

# The Effects of Fire on Cultural Resources Mesa Verde National Park, Colorado

Kathleen Fiero<sup>1</sup>

---

**Abstract.**—In 1989 the Long Mesa fire burned approximately 3000 acres in Mesa Verde National Park, Colorado. The fire spread along the top of Long Mesa and the adjacent canyons covering an area containing approximately 200 known archeological sites. Because of the concern for cultural resources, all fire lines and similar earth moving tasks were done by hand with an archeologist on each crew. No heavy equipment was used. The archeological sites in the burn area varied from prehistoric to historic, isolated hearths to surface pueblos and cliff dwellings. A resurvey of the burn area was undertaken to evaluate the extent of fire damage. The direct effects of the fire varied from very minimal impact on buried sites to complete loss for historic wood structures. Two rooms in cliff dwellings burned. During this resurvey, 23 previously unidentified sites were recorded. A project to stabilize cliff dwellings in the burn area was undertaken as was a study of the effects of fire retardant on pottery sherds. Three natural resource studies were also funded: a vegetation map, a fire history study, and a vegetation and fuels inventory.

---

## INTRODUCTION

Mesa Verde National Park is located in south-western Colorado on the northeast edge of the Colorado Plateau. The park was established in 1906, ten years before the National Park Service, to preserve and protect the cultural resources located within its boundaries. The park contains 52,000 acres and the vast majority of this area has been surveyed by an archeologist. Approximately 4,000 sites have been recorded. These sites vary from large cliff dwellings to one and two room storage units, from masonry pueblos to dirt walled pithouses. There are also wood sweat lodges, fence posts and cabins. The great majority of the sites are a manifestation of the Northern San Juan Basin Anasazi tradition and date from AD 600-1300 but there are a few earlier Archaic sites and a few that date to the historic period, AD 1860s to the present.

Mesa Verde was well named by some unknown Spaniard. The flat cuesta that slopes gradually to the south is indeed green. There are three main vegetation communities in the park: piñon-juniper woodland which is dominant at the south end of

the mesa, mountain shrub at the north end of the mesa, and Douglas fir on the north facing escarpment.

Fires have been suppressed in the park since its establishment in 1906. Consequently high fuel loads have developed in many areas of the park. There have been several major fires in the park: 1934, 1959, 1972. The last major fire, the Long Mesa fire, was in 1989.

## THE LONG MESA FIRE

The Long Mesa fire burned approximately 3000 acres. The fire started in a dense stand of piñon-juniper (fig. 1) and spread north moving into the mountain shrub community and finally burned itself out descending the north escarpment in a Douglas fir community. The fire started on a hot, dry, windy day in early July and burned for two weeks. The effects of this fire on the park's cultural resources will be discussed in terms of the direct effects of the fire, and the effects of fire suppression activities.

---

<sup>1</sup>Archeologist, National Park Service, Mesa Verde National Park, Mesa Verde, CO.

## Fire Suppression

Two key management decisions had a big impact on the effects of the fire on cultural resources. One decision was to fight the fire by hand—no heavy equipment was used. This decision was based on previous fire experience in Mesa Verde and in other park service areas with high densities of cultural resources, a common attribute of piñon-juniper woodlands in the Southwest. The second important decision was to assign an archeologist to each fire crew. Each archeologist was given a copy of the cultural resource base map for the area where they were working. Initially the archeologists were sent out with each crew to flag fire lines but as the fire was being fought, this changed to flagging areas to be avoided by line work, i.e. flagging the sites. Also all fire fighters were told of the significance of the cultural resources and the importance of avoiding damage to these resources. Because all work was done by hand and because there was an archeologist on each crew, there was virtually no damage to the cultural resources by fire suppression activities. Only two sites were damaged and in both cases the damage was very minor, one upright slab was chipped and one stone was displaced from a wall. There was no vandalism and no artifact piles. The only graffiti noted was minor and was not in the vicinity of a site. It is worth noting that the archeologists found that keeping ahead of the fire crews, flagging sites, was easier during the fire than during mop-up when people were spread much thinner over the landscape.

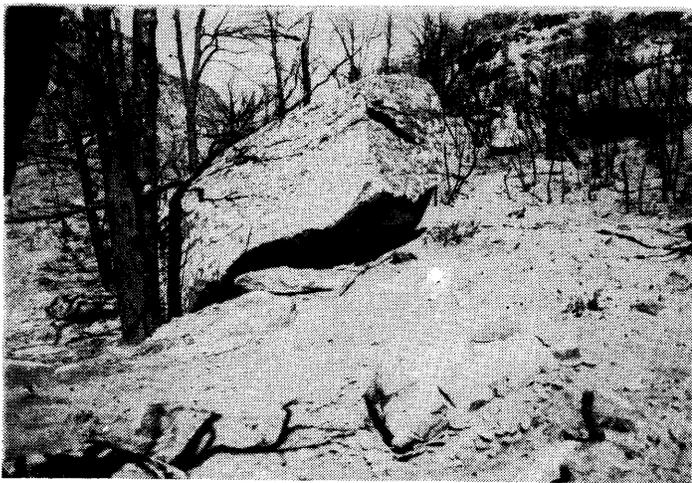


Figure 1.—This photograph shows the typical condition of the piñon-juniper woodland after the Long Mesa fire. Note the burned piñon pine and serviceberry and the heavily spalled sandstone boulder.

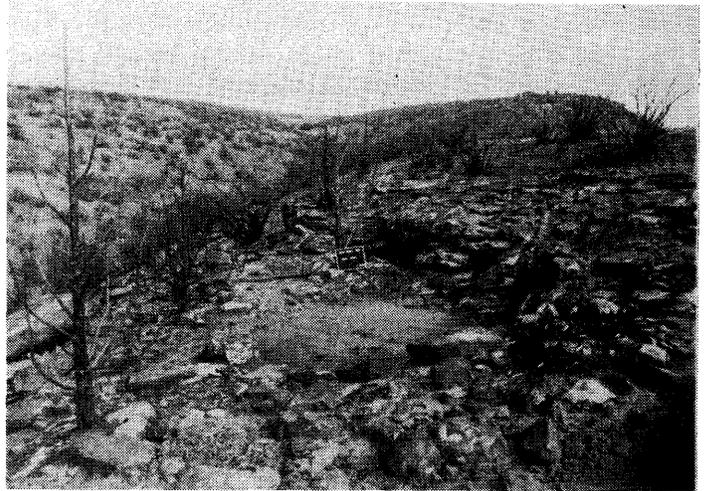


Figure 2.—The condition of a mesa top pueblo after the fire. The pueblo is located in the mountain shrub community.

## Post-Fire Survey

Immediately after the fire was officially out, an archeological survey of the burn area was initiated. By overlaying a map of the burn area on the cultural resource base map, it was known that 194 recorded archeological sites were in the burn area. These sites varied from hearths to large pueblos, from surface sites to cliff dwellings, from prehistoric to historic structures. Of the 194 sites, 165 were relocated. Two of the 29 sites that were not relocated were probably consumed by the fire (wood structures). The others may have been missed because after the fire it was not easy to locate metal site stakes amongst all the ash and burned trees and bushes. Also some of these sites may have been misplotted originally or damaged by road maintenance between the time of the original survey and this resurvey. Twenty-three previously unrecorded sites were located and recorded during this survey. Most of these sites were located in areas that had been covered by a dense growth of shrub (better known as *Quercus goddardiana* to archeologists) and after the fire the sites in these areas were much easier to see.

Of the 188 sites evaluated for fire damage in the burn area (Eining 1990:32), 49 (26%) were missed by the fire, 71 (38%) suffered low damage, 32 (17%) moderate damage, and 36 (19%) high damage. The 29 sites that were not relocated were not evaluated and so are not included in these totals. If any of these were totally consumed by the fire, as two may have been since they were wood structures, this would increase the percentage of sites in the high category. Of these 36 located sites suffering high damage, four were totally destroyed, and one

room in two different cliff dwellings burned. The four totally destroyed sites were wood sweat lodges. Pack rat debris in the two cliff dwellings caught fire and resulted in incredibly hot fires burning in those rooms. Factors involved in defining low, moderate and high damage included fire intensity, vegetation loss, impact to artifacts, damage to rubble and amount of site area affected by the fire (ibid:11). The high category (fig. 2) covered such observations as vegetation on the site totally burned, soil and rock oxidized, spalling of exposed stone, scorched artifacts (ibid:32). Low was used to refer to sites that were partially or wholly burned over but with little visible impact because of low fire intensity. Moderate was somewhere between these extremes.

On the basis of this survey, sites were recommended for rehabilitation work: erosion control, water diversion, stabilization. Eighteen cliff dwellings in the burn area were stabilized in 1989 and 1990 and water diversion measures were taken as needed at these sites (Fiero 1991). Two talus slope sites were seeded. This was the only intervention in the burn area. No other seeding, planting or other erosion control measures were undertaken. There was above average moisture in the fall, winter and spring of 1989/90 and vegetation returned to the burn area very rapidly.

### Studies Undertaken as a Result of the Fire

Oppelt and Oliverius (1993) studied the effects of fire retardant on sherds and concluded that it was minimal. The amount of duff around the sherd was the critical variable in determining how smoke blackened the particular sherd became. Floyd-Hanna, Romme, and Hanna (1994) completed a vegetation and fuels inventory of the park, Romme and Hanna developed a vegetation map, and Floyd-Hanna and Romme (1993) studied the park's fire history by dating oak. There has been no research into the effect of slurry on stone, wood, ceramics. Duncan (1990) compiled an annotated bibliography on the effect of fire on cultural resources.

### Actions Taken by the Park

The park now has a fire management officer who is responsible for fire suppression activities in the park. The park policy is still to put out all fires as soon as is practical and every summer there is a helicopter and helitac crew in the park for this

purpose. There is also a fuel reduction crew in the park in the summer. They reduce fuel loads around park buildings by cutting trees and shrubs and removing the wood by hand. Park buildings have been prioritized as to their importance (Research Center which houses the archeological collections first, Museum second, etc.) and fuels are reduced around buildings based on this schedule.

## CONCLUSIONS

Those archeological sites which are the most vulnerable to damage from a wildfire (see also Romme, Floyd-Hanna, Conner 1993) are wood structures such as hogans, cabins, fence lines. Also very vulnerable to fire damage are rock art panels because of rock spalling, and cliff dwellings which contain combustible material. Less vulnerable to damage in a fire are lithic scatters and water control devices such as check dams. Those sites with the least vulnerability to fire are buried unexcavated pueblos and pithouses. As important as site type in surviving a fire, is the type of fire suppression activities which take place during a fire. On the basis of the Long Mesa fire, there is no question that the lack of bulldozers and other heavy equipment and the use of archeologists on the fire lines reduced the amount of damage to the cultural resources.

## LITERATURE CITED

- Duncan, Faith L. 1990. Long Mesa Fire 1989. Fire Effects and Cultural Resources: An Annotated Bibliography. Ms on file Research Center, Mesa Verde National Park, Colorado.
- Eininger, Susan. 1990. Long Mesa Fire 1989: Archeological Survey and Post-Fire Assessment. Ms on file Research Center, Mesa Verde National Park, Colorado.
- Fiero, Kathleen. 1991. The 1989 Long Mesa Fire. Archeological Rehabilitation, Report on Stage II: Ruin Stabilization. Ms on file Research Center, Mesa Verde National Park, Colorado.
- Floyd-Hanna, Lisa, William H. Romme. 1993. Fire Effects and Fire History of Mesa Verde National Park. Final Report. Ms on file Research Center, Mesa Verde National Park, Colorado.
- Floyd-Hanna, Lisa, William H. Romme, David D. Hanna. 1994. Vegetation and Fuels Inventory of Mesa Verde National Park. Ms of file Research Center, Mesa Verde National Park, Colorado.
- Oppelt, Norman I and Timothy Oliverius. 1993. The Effects of Fire Retardant Foam on Prehistoric Potsherds. *Southwest Lore*, Vol. 59, No. 1, pp 26-30.
- Romme, William H., Lisa Floyd-Hanna and Melissa Connor. 1993. Effects of Fire on Cultural Resources at Mesa Verde NP. *Park Science*, summer, pp 28-30.