site forms included in Volume II of this report.

Table 6.1. All Assessed Sites.

Cultural Resource	Total Number Assessed
Prehistoric and temporally unplaced site	390
Historic site	68
Historic building	12
Not a site	5
Not relocated	5
Total	480

Table 6.2. Fire and Non-Fire Related Impacts to Cultural Resources Located within the Burn Area.

Impact	Prehistoric and Temporally Unplaced Sites	Historic Sites	Historic Buildings	Total
Fire damage	216	53	12	281
Suppression activities	32	3	0	35
Rehabilitation	21	8	0	29
Erosion	175	36	0	211
Total	444	100	12	556

Table 6.3. Burn Severity Based on GIS Coverage Cross-Tabulated with Burn Severity Assessment of CRMT.

Burn Severity as assessed by CRMT	Burn Severity based on GIS Coverage				Total Number of Sites
	None	Low	Moderate	Severe	
None	96	94	2	0	192
Low	20	87	6	0	113
Moderate	9	86	7	0	102
Severe	1	44	7	11	63
Total	126	311	22	11	470

A SUMMARY OF FIRE EFFECTS TO ALL ANCIENT CULTURAL RESOURCES AT LANL

The most severely impacted ancient archaeological sites (wooden historical sites were by far the most devastated by the Cerro Grande Fire, impacts to these sites are discussed in detail in Chapters 11 and 12), as a class, are masonry structures, including pueblos, fieldhouses, and an assortment of other structures that fall under the rubric “rock feature” (e.g., check dams, rock piles, garden plots, etc.). Figure 6.1 illustrates that all types of masonry structure sites were affected in a similar manner; although, pueblos were slightly less likely to be impacted by any given effect. Most pueblos are located in the piñon-juniper zone, or in the ecotone between the piñon-juniper woodland and the ponderosa pine forest: that is, pueblos are for the most part surrounded by a smaller fuel load than other sites (Vierra and Balice 2001). Damage to masonry structures at sites is quite varied.

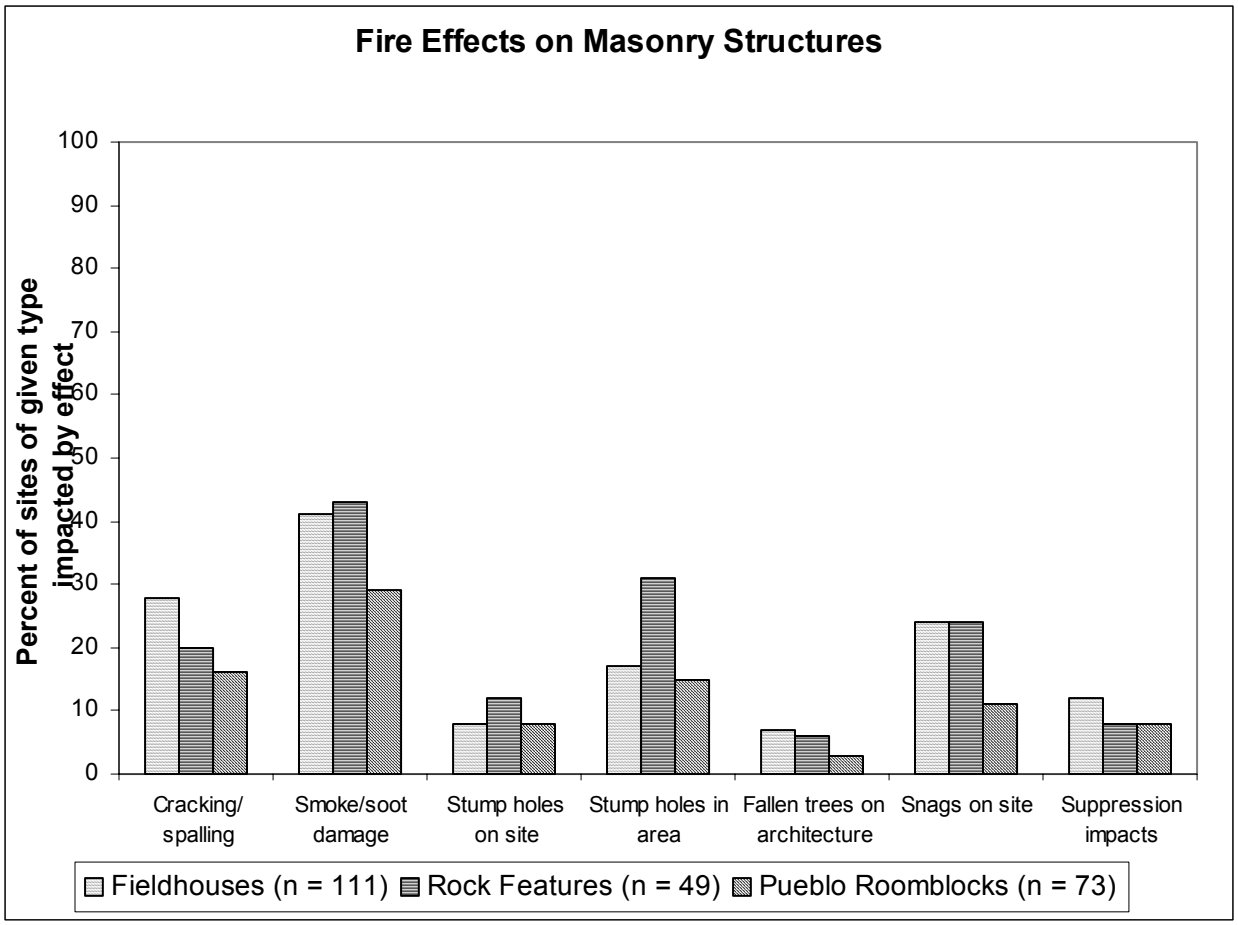


Figure 6.1. The effects of the Cerro Grande Fire on masonry structures at LANL.

Smoke or soot damage is the most common effect, but even this is present at less than 50% of the sites. Less common, but in fact more destructive, was the presence of cracking and spalling on masonry. When cracking and spalling did occur, usually less then a quarter of the masonry was affected, although in a few instances, virtually all of the masonry was spalled. Stump holes were particularly common in ponderosa pine areas that were subject to moderate- and severe-intensity burning. The presence of fallen trees on architecture was not common, however, snags do pose potential future threats to sites because they are fuel for future fires and because if they do fall, they create new avenues for erosion.

Impacts to sites from suppression of the fire ranged from relatively innocuous (i.e., vehicle ruts) to very destructive; in some cases masonry blocks from fieldhouses were used to anchor tents in the suppression camp. Three fieldhouses were almost completely destroyed by dozer lines. Fortunately, these highly adverse impacts were very rare, and less than six sites were affected.

Fire damage to cavates (Figure 6.2) was infrequent and minor, and, in general, these features weathered the Cerro Grande Fire quite well. There is, however, one significant potential research issue created by the fire. The interiors of many cavates were deliberately smoke-blackened as part of their original construction. These carbon deposits have the, albeit untested, potential to yield radiocarbon dates. It is not known if soot from the Cerro Grande Fire caused contamination problems for radiocarbon dating.

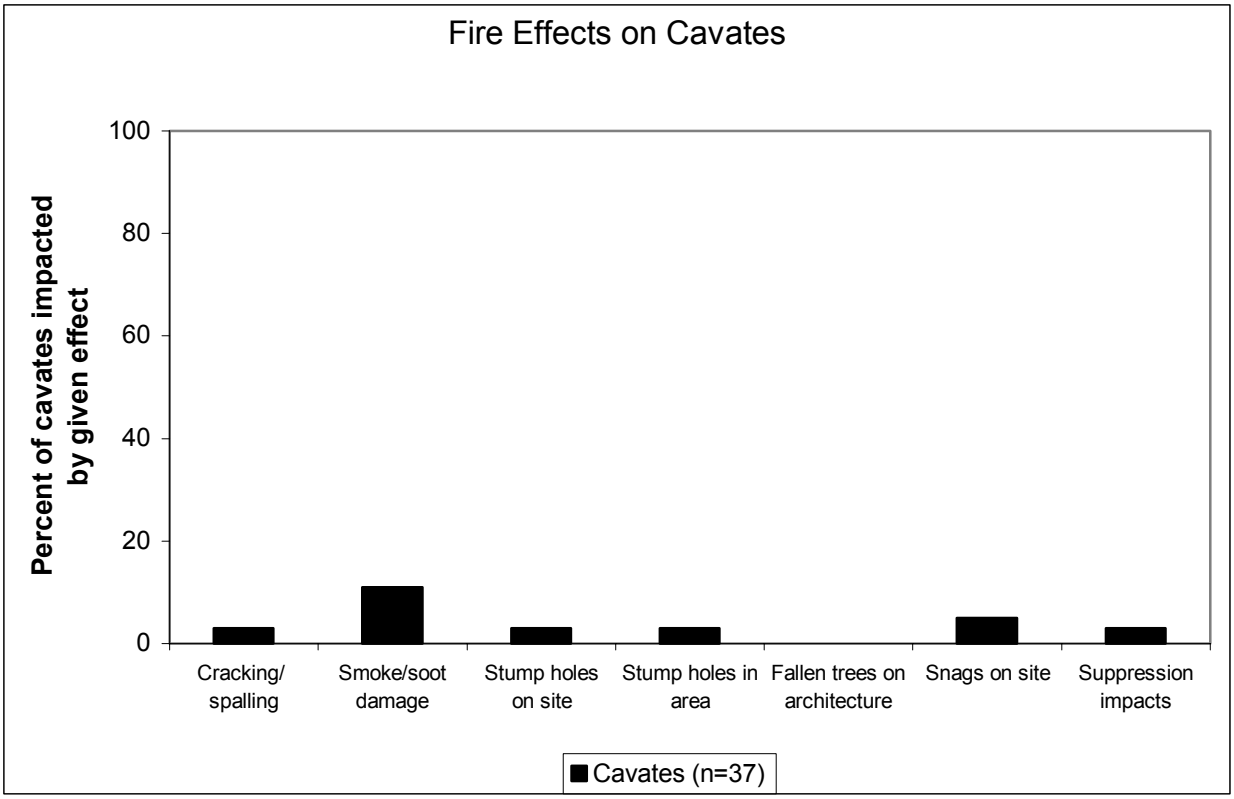


Figure 6.2. Fire effects on cavate features at LANL.

Artifact scatters were impacted in ways that differ from sites with masonry architecture. The main impact to artifact scatters is from erosion and the potential threat of erosion created by a loss of vegetation, fallen trees, and snags. There were some suppression impacts at these sites, but these were usually rather minor.

Certainly the intensity of the fire in specific areas determined how likely a given site was to suffer any given type of impact. Figure 6.3 illustrates the frequency of effects on masonry structures by burn intensity. Burn intensity, reflected in Figure 6.3, refers to our on-the-ground determination, not the burn areas depicted on the map. As can be clearly seen in this figure, the hotter the fire, the more likely a site was to be affected by any given impact. The "stump holes in the site area" category is a curious exception, and we can offer no explanation for it at the current time.

The GIS coverage created using infrared aerial photography during the Cerro Grande Fire was used during this project and divided burn severity into three categories: low, moderate, and severe (see Figure 4.2). These distinctions were made largely on the basis of the intensity and duration of the burn within a specific area. However, in-field analysis at specific points on the landscape (i.e., cultural sites) revealed that there were discrepancies between the broadly painted pattern in the GIS and the true nature of the burn. Table 6.3 compares the GIS-assigned burn intensity with the field-assigned burn intensity for 470 of the sites in this study. Excluded from this table are six sites for which no field data are available, and three sites for which no GIS data are available. The large number of sites in the GIS category of "None" is due to two factors: first, a number of the sites visited were in staging areas for firefighting activities, and therefore not burned; second, sites near areas depicted as being burned on the GIS were visited to make sure they were not impacted by spot fires. In fact, the fire impacted 30 sites that were not depicted in burn areas on the GIS maps.

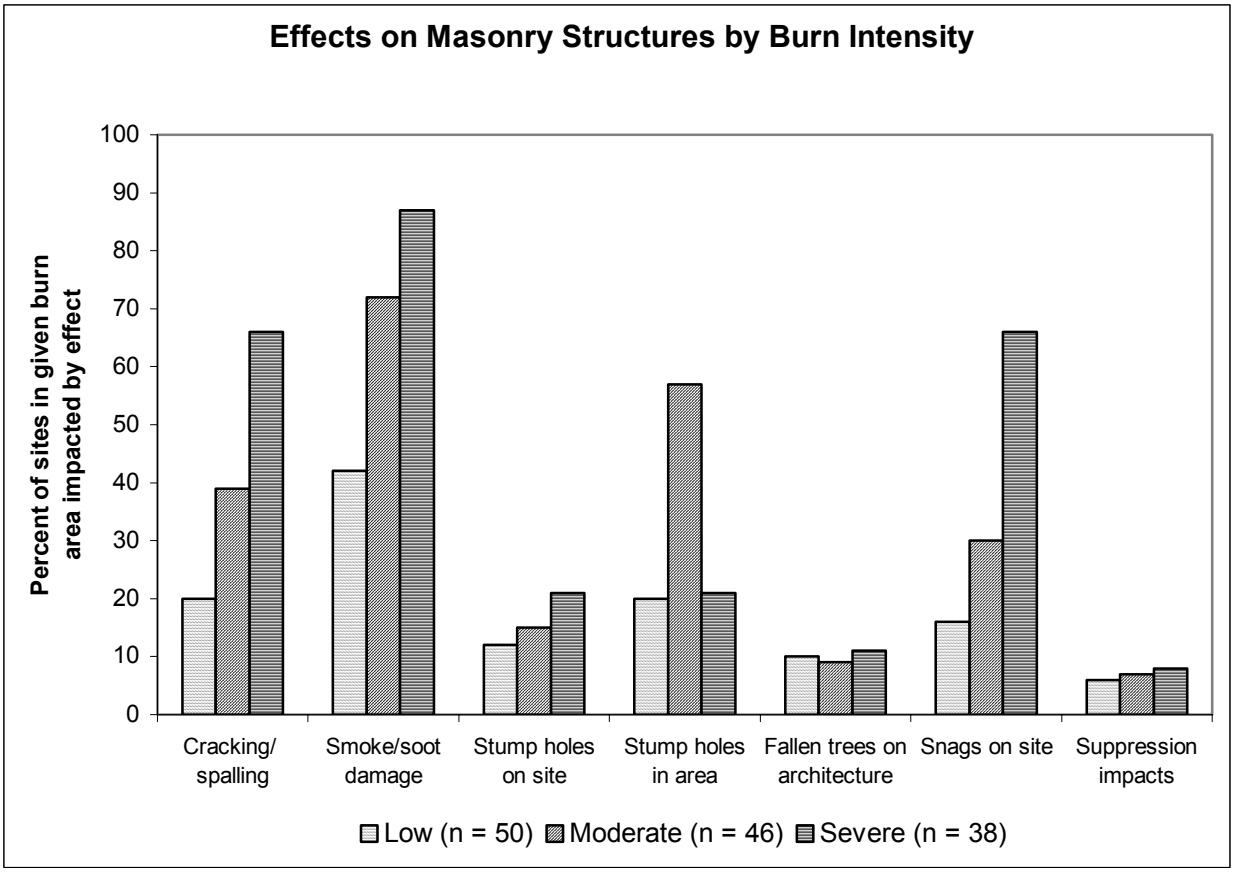


Figure 6.3. Burn intensity and fire effects to masonry structures.

The salient feature of Table 6.1 is that it shows there is a great deal a small-scale variability in burn severity within the broad GIS areas of low and moderate burn. The only GIS category that did not show this variability was severe burn. Specifically, while fewer sites overall were in burned areas (n = 278) than expected (n = 333), five times more than the expected number were in moderately or severely burned areas (n = 33 vs n = 165). Thus, while the GIS coverage gave us a good idea of *where* burning occurred, it did not give us a good idea of the *intensity* of burning at any given site.

Chapter 7

Description of Impacted Native American Resources in the Engineering Sciences and Applications Division

Alan L. Madsen

BACKGROUND FOR THE ESA ASSESSMENT

The ESA Division is located in the southwestern portion of LANL property (Figure 7.1). ESA ranges from an elevation of 6,800 ft to 7,800 ft and incorporates approximately 3.5 square miles of land. The eastern edge is bordered by the intersection of Water Canyon and Cañon de Valle. State Route 4 travels along part of the southern edge and State Route 501 on the western edge. Vegetation within this area is comprised of a ponderosa pine forest with some piñon and juniper throughout the area. ESA incorporates TA-11, -16, -28, and -37. There are many archeological sites that exist within the ESA boundary; however, because they exist within ESA does not mean that all of the sites burned. Only those sites that exist in ESA within the Cerro Grande Fire boundary are addressed in this chapter (Table 7.1). Details about the damage each site sustained, the specific effects of the fire, and general information about these sites are included below for those sites identified as Archaic period and Ancestral Pueblo Native American, as well as those sites of unknown age. Historic period (non-Native American) sites are discussed in Chapters 11 and 12.

The Cerro Grande Fire burned the majority of the land in ESA. The burn severity ranges between none, low, moderate, and severe in some places. Small spot fires in the ESA area began on May 7 and continued through May 10, 2000. On May 10, larger portions of ESA burned uncontrollably; subsequently, by May 11, 2000, 95% of ESA had burned.

ASSESSMENT OF FIRE-IMPACTED PREHISTORIC AND TEMPORALLY UNPLACED SITES IN ESA

LANL archaeologists revisited archaeological sites in ESA after the Cerro Grande Fire occurred in May 2000. Each site was revisited to assess the damage that the fire or fire-related activities may have inflicted (Table 7.2). The purpose of the CGFA Project was to determine which sites needed stabilization or treatment to protect remaining archaeological resources.

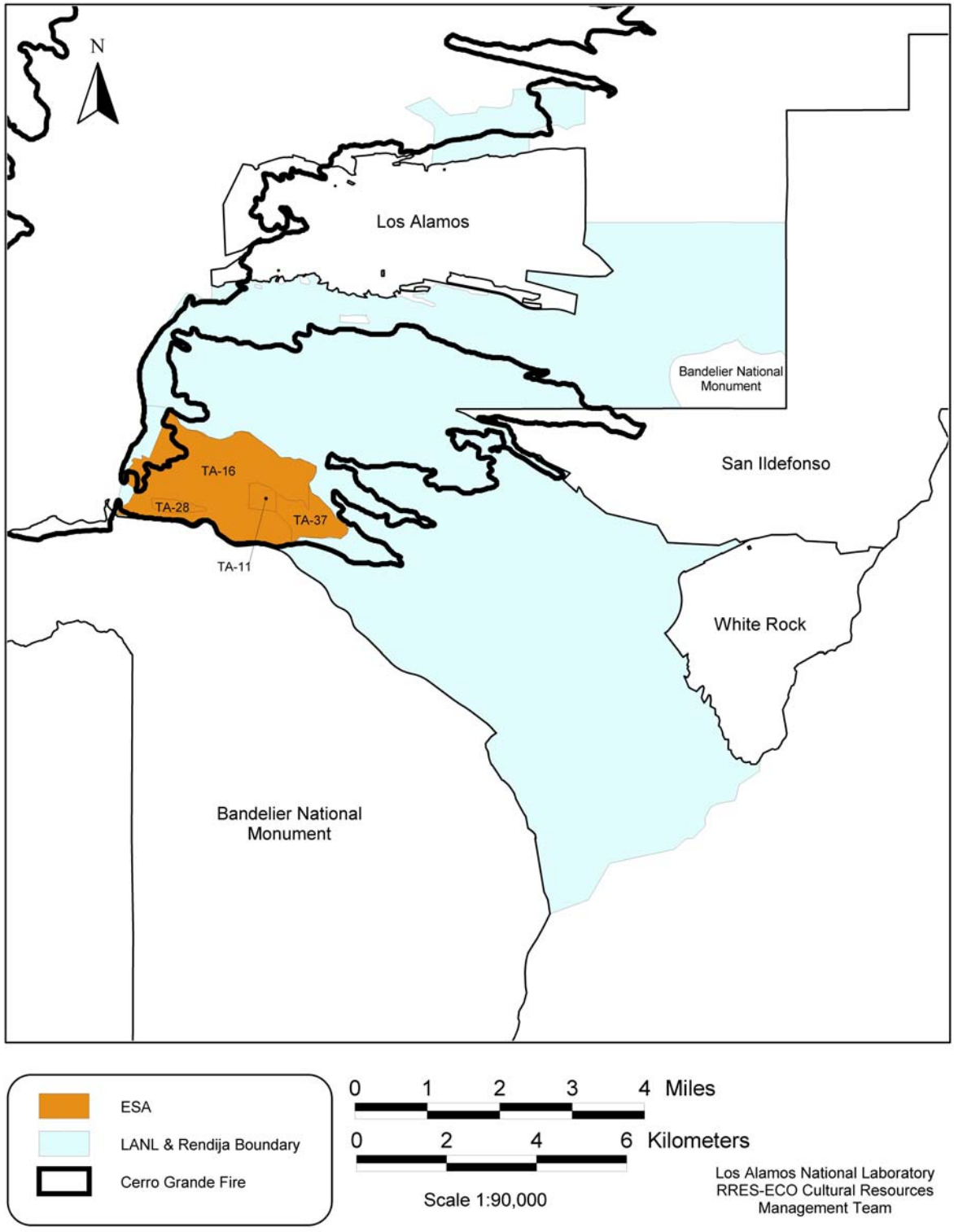


Figure 7.1. Map of Engineering Sciences and Applications Division (ESA).

Table 7.1. All Assessed Sites in ESA by Technical Area.

Technical Area	LA Number	Site Type	Period/ Phase	Impacted by Cerro Grande	Non-Fire Impacts	Treatment	Comments
11	12656	Roomblock	Unidentified	No	No		
11	86659	1-3 room structure	Ancestral Pueblo	Yes	No	Yes	Wattles
16	136667	Lithic scatter	Archaic	Yes	No	No	FMU-80
16	201	1-3 room structure					Not relocated
16	204	1-3 room structure	Ancestral Pueblo	Yes	Yes	No	None
16	15854	Roomblock	Coalition	Yes	No	Yes	None
16	15855	Roomblock	Coalition	Yes	No	No	None
16	15856	Roomblock	Coalition	Yes	Yes	No	None
16	15857	Roomblock	Coalition	Yes	No	No	None
16	15858	1-3 room structure	Ancestral Pueblo	Yes	No	No	None
16	15859	1-3 room structure	Ancestral Pueblo	Yes	No	No	None
16	16807	Homestead	Homestead	Yes	Yes	Yes	Discussed in Chap. 12
16	21299	1-3 room structure	Classic	Yes	No	No	None
16	21300	Artifact scatter	Ancestral Pueblo	Yes	No	No	None
16	21333	Rock feature	Ancestral Pueblo	Yes	No	No	None
16	21367	Lithic scatter	Archaic	Yes	No	No	None
16	21368	Lithic scatter	Archaic	Yes	Yes	No	None
16	21369A	Lithic scatter	Archaic	Yes	No	No	None
16	21369B	Historic scatter	Unidentified Historic	Yes	No	No	Discussed in Chap. 12
16	21370	Rock feature	Unidentified Prehistoric	Yes	No	No	None
16	21371	Lithic scatter					Not relocated
16	86648	Lithic scatter	Unidentified Prehistoric	None	No	No	None
16	86649	Lithic scatter	Archaic	Yes	No	No	None
16	86650A	Cavate	Ancestral Pueblo	Yes	No	No	None
16	86650B	Cavate					Not relocated
16	86650C	Cavate					Not relocated
16	86651	1-3 room structure	Ancestral Pueblo	Yes	Yes	Yes	Wattles
16	86652	1-3 room structure	Ancestral Pueblo	Yes	Yes	Yes	Monitor
16	86653	1-3 room structure	Ancestral Pueblo	Yes	No	No	None
16	86654A	1-3 room structure	Ancestral Pueblo	Yes	Yes	No	None
16	86654B	Grid garden	Ancestral Pueblo	Yes	No	No	None
16	86655	1-3 room structure	Ancestral Pueblo	Yes	No	No	None
16	86656	1-3 room structure	Coalition	Yes	No	No	None
16	86657	Roomblock	Coalition	Yes	No	No	None
16	86660	1-3 room structure	?	Yes	No	Yes	Monitor erosion
16	86661	“check dam”					Not a Site
16	86662	1-3 room structure	Coalition	Yes	No	No	None
16	86663	1-3 room structure	Ancestral Pueblo	None	No	No	None
16	86687	1-3 room structure	Ancestral Pueblo	Yes	No	No	None

Table 7.1. (cont.)

Technical Area	LA Number	Site Type	Period/ Phase	Impacted by Cerro Grande	Non-Fire Impacts	Treatment	Comments
16	86688	1-3 room structure	Classic	Yes	No	Yes	Data recovery
16	86689	Rock art and rock feature	Ancestral Pueblo	Yes	No	No	None
16	86690	Rock art	Ancestral Pueblo	None	No	No	None
16	87426	Lithic scatter	Archaic	Yes	Yes	No	Excelsior netting
16	87427	Lithic scatter	Archaic	Yes	Yes	Yes	Fence site, monitor
16	109616	Lithic scatter	Archaic	None	No	No	None
16	122031	Lithic scatter	Archaic	Yes	No	Yes	Remove snags
16	126547	Rock art	Ancestral Pueblo	Yes	No	No	None
16	136905	Roomblock	Ancestral Pueblo	Yes	No	No	None
16	136879	Lithic scatter	Unidentified prehistoric	Yes	No	No	None
16	136880	Artifact scatter	Cold War	Yes	No	No	No
16	136820	Artifact scatter	Cold War	Yes	No	No	None
16	136830	Artifact scatter	Cold War	Yes	No	No	No
16	136841	Artifact scatter	Cold War	Yes	No	No	No
16	136851	Trail/ Stairs	Unidentified	Yes	No	No	No
28	202	1-3 room structure					Not relocated
28	203	Roomblock					Not relocated
37	4653A	Roomblock	Coalition	Yes	No	Yes	Remove snag
37	4653B	1-3 room structure	Coalition	Yes	No	Yes	Remove snag and fallen tree
37	4654A	Roomblock	Coalition	Yes	No	Yes	Remove snag
37	4654B	Roomblock	Coalition	Yes	No	Monitor	Snags-damage structure
37	4654C	Rock art	Ancestral Pueblo	Yes	No	No	None
37	4655A	Roomblock	Coalition	None	No	No	None
37	4655B	Artifact scatter					Not a site
37	12655	Plaza pueblo	Coalition	Yes	No	Yes	Wattles
37	30636	Game pit and rock art	Unidentified prehistoric	None	No	No	None
37	86658	1-3 room structure	Ancestral Pueblo	None	No	No	None
37	86693	Artifact scatter					Not a site
37	110139	Rock art					Not relocated
37	“L100”	Rock feature					Not a site

Table 7.2. Prehistoric and Temporally Unplaced Sites in ESA that were Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/ partial burned trees in site area	Other	Suppression	Rehabilitation	Enhanced erosion
11	86659	Moderate	Yes	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No
16	204	Moderate	No	No	Yes	Yes	No	No	No	Yes	No	No	Yes	Yes
16	15854	Moderate	Yes	No	No	No	No	No	No	No	No	No	No	No
16	15855	Moderate	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No
16	15856	Low	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
16	15857	Low	No	No	No	No	No	No	No	Yes	No	No	No	No
16	15858	Severe	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No
16	15859	Low	No	No	Yes	Yes	No	No	No	No	No	No	No	No
16	21299	Low	Yes	Yes	No	No	No	No	No	No	No	No	No	No
16	21300	Low	No	No	No	No	No	No	No	Yes	No	No	No	No
16	21333	Moderate	No	No	Yes	Yes	No	No	No	No	No	No	No	No
16	21367	Low	No	No	Yes	Yes	No	No	No	No	No	No	No	No
16	21368	Low	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
16	21369A	Moderate	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No
16	21370	Low	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No
16	86649	Severe	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No
16	86650A	Moderate	No	No	No	No	No	No	No	Yes	No	No	No	No
16	86651	Moderate	No	No	Yes	Yes	No	Yes	No	No	No	No	No	Yes
16	86652	Severe	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes
16	86653	Moderate	No	No	No	No	No	No	No	Yes	No	No	No	No
16	86654A	Moderate	No	No	Yes	Yes	No	No	No	Yes	No	No	No	Yes
16	86654B	Moderate	No	No	No	No	No	No	No	Yes	No	No	No	No
16	86655	Severe	Yes	No	Yes	Yes	No	No	No	Yes	No	No	No	No
16	86656	Moderate	No	No	No	No	No	No	Yes	Yes	No	No	No	No
16	86657	Moderate	No	No	Yes	Yes	No	No	No	Yes	No	No	Yes	No
16	86660	Low	No	No	No	No	No	No	Yes	No	No	No	No	Yes
16	86662	Low	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
16	86687	Low	Yes	No	No	No	No	No	No	No	No	No	No	No
16	86688	Low	Yes	No	No	No	No	No	No	No	No	No	No	No
16	86689	Low	No	No	No	No	No	No	No	Yes	No	No	No	No
16	87426	Low	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes
16	87427	Low	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes
16	122031	Moderate	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No
16	126547	Low	No	No	No	No	No	No	No	No	No	No	No	No
16	136667	Low	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
16	136879	Low	No	No	No	No	No	No	No	No	No	No	No	No
16	136905	Moderate	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No
37	4653A	Low	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No
37	4653B	Low	No	No	No	No	No	Yes	Yes	No	No	No	No	No

Table 7.2. (cont.)

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional Stump or root holes in site	Loss of architectural wood	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage	Additional snags/ partial burned trees in site area	Other	Suppression	Rehabilitation	Erosion
37	4654A	Moderate	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No	No
37	4654B	Low	Yes	No	No	No	No	No	Yes	No	No	No	No	No
37	4654C	Low	No	No	No	No	No	No	No	No	No	No	No	No
37	12655	Moderate	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	No

TA-11

LA 86659. This site consists of a small tuff block rubble mound representing a one-room structure. Alignments are visible on all sides of the site. The site is located in a ponderosa pine forest on a gentle northeasterly slope just north of the mesa ridge. Because no diagnostic artifacts were observed at the site, the occupation period is referred to as Ancestral Pueblo. Burn severity at this site is moderate. There was some cracking and spalling of masonry, smoke and soot damage, stump and root holes in the site area, and some partial burned trees in the site area that can damage the structure. Several cut trees are near the site, but it is unknown if these were cut down as immediate post-fire rehabilitation or as part of some other project. There were no suppression impacts to the site. It is recommended that two to three wattles be placed in the area to prevent erosion as treatment for this site.

TA-16

LA 204. The site consists of a two-room structure (6 m by 2.5 m, 1 m high) of well-shaped tuff blocks (Figure 7.2). The site is located on a very gentle east-facing slope just north of Water Canyon. The vegetation is dominated by ponderosa pines. This site is Ancestral Puebloan. The area around this site was moderately burned. There are four snags in the area and two stump holes, but these do not pose a threat to the site. Twenty percent of the masonry is soot damaged. There is a low-level threat from erosion at the site because duff in the area was burned off during the fire. Rehabilitation efforts have taken place near the site; there has been tree cutting in the area and excelsior matting has been placed south of the site. These activities do not seem to have negatively impacted the site.

Binzen field notes state, "Approximately forty years ago a survey was conducted in TA-16 and TA-28. Four sites were recorded. One of them, LA 204, has the same location on the ARMS [Archaeological Records Management System] map of the time as the small ruin described above. However, since the original form lacks specific data regarding the dimensions and artifact content of LA 204, and the locational accuracy is described as being 'poor,' there is a possibility that the larger neighboring ruin, LA 86657, may be the site originally recorded as LA 204. It is also possible that neither of these structures is LA 204. The closest possible match was made during the survey and has been used for the purposes of this report."

Figure 7.2. General view of LA 204, looking east-northeast.

LA 15854. This site consists of a long and narrow (26 m north-south by 10 m east-west, 1 m high) pueblo roomblock of roughly shaped tuff blocks and associated artifacts. This site is located on a flat mesa top in the northeast corner of a large open field area south of the TA-37 entrance gate. Vegetation consists mostly of short grass with stands of ponderosa pine, piñon, and juniper trees. This site contains numerous, highly visible alignments to the north and south. The artifact concentration measures 40 m north-south by 50 m east-west. Several types of ceramics and chipped stone were located in the site area. Observations of the ceramics date this site to the Coalition period. The area around the site was slightly burned, and there are several partially burned trees on and around the site. Twenty percent of the masonry is soot damagedand 10% is heat spalled. In the past there has been some churning of the midden soil by animals, creating a very low erosional threat.

LA 15855. The site is a multiple-feature pueblo roomblock that appears to have been partially excavated, but it is not known when or by whom. Feature A is a circular depression (4.3 m by 3.5 m, 0.35 m deep) that Steen (1982) and Binzen (n.d.) identify as a kiva depression. This feature was not observed during the CGFA Project. Feature B is a pueblo roomblock (28 m north-south by 10 m east-west, 2 m high) of shaped and unshaped tuff blocks. Feature C was originally identified as a small rock feature but was later identified as a backfill pile from the excavations. Feature C was not recorded during the CGFA Project. Feature D is a second pueblo roomblock (18 m north-south by 12 m east-west). Feature D is 25 m southwest of Feature B, and the entire site covers an area of about 7,700 m^2. The site is located on a flat mesa top at the edge of Water Canyon. Vegetation within the site area consists mostly of short grasses and scrub oak with a few ponderosa pine, piñon, and juniper trees present. Observations of the ceramics date this site to the Coalition period. The area around the site was moderately burned and there are

approximately 10 snags and partially burned trees in the area and several stump holes. These do not pose a threat to the site.

LA 15856. The site consists of two pueblo roomblocks. Feature A is a small rubble mound with several alignments visible (5 m north-south by 4.5 m east-west). Feature B is a linear roomblock (14.5 m north-south by 4 m east-west) located 15 m to the southeast of Feature A. The site is located on a flat mesa top above Water Canyon. Vegetation consists mostly of short grasses and scrub oak with a few ponderosa pine, piñon, and juniper trees present. Observations of the ceramics date this site to the Coalition period. The area around the site was lightly burned. There are four stump holes in the area, but these do not pose a threat to the site. There is a low erosional threat on the western portion of the site where pooling of sediments is occurring.

LA 15857. This site consists of an L-shaped pueblo roomblock (17 m north-south by 10 m east-west) and an associated artifact scatter. The site is located on top of a slight rise on a flat mesa top just south of the TA-37 access road in a lightly forested ponderosa pine, piñon, and juniper woodland. The roomblock appears to be two rooms wide and five rooms long with its long side oriented north-south and has an east-west width of 5 m. The northern end, with its addition room, measures 10 m east-west. Observations of the ceramics date this site to the Coalition period. The area around the site was slightly burned. There are about 10 to 15 partially burned scrub oaks in the area that soot damaged 3% of the masonry.

LA 15858. This site consists of a one- to two-room structure (4 m by 4 m, 0.3 m high) of roughly shaped tuff blocks (Figure 7.3). Despite being located adjacent to a building in the developed western part of TA-16, there was a fair sized stand of ponderosa pines and some smaller tree species growing on and around the site. The site is composed of lichen-covered, roughly shaped tuff blocks and rubble. No artifacts were

Figure 7.3. View looking south of LA 15858 with B. Vierra.

observed in association with this site. This site is Ancestral Puebloan. The area around the site was severely burned. Nearly all the trees in the immediate area were burned and several trees near the site could damage it if they fall. Sixty percent of the masonry is soot damaged and 10% is heat spalled. Many of the burned trees in the area have been cut down as part of the rehabilitation effort, but the trees immediately surrounding the site still stand.

LA 15859. This site consists of two features, a small ruin and an associated alignment feature. The first feature is a rubble mound composed of large tuff blocks. No alignments are visible at the rubble mound. This structure is approximately 6 m by 5 m and probably contains two rooms. The second feature is a scatter of tuff rubble with artifacts and two visible alignments of shaped tuff blocks. The second feature is approximately 2 m by 2 m and its function is unclear. This site is located on a gradual south-facing incline on the TA-16 mesa top. Approximately 300 m to the west is a deep drainage, which is south of the intersection of the TA-11 and TA-37 access roads. Site burn severity is low for these two features. There are stump and root holes within the site area. No suppression impacts were made to this site during the Cerro Grande Fire, and no treatment is recommended.

LA 21299. This site consists of a one- to three-room structure and associated artifact scatter. This site is located north of State Route 4 and south of Water Canyon, a power line is close to the site. The one- to three-room structure is constructed of shaped tuff blocks, and five rock alignments are visible. A lithic and ceramic scatter is present around the site and extends at least 20 m north from the structure. Some glazeware ceramics were located. Based on the ceramics present, this site dates to the Classic period. When the UCLA Pajarito Archaeological Research Project (PARP) first recorded this site, the one- to three-room structure was not located. The burn severity at this site is low. There is some cracking and spalling on the masonry, smoke and soot damage, and stump holes in the site area. There are no suppression impacts to this site, and no treatment is recommended.

LA 21300. This site consists of an artifact scatter located on a point above Water Canyon and at the end of an old dirt road. This artifact scatter primarily consists of lithics of Cerro Pedernal chert, obsidian, and rhyolite. Several smeared-indented corrugated sherds were also recognized. The site is approximately 5 m by 5 m in size and about 30 artifacts were observed. PARP originally recorded this site as a pot drop but, based on the number of lithic debitage present, the site is considered a small artifact scatter. Site burn severity is low. There are only a few snags and partially burned trees in the site area. There are no suppression impacts to the site, and no treatment is recommended.

LA 21333. This site consists of a single rock alignment. This is a very questionable rock feature. The site has a single row of tuff blocks, 2 m long and 10 cm wide. The alignment runs in a north-south direction. One basalt flake was found 3 m west of the alignment. There are possible sub-surface features. Burn severity was moderate for this site. Fire effects consist of smoke and soot damage, stump holes in the site area, and additional snags and partially burned trees in the site area. There were no suppression impacts to this site, and no treatment is recommended.

LA 21367. This site consists of an Archaic period lithic scatter. The site is located on a mesa top just north and east of the intersection between State Route 4 and West Jemez Road. PARP had originally recorded and collected much of this site. All that is left today is a sparse obsidian and chert scatter. Burn severity is low at this site. The fire effects include stump and root holes in the site area and additional snags or partial burned trees in the site area. There were no suppression impacts to this site, and no treatment is recommended.

LA 21368. This site consists of a sparse lithic scatter, approximately 20 m by 20 m, and is comprised mostly of obsidian, 50% of which was collected in 1979 by PARP. This site is located in a ponderosa pine forest approximately 40 m east of State Route 4. There is a small stream channel that runs through the

middle of the site, increasing erosion effects. Based on obsidian being the sole lithic raw material and the absence of ceramics, this site is dated to the Archaic period. This site was in a low-burn area and the effects of the Cerro Grande Fire were minimal, only stump and root holes are in the site area. However, during the fire certain suppression efforts affected the site. A fire road was expanded, built by a bulldozer close to the site, and more then 30 burned trees were cut down in the site area.

LA 21369A. This site consists of two components: a lithic and ceramic scatter (LA 21369A) and historic structures (LA 21369B; see Chapter 12) measuring approximately 100 m north-south by 20 m east-west. The sherd and lithic scatter component is mostly comprised of obsidian flakes with some corrugated pottery sherds. In 1979, PARP collected five bifaces and approximately 50% of the lithic and ceramic scatter. The site has been extensively bulldozed and is disturbed by two roads running north-south and parallel to one another. The site burn severity is moderate. Stump and root holes exist adjacent to historic foundations and elsewhere in the site, and additional snags are in the site area. No treatment is recommended for this site.

LA 21370. This site consists of a small rubble mound of shaped tuff blocks (Figure 7.4). The mound may be recent or the blocks were cannibalized from another site in the vicinity. There are no visible remains of an old horseshoe were located. Due to the lack of artifacts, the site affiliation is undetermined. This site had been previously burned in 1977 during the La Mesa Fire. The site is located in a cleared meadow approximately 150 m north of State Route 4 and 40 m south of the Water Canyon cliff edge. The effects from the Cerro Grande Fire include stump and root holes adjacent to masonry, stump and root holes in the site area, and additional snags or partially burned trees in the site area. There were no suppression impacts to the site. No treatment is recommended for this site.

Figure 7.4. General view looking east of LA 21370 with J. Nisengard (left) and B. Harmon.

LA 86649. This site is an obsidian lithic scatter (380 m^2) located on a gentle east-facing slope in a ponderosa pine forest 30 m west of a barbed wire fence. The head of a small drainage is immediately to the southeast and the mesa edge is located 30 m east of the site. Based on obsidian being the sole lithic raw material and the absence of ceramics, this site is dated to the Archaic period. The area was severely burned and there are a number of snags and stump holes in the site area. Due to the gentle slope the site rests on, there is a low erosional threat. A two-track dirt road runs through the eastern edge of the site.

LA 86650A. This site consists of a single cavate that faces southeasterly, situated in Water Canyon. The cavate is not very accessible and appears to be fairly eroded. No artifacts were observed below the cavate. There appears to be some possible hand and foot holds below the cavate but they are highly eroded. Site burn severity is moderate. The cavate itself doesn't appear to be affected by the fire but the forest in the

LA 86651. This site consists of a one- to two-room structure (8 m by 6 m) of well-shaped tuff blocks. It is located on a gentle east-facing slope incised by several small drainages in a ponderosa pine forest. No artifacts were observed on the surface. The area around the site was moderately burned. There are two stump holes in the site area, and two small scrub oaks have fallen onto the masonry. The site is on a small mound that is steep sided and is eroding down; only scrub oaks are helping to stabilize the site. Erosion of this site will continue at an increased rate because there is only a light layer of new duff.

LA 86652. This site consists of a one-room structure (1.5 m by 4 m) of roughly shaped tuff blocks. The site is located on a gentle east-facing slope incised by deep drainages in the canyon bottom. Vegetation in the area consists of ponderosa pine, piñon, and scrub oak. The masonry is not as linear as it may have been in the past due to the effects of natural erosion; tuff blocks associated with the site are moving downslope. When this site was visited in 1992 by LANL archaeologists, alignments were more visible. Based on the lack of visible artifacts, this site dates to Ancestral Puebloan. The area around the site was severely burned. There are four stump holes and two snags in the site area, but they do not pose a threat to the site. There is also a low erosional threat due to small, near-by drainages.

LA 86653. This site consists of a two-room structure (5 m by 3 m) of well-shaped tuff blocks (Figure 7.5). The site is located on a gentle east-facing slope incised by several small drainages in a ponderosa pine forest. The tuff blocks are well shaped and some are quite large. No coursing or alignments are visible. Approximately 25 artifacts were observed in association with this site, scattered over an area measuring 15 m north-south by 15 m east-west. This site is Coalition. The area around the site was moderately burned. There is one snag in the site area, and 20% of the masonry is soot damaged. There is also a low erosional threat due to the absence of duff that was burned off.

LA 86654A. This site consists of a one-room structure (2 m by 2.5 m) of large, well-shaped tuff blocks. The site is located on a gentle east-facing slope incised by several small drainages in a ponderosa pine forest. This structure is a small, square structure constructed of large, well-shaped tuff blocks. The mound is high and square. Most of the structure is still composed of two courses of wall that are exceptionally well preserved. Due to lack of artifacts, the site is classified as Ancestral Puebloan. The steep sides of the structure seem to be encouraging erosion activities; however, the scrub oaks growing out of the structure may be helping to curb extensive erosion. The area around the site was moderately burned. There are two stump holes and many snags in the site area, but they do not pose a threat to the site.

LA 86654B. This site is an apparent garden plot (3 m by 3 m) of a few unshaped tuff blocks. The site is located on a gentle east-facing slope incised by several small drainages in a ponderosa pine forest. This site consists of an apparent agricultural feature composed of a few shaped tuff blocks located 55 m northwest of LA 86654A. The blocks are stacked on edge and form an east-west alignment. A shallow, intermittent drainage is approximately 480 m to the northwest. This site is most likely Ancestral Puebloan

in age. The area around the site was slightly burned. There are four snags in the site area, and 10% of the tuff blocks are soot damaged.

Figure 7.5. LA 86653, J. Nisengard at the two-room structure impacted by the fire.

LA 86655. This site is a one-room structure (4 m by 3 m) of shaped tuff blocks (Figure 7.6). The site is located on a gentle south-facing slope incised by several small drainages in a ponderosa pine forest. This site is Ancestral Puebloan. The area around the site was severely burned. There are five stump holes and many snags in the site area, but they do not pose a threat to the site. Although there is minimal soot damage, 25% of the masonry is heat spalled. There is also a low erosional threat to the site.

LA 86656. This site is a two- to three-room structure (3 m by 3 m) of roughly shaped tuff blocks. The site is located on a gentle southeast-facing slope incised by several small drainages in a ponderosa pine forest. Based on ceramics observed by earlier surveys, this site dates to the Coalition period. The area around the site was moderately burned. There are four snags in the area and an additional snag that could damage the site if it falls. An old bulldozer firebreak not related to the Cerro Grande Fire has disturbed the eastern edge of the site (Figure 7.7).

LA 86657. This site is comprised of a pueblo roomblock (6 m north-south by 10 m east-west) and an associated artifact scatter. The site is located on a gentle southeast-facing slope incised by small drainages in a ponderosa pine forest. Clear alignments are visible in the center of the mound and on the north, south, and east sides. Copious amounts of wall fall and rubble are strewn downslope to the north, east, and south. The artifact scatter surrounding the site measures 30 m north-south by 35 m east-west. Based on ceramic observations of previous surveys, this site dates to the Coalition period. The area around the site was moderately burned during the Cerro Grande Fire. There are a number of burned trees in the area and

two stump holes, but these do not pose a threat to the site. Ten percent of the masonry is soot damaged. Rehabilitation efforts have occurred in the site vicinity. Wattles have been placed to the north and west of the site and straw has been spread around the site area. There is a low threat of erosion. For additional comments see the description of LA 204.

Figure 7.6. General view looking north of LA 86655 with K. Schmidt.

LA 86660. This site is a one-room structure (3 m by 2.5 m) of roughly shaped tuff blocks. The site is located on a flat mesa top north of Water Canyon near the TA-37 entrance at the western edge of an open field. Vegetation around the site consists of short grasses and a few ponderosa pines and scrub oak. The structure is comprised of a small, square rubble mound with visible wall alignments located on all sides. Additional tuff blocks are scattered 20 m to 30 m east of the structure. No artifacts were observed to be in association with this structure. Based on the construction style and materials, this site is of Ancestral Puebloan origin. However, all of the neighboring sites date to the Ancestral Puebloan Coalition period. The area around the site was slightly burned. There is one partially burned ponderosa pine that might damage the site if it falls, and 60% of the masonry was soot damaged during the Cerro Grande Fire. As the duff has burned off and the site is on a slight slope, there is a low erosion threat.

LA 86662. The site is a one-room structure (2.5 m by 2.5 m) of shaped tuff blocks and associated artifact scatter. The site is located on a fairly flat mesa top just north of Water Canyon near several large pueblo ruins and other features. Vegetation around the site consists of short grasses and a few ponderosa pine, piñon, and juniper trees. The masonry consists of shaped tuff blocks, and alignments are visible on the south and west sides of the 0.3-m-high mound. The westernmost alignment runs northwest-southeast and forms right angles with the north-south alignments. The total scatter size measures 5 m by 5 m and consists of several pieces of chipped stone along with associated ceramics. Based on the artifacts

observed and the other sites in the area, this site dates to the Coalition period. The area around the site was slightly burned, there are two stump holes in the area but they do not pose a threat to the site. There is a low erosion threat to this site.

Figure 7.7. General view of LA 86656, looking south. Note burned tuff blocks along the edge of an old bulldozed firebreak road.

LA 86687. This site consists of two east-west-running possible alignments of unshaped tuff blocks. The site is located on a small rise on a flat mesa top in open ponderosa pine forest north of Water Canyon. This site is comprised of two noncontiguous linear alignments of roughly shaped tuff blocks with additional tuff blocks and rubble scattered up to 10 m away. The two alignments at the site are separated by a 1.5-m space. The northern alignment is 1.8 m long and the southern is 2.3 m long. The tuff blocks could be the remains of a small structure that was salvaged or they could be part of a possible water control or agricultural device. No artifacts were located in association with this site. This site has been identified as an Ancestral Puebloan site. The area around the site was slightly burned and one block in the alignments is spalled.

LA 86688. This site consists of two features. Feature A is a 2-m by 3-m concentration of shaped tuff blocks. Feature B, located 25 m to the northeast of Feature A, is a one- to three-room structure that has been mostly destroyed by an old bulldozer cut. Well-shaped masonry blocks are scattered along 20 m of the cut. The site is located on a flat mesa top in an open ponderosa pine and scrub oak forest. Based on the size and shape of the masonry blocks, the site dates to the Classic period. The area around the site was slightly burned. Fifty percent of the masonry is soot damaged, and 10% is heat spalled. There is a low erosion threat from the bulldozer cut.

LA 86689. This site consists of a cairn and a petroglyph panel, 40 cm high and 40 cm wide. This site is located on a south-facing canyon edge above a talus bench just above Water Canyon. Vegetation in the area of this site consists of ponderosa pine, piñon, and scrub oak. The petroglyphs are located on a large boulder and have four different panels: A, B, C, and D. Petroglyph panel A contains animal images and faces southeast. Panels B, C, and D face southwest and contain images of hands, animals, human figures, and a circle. Each petroglyph has lichen growing in the pecked areas. The rock cairn is located directly above the petroglyphs. The rock cairn may be from a historic period based on the presence of a sixteen penny rusted wire nail driven into the bedrock immediately south. Lichen covers both the cairn and the bedrock with similar patterns suggesting that the cairn may be older then the Laboratory. The burn severity of the Cerro Grande Fire was low in the vicinity of this site. The scrub oak next to the petroglyph panel was not impacted, but a large piñon tree 7 m to the southwest of the panel did burn.

LA 87426. This site consists of an Archaic period artifact scatter. The site is situated on both sides of West Jemez Road. The portion of the site on the western side has been destroyed by debris from a flood in Water Canyon that settled over the site and was then removed. The eastern portion of the site is still present although impacted by the same debris removal in the western portion of the site. The intact portion on the site sits atop a small bench above the canyon bottom. Obsidian is the most common artifact type seen on the surface. The site burn severity is low. There are a few snags and partially burned trees near the site area. No suppression impacts were observed, and no treatment is recommended.

LA 87427. This site consists of an Archaic period artifact scatter. This site is located next to West Jemez Road on a small ridge top in a ponderosa pine forest with some piñon and juniper in the area. The site is approximately 82.5 m by 34.5 m in size with the largest concentration areas measuring 20 m by 15 m. The site is comprised mostly of obsidian flakes with a few flakes of chert present. Two broken biface tools were observed. Site burn severity is moderate and left some burned stump and root holes in the site area. Suppression impacts consist of tree felling in the site area. Erosion is also a threat to this site because of the runoff from the site to West Jemez Road. Some heavy equipment has been driven over this site. Recommended preservation treatment includes monitoring and fencing to prevent future impact.

LA 122031. This site consists of multiple components including an Archaic period lithic scatter, a historic artifact scatter, and some tuff blocks. The site size is approximately 34 m east-west by 27 m north-south. The site is located in a mixed ponderosa pine and piñon-juniper woodland approximately 225 m west of West Jemez Road and west of building TA-16-205. The lithic artifacts are thought to date to the Archaic period. The historic artifacts in the site area date to the Statehood-World War II period. Both rock features are unknown as to function and cultural affiliation. The site burn severity is moderate. The only effects left by the fire are stump and root holes in the site area, snags and partial burned trees that can damage structures, and additional snags in the site area. Rehabilitation at this site consisted of the removal of burned snags. Treatment recommendations for this site consist of filling the stump and root holes.

LA 126547. This site is a possible petroglyph panel (about 0.5 m by 0.5 m) on a small south-facing ledge face overlooking a broad bench above Water Canyon. The site is of Ancestral Puebloan origin. A number of scrub oaks are growing in the vicinity of the site. The petroglyph resembles a human figure but has eroded or it was never completed. The area around the site was slightly burned and some of the ledge face near the petroglyph panel has been soot damaged. A large ponderosa pine tree located 5 m north of the petroglyph did burn during the Cerro Grande Fire.

LA 136667 (BCH-3). This site consists of a light Archaic period obsidian scatter. The lithic scatter is located along a recent dozer cut along a power line in TA-16. The burn effects at the site are low. There are stump and root holes in the area and additional snags in the site area as a result of the Cerro Grande Fire. Suppression impacts to the site consist of dozer lines, tree felling, and vehicle ruts. No treatment is recommended for this site.

LA 136879 (WBM-7). This site consists of an unidentified prehistoric obsidian scatter, about 40 m north-south by 45 m east-west. A two-track dirt road is immediately south of the site. Burn severity at this site is low. There are no apparent suppression impacts to this site, and no treatment is recommended.

LA 136905 (K-166). This site consists of a small mound with shaped and unshaped tuff blocks (Figure 7.8). It is located in a ponderosa pine forest and is approximately 30 m by 30 m in size. No artifacts were identified at the site, so it has been classified as Ancestral Pueblo. The site burn severity is moderate, and fire effects at the site include cracking and spalling of masonry, smoke damage, and stump and root holes in the site area. Some of the burned tress in the site area were removed, and no treatment is recommended.

Figure 7.8. General view of LA 136905 after flagging, looking southeast.

TA-37

LA 4653A. This site consists of a small pueblo roomblock situated on the north side of the TA-37 mesa top and north of bunker 37-11, which is inside the fence. There is a small access road that runs on the south side of the site. This pueblo roomblock measures 30 m by 10 m. This long, narrow roomblock is composed of well-shaped tuff blocks. Walls two to three courses high are visible in the southern and northeastern areas of the mound. There are also numerous alignments and corners visible. Artifacts observed include Santa Fe Black-on-white, plainware, smeared-indented wares, basalt, and obsidian. Based on the ceramics observed, this site dates to the Coalition period. Fire effects at this site are low as a result of the Cerro Grande Fire and are comprised of cracking and spalling on masonry, smoke and soot damage, snags and partial burned trees that can damage structures, and additional snags and burned trees in the site area. There were no suppression impacts to this site. Removal of dead and burned trees at the southwest corner of the mound is the recommended treatment for this site.

LA 4653B. This site consists of a small two-room structure of long, well-shaped tuff blocks. There are visible alignments and walls up to three courses high. The mound is approximately 4 m by 2 m. The northern room of the structure displays evidence of pothunting. A few tuff blocks are scattered 15 m to the north and northwest of the structure, and a low mound of earth was noted 15 m north of the structure. This site is approximately 30 m east of LA 4653A and has similar artifacts present. Based on the ceramics, this mound dates to the Coalition period. Effects of the Cerro Grande Fire are low and consist of snags or partial burned trees in the site area along with a fallen tree on the rubble mound. There were no suppression impacts to this site. The treatment recommended consists of the removal of a standing, but dead, tree and the single tree that is laying across the rubble mound.

LA 4654A. This site consists of a small pueblo roomblock located near the south edge of the TA-37 mesa top that overlooks Water Canyon. The site is approximately 15 m by 13 m, and alignments are visible in the central area of the structure. The tuff blocks are well shaped and unusually large. A chain link fence deviates around the mound on the south side of the site (Figure 7.9). Some bulldozing is evident in this area. The large majority of the roomblock component of this site, despite having been damaged by the fence construction, is undisturbed. Artifacts observed include Santa Fe Black-on-white, some corrugated utility ware, basalt, chert, and chalcedony. Based on the ceramics observed, this site dates to the Coalition period. The effects of the Cerro Grande Fire are moderate and consist of cracking and spalling of masonry, smoke and soot staining, snags and partial burned trees that can damage structures, and additional snags and burned trees in the site area. There were no suppression impacts to this site during the fire. The removal of a burned and dead tree from the center of the rubble mound is recommended treatment for this site.

Figure 7.9. LA 4654A; the tree in the center of the rubble mound is recommended for removal.

LA 4654B. This site consists of a pueblo roomblock that is located immediately outside the perimeter fence on the southern edge of the TA-37 mesa top in a ponderosa pine forest. The site is situated on a mesa edge 7,250 ft in elevation. Feature A is a rubble mound of shaped tuff blocks, 8 to 10 rooms, that measures 25 m north-south by 12 m east-west. The north and south ends are taller then the middle. Rock alignments are clearly visible along the western and northern edges. Considerable mechanical disturbance was noted on all sides of the ruin. To the east of the roomblock is a 25 m by 10 m earthen berm, this is probably backfill from the TA-37 bunker excavation. It is likely that this berm covers most of the site's midden area. Feature B is located 50 m southeast of the rubble mound on the edge of the mesa. LA 4654B was slightly burned during the Cerro Grande Fire. Two partially burned ponderosa pine trees are growing in the rubble mound. If they die and fall over they could cause serious damage. It is recommended that this site be monitored to determine the condition of the burned trees.

LA 4654C. This site consists of two petroglyphs and a set of stairs located on the mesa edge. The first feature is a series of hand and foot holds that lead down a south-facing ledge to a bench that overlooks upper Water Canyon. The two petroglyph panels are located 10 m west of the stairs. The petroglyph panels consist of two figures carved into the tuff cliff. The first panel depicts a humanlike figure, and the second panel depicts a quadruped with a long tail. The panels are approximately 3 m apart. Some of these scrub oaks in the vicinity burned during the Cerro Grande Fire. The area in which the site is located has been slightly burned and left some soot on the cliff walls near the petroglyphs; but neither the stairs or the petroglyphs appear to have sustained any fire damage. No recommendations were made for treatment.

LA 12655. This site, known as Nake'muu, consists of a plaza pueblo (with about 50 rooms) with standing walls. It is located at the end of a mesa overlooking Water Canyon and Cañon de Valle. The shaped tuff masonry walls are in fair to good shape, standing up to about 6 ft in height. The pueblo was built directly on bedrock. The isolated location of the site has protected the site from outside visitors, although there are a few recent fire circles that may date to the 1930s and be associated with the Los Alamos Boys Ranch. Very few artifacts are visible on the surface of the site. The ceramics observed date the site to the Coalition period, but the architecture style looks more like what one would see in the Classic period. The site was originally recorded by Hewett in the early 1900s and revisited by Steen in the 1970s. Nake'muu consists of two separate roomblocks that enclose a central plaza area. Approximately 23 rooms are situated in the northwest block and about 35 in the southeast block. There are no obvious surface indications of kivas, but Steen's map denotes the presence of a kiva at the north end of the plaza and to the west of the site. The pueblo walls are constructed of shaped tuff masonry blocks with adobe mortar and chinking stones. Two rooms still contain some adobe plaster on the walls. The site burn severity at Nake'muu is moderate. The fire effects at the site include cracking and spalling on masonry, smoke and soot damage to masonry, stump and root holes adjacent to masonry, additional stump and root holes in the site area, and partial burned trees that can damage structures. There were no suppression impacts to this site. Rehabilitation at this site includes the felling of two burned trees and the placement of wattles and straw to slow erosion. Treatment is recommended for stabilization of this site.

Non-Fire Related Impacts to Prehistoric and Temporally Unplaced Sites

Some sites within ESA were damaged by different means and not as a direct result of the Cerro Grande Fire. Assessment efforts also included the documentation and recording of damage sustained either as an indirect result of fire activities or from other factors. Damage to these sites occurred, or is currently occurring, primarily due to erosion activities. Table 7.3 lists the prehistoric and temporally unplaced sites in ESA that are currently sustaining damage from non-fire related impacts.

Table 7.3. Prehistoric and Temporally Unplaced Sites in ESA with Impacts not Related to the Cerro Grande Fire.

Technical Area	LA or Temporary Number	Non-Fire Related Impacts
16	204	Moderate to high level of erosion
16	15856	Low level of erosion
16	21368	Moderate to high level of erosion due to its location near an active drainage
16	86651	Moderate to high level of erosion due to its location on a steep slope
16	86652	Low level of erosion
16	86654A	Low level of erosion
16	86662	Low level of erosion
16	87426	Moderate to high level of erosion due to active drainage near the base of Water Canyon
16	87427	Low level of erosion due to active drainage near site

Recommended Treatments for Prehistoric and Temporally Unplaced Sites

Treatment is recommended for 12 sites located in ESA (Table 7.4). The technical area in which the site is located, the site type, the type of action suggested for the site, and a general description of the action are all included in the table. The sites impacted by the Cerro Grande Fire and situated in ESA will be subject to continued monitoring and protection. Those sites selected for treatments should receive treatment within the next year (see Chapter 13).

Table 7.4. Prehistoric and Temporally Unplaced Sites with Recommended Treatment in ESA.

Technical Area	LA or Temp Number	Site Type	Type of Action to be taken at Site	Recommended Treatment
11	86659	Fieldhouse	Treatment	Place wattles to prevent further erosion
16	86651	Fieldhouse	Treatment	Place wattles to prevent further erosion
16	86660	Fieldhouse	Monitor	Monitor site on erosion
16	86688	Fieldhouse	Treatment and Monitor	Monitor site and test to determine eligibility of site due to bulldozer damage
16	87427	Lithic Scatter	Treatment and Monitor	Monitor activity near site. Fence site to prevent future damage by vehicle activity near site
16	122031	Lithic Scatter	Treatment	Remove snags from site area
37	4653A	Roomblock	Treatment	Remove burned snags from site
37	4553B	Fieldhouse	Treatment	Remove snag and fallen tree from site
37	4654A	Roomblock	Treatment	Remove snag from site
37	4654B	Roomblock	Treatment and Monitor	Remove snags that may damage structure. Monitor site
37	12655	Plaza Pueblo	Treatment	Place wattles in site area to slow erosion

Chapter 8

Description of Impacted Native American Cultural Resources Located at Dynamic Experimentation Division (DX)

Kari M. Schmidt

BACKGROUND FOR THE DX ASSESSMENT

Personnel from the CGFA Project team visited 154 sites in DX. These sites are located within all or parts of 10 technical areas (06, 08, 09, 14, 15, 22, 36, 40, 67, and 69) at LANL (Figure 8.1). Although all of these sites are located within the perimeter of the burn area, not every site in the area burned.

Table 8.1 lists all of the sites in DX situated within the Cerro Grande Fire boundary and the specific type of damage that these sites sustained. General information about site type is provided in subsequent sections, and details of the specific kinds of damage sustained at individual sites, as well as a general discussion of the environment surrounding the sites, are discussed further below. This chapter specifically treats fire impacts on Native American resources (both pre-European and historic), along with those site types of unknown age. Historic period homesteads, and Manhattan Project and early Cold War sites, are presented in more detail in Chapters 11 and 12.

LANL contains several distinct environmental zones. Ranging between the Rio Grande and the base of the Jemez Mountains, the elevation gradient at LANL is approximately 800 m (2,400 ft); it extends from a low of 5,400 ft to approximately 7,800 ft. This elevation change and a complex geological history have created several different climatic zones, soil types, vegetative zones, and animal habitats, many of which are present in the DX area.

The diversity in the ecosystems at LANL is due to the dramatic 1,500-m elevation gradient from the Rio Grande on the east to the Jemez Mountains, 20 km to the west, and to the many canyons with abrupt surface slope changes that parallel this gradient. The mesa orientation, solar radiation, differences in soils, and moisture create several ecotones throughout the Pajarito Plateau. The elevation gradient, and the corresponding variable climatic conditions in the LANL region, is reflected by the presence of five major vegetational cover types. These major cover types are defined by their dominant tree species and by their structural characteristics as follows: juniper savanna, piñon-juniper woodland, ponderosa pine forest, mixed conifer forest, and spruce-fir forest.

At DX, which includes all or parts of TA-06, -08, -09, -14, -15, -22, -36, -40, -67, and -69, the dominant communities are piñon-juniper woodland and ponderosa pine forest. In general, the elevation in DX

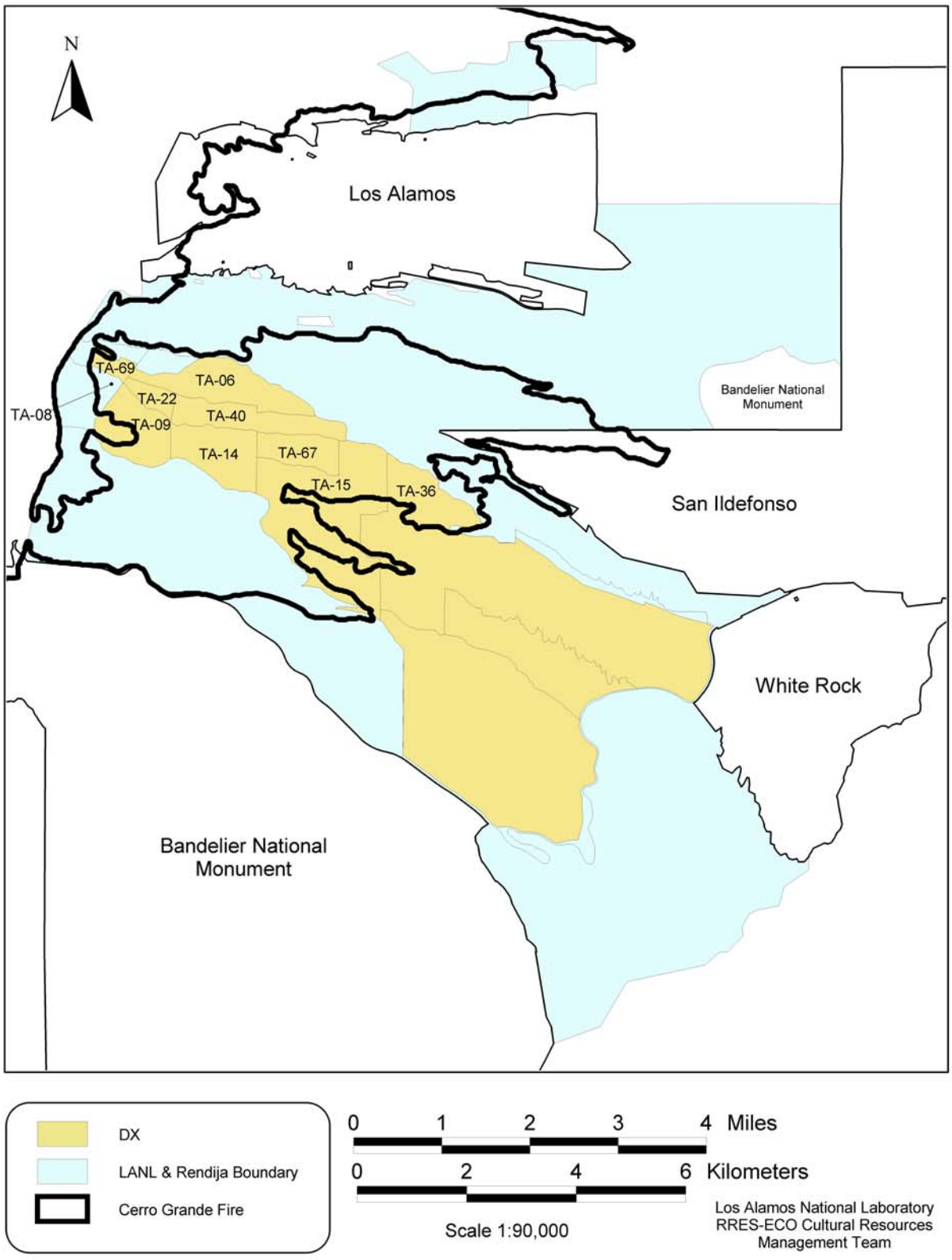


Figure 8.1. Map of Dynamic Experimentation Division (DX).

varies between approximately 1,950 m and 2,350 m. In DX, piñon-juniper woodland is found between 1,950 m and 2,195 m, and on mesa tops, they are the predominant vegetation types. Juniper is codominant with piñon in this coverage especially at lower elevations. Piñon increases in importance at higher elevations. Ponderosa pine forest extends to as low as around 1,900 m in some of the protected canyons. In more open canyons, ponderosa pine is not normally found below around 1,950 m. On the mesa tops, ponderosa pine forest extends to 2,378 m (7,800 ft) in elevation. Ponderosa pine is the only overstory species throughout most of the elevation range of this community type. The understory commonly consists of kinnikinnik, Colorado barberry, and Gambel oak along with numerous species of herbs and grasses in the forb layer (Balice 1998:14–18; Balice et al. 1997:19).

Table 8.1. All Assessed Sites in DX by Technical Area.

LA No./ Temp No.	TA	Site Type	Period/ Phase	Fire Related Impacts	Non Fire-Related Impacts	Treatment Recom-mended	Comments
21334	6	Historic structure	Homestead	Yes	Yes	No	
22767	6	Rock feature	Unidentified				Not relocated
25284	6	Historic structure	Manhattan Project	Yes	No	No	
70027	6	Rock features	Unidentified				Not relocated
89770	6	Wagon road	Homestead	Yes	No	No	
89771	6	Historic structure	Manhattan Project	Yes	Yes	No	
89772	6	Water control feature	Homestead	Yes	Yes	No	
89773	6	Water control feature	Homestead	Yes	Yes	No	
131233	6	Wagon road	Homestead	Yes	Yes	No	
131234	6	Historic structure	Manhattan Project	Yes	No	No	
131236	6	Historic trash scatter	Homestead	Yes	Yes	Yes	
136860	6	Fenceline	Homestead	Yes	No	No	
16808	8	Historic structure	Homestead	No	Yes	No	
89825	8	Trails/stairs	Homestead	Yes	Yes	No	
89826	8	Historic structure	Homestead	Yes	Yes	No	
89828	8	Lithic scatter	Undetermined prehistoric	Yes	No	No	
89829	8	Historic trash scatter	Homestead	Yes	Yes	No	
89830	8	Historic trash scatter	Homestead	Yes	Yes	No	
136774	8	Lithic scatter	Archaic	Yes	No	No	
21292	9	Lithic scatter	Archaic	Yes	No	No	
21293	9	Lithic scatter	Undetermined prehistoric	Yes	No	No	
21294	9	Lithic scatter	Undetermined prehistoric	Yes	No	No	
21297	9	Historic structure	Homestead	Yes	Yes	No	
89833	9	Historic trash scatter	Homestead	No	No	No	
89834	9	Historic trash scatter	Manhattan Project	Yes	No	No	
89835	9	“Rockshelter”	Unidentified				Not a site
89836	9	Rockshelter	Ancestral Pueblo	Yes	Yes	No	
89837	9	Cavate	Undetermined prehistoric	Yes	No	No	
89838	9	Rock feature	Undetermined Historic	Yes	No	Yes	
136828	9	Historic structure	Homestead	Yes	No	No	
136831	9	Wagon road	Unidentified	Yes	No	No	
12654	14	1-3 room structure	Ancestral Pueblo	Yes	No	Yes	

Table 8.1. (cont.)

LA No./ Temp No.	TA	Site Type	Period/ Phase	Fire Related Impacts	Non Fire-Related Impacts	Treatment Recom-mended	Comments
16804	14	Rock art	Undetermined prehistoric				Not relocated
21298	14	Historic structure	Homestead	Yes	Yes	Yes	
21332	14	Lithic scatter	Undetermined prehistoric	Yes	No	No	
126548	14	Lithic scatter	Archaic	Yes	No	No	
136674	14	Wagon road	Homestead	Yes	No	No	
136832	14	Road segment	Undetermined Historic	Yes	Yes	No	
136833	14	1-3 room structure	Ancestral Pueblo	Yes	Yes	Yes	
4663	15	Small roomblock	Coalition	Yes	No	No	
4664	15	Small roomblock	Coalition	Yes	Yes	No	
4666	15	Small roomblock	Coalition	No	No	No	
4670A	15	Small roomblock	Coalition	No	No	No	
4670B	15	Small roomblock	Coalition	No	No	No	
4670C	15	Small roomblock	Coalition	No	No	No	
4670D	15	1-3 room structure	Coalition	No	No	No	
4684	15	Small roomblock	Coalition	Yes	No	Yes	
4685	15	1-3 room structure	Classic	No	No	No	
4686	15	1-3 room structure	Ancestral Pueblo	No	No	No	
12648	15	Small roomblock	Coalition	Yes	No	Yes	
12650	15	1-3 room structure	Coalition	No	No	No	
12651	15	Small roomblock	Coalition	No	No	No	
14869	15	1-3 room structure	Ancestral Pueblo	No	Yes	Yes	
89727	15	Small roomblock	Coalition	Yes	No	Yes	
89797	15	Cavate	Ancestral Pueblo	Yes	Yes	No	
89798	15	Small roomblock	Classic	No	No	No	
89799	15	1-3 room structure	Classic	No	No	No	
89800	15	1-3 room structure	Late Coalition/ Early Classic	No	No	No	
89802	15	Small roomblock	Coalition	Yes	Yes	Yes	
89803	15	1-3 room structure	Ancestral Pueblo	Yes	No	Yes	
108735	15	Check dam	Ancestral Pueblo	Yes	Yes	Yes	
108738	15	1-3 room structure	Classic	Yes	No	No	
108739	15	Cavate	Classic	Yes	Yes	No	
108740	15	Rock art	Undetermined prehistoric	No	No	No	
108741	15	Cavate	Unidentified	No	Yes	No	
108742	15	Cavate	Ancestral Pueblo	No	No	No	
108743	15	Small roomblock	Coalition	No	Yes	No	
108744	15	1-3 room structure	Ancestral Pueblo	No	No	No	
108745	15	Rockshelter	Undetermined Historic	No	No	No	
108746	15	Historic trashscatter	Undetermined Historic	Yes	No	No	
108747	15	Artifact scatter	Coalition	No	No	No	
110123	15	Small roomblock	Coalition	No	No	No	
110124	15	Small roomblock	Coalition	Yes	No	No	
110125	15	Rockshelter	Undetermined prehistoric	Yes	Yes	No	
110137	15	Rock art	Undetermined prehistoric				Not relocated

Table 8.1. (cont.)

LA No./ Temp No.	TA	Site Type	Period/ Phase	Fire Related Impacts	Non Fire-Related Impacts	Treatment Recom-mended	Comments
129490	15	Small roomblock	Coalition	Yes	Yes	Yes	
129491	15	Small roomblock	Coalition	Yes	Yes	Yes	
129492	15	1-3 room structure	Classic	Yes	Yes	Yes	
129493	15	1-3 room structure	Coalition	No	Yes	No	
129494	15	Plaza pueblo	Coalition	No	No	No	
129495	15	1-3 room structure	Coalition	No	Yes	No	
129496	15	Earthen berm	Cold War	No	No	No	
136627	15	Historic trash scatter	Homestead	Yes	No	No	
136889	15	Small roomblock	Coalition	Yes	No	No	
136890	15	1-3 room structure	Coalition	No	No	No	
136716	15	Artifact scatter	Coalition	No	No	No	
136893	15	1-3 room structure	Ancestral Pueblo	Yes	Yes	Yes	
136944	15	Rock pile	Unidentified	Yes	No	Yes	
136945	15	Lithic scatter	Archaic	Yes	No	No	
136946	15	Rock feature	Unidentified	Yes	No	No	
136947	15	1-3 room structure	Ancestral Pueblo	Yes	Yes	Yes	
136948	15	Historic structure	Homestead	Yes	No	No	
136949	15	Lithic scatter	Undetermined prehistoric	Yes	Yes	No	
136958	15	1-3 room structure	Classic	Yes	Yes	No	
136959	15	Rock feature	Undetermined prehistoric	Yes	Yes	Yes	
136960	15	1-3 room structure	Coalition	No	Yes	No	
136962	15	1-3 room structure	Coalition	Yes	No	No	
136971	15	1-3 room structure	Classic	No	Yes	No	
137011	15	Historic trash scatter	Homestead	Yes	No	No	
“Q-134”	15	Historic structure	Undetermined Historic	Yes	No	No	Not assigned LA#
21331	22	Rock piles	Homestead	Yes	No	No	
21383	22	Lithic scatter	Undetermined prehistoric				Not relocated
86643	22	Historic structure	Homestead	Yes	No	Yes	
89769	22	Historic trash scatter	Homestead	Yes	Yes	Yes	
136859	22	Historic trash scatter	Homestead	Yes	Yes	No	
4667	36	Small roomblock	Coalition	No	No	No	
4675	36	Unknown site type	Unidentified				Not relocated
12646A	36	Small roomblock	Coalition	No	No	No	
12646B	36	Small roomblock	Coalition	No	Yes	Yes	???
12647	36	Small roomblock	Coalition	No	No	No	
12652A	36	Garden plot	Coalition	No	No	No	
12652B	36	Garden plot	Ancestral Pueblo	No	No	No	
12653A	36	Small roomblock	Coalition	No	No	No	
12653B	36	Garden plot	Ancestral Pueblo	No	No	No	
12653C	36	1-3 room structure	Classic	No	No	No	
12722A	36	Small roomblock	Coalition	No	No	No	
12722B	36	Rock feature	Unidentified	No	No	No	
12722C	36	Rock feature	Undetermined prehistoric	No	No	No	

Table 8.1. (cont.)

LA No./ Temp No.	TA	Site Type	Period/ Phase	Fire Related Impacts	Non Fire-Related Impacts	Treatment Recom-mended	Comments
21286	36	Lithic scatter	Archaic	Yes	Yes	Yes	
21322	36	Lithic scatter	Archaic	Yes	Yes	No	
21377	36	Lithic scatter	Unidentified	No	No	No	
89801	36	Artifact scatter	Coalition				Not relocated
89804	36	Rock pile	Coalition	No	No	No	
89806	36	Rock feature	Classic	No	No	No	
89807	36	Cavate	Unidentified	No	No	No	
89808	36	Cavate	Undetermined prehistoric	No	No	No	
136720	36	Rock art	Undetermined prehistoric	No	No	No	
136721	36	Small roomblock	Coalition	No	Yes	No	
136722	36	Cavate	Classic	No	No	No	
136723	36	Cavate	Undetermined prehistoric	No	No	No	
136725	36	Cavate	Undetermined prehistoric	Yes	No	Yes	
136854	36	Rockshelter	Unidentified	No	No	No	
136939	36	Artifact scatter	Archaic	No	No	No	
136954	36	Rock art	Unidentified	Yes	No	No	
136955	36	Rockshelter	Ancestral Pueblo	Yes	No	No	
136967	36	1-3 room structure	Ancestral Pueblo	Yes	No	Yes	
136979	36	Cavate	Ancestral Pueblo	No	No	No	
W-14	36	Wagon Road	Undetermined historic				Not a site
12645	40	1-3 room structure	Ancestral Pueblo				Not relocated
86641	40	Cavate	Coalition				Access denied; too close to firing site
86642	40	Rockshelter	Unidentified	Yes	Yes	Yes	
136861	40	Historic trash scatter	Homestead	Yes	Yes	No	
89714	67	1-3 room structure	Coalition	Yes	No	Yes	
89790	67	1-3 room structure	Coalition	Yes	No	Yes	
89791	67	1-3 room structure	Classic	Yes	No	Yes	
89792	67	1-3 room structure	Late Coalition/Early Classic	Yes	No	No	
89793	67	Rock feature	Ancestral Pueblo	Yes	No	No	
89794	67	Small roomblock	Classic	Yes	No	No	
89795	67	Small roomblock	Classic	No	No	No	
89796	67	1-3 room structure	Ancestral Pueblo	Yes	No	No	
89809	67	1-3 room structure	Ancestral Pueblo	Yes	No	No	
89815	67	Game pit	Undetermined prehistoric	Yes	No	Yes	
89824	69	Lithic scatter	Undetermined prehistoric	Yes	No	No	
89827	69	Water-control feature	Manhattan Project	Yes	Yes	No	

CULTURAL RESOURCES AT DX

During the Cerro Grande revisit and assessment phase, 130 sites were listed for inspection and assessment at the beginning of the project. At the completion of fieldwork for DX localities, 154 sites had actually been identified and visited.

The majority of the sites in DX are either prehistoric one- to three-room structures (*n* = 31) or small pueblo roomblocks (*n* = 27). Additionally there are a number of other site types located throughout the DX complex. These include 12 historic structures, 13 prehistoric lithic scatters, 11 prehistoric cavates, 12 rock features (five prehistoric, two historic, and five unaffiliated), 11 historic trash scatters, 7 rockshelters, 4 prehistoric artifact scatters, 6 historic wagon road segments, 3 prehistoric garden plots, 3 historic water-control features, 5 prehistoric petroglyph sites, 1 Historic period fence line, 1 Historic period trail, 1 unaffiliated lithic scatter, 1 prehistoric plaza pueblo roomblock, 1 Cold War period earthen berm, 1 prehistoric check dam, 1 unaffiliated cavate, 1 prehistoric game pit, and 1 site of unknown site type (Table 8.1). The one- to three-room structures are evenly distributed throughout the DX complex, but seem to be concentrated in TA-15 (*n* = 20). Of the 31 one- to three-room structures located in DX, nine date to the Coalition period, eight to the Classic period, two to the Late Coalition or Early Classic periods, and twelve could only be generally affiliated with the Ancestral Pueblo period. Like the one- to three-room structures in DX, the small pueblo roomblocks are heavily concentrated in TA-15 (*n* = 20), with six others in TA-36 and two in TA-67. Of the 28 small roomblocks in DX, 26 date to the Coalition period and three date to the Classic period.

During the fire assessment 17 new sites were found in DX. These sites include LA 136860 (TA-6); LA 136774 (TA-8); LA 136828 and TK-20 (TA-9); LA 136674, LA 136832, and LA 136833 (TA-14); LA 136627 and LA 136716 (TA-15); LA 136859 (TA-22); LA 136720, LA 136721, LA 136722, LA 136723, LA 136725, and LA 136854 (TA-36); and LA 136861 (TA-40). Eight previously recorded sites in DX could not be relocated. These include LA 22767 and LA 70027 (TA-6), LA 16804 (TA-14), LA 10137 (TA-15), LA 21383 (TA-22), LA 4675 and LA 89801 (TA-36), and LA 12645 (TA-40). Two previously recorded sites in DX were determined to be only natural rock outcrops (LA 89835, TA-9; W14, TA-36). One site, LA 86641, was not revisited because of its proximate location to a firing site.

General Impacts of the Cerro Grande Fire

For the most part, portions of DX were moderately impacted by the Cerro Grande Fire (see Figure 4.2). The mesa top burned more intensely, while the slopes of the canyons in the area did not burn as severely, although they were impacted. Despite the generally low to moderate burn suggested for the DX area, 20 sites did burn severely. These sites are LA 25284, LA 89771, and LA 89773 (TA-6); LA 89837, LA 89838, and TK-20 (TA-9); LA 12654, LA 21298, and LA 136833 (TA-14); LA 136893, LA 136945, LA 136946, Q-134, and LA 136959 (TA-15); LA 89769 and LA 136859 (TA-22); LA 136967 (TA-36); and LA 89790, LA 89791, and LA 89809 (TA-67). Moderately heavy burning affected 30 sites, including LA 21334, LA 89772, LA 131234, LA 131236, and LA 136860 (TA-6); LA 136774 (TA-8); LA 21293, LA 21297, and LA 89834 (TA-9); LA 136674 and LA 136832 (TA-14); 89727, 89797, 89802, 89803, 129490, 108739, LA 136627, LA 136944, LA 136947, LA 136948, LA 136949, and LA 137011 (TA-15); LA 21331 (TA-22); LA 86642 and LA 136861 (TA-40); and LA 89714, LA 89793, LA 89794, and LA 89815 (TA-67). Thirty-seven sites in DX experienced effects from low-intensity burn. These sites include LA 89770 and LA 131233 (TA-6); LA 89825, LA LA 89826, LA 89828, LA 89829, and LA 89830 (TA-8); LA 21292, LA 21294, LA 89836, and LA 136828 (TA-9); LA 21332 and LA 126548 (TA-14); LA 4663, LA 4664, LA 4684, LA 12648, LA 108735, LA 108738, LA 108740, LA 108741, LA 108746, LA 110124, LA 110125, LA 129491, LA 129492, LA 136889, LA 136958, and LA 136962 (TA-15); LA 86643 (TA-22); LA 21322, LA 136954, and LA 136955 (TA-36); LA 89792 and LA 89796 (TA-67); and LA 89824 and LA 89827 (TA-69). Fifty-six sites in DX sustained no fire related damage (see Table 8.1). Two sites, LA 21286 and LA 136725, both in TA-36, were not directly impacted by burning, but were impacted by suppression activities. At both sites, there is evidence of damage from heavy machinery, probably the result of a bulldozer line or firebreak.

The sites listed in Tables 8.2 (prehistoric and temporally unplaced) were all directly impacted by fire-related activities, suffered damage from burning and/or from suppression or rehabilitation activities, and will be in greater detail discussed in the following section. Table 8.1 lists all of the sites in DX situated within the Cerro Grande Fire boundary and the specific type of impacts that these sites sustained.

Assessment efforts for the majority of sites listed in Table 8.1 were carried out by Brad Vierra, Steve Hoagland, Bruce Masse, Kari Schmidt, Jennifer Nisengard, Alan Madsen, Brian Harmon, Phil Noll, and Terry Knight. Additional personnel included Diane Curewitz, Mike Hannaford, Mike Dilley, Mike Kennedy, David Barsanti, Woody Aguilar, John Zahrt, and Alysia McLain. Assessment visits were conducted between October 30, 2000, and June 2002. The combined efforts allowed for the successful completion of the assessments for all sites located within the boundaries of DX.

Table 8.2. Prehistoric and Temporally Unplaced Sites in DX that were Directly Impacted by the Cerro Grande Fire.

LA Number	Technical Area	Degree of Burn	Spalling on masonry	Soot damage on masonry	Stump holes on masonry	Stump holes in site area	Loss of architectural wood	Fallen trees on walls	Snags that can damage structures	Snags in site area	Suppression	Rehabilitation	Enhanced erosion
89828	8	Low	No	No	No	Yes	No	No	No	Yes	No	No	No
136774	8	Moderate	No	No	Yes	No	No	No	No	Yes	No	No	No
21292	9	Low	No	No	No	No	No	No	No	Yes	No	No	No
21293	9	Moderate	No	No	No	Yes	No	No	No	Yes	No	No	No
21294	9	Low	No	No	No	No	No	No	No	Yes	No	No	No
89836	9	Low	No	No	No	No	No	No	No	Yes	No	No	Yes
89837	9	Severe	No	No	No	Yes	No	No	No	Yes	No	No	No
12654	14	Severe	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No
21332	14	Low	No	No	No	No	No	No	No	Yes	No	No	No
126548	14	Low	No	No	No	No	No	No	No	Yes	No	No	No
136833	14	Severe	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	Yes
4663	15	Low	No	No	No	No	No	No	No	No	No	No	No
4664	15	Low	No	No	No	No	No	No	No	No	No	No	Yes
4684	15	Low	No	No	No	No	No	No	No	Yes	No	No	No
12648	15	Low	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	No
89727	15	Moderate	No	Yes	No	No	No	No	No	No	No	No	No
89797	15	Moderate	No	No	No	No	No	No	No	Yes	No	No	Yes
89802	15	Moderate	Yes	Yes	No	No	No	No	Yes	No	No	No	Yes
89803	15	Moderate	No	No	No	Yes	No	No	No	Yes	No	No	No
108735	15	Low	No	No	Yes	No	No	No	No	No	No	No	Yes
108738	15	Low	No	No	No	No	No	No	No	Yes	No	No	No
108739	15	Moderate	No	No	No	No	No	No	No	Yes	No	No	Yes
110124	15	Low	No	No	No	No	No	No	No	Yes	No	No	No
110125	15	Low	No	No	No	No	No	No	No	No	No	No	Yes

Table 8.2. Prehistoric

LA Number	Technical Area	Degree of Burn	Spalling on masonry	Soot damage on masonry	Stump holes on masonry	Stump holes in site area	Loss of architectural wood	Fallen trees on walls	Snags that can damage structures	Snags in site area	Suppression	Rehabilitation	Enhanced erosion
129490	15	Moderate	No	Yes	No	No	No	No	No	Yes	No	No	Yes
129491	15	Low	No	Yes	No	No	No	No	No	Yes	No	No	Yes
129492	15	Low	Yes	No	No	No	No	No	No	No	No	No	Yes
136889	15	Low	No	Yes	No	No	No	No	No	No	No	No	No
136893	15	Severe	Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	Yes
136944	15	Moderate	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No
136945	15	Severe	No	No	No	Yes	No	No	No	Yes	No	No	No
136946	15	Severe	No	No	No	No	No	No	No	Yes	No	No	No
136947	15	Moderate	Yes	Yes	Yes	No	No	No	No	Yes	No	No	Yes
136949	15	Moderate	No	No	No	No	No	No	No	Yes	No	No	Yes
136958	15	Low	No	No	No	No	No	No	No	Yes	No	No	Yes
136959	15	Severe	Yes	Yes	No	No	No	No	Yes	Yes	No	No	Yes
136962	15	Low	No	No	No	No	No	No	No	No	No	No	No
21322	36	Low	No	No	No	No	No	No	No	Yes	No	No	Yes
21286	36	None	No	No	No	No	No	No	No	No	Yes	No	Yes
136725	36	None	No	No	No	No	No	No	No	No	Yes	No	No
136954	36	Low	No	No	No	No	No	No	No	No	No	No	No
136955	36	Low	No	No	No	No	No	No	No	No	No	No	No
136967	36	Severe	Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	No
86642	40	Moderate	Yes	No	No	Yes	No	Yes	No	Yes	No	No	Yes
89714	67	Moderate	Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	No
89790	67	Severe	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No
89791	67	Severe	Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	No
89792	67	Low	No	No	No	No	No	No	No	Yes	No	No	No
89793	67	Moderate	No	No	No	No	No	No	No	Yes	No	No	No
89794	67	Moderate	No	No	No	No	No	No	No	Yes	No	No	No
89796	67	Low	No	No	No	No	No	No	No	Yes	No	No	No
89809	67	Severe	Yes	No	No	No	No	No	No	Yes	No	No	No
89815	67	Moderate	No	No	No	No	No	No	No	Yes	No	No	No
89824	69	Low	No	No	No	Yes	No	No	No	Yes	No	No	No

ASSESSMENT OF FIRE-IMPACTED NATIVE AMERICAN AND TEMPORALLY UNPLACED SITES

Fifty-five prehistoric and temporally unplaced sites in DX were directly impacted by the Cerro Grande Fire. These sites include LA 89828 and LA 136774 (TA-8); LA 21292, LA 21293, LA 21294, LA 89836,

LA 89837, and LA 136831 (TA-9); LA 12654, LA 21332, LA 126548, and LA 136833 (TA-14); LA 4663, LA 4664, LA 4684, LA 12648, LA 89727, LA 89797, LA 89802, LA 89803, LA 108735, LA 108738, LA 108739, LA 110124, LA 110125, LA 129490, LA 129491, LA 129492, LA 136889, LA 136893, LA 136944, LA 136945, LA 136946, LA 136947, LA 136949, LA 136958, LA 136959, and LA 136962 (TA-15); LA 21286, LA 21322, LA 136725, LA 136967, LA 136954, and LA 136955 (TA-36); LA 86642 (TA-40); LA 89714, LA 89790, LA 89791, LA 89792, LA 89793, LA 89794, LA 89796, LA 89809, and LA 89815 (TA-67); and LA 89824 (TA-69).

The intensity of the Cerro Grande Fire in DX ranged from low to severe. Fire impacts to sites in DX included cracking and spalling on masonry. Smoke and soot damage often occurred on the masonry blocks associated with pueblo roomblocks, one- to three-room structures, and rock features. Burned trees resulted in abundant stump and root holes that damaged architectural features. Additionally, fallen trees and partially burned trees also affected the appearance and stability of cultural remains in these areas. Additional impacts to sites in DX included damage caused by suppression activities. At one site, 21286, no damage from burning was sustained, but the site was impacted by intensive suppression activities that involved the movement of vehicles across and through the boundaries of the site. Table 8-2 lists the prehistoric and temporally unplaced sites that were impacted by the Cerro Grande Fire and the specific type of damage sustained. The site and the damage sustained are then discussed in further detail.

Each site included in Table 8.2 sustained some damage, from minor to severe, during the Cerro Grande Fire. The specific nature of the damage at each of the sites in DX is discussed in the following pages.

TA-8

LA 89828. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. The site was identified as an undetermined prehistoric lithic scatter that consisted entirely of obsidian debitage. Three obsidian core fragments and approximately 15 flakes, all of translucent obsidian, were identified. The site area, as well as the site itself, was minimally impacted by the fire. The burn is evidenced at the site by approximately five stump holes in the immediate site vicinity as well as by 10 snags/partially burned trees in the site area. The site was not impacted by rehabilitation or suppression activities.

LA 136774 (BV-9). The site was first identified during the survey of sites undertaken as part of the assessment of damage done to sites during the Cerro Grande Fire. During our inspection, the site was identified as an Archaic period lithic scatter. Artifacts at the site consist of approximately 8 to 10 obsidian flakes, all either of the dusty (Polvadera Peak) or translucent (Obsidian Ridge) variety. The site is located in a moderately burned scrub oak and ponderosa pine forest. The degree of the burn severity is evidenced at the site in the form of three stump holes and approximately 20 snags or partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

TA-9

LA 21292. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. The site was identified as an Archaic period lithic scatter that consists of approximately seven flakes that were observed in a 70-m by 40-m area. Five of the flakes were Cerro Pedernal chert, and two were manufactured from translucent obsidian. The site is located in a moderately burned scrub oak and ponderosa pine forest, but was minimally impacted. The low degree of burn severity is only evidenced at the site in the form of approximately 10 snags or partially burned trees in the site area. The site was not impacted by rehabilitation or suppression activities.

LA 21293. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. The site was identified as a prehistoric lithic scatter of undetermined affiliation that consists of a small amount of lithic debitage. Identified materials include two obsidian flakes, one biface flake, and one core flake. Material type of the latter two artifacts was not stated on the revisit form. The site is located in a moderately burned scrub oak and ponderosa pine forest. The moderate degree of burn is evidenced at the site by approximately five stump holes in the immediate site vicinity, as well as by approximately 20 snags/partially burned trees in the site area. The site was not impacted by rehabilitation or suppression activities.

LA 21294. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. The site was identified as a prehistoric lithic scatter of undetermined affiliation that consists of a small amount of lithic debitage. The site is located in a ponderosa pine and piñon-juniper woodland/forest and was minimally impacted by the fire. The effects of the burn are evidenced at the site by approximately 30 snags and/or partially burned trees in the site area. The site was not impacted by rehabilitation or suppression activities.

LA 89836. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. The site was identified as a grouping of three prehistoric rockshelters of undetermined cultural affiliation. Rockshelter #1 is a large southeast-facing boulder with a slight overhang. A one-course rectangular rock alignment abuts up against the shelter. Several sherds were observed in the immediate area, but were not identified to type. Rockshelters #2 and #3 appear to be naturally occurring rockshelters that may have been used briefly for cultural purposes, but no artifacts were associated with the shelters. The site is located in a ponderosa pine and piñon-juniper woodland/forest and was minimally impacted by the fire. The effects of the burn are evidenced at the site by approximately 10 snags and/or partially burned trees in the site area. The site was not impacted by rehabilitation or suppression activities.

LA 89837. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. The site was identified as a cavate of undetermined prehistoric cultural affiliation. The site consists of a small cavate and two possible rock-cut rooms on the ledge immediately above the cavate. No artifacts were associated with the site. LA 89837 is located in a mixed ponderosa pine forest and piñon-juniper woodland, and was severely burned during the fire. The effects of the burn are evidenced at the site by approximately 10 snags and/or partially burned trees. The site was not impacted by rehabilitation or suppression activities.

TA-14

LA 12654. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. In both visits, the site was identified as an undetermined prehistoric one- to three-room structure constructed from shaped tuff blocks and in the shape of an amorphous rubble mound (Figure 8.2). No artifacts were identified during the visit. The site is located in a piñon-juniper woodland with some scrub oak in the area. The area around the site was severely burned during the Cerro Grande Fire. Effects of this burn are evidenced by cracking, spalling, and soot and smoke damage on the masonry blocks, partially burned trees in the immediate vicinity of the site that can potentially damage the masonry further, and approximately five snags and partially burned trees in the general vicinity of the one- to three-room structure. Because of the severity of the burn, a number of trees have the potential to affect the site further. As a result, it is recommended that a large, dead tree on the south side of the mound be cut down. Despite the severe burn in the area, however, the site was not impacted by suppression or rehabilitation activities.

LA 21332. Before the Cerro Grande revisit, the site was most recently surveyed in February 2000. During the Cerro Grande revisit, the site was identified as a prehistoric lithic scatter of undetermined affiliation that consists of a small amount of lithic debitage. The site is located in a ponderosa pine forest in an area

that was minimally burned by the fire. Effects on the site were few, but do include the presence of three partially burned trees in the general vicinity of the site. The site was not impacted by rehabilitation or suppression activities.

Figure 8.2. LA 12654, a one- to three-room structure after the Cerro Grande Fire.

LA 126548. Before the Cerro Grande revisit, the site was most recently surveyed in February 2000. During the Cerro Grande revisit, the site was identified as an Archaic period lithic scatter that consists of a small amount of lithic debitage. The site is located in a ponderosa pine forest in an area that was minimally burned by the fire. Effects on the site were few, but do include the presence of approximately five partially burned trees in the general vicinity of the site. The northwestern portion of the site burned hotter than the remaining portions of the site based on the presence of the snags in only this area. The site was not impacted by rehabilitation or suppression activities.

LA 136833 (TK-22). This site was first identified during the survey undertaken as part of the assessment of damage done to archaeological sites during the Cerro Grande Fire. During inspection, the site was identified as an Ancestral Pueblo period one- to three-room structure constructed from shaped tuff blocks (Figure 8.3). A single artifact, an obliterated-indented corrugated sherd, was identified during the visit. LA 136833 is located in a mixed ponderosa pine forest and piñon-juniper woodland. The area around the site was severely burned during the Cerro Grande Fire. Effects of this burn are evidenced by cracking, spalling, and soot damage on approximately 40% of the masonry blocks; approximately five snags and partially burned trees in the immediate vicinity of the one- to three-room structure with the potential to further damage the site; and numerous additional snags and partially burned trees in the general vicinity of the site. Because of the severity of the impacts to the site, rehabilitation activities were undertaken. A

number of trees in the area have been felled, and several wattles have been placed in the general vicinity of the one- to three-room structure. LA 136833 was not impacted by suppression activities.

Figure 8.3. LA 136833, T. Knight and B. Harmon (from left to right) at the one- to three-room structure after the Cerro Grande Fire.

TA-15

LA 4663. Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a single-story small roomblock with approximately six to eight surface rooms constructed from shaped tuff blocks. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site was likely occupied during the Coalition period. However, the presence of loaf-shaped construction blocks suggests that the site may have been occupied through to the early Classic or possibly reoccupied during the Classic period. LA 4663 is located in the transition zone between ponderosa pine forest and piñon-juniper woodland. The Cerro Grande Fire minimally impacted LA 4663 as the effects on the site were few, and only a general burn in the vicinity of the site could be detected. The site was not impacted by rehabilitation or suppression activities.

LA 4664. Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a single-story small roomblock with approximately six to eight surface rooms constructed from shaped tuff blocks. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site was likely occupied during the Coalition period. LA 4664 is located in the transition zone between ponderosa pine forest and piñon-juniper woodland. The Cerro Grande Fire

minimally impacted LA 4664 as the effects on the site were few and only a general burn in the vicinity of the site could be detected. The site was not impacted by rehabilitation or suppression activities.

LA 4684. Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a small roomblock with approximately 10 surface rooms constructed from shaped tuff blocks. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site was likely occupied during the Coalition period. The site is located in a ponderosa pine forest, with piñon-juniper woodland in the area. The Cerro Grande Fire minimally impacted LA 4684. Effects on the site were few, but do include the presence of approximately five partially burned trees in the general vicinity of the site. The site was not impacted by rehabilitation or suppression activities.

LA 12648. Before the Cerro Grande revisit, the site was most recently visited in 1992. The site was identified as a small roomblock with associated rock alignments. LA 12648 is located in a piñon-juniper woodland with some ponderosa pine and scrub oak in the area. The roomblock has approximately 10 surface rooms that are constructed from shaped tuff blocks. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site is associated with the Coalition period. Overall, the site is in excellent condition (except for the presence of a single looter's pit), with hundreds of artifacts on the surface. Chipped stone flakes, bifaces, and core fragments made from basalt, obsidian, and Cerro Pedernal chert were identified, as were several pieces of ground stone and hundreds of ceramics. The site was moderately affected by the fire. These effects are evidenced at the site by cracking, spalling, and soot damage on the masonry, stump and root holes on the masonry itself and in the immediate site area, and burned trees that have fallen on the walls and rubble. The site was not impacted by rehabilitation or suppression activities.

LA 89727. Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a small roomblock constructed from shaped tuff blocks (Figure 8.4). Because of the severely damaged nature of the roomblock from the construction of an adjacent connector line, it is difficult to discern how many rooms may have been present at the site. It appears that there may still be two to four intact rooms remaining, but the original size of the roomblock is unknown. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site was likely occupied during the Coalition period. The site is located in a ponderosa pine forest, with piñon-juniper woodland in the area. LA 89727 was moderately impacted by the Cerro Grande Fire, effects of which are evidenced by the presence of smoke and soot damage on the masonry blocks. The trees along the western boundary of the site are burned, but the remaining areas are unburned. The site was not impacted by rehabilitation or suppression activities.

LA 89797. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. During both visits, the site was identified as a cavate of Ancestral Pueblo affiliation. The cavate has an enclosing wall, constructed from about a dozen unshaped tuff blocks and two courses of visible masonry. There is no evidence of chinking stones, mortar, or plaster, although there is a fair amount of smoke blackening on the ceiling of the cavate. No artifacts were identified during the revisit. LA 89797 is located in a piñon-juniper woodland. The site was moderately impacted by the Cerro Grande Fire, effects of which are evidenced by a number of snags and partially burned trees in the vicinity of the site, but was not impacted by rehabilitation or suppression activities.

LA 89802. Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a small roomblock constructed from shaped tuff blocks. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, as well as the possible presence of two Kwahe'e Black-on-white sherds, the site was likely occupied during the Coalition period. The site is located in a ponderosa pine forest, with piñon-juniper woodland in the area. LA 89802 was moderately impacted by the Cerro Grande Fire. Effects of the burn are evidenced by the presence of cracking,

spalling, smoke, and soot damage on the masonry blocks and four partially burned trees on the mound itself. Because of the presence of four dead, burned trees on the mound and the potential damage that can be sustained by the roomblock if these trees fell, it is recommended that the trees be removed. The site was not impacted by rehabilitation or suppression activities.

Figure 8.4. LA 89727, a pueblo roomblock after the Cerro Grande Fire.

LA 89803. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as an Ancestral Pueblo period one- to three-room structure constructed from shaped tuff blocks (Figure 8.5). Two artifacts, a basalt flake and a smeared-indented corrugated sherd, were identified during the visit. LA 89803 is located in a ponderosa pine forest. The area around the site was moderately burned during the Cerro Grande Fire. Effects of this burn are evidenced by two stump holes in the site area and five snags/partially burned trees in the vicinity of the one- to three-room structure. The site was not impacted by suppression or rehabilitation activities.

LA 108735. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as an Ancestral Pueblo period masonry check dam. The check dam is constructed perpendicular to a small, west-flowing drainage that crosses Water Canyon. The alignment is 5 m long by 2 m wide. One artifact was found in association with the check dam. LA 108735 is located in a ponderosa pine to piñon-juniper transition area. The area around the site was minimally impacted by the Cerro Grande Fire, as effects of the burn are only evidenced by a single stump hole in the immediate site area. The site was not impacted by suppression or rehabilitation activities, but is recommended for treatment.

Figure 8.5. LA 89803, a one- to three-room structure after the Cerro Grande Fire.

LA 108738. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as a Classic period one- to three-room structure constructed from shaped tuff blocks. Several Biscuit B sherds were identified during the visit, supporting the Classic period affiliation. LA 108738 is located in a transitional zone between ponderosa pine forest and piñon-juniper woodland, with a small amount of scrub oak in the area. The area around the site was minimally burned during the Cerro Grande Fire, but effects of the burn are present in the form of snags and partially burned trees in the vicinity of the one- to three-room structure. The site was not impacted by suppression or rehabilitation activities.

LA 108739. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. During both visits, the site was identified as a Classic period cavate site with two eroded cavates. The cavates have an enclosing wall that is constructed from about a dozen unshaped tuff blocks and three courses of visible masonry. There is no evidence of chinking stones, mortar, or plaster, although there is a fair amount of smoke blackening on the ceiling of the cavates. They are heavily eroded. No artifacts were identified during the revisit. LA 108739 is located in a ponderosa pine forest. The site was moderately impacted by the Cerro Grande Fire, the effects of which are evidenced by a number of snags and partially burned trees in the vicinity of the site, but was not impacted by rehabilitation or suppression activities.

LA 110124. Before the Cerro Grande revisit, the site was most recently surveyed in 1995. The site was identified as a Coalition period one- to three-room structure constructed from shaped masonry blocks. Both the presence of Wiyo Black-on-white sherds and the general shape of the masonry blocks support a Coalition period affiliation. LA 110124 is located in a transitional zone between ponderosa pine forest and piñon-juniper woodland. The area around the site was minimally burned during the Cerro Grande

Fire, but effects of the burn are present in the form of approximately five snags and/or partially burned trees in the vicinity of the structure. The site was not impacted by suppression or rehabilitation activities.

LA 110125. Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a rockshelter or rock overhang. There is smoke blackening on the ceiling in an area 1 m by 0.5 m. The rockshelter measures 5.4 m wide by 2.5 m deep by 2.0 m high. One artifact, a possible Santa Fe Black-on-white sherd, was observed in the rockshelter during the revisit. The site is located in a ponderosa pine forest with some scrub oak in the area. The area around the site was minimally burned during the fire and there are no visible effects present at the site. The site was not impacted by suppression or rehabilitation activities.

LA 129490. Before the Cerro Grande revisit, the site was most recently visited in February 2000. In both instances, the site was identified as an L-shaped small roomblock constructed from shaped tuff blocks and with approximately 15 rooms. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site was likely occupied during the Coalition period. Cerro Pedernal chert and obsidian flakes are also present in fairly abundant numbers on the surface of the site. The site is located on the edge of a ponderosa pine forest above Potrillo Canyon. The site was moderately impacted by the Cerro Grande Fire. Effects of the burn are evidenced by the presence of smoke and soot damage on the masonry blocks and three partially burned trees on the southern edge of the mound itself. The site was not impacted by rehabilitation or suppression activities.

LA 129491. Before the Cerro Grande revisit, the site was most recently visited in February 2000. In both instances, the site was identified as a small, linear roomblock that was constructed from masonry tuff blocks. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site was likely occupied during the Coalition period. LA 129491 is located on the edge of a ponderosa pine forest above Potrillo Canyon and near the edge of a meadow. The Cerro Grande Fire minimally impacted the site. Effects of the burn are evidenced by the presence of smoke and soot damage on the masonry blocks and three partially burned trees on the southern and western sides of the mound. Although the snags are not on the mound itself, they do have the potential to damage the architecture if they fall onto the mound. The site was not impacted by rehabilitation or suppression activities.

LA 129492. Before the Cerro Grande revisit, the site was most recently surveyed in February 2000. In the latter visit, the site was identified as a Classic period one- to three-room structure constructed from shaped tuff blocks. The affiliation was based on the presence of diagnostic sherds and the shape of the masonry blocks. LA 129492 is located in a ponderosa pine forest. The area around the site was minimally burned during the Cerro Grande Fire, but there are effects present at the site. Cracking and spalling from the intensity of the burn have damaged 15% of the blocks, and there are a number of dead trees in the immediate site vicinity. The site was not impacted by suppression or rehabilitation activities.

LA 136889 (B-3). Before the Cerro Grande revisit, the site was most recently visited in 1991. In both instances, the site was identified as a small roomblock that was constructed from masonry tuff blocks. Based on the presence of Wiyo Black-on-white and Santa Fe Black-on-white ceramics, the site was likely occupied during the Coalition period. LA 136889 is located in a meadow on the edge of a ponderosa pine forest above Potrillo Canyon. The Cerro Grande Fire minimally impacted the site. Effects of the burn are evidenced by the presence of smoke and soot damage on approximately 10% of the masonry blocks. The site was not impacted by rehabilitation or suppression activities.

LA 136893 (K-137). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as an Ancestral Pueblo period one- to three-room structure constructed from roughly shaped tuff blocks. The rubble mound is distinctively round, but possible square alignments are visible in the mound itself. No artifacts were identified during the visit. LA 136893 is located in a

ponderosa pine and piñon-juniper woodland with some scrub oak in the area. The area around the site was severely burned during the Cerro Grande Fire as is evidenced by cracking, spalling, and smoke damage on the masonry blocks; numerous stump holes in the site area; and snags and partially burned trees in the immediate vicinity of the one- to three-room structure itself and in the surrounding area. The site was not impacted by suppression or rehabilitation activities.

LA 136944 (Q-102). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as an unidentified rock pile consisting of shaped tuff blocks with some visible alignments. No artifacts were identified during the visit effectively precluding a cultural assignation. LA 136944 is located in a ponderosa pine and piñon-juniper woodland with some scrub oak in the area. The area around the site was moderately burned during the Cerro Grande Fire. Effects of this burn are evidenced by soot and smoke damage on 5% of the masonry blocks, stump and root holes in the general site area, and snags and partially burned trees in the general vicinity of the site, as well as on the mound itself. These snags have the potential to damage the masonry if they fall onto the site. There is also a large burned and hollowed out ponderosa pine (Figure 8.6) that is directly north of the rock pile that has resulted in a very large stump hole. It is recommended that this tree be removed. The site was not impacted by suppression or rehabilitation activities.

Figure 8.6. LA 136944, rock pile in the background and a tree recommended for removal.

LA 136945 (Q-104). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. During both visits, the site was identified as an Archaic period lithic scatter. Artifacts include obsidian

core and thinning flakes made from translucent materials, basalt cores, Cerro Pedernal core flakes, and a Late Archaic corner notched point made from translucent obsidian. In addition to the prehistoric artifacts, there are also a few isolated historic artifacts on the surface of the site. These include two sardine cans, a tobacco can, and 10 all-purpose cans, generally of the soldered-type variety. The site is located in a severely burned scrub oak and ponderosa pine forest with isolated occurrences of piñon and juniper. The severity of the burn is evidenced at the site in the form of one large stump hole in the site area and approximately 20 snags or partially burned trees in the general site area. The site was not impacted by suppression or rehabilitation activities.

LA 136946 (Q-106). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as an amorphous rock feature consisting of shaped and unshaped tuff blocks with one possible visible alignment. No artifacts were identified during the visit, thereby effectively precluding a cultural assignation. LA 136946 is located in a mixed ponderosa pine and piñon-juniper woodland with some scrub oak also present in the area. The area around the site was severely burned during the Cerro Grande Fire as is evidenced by approximately five snags and partially burned trees in the general vicinity. The site was not impacted by suppression or rehabilitation activities.

LA 136947 (Q-110). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as an undetermined prehistoric one- to three-room structure constructed from shaped tuff blocks. No artifacts were identified during the visit. LA 136947 is located in a ponderosa pine and piñon-juniper woodland with some scrub oak in the area. The area around the site was severely burned during the Cerro Grande Fire. Effects of this burn are evidenced by cracking, spalling, and soot and smoke damage on the masonry, stump and root holes on and adjacent to the masonry itself, and snags and partially burned trees in the vicinity of the one- to three-room structure. The site was not impacted by suppression or rehabilitation activities.

LA 136949 (Q-136). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. During both visits, the site was identified as a prehistoric lithic scatter. The artifacts consist primarily of obsidian thinning flakes, although materials from all stages of production are present. The scatter is approximately 19 m east-west by 30 m north-south. The site is located in a moderately burned scrub oak and ponderosa pine forest with isolated occurrences of piñon and juniper. The severity of the burn is evidenced by approximately 10 snags or partially burned trees in the general site area. The site was not impacted by suppression or rehabilitation activities.

LA 136958 (Q-152). Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a one- to three-room structure that was constructed from masonry tuff blocks. Based on the presence of Biscuit B ceramics and the shape of the masonry blocks, the site was likely occupied during the Classic period. LA 136958 is located in a ponderosa pine and piñon-juniper woodland transition zone with some scrub oak in the area. The area around the site was minimally burned during the Cerro Grande Fire. Effects of this burn are evidenced by the presence of snags and partially burned trees in the vicinity of the one- to three-room structure. The site was not impacted by suppression or rehabilitation activities.

LA 136959 (Q-153). Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as an unidentified prehistoric rock feature that was constructed from masonry tuff blocks. The site includes approximately 8 to 10 tuff blocks in a 2-m by 3-m L-shaped alignment. It is possible that the site was a one- to three-room structure, but not enough of the structural integrity remains to make this determination. No artifacts were identified in the site area, making a cultural assignation more specific than ‘prehistoric’ impossible. LA 136959 is located in a ponderosa pine and piñon-juniper woodland transition zone with some scrub oak in the area. The area around the site was severely burned during the Cerro Grande Fire and the site itself was heavily impacted. Effects of this burn

are evidenced by cracking, spalling, and soot and smoke damage on all of the masonry blocks, snags and partially burned trees close enough to the rock pile so that they have the potential to damage the feature itself, and by the presence of at least 20 snags and partially burned trees in and around the vicinity of the rock feature. Despite the heavy fire damage, however, the site was not impacted by suppression or rehabilitation activities.

LA 136962 (Q-170). Before the Cerro Grande revisit, the site was most recently visited in 1992 or 1993. In both instances, the site was identified as a one- to three-room structure that was constructed from masonry tuff blocks and had several visible alignments. Based on the presence of Santa Fe Black-on-white ceramics and on the shape of the masonry blocks, it is thought that the site was occupied during the Coalition period. LA 136962 is located in a ponderosa pine and piñon-juniper transition zone with some scrub oak in the area. The area around the site was minimally burned during the Cerro Grande Fire, but the site itself was not directly impacted. The site was not impacted by suppression or rehabilitation activities.

TA-36

LA 21322. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. During both visits, the site was identified as an Archaic period lithic scatter. Artifacts include lithic debitage made from Cerro Pedernal chert, obsidian, rhyolite, and basalt. The site is located in a ponderosa pine and piñon-juniper transition zone. The area around the site was minimally impacted by the Cerro Grande Fire as is evidenced by the presence of two partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

LA 21286. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. During both visits, the site was identified as an Archaic period lithic scatter. Artifacts include lithic debitage made from Cerro Pedernal chert, obsidian, rhyolite, and basalt. A variety of artifact types was present at the site as well, including core flakes and unidentified flake fragments. The site is located in a ponderosa pine and piñon-juniper transition zone. The area around the site was not burned during the Cerro Grande Fire, but the site itself was impacted by suppression activities. There is evidence of damage from heavy machinery at the site, probably the result of a bulldozer line or firebreak. Additionally, many trees in the area have been felled. As a result of the damage from suppression activities, it is recommended that the area around LA 21286 be seeded and that excelsior matting, wattles, and straw bales be placed throughout the site area. The site was not impacted by rehabilitation activities.

LA 136725 (BV-40). LA 136725 was first identified during the survey undertaken as part of the assessment of damage done to archaeological sites during the Cerro Grande Fire. During inspection, the site was identified as a series of prehistoric cavates. Six cavates were identified, but only one had blackened sooting on the ceiling with associated rock art. No artifacts were identified. The site is located in a ponderosa pine and piñon-juniper transition zone. The area around the site was not burned during the Cerro Grande Fire, but the site was impacted by suppression activities. There is evidence of damage from heavy machinery at the site, probably the result of a bulldozer line or firebreak. The site was not impacted by rehabilitation activities.

LA 136954 (Q-144). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. During both visits, the site was identified as a rock art panel of undetermined affiliation. The panel consists of a single smiling face, and no artifacts were identified. The archaeologists who revisited the site felt that the petroglyph was probably not prehistoric, but this was not supported by anything concrete. The site is located in a ponderosa pine forest. Although the area around the site was minimally burned during

the fire, the site itself was not directly affected by the fire. The site was not impacted by suppression or rehabilitation activities.

LA 136955 (Q-145). Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as an Ancestral Pueblo period rockshelter or rock overhang. The site has a low rubble mound that forms a south-facing semicircle. LA 136955 is located in a ponderosa pine forest. Although the area around the site was minimally burned during the fire, the site itself was not directly affected by the fire. The site was not impacted by suppression or rehabilitation activities.

LA 136967 (Q-66). Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a one- to three-room structure that was constructed from masonry tuff blocks and contained several visible alignments. Based on the presence of ceramics and on the shape of the masonry blocks, it is suspected that the site was occupied sometime during the Ancestral Pueblo period, but no specific temporal designation within this period could be confidently determined. LA 136967 is located in an area dominated by ponderosa pine, but with some piñon and juniper in the area. The area around the site was severely burned during the Cerro Grande Fire and the site itself was heavily impacted. Effects of this burn are evidenced by cracking, spalling, and soot and smoke damage on approximately 90% of the masonry blocks, a single stump hole on the site itself, one partially burned tree close enough to the feature that it has the potential to do further damage, and by the presence of at least 20 snags and partially burned trees in and around the vicinity of the one- to three-room structure. Despite the heavy fire damage, however, the site was not impacted by suppression or rehabilitation activities.

TA-40

LA 86642. Before the Cerro Grande revisit, the site was most recently visited in 1992. In both instances, the site was identified as a rockshelter or rock overhang with a low enclosing wall. These features appear to have been formed in a nook between two large boulders that have tumbled to the bottom of the canyon. Because no artifacts were identified in the site area, no cultural assignation is possible. It is thought that the site may be a recent camping structure, but this can't be determined to the exclusion of a prehistoric assignation. LA 86642 is located in a ponderosa pine forest with some scrub oak in the area. The area around the site was moderately burned during the Cerro Grande Fire. Effects of this burn are evidenced by cracking and spalling on approximately 15% of the surface area of the boulders, two stump holes in the immediate vicinity of the shelter, burned trees that have fallen onto the shelter, and a number of snags and partially burned trees in the vicinity of the rockshelter. It is recommended that sheet wash at the site be monitored. The site was not impacted by suppression or rehabilitation activities.

TA-67

LA 89714. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as a one- to three-room structure that was constructed from shaped and unshaped masonry tuff blocks. Based on the presence of Santa Fe Black-on-white ceramics and the size and shape of the masonry blocks, the site was occupied during the Coalition period. LA 89714 is located in a ponderosa pine and piñon-juniper transition zone with some scrub oak in the area. The area around the site was moderately burned during the Cerro Grande Fire. Effects of this burn are evidenced by cracking and spalling on approximately 20% of the masonry blocks, smoke or soot damage on 20% of the masonry blocks, numerous stump holes in the site area, three snags in the immediate vicinity of the site, and numerous partially burned trees in the site area. The three snags and partially burned trees in the immediate vicinity of the site have the potential to damage the masonry if they fall. Because of the impacts to the site from the fire and the potential damage from the burned trees, it is recommended that

the three burned trees on the mound be removed to prevent further destruction. Despite heavy impacts from the fire, the site was not impacted by suppression or rehabilitation activities.

LA 89790. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as a one- to three-room structure that was constructed from masonry tuff blocks (Figure 8.7). Based on the presence of Wiyo Black-on-white ceramics and the shape of the masonry blocks, the site was likely occupied during the Coalition period. LA 89790 is located in a piñon-juniper woodland with some scrub oak in the area. The area around the site was severely burned during the Cerro Grande Fire. Effects of this burn are evidenced by cracking and spalling on approximately 10% of the masonry blocks, smoke or soot damage on 80% of the masonry blocks, seven stump holes in the immediate vicinity of the one- to three-room structure, and seven snags and partially burned trees in the vicinity of the site that have the potential to damage the masonry if they fall. Because of the impacts to the site from the fire, it is recommended that a single tree on the north edge of the mound be cut down to prevent further destruction of the site. Due to heavy impacts, however, the site was not impacted by suppression or rehabilitation activities.

Figure 8.7. LA 89790, an ancient one- to three-room structure after the Cerro Grande Fire.

LA 89791. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as a one- to three-room structure that was constructed from masonry tuff blocks (Figure 8.8). Based on the presence of Biscuit B ceramics and the shape of the masonry blocks, the site was likely occupied during the Classic period. LA 89791 is located in a piñon-juniper woodland with some scrub oak in the area. The area around the site was severely burned during the Cerro Grande Fire.

Effects of this burn are evidenced by cracking and spalling on approximately 10% of the masonry blocks, smoke or soot damage on 10% of the masonry blocks, 12 stump holes in the immediate vicinity of the one- to three-room structure, and a number of snags and partially burned trees in the vicinity of the site that have the potential to damage the masonry if they fall. Because of the impacts to the site from the fire, it is recommended that a single tree on the north side of the mound be cut down to prevent further destruction of the site. Despite heavy impacts from the fire, the site was not impacted by suppression or rehabilitation activities.

Figure 8.8. LA 89791, B. Vierra at the one- to three-room structure after the Cerro Grande Fire.

LA 89792. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as a one- to three-room structure that was constructed from masonry tuff blocks. Based on the presence of Wiyo Black-on-white and Biscuit B ceramics, the site was likely occupied during the Late Coalition or Early Classic periods. LA 89792 is located in a piñon-juniper woodland with some scrub oak in the area. The area around the site was minimally burned during the Cerro Grande Fire. Effects of the burn are evidenced by one partially burned tree in the site area. The site was not impacted by suppression or rehabilitation activities.

LA 89793. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as an anomalous rock feature or possible wall of a roomblock or one- to three-room structure. The lack of structural integrity, however, precludes a confident assignation as to what type of site this is. The presence of several plainware ceramics on the surface of the site suggests that the site can be culturally affiliated with the Ancestral Pueblo period. LA 89793 is located in a ponderosa pine forest

with some piñon and juniper in the area as well. The area around the site was moderately burned during the Cerro Grande Fire. Effects of this burn are evidenced by the presence of three partially burned trees in the vicinity of the rock feature. The site was not impacted by suppression or rehabilitation activities.

LA 89794. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as a small roomblock that was constructed from masonry tuff blocks. Based on the presence of Biscuit B ceramics and the shape of the masonry blocks, it is likely that the site was occupied during the Classic period. LA 89794 is located in a ponderosa pine forest and piñon-juniper woodland transition zone. The site was moderately impacted by the Cerro Grande Fire. Effects of the burn are evidenced by the presence of six partially burned trees in the site area. The site was not impacted by rehabilitation or suppression activities.

LA 89796. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as a one- to three-room structure that was constructed from unshaped masonry tuff blocks. The presence of utility wares and the lack of diagnostic artifacts at the site suggest the site was occupied during the Ancestral Pueblo period. LA 89796 is located in a piñon-juniper woodland with some scrub oak in the area. The area around the site was minimally burned during the Cerro Grande Fire. Effects of the burn are evidenced by five partially burned trees in the site area as well as a number of burned scrub oaks. The site was not impacted by suppression or rehabilitation activities.

LA 89809. Before the Cerro Grande revisit, the site was most recently visited in 1993. In both instances, the site was identified as a one- to three-room structure that was constructed from roughly shaped tuff blocks. The presence of utility wares and the lack of diagnostic artifacts at the site suggest the site was occupied during the Ancestral Pueblo period. LA 89809 is located in a piñon-juniper woodland area that was severely burned during the Cerro Grande Fire. Effects of the burn are evidenced by cracking and spalling on 10% of the masonry blocks and by seven partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

LA 89815. Before the Cerro Grande revisit, the site was most recently visited in 1993. In the most recent revisit, the site was identified as an unidentified prehistoric game pit that was excavated into tuff bedrock. The pit expands from 1.7 m north-south by 1.0 m east-west at the opening, to 2.9 m north-south by 2.2 m east-west at the base. No artifacts were identified during the visit. LA 89815 is located in a piñon-juniper woodland with small amounts of scrub oak in the area. The area around the site was moderately burned during the Cerro Grande Fire. Effects of the burn are evidenced by the presence of six snags and partially burned trees in and around the vicinity of the game pit. The site was not impacted by suppression or rehabilitation activities.

TA-69

LA 89824. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. During both visits, the site was identified as an unidentified prehistoric lithic scatter. Artifacts include approximately 20 translucent obsidian flakes. The site is located in a ponderosa pine and piñon-juniper transition zone on a level ridgetop just east of the confluence of two small drainages. The area around the site was minimally burned during the Cerro Grande Fire. The burn is evidenced by two stump holes and approximately 20 snags or partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

Non-Fire Related Impacts to Prehistoric and Temporally Unplaced Sites

In addition to damage sustained as a direct result of the Cerro Grande Fire, assessment efforts also included the documentation and recording of damage sustained either as an indirect result of fire activities or from other factors. Damage to these sites occurred, or is currently occurring, primarily due to erosion activities. Table 8.3 lists the prehistoric and temporally unplaced sites in DX that are currently sustaining damage from non-fire related impacts.

Table 8.3. Prehistoric and Temporally Unplaced Sites in DX with Damage not Related to the Cerro Grande Fire.

LA Number	Technical Area	Non-Fire Related Impacts
89836	9	Low-level erosion
136833	14	Low-level erosion due to the location of the site on a small rise
4664	15	Low-level erosion
14869	15	Moderate to high erosion due to active gully action
89797	15	Low-level erosion, duff absent
89802	15	Low-level erosion
108735	15	Low-level erosion from the cleared areas upstream
108739	15	Low-level erosion
108741	15	Low-level erosion
108743	15	Low-level erosion from a shallow slope
110125	15	Low-level erosion; stream channel located about 5 m south of the shelter
129490	15	Low-level erosion as gully is eroding the southern portion of the site
129491	15	Low-level of erosion as western portion of the site has no duff
129492	15	Moderate to high erosion via a gully on the western side of the site
129493	15	Low-level erosion, but a small road has cut site and there is active erosion off slope
129495	15	Low-level erosion from road cutting into site; piñon in the middle of the site also causing erosion
136893	15	Low-level erosion as site is situated on a slight slope
136947	15	Low-level erosion
136949	15	Low-level erosion as a gully is cutting through the site
136958	15	Low-level erosion with gully running north-south
136959	15	Moderate to high erosion, as the area was severely burned and there is a gully cutting the site to the west of the feature
136960	15	Low-level erosion from a gully along the north side of the site
136971	15	Low-level erosion as site is situated on slight slope
12646B	36	Moderate to high erosion, as a shallow drainage runs through the site
21286	36	Moderate to high erosion
21322	36	Low-level erosion
136721	36	Low-level erosion
86642	40	Low-level erosion; there is sheet wash upslope from the shelter protected

Recommended Treatments for Prehistoric/Temporally Unplaced Sites in DX

Treatment is recommended for 12 sites located in DX (Table 8.4). The technical area in which the site is located, the site type, the type of action suggested for the site, and a general description of the action are all included in the table. See Chapter 13 for a discussion of actual treatments.

Table 8.4. Prehistoric and Temporally Unplaced Sites with Recommended Treatment in DX.

Technical Area	LA Number	Site Type	Type of Action to be taken at Site	Recommended Treatment
14	12654	Fieldhouse	Treatment	Cut down tree on south side of mound; erosion control
14	136833	Fieldhouse	Treatment	Remove snags; erosion control
15	4684	Small roomblock	Treatment	Remove snags; erosion control
15	12648	Small roomblock	Treatment	Remove snags; fill stump holes; erosion control
15	14869	Fieldhouse	Treatment	Seed and mulch the road
15	89727	Small roomblock	Treatment	Remove snags; erosion control; attend to construction damage prior to Cerro Grande Fire
15	89802	Small roomblock	Treatment	Remove 2 to 4 small burned trees on the mound; erosion control
15	89803	Fieldhouse		
15	108735	Check dam	Treatment	Protective erosion control above feature
15	129490	Small roomblock	Treatment	Remove snags; erosion control
15	129491	Small roomblock	Treatment	Remove snags; erosion control
15	129492	Small roomblock	Treatment	Remove snags; erosion control
15	136893	Fieldhouse	Treatment	Remove snags; fill stump holes; erosion control
15	136944	Rock pile	Treatment	Remove large ponderosa pine directly north of the rock pile; fill stump holes; erosion control
15	136947	Fieldhouse	Treatment	Remove snags; fill in stump holes; erosion control
15	136959	Fieldhouse	Treatment	Remove snags; erosion control
36	12646B	Small roomblock	Treatment	Place two wattles above the site
36	21286	Lithic scatter	Treatment	Repair suppression damage; seed area and put excelsior mats, wattles, and straw bales to prevent erosion
36	136725	Cavates	Treatment	Repair suppression damage; erosion control
36	136967	Fieldhouse	Treatment	Cut down Ponderosa pine tree at the edge of the structure
40	86642	Rockshelter	Monitor	Monitor sheet wash
67	89714	Fieldhouse	Treatment	Remove three trees from rubble mound; fill stump holes; erosion control
67	89790	Fieldhouse	Treatment	Cut down one tree at North edge of site; fill stump holes; erosion control
67	89791	Fieldhouse	Treatment	Cut down one tree at North side of mound; fill stump holes; erosion control
67	89815	Game pit	Treatment	Remove snags; erosion control

Chapter 10

DESCRIPTION OF IMPACTED RESOURCES IN THE RENDIJA CANYON TRACT

Brian C. Harmon

BACKGROUND FOR THE RENDIJA CANYON TRACT ASSESSMENT

The Rendija Canyon Tract is a 369-ha (910-ac) plot of land north of the Los Alamos town site (Figure 10.1). This land is owned by the DOE and managed by LANL, although there currently are no active facilities within the Rendija Canyon Tract. The Los Alamos Sportsmans Club (consisting of shooting ranges and several small buildings) is located within the Rendija Canyon Tract and covers 40.5 ha (100 ac). The Sportsmans Club leases the land it occupies from the DOE. The tract is surrounded by U.S. Forest Service land on all sides save for a partial border shared with Los Alamos County land to the south.

The east-west running Rendija Canyon is bordered on the south by the steep-sided Barranca and Deer Trap Mesas. To the north lies the south flank of Guaje Mountain, below which sits a flat and wide bench. The bench and canyon lose elevation from west to east, although the canyon does so at a greater rate: while only 6 m (20 ft) separate the bench and canyon bottom in the west, about 120 m (400 ft) do so in the east.

The slopes of Guaje Mountain are composed of the Tshirege Member of the Bandelier Tuff and are incised by numerous drainages creating a rugged terrain. The largest of these drainages is Cabra Canyon, located in the northwest corner of the tract. The bottom of Rendija Canyon is fairly narrow, ranging in width from 50 to 100 m (160 to 330 ft). In places the canyon has cut down to the Otowi Member of the Bandelier Tuff and the underlying beds of the Cerro Toledo Rhyolite.

The lowest point within the assessment area is in the canyon bottom at an elevation of 2,070 m (6,800 ft); the highest point in the assessment area is a little over 2,160 m (7,100 ft). Vegetation is a mixture of ponderosa pine forest and piñon-juniper woodland. There are also several open areas in which the vegetation consists of short grasses, forbs, and isolated piñon and juniper trees.

The Rendija Canyon Tract is a popular recreation spot: an improved dirt road runs the length of the canyon that people use to access the area for activities including hiking, biking, horseback riding, off-road driving, camping, and target shooting. Other modern cultural modifications to the landscape include the creation of firing range berms and other features at the Sportsmans Club. While this construction has disturbed a sizeable area, there are still several sites intact on the Club's property. Additionally, a number of marked and unmarked two-track dirt roads and trails cross the tract in all directions.

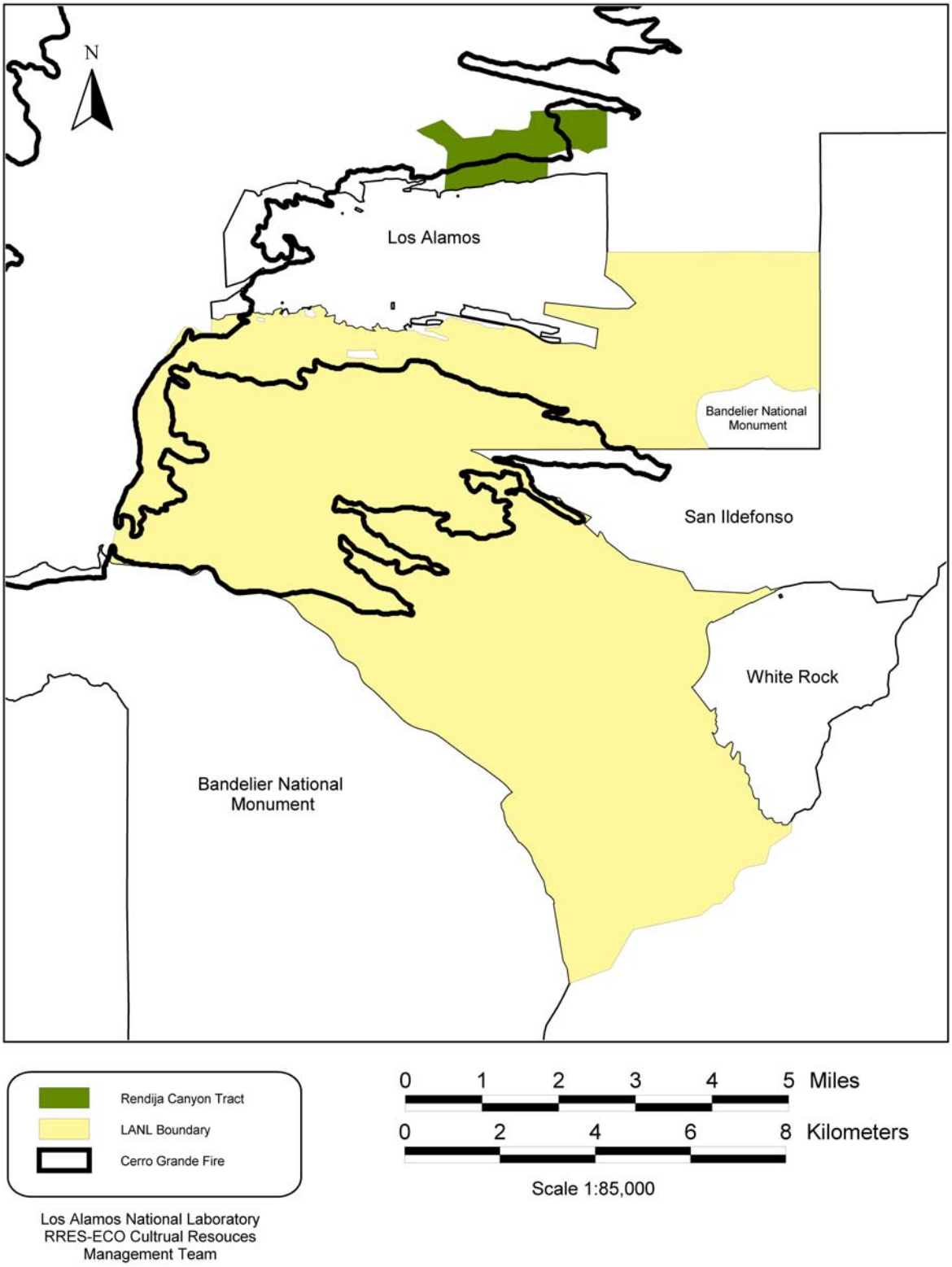


Figure 10.1. Map of the Rendija Canyon Tract.

With areas of severe, moderate, low, and no burning, the intensity of the Cerro Grande Fire in the Rendija Canyon Tract was highly variable. There was no burning in the southern or eastern portions of the tract, and the most severe burning occurred just north of the Sportsmans Club and in Cabra Canyon. In all other areas the burning was patchy and the severity variable. The fire impacted a total of 37 sites within the area.

Previous fieldwork in the Rendija Canyon Tract (Hill and Trierweiler 1986, Larson and McGehee n.d., McGehee and Manz 1991, Hill 1992, McGehee et al. 1993, and Hoagland et al. 2000) consisted of surveys and infield analyses. Work by Peterson and Nightengale (1993) in support of the earlier-proposed Bason Land Exchange resulted in the placement of one or more test pits on a number of sites. It should also be noted that Peterson and Nightengale originally located LA 99394 in the Rendija Canyon Tract; in fact, this site is on Forest Service land.

Nearly all of the sites in the Rendija Canyon Tract are either one- to three-room structures (n = 33) or rock features (n = 16). Additionally, there are six prehistoric artifact scatters, two possible teepee rings, a Homestead Era homestead complex, a historic log structure of unknown function, and a Homestead Era wagon road (Table 10.1). The one- to three-room structures are evenly distributed throughout the tract. Most of these that could be assigned a temporal affiliation dated to the Classic period. A number of the rock features may be agricultural features or remnants of fieldhouses. However, there are several rock features and even the one- to three-room structures that are clearly not fieldhouses or other typical habitation structures. These sites probably date to the Classic period. It is noted that San Ildefonso Pueblo has identified several sites within the Rendija Canyon Tract as Traditional Cultural Properties for the Bason Land Exchange project (Peterson and Nightengale 1993), a designation that received the concurrence of the State Historic Preservation Officer (SHPO).

During the fire assessment, four new sites were found (LA 135291, LA 135292, LA 135293, and LA 135294), three previously recorded sites could not be relocated (LA 85402, LA 85859, and LA 86553), and a fourth previously recorded site was determined to be only a natural rock outcrop (LA 85868). New features were found at sites LA 85858, LA 86604, and LA 127629. With the discovery of a new feature at LA 86604, this site, which had previously been determined not to be eligible for inclusion on the National Register of Historic Places (NRHP), is now possibly eligible for inclusion. Conversely, the one cultural feature at LA 70026 was destroyed by the fire, thereby making the site not eligible for inclusion on the NRHP. Before the fire, LA 70026 was considered potentially eligible. More accurate temporal affiliations were assigned to LA 127627 and LA 127630. There are now 60 archaeological sites recorded in the Rendija Canyon Tract, 47 of which are eligible or potentially eligible for inclusion on the NRHP.

Fourteen of the project sites were previously determined by the SHPO as not being eligible for listing in the NRHP (LA 85410, LA 85411, LA 85418, LA 85857, LA 85862, LA 85863, LA 85865, LA 85866, LA 86604, LA 99391, LA 99392, LA 99393, LA 99394), including a natural rock outcrop (LA 85868). However, as part of the project was designed to observe the nature of damage to various types of archaeological resources, all but the natural rock outcrop were included in our fire assessment project.

Fire assessment work occurred on June 7 and 8, 2000; October 3 through 6, 18, 19, and 26, 2000; and October 10 and 11, 2001. The majority of the fieldwork was performed by Bradley Vierra, Brian Harmon, Alan Madsen, Jennifer Nisengard, and Kari Schmidt. Additional fieldwork was performed by Bruce Masse, Steve Hoagland, Terry Knight, David Barsanti, Diane Curewitz, Michael Dilley, Scott Gebhardt, Michael Hannaford, and Michael Kennedy.

Table 10.1. All Assessed Sites in the Rendija Canyon Tract.

LA Number	Site Type	Period/Phase	Impacted by Cerro Grande	Non-Fire Impact	Treatment	Comments
LA 15116	1-3 room structure	Ancestral Pueblo	Yes	No	Yes	
LA 21439	1-3 room structure	Classic	Yes	No	No	
LA 70025	1-3 room structure	Late Coalition/ Early Classic	Yes	Yes	Yes	
LA 70026	Historic Structure	Homestead	Yes	Yes	No	
LA 85402	1-3 room structure	Classic				Not relocated
LA 85403	1-3 room structure	Ancestral Pueblo	No	Yes	No	
LA 85404	1-3 room structure	Ancestral Pueblo	No	Yes	No	
LA 85405	1-3 room structure	Classic	Yes	Yes	No	
LA 85406	Rock Feature	Developmental Pueblo	Yes	No	Yes	Not originally identified for treatment in the field, but added because of burn severity
LA 85407	Historic Structure	Homestead	Yes	No	No	
LA 85408	1-3 room structure	Classic	Yes	Yes	No	
LA 85409	1-3 room structure	Classic	Yes	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 85410	Rock Feature	Ancestral Pueblo	Yes	Yes	No	Originally identified for treatment in the field, but removed from consideration due to ineligibility to NRHP as determined by SHPO
LA 85411	Rock Feature	Classic	Yes	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 85412	1-3 room structure	Late Coalition/ Early Classic	No	No	No	
LA 85413	Rock Feature	Classic	No	Yes	No	
LA 85414	1-3 room structure	Ancestral Pueblo	No	Yes	No	
LA 85415	Rock Feature	Classic	No	No	No	
LA 85416	Rock Feature	Classic	Yes	No	Yes	Not originally identified for treatment in the field, but added because of burn severity
LA 85417	1-3 room structure	Ancestral Pueblo	No	No	No	
LA 85418	Rock Feature	Undetermined Prehistoric	No	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 85419	Rock Feature	Classic	Yes	No	No	
LA 85857	1-3 room structure	Classic	Yes	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 85858	Rock Feature	Classic	Yes	No	Yes	
LA 85859	Artifact Scatter	Multi-Component				Not relocated
LA 85860	Rock Feature	Classic	Yes	Yes	Yes	
LA 85861	Artifact Scatter	Late Coalition/ Early Classic	Yes	Yes	No	

Table 10.1. (cont.)

LA Number	Site Type	Period/Phase	Impacted by Cerro Grande	Non-Fire Impact	Treatment	Comments
LA 85862	1-3 room structure	Late Coalition/ Early Classic	No	Yes	No	Originally identified for treatment in the field, but removed from consideration due to ineligibility to NRHP as determined by SHPO
LA 85863	Rock Feature	Late Coalition/ Early Classic	Yes	No	No	Site determined by SHPO as not eligible for NRHP
LA 85864	Rock Ring	Historic	No	Yes	No	
LA 85865	Artifact Scatter	Late Coalition/ Early Classic	No	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 85866	1-3 room structure	Coalition	No	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 85867	1-3 room structure	Classic	No	Yes	No	
LA 85868						Natural rock outcrop. Determined by SHPO as not eligible for NRHP
LA 85869	Rock Ring	Historic	No	No	No	
LA 85870	Rock Feature	Undetermined	Yes	Yes	No	
LA 86553	Wagon Road	Homestead				Not relocated
LA 86604	1-3 room structure	Classic	Yes	No	Yes	Site originally determined by SHPO as not eligible for the NRHP. Additional feature found after fire.
LA 86605	1-3 room structure	Classic	Yes	Yes	Yes	
LA 86606	1-3 room structure	Ancestral Pueblo	Yes	Yes	Yes	
LA 86607	1-3 room structure	Coalition	Yes	Yes	No	
LA 87430	1-3 room structure	Classic	No	Yes	No	Originally identified for treatment in field; removed from consideration due to absence of fire damage
LA 99391	Artifact Scatter	Coalition	No	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 99392	1-3 room structure	Classic	Yes	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 99393	1-3 room structure	Classic	Yes	Yes	No	Site determined by SHPO as not eligible for NRHP
LA 99394	1-3 room structure	Ancestral Pueblo	No	No	No	Site determined by SHPO as not eligible for NRHP
LA 99396	Artifact Scatter	Archaic	No	Yes	No	
LA 99397	Artifact Scatter	Archaic	Yes	Yes	No	
LA 127626	1-3 room structure	Ancestral Pueblo	Yes	No	Yes	
LA 127627	1-3 room structure	Classic	Yes	Yes	Yes	
LA 127628	Rock Feature	Classic	Yes	Yes	No	Originally identified for treatment in the field, but removed from consideration due to low erosion threat and lack of site integrity

Table 10.1. (cont.)

LA Number	Site Type	Period/Phase	Impacted by Cerro Grande	Non-Fire Impact	Treatment	Comments
LA 127629	1-3 room structure	Ancestral Pueblo	Yes	Yes	Yes	
LA 127630	1-3 room structure	Classic	Yes	Yes	Yes	
LA 127632	1-3 room structure	Ancestral Pueblo	No	No	No	
LA 127633	Rock Feature	Ancestral Pueblo	Yes	Yes	Yes	
LA 127634	1-3 room structure	Classic	Yes	Yes	Yes	
LA 127635	1-3 room structure	Classic	Yes	Yes	Yes	
LA 135291	Rock Feature	Ancestral Pueblo	Yes	No	No	Originally identified for treatment in the field, but removed from consideration due to lack of site integrity
LA 135292	Rock Feature	Ancestral Pueblo	Yes	Yes	No	
LA 135293	1-3 room structure	Coalition	Yes	No	Yes	
LA 135294	1-3 room structure	Ancestral Pueblo	No	No	No	

ASSESSMENT OF PREHISTORIC AND TEMPORALLY UNPLACED SITES

Fire-Impacted Prehistoric and Temporally Unplaced Sites

Of the 57 prehistoric and temporally unplaced sites in Rendija Canyon, the fire impacted 35 while three could not be relocated (Table 10.2). The impacted sites are discussed below, as is LA 135294, which, while not impacted by the fire, has not been previously described.

The most common fire impacts caused by the fire were soot damaged and heat spalled masonry. Long-term threats were also created; in areas where the fire burned away the duff and low-lying vegetation and/or totally consumed trees to create stump holes, there is an increased potential for erosion. Trees that were killed by the fire but not totally consumed may fall onto sites, which might damage aboveground architecture and displace subsurface features and artifacts.

Despite the damage caused by the fire, burned off vegetation did allow for the discovery of new sites and new data on some old sites. Four new sites were found (LA 135291, LA 135292, LA 135293, and LA 135294), new features were found at three sites (LA 85858, LA 86604, and LA 127629), and more accurate temporal affiliations were assigned to two sites (LA 127627 and LA 127630). The discovery of a new feature at LA 86604 has changed its standing from not eligible for inclusion on the NRHP to possibly eligible (pending SHPO concurrence).

LA 15116. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project (Hoagland et al. 2000). It is a one- to three-room structure of unshaped tuff blocks scattered over a 6-m by 8-m area. The original structure appears to have been 3 m by 3.5 m with a smaller enclosure inside. The site is located on a gentle north-facing slope above the canyon bottom. Vegetation around the site consists primarily of piñon, juniper, and ponderosa pine trees. No artifacts were observed. The site is likely

Ancestral Puebloan, but the specific period cannot be determined. Around the site the area was severely burned. There are many snags and partially burned trees in the vicinity of the site; approximately five of these have potential to damage the site should they fall. Thirty percent of the tuff blocks are soot damaged, and 10% are heat spalled. As the fire burned away the duff surrounding the site there is a low erosional threat.

Table 10.2. Prehistoric and Temporally Unplaced Sites Directly Impacted by the Cerro Grande Fire.

LA Number	Degree of Burn	Cracking/spalling on masonry	Smoke/soot damage on masonry	Stump/root holes on or adjacent to masonry	Additional stump/root holes in site area	Loss of architectural wood/features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Other	Suppression	Rehabilitation	Enhance erosion
15116	Severe	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
21439	Low	No	Yes	No	No	No	Yes	No	No	No	No	No	Yes
70025	Severe	Yes	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
85405	Severe	No	Yes	No	No	No	No	Yes	No	No	No	No	Yes
85406	Severe	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No
85408	Low	No	Yes	No	No	No	No	Yes	No	Yes	No	No	No
85409	Severe	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes
85410	Low	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
85411	Severe	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes
85416	Severe	No	No	No	No	No	No	No	Yes	No	No	No	No
85419	Moderate	No	No	No	No	No	No	No	Yes	No	No	No	No
85857	Low	No	No	No	No	No	No	No	Yes	No	No	No	Yes
85858	Severe	No	Yes	No	No	No	No	Yes	Yes	No	No	No	No
85860	Severe	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	Yes
85861	Severe	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
85863	Moderate	No	Yes	No	Yes	No	No	No	Yes	No	No	No	Yes
85870	Severe	No	No	No	No	No	No	No	Yes	No	No	No	Yes
86604	Low	No	Yes	No	No	No	No	Yes	No	No	No	No	No
86605	Severe	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes
86606	Severe	Yes	Yes	No	No	No	No	No	Yes	No	No	No	Yes
86607	Severe	No	Yes	No	No	No	No	No	Yes	No	No	No	Yes
99392	Severe	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No	Yes
99393	Moderate	No	No	No	No	No	No	No	No	No	No	No	Yes
99397	Severe	No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes
127626	Severe	No	Yes	No	No	No	No	Yes	Yes	No	No	No	No
127627	Severe	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes
127628	Severe	Yes	Yes	No	No	No	No	No	No	No	Yes	No	Yes
127629	Severe	Yes	Yes	No	No	No	No	Yes	Yes	Yes	No	No	Yes
127630	Severe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
127633	Moderate	No	No	No	No	No	No	Yes	No	No	No	No	Yes
127634	Severe	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No	Yes
127635	Severe	No	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
135291	Moderate	No	Yes	No	No	No	No	No	No	No	No	No	No
135292	Moderate	No	Yes	No	Yes	No	No	No	No	No	No	No	No
135293	Moderate	No	No	No	No	No	No	No	No	No	No	No	Yes

LA 21439. This site was last visited and formally recorded in 1992 as part of the Bason Land Exchange (Peterson and Nightengale 1993) and consists of a mound of unshaped cobbles and boulders (5 by 6 m, 0.4 m high), and two boulder alignments extending from the mound. The first alignment extends 7.5 m to the south while the second alignment extends at least 27 m to the north. The rubble mound appears to be a one- to three-room structure. The site is located at the end of an east-west trending ridge north of the canyon among ponderosa pine trees. Previous work dates the site to the Classic period based on ceramics. The area around the site was slightly burned. There are three large and four or five small snags that could damage the site if they fall. Several of the boulders of the northern alignment are soot damaged. The absence of duff from the site creates a low erosional threat.

LA 70025. This site (Figure 10.2) was last visited in 1992 as part of a LANL Environmental Restoration Project (McGehee et al. 1993). The site consists of two one-room structures (3 m by 3 m and 2 m by 2 m) separated by 7 m. Both structures are composed of mostly unshaped tuff blocks. The site is located on the edge of a low ridge finger in western Cabra Canyon among ponderosa pine trees. Based on ceramics the site probably dates to the Late Coalition or Early Classic. The area around the site was severely burned. There are 40+ snags and partially burned trees in the area; two of these have the potential to damage the site should they fall. All of the masonry on the site is heavily soot damaged, although less than 5% is heat spalled. The duff has been burned off from around the site. As some of the tuff blocks have already started migrating downslope, the absence of duff serves to increase an already high erosional threat.

Figure 10.2. LA 70025, view of larger fieldhouse, facing north.

LA 85405. This site was last visited in 1992 as part of the Bason Land Exchange. The site is a one- to two-room structure (3.5 m by 5 m) of unshaped tuff blocks. The site is located on a steep east-facing slope north of the canyon in piñon-juniper woodland. Ceramics data from pervious surveys and excavations date the site to the Classic period. The area around the site was severely burned. There are three snags to the northwest of the site that may damage it if they fall. Thirty percent of the masonry has suffered slight soot damage. The fire burned off the duff and grasses around the site so there is a low erosional threat.

LA 85406. This site was last visited in 1992 as part of the Bason Land Exchange. The site is a circular rock feature, about 6 m in diameter. Excavations suggest that the subsurface remains of a one- to three-room structure may be present. The site is located on top of a small hill north of the canyon. The vegetation consists of mostly piñon and juniper trees. Previous surveys and excavation have found only a few obsidian flakes in association with the site. Excavations did obtain a radiocarbon sample, which was dated to 1040 ± 60 years BP (probably uncorrected). If this date is associated with the occupation/utilization of the site, the site would date to the Developmental period. The area around the site was severely burned. There are 11 snags in the area; four of these are growing within the masonry and would damage the site if they fell, even though they are relatively small. A fifth snag near the site has potential to damage it. A large branch from a nearby tree has already fallen on the masonry, but it has not caused any damage. Eighty percent of the masonry blocks are soot damaged, 30% are heat spalled.

LA 85408. This site was last visited in 1992 as part of the Bason Land Exchange. The site is a one- to three-room structure of unshaped tuff blocks covering an area of 5 m by 6 m and located on the east-facing slope of a narrow ridge north of the canyon. The vegetation is mixed ponderosa pine forest and piñon-juniper woodland. A two-track road runs 3 m south of the site. Ceramic data from previous surveys and excavations date the site to the Classic period. The area around the site experienced low burning. There are about five snags that could damage the site if they fall. Fifteen percent of the masonry is soot damaged.

LA 85409. This site was last visited in 1992 as part of the Bason Land Exchange. The site is a one- to three-room structure (6 m by 6 m, 0.2 m high) of unshaped tuff blocks. The site is located on a west-facing slope on the north side of the canyon. The dominant vegetation is composed of ponderosa pine, piñon, and juniper. Ceramic data from previous surveys date the site to the Classic period. The area around the site was severely burned. There are five snags in the area, two of which could damage the site if they fall. A sixth tree has already fallen onto the site. Fire damage to the masonry is restricted to the western edge of the site. Forty percent of the masonry has suffered soot damage. Only three of the masonry blocks (less than 1%) are heat spalled. A small metal tag used to identify the site was melted by the heat of the fire. Due to the burned off duff, there is a low erosional threat.

LA 85410. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of a series of linear rock features of unshaped tuff blocks; these are probably check dams. The site is located on a gentle east-facing slope north of the canyon. Two small drainages and a two-track road run through the site. Comparing maps produced by previous surveys to fire assessment field observations, it appears that there are fewer tuff blocks than there were in the past. The reason for this discrepancy is unknown, although the drainages that run through the site do not seem large enough to remove tuff blocks. The site is in piñon-juniper woodland. Previous surveys found several obsidian and chalcedony flakes and biface fragments at the site. One of the bifaces was identified as a resharpened Archaic projectile point fragment. The check dams are probably Ancestral Puebloan. The northern portion of the site was unaffected by the fire. In the southern area there are several snags on and near the site, and there are five stump holes near the rock features that present an erosional threat. In a letter dated October 6, 2000, the SHPO indicated that this site is not eligible for inclusion on the NRHP.

LA 85411. This site was last visited in 1992 as part of the Bason Land Exchange. The site is a rock pile (5 m by 5 m, 0.3 m high) of unshaped tuff blocks. Thirty to 35 m to the south is a tuff block concentration that may be natural. The site is located on a ridge to the north of the canyon in piñon-juniper woodland. Ceramic data from previous surveys and excavations date the site to the Classic period. The area around the site was severely burned and there are a number of snags in the area, four of which could damage the site if they fell. Additionally, there are two small stump holes near the rock pile, although these do not represent a threat to the site. Twenty percent of the rocks are soot damaged. Due to the slope the site lays on and the severe burning, there is a low erosional threat. In a letter dated October 6, 2000, the SHPO indicated that this site is not eligible for inclusion on the NRHP.

LA 85416. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of a rock pile of unshaped tuff blocks about 3.5 m in diameter and 0.5 m high. The site is located on an east-west trending ridge in piñon-juniper woodland. Ceramic data from previous surveys and excavations date the site to the Classic period. The area around the site was severely burned, and there are several snags and partially burned trees in the area. No damage to the rock pile from the fire was observed.

LA 85419. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of a rock pile of unshaped tuff blocks about 6 m in diameter and 1 m high. The site is located on a southeast-facing slope to the north of the canyon. Vegetation consists mostly of ponderosa pines with a few junipers intermixed. One of these juniper trees is growing in the center of the mound. Previous surveys dated this site to the Classic period based on ceramics. The area around the site was moderately burned, and there are a number of snags and partially burned trees present. No damage to the rock pile from the fire was observed.

LA 85857. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of a one- to three-room structure (5 by 6 m) of tuff blocks. The site is located on a gently south-facing slope on a bench north of Rendija Canyon. The vegetation consists of short grasses and occasional ponderosa pine, piñon, and juniper. Ceramic data from previous surveys date this site to the Classic period. The area around the site was slightly burned, and there are two or three partially burned trees in the area, however they do not pose a threat to the site. The site is located between two drainages that are actively eroding the site. In a letter dated October 6, 2000, the SHPO indicated that this site was not eligible for inclusion on the NRHP.

LA 85858. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of four roughly circular rock piles of rhyolitic tuff cobbles. The largest (A) is 3 m in diameter and 0.5 m high, a second (B), 8 m to the northeast, is 2 m in diameter and 0.3 m high. The two smallest piles (C) and (D) are each 1 m in diameter, 0.3 m high, and are 18 m and 20 m, respectively, north-northeast of A. Feature D had not been identified by earlier surveys. A juniper had grown in the middle of each pile and each of these trees was destroyed by the fire. Ceramic data from previous surveys date this site to the Classic period. There are a number of snags and partially burned trees in the area, although only three or four have the potential to damage the site. Forty percent of the rocks are soot damaged.

LA 85860. This site was last visited in 1992 as part of the Bason Land Exchange. The site is a large rock pile (5 m in diameter, 0.4 m high) made of unshaped tuff cobbles. There is a depression in the center of the mound that may be the result of pothunting. The site is located on the north-facing slope of an east-west trending ridge in light piñon-juniper woodland. Earlier surveys observed ceramics that date the site to the Classic period. One of these surveys (Hill 1992) also observed a tiponi in the northeast corner of the rock feature. Peterson and Nightengale (1993) state that the tiponi was moved from its original position and partially buried. It is unclear if they mean the position of the tiponi, as observed by Hill, was not original, or if they themselves moved and buried the tiponi. The tiponi was not observed during the fire assessment. The trees around the site were severely burned and a number of them may damage the site if

they fall. There is one stump hole near the rock feature. Ninety percent of the cobbles are soot damaged. As the site is located on an east-facing slope and the duff is absent there is a low erosional threat.

LA 85861. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of a very diffuse chipped stone and ceramic scatter on an east-facing slope. There is some disagreement on the dating of the site. Hill (1992) dates it to the Late Coalition while Peterson and Nightengale (1993) date it to the Classic period. It seems likely that the site dates to the Late Coalition/Early Classic. The vegetation consists of ponderosa pine, piñon, and juniper, all of which have been severely burned. Before the fire the site was being eroded downslope. The erosion will increase now that the duff has been burned off and a number of stump holes have been created.

LA 85863. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of a 3-m by 4.5-m sub-rectangular rock feature of rhyolitic tuff cobbles on a south-facing slope. Vegetation consists of ponderosa pine, piñon, and juniper. Previous surveys suggest that this site dates to the Late Coalition or Early Classic period. Although the surrounding trees have been severely burned, there is only a small amount of very light soot damage to the tuff cobbles. The absence of duff at this site creates a low erosional threat. In a letter dated October 6, 2000, the SHPO indicated that this site is not eligible for inclusion on the NRHP.

LA 85870. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of three rock piles of unshaped tuff blocks (1.6 m by 1 m by 0.3 m, 1.5 m by 1 m by 0.3 m, and 2 m by 1 m by 0.3 m). All three piles are within a 6-m by 5-m area. The site is located on a south-facing slope to the north of the canyon in mixed ponderosa pine forest and piñon-juniper woodland. The temporal affiliation of this site has not been determined. The area around the site has been severely burned; the rock piles, however, do not appear to have been impacted by the fire. Due to the slope the site lays on and the severe burning, there is a low erosional threat.

LA 86604. This site was last visited in 1992 as part of the Environmental Restoration Project. The site consists of the remains of two one-room structures made of unshaped tuff cobbles. Both are about 2 m by 2 m and 0.15 m high. The structures are separated by 1 m. The site is located in an open area on the Sportsmans Club property. Ceramic data from previous surveys date this site to the Classic period. Originally, only one of the structures was recorded. Two junipers were growing in the middle of the second structure obscuring it from sight. These were burned by the fire, thereby revealing the second structure. Should these trees fall they would damage that structure. Additionally, 30% of the masonry of the new feature is soot damaged. The original feature was not impacted by the fire. In a letter dated May 10, 1993, the SHPO indicated that this site was not eligible for inclusion on the NRHP; however, with the discovery of a new feature, this site is now potentially eligible.

LA 86605. The site was last visited in 1992 as part of the Environmental Restoration Project. This site consists of the remains of a one- to two-room structure of both unshaped and well-shaped tuff blocks. The site is located on the Sportsmans Club property at the edge of a ponderosa pine forest. An old trail runs along the north edge of the site. Ceramic data from previous surveys date this site to the Classic period. The area around the site was severely burned. Seventy-five percent of the masonry is soot damaged, and there is a very small amount of heat spalling. Due to the severe burning at the site and a nearby drainage, there is a high erosional threat to the site.

LA 86606. This site was last visited in 1992 as part of the Environmental Restoration Project. The site consists of the remains of a one-room structure of tuff rocks. Some of the rocks are stacked two courses high, others have migrated downslope. Six meters to the west is a four-rock-long (1.5 m long) tuff alignment. The site is located on an isolated finger above and to the south of Cabra Canyon in a heavily wooded ponderosa pine forest. No artifacts were observed, although the site is probably Ancestral

Puebloan. The area around the site was severely burned, but no snags or partially burned trees threaten the site. All of the masonry is soot damaged and spalled. Since much of the duff and surrounding vegetation were destroyed in the fire, erosion is a threat.

LA 86607. This site (Figure 10.3) was last visited in 1992 as part of the Environmental Restoration Project. The site consists of the remains of a two- to four-room structure of tuff blocks. It is situated on top of the ridge forming the south side of Cabra Canyon. A narrow hiking trail runs through the site. Seven tuff blocks from the site were, at some time in the past (circa 5+ years ago), placed across the trail to help prevent erosion. Previous observations on the ceramics of the site indicate that it dates to the Coalition period. The area around the site was severely burned, although there is little vegetation in the immediate site vicinity. Twenty percent of the masonry was soot damaged. Due to the trail and absence of duff around the site, there is a low erosional threat.

Figure 10.3. LA 86607, view of fieldhouse and modern trail, facing north.

LA 99392. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of the remains of a one-room structure of tuff blocks. Remains of the southwest, southeast, and northwest walls are present; the northeast side is open. The site is located on a gentle northeast-facing slope in ponderosa pine, piñon, and juniper. Previous survey and excavation records date this site to the Classic period. The site is in a severely burned area. There are five snags and one stump hole in the vicinity of the site, but they do not pose a threat. Eighty percent of the masonry is soot damaged, and 10% is heat spalled. Due to the severe burning at the site and two nearby drainages, there is a low erosional threat to the site. In a letter dated October 6, 2000, the SHPO indicated that this site was not eligible for inclusion on the NRHP.

LA 99393. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of the remains of a one- to three-room structure of tuff blocks (2.5 m by 3 m). The site is located on a south-facing ridge slope in piñon-juniper woodland. Previous survey and excavation data date this site to the Classic period. The site is in a moderately burned area. There are three snags in the vicinity of the site, but they do not pose a threat. In a letter dated October 6, 2000, the SHPO indicated that this site was not eligible for inclusion on the NRHP.

LA 99397. This site was last visited in 1992 as part of the Bason Land Exchange. The site consists of a sparse chipped stone artifact scatter covering 900 m^2. It is located on a gentle east-facing slope of a narrow ridge in piñon-juniper woodland. A small drainage runs across the northern edge of the site, and an old, two-track road runs through its center. Based on the high percentage of obsidian flakes observed by previous surveys and the absence of ceramics, this site probably dates to the Archaic. The area around the site was severely burned. There are three to five fallen trees and about seven stump holes on the site. Due to the severe burning at the site and a nearby drainage, there is a high erosional threat.

LA 127626. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site consists of the remains of a one-room structure of unshaped tuff blocks. It is about 3 m by 3 m in size. The site is located on the northern slope of the south bench of Rendija Canyon in ponderosa pine forest. Although no artifacts were observed, this site is probably Ancestral Puebloan. The site area was severely burned and there are five snags and/or partially burned trees that could damage the site. Ninety percent of the masonry is soot damaged.

LA 127627. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site consists of the remains of a one-room structure of unshaped tuff blocks, 3 m by 3 m in size. The tuff blocks are two courses high. The site is on the north-facing slope of the south bench of Rendija Canyon in ponderosa pine forest and is just north of the Sportsmans Club shotgun range. The duff around the site was burned off, exposing a light artifact scatter which previous surveys had been unable to observe. The ceramics consisted of one Santa Fe Black-on-white sherd, four Biscuit A sherds, two Biscuit B sherds, one indeterminate glazeware sherd, and one smeared-indented corrugated sherd. Chipped stone artifacts consisted of one chalcedony and one rhyolite flake. Based on this data the site can be dated to the Classic period. The area around the site was severely burned. Of the many snags and partially burned trees in the vicinity of the structure, there are five snags that could damage the site. There is one stump hole adjacent to the masonry and a second at some distance from the site masonry. Ninety percent of the masonry is soot damaged, and 30% of it is heat spalled. The absence of duff at the site creates a moderate erosional threat. As this site is at the far end of the shotgun range it is covered by millions of shotgun pellets.

LA 127628. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site consists of a 12-m-long linear rock alignment of unshaped tuff and rhyolite blocks. It is possible that this alignment is the remains of a disturbed fieldhouse. The site is 2 m south of, and parallel to, the Sportsmans Club fence. It is situated just above the north-facing slope of the south bench of Rendija Canyon in relatively open ponderosa pine forest. Previous surveys dated the site to the Classic period based on ceramic data. The area around the site was severely burned, and there is one tree that has the potential to damage the site. All of the masonry is soot damaged and 50% is heat spalled. The absence of duff at this site creates a low erosional threat.

LA 127629. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site consists of two features: one is a one-room structure (2 m by 3 m) of tuff and rhyolite blocks, the second (previously unidentified) feature is a 3-m by 1-m rock feature of tuff blocks. The structure is fairly well preserved with alignments of the north, south, and west walls present. The site is situated on the north-facing slope of the south bench of Rendija Canyon in ponderosa pine forest. The site is next to the Sportsmans Club fenceline, just north of the rifle range. Although no artifacts were observed, this site is

probably Ancestral Puebloan. The area around the site was severely burned. Of the many snags and partially burned trees in the area, at least 10 have the potential to damage the site. Eighty percent of the masonry is soot damaged and 30% is heat spalled. There is also a high erosional threat to the site as it is located on a slope and the surrounding duff was burned off. There are a number of melted bullets from the rifle range on the site; some of the bullets have melted onto the masonry.

LA 127630. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site consists of the remains of a one- to two-room structure (4 m by 4 m) of unshaped tuff and basalt blocks. Erosion has displaced some of the blocks downslope to the north and east. The site is located just above the north-facing slope of the south bench of Rendija Canyon in a heavy ponderosa pine forest. The duff around the site was burned off exposing a light artifact scatter, which pervious surveys had been unable to observe. Four undifferentiated biscuitware sherds, two possible Wiyo Black-on-white sherds, and several other unidentifiable sherds were observed. Based on this data the site dates to the Classic period. The area around the site was severely burned. Of the many snags and partially burned trees in the area, at least 10 have the potential to damage the site. There is one stump hole near the masonry. Eighty percent of the masonry is soot damaged, and 40% is heat spalled. Erosion was a problem before the fire, as the site is on the very edge of a bench. With the duff and plants burned off, it is now an even greater threat.

LA 127633. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site is a rock feature of five upright rhyolite slabs and several unshaped tuff blocks over a 1-m by 2-m area. The site is located on a steep south-facing slope on the north side of Rendija Canyon in heavy ponderosa pine forest. Although no artifacts were observed, this site is probably Ancestral Puebloan. The area around the site was moderately burned. There are two partially burned trees near the site that have the potential to damage it should they fall. As the duff burned off and this site is on a steep slope, there is a high erosional threat.

LA 127634. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site consists of the remains of a two- to three-room structure (3 m by 3 m) of mostly unshaped tuff and rhyolite blocks. The site is located north of Rendija Canyon on a low north-south trending finger gently sloping to the southeast. The site is in heavy ponderosa pine forest. Ceramic data from previous surveys date this site to the Classic period. The area around the site was severely burned. Of the many snags and partially burned trees in the area, about 10 have the potential to damage the site. There are two stump holes in the site vicinity, but they do not represent a threat. All of the masonry is soot damaged. With the duff absent erosion is also a threat.

LA 127635. This site was last visited in 1999 as part of the Land Conveyance and Transfer Project. The site consists of the remains of a one-room structure (2.5 m by 3.5 m) of unshaped tuff blocks. There is very little rubble remaining but the foundation is intact. The site is located to the north of Rendija Canyon on a low north-south trending ridge among ponderosa pines. Ceramic data from previous surveys date the site to the Classic period. There are many snags and partially burned trees surrounding the site, a number of which could damage the structure if they fall. All of the masonry on the site is soot damaged. Since the site is on a slope and all the duff and smaller vegetation were destroyed during the fire, there is the threat of erosion.

New Sites

LA 135291 (BCH-1). This site (Figure 10.4) consists of a scatter (10 m by 10 m) of mostly unshaped tuff blocks. It is not clear if these blocks are the remains of a structure, a rock pile, or something else. The site is located just above the north-facing slope of the south bench of Rendija Canyon in a lightly forested

area. Several unidentifiable sherds and one obsidian flake were found at the site. This site is probably Ancestral Puebloan. The area below the site—the bench slope and canyon bottom—suffered severe burning, and there are two junipers in the center of the tuff blocks that were burned by the fire; these could damage the site if they fall. Otherwise, no burning occurred in the site area. Many of the masonry blocks are soot damaged.

Figure 10.4. LA 135291, view of rock feature, facing east.

LA 135292 (JEN-1). This site consists of a small (1-m by 2-m) pile of tuff blocks. It is not clear if these blocks are the remains of a structure, a rock pile, or something else. The site is located in a clearing on the south bench of Rendija Canyon. A number of scrub oaks have grown on and near the site. Several unidentified sherds and Cerro Pedernal chert flakes were observed. The site is probably Ancestral Puebloan. The scrub oak at the site was partially burned, but the snags do not represent a threat to the site. Several of the tuff blocks are soot damaged.

LA 135293 (WBM-101). This site consists of a one- to three-room structure of unshaped tuff blocks. The site is located among ponderosa pine on a northeast-facing slope north of the canyon. One smeared corrugated sherd was observed. The site is Coalition. The area around the site was moderately burned and there are several snags in the area that have the potential to damage the site. A stump hole near the masonry creates an erosional threat. Several of the masonry blocks are soot damaged.

LA 135294 (WBM-100). This site consists of a two- to three-room structure (4 m by 8 m) of unshaped tuff blocks and a possible second feature (a 2-m by 3-m cluster of unshaped tuff blocks) 20 m to the east.

The site is located on top of an east-west running ridge north of the canyon in piñon-juniper woodland. Several obsidian flakes were observed, suggesting that the site is Ancestral Puebloan. The fire did not affect this site.

Non-Fire Related Impacts to Prehistoric and Temporally Unplaced Sites

Thirty-seven prehistoric and temporally unplaced sites have been impacted by, or have the potential to be impacted by, non-fire related effects (Table 10.3). Two of these sites (LA 85864 and LA 85867; both probable Athabaskan teepee rings) do date to the Historic period but are included in this section because they are treated, for management purposes, as prehistoric/temporally unplaced sites.

Several sites have been affected by more than one impact. The most common impact is natural erosion caused by the location of the site (e.g., on a steep slope, near a large drainage, etc.). Thirty-two sites face some kind of natural erosion threat. The second most common impact is the passage of one or more trails and/or dirt two-track roads near or through a site. The passage of motorized and non-motorized vehicles over a site can destroy artifacts, masonry, and other features. Non-vehicular traffic is less destructive; however, sites situated on or near trails are exposed to the threat of vandalism and pot hunting. Additionally, both two-track roads and trails may act as channels for erosion and can impact sites even if traffic along the route ceases. Eleven sites have a trail and/or two-track road running near and/or through them. Two sites have had masonry blocks moved or removed. In the case of LA 86607 the masonry was placed across the trail running through the site to help prevent erosion. In the case of LA 85403, several masonry block-sized holes indicated a recent removal of part of the site. Finally, ammunition is accumulating at two sites down range of the Sportsmans Club firing ranges.

Table 10.3. Prehistoric And Temporally Unplaced Sites in Rendija Canyon with Damage not Related to the Cerro Grande Fire.

LA Number	Non-fire Impact
70025	Erosional threat: high (on narrow ridge)
85403	Vandalism (some masonry removed)
85404	Erosional threat: low (near drainage)
85405	Erosional threat: low (on slope)
85408	Two-track road near site
85409	Erosional threat: low (on slope)
85410	Erosional threat: low (two small drainages run through site), Two-track road catches edge of site
85411	Erosional threat: low (on slope)
85413	Erosional threat: low (on slope)
85414	Erosional threat: high (on slope), Two-track road runs through site
85418	Erosional threat: low (at edge of drainage)
85857	Erosional threat: high (pedestaled between two drainages)
85860	Erosional threat: low (on slope)
85861	Erosional threat: low (on slope)
85862	Two-track road runs directly over masonry
85864	Erosional threat: high (pedestaled by surrounding drainages)
85865	Erosional threat: low (on slope)
85866	Erosional threat: low (near drainage), Two-track runs through site
85867	Two-track road runs through site
85870	Erosional threat: low (on slope)
86605	Erosional threat: high (near drainage), Trail catches edge of site
86606	Erosional threat: high (on slope)

Table 10.3. (cont.)	
LA Number	**Non-fire Impact**
86607	Erosional threat: low (on slope), Trail runs through site, Some masonry moved (see notes on site)
87430	Erosional threat: high (at edge of eroding bench), trail catches edge of site
99391	Erosional threat: low (at edge of drainage), Two-tracks run through site
99392	Erosional threat: low (small drainages at edges of site)
99393	Erosional threat: low (on slope)
99396	Erosional threat: low (on slope)
99397	Erosional threat: high (near drainage)
127627	Erosional threat: high (on slope), Covered with shotgun shell pellets
127628	Erosional threat: low (on slope)
127629	Erosional threat: high (on slope), Melted and non-melted bullets on site
127630	Erosional threat: high (on slope)
127633	Erosional threat: high (on slope)
127634	Erosional threat: high (on slope)
127635	Erosional threat: high (on slope)
135292	Two-track road catches edge of site

Recommended Treatments for Prehistoric and Temporally Unplaced Sites

Treatment for fire-related impacts is recommended for 19 sites (Table 10.4). Most sites need erosion control, variously in the form of wattles, straw bales, or excelsior matting, and several sites require or may require stump filling and tree felling. Two sites require only monitoring. Additional treatment for non-fire related impacts is recommended for four sites. For further comments on treatment, see the discussion in Chapter 13.

Table 10.4. Prehistoric and Temporally Unplaced Sites in Rendija Canyon Recommended for Treatment.

LA Number	**Site Type**	**Treatment**
15116	Fieldhouse	Wattles (2)
21439	Fieldhouse	Tree felling (3); tree removal (3); fencing (433 ft)
70025	Fieldhouse	Excelsior matting (1); wattles (5); seed (0.4 ac); straw bales (10)
85406	Fieldhouse Rock Feature	Tree felling (6); tree removal (6); fencing (108 ft)
85415	Rock Feature	Fencing (246 ft)
85416	Rock Feature	Tree felling (6); tree removal (6); fencing (377 ft)
85419	Rock Feature	Fencing (125 ft)
85858	Rock Feature	Tree felling (8); tree removal (8); fencing (377 ft)
85860	Rock Feature	Excelsior matting, tree felling (10); tree removal (10; fencing (87 ft)
85870	Rock Feature	Fencing
86606	Fieldhouse	Excelsior matting (1); wattles (2), seed (0.1 acre);, straw bales (3)
127626	Fieldhouse	Wattles (2)
127627	Fieldhouse	Wattles (3); fill stump hole (1); straw bales (5); seed (0.2 ac)
127629	Fieldhouse	Wattles (4); straw bales (5); seed (0.3 ac)
127630	Fieldhouse	Fill stump hole (1); wattles (3); straw bales (3); seed (0.2 ac)
127633	Rock Feature	Wattles (2); straw bale (1); seed (0.1 ac)
127634	Fieldhouse	Wattles (3); straw bales (3); seed (0.1 ac)
127635	Fieldhouse	Excelsior matting (1); wattles (3); straw bales (3); seed (0.1 ac)
135293	Fieldhouse	Fill stump hole (1)
85862*	Fieldhouse	Data recovery

Table 10.4. (Cont.)

LA Number	Site Type	Treatment
86605*	Fieldhouse	Fence off site
87430*	Fieldhouse	Data recovery
135292*	Rock Feature	Possibly fence off site

* The recommended treatments for these sites are for non-fire related impacts

Chapter 11

Overview of Homesteads, Manhattan Project Resources, and Early Cold War Resources Impacted by the Cerro Grande Fire

Ellen D. McGehee, Kari L. M. Garcia, and John Isaacson

INTRODUCTION

In May 2000, the Cerro Grande Fire burned approximately 8,000 ac of DOE-managed land at LANL. Although the fire was generally of low intensity within the boundaries of LANL, it impacted a significant number of LANL's cultural resources. Historic wooden properties, such as Homestead period cabins and Manhattan Project buildings and structures, were affected more heavily than ancient archaeological sites.

We provide a general overview of the Homestead period at LANL, along with that of the Manhattan Project and Early Cold War period. We then briefly summarize the impacts that the Cerro Grande Fire had on these resources, and provide some management recommendations specific to these historic resources. Chapter 12 presents a detailed discussion of specific historic archaeological sites impacted by the Cerro Grande Fire, utilizing the assessment format presented in Chapters 7 through 10.

Homestead Period (1890–1942)

Formal homesteading on the Pajarito Plateau began in the 1890s. Many of the original patent holders were Hispanic Americans who had permanent homes in the Rio Grande Valley. Homestead families used the Plateau for seasonal farming, ranching, and resource gathering. Notable exceptions to this pattern included the establishment of a few permanent Anglo ranches such as the Los Alamos Ranch School, located in the area of present-day downtown Los Alamos, and Anchor Ranch, located on LANL land. The Los Alamos Ranch School was in operation from 1918 until the end of the Homestead period in 1942, a date that coincides with the U.S. Government's acquisition of lands on the Pajarito Plateau for the creation of a secret wartime laboratory.

Patented homestead sites located at LANL are complex sites exhibiting a variety of historic features. These features include the remains of wooden buildings and structures such as cabins, sheds, corrals, animal pens, privies, and fence lines. Historic artifact scatters, subsurface features, and a diversity of rock features are also commonly found on LANL land.

Manhattan Project (1942–1946)

The scientific laboratory at Los Alamos was the location of secret research and design efforts for the development of the first atomic weapons. This secret undertaking was known as Project Y of the Manhattan Project. Although the fission bomb was conceptually attainable, many difficulties still stood in the way of producing a usable weapon. Two bomb designs appeared to be the most promising: a uranium "gun" device and a plutonium "implosion" device.

Hundreds of LANL properties were constructed during the war years (1943–1945). Yet, as of May 2000, only 65 buildings and structures remained. Manhattan Project properties range from modest temporary wooden buildings of World War II mobilization design to more substantial concrete structures. Many of the properties originally housed administrative or support activities and are of minor significance to the history of the Manhattan Project; however, a few of the remaining buildings played key roles in the development of the first atomic weapons and are highly significant properties. Of these, the cluster of buildings known as V-Site was among the most significant.

Of the two approaches to bomb design, the implosion method was extremely difficult to perfect. However, by the fall of 1944, there was enough confidence in the success of the implosion weapon to begin selection of a site where a test device, later known as the Trinity device, could be assembled. In 1944, a small portion of the S-Site high explosives area was set aside for the development of V-Site. The wooden buildings and structures eventually constructed at V-Site were used to test assemble the Trinity device before its shipment to the Trinity Site in southern New Mexico. V-Site was one of the most secret facilities at the early laboratory—no pictures of World War II-era activities at V-Site could be located in LANL's extensive photographic archives.

Cold War (1946-1990)

Most of the existing buildings and structures at LANL belong to the period that historians have termed the Cold War, which is dated between the end of the Manhattan Project in 1946 and the aftermath of tearing down of the Berlin War in 1989 and the events that led to the dissolution of the former Soviet Union in 1991. At LANL, the Cold War is divided into two separate periods, the Early Cold War era (1946-1956) and the Late Cold War era (1956-1990).

As noted in Chapter 2, the Early Cold War era was characterized by the completion of fundamental nuclear weapons designs and other diverse research including supercomputing, biomedical and health physics research, explosives research and development, early reactor technology, pioneering physics research, and the development of early high-speed photography.

The early years of the Late Cold War era witnessed the continued support of atmospheric testing programs in the Pacific and at the Nevada Test Site (NTS) and subsequent underground testing at NTS. Other defense mission undertakings during this time included treaty and test ban verification programs (such as using satellite sensors to detect nuclear explosions), research and development of space-based weapons, and continued involvement with stockpile stewardship issues.

Cold War period non-weapon research supported a variety of undertakings including nuclear medicine, genetic studies, collaborations with the National Aeronautics and Space Administration (NASA), superconducting research, contained fusion reaction research, and other types of energy research (McGehee and Garcia 1999).

Study of Cold War period facilities at LANL is presently ongoing in order to assess the specific historic significance of each facility. This process, which is being pursued concurrent with infrastructure upgrades throughout the LANL complex, will likely take several more years to complete.

INITIAL FIRE EFFECTS

During the period of May 11 through May 12, 2000, the Cerro Grande Fire consumed 2,400 ac of LANL land. The fire crossed into the Laboratory via Water Canyon, immediately impacting the Grant and Garcia homestead site on the east side of West Jemez Road. It crossed through LANL's high explosives area, home of historic V-Site, burned across the Laboratory to TA-6, the location of the Montoya homestead, and into the Pajarito Road corridor, the location of the Romero and McDougall homesteads. Many of the affected Homestead and Manhattan Project properties were located in low- and moderate-burn severity areas. Unfortunately, because of the dry and well-aged nature of the wood found at these sites, many of the structures and buildings were almost entirely consumed by fire. Most of the later Cold War architecture at LANL is built using poured concrete or concrete masonry units. For the most part, the fire did not affect this style of construction.

GENERAL FIRE EFFECTS TO HOMESTEAD PERIOD PROPERTIES

Ten LANL homestead sites are located within the burn perimeter of the Cerro Grande Fire. These sites represent 66% of the identified patented homesteads at LANL. The 10 homesteads had a variety of features, both wooden and non-wooden, and still have data potential in the form of subsurface features and unanalyzed artifact scatters. Unfortunately, however, all significant structures or buildings associated with Hispanic homesteading at LANL were lost. Major Homestead period losses include the cabin and shed from the Montoya *y* Gomez homestead on Two-Mile Mesa, LA 21334 (Figures 11.1 and 11.2), the standing privy and other wooden features from the Grant and Garcia homestead in Water Canyon, LA 16807, and the Upper Pajarito Canyon Bridge, LA 89826.

There are a number of additional Homestead period sites and features located within the burned area perimeter at LANL. These sites, discussed in greater detail in Chapter 12, include isolated trash scatters and animal pens, wagon road segments, drainage-control and water-retention features, and temporary shelters. Homestead Era wooden resources on nearby U.S. Forest Service land were also totally consumed by the fire. Forest Service losses include the Garcia cabins and the "Line Camp" cabin north of Rendija Canyon (Figures 11.3 and 11.4).

Post-Fire Flooding

On June 28, 2000, an intense rainstorm caused significant flooding along West Jemez Road. This flooding event damaged State Route 501 in Water Canyon and destroyed the Anchor Ranch Ice House (Feature 1 of LA 16808) in TA-8. A nearby Homestead period wooden (LA 89826) appears to have been likewise destroyed by this flood (see Chapter 12). Due to the severity of this flood event (see Figures 11.5 and 11.6), which was triggered by the high severity burn on U.S. Forest Service lands upslope from TA-8, it was feared that this presaged one or more seasons of additional flood damage to facilities and cultural resources at LANL. This situation helped to spark the construction of flood retention structures in several canyons, and the placement of protective cement barriers around the historic Pond cabin (LA 21973) in Los Alamos Canyon. Fortunately, in the nearly 2.5 years since the destruction of the ice house and bridge, no other cultural resources have been impacted by fire-enhanced flooding.

Figure 11.1. LA 21334, the Montoya cabin on Two-Mile Mesa before the Cerro Grande Fire.

Figure 11.2. The Montoya cabin after the Cerro Grande Fire.

Figure 11.3. U.S. Forest Service Homestead Era site, LA 12710, the "Line Camp" before the Cerro Grande Fire.

Figure 11.4. The "Line Camp" after the Cerro Grande Fire.

Figure 11.5. The Ice House at Anchor Ranch (pre-flood and pre-fire).

Figure 11.6. The Ice House (post-flood and post-fire).

FIRE EFFECTS TO MANHATTAN PROJECT AND EARLY COLD WAR PROPERTIES

Manhattan Project properties were also lost on May 11, 2000. When the Cerro Grande Fire burned across LANL's high explosives testing area, four of six properties at V-Site were destroyed. Luckily, Building TA-16-516, the Trinity device assembly building, remained untouched. Before the fire, an open wooden shed at V-Site was being used to house historic casting equipment salvaged from another Manhattan Project building (Figures 11.7 and 11.8). The shed and all combustible artifacts were burned. Other metal and glass artifacts were either melted or severely damaged by the effects of the fire.

Storage buildings TA-40-72 and TA-40-73, built in 1945, were completely consumed by fire. TA-16-372, a wooden cooling tower built in 1953, was also completely burned. A small complex of historic buildings located at TA-15 was partially burned; the damage to these buildings, known as the "The Hollow," is detailed in a LANL historic building survey report written after the Cerro Grande Fire (McGehee and Garcia 2001). The fire also impacted TA-14-5, a small wood-frame control room and attached concrete bunker—the wooden portion of the building was burned. Additionally, several Manhattan Project experimental areas with wooden elements at former TA-7 were burned, and two historic wooden bomb covers on Two-Mile Mesa were almost completely destroyed by the fire (see discussion in Chapter 8).

Manhattan Project (1942–1946)

TA-14-5. TA-14-5 was constructed in 1944. The building was originally used as a control room and was of wood-frame and concrete construction. In 1961, the function of the building changed from a control room to a storage area. The wooden part of the building was destroyed during the Cerro Grande Fire. The small concrete bunker is still standing (Figures 11.9 and 11.10).

V-Site. TA-16-515 (originally V-1 and V-2) was built in 1944 and was completely destroyed by the fire (Figures 11.11 and 11.12). It was a wood-frame building with a low-pitched roof and a concrete foundation. There were asbestos shingles on the exterior of the building, and the south and east sides of the building were barricaded with an earthen berm. This building was a high explosives processing building (McGehee 1995).

TA-16-518 (originally V-6) was built in 1945 and was completely destroyed by the Cerro Grande Fire. It was a three-sided, wood-frame structure with a concrete foundation. This building had 10 "bays" and abutted building TA-16-519 on the southwest end. It was used as a storage shed and later used for inert storage (McGehee 1995).

TA-16-519 (originally V-7), built in 1944, was also completely destroyed. It was a wood-frame building with a low-pitched roof and a concrete foundation. It was connected to the east wall of TA-16-520 by a common wall. Building TA-16-519 was used as a storage building and was later used for inert storage and, possibly, classified material storage (McGehee 1995).

TA-16-520 (originally V-8), built in 1944, was completely destroyed by the fire. It was a wood-frame building with a concrete foundation. It was connected to the west wall of TA-16-519 by a common wall. Building TA-16-520 was used as a storage building and possibly for testing. It was later used for inert storage and, possibly, classified material storage (McGehee 1995).

TA-16-524, an electrical pit built in 1944, was also destroyed. It was of timber construction and was located at the V-Site area.

Figure 11.7. Artifacts stored at V-Site before the Cerro Grande Fire.

Figure 11.8. Artifacts stored at V-Site after the Cerro Grande Fire.

Figure 11.9. TA-14-5, remaining concrete portion and berm after the Cerro Grande Fire.

Figure 11.10. TA-14-5, rear view of former control room and berm after the Cerro Grande Fire.

Figure 11.11. TA-16-515 at V-Site before the Cerro Grande Fire.

Figure 11.12. TA-16-515 after the Cerro Grande Fire.

TA-40. TA-40-72 and TA-40-73 (originally TD-2 and TD-3) were completed destroyed in the fire (Figures 11.13 and 11.14). These two identical buildings were built in 1945 from the same plans and were used as general storage buildings. However, they were also identified as "magazines" on a 1955 Laboratory Structure Location Map and probably functioned at one time as explosives support buildings. They were wood frame with 2-in. by 4-in. studs and bracing set on reinforced concrete floors and appear to have had asbestos siding or shingles.

Figure 11.13. TA-40-72 after the Cerro Grande Fire.

Early Cold War (1947–1963)

TA-2. The elevated risk of flooding in Los Alamos Canyon necessitated the emergency removal of TA-2-4, a small building at the historic Omega West Reactor facility (Figure 11.15). This building was built in 1947, and, although used primarily as a guard station, was once used to store radioactive material associated with the Omega West Research Reactor (McGehee 2000).

TA-15. TA-15-50, built in 1959, was completely destroyed in the fire. This building was originally built as a three-sided structure then modified to a shop and laboratory building. It was of wood construction with corrugated steel siding (McGehee and Garcia 2001). TA-15-371, built in 1960, was completely destroyed in the fire. It was a covered passageway located between buildings TA-15-50, the "Staff Shop," and TA-15-194, the "Pulsed Power Laboratory." It was constructed of corrugated steel and wood with plastic "sky lights" (McGehee and Garcia 2001).

TA-16. TA-16-372 was a wooden cooling tower built in 1953 (McGehee 1995). It was located near TA-16-390 and was completely destroyed by the fire (Figures 11.16 and 11.17).

Figure 11.14. TA-40-73 after the Cerro Grande Fire.

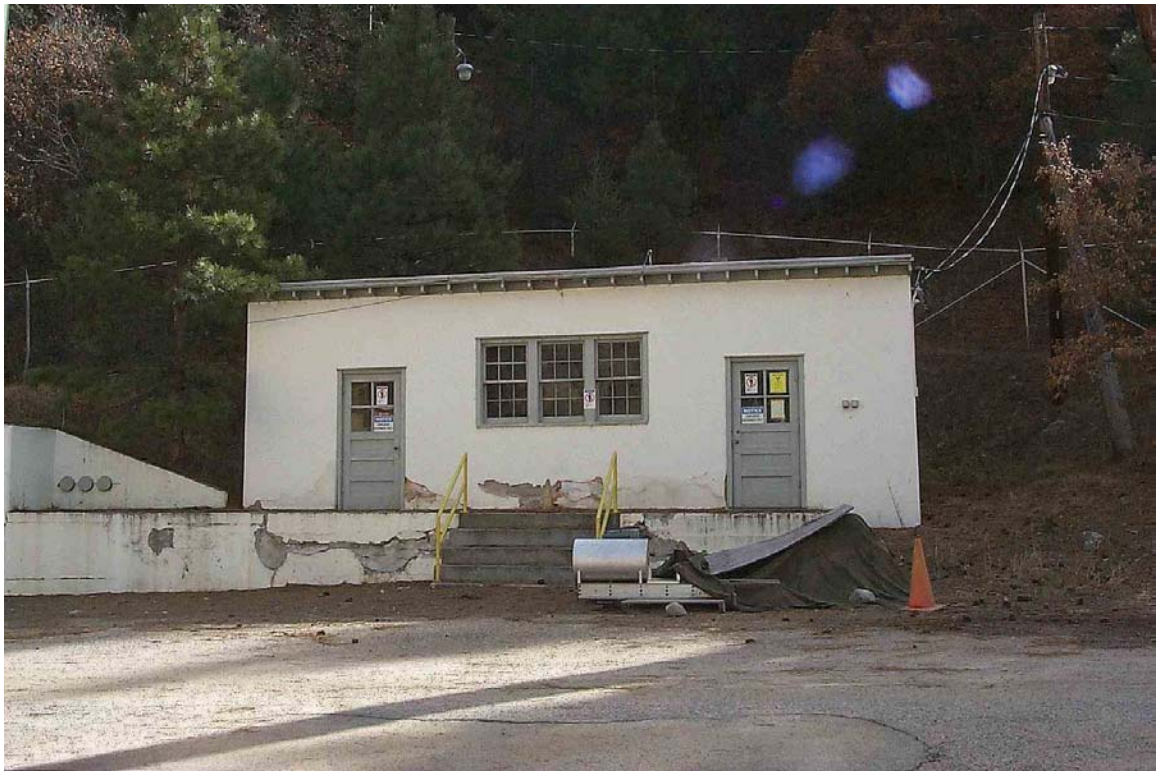


Figure 11.15. TA-2-4 in Los Alamos Canyon.

Figure 11.16. TA-16-372 before the Cerro Grande Fire.

Figure 11.17. TA-16-372 after the Cerro Grande Fire.

FIRE-IMPACTS TO MINOR BUILDINGS AND STRUCTURES (Post-1963 or Otherwise Exempt from Review)

Minor support structures and properties built after 1963 are exempt from NRHP-eligibility consideration under the terms of a programmatic agreement between the DOE/Office of Los Alamos Site Operations and the New Mexico SHPO due to their lack of historical significance (Programmatic Agreement Number MOU DE-GM32-00AL77152, Appendix A). Many of the properties that were damaged or destroyed by the fire are exempt from review but are included in this section of the report for information purposes only.

TA-15

TA-15-239, built in 1965, was completely destroyed in the fire. Structure TA-15-239 was a covered passageway located between TA-15-50, the "Staff Shop," and TA-15-203, the "REX Laboratory." The passageway was constructed of corrugated steel and wood with plastic "sky lights."

Two metal storage sheds, TA-15-314 and TA-15-339, and four metal storage transportainers, TA-15-329, TA-15-372, TA-15-374, and TA-15-375, were destroyed in the fire.

TA-16

Two transformer stations, TA-16-559 and TA-16-578, were completely destroyed.

TA-46

TA-46-86, a cooling tower, and its associated pump house, TA-46-87, were both built in the 1960s. TA-46-86 was completed destroyed in the fire and TA-46-87 was damaged.

Six office trailers or modular office buildings were completely destroyed at TA-46: TA-46-121, TA-46-181, TA-46-241, TA-46-242, TA-46-325, and TA-46-397. These properties were installed at the technical area between 1964 and 1990.

TA-52

An office trailer, TA-52-111, was installed at TA-52 in 1988 and was completely destroyed by the Cerro Grande Fire.

TA-64

At TA-64, three Morgan© Sheds (TA-64-7, TA-64-19, and TA-64-23) and two metal transportainers (TA-64-18 and TA-64-21) were completely destroyed by the fire. TA-64-9, an office trailer installed in 1988, was also completely destroyed. Five military expandable shelters used for storage (TA-64-11, TA-64-12, TA-64-13, TA-64-15, and TA-64-24) are listed as having been destroyed by the fire; however, two of the shelters, TA-64-15 and TA-64-24, may have been removed from the Laboratory in August 1998.

POST-FIRE CULTURAL RESOURCE MANAGEMENT ISSUES FOR FIRE-IMPACTED HOMESTEADS AND MANHATTAN PROJECT AND COLD WAR RESOURCES

Initial Field Assessment and Mitigation

Field assessments were initially conducted to determine the degree of damage from the Cerro Grande Fire. Flood, tree fall, and erosional risks were also assessed. Tree-ring samples were taken from burned or flooded sites, and initial assessments of impacts to artifact scatters were carried out. (Dendrochronology data from the impacted sites are included in Appendix I). Fire effects to non-combustible Homestead period artifacts were easily identified. These effects included evidence of spalling on ceramic surfaces and an increase in friability and surface degradation on metal objects. Additionally, many glass items have cracked or shattered since the fire, and plastic and rubber artifacts, if not melted, have become more brittle. At V-Site, the surfaces of the kettles used to process high explosives are now significantly rusted. The intense heat of the fire at V-Site was clearly demonstrated by the numerous metal items that had melted.

Long-Term Management and Preservation

The Cerro Grande Fire has made it obvious that long-term management of historic wooden properties will be an important part of LANL's cultural resource management responsibilities. One of the first steps to be taken will be the development of historical contexts for both the Homestead and Manhattan Project periods at LANL. These contexts will be developed using a compilation of pre-fire documentation from a variety of sources—from existing site forms to homestead patent papers, historic photographs, and interviews. Using the information presented in the context documents, the most significant properties from these historic periods will be selected for stabilization and preservation.

The 10 patented homestead sites still have data potential in the form of subsurface features and unanalyzed artifact scatters. Other Homestead Era sites (summarized at the end of Chapters 7–10), while not formally identified with a patented homestead site, also have similar data potential. Unfortunately, many burned historic artifacts are rapidly deteriorating—as stated above, increased surface spalling and artifact friability are just some of the observed post-fire effects. In response to the post-fire risk of data loss, a mitigation plan will be developed that will include the in-field analyses of historic artifact scatters located in the areas burned by the Cerro Grande Fire.

Management Of The V-Site And Other Manhattan Project Properties

In 1998, V-Site was designated an official project of the *White House Millennium, Save America's Treasures* grant program. The DOE received a grant to restore the buildings for the development of a Manhattan Project interpretative center. The grant required private matching funds to be raised, and the DOE entered into a cooperative agreement with the National Trust for Historic Preservation to assist in raising the necessary private funds. The Cerro Grande Fire necessitated a reevaluation of the original preservation project centered on the buildings at V-Site. After the fire, the DOE consulted with the Advisory Council and the SHPO. A main discussion topic was that the fire's impacts were now part of the history of V-Site and that this would have to be acknowledged in some way.

A decision was ultimately made to leave the ruins of TA-16-515 in a post-fire state (see Figure 11.12) and to rebuild the original courtyard area around TA-16-516, the intact assembly building. To date, the

remains of TA-16-515 have been decontaminated of asbestos-containing material, and a large crane, associated earthen berms, and the foundation have been left in place.

The DOE has also decided to identify an alternate Manhattan Project property for the development of the Manhattan Project interpretive center. One possible candidate is the "periscope bunker," a cement bunker built into the side of a small hill near the historic Anchor Ranch site. This building was used for ballistics experiments in the design of Little Boy, the uranium gun device. The building was originally equipped with a tall periscope that allowed researchers to observe ballistics tests from the safety of the bunker.

Chapter 12

Field Fire Assessment of Homesteads and Manhattan Project and Cold War Resources Impacted by the Cerro Grande Fire

Kari M. Schmidt, Jennifer E. Nisengard, Brian C. Harmon, Alan L. Madsen, and W. Bruce Masse

INTRODUCTION

Chapter 11 presented a general overview of historic non-Native American cultural properties at Los Alamos National Laboratory (LANL). This included general observations about the effects of the Cerro Grande Fire on these resources as well as management recommendations for mitigating the effects of the fire. It dealt with the general nature of impacts to Homestead period resources and a specific listing of Manhattan Project and Early Cold War period buildings and structures directly impacted by the fire.

The present chapter details the results of the field assessments of historic archaeological sites within the boundaries of the Cerro Grande Fire at Los Alamos National Laboratory. These historic resources were evaluated in much the same manner as the Native American archaeological sites described in Chapters 6 through 10. The sites are divided into three major categories—(1) Homestead period (including cabins, corrals, trash deposits, boundary fences, and similar features); (2) a combined treatment of Manhattan Project and Early Cold War (primarily represented by trash deposits); and (3) undetermined historic affiliation. Included within the Homestead period is a Civilian Conservation Corps (CCC) camp utilized for the construction of State Route 4. Non-fire related impacts and recommended treatments for impacted sites are also discussed. As with Chapters 7 through 10, the impacted resources are described by facility management unit.

SPECIFIC FIRE EFFECTS ON HOMESTEAD PERIOD ARCHAEOLOGICAL SITES

Homestead Period Fire Effects in Engineering Sciences and Applications Division (ESA)

The Cerro Grande Fire impacted at least two Homestead period historic sites in ESA (Table 12.1). The intensity of the Cerro Grande Fire in ESA ranged from low to severe, although both historic sites were in a moderately burned area. Fire impacts to the historic sites include soot staining on masonry, charring of artifacts, and stump holes and snags that pose threats to the site architecture and integrity.

Table 12.1. Homestead Period Sites in ESA Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced Erosion
16	*16807												
16	21369B	Moderate	No	No	No	Yes	No	No	No	Yes	Yes	No	

*See discussion for FMU-80

TA-16

LA 16807. This site consists of the remains of a large historic homestead that straddles the boundary between ESA and FMU-80. Because the majority of the site is located within FMU-80, the discussion will be deferred for inclusion below with the descriptions of impacts in FMU-80.

LA 21369. This site consists of two components, a lithic and ceramic scatter (LA 21369A) and several historic structures (LA 21369B). The historic component (Figure 12.1) consists of the remains of at least

Figure 12.1. General view looking northwest of a historic foundation at LA 21369B with B. Harmon (left) and J. Nisengard.

seven structures, tuff blocks, and concrete. These features represent the remains of a pre-World War II Civilian Conservation Corps (CCC) construction camp associated with the building of State Route 4. Together these components measure approximately 100 m north-south by 20 m east-west. The site has been extensively bulldozed and is disturbed by two roads running north-south and parallel to one another. This site is fairly disturbed, a great deal of gravel litters the site and there are several large holes between the small mounds; the mounds consist of concrete and tuff blocks. Some bent metal is also present. A small concrete structure is associated with a can scatter to the north of the concentration of the structure mounds. The site burn severity is moderate. Stump and root holes exist adjacent to masonry and in the site, and additional snags are in the site area. No treatment is recommended for this site.

Homestead Period Fire Effects in Dynamic Experimentation Division (DX)

A total of 22 Homestead period sites in DX were directly impacted by the Cerro Grande Fire (see Table 12.2). The intensity of the Cerro Grande Fire in DX ranged from low to severe. Fire impacts to historic sites in DX included cracking and spalling on masonry as heat from the fire sometimes caused masonry blocks to crack. Smoke and soot damage often occurred on the masonry blocks associated with historic structures and rock features. Burned trees resulted in abundant stump and root holes that damaged architectural features.

Additionally, fallen trees and partially burned trees also affected the appearance and stability of cultural remains in these areas. Sites that contained architectural wood (i.e., cabin foundations or corrals) were most damaged as much of the wood that comprised the feature was burned and consequently destroyed during the fire. Additional impacts to sites in DX included damage caused by suppression and rehabilitation activities.

Table 12.2 lists the historic Homestead period sites that were impacted by the Cerro Grande Fire and the specific type of damage sustained. The site and the damage sustained are then discussed in further detail for each site.

TA-6

LA 21334. Before the Cerro Grande revisit, the site was most recently surveyed in March 2000. The site consists of the remains of the Sanchez *y* Montoya Homestead, which dates to the period of circa 1899 to 1942 (Masse et al. 1991). It is located on the north side of Two-Mile Mesa in ponderosa pine and piñon-juniper woodland. The site contained the remains of a one-room log cabin, a smaller log structure presumed to represent a storage shed, a pole corral, a wire-fenced garden, a wagon road, two waterholes, a footpath, and an isolated section of fence line with a gate. During the Cerro Grande revisit, several changes were noted. Principally, it was noted that the cabin has burned completely (see Figures 11.1 and 11.2). The foundation is visible and there are several historic artifacts, mostly metal, piled inside of the burned cabin (barrels, barrel hoops, corrugated metal, cans, buckets, and wire). Most other features at the site have also burned completely. It appears that the north side of the site, near the canyon, burned hotter than the southern portion. The garden area, which was fenced with historic barbed wire, is slightly burned. There are a few fence posts still standing, some slightly burned and some severely burned. During the revisit, portions of a wagon road were encountered and located and recorded by use of the Global Positioning Satellite system. The first segment is 11 m long by 2 m wide by 0.7 m deep and has dry laid, unshaped, and stacked boulders. The second segment is 7 m long by 2 m wide by 0.8 m deep. Rehabilitation efforts have been implemented at the site. Erosion control devices have been placed down the wagon road, and there are wattles placed near the bottom of the canyon. The site was not impacted by suppression activities. Attempted dendrochronological dating of site was unsuccessful (see Appendix I).

Table 12.2. Homestead Period Sites in DX Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced erosion
6	21334	Moderate	No	No	No	No	Yes	No	No	Yes	No	Yes	Yes
6	89770	Low	No	No	No	No	Yes	No	No	No	No	No	No
6	131233	Low	No	No	No	Yes	No	No	No	Yes	No	No	Yes
6	131236	Moderate	No	No	No	Yes	No	No	No	Yes	No	Yes	Yes
6	136860	Moderate	No	No	No	No	Yes	No	No	Yes	No	No	No
8	*16808												
8	89825	Low	No	No	No	No	No	No	No	Yes	No	No	Yes
8	89826	Low	No	No	No	No	Yes	No	No	Yes	No	No	Yes
8	89829	Low	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes
8	89830	Low	No	No	No	Yes	No	No	No	Yes	No	No	Yes
9	21297	Moderate	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes
9	136828	Low	No	Yes	No	No	Yes	No	No	No	No	No	No
14	21298	Severe	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes
14	136674	Moderate	No	No	No	Yes	No	No	No	Yes	No	No	No
15	108746	Low	No	No	No	No	No	No	No	No	No	No	No
15	136627	Moderate	No	No	Yes	Yes	No	No	No	Yes	No	No	No
15	136948	Moderate	No	No	No	No	No	No	No	Yes	No	No	No
15	137011	Moderate	No	No	No	No	No	No	No	Yes	No	No	No
22	21331	Moderate	Yes	Yes	No	Yes	No	No	No	Yes	No	No	No
22	86643	Low	No	No	No	No	Yes	No	Yes	Yes	No	No	No
22	89769	Severe	No	No	No	Yes	No	No	No	Yes	No	No	Yes
22	136859	Severe	No	No	No	No	No	No	No	Yes	No	No	Yes
40	136861	Moderate	No	No	No	No	No	No	No	Yes	No	Yes	Yes

*Impacted by flooding immediately following the Cerro Grande Fire; see discussion for FMU-80

LA 89770. Before the Cerro Grande revisit, the site was most recently surveyed in March 2000. The site is that of a Homestead period wagon road with associated fence lines. No artifacts were identified during either visit. The wagon road segments are located in ponderosa pine forest, with some scrub oak in the area. The area around the site was minimally burned during the Cerro Grande Fire, some of the architectural wood (fence posts) at the site was burned. It is thought that the fire caused the loss of between 12 and 17 posts. The site was not impacted by suppression or rehabilitation activities. Attempted dendrochronological dating of several posts proved unsuccessful (see Appendix I).

LA 131233. Before the Cerro Grande revisit, the site was most recently surveyed in March 2000. In this visit, as well as the Cerro Grande Fire revisit, the site was identified as a Homestead period wagon road. The road segment is 4 m long by 2.3 m wide by 0.3 m deep. One rut is 0.26 m wide by 0.13 m deep; the other is 0.69 m. A wall located immediately north of the drainage was identified. No artifacts were identified during either visit. The wagon road segments are located in ponderosa pine forest, with some

scrub oak in the area. The area around the site was minimally burned during the Cerro Grande Fire, but there are stump and root holes and partially burned trees in the site vicinity. The site was not impacted by suppression or rehabilitation activities.

LA 131236. Before the Cerro Grande revisit, the site was most recently surveyed in March 2000. In this visit, as well as during the Cerro Grande Fire revisit, the site was identified as a Homestead period artifact scatter. Items at the site include leather and other perishable materials, as well as a wide array of historic cans. The site is located in the ponderosa pine forest and scrub oak woodland. The area around the site was moderately burned during the fire as is evidenced by stump holes, partially burned trees in the site area, and burned artifacts. Because of the effects of the fire, and primarily due to the accelerated decomposition rates in the site area, data recovery is recommended. These efforts should take the form of intensive analysis of surface artifacts and the collection of pertinent items. Despite significant losses from the fire, however, the site was not impacted by suppression or rehabilitation activities.

LA 136860 (TK-7). The site was first identified during the survey of sites undertaken as part of the assessment of damage done to sites during the Cerro Grande Fire. During our inspection, the site was identified as a Homestead period fenceline. No associated artifacts were identified. LA 136860 is located in a moderately burned scrub oak and ponderosa pine forest. The degree of the burn severity is evidenced at the site by the loss of approximately 50% of the architectural wood associated with the fence posts and by a number of snags or partially burned trees in the general site area. The site was not impacted by suppression or rehabilitation activities.

TA-8

LA 16808. This Homestead period site is that of the large Anchor Ranch complex, which straddles both DX and FMU-80 near State Route 501. Because that portion of the site damaged by the Cerro Grande Fire (by post-fire flooding) is located within FMU-80, the discussion will be deferred for inclusion below with the descriptions of impacts in FMU-80.

LA 89825. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. In both visits, the site was identified as a Homestead period wagon road segment. There was a wooden bridge associated with the wagon road, but that structure burned during the fire. No artifacts were identified during either visit. The wagon road segments are located in a mixed ponderosa pine forest and piñon-juniper woodland. The area around the site was minimally burned during the Cerro Grande Fire, but most of the architectural wood (bridge) at the site was burned. Additionally, there are approximately 100 partially burned trees in and around the site that have the potential to do more damage to the site. Because of the high number of trees burned in the area, wattles have been placed across a small drainage near the end of the wagon road segment. The site was not impacted by suppression activities.

LA 89826. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. In both visits, the site was identified as a Homestead period structure. The site consists of the collapsed portions of a wooden bridge over a segment of LA 89825 (Figure 12.2), a Homestead period wagon road. Nothing remains of the wooden structure as it appears to have washed away. There is a single piece of burned wood lodged between two rocks on the south side of the crossing. It is probable that this is the only piece of wood remaining. No artifacts were identified during either visit. LA 89826 was located in a mixed ponderosa pine forest and piñon-juniper woodland. The area around the site was minimally burned during the Cerro Grande Fire. In addition to the destruction of the wooden bridge, the fire also affected the site in the form of 10 partially burned trees in the immediate site vicinity. The site was not impacted by suppression or rehabilitation activities. Dendrochronological dating of bridge specimens proved unsuccessful, however one element could be matched with the Anchor Ranch Ice House (see Appendix I).

Figure 12.2. LA 89826, a Homestead period structure after the Cerro Grande Fire.

LA 89829. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. In both visits, the site was identified as a Homestead period artifact scatter. Items at the site include metal materials, a wide array of historic cans, and approximately 10 pieces of charred lumber. The site is located in the ponderosa pine forest, and the area around the site was minimally burned during the fire. The effects are evidenced by three stump holes in the site area, the loss of architectural wood, and a number of partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

LA 89830. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. In both visits, the site was identified as a Homestead period artifact scatter. Items at the site include metal materials and a wide array of historic cans and bottles. Many of the cans and bottles burned during the fire and are in poor condition. The site is located in the ponderosa pine forest and the area around the site was minimally burned during the fire. The effects are evidenced by one stump hole in the site area and two partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

TA-9

LA 21297. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. In both visits, the site was identified as a Homestead period structure. The site consists of the collapsed remains of a wagon frame and a stove. The wood around the wagon frame burned during the fire. Only a few artifacts were identified during the Cerro Grande revisit. LA 21297 is located in a mixed ponderosa pine forest and piñon-juniper woodland, with a fairly high proportion of scrub oak. The area around the site was

moderately burned during the Cerro Grande Fire. Effects of the fire are evidenced by one stump hole in the immediate site area, the loss of architectural wood features in the form of the wagon frame, and approximately 50 partially burned trees in the site vicinity. The site was not impacted by suppression or rehabilitation activities.

LA 136828 (TK-18). LA 136828 was first identified during the survey undertaken as part of the assessment of damage done to archaeological sites during the Cerro Grande Fire. During inspection of the site, it was identified as a historic structure dating to the Homestead period. The site is a small corral-like feature with fence posts and a rock wall. The rock wall is approximately 0.5 m to 0.8 m high and sits adjacent to a small drainage. One of the fence posts was completely burned during the fire, and two others were slightly burned. No associated artifacts were identified. LA 136828 is located in an area of scrub oak and ponderosa pine forest that was minimally burned. The degree of the burn is evidenced at the site by smoke and soot damage on the rock wall and by the loss of all or parts of a number of fence posts. The site was not impacted by suppression or rehabilitation activities.

TA-14

LA 21298. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. In both visits, the site was identified as a historic structure dating to the Homestead period. The site consists of a rock pile that may have been a windbreak or structure foundation and an associated can scatter (Figure 12.3). A wooden ramada was identified during the 1979 visit, but the ramada was seemingly destroyed during the fire since no traces of it were visible during the Cerro Grande revisit. LA 21298 is located in a mixed

Figure 12.3. LA 21298, a Historic period structure after the Cerro Grande Fire.

ponderosa pine forest and piñon-juniper woodland, with a fairly high density of scrub oak in the area. The area around the site was severely burned as is evidenced by cracking, spalling, and soot damage on the masonry blocks; stump and root holes on the site itself as well as in the surrounding area; snags and partially burned trees in both the immediate and general vicinity of the site; and the loss of architectural wood in the form of a ramada. The site was not impacted by suppression or rehabilitation activities, but because of the extensive damage, it is suggested that potentially threatening trees in the area be removed.

LA 136674 (BV-10). The site was first identified during the Cerro Grande Fire assessment survey. During our inspection, the site was identified as part of a Homestead period wagon road (1913 bench marker). No associated artifacts were identified. Due to its proximity to both the Gomez and Montoya Homestead sites, however, the wagon road may be related to one of these sites. LA 136674 is located in a moderately burned scrub oak and ponderosa pine forest. The degree of the burn severity is evidenced at the site in the form of numerous stump holes and snags or partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

TA-15

LA 108746. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as a Homestead period artifact scatter. There is an anomalous pile of rocks associated with the trash scatter. The rock pile consists of approximately 20 to 25 rocks set in a somewhat semicircular pattern. The rocks are situated in an area measuring 3.5 m north-south by 3 m east-west. The rocks are not shaped and it is thought that the semicircle may simply represent a push-pile from the nearby fire road. LA 108746 is located in a mixed ponderosa pine and piñon-juniper area. The area around the site was minimally burned during the fire and there are no visible effects present at the site. The site was not impacted by suppression or rehabilitation activities.

LA 136627 (ALM-71). The site was first identified during the Cerro Grande Fire assessment survey. During our inspection, the site was identified as a Homestead period artifact scatter. Items at the site include a small number of historic cans and glass fragments. LA 136627 is located in the ponderosa pine forest, and the area around the site was moderately burned during the fire. The effects of the burn are evidenced at the site by the presence of approximately five stump holes in the site area and by about 20 partially burned trees. The site was not impacted by suppression or rehabilitation activities.

LA 136948 (Q-135). Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as a Homestead period structure consisting of a bridge and a road cut (formerly components A and C). No artifacts were identified during the 2001 revisit although several cans were identified in the initial visit. LA 136948 is located in a mixed ponderosa pine and piñon-juniper area. The area around the site was moderately burned during the Cerro Grande Fire as is evidenced by approximately 20 snags and partially burned trees around the site. The site was not impacted by suppression or rehabilitation activities.

LA 137011 (W-21). During the Cerro Grande revisit, the site was identified as a Homestead period artifact scatter. Items identified at the site include a wide array of bottles and cans that likely represent a trash dump. LA 137011 is located in a mixed ponderosa pine and piñon-juniper area. The area around the site was minimally burned during the fire as is evidenced by approximately 10 snags or partially burned trees in the vicinity of the site. The site was not impacted by suppression or rehabilitation activities.

TA-22

LA 21331. Before the Cerro Grande revisit, the site was most recently surveyed in 1979. In both visits the site was identified as a series of linear rock piles dating to the Homestead period. The original site recorders noted that there may have been field clearing associated with the piles. The piles range from 5 m to 10 m in length and are about five rocks wide. A small number of metal cans were identified in the site area and it's thought that the rock piles are associated with these; but this assignation is not certain. LA 21331 is located in ponderosa pine forest, but there is some scrub oak in the area. The area around the site was moderately burned during the Cerro Grande Fire. These effects are evidenced by cracking, spalling, smoke, and soot damage on the rocks; approximately 70 stump holes in the site area; and a large number of partially burned trees. The site was not impacted by suppression or rehabilitation activities.

LA 86643. Before the Cerro Grande revisit, the site was most recently surveyed in 1991. The site is the remains of the Gomez Homestead. It contained the following features: a cabin foundation (Figure 12.4) and roof beams, corrugated roof material, a stone structure, a corral (Figure 12.5), a historic trash dump, an horno, and a fence line. The site is located in ponderosa pine forest, and the area was moderately impacted by the fire. Many of the features mentioned above were burned during the Cerro Grande Fire, although nothing was completely destroyed. The cabin foundation area was burned; only one wood roof beam remains. The corrugated roof material associated with the cabin is burned but intact (in four pieces).

Figure 12.4. LA 86643, the cabin foundation after the Cerro Grande Fire.

Several of the cabin foundation blocks have been discolored by smoke damage. The corral area is burned with trees being burned at the base. The northwest section of the masonry wall of the corral is most heavily burned. Remnants of a burned post are present in the north-central sections of the corral, and

about 10 pieces of corrugated metal are also burned. The trash dump area was heavily burned, and while the artifacts suffered damage, they are all still intact. The area around the fence line was also burned, but there are still about 30 wooden fence posts present, five of which are still upright. The stone structure and the horno were not burned during the fire. In addition to these effects, evidence of the burn is also present in the form of approximately 20 partially burned trees in the site area that have the potential to further damage the structures. Architectural wood was also lost. Because of the heavy damage the site sustained, especially the corral, it is recommended that the burned trees in the corral be cut down to prevent further damage. The site was not impacted by suppression or rehabilitation activities. An attempt was made to dendrochronologically date the Gomez homestead fenceline, however this proved unsuccessful due to the erratic nature of the ring series of the juniper posts (see Appendix I).

Figure 12.5. LA 86643, B. Harmon at the corral after the Cerro Grande Fire.

LA 89769. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as a Homestead period artifact scatter (Figure 12.6). Items at the site include approximately 120 metal cans, three glass shards, and three broken bottles. The cans were burned during the fire but remain intact. Heavy pine duff obscures the ground surface, and more trash could be present below the duff level. LA 89769 is located in a mixed ponderosa pine and piñon-juniper area. The area around the site was severely burned during the fire. The effects are evidenced by approximately five stump holes in the site area and over 30 partially burned trees. Because of the severe burn, most of the duff is gone. As a result, it is recommended that two wattles be placed upslope and downslope (one each) of the trash scatter. The site was not impacted by suppression or rehabilitation activities.

Figure 12.6. LA 89769, an artifact scatter after the Cerro Grande Fire.

LA 136859 (TK-6). The site was first identified during the survey of sites undertaken as part of the assessment of damage done to sites during the Cerro Grande Fire. During inspection, the site was identified as a Homestead period artifact scatter. Items at the site include a small number of historic cans and glass fragments. LA 136859 is located in the ponderosa pine forest, and the area around the site was severely burned during the fire. The effects of the burn are evidenced at the site by the presence of a number of partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

TA-40

LA 136861 (TK-8). The site was first identified during the survey of sites undertaken as part of the assessment of damage done to sites during the Cerro Grande Fire. During inspection, the site was identified as a Homestead period artifact scatter. Items at the site include historic cans and other trash. LA 136861 is located in the ponderosa pine forest, and the area around the site was moderately burned during the fire. The effects of the burn are evidenced at the site by the presence of a number of partially burned trees in the site area. Rehabilitation efforts have been implemented at the site as wattles have been placed in the area and reseeding has been undertaken. The site was not impacted by suppression activities.

Homestead Period Fire Effects in Facilities Management Unit 80 (FMU-80)

A total of 11 Homestead period sites in FMU-80 were directly impacted by the Cerro Grande Fire (see Table 12.3). The intensity of the Cerro Grande Fire in DX ranged from low to severe. Fire impacts to historic sites in DX included cracking and spalling on masonry as heat from the fire sometimes caused masonry blocks to crack. Smoke and soot damage often occurred on the masonry blocks associated with historic structures and rock features. Burned trees resulted in abundant stump and root holes that damaged architectural features.

Table 12.3. Homestead Period Sites in FMU-80 Directly Impacted by the Cerro Grande Fire

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced erosion
5	30638	Severe	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	No
8	*16808	None	No	No	No	No	No	No	No	No	No	No	Yes
16	**16807	Moderate	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes
46	64874	Moderate	Yes	No	No	No	Yes	No	Yes	Yes	No	No	No
49	15866B	Moderate	No	No	No	No	No	No	No	No	Yes	No	No
49	137758	Low	Yes	Yes	No	No	No	No	No	Yes	No	No	No
50, 55	131237	Moderate	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes
60	89776	Moderate	No	No	No	Yes	Yes	No	No	Yes	No	No	Yes
69	89821	Low	No	No	No	Yes	No	No	No	Yes	Yes	No	No
69	89822	Low	No	No	No	Yes	No	No	No	Yes	No	No	Yes
69	89823	Low	No	No	No	No	No	No	No	No	No	No	No

*Site partially in DX; **Site partially in ESA

TA-5

LA 30638. Before the Cerro Grande revisit, the site was most recently surveyed in 1998. During this inspection, the site was identified as part of the Fermin Vigil homestead, with a cement-lined cistern (Figure 12.7) and historic trash scatter present. During the Cerro Grande revisit, the site was identified as a historic cistern and associated trash scatter dating to the Homestead period. The site is located in the bottom of Mortandad Canyon and was severely impacted by the fire. The severity of the burn is evidenced by the destruction of wooden structures (fence posts) associated with the site, as well as by cracking, spalling, and soot damage on the cistern itself and the presence of numerous partially burned trees in the site area. The snags pose a potential threat to the cistern, especially if they fall and further damage the masonry structure. In addition to impacts from the fire itself, the site has also been impacted by several rehabilitation activities, including the felling of a single tree, the placement of mulch across the site, and a fence around the cistern. The site was not impacted by suppression activities.

Figure 12.7. LA 30638, a cistern with associated masonry.

TA-8

LA 16808. This Homestead period site is that of the large Anchor Ranch complex, which straddles and extends into both DX and FMU-80 near State Route 501. Before the Cerro Grande revisit, the site was extensively surveyed in 1992 and 1997 (Manz and Hoagland 1997), but was revisited immediately after the Cerro Grande Fire in August 2000 in conjunction with emergency flood control actions (Masse 2000).

The site covers an area of nearly 19 ha (46 ac), and contains the remains of six structures and 24 associated discrete features. Due to the fortunate and prescient circumstance of tree thinning in and around the site in 1998, the year before the Cerro Grande Fire, the structures and features of the Anchor Ranch complex were not directly impacted by the fire itself. However, one structure, the remains of an ice storage house, was destroyed by flooding immediately after the fire (Masse 2000). Steen (1982:Fig. 8) photographed the ice storage house as it looked some twenty years ago prior to the Cerro Grande Fire. On 28 June 2000, an intense 20-minute rain cell in the burned forest upslope (to the west) and across State Route 501 from the Anchor Ranch complex, created a localized flashflood that overflowed the pond above the ice house and then demolished the ice house structure itself (see Figures 11.5 and 11.6; Masse 2000).

Dendrochronological samples were collected from logs used in the construction of the ice house and submitted to the University of Arizona Tree Ring Laboratory both prior to and after the Cerro Grande Fire (see Appendix I). These various samples yielded tree-felling dates ranging between 1929 to 1934, roughly the same time as wood procurement for the Victor Romero Homestead. One of the undatable logs at the ice storage house was from the same tree used for the bridge at LA 89826.

TA-16

LA 16807. This site was last visited in 1997 as part of the West Jemez Road Tree Thinning Project. This homestead site is located on a small bench above Water Canyon, east of State Road 501 (West Jemez Road). The homestead complex measures approximately 70 m north-south by 80 m east-west. Water Canyon bounds the site on the northern side. The vegetation consists of ponderosa pines, numerous species of scrub and brush, and short grass. Nine features have been identified at the site: a cabin foundation (Feature 1), a standing wood-frame one-seat privy (Feature 2), alignments of barbed wire fence (Feature 3), a possible cement spring box (Feature 4), the remains of a wooden box (Feature 5), two anomalous rock clusters (Feature 6), a small rock alignment (Feature 7), a tuff rock with the initials AGS carved in it (Feature 8), and a trash scatter (Feature 9). There is also a light scatter of obsidian at the site, from a nearby Archaic period lithic scatter.

LA 16807 represents the remains of the Ted Mather and Rose Grant homestead. Ted Mather was a hunter and trapper for Frank Bond at the Baca Location in the Jemez Mountains above the Pajarito Plateau (Foxx and Tierney 1999:12). Ted and his wife, Rose Grant, lived at their homestead for several years before moving to the Los Alamos town site when he was hired as a wrangler at the Ranch School.

At the time the site was visited for this assessment there was heavy snow cover, but it was determined that the site area was moderately burned. The most extensive burning occurring upslope from the site to the north and east. The privy, fence posts, and portions of the cabin foundation were burned during the fire, as were some of the artifacts. Cracking and spalling on masonry is only evident on the privy. There are approximately five stump holes in the immediate site area, five trees that have fallen on wood or rubble, two snags that have the potential to damage structures, and many additional snags and partially burned trees in the site area. Suppression impacts to this site consist of tree felling, with about 10 large ponderosa pines currently lying on the site. Because the site is located at near the base of Water Canyon, there is some erosional threat. Treatment is recommended for the site and includes the filling of stump holes and the felling of snags that pose a threat to the integrity of the site.

TA-46

LA 64874. This Homestead period site is that of a couple of historic brass cap markers (dated 1913 and 1938, respectively) and associated stone cairns, and adjacent Homestead period fence lines. The site is situated in mixed piñon-juniper and ponderosa pine forest on top of a mesa immediately west of the western tip of the San Ildefonso Sacred Lands. Prior to the Cerro Grande Fire, the site was last recorded in 1986 at the time it was originally identified. The area was moderately burned during the Cerro Grande Fire, which resulted in the partial or complete destruction of most of the individual fence posts. A number of snags are situated in and around the remnants of the fence lines.

TA-49

LA 15866B. This Homestead period site is that of a log cabin originally recorded in 1977 (Steen 1982:35-36). The site is situated within the footprint of the 1977 La Mesa Fire. The original field forms—filled out less than one month after the fire—indicate that the only evidence of structural remains at that time was a stone fireplace. Frustratingly, no mention of the La Mesa Fire is made for this site in Steen's 1982 report or on the original field form, therefore it is not known to what degree the fire may have impacted the origin wooden elements of the site. However, photographs of the cabin location taken immediately after the La Mesa Fire (Steen 1982:Fig. 6) clearly indicate that at least the log foundation of the structure was

present and burned during the La Mesa fire. The Cerro Grande Fire was of moderate severity in and around the site area, but little or no damage was apparently inflicted on the site itself, undoubtedly largely the result of the earlier destruction during the1977 La Mesa Fire. There was no evidence of Cerro Grande Fire damage on two small stacks of stone that likely represent the remains of the fireplace. A fire suppression road, created or enhanced during the Cerro Grande Fire, is situated a few meters south of the two stone piles. Given the present amorphous nature of the site, it is unclear if this road caused any actual damage to the Homestead site.

LA 137757 (BCH-18). The site was first identified during the Cerro Grande Fire assessment survey. The site was identified as a "C"-shaped rock feature with associated Homestead period artifacts. The stones associated with the feature were cracked and exhibited spalling due to the fire, and there was at least one snag within the general vicinity of the site. Because the site was first discovered during the assessment survey, it is unknown as to whether or not there had been a loss of architectural wood or features. Erosion is not a problem at the site, and no treatment measures were recommended.

TA-50 and TA-55

LA 131237. The site is an assemblage of homesteading features and associated historic trash from two adjoining homesteads: the McDougall and Roybal homestead (ca. 1908 to 1942) and the David Romero homestead (ca. 1893 to 1942). Together the homesteads occupied portions of what is now both TA-50 and TA-55. The two homestead sites originally provided separate Laboratory of Anthropology site numbers (including also LA 131238), but were eventually combined due to confusion as to which of the features belong to the David Romero homestead site and which belong to that of Robert McDougall/Ramon Roybal (McDougall sold his property to Roybal).

LA 131237 was initially extensively studied as part of the 1984 to 1986 data recovery program by Cross-Cultural Research Systems, Inc. (McGehee et al. 1988) at the adjacent Victor Romero homestead (LA 16806), but this work has not yet been reported. The site was restudied during the period immediately before and after the Cerro Grande Fire as part of the Pajarito Gas Line Project (Masse et al. 2001). This Historic period homestead site consists of a corral, two trash scatters, a dugout, a cistern, a fence, and possibly a log cabin. The site is situated in an open grassland area. The corral and house sites have some unburned and partially burned posts that are potentially suitable for dendrochronology. There are also several pieces of wood and board fragments around the dugout and cistern; some of these exhibit slight charring. The entire area suffered from a duff fire, the scrub oak and grasses also burned. The northern portion of the trash scatter burned, while the southern part did not. There are stump holes, snags, and partially burned trees in the vicinity of the site. Samples collected from the corral and submitted to the University of Arizona Tree Ring Laboratory in 1990 yielded a tight cluster of dendrochronological dates around 1906 to 1908 (see Appendix I).

TA-60

LA 89776. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. The site was identified as a possible privy, with a square depression and wood planks present at the site. During the Cerro Grande revisit, LA 89776 was identified as a small Homestead period location, represented by a possibly privy, a square depression (perhaps representing a dugout), and a light historic trash scatter. Although the site originally contained several wood planks, these are presumed destroyed by the fire since they could not be relocated. The site burned moderately heavy, with a presumed loss of architectural

features and wood planks. Additionally, there is one stump hole in the site area, and 10 to 12 snags or partially burned trees. The site was not impacted by suppression or rehabilitation activities.

TA-69

LA 89821. The site was last visited in 1992 as part of the Environmental Restoration Project. Situated in a mixed ponderosa pine forest and a piñon-juniper woodland, the site consists of a historic can scatter. The area was subject to a low burn; there are stump holes, burned trees, and snags near the site. All that remains of the site are a bucket and two cans. Treatment is not recommended, as this site is not eligible.

LA 89822. Before the Cerro Grande revisit, the site was last visited in 1992 as part of the Environmental Restoration Project. The site is situated in a mixed ponderosa pine forest and piñon-juniper woodland. Subject to a low burn, there are stump holes, snags, and burned trees in the site area. The site consists of a Homestead period can scatter with buckets, pails, and cans identified in the area. Some of these artifacts burned as a result of the fire. This site is not eligible and no treatment is recommended.

LA 89823. The site was last visited in 1993 as part of the Environmental Restoration Project. Situated in a mixed ponderosa pine forest and piñon-juniper woodland, the site consists of a historic artifact scatter. The site surface was subject to a low burn and some of the glass, ceramics, and cans burned during the fire. Regardless, the artifacts remain in relatively good condition, and the site is eligible. No treatment is recommended for the site.

Homestead Period Fire Effects in Rendija Canyon

The fire impacted at least two of the three known historic sites in the Rendija Canyon Tract, the third could not be relocated (Table 12.4). The primary impact of the fire on these sites was the destruction of most or all of the wood present. Other features were damaged by the heat and/or smoke. Since the wood enclosure, the sole indisputably cultural feature at LA 70026, was destroyed, this site is now not eligible for inclusion on the NRHP (pending SHPO concurrence).

Table 12.4. Homestead Period Sites in Rendija Canyon Directly Impacted by the Cerro Grande Fire

LA Number	Degree of Burn	Cracking/spalling on masonry	Smoke/soot damage on masonry	Stump/root holes on or adjacent to masonry	Additional stump/root holes in site area	Loss of architectural wood/features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced erosion
70026	Severe	No	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Yes
85407	Moderate	No	No	No	No	Yes	No	No	No	No	No	No

LA 70026. This site was last visited in 1992 as part of Environmental Restoration Project. The site was a historic wood enclosure of unknown function and consisting of a single tier of hand-cut logs (5 m by 7 m). In the center of the wood enclosure was a small rock pile, possibly the result of a tree fall. The site is located in the bottom of Cabra Canyon in ponderosa pine forest. No artifacts were observed but earlier surveys dated the site to the Homestead Era based on its construction method and the age of the trees

growing inside the enclosure. The area around the site was severely burned. There are 50+ snags and partially burned trees in the area and three stump holes on or near the site. The wood that made up the enclosure was almost totally destroyed; only one partially burned log fragment that may have been part of the original structure remains. The rock pile is still present, although 90% of the rocks have suffered soot damage. As the site is located in a canyon bottom, there is a high erosional threat. In a letter dated May 10, 1993, the SHPO identified the site as possibly eligible for inclusion on the NRHP. With the complete, or virtually complete, destruction of the enclosure, this site is no longer eligible.

LA 85407. This site (Figure 12.8) was last visited in 1992 as part of the Bason Land Exchange. The site is part of the historic Serna homestead consisting of the remains of a log cabin, a second possible log structure of unknown use, a corral, a fence line, a trash scatter, and two rock features (possible hornos). While the site itself measures 100 m by 90 m, the entire homestead tract covered a little over 60 ac. Artifacts in the trash scatter and on other parts of the site include lard, sardine, coffee, kerosene, and condensed milk cans, galvanized metal, and purple glass fragments. The homestead was inhabited by the family of Fidel Serna, and later the family of José María Serna, from the early 1900s to 1942 or 1943 (Peterson and Nightengale 1993:50–57). There is also a very light scatter of prehistoric artifacts on the site consisting of several obsidian flakes, one Biscuit B sherd, and two Kapo Black sherds. The site is located on a small bench to the north of the canyon. Vegetation consists mostly of short grasses and small stands of piñon and juniper. The area in general is moderately burned, although most of the wood from the cabin, the possible structure, and corral was destroyed. The fence posts also suffered some damage although many of them are still present. Attempted dendrochronological dating of four log specimens from the site proved unsuccessful (see Appendix I).

Figure 12.8. LA 85407, view of cabin remains, facing northeast.

SPECIFIC FIRE EFFECTS ON MANHATTAN PROJECT AND EARLY COLD WAR PERIOD ARCHAEOLOGICAL SITES

Manhattan Project and Early Cold War Fire Effects in Engineering Sciences and Applications Division (ESA)

A total of four Cold War period archaeological sites were identified within ESA as being impacted by the Cerro Grande Fire. No Manhattan Project sites were so identified. These are summarized in Table 12.5.

Table 12.5. Manhattan Project Sites in ESA Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/ partial burned trees in site area	Other	Suppression	Rehabilitation	Erosion
16	136820	Moderate	No	No	No	No	No	No	No	Yes	No	No	No	No
16	136830	Moderate	No	No	No	No	No	No	No	Yes	No	No	No	No
16	136841	Moderate	No	No	No	No	No	No	No	Yes	No	No	No	No
16	136880	Severe	No	No	No	No	No	No	No	No	No	No	No	No

TA-16

LA 136820 (TK-1). This site consists of a concentration of LANL trash and a dispersed scatter of associated trash. Materials identified at the site include broken glass, rusted cans and buckets, some type of textile, wire, and other miscellaneous artifacts. This site most likely dates back to the Cold War Era. Site burn severity was moderate, and no treatment is recommended.

LA 136830 (TK-2). The site consists of a highly concentrated can scatter with one broken glass bottle present. The cans sustained some fire damage, but remain intact for the most part. Site burn severity was moderate, and few artifacts appeared to be damaged. There is no evidence of rehabilitation or site disturbance. No treatment is recommended.

LA 136841 (TK-3). The site consists of a historic trash scatter. Artifacts observed include cans, glass, textiles, batteries, wire, buckets, and miscellaneous materials most likely dating to the Cold War Era. The burn severity in the area is moderate; however, all of the artifacts appear to have escaped fire damage. One large concentration lies near the canyon edge, all other artifacts are highly dispersed throughout the area. No treatment is recommended for this site.

LA 136880 (WBM-8). This site consists of a historic trash scatter dating back to the Cold War Era. There are several pipe fragments and pipe sections throughout the site. This site is located southwest of building TA-16-1486 by approximately 60 m. The site burn severity is severe. There were no suppression impacts to this site, and no treatment is recommended.

Manhattan Project and Early Cold War Fire Effects in Dynamic Experimentation Division (DX)

A total of seven Manhattan Project archaeological sites in DX were directly impacted by the Cerro Grande Fire (Table 12.6). No archaeological sites specifically assigned to the Early Cold War period were identified as being damaged by the fire. As noted earlier, the intensity of the Cerro Grande Fire in DX ranged from low to severe. Fire impacts to historic sites in DX included cracking and spalling on masonry as heat from the fire sometimes caused masonry blocks to crack. Smoke and soot damage often occurred on the masonry blocks associated with historic structures and rock features. Burned trees resulted in abundant stump and root holes that damaged architectural features. Additionally, fallen trees and partially burned trees also affected the appearance and stability of cultural remains in these areas. At a single site, LA 89771, both suppression and rehabilitation activities were undertaken, but the site was impacted by intensive suppression activities that involved the movement of vehicles across and through the boundaries of the site.

Table 12.5 lists the historic sites that were impacted by the Cerro Grande Fire and the specific type of damage sustained. The sites and the damage sustained are then discussed in further detail.

Table 12.6. Manhattan Project Sites in DX Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced erosion
6	25284	Severe	No	No	No	No	No	No	No	Yes	No	No	
6	89771	Severe	No	No	No	Yes	Yes	No	No	Yes	Yes	Yes	
6	89772	Moderate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
6	89773	Severe	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	
6	131234	Moderate	No	No	No	No	Yes	No	No	No	No	No	
9	89834	Moderate	No	No	No	No	No	No	No	Yes	No	No	
69	89827	Low	No	No	No	No	No	No	No	Yes	No	No	

TA-6

LA 25284. Before the Cerro Grande revisit, the site was most recently surveyed in February 2000. In this visit, as well as the Cerro Grande Fire revisit, the site was identified as a large concrete bowl/basin that was constructed during the Manhattan Project period. The bowl is 60 m in diameter and was poured in 16 pie-shaped wedges that are about 3.2 m wide in the center of the bowl and about 10.8 m wide at the outside edge. The center of the bowl has a raised dome that is about 14.5 m in diameter and 1 m high. The structure is located in ponderosa pine forest, although there is some scrub oak in the area. The area around the site was severely burned during the fire. The severity of the burn, however, did not impact the site greatly as the only visible effects are a number of partially burned trees in the general area of the site. Despite the severity of the burn in the area, the site was not impacted by suppression or rehabilitation activities.

LA 89771. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In this visit, as well as the Cerro Grande Fire revisit, the site was identified as a dam made from piled earth and reinforcing boards constructed for a stock tank/reservoir during the Manhattan Project period. The historic structure is approximately 30 m long on a southwest-northeast axis, and is 3.0 m wide at the northeast end, 5.1 m wide in the middle, and 4 m wide at the southwest end. There are two to four eroded areas (possible sluices) in the dam. In the 1992 visit, four ponderosa pines were visible as part of the dam construction; these burned during the Cerro Grande Fire. LA 89771 is located in a mixed ponderosa pine forest and piñon-juniper woodland, with a small amount of scrub oak in the area. The area around the site was severely burned during the fire as is evidenced by stump holes in the site area, the loss or architectural wood associated with the dam, and a number of partially burned trees and residual snags in the general area of the site. Because of the severity of the burn in the site area, both suppression and rehabilitation activities were undertaken in the form of tree felling.

LA 89772. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In this visit, as well as the Cerro Grande Fire revisit, the site was identified as a drainage/water-control feature that was constructed during the Manhattan Project period. The water-control feature is approximately 9.9 m long on the north-south axis and runs across a drainage that flows east-west. In the 1992 visit, the feature consisted of timbers, logs, and unshaped tuff blocks; the majority of the wooden components burned in the Cerro Grande Fire. LA 89772 is located in a ponderosa pine forest with a moderate amount of scrub oak in the area. The area around the site was severely burned during the fire as is evidenced by cracking, spalling, and soot damage on the masonry blocks, stump holes in the site area, the loss or architectural wood associated with the water-control feature, trees that have fallen on the structure, and snags and partially burned trees that are both in the general area of the site and have the potential to further damage the structure in the future. Despite the numerous effects from the fire, suppression impacts were not visible and rehabilitation activities were not undertaken at the site.

LA 89773. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In this visit, as well as the Cerro Grande Fire revisit, the site was identified as a drainage/water-control feature that was constructed during the Manhattan Project period. The water-control feature consists of a pile of unshaped rubble and earth and a rock alignment. In the 1992 visit, the feature also contained two tree stumps, but these were likely burned in the Cerro Grande Fire. LA 89773 is located in a ponderosa pine forest with a moderate amount of scrub oak in the area. The area around the site was severely burned during the fire as is evidenced by cracking, spalling, and soot damage on the masonry blocks; stump holes in the site area; the loss of architectural wood associated with the water-control feature; trees that have fallen on the structure; and snags and partially burned trees that are in the general area of the site and have the potential to further damage the structure. Because of the extensive damage at the site, rehabilitation activities were undertaken. To prevent further damage to the water-control feature, a number of trees were felled in the vicinity of the site. There were no suppression impacts at the site.

LA 131234. Before the Cerro Grande revisit, the site was most recently surveyed in March 2000 (Masse et al 2001). In this visit, as well as the Cerro Grande Fire revisit, the site was identified as consisting of three historic storage structures dating to the Manhattan Project period. These structures are identified as "bomb huts"—that is, wooden storage structures that contained casings and other such components of nuclear weapons prior to their assembly. These three storage units are referred to as Structures A, B, and C. Structures A and B were completely burned during the Cerro Grande Fire, and only small, isolated portions remain. Structure C escaped direct fire effects and appears to be mostly undisturbed (Figure 12.9). The structures are located in the ponderosa pine forest, and there is some scrub oak in the area. The area around the site was moderately burned during the fire, and a significant amount of architectural wood was lost, specifically that associated with Structures A and B (Figure 12.10). Despite significant losses from the fire itself, the site was not impacted by suppression or rehabilitation activities.

Figure 12.9. LA 131234, Structure C after the Cerro Grande Fire.

Figure 12.10. LA 131234, A. Madsen at Structure B after the Cerro Grande Fire.

TA-9

LA 89834. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. In both visits, the site was identified as a Manhattan Project period artifact scatter. Items at the site include bottle glass, metal cans, metal fragments, and areas of poured concrete. The scatter has been disturbed by an old gas line corridor and by recent road shoulder construction activities. LA 89834 is located in a mixed ponderosa pine and piñon-juniper area. The area around the site was moderately burned during the fire. The effects are evidenced by approximately 10 partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

TA-69

LA 89827. Before the Cerro Grande revisit, the site was most recently surveyed in 1993. In both visits, the site was identified as a Manhattan Project period water-control feature. The site is located in a streambed within a mixed ponderosa pine and piñon-juniper area. Site items include a metal pipe and a vertical ceramic pipe, as well as a concrete slab. The concrete slab is mostly buried in the stream channel under boulders and sediments. Archaeologists visiting the site during the Cerro Grande revisit could not locate a "wooden cover." It is presumed that this washed away during the floods after the fire (such as occurred for the previously discussed Anchor Ranch Ice House) or was burned during the fire itself. The area around LA 89827 was minimally burned during the fire. The effects are evidenced by the possible loss of architectural features (wooden cover) and five partially burned trees in the site area. The site was not impacted by suppression or rehabilitation activities.

Manhattan Project and Early Cold War Fire Effects in Facility Management Unit 80 (FMU-80)

Only one Early Cold War period archaeological site (and no Manhattan Project sites) in FMU-80 was identified as being directly impacted by the Cerro Grande Fire. Table 12.7 lists the site that was impacted by the Cerro Grande Fire and the specific type of damage sustained. The site and the damage are then discussed in further detail.

Table 12.7. Early Cold War Period Site in FMU-80 Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced Erosion
69	89820A&B	None	No	No	No	No	No	No	No	No	Yes	No	Yes

TA-69

LA 89820A and B. The site, situated in a ponderosa pine forest area, is identified as a Manhattan/Cold War structure. Previously identified in 1996, the site consists of two components. The first component includes two cement structures (component A1 and A2) and associated trash and structural debris. The second component is a "rock" mound (component B) containing red bricks and milled lumber. The Cerro Grande Fire did not burn through this area and the cement structures are not disturbed, however a fire suppression road has bisected the mound. The mound is located 20 m to the southeast of provenience A2. During the Cerro Grande revisit, LA 89820A and B (the cement structures and the mound) were treated as a single site. Low-level erosion, the result of the road cut, affects the site.

Manhattan Project and Early Cold War Fire Effects in Rendija Canyon

No known Manhattan Project or Early Cold War period archaeological sites are present within Rendija Canyon.

SPECIFIC FIRE EFFECTS ON HISTORIC PERIOD ARCHAEOLOGICAL SITES OF UNDETERMINED AFFILIATION

Historic Period Undetermined Affiliation Fire Effects in Engineering Sciences and Applications Division (ESA)

There was a single Historic period archaeological site of undetermined affiliation identified within ESA as being impacted by the Cerro Grande Fire. This is listed in Table 12.8 and is described below.

Table 12.8. Historic Site of Undetermined Affiliation in ESA Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/ partial burned trees in site area	Other	Suppression	Rehabilitation	Enhanced erosion
16	136851	Moderate	No	No	No		No	No	No	No	No	No	No	No

TA-16

LA 136851 (TK-4). The site is a trail that runs along the west-facing slope of the canyon between buildings TA-16-410 and TA-16-370. The trail is not rock cut, it is visible in the sediments. The trail runs for about 150 m northwest-southeast. Three recent-looking (less than 100 years) cairns help to delineate the boundaries of the trail. Site burn severity is moderate, but the fire did not affect the trail. There is no recommended treatment for this site.

Historic Period Undetermined Affiliation Fire Effects in Dynamic Experimentation Division (DX)

A total of five Historic period archaeological sites of undetermined affiliation were identified within DX as being directly impacted by the Cerro Grande Fire. As noted earlier, the intensity of the Cerro Grande Fire in DX ranged from low to severe. Table 12.9 lists the sites that were impacted by the Cerro Grande Fire and the specific type of damage sustained. The sites and damage are then discussed in further detail.

Table 12.9. Historic Sites of Undetermined Affiliation in DX Directly Impacted by the Cerro Grande Fire.

Technical Area	LA or Temporary Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced Erosion
9	89838	Severe	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No
9	136831	Severe	No	No	No	No	No	No	No	Yes	No	No	No
14	136832	Moderate	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes
15	Q-134	Severe	No	No	No	No	Yes	No	No	Yes	No	No	No

TA-9

LA 89838. Before the Cerro Grande revisit, the site was most recently surveyed in 1996. In both visits, the site was identified as a Historic period rock feature consisting of a small, somewhat curved alignment of flat, tabular, rhyolitic slabs piled four courses high (Figure 12.11). The alignment appears to represent some sort of hunting blind or windbreak. Based on the presence of axe cut timbers, the site was assigned to the Historic period. The site is located in a mixed ponderosa pine and piñon-juniper woodland area. The area around LA 89838 was severely burned during the Cerro Grande Fire as is evidenced by cracking, spalling, and soot staining on a large percentage of the masonry blocks; stump and root holes both on the site itself and in the immediate area around the site; the loss of architectural wood that was referenced in the 1996 visit; and partially burned trees both on the site itself and in the general site area. Despite the severe burn, however, the site was not impacted by suppression or rehabilitation activities.

LA 136831 (TK-20). LA 136831 was first identified during the survey undertaken as part of the assessment of damage done to archaeological sites during the Cerro Grande Fire. During inspection, the site was identified as a temporally undetermined wagon road segment. Rusted wire and broken glass were identified on the sides of the road, but it could not be determined if the artifacts were related to the road. The road itself has been stabilized near the creek bed near the site, and it appears as though it is used today as a fire road. LA 136831 is located in an area of scrub oak and ponderosa pine forest that was severely burned during the fire. The degree of the burn is evidenced by a high number of snags and partially burned trees in the general vicinity of the site. The site was not impacted by suppression or rehabilitation activities.

Figure 12.11. LA 89838, a Historic period rock feature after the Cerro Grande Fire.

TA-14

LA 136832 (TK-21). The site was first identified during the Cerro Grande Fire assessment survey. During inspection, the site was identified as an undetermined Historic period road segment. No associated artifacts were visible on the surface. LA 136832 is located in a moderately burned scrub oak and ponderosa pine forest. The degree of the burn severity is evidenced at the site in the form of cracking, spalling, and soot damage on tuff cobbles along the road; by numerous stump/root holes; and by approximately 20 snags and partially burned trees in the general vicinity of the site. Additionally, the site was impacted by both suppression and rehabilitation activities as several of the downed trees in the area were felled and wattles were placed across the surface of the road segment.

TA-15

Q-134. Before the Cerro Grande revisit, the site was most recently surveyed in 1992. Q-134 is located in a mixed ponderosa pine and piñon-juniper area. The site was identified as an undetermined Historic period structure. The site was described as a possible pen or temporary rectangular structure made out of logs laid on top of each other. The logs were two to four courses high, and the structure was three-sided with the south side absent. Some historic artifacts, including a lard can and several food cans, were identified in the vicinity. Due to the proximity of LA 136948, a Homestead period bridge and trash dump, it is quite possible that Q-134 dates to the same period, but this could not be verified. The site was not formally recorded at the time of its discovery in 1992. During the 2001 revisit, the site could not be

relocated despite an extensive search. It is presumed that the logs, and thus the structure itself, were destroyed during the fire as the area around the site was severely burned. The effects of the burn are evidenced by approximately 50 snags and partially burned trees in the site area. The site area was not impacted by suppression or rehabilitation activities. Because of the lack of formal recording prior to destruction, a Laboratory of Anthropology (LA) number has not been assigned to the site.

Historic Period Undetermined Affiliation Fire Effects in Facilities Management Unit 80 (FMU-80)

Only one Historic period site of undetermined affiliation in FMU-80 was identified as being directly impacted by the Cerro Grande Fire. Table 12.10 lists the site that was impacted by the Cerro Grande Fire and the specific type of damage sustained. The site and the damage are then discussed in further detail.

Table 12.10. Historic Site of Undetermined Affiliation in FMU-80 Directly Impacted by the Cerro Grande Fire.

Technical Area	LA Number	Degree of Burn	Cracking or spalling on masonry	Smoke or soot damage on masonry	Stump or root holes on or adjacent to masonry	Additional stump or root holes in site area	Loss of architectural wood or features	Fallen tree(s) on walls or rubble	Snags/partial burned trees that can damage structures	Additional snags/partial burned trees in site area	Suppression	Rehabilitation	Enhanced erosion
60	89778	Moderate	Yes	Yes	No	Yes	No	No	No	Yes	No	No	Yes

TA-60

LA 89778. Before the Cerro Grande revisit, the site was most recently visited in 1992. The site was identified as a Historic period water-control feature (dam/pond) constructed from axe-cut timbers, earth, and rock. The topography on site slopes to the north-northeast. No artifacts were visible on the surface and therefore the site's cultural affiliation is uncertain. However, due to the proximity of the site to a large homestead (LA 30640), the dam/pond can be reasonably hypothesized to be directly associated with the homestead.

LA 89778 is located in a portion of the technical area that saw a moderate degree of burning during the fire. The axe-cut timbers identified during the 1992 survey were not identified during the revisit, suggesting they may have burned. Additionally, the site has been impacted by the fire in other ways as is evidenced by cracking and spalling on approximately 25% of the masonry. In addition, there is smoke and soot damage on much of the masonry, numerous stump holes in the site area, and several snags or partially burned trees surround the site. A large ponderosa pine has fallen approximately 10 m north of the water-control feature, but it is not directly impacting the site. The berm of the feature is eroding away, and several snags could affect the preservation of this feature. Removal of the snags may or may not help. The site was not impacted by suppression or rehabilitation activities.

Historic Period Undetermined Affiliation Fire Effects in Rendija Canyon

No Historic period archaeological sites of undetermined affiliation were identified within Redija Canyon as being impacted by the Cerro Grande Fire.

IMPACTS OBSERVED AT HISTORIC PERIOD ARCHAEOLOGICAL SITES NOT RELATED TO THE CERRO GRANDE FIRE

In addition to damage sustained as a direct result of the Cerro Grande Fire, assessment efforts also included the documentation and recording of damage sustained either as an indirect result of fire activities or from other factors. Damage to these sites occurred, or is currently occurring, primarily due to natural erosion activities. In some cases, the Cerro Grande Fire has exacerbated prior erosion problems. Tables 12.10 through 12.12 lists the historic sites in the facility management units that are currently sustaining damage from non-fire related impacts, or natural erosion enhanced by the Cerro Grande Fire. It is noted that sites falling into this category were not documented for ESA.

Table 12.11. Historic Sites in DX with Impacts not Related to the Cerro Grande Fire.

Technical Area	LA Number	Non-Fire Related Impacts
6	21334	Low-level erosion; fear that foundation will move downslope
6	86771	Moderate to high erosion; pedestalling present and no duff at site
6	89772	Low-level erosion
6	89773	Low-level erosion
6	131233	Low-level erosion from active gully scouring in the bottom of the wash
6	131236	Low-level erosion; the potential for sheet erosion exists at the site
8	16808	Moderate to high erosion with drainages running throughout the extent of the site area; potential for reservoir to flood and damage associated structures
8	89825	Low-level erosion as there are three erosional gullies that cut the road
8	89826	Moderate to high erosion; the wood bridge that was situated across drainage has been washed away
8	89829	Low-level erosion with shallow SE trending slope
8	89830	Moderate to high erosion as site is located on slope adjacent to gully on bedrock
9	21297	Low-level erosion as site slopes to south and surface is covered with duff
14	21298	Low-level erosion as site is on a slight slope
14	136832	Moderate to high erosion with arroyos in the area approaching 50 cm deep
22	89769	Moderate to high erosion as site is located in a north-south trending gully
40	136861	Low-level erosion, especially at the mesa edge
69	89827	Moderate to high erosion as the site is located in a stream bed

Table 12.12. Historic Sites in FMU-80 with Impacts not Related to the Cerro Grande Fire.

Technical Area	LA Number	Non-Fire Related Impacts
5	136724	Low-level erosion
50, 55	131237	Trash deposit should be subject to infield analysis, possible excavation of cistern and dugout
69	89818	Moderate to high threats from erosion, artifacts are on a slope
69	89819	Low-level erosion, artifacts are in a diffuse drainage
69	89822	Low-level erosion, artifacts are in drainages although surface is duff covered

Table 12.13. Historic Site in Rendija Canyon with Impacts not Related to the Cerro Grande Fire.

Technical Area	LA Number	Non-Fire Related Impacts
Rendija Canyon	70026	Erosional threat: high (in canyon bottom)

RECOMMENDED TREATMENTS TO MINIMIZE FIRE-RELATED IMPACTS AT HISTORIC PERIOD ARCHAEOLOGICAL SITES

Treatment is recommended for several of the Historic period sites assessed in the four facility management units. This information is summarized below in Tables 12.14 through 12.17. The technical area in which the site is located, the site type, the type of action suggested for the site, and a general description of the action are all included in the tables. Figure 12.12 shows LA 131236, one of the five historic sites in DX recommended for treatment. This site is typical of historic artifact scatters where the burning of the duff and the complete burning of trees and their roots have impacted both the surface and subsurface character of the deposits.

It is noted that the treatment recommended for these historic sites is different and separate from that of the ongoing program of rehabilitation of Native American archaeological sites discussed in the next chapter (Chapter 13).

It is also noted that we attempted to recover dendrochronological samples from every fire-impacted historic Homestead period site where it seemed practical and appropriate to do so. A large number of samples were taken from burned fence posts and the remnants of log structures (such as cabins and bridges). The results of the analysis of these samples are provided in Appendix I.

Table 12.14. Historic Period Sites with Recommended Treatment in ESA.

Technical Area	LA Number	Site Type	Type of Action to be taken at Site	Recommended Treatment
16	16807	Homestead	Treatment	Remove felled trees and dead trees in site area

Table 12.15. Historic Period Sites with Recommended Treatment in DX.

Technical Area	LA Number	Site Type	Type of Action to be taken at Site	Recommended Treatment
6	131236	Artifact scatter	Data Recovery	In-field surface analysis and data collection of pertinent items (see Figure 12.12)
9	89838	Rock feature	Treatment and Data Recovery	Fell 1 to 3 trees in the area of the site, and collect a dendro sample for the wooden beam fragment
14	21298	Historic structure	Treatment	Cut down and remove some of the severely burned trees that may further damage the site
22	86643	Historic structure	Treatment	Cut down trees in feature corral
22	89769	Artifact scatter	Treatment	Place one wattle upslope of trash scatter and one downslope of scatter

Figure 12.12. LA 131236, with stump holes in the artifact scatter.

Table 12.16. Historic Period Sites with Recommended Treatment in FMU-80

Technical Area	LA Number	Site Type	Type of Action to be taken at Site	Recommended Treatment
50, 55	131237	Homestead	Data Recovery	Trash deposit should be subject to infield analysis, possible excavation of cistern and dugout; fencing of the cistern and dugout
60	30640	Homestead	Treatment	Put a fence around the perimeter of the site
60	89776	Homestead	Treatment	Site perimeter needs to be fenced, as it is immediately adjacent to a log chipping station

Table 12.17. Historic Period Site with Recommended Treatment in Rendija Canyon

Technical Area	LA Number	Site Type	Type of Action to be taken at Site	Recommended Treatment
Rendija Canyon	85407	Homestead	Data Recovery	Collection of dendrochonological samples for possible dating of the homestead

Chapter 13

Ancestral Pueblo Site Rehabilitation

W. Bruce Masse

A major goal of the CGFA Project was the development of various specific rehabilitation measures by which to minimize the damage caused to Ancestral Pueblo archaeological sites by the Cerro Grande Fire and its aftermath, and to provide long-term protection for these important cultural resources. This task was (and will be) achieved by using a four-step process that included two separate evaluations (the second of which was itself divided into two separate phases): the actual implementation of mitigation (rehabilitation) measures and a long-term monitoring program to review the success of the rehabilitation measures.

The initial evaluation was conducted by the LANL CRMT archaeologists between October 2000 and April 2002. The fieldwork methods are summarized in Chapter 5 of this report, and the findings and recommendations are summarized in Chapters 6 through 10. This critical effort provided important baseline data regarding the types and extent of fire damage at each assessed site and yielded an initial set of recommendations for rehabilitation.

Archaeologists are broadly trained in a variety of ecological and environmental disciplines. However, as the first evaluation progressed, it soon became apparent that the lack of specific training in forestry management and environmental engineering hampered our efforts at devising a consistent set of rehabilitation recommendations. For example, as pointed out in Chapter 5, it was not possible to develop a reliable set of standards by which to measure erosion that could be consistently applied at each site by the various field teams; although we were able to rate the threats on a relative scale, “low, moderate, and high.” In a similar vein, we also recommended snag removal and tree thinning at each site in a conservative manner, suggesting that only those trees and snags that were actually on a site mound itself should be removed.

Also during the first evaluation phase, the CRMT began discussions with the managers of the overall LANL CGRP about the possibility of involving our Pueblo neighbors in the rehabilitation of their ancestral sites. The CGRP immediately saw the value of such involvement both in terms of allowing members of the Pueblos to view and work at sites long closed to their access, and in terms of some degree of economic development for the people involved in these efforts. Most importantly, the involvement of tribal members enabled the Pueblos to provide an important perspective on the cultural resources at LANL based on their own historical knowledge that is sometimes missing from, but is complementary to, that of western science.

The CGRP in concert with CRMT contacted the Governors of the Pueblos of San Ildefonso, Santa Clara, Cochiti, and Jemez to discuss their involvement in the rehabilitation efforts. After a series of meetings,

the four Pueblos decided to work in concert with the CRMT to help rehabilitate these important Ancestral Pueblo cultural resources.

To this end, LANL set up direct contracts with the four Pueblos, which represent the first such Native American contracts in the history of LANL, through the auspices of the CGRP. This collaboration was purposefully expanded by CGRP to include aspects of forestry and erosion control management outside of the boundaries of the archaeological sites. As a result, the contracts have become a significant component of the overall CGRP efforts at LANL. This innovative and unique collaborative project is being conducted at Ancestral Pueblo sites through the period of April 2002 to September 30, 2003.

Because Pueblo rehabilitation crews had not previously viewed the sites included in this study, the CGRP contracts involved the establishment of a Cultural Resources Assessment Team (CRAT) from the Pueblos of San Ildefonso and Santa Clara. The CRAT consists of tribal cultural specialists, and forestry and erosion control experts, assisted by specialists from the LANL CGRP and the CRMT.

During April and May 2002, the CRAT reevaluated 72 cultural sites included in the present report, specifically in TA-5, TA-49, TA-60, and Rendija Canyon. In September and October 2002 the CRAT reevaluated 46 additional sites in DX and ESA contained in this report. The 118 sites were selected by the CGFA Project director, W. Bruce Masse. The selection process was based on the findings and recommendations of the initial CRMT evaluations, the consideration of perceived cultural sensitivities that might be associated with the sites, and the results of discussions with foresters and erosion control experts within CGRP. The final list of sites selected for CRAT evaluation differed somewhat from the field recommendations for site rehabilitation contained in this report, especially by the inclusion of sites where snags were present away from rubble mounds. As previously stated, originally, CGRP field crews recommended snag removal only when snags were actually on site mounds themselves. CRAT also includes all sites that have any fire related erosion, while CGRP recommendations were only for sites with moderate to high threats from erosion.

The report generated by the CRAT for the 72 sites in Rendija Canyon and TA-5, TA-49, and TA-60 includes a discussion of "cultural sensitivities" for each site along with specific and general recommendations for rehabilitation (CRAT 2002). These recommendations include the placement of a total of 244 straw wattles, the use of over 24 ac of native seed, the removal of hundreds of trees and snags, and the placement of 32,330 linear feet of wire fence. A substantial portion of the fencing was recommended in the form of district fences that enclose more than a single site. These district fences take into account various aspects of cultural sensitivities and the need for site protection. Because of the nature of the cultural sensitivities for the Pueblos, CRAT and CGRP decided to classify the CRAT (2002) report as "Official Use Only" so that only facility managers and other persons with a "need to know" would have access to its contents and recommendations.

The second phase of the CRAT evaluation, which began in September 2002, is currently ongoing as of the publication of the present report (October 2002). The second phase will be immediately followed by actual site rehabilitation accomplished by Pueblo crews. The rehabilitation includes an ambitious program of rehabilitation and protection at selected Ancestral Pueblo archaeological sites on LANL property impacted by the Cerro Grande Fire. This consists of the removal of snags and fallen trees, the thinning of some live trees at the individual sites and the scattering of the slash from these trees, filling in stump holes, implementing erosional control measures (such as the use of straw wattles and the sowing of native seed), and the construction of fences and other protective measures for sites situated near fire roads and in the vicinity of designated emergency operations areas. These rehabilitation measures are being conducted using hand equipment to prevent inadvertent damage to the sites by motorized vehicles and other heavy equipment.

The final management task of both the rehabilitation project and the CGFA Project is to design and implement a long-term site monitoring program. This program will be used not only to monitor the damage incurred by selected archaeological sites, but also to judge the overall success of the archaeological site rehabilitation program itself. Annual repeat photography is anticipated to be combined with other measures to track significant changes in the character of individual sites over a period of several years. The results of the monitoring program, like that of this initial damage assessment, will be made available to our Pueblo neighbors and can be made available to other land management agencies upon request.

Chapter 14

Management Considerations

W. Bruce Masse, Brian C. Harmon, and Jennifer E. Nisengard

Wildfires continue to be a major threat to both cultural and natural resources at LANL. Weather conditions characteristic of the Pajarito Plateau, specifically periods of drought and high winds, are factors that play important roles in the potential for such destructive fires as the Cerro Grande Fire. No one could have anticipated the devastation caused by the Cerro Grande Fire; however, now that the potential of such a natural disaster has been witnessed, there are precautions that can be taken not only to help prevent such problems, but also to ensure that the Laboratory is better equipped to deal with such events in the future. Although we did have archaeologists out with firefighting crews, for a variety of reasons our ability to protect cultural remains from the Cerro Grande Fire was minimal.

LANL has already initiated a series of important steps that will help to reduce the potential for serious damage to cultural resources from future wildfires and other natural disasters in the vicinity of the Laboratory. These include a major tree-thinning program, which includes approximately 10,000 ac of Laboratory land, the construction of a new Emergency Operations Center to better coordinate emergency activities, and additional controls on the logistics surrounding the use of camps for emergency field crews.

As we have learned from the Cerro Grande Fire, even low-intensity fires can have detrimental impacts to certain classes of cultural resources. These impacts include the effects of the fire itself on wooden and masonry structural remains, the effects of unrestricted suppression activities, and the potential long-term effects of fire for localized flooding and erosion. Therefore, the information included in this report can be used as both a reference guide and a management tool even for those situations in which proactive long-term wildfire management is being actively pursued.

LESSONS LEARNED

Preparation of this report has provided many lessons about wildfires; fire impacts to cultural resources; and efficient and effective ways to evaluate, record, and analyze such impacts. With the help of sufficient funding, and a great deal of support from LANL and DOE, the CRMT has been fortunate for the opportunity to assess the damage to a large number of sites within a concentrated area on the landscape. As previously stated, wildfires, regardless of size, can have a serious impact on archaeological and historic sites. As we discussed in Chapters 5 and 6, the kinds of impacts are quite variable and influenced by multiple factors, including site type and location. By analyzing these factors and understanding which kinds of sites will sustain severe damage during a wildfire, we can begin to develop a working strategy for managing and protecting sites during such natural disasters. As discussed in Chapters 7–11, masonry

structures and historic wooden structures tended to suffer the most severe damage, while cavates and artifact scatters sustained alternative impacts. We can therefore use this information to prioritize site protection measures in the event of a future wildfire.

Increased threats from erosion appear to be one of the most common wildfire impacts and, because they are hard to assess, they are also the most difficult to mitigate. The CGFA Project Team had great difficulty creating a useful and meaningful characterization of "erosional threats." We had several areas on the assessment form to provide specific information about the erosion at a site, including the degree of the slope upon which a site sits, an area to describe gullies in the site vicinity, and scouring. Ultimately, because there was such variation among the crews in this category, we have only been able to state that a site is subject to some degree of erosional threats.

Field crews used the categories "none, low, and moderate to high" to qualify the threat from erosion. We sometimes found it difficult to determine whether or not the threat was the result of the Cerro Grande Fire or simply the result of natural processes of erosion. Determining the duration of a threat also proved complicated; for instance, once ground vegetation and duff are replaced in burn areas, will sites be protected from erosion once again? To date, this issue has not been resolved, and for this reason we must work with other groups to develop methods for quantifying the threat that can then be used to create meaningful data concerning these impacts. In the interim, we will continue with monitoring and rehabilitation efforts that help to protect sites from existing threats.

MANAGEMENT STRATEGIES

There are four major management tasks that the fire assessment team hopes to accomplish in the next several years in terms of understanding and dealing with the Cerro Grande Fire at LANL. The first task is to conduct further analyses of the data gathered during the fire assessment project. These data will be included in summary reports, like this one, or in specific topical reports intended to assist resource managers at LANL and to provide insights into wildfire management that may be of use to other land management agencies.

The second management task, which has already begun, is the ambitious program outlined in Chapter 12, of rehabilitation and protection at selected Ancestral Pueblo archaeological sites on LANL property impacted by the Cerro Grande Fire. This program includes removal of snags and fallen trees, filling in stump holes, implementing erosional control measures (such as the use of straw wattles and the sowing of native seed), and the construction of fences and other protective measures for sites situated near fire roads and in the vicinity of designated emergency operations areas. As previously mentioned, these rehabilitation measures are being conducted using hand equipment to prevent inadvertent damage to the sites by motorized vehicles and other heavy equipment.

An important aspect of the rehabilitation project is that of cooperation with our neighbors from the Pueblos of San Ildefonso, Santa Clara, Cochiti, and Jemez. To this end, LANL set up direct contracts with the four Pueblos, through the auspices of the CGRP, to have them assist in the process of forest and cultural site rehabilitation. In forming this partnership, we specifically acknowledged that it was important to make every attempt to include the Pueblos in the management of their ancestral sites.

The third management task is to conduct immediate (within the next few years) albeit limited data recovery in conjunction with the heavily damaged Homestead period sites. As noted in Chapter 11, such data recovery has already begun with the collection of a number of tree-ring specimens for dendrochronological analyses from burned homestead cabins, fences, and related structures (Appendix I). In addition, there is the need to initiate detailed surface analysis and possible data recovery excavations in

those homestead artifact scatters that were impacted by the burning of surface duff and tree roots. The present evidence suggests that the exposure to fire has caused many classes of artifacts (such as glass and metal) in these deposits to begin a rapidly escalating cycle of degradation and decomposition; the fire largely destroyed other artifact classes including leather, wood, and botanical remains.

The fourth and final management task, as noted in Chapter 12, is to design and implement a long-term site monitoring program. This program will be used not only to monitor the damage incurred by selected archaeological sites, but will also be used to judge the overall success of the archaeological site rehabilitation program itself. We expect to use annual repeat photography together with other measures to track significant changes in the character of individual sites. This monitoring effort will be integrated into the larger program of archaeological site monitoring at the Laboratory as part of the LANL Cultural Resources Management Plan.

An emphasis must also be placed on the importance of public outreach and education. Many of the people who worked to control the Cerro Grande Fire were not familiar with the cultural resources characteristic of the Pajarito Plateau and as a result some sites sustained non-fire related damage. The CRMT must ensure that facility managers and emergency response crews are aware of what an archaeological site looks like and the most effective ways to protect such sites. However, even well-trained and -educated emergency crews are no match for proactive management strategies, which help to reduce the potential for future fires and other natural disasters that may impact cultural resources.

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APPENDIX I

Dendrochronology of LANL Homestead Sites Impacted by the Cerro Grande Fire

Jeffrey S. Dean, Laboratory of Tree-Ring Research (Arizona)

[In January 2002, 57 archaeological tree-ring samples were sent to the University of Arizona Laboratory of Tree-Ring Research from Homestead period sites that were impacted by the Cerro Grande Fire. The following discussion and data are extracted and edited from correspondence provided to the LANL CRMT in a letter from Dr. Jeffrey S. Dean, dated May 3, 2002. Along with the results of the analyses of these 57 samples, Dr. Dean provided a summary of the analyses and results of 96 samples earlier submitted for the Victor Romero Cabin (LA 16806), which for convenience are included in this appendix. The Romero Cabin was originally situated in TA-55, but in 1987 was dismantled, moved, and reconstructed at its current location near the Fuller Lodge in the Los Alamos town site. The reader is referred to Foxx and Tierney (1999:63–70); and Masse et al. (2001)—Ed.]

Here are the results of our analyses of 57 archaeological tree-ring samples from seven historical homestead sites on LANL land. Included are date lists, species identification forms, and a key to the symbols appended to the dates. The 57 samples have been incorporated into the Laboratory of Tree-Ring Research existing Los Alamos Cabins site category (New Mexico I 77) and assigned LAC numbers in our Douglass Collection catalog (Table Appendix 1.1). Earlier collections from Los Alamos historical sites produced dates and are included here.

LA 16806 (Victor Romero Cabin)

We have three collections from the Romero Cabin (LA 16806) site. In July 1981, Charlie Steen submitted eight samples from the cabin (Feature 1), one from Feature 2 (which we discarded because it was too fragmentary to use), and one from the east fence (Accession A-576). These samples yielded the six dates reported on the A-576 date list. In June 1985, Dave Snow of Cross-Cultural Research Systems submitted 54 samples from the cabin (A-683). The 50 dates derived from these samples are on the A-683 date list. In November 1985, Snow submitted 32 samples that he and Ellen McGehee collected from Feature 2 (the hog pen). The 28 dates resulting from this analysis are given on the A-702 date list.

The distribution of cutting dates identifies six different wood procurement episodes for the logs from the cabin (Feature 1):

(1) As indicated by its incomplete terminal ring, ROM 25 was acquired during the ponderosa pine growing season (summer) of 1913. The dying or already dead ROM 1 element could have been

acquired at the same time as ROM 25. Alternatively, ROM 1 may have been obtained at the same time as other 1908 logs at this site and the David Romero homestead.

(2) The mixture of complete and incomplete terminal rings places acquisition of 31 logs in the spring of 1934 when 29 ROM trees with incomplete terminal rings dated to 1934 had begun growing and two trees (ROM 10 and LAC 3) with complete terminal rings dated to 1933 had not.

(3) An incomplete terminal ring series indicates that the ROM 37 tree was felled during the ponderosa pine growing season (summer) of 1935.

(4) Plus symbols suggest that three additional logs (ROM 38, 40, and 49) were obtained in the spring of 1938.

(5) A cluster of incomplete terminal rings near (+) cutting dates at 1960 and 1961 specifies wood procurement in the summer of 1961.

(6) Finally, nine cutting dates with complete terminal rings identify trees felled sometime after the ponderosa pine growing season of 1966, that is, between September 1966 and June 1967. The early non-cutting (vv) dates from Steen's samples probably reflect the erosion of rings from the exteriors of logs obtained during the 1934 tree felling event.

Deciding how these dates relate to construction episodes in the history of the cabin depends on the specific proveniences of the dates. The tree-ring evidence alone suggests some possibilities that can be evaluated against more complete data. It's high likely that the many logs obtained in spring 1934 were used in the initial construction of the cabin or, perhaps, in a major addition. Based on Snow's submission letter, the 1908 and/or 1913 logs likely were salvaged from older contexts and reused in 1934. The 1938 timbers may represent additions to the structure built in 1934, or all the 1930s logs may have been stockpiled for major construction in 1938. The two 1960s clusters could indicate separate additions in 1961 and 1966-1967, or the 1961 logs could have been stockpiled for use in 1966-1967.

Six or seven tree felling episodes are evident in the dates from Feature 2 (hog pen):

(1) Single trees were cut in the summers of 1894 and 1895.

(2) Single trees were cut in the summers of 1894 and 1895.

(3) A cluster of one near (+) cutting date at 1906 (ROM 65), one non-cutting date at 1907 (ROM 56), and one cutting date at 1908 (ROM 74) probably represent three trees cut together in the summer of 1908.

(4) One tree (ROM 63), a rare Douglass-fir, was cut in the summer of 1910.

(5) A strong cluster comprising one non-cutting date at 1910 (ROM 86) and 18 cutting dates at 1912 places a major wood procurement episode in 1912. Terminal rings show this event to have occurred at the end of the growing season when some trees had stopped growing for the year (those with complete terminal rings) and others (those with incomplete terminal rings) had not. These trees, therefore, were felled in August or September of 1912.

(6) Two later non-cutting dates place one or two minor wood procurement events no earlier than the 1920s and 1930s.

Dendrochronologically speaking, the hog pen probably was built in autumn of 1912. Logs acquired before 1912 probably were salvaged from older contexts and reused in the pen. The two younger dates probably represent minor repairs to the structure at least as late as 1931.

LA 131237 (David Romero/McDougall/Roybal Homestead --- originally designated LA 16806B)

Ten dates were derived from samples collected from Feature 4 (corral) at the David Romero Homestead (LA 16806B) by Ellen McGehee in July 1990 (A-930). A tight cluster of three non-cutting (LAC 16, 17, and 23) and two cutting (LAC 21 and 24) dates between 1906 and 1908 places wood procurement for the

corral in 1908. Incomplete terminal rings on the two cutting date samples place tree felling during the ponderosa pine growing season, that is, the summer of 1908. Exterior ring loss caused by weathering easily could account for the differences between these dates and 1908.

LA 16808 (Anchor Ranch)

One (LAC 52) of the six ponderosa pine samples from the Anchor Ranch (LA 16808) icehouse has a tight ring series that cannot be dated. A sample previously collected by Steen (LAC 13) produced a complete terminal ring cutting date that places tree felling after the 1929 growing season, that is, between September 1929 and June 1930. Three samples (LAC 54-56) yielded complete terminal ring cutting dates that place the felling of these trees between September 1933 and June 1934, roughly the same time as wood procurement for the Victor Romero cabin (LA 16806). Double plus (+ +) symbols suggest that two samples (LAC 57 and 53) represent deadwood elements from trees that died of natural causes in the late 19th or early 20th century. Interestingly, LAC 53 comes from the same tree as LAC 34 from the Homestead Bridge (LA 89826), which establishes a direct link between the bridge and Anchor Ranch.

LA 21334 (Sanchez y Montoya Homestead)

Two samples (LAC 35 and 36/37) from the Sanchez *y* Montoya Homestead (LA 21334) could not be dated. One sample (LAC 38) from the garden fence yielded a date of 1915 with a "+ +" symbol that suggest a deadwood element acquired after the tree died of natural causes. The canyon fence produced four non-cutting dates ranging from 1746 to 1840. Note that weathering and/or burning have removed the sapwood from all of these samples. Depending on the age of the tree, this could mean that the ponderosa pines have suffered the removal of 50 to 100 exterior rings. Therefore, the garden fence postdates 1915 by some years, and the canyon fence postdates 1840 by a period of unknown but substantial length.

LA 70028 (Vigil *y* Montoya Homestead)

Fourteen of the 19 samples from the Vigil *y* Montoya Homestead (LA 70028) failed to date for one or various combinations of the following conditions: too few rings, tight ring series, and serious false ring problems. Two elements from Feature 3 (LAC 79/80) came from a single tree that was felled an unknown number of years after 1855. The heartwood-sapwood boundary (HW/SW) dated at 1746 suggests that this (1855) may be fairly close to a cutting date. A "+ +" symbol suggests that Feature 4 South Log (LAC 73) represents an element acquired from a dying or dead tree in 1911 or sometime thereafter. The absence of sapwood indicates that LAC 81 (north of Feature 6) was felled many years after 1833. A similar lack of sapwood places acquisition of LAC 68 from the surface of Feature 7 many years after 1720. The "+ +" symbol suggests that LAC 64 from Northwest of Collection Grid A comes from a tree that was dying or already dead in 1963. About all that can be said from this array of dates is that there was some wood procurement activity as late as 1911 and possibly as late as 1963.

LA 85407 (Serna Homestead)

Although four samples from the Serna Homestead (LA 85407) dated, they all lack sapwood and, therefore, each was felled many years after its date.

LA 86643 (Gomez Homestead)

Unfortunately, all seven samples from the Gomez Homestead (LA 86643) are juniper fence posts that have highly erratic ring series at best with severe false ring problems; therefore, none of them could be dated.

LA 89770 (Homestead Boundary Fence)

Three samples from the boundary fence between the Gomez and Sanchez *y* Montoya homesteads (LA 8977) have too few rings to be dated. Although the remaining six samples dated, they all lack sapwood. Thus, about all that can be said is that the fence was built (or repaired) many years after 1890.

LA 89826 (Homestead Bridge)

Two ponderosa pine samples from the Homestead Bridge (LA 89826) have short and/or erratic ring series that cannot be dated. The third sample (LAC 34) produced a "+ +" date that may have come from a tree that was dying or dead of natural causes when it was harvested in or after 1899. A different element from the same tree occurs in the Anchor Ranch Ice House.

EXPLANATION OF TABLE SYMBOLS

The following symbols apply to Table Appendix 1.1 as follows:

The symbols used with the inside date are:

- year = no pith ring present
- p = pith ring present
- fp = the curvature of the inside ring indicates that it is far from the pith
- ±p = pith ring present, but due to the difficult nature of the ring series near the center of the specimen, an exact date cannot be assigned to it. The date is obtained by counting back from the earliest dated ring.
- ± = the innermost ring is not the pith ring and an absolute date cannot be assigned to it. A ring count is involved.

The symbols used with the outside date are:

- B = bark present
- G = beetle galleries are present on the surface of the specimen
- L = a characteristic surface patination and smoothness, which develops on beams stripped of bark, is present
- c = the outermost ring is continuous around the full circumference of the specimen. This symbol is used only if a recent section is present.
- r = less than a full section is present, but the outermost ring is continuous around available circumference
- v = a subjective judgment that, although there is no direct evidence of the true outside on the specimen, the date is within a very few years of being a cutting date
- vv = there is no way of estimating how far the last ring is from the true outside
- + = one or more rings may be missing near the end of the ring series whose

presence or absence cannot be determined because the specimen does not extend far enough to provide an adequate check

- ++ = a ring count is necessary due to the fact that beyond a certain point the specimen could not be dated

The symbols B, G, L, c, and r indicate cutting dates in order of decreasing confidence, unless a "+" or "++" is also present.

The symbols L, G, and B may be used in any combination with each other or with the other symbols except "v" and "vv". The "r" and "c" symbols are mutually exclusive, but may be used with L, G, B, "+" and "++". The "v" and "vv" are also mutually exclusive and may be used with the "+" and "++". The "+" and "++" are mutually exclusive but may be used in combination with all other symbols.

Table Appendix 1.1. Dendrochonological Results Associated with LANL Homesteads

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
V. Romero Cabin LA 16806	Cabin	ponderosa	1908++	ROM-1	
" "	Cabin	ponderosa	1961+v	ROM-2	
" "	Cabin	ponderosa	1966rLB	ROM-3	
" "	Cabin	ponderosa	1966rLGB	ROM-4	
" "	Cabin	ponderosa	1934rB	ROM-5	
" "	Cabin	ponderosa	1934r	ROM-6	
" "	Cabin	ponderosa	1934r	ROM-7	
" "	Cabin	ponderosa	1934G	ROM-8	
" "	Cabin	ponderosa	1934r	ROM-9	
" "	Cabin	ponderosa	1933v	ROM-10	
" "	Cabin	ponderosa	1960+v	ROM-11	
" "	Cabin	ponderosa	1934v	ROM-12	
" "	Cabin	ponderosa	1934r	ROM-13	
" "	Cabin	ponderosa	1934rB	ROM-14	
" "	Cabin	ponderosa	1934rB	ROM-15	
" "	Cabin	ponderosa	1960+B	ROM-16	
" "	Cabin	ponderosa	1934r	ROM-17	
" "	Cabin	ponderosa	1934v	ROM-18	
" "	Cabin	ponderosa		ROM-19	Too short
" "	Cabin	ponderosa		ROM-20	Too short
" "	Cabin	ponderosa	1966r	ROM-21	
" "	Cabin	ponderosa	1934r	ROM-22	
" "	Cabin	ponderosa	1934v	ROM-23	
" "	Cabin	ponderosa	1966rB	ROM-24	
" "	Cabin	ponderosa	1913G	ROM-25	
" "	Cabin	ponderosa	1934r	ROM-26	
" "	Cabin	ponderosa	1934v	ROM-27	
" "	Cabin	ponderosa	1934r	ROM-28	
" "	Cabin	ponderosa	1934r	ROM-29	
" "	Cabin	ponderosa	1934r	ROM-30	
" "	Cabin	ponderosa	1934r	ROM-31	

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Cabin	ponderosa	1934r	ROM-32	
" "	Cabin	ponderosa	1934rB	ROM-33	
" "	Cabin	ponderosa	1934rB	ROM-34	
" "	Cabin	ponderosa	1934rB	ROM-35	
" "	Cabin	ponderosa	1934rB	ROM-36	
" "	Cabin	ponderosa	1935rG	ROM-37	
" "	Cabin	ponderosa	1937G	ROM-38	
" "	Cabin	ponderosa	1966rLGB	ROM-39	
" "	Cabin	ponderosa	1938G	ROM-40	
" "	Cabin	ponderosa	1960+v	ROM-41	
" "	Cabin	ponderosa	1966rLB	ROM-42	
" "	Cabin	ponderosa	1966rB	ROM-43	
" "	Cabin	ponderosa	1934rG	ROM-44	
V. Romero Cabin LA 16806	Cabin	ponderosa	1934r	ROM-45	
" "	Cabin	ponderosa	1934v	ROM-46	
" "	Cabin	ponderosa	1934v	ROM-47	
" "	Cabin	ponderosa	1934v	ROM-48	
" "	Cabin	ponderosa	1937+rG	ROM-49	
" "	Cabin	ponderosa		ROM-50	Too short
" "	Cabin	ponderosa	1966r	ROM-51	
" "	Cabin	ponderosa	1961+rLB	ROM-52	
" "	Cabin	ponderosa		ROM-53	Same tree as #45
" "	Cabin	ponderosa	1934r	ROM-54	
				ROM-55	
" "	Hog Pen	ponderosa	1907vv	ROM-56	
" "	Hog Pen	ponderosa	1912B	ROM-57	
" "	Hog Pen	ponderosa	1931vv	ROM-58	
				ROM-59	
" "	Hog Pen	ponderosa	1912G	ROM-60	
" "	Hog Pen	ponderosa	1895rG	ROM-61	
				ROM-62	
" "	Hog Pen	Douglas fir	1910r	ROM-63	
" "	Hog Pen	Ponderosa	1912G	ROM-64	
" "	Hog Pen	Ponderosa	1906+rG	ROM-65	
" "	Hog Pen	Ponderosa	1912LB	ROM-66	
" "	Hog Pen	ponderosa	1912G	ROM-67	
" "	Hog Pen	ponderosa	1912G	ROM-68	
" "	Hog Pen	ponderosa	1912G	ROM-69	
" "	Hog Pen	ponderosa	1912G	ROM-70	
" "	Hog Pen	ponderosa	1912G	ROM-71	
" "	Hog Pen	ponderosa	1894r	ROM-72	
" "	Hog Pen	ponderosa	1912GB	ROM-73	
" "	Hog Pen	ponderosa	1908G	ROM-74	
" "				ROM-75	

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Hog Pen	ponderosa	1912r	ROM-76	
" "	Hog Pen	ponderosa	1912rG	ROM-77	
" "	Hog Pen	ponderosa	1898++vv	ROM-78	
" "	Hog Pen	ponderosa	1922++vv	ROM-79	
" "	Hog Pen	ponderosa	1912rG	ROM-80	
" "	Hog Pen	ponderosa	1912GB	ROM-81	
" "	Hog Pen	ponderosa	1912rLB	ROM-82	
" "	Hog Pen	ponderosa	1912G	ROM-83	
" "	Hog Pen	ponderosa	1912rG	ROM-84	
" "	Hog Pen	ponderosa	1912G	ROM-85	
" "	Hog Pen	ponderosa	1910vv	ROM-86	
" "		ponderosa	1776+p – 1908vv	LAC-1	
				LAC-2	
" "		ponderosa	1829p – 1933rGB	LAC-3	
V. Romero Cabin LA 16806		ponderosa	1776+p – 1892vv	LAC-4	
" "		ponderosa	1863 – 1926vv	LAC-5	
" "		ponderosa	1816 – 1932vv	LAC-6	
" "		ponderosa	1873 – 1934vv	LAC-7	
				LAC-8	
				LAC-9	
				LAC-10	
				LAC-11	
				LAC-12	
D. Romero Cabin LA 131237	Corral	ponderosa	1798p – 1884vv	LAC-15	
" "	Corral	ponderosa	1797p – 1906vv	LAC-16	
" "	Corral	ponderosa	1835p – 1906vv	LAC-17	
" "	Corral	ponderosa	1787p – 1883vv	LAC-18	
" "	Corral	ponderosa	1792p – 1853vv	LAC-19	
" "	Corral	ponderosa	1809p – 1898vv	LAC-20	
" "	Corral	ponderosa	1837p – 1908rG	LAC-21	
" "	Corral	ponderosa	1841p – 1898vv	LAC-22	
" "	Corral	ponderosa	1804p – 1908vv	LAC-23	
" "	Corral	ponderosa	1810p – 1908v	LAC-24	
Anchor Ranch LA 16808	Ice House	ponderosa	1806p – 1929GB	LAC-13	
				LAC-14	
" "	Ice House	ponderosa		LAC-52	Compressed ring series
" "	Ice House	ponderosa	1783p – 1899++rLGB	LAC-53	Same as LAC-54 (Bridge)
" "	Ice House	ponderosa	1822p – 1933rLGB	LAC-54	Compressed W side

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Ice House	ponderosa	1798p – 1933rLGB	LAC-55	Compressed W side
" "	Ice House	ponderosa	1878p – 1933rLGB	LAC-56	Compressed S side
" "	Ice House	ponderosa	1790p – 1896++rLGB	LAC-57	Compressed S side
Sanchez *y* Montoya Homestead LA 21334	Garden Fence	ponderosa		LAC-35	Too short (23 rings). Broken BE
" "	Garden Fence	ponderosa		LAC-36	Too short (29 rings). Axe cut BE
" "	Garden Fence	ponderosa		LAC-37	Too short (29 rings). Axe cut BE
" "		ponderosa	1794 – 1915++vv	LAC-38	
" "		ponderosa	1707p – 1777vv	LAC-39	
" "		ponderosa	1687p – 1746vv	LAC-40	
" "		ponderosa	1687p – 1791vv	LAC-41	
" "		piñon	1749p – 1840vv	LAC-42	
Vigil *y* Montoya Homestead LA 70028	Feature 1	ponderosa		LAC-62	Compressed
" "	SW corner	ponderosa		LAC-63	Compressed
" "	N&W of collection grid	ponderosa	1836p – 1963++G	LAC-64	HW/SW at 1874
" "	Feature 7	ponderosa		LAC-65	Too short (27 rings). No sapwood
" "	Feature 7	ponderosa		LAC-66	Too short (32 rings). No sapwood
" "	Feature 7	juniper		LAC-67	False rings
" "	Feature 7	piñon	1562 – 1720vv	LAC-68	No sapwood
" "	Feature 7	ponderosa		LAC-69	Too short (43 rings). No sapwood
" "	Feature 7	ponderosa		LAC-70	Too short (33 rings). No sapwood
" "	Feature 6	ponderosa		LAC-71	Too short (30 rings). No sapwood
" "	Feature 6	ponderosa		LAC-72	No sapwood
" "	Feature 4	ponderosa	1836p – 1911++G	LAC-73	HW/SW at 1843
" "	Feature 4	ponderosa		LAC-74	Short. False rings. No sapwood
" "	Feature 4	ponderosa		LAC-75	Too short (18 rings). No sapwood
" "	Feature 4	ponderosa		LAC-76	No sapwood
" "	Feature 4	ponderosa		LAC-77	Too short (23 rings). No sapwood

Table A.1.1. (cont.)

Site Name and LA Number	Feature Type	Species	Date	Lab. No	Remarks
" "	Feature 4	ponderosa		LAC-78	Compressed. No sapwood
" "	Feature 3	ponderosa	1650p – 1855+vv	LAC-79	HW/SW at 1746
" "	Feature 3	ponderosa	1650p – 1855+vv	LAC-80	HW/SW at 1746
" "	Feature 6	ponderosa	1759p – 1833vv	LAC-81	No sapwood
Serna Homestead LA 85407	Wood pile, SE corner	ponderosa	1769 – 1815vv	LAC-58	No sapwood
" "	Wood pile, SE corner	ponderosa	1754p – 1819vv	LAC-59	No sapwood
" "	Structure, W side	ponderosa	1685 – 1792vv	LAC-60	No sapwood
" "	Fence Line	ponderosa	1780p – 1826vv	LAC-61	No sapwood
Gomez Homestead LA 85407	Fence Line	juniper		LAC-25	Erratic. False rings
" "	Fence Line	juniper		LAC-26	Erratic. False rings
" "	Fence Line	juniper		LAC-27	Erratic. False rings
Gomez Homestead LA 85407	Fence Line	juniper		LAC-28	Erratic. False rings
" "	Fence Line	juniper		LAC-29	Erratic. False rings
" "	Fence Line	juniper		LAC-30	Erratic. False rings
" "	Fence Line	juniper		LAC-31	Erratic. False rings
LA 89770 (Gomez/Sanchez *y* Montoya Boundary Fence)	Fence Line	ponderosa	1793p – 1831vv	LAC-43	No sapwood
" "	Fence Line	ponderosa	1777p – 1820+vv	LAC-44	No sapwood
" "	Fence Line	ponderosa	1796p – 1834vv	LAC-45	No sapwood
" "	Fence Line	ponderosa	1793p – 1831vv	LAC-46	No sapwood
" "	Fence Line	ponderosa		LAC-47	Too short (17 rings). No sapwood
" "	Fence Line	ponderosa		LAC-48	Too short (37 rings). No sapwood
" "	Fence Line	ponderosa	1775p – 1837vv	LAC-49	No sapwood
" "	Fence Line	ponderosa		LAC-50	Too short (27 rings). No sapwood
" "	Fence Line	ponderosa	1809p – 1890vv	LAC-51	No sapwood
LA 89826 (Homestead Bridge)	Bridge	ponderosa	1783p – 1899++rLGB	LAC-34	Same as LAC-53 (Anchor Ranch)
" "	Bridge W log	ponderosa			Short. Erratic
" "	Bridge E log	ponderosa			Erratic