ENVIRONMENTAL ASSESSMENT
U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

HAZARD FUEL REDUCTION PLAN

SPRUCE TREE HOUSE AND PETROGLYPH POINT

Mesa Verde National Park
Montezuma County, Colorado

July 1998
ENVIRONMENTAL ASSESSMENT

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Mesa Verde National Park
1998

Summary

In 1993, Mesa Verde National Park implemented a Hazard Fuel Reduction Plan in an effort to protect structures and other facilities in the developed areas of the park. The severe and irreversible damage done to the park's cultural resources at Battleship Rock and other sites in Soda Canyon by the 1996 Chapin 5 wildfire has compelled the National Park Service to extend its hazard fuel reduction strategies to include Ancestral Puebloan archeological sites, petroglyph panels, and other archeological resources. In 1997, a hazard fuel assessment was completed that identified the park's cultural resource sites at greatest risk from wildfire. The cliff dwelling at Spruce Tree House and the petroglyph panel at Petroglyph Point were determined to be at greatest immediate risk.

The highly flammable nature of the woodlands and shrublands of Mesa Verde National Park guarantees that more wildfires will occur here. The National Park Service proposes to mechanically thin the forested cover in front of both sites. Less woody fuel next to these sites would reduce the risk that enough heat would be generated, in the event of a wildfire in this section of Chapin Mesa, to irreparably damage these internationally recognized resources. This environmental assessment compares the likely consequences of this plan (Alternative B) and that of continuing the current strategy of simply waiting for the next fire (Alternative A).

Alternative B is the preferred action for the following reasons:

1. Spruce Tree House and Petroglyph Point would be less likely to be damaged by a wildfire.

2. Alteration of the native vegetation cover would be minor, limited in scope, and have no significant impacts on wildlife and other natural resources.

3. Inconveniences to park visitors would be brief and limited to just two sites among many that are available to the public.

Mechanical fuel reduction would result in temporary disturbance to natural quiet, local air quality, soil, vegetation, and wildlife habitat. There would be no impacts to threatened or endangered species. No floodplains or wetlands are involved. Impacts to surface water should be minimal, short-term, and acceptable. No significant cumulative impacts were identified.
The sites have been surveyed for archeological, ethnographic, and historic resources. Consultation over this plan will be conducted with the Colorado State Historic Preservation Office, the Advisory Council on Historic Preservation, and the U.S. Fish and Wildlife Service. All 24 American Indian tribes affiliated with Mesa Verde National Park will be notified of this plan.

The majority of the project area is located in one of the most heavily visited sites in the park. Spruce Tree House may have to be closed to public visitation for approximately three days and the trail to Petroglyph Point for almost one week during the fall season. Numerous similar sites would remain open to the public to serve substitute interpretive opportunities. No significant impact would be experienced on the social or economic level.

Public comments on this project will be accepted through August 24, 1998. Address comments to:

Superintendent
Mesa Verde National Park
PO Box 8
Mesa Verde, Colorado 81330
TABLE OF CONTENTS

INTRODUCTION

Summary .................................................................................................................. i
Park Purpose and Significance ................................................................................. 1
Purpose and Need for this Plan ................................................................................ 1

ALTERNATIVES CONSIDERED

Alternative A: No Action ....................................................................................... 4
Alternative B: Mechanical Hazard Fuel Reduction .......... 4
Alternative Considered but Rejected: Prescribed Fire ........................................... 9

AFFECTED ENVIRONMENT

Cultural Resources .................................................................................................. 10
Visitor Use and Park Management ........................................................................... 10
Vegetation and Fire History ..................................................................................... 11
Threatened and Endangered Species ...................................................................... 13
Wildlife ...................................................................................................................... 13
Water, Wetlands, and Floodplains .......................................................................... 14
Geology and Soil ........................................................................................................ 14
Air Quality and Viewshed ........................................................................................ 14

ENVIRONMENTAL CONSEQUENCES

Impacts of Alternative A: No Action ...................................................................... 15
Impacts of Alternative B: Mechanical Hazard Fuel Reduction ........................... 17

CONSULTATION AND COORDINATION ................................................................. 21

PLANNING TEAM .................................................................................................... 21

REFERENCES ........................................................................................................... 22

LIST OF MAPS

Vicinity Map: Mesa Verde National Park ................................................................ iii
Fires Greater Than 24.00 Acres: Mesa Verde N. P. (1934-1996) ....................... 3
Spruce Tree House Vicinity ....................................................................................... 5
Spruce Tree House Sketch Map ............................................................................... 6
INTRODUCTION

Park Purpose and Significance

Mesa Verde National Park was created on June 29, 1906 to preserve from injury or spoilation the ruins and other works and relics of prehistoric man contained within the established boundaries (see enabling legislation: 34 Stat. 616). Under the National Park Service's Organic Act of 1916 (Public Law 235, 39 Stat.535) the purpose of the park was expanded to "...conserve the scenery, natural and historic objects and wildlife..." and to provide for their enjoyment in a manner that would leave them unimpaired for future generations.

NPS-18 (Wildland Fire Management Guideline) states, "The fire management program, carefully guided by resource management objectives, should protect cultural resources and perpetuate the natural resources and their associated natural processes."

The Resource Management Plan for Mesa Verde National Park (1991) states, "the uniqueness of Mesa Verde National Park as the only national park in the National Park Service devoted primarily to cultural themes is a reflection of the exceptional importance of its cultural resources. This is further indicated in the recognition of Mesa Verde National Park as a World Heritage Cultural Site."

As a signatory to the Convention for the Protection of World Cultural and Natural Heritage (entered into force on December 17, 1975), the United States Government, through its agencies, such as the National Park Service, "...recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of cultural and natural heritage referred to in Articles 1 and 2 and situated on its territory belongs primarily to that State. It will do all it can to this end, to the utmost of its own resources and, where appropriate, with any international assistance and cooperation, in particular, financial, artistic, scientific and technical, which it may be able to obtain." (Part II, Article 4.)

Purpose and Need for this Plan

The current wildland fire management plan for Mesa Verde National Park was approved in 1993 and meets the standards set in the 1990 revision of NPS-18.

Continued action is needed to reduce the possibility of wildfire threatening life, property, and resources in Mesa Verde National Park. In order to accomplish this objective, the National Park Service has begun implementing a program to reduce the accumulation of forest fuels in and around developments on Chapin and Wetherill Mesas and at Far View and Morefield campground and village. This objective will be accomplished through a combination of mechanical removal and management ignited prescribed fire.
In 1993, Mesa Verde National Park implemented a Hazard Fuel Reduction Plan in an effort to protect structures and other facilities in the developed areas of the park. The severe and irreversible damage done to the park’s cultural resources at Battleship Rock and other sites in Soda Canyon by the 1996 Chapin 5 wildfire has compelled the National Park Service to extend its hazard fuel reduction strategies to include Ancestral Puebloan archeological sites, petroglyph panels, and other archeological resources. In 1997, a hazard fuel assessment was completed that identified the park’s cultural resource sites at greatest risk from wildfire. The cliff dwelling at Spruce Tree House and the petroglyph panel at Petroglyph Point (formerly known as Pictograph Point) were determined to be at greatest immediate risk.

The potential for wildfire in Mesa Verde National Park and the impact such an event could have on private and public developments and resources has long been a concern of the National Park Service. Mesa Verde has been subject to periodic large, rapidly spreading, high intensity wildfires prior to and during historic times. Since 1934 large wildfires (greater than 2,000 acres) have occurred within the park every 15 years on average.
ALTERNATIVES CONSIDERED

Alternative A: No Action

The National Park Service would manage the vegetation around Spruce Tree House and Petroglyph Point the same way it has for decades. The trees and shrubs would continue to grow largely unhindered. The park would continue to stand alert to suppress wildfires that threaten these sites knowing that under certain climatic and seasonal conditions, it is unlikely that suppression efforts by man and technology would be able to stop a wildfire in this canyon when extreme fire behavior occurs.

Alternative B: Mechanical Hazard Fuel Reduction (Proposed Action)

The objectives of the hazard fuel reduction program are:

1. Reduce hazardous accumulations of live and dead woody fuels to minimize potential spread and intensity of wildfire, reduce potential adverse fire impacts on surface and subsurface cultural resources at Spruce Tree House and Petroglyph Point.

2. Maintain as closely as possible the historic environment consisting of natural native vegetation through practices which are commensurate with protection of the unique cultural resources of the park in keeping with the mandate of the park's enabling legislation to conserve "...the scenic, scientific, ...and other values..."

Spruce Tree House:

Estimated Fire Intensity: Extreme
Crowning Fire Potential: High
Overall Fire Potential: Extreme

During the month of April 1959, the park maintenance crews reduced fuels at Spruce Tree House for a "Vista Clearing Project." Before and after photographs contained within the Superintendent's Monthly Narrative Report for April, 1959 indicate that this fuel reduction was extensive. Many of the largest Douglas fir trees and many oak trees were removed.

The fuel type at Spruce Tree House is Douglas fir overstory with a closed canopy Gambel oak understory (Fuel Model 4). Flame lengths of up to 40 feet can occur in the understory oak fuel and can cause torching of the over 100-foot tall Douglas fir trees in the drainage. Fire rating potential indicates extreme fire behavior would occur in drought years on a dry day with a moderate wind.
The vicinity around Spruce Tree House would receive three treatments.

Primary Treatment Area:
- Remove the Douglas fir tree that is adjacent to the dwelling on the north end of the alcove.
- Mechanically thin all brush and pole-size trees (<15cm diameter at breast height [dbh]).
- Create a shaded fuel break using a 20-foot crown spacing formula for all mature oak trees (>15cm dbh); this includes all dead and down fuels.
- Retain all of the tallest Douglas fir trees, but cut the limbs up the trunks as high as can be safely reached to prevent a fire from climbing into the crowns. Remove all remaining intermediate sized Douglas fir trees only where they may pose a ladder fuel risk to the taller trees. Preserve sapling and seedling Douglas firs where they occur in a disbursed spacing to provide for a new generation.

Secondary Treatment Area:
- Mechanically thin all brush and pole-size trees (<15cm dbh).
- Retain all of the tallest Douglas fir trees, but cut the limbs up the trunks as high as can be safely reached to prevent a fire from climbing into the crowns. Remove all remaining intermediate sized Douglas fir trees only where they may pose a ladder fuel risk to the taller trees. Preserve sapling and seedling Douglas firs where they occur in a disbursed spacing to provide for a new generation.
- Create a shaded fuel break using a 40-foot crown spacing formula for all mature trees (>15cm dbh); this includes all dead and down fuels.

Spruce Tree House: Sketch map shows primary and secondary treatment areas for mechanical fuel load reduction.
Fuel Break Treatment Area:

Construct a fuel break approximately 300 yards down canyon from the Spruce Tree House alcove. Mechanically thin all live and dead woody vegetation 100 feet wide on both the west and east sides of the drainage connecting natural geographical features such as sandstone outcrops for use as natural fuel breaks.

Logistical Approach:

This plan assumes the use of a Type I hand crew (20-person team dedicated to fire fighting responsibilities for a whole season). The labor estimate is 525 work hours, or about 3½ workdays for a highly organized crew. Two garden tractors with trailers, 2 brush cutters, at least 2 chainsaws, and numerous hand tools would be necessary.

Debris and Slash Disposal (Primary and Secondary Treatment Areas):
- Haul all debris and slash to the "bus parking lot"; use it as a staging area to transfer slash and transport it to the permanent burn spot on Chapin Mesa.
- Maintain separate piles for brush and cordwood. All brush <4" in diameter should be burned and all >4" diameter wood should be sold as cordwood.
- On an annual basis use a weed whacker to maintain lowered a fuel load being careful not to harm Douglas fir seedlings and saplings where they occur in a disbursed spacing to provide for a new generation.

Debris and Slash Disposal (Fuel Break Treatment Area):
- All brush and "bucked up" logs should be scattered below the fuel break.
- On a biannual basis use a weed whacker to maintain a lowered fuel load.

Petroglyph Point:

| Estimated Fire Intensity: | Extreme |
| Crowning Fire Potential: | Extreme |
| Overall Fire Potential: | Extreme |

The petroglyph panel has a fuel type consisting of open canopy pinyon-juniper overstory with some very large Douglas fir trees and a closed canopy oak understory. MEVEFUEL Custom Fuel Model 28 indicates a maximum flame length of 42 feet. Fire rating potential indicates high to extreme fire behavior would occur in drought years on a dry day with moderate winds.

Treatment Area:

- Create a shaded fuel break 100 feet wide using a formula of 40 feet between crowns; this includes all dead and down fuels. Do not remove the largest Douglas fir tree directly in front of the site. Limb up that remaining Douglas fir tree as high as can be safely reached.
- Remove all dead and down fuels in the treatment area.
Logistical Approach:

This plan assumes the use of a hazard fuel crew or the same Type I hand crew being used at Spruce Tree House. The labor estimate for this site is 100 work hours.

Debris and Slash Disposal:
- All brush and "bucked up" logs should be carried down slope and scattered below the shaded fuel break.
- On a biannual basis use a weed whacker to maintain a lowered fuel load.

Soil Erosion and Water Quality:

There are no floodplains or wetlands within the vicinities of the two archeological sites being considered for fuel load adjustment. The sites would be monitored for increased rates of erosion after site treatments are completed. This can be done on a casual basis by requesting park staff to make observations during their normal work-related visits to the sites. Should localized higher rates of erosion occur as a result of fuel adjustments, it may be necessary to establish a formal monitoring system that includes small-scale site rehabilitation projects similar to those now being employed by Chapin 5 post-fire assessment crews, such as reseeding with native grasses and mulching.

Monitoring:

A qualified archeologist would be present at all times work is being performed around the sites. This archeological monitor must have site preservation and protection of other resources such as Threatened and Endangered Species and park species of special concern as the primary focus.

A casual biological monitoring program would be established to check for invasion of non-native species after work is completed. Significant invasion of non-native species has not occurred in areas at Mesa Verde where mechanical fuel load reduction has already taken place. In the unlikely event that invasive species do become a problem, a weed-control program would be initiated.

Work Crews:

Interagency fire crews would be used to accomplish fuel load reduction around these archeological sites. These crews would have some training in the delicacies of working around archeological remains, the locations of all plant species of special concern, and would understand the role of the archeological monitor while work is underway on the site. The make-up of this crew is uncertain at this time, however, it might be possible to acquire the services of a Type I hand crew (18-20 people). Using this method the work would be accomplished quickly, while still guaranteeing high quality work and excellent site preservation. This method would be especially useful at Spruce Tree House.
Alternative Considered but Rejected: Prescribed Fire

Management-ignited prescribed fire is a commonly used and accepted tool in managing vegetation and fuels. Prescribed fire is the intentional setting of a fire in a certain location under predetermined conditions that is expected to result in a desired outcome for the treatment area's vegetation. The project areas are very small and would require extensive line construction in order to prevent a prescribed fire from escaping containment. In addition, a fire, including a prescribed fire, could cause unwanted mortality among the pinyon pines, juniper trees, and antelope bitterbrush. Standing dead trees left inside the burn blocks would still represent hazardous fuels in the treatment area and would be less aesthetically pleasing to visitors. Finally, we have no conclusive knowledge of what the impacts may be to Spruce Tree House and Petroglyph Point from a less intense fire such as a prescribed burn. For these reasons, prescribed fire is not considered appropriate in this particular case.
AFFECTED ENVIRONMENT

Cultural Resources:

Spruce Tree House (5MV640) is a typical Pueblo III period cliff dwelling that was partially excavated by Nordenskiold in 1891 and again by Fewkes in 1908. Much of the site, however, is not excavated and considerable data potential remains, including an abundance of prehistoric wood, original plaster, and a midden. The site has several reconstructed kiva roofs and probably a few highly flammable packrat middens. Spruce Tree House is one of the most heavily visited sites in the world and represents high capital expenditure in terms of total excavation, stabilization, and interpretation costs. Although the historic Park Headquarters buildings are not part of the site, they are located immediately up slope and are in close proximity to Spruce Tree House. The high vulnerability of Spruce Tree House and adjacent Park Headquarters buildings makes this vicinity the highest priority area for fuel load adjustment within the park.

At Petroglyph Point, no other cultural resources are present besides the petroglyph panel (5MV1001). This panel is one of the largest assemblages of petroglyphs in Mesa Verde. The panel is showing some natural exfoliation at this time. The canyon below the site is very steep and deep, and contains a very high fuel load. This panel is extremely vulnerable to a large plume-dominated fire similar to the Chapin 5 Fire (1996), which severely damaged the Battleship Rock petroglyph panel by discoloring and exfoliating the rock surface, thus destroying the pecked figures. This site is listed as a high priority for fuel adjustment.

These two locations selected for reduction of hazardous fuels are World Cultural Heritage Sites and are listed in the National Register of Historic Places. Neither site has received previous treatment to guard against the possibility of wildfire. The recent fire history at Mesa Verde suggests that steps should be taken to protect these sites from wildfire.

The 24 American Indian tribes with ethnographic ties to Mesa Verde’s archeological sites and petroglyphs have stressed the importance of protecting these sites from damage.

Visitor Use and Park Management:

Spruce Tree House is open to the public all year and receives heavy visitation. Petroglyph Point is open to the public all year as weather permits, but receives far less visitation due to the distance needed to hike there.

In the interest of visitor safety and in consideration for the quality of the visitor experience, all fuel load reduction would take place in the fall when visitation begins to taper off from the summer rush. Access to each of the sites may be temporarily closed to the public, at least during tree felling and other dangerous stages of the operation.
Currently, the park stations a park ranger-interpreter at Spruce Tree House at all hours when the site is open to visitation. Annual site maintenance occurs on a regular basis including trail work. The park’s team of site stabilization specialists performs regular work maintaining the integrity of the masonry walls at Spruce Tree House and many other cliff dwellings in the park.

Because of its popularity and accessibility, Spruce Tree House experiences more human-caused noises than most of the park. The sounds of automobiles and peoples’ voices are commonly heard at this “frontcountry” site. Although not a truly “backcountry” site, Petroglyph Point is far enough away from Spruce Tree House that it experiences very little in the way of mechanical noises and far less in the way of human voices.

Vegetation and Fire History:

The project sites are located within the pinyon pine (Pinus edulis) and Utah juniper (Juniperus osteosperma) zone as described by Erdman (1970). Omi (1980) and Floyd-Hanna et al (1994) have further described the park’s vegetative communities. Climax pinyon-juniper woodland dominates the mesa top above the two project sites. Total fuel loading averages 35 tons per acre including an average of 8-9 tons per acre of dead and down wood. The elevation for the two sites is approximately 6,800 feet.

Over the course of the past 25 years, approximately 25% of Mesa Verde has burned. If this trend continues, nearly half of the acreage in the park would experience wildfire within a half-century. Omi (1980) suggested that about 95% of the wildfires at Mesa Verde originate in pinyon-juniper forest, probably as a result of high frequency lightning strikes. The present high density and closed canopy conditions of the pinyon-juniper forest at Mesa Verde also play a major role in an apparently increasing frequency and severity of wildfires. It is important to note that both of the archeological sites included in this plan are located within the pinyon-juniper community.

Intergrading with the pinyon-juniper woodland vegetation on the steep slopes below the mesa top where the project sites are located grow shrub species associated with the mountain shrub zone. The major species common to the pinyon-juniper woodland and the mountain shrub community are Gambel oak (Quercus gambelii), serviceberry (Amelanchier utahensis), mountain mahogany (Cercocarpus montanus), fendler bush (Fendlera rupicola), and antelope bitterbrush (Purshia tridentata).

Located below Spruce Tree House grow trees and shrubs of the Douglas fir-pinyon pine association as described by Floyd-Hanna et al (1994). In addition to the dominant species, Douglas fir (Pseudotsuga menziesii), this thin linear canyon bottom community is mixed with many of the dominant trees from the previously mentioned communities, such as Gambel oak, pinyon pine, as well as some Rocky Mountain red juniper (Juniperus scopulorum).
Pinyon-juniper forests make up 50 percent of the vegetation in the park, but are associated with 94.7 percent of the wildfire ignitions. Oak brush fields and grasslands account for the remaining 5.3 percent.

The pinyon pine-juniper forest on Chapin Mesa has reached the climax stage and is a continuous canopy with very little spacing between tree crowns. A fuel inventory study conducted on Chapin Mesa by Omi (1980) found immature pinyon pines at an average frequency of 566 trees per acre and immature junipers at an average frequency of 475 trees per acre. The base of the crowns on mature pinyon pine and juniper trees are low to the ground which allows fire to easily spread from ground vegetation (dead and down fuel, tree regeneration, and brush) up into the tree crown.

In addition to Omi's study, Mesa Verde staff later conducted a fuel inventory as well. Both of the fuel inventory studies revealed that the majority of fuel by weight was contained in the larger size classes (1 inches or greater). The following is a breakdown by size class of both fuel inventory studies on Chapin Mesa:

**Downed Woody Fuels Inventory**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-.25 (in)</td>
<td>0.088</td>
<td>0.193</td>
</tr>
<tr>
<td>.26-1 (in)</td>
<td>0.609</td>
<td>0.896</td>
</tr>
<tr>
<td>1-3</td>
<td>1.347</td>
<td>3.040</td>
</tr>
<tr>
<td>3+ sô</td>
<td>5.457</td>
<td>2.390</td>
</tr>
<tr>
<td>3+ rott n</td>
<td>0.880</td>
<td>2.330</td>
</tr>
<tr>
<td>Total</td>
<td>8.381</td>
<td>8.849</td>
</tr>
<tr>
<td>Duff</td>
<td>1.029</td>
<td></td>
</tr>
<tr>
<td>Litter</td>
<td>3.104</td>
<td></td>
</tr>
<tr>
<td>Herbaceous</td>
<td>0.135</td>
<td></td>
</tr>
<tr>
<td>Shrubs (from pinyon-juniper forest)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaf</td>
<td>0.128</td>
<td></td>
</tr>
<tr>
<td>Stems</td>
<td>0.867</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.995 T/Acre</td>
<td></td>
</tr>
</tbody>
</table>

Also, there is a significant amount of standing dead and down pinyon pine snags and logs resulting from black stain (Verticicladiella wagenerii) root disease as documented in a study conducted by Wagner (1978).

In 1989 another large fire (Long Mesa) occurred within the park. It also fell within the historical fire occurrence pattern identified by Omi (1980). It originated on July 8, 1989 in the pinyon pine-juniper forest during the period when most large fires occur at Mesa Verde (June 20 to July 20).
Holdover fires (small lightning set fires that do not erupt into wildfires until weather and fuel conditions change a day or more later) also seem to play a significant role in the development of large fires in Mesa Verde. The Moccasin Mesa, Rock Springs, Long Mesa, and Chapin 5 Fires all started from one to three day old lightning strikes. Earlier large fires also may have originated from holdover fires, but cannot be substantiated due to a lack of documentation.

Threatened and Endangered Species:

Both the American peregrine falcon (*Falco peregrinus*) and Mexican spotted owl (*Strix occidentalis*) are federally listed species under the Endangered Species Act that are known to nest in canyon cliffs within Mesa Verde National Park. Spotted Owls are known to occupy nearby Spruce Canyon. All potential adverse impacts to these species can be avoided by scheduling the fuel reduction work well past the breeding season.

There are several species of plants within the pinyon-juniper community at Mesa Verde that are classified by Mesa Verde National Park as species of special concern. The park will manage for these species in the same manner as they would if they were formally listed as endangered. One of these plants growing on the Chapin Mesa is Smollaee's milkvetch (*Astragalus schmodilae*), but it is not known to occur in the side canyon where the project would take place. Locally, mountain clematis (*Clematis pseudoalpina*) is a Pleistocene relic species and a park species of special concern growing in the rocky slopes of the project areas. The Mesa Verde stickseed (*Hackelia gracilenta*) was formerly a candidate species for federal listing under the Endangered Species Act. It grows on the slopes of the Spruce Tree House area, but it may respond favorably to the more open canopy after fuel treatment. The endemic Mesa Verde wandering aletes (*Aletes mcdougalli breviradiatus*) is listed by the state of Colorado. This species' entire range consists of nine populations in the park. One of these populations grows along the Petroglyph Point Trail at the base of the Cliff House Sandstone formation.

A biological inspection of the project areas would take place in advance of fuel reduction activities. This examination would include the site areas, plus a 100-foot wide buffer zone around the targeted treatment areas. A qualified biologist would mark species of concern on each site with flagging in advance of the work and would provide work crews with a concise report detailing species of concern at each site. By scheduling fuel reduction during the fall season, well after blooming, potential adverse impacts to these species can be minimized.

Wildlife:

Other than breeding birds, the two project sites support a modest diversity of wildlife. Common mammals living here are mule deer, ringtail, gray fox, rock squirrel, and Colorado chipmunk. Common reptiles here include the prairie rattlesnake, tree lizard, and plateau striped whiptail. During the spring and summer breeding season, common...
birds at these sites include the common poorwill, white-throated swift, broad-tailed hummingbird, hairy woodpecker, ash-throated flycatcher, violet-green swallow, Steller’s jay, common raven, mountain chickadee, white-breasted nuthatch, canyon wren, solitary vireo, black-throated gray warbler, Virginia’s warbler, western tanager, black-headed grosbeak, spotted towhee, and pine siskin. Spruce Tree House has been used by Turkey Vultures as a nesting location in the past and, along with the adjacent Douglas fir trees, night roost sites.

Water, Wetlands, and Floodplains:

There are no floodplains or wetlands within the vicinities of the two archeological sites being considered for fuel load adjustment. A natural spring north of Spruce Tree House trickles a small amount of surface water down the bottom of this small side canyon supporting a short series of intermittent pools. The project area does not include the spring source.

Geology and Soil:

The two project areas possess steep eroded slopes within the Cliff House Sandstone Formation. A thin layer of colluvial sandy loam covers much of the areas around the sandstone outcrops.

Air Quality and Viewshed:

Mesa Verde National Park is a designated Class One airshed under the Clean Air Act. Although air quality in the park has deteriorated in the last several decades, few areas in the Lower 48 states experience better air quality than the Colorado Plateau.

The park enjoys spectacular long distance vistas from various roadside overlooks. Visibility can exceed 100 miles under ideal atmospheric conditions. Due to local relief, long distance vistas are not available from the southern parts of Chapin Mesa. The local viewshed, however, offers visitors outstanding scenes of the ancient evergreen woodlands on the mesa tops and canyon slopes and bottoms. Commanding views of cliff dwellings from mesa rims, including Spruce Tree House, are easily available even to the most casual visitor.
ENVIRONMENTAL CONSEQUENCES

Impacts of Alternative A. No Action

Under this alternative the National Park Service would continue to suppress all fires in the project area as quickly and efficiently as possible. No effort would be made to reduce the amount of fuel through the use of mechanical thinning. It is likely that suppression efforts would be successful most of the time. However, with continued suppression and lack of other action to reduce fuel, forest debris would continue to accumulate around Spruce Tree House and Petroglyph Point. It is, therefore likely that conditions would eventually result in a fire that cannot be controlled and would render these archaeological sites indefensible from wildfire. Should a wildfire occur here under certain extreme conditions, these cultural sites could be lost or severely damaged.

Cultural Resources:

Maintaining the status quo would result in no immediate effect on the cultural resources of the two sites. In the long-term, however, a severe wildfire could produce enough heat and smoke to cause irreversible damage to Spruce Tree House, the petroglyph panel, and any surface artifacts present. Damage could include erosion, discoloration, and exfoliation of sandstone and wall plaster and the designs drawn on them or those pecked onto the petroglyph panel. Other than wooden beams (many of which have been tree ring dated) and packrat middens, flammable materials such as corn cobs, sandals, and basketry have been removed from Spruce Tree House by archaeologists. The wooden beams and the midden in front of the alcove could be consumed by fire. Fire suppression activities such as hand line cutting and aerial drops of water or fire retardant chemicals could cause additional damage to the two sites. Emergency fire line cutting could include uncontrolled digging in potentially rich archaeological sites. High impact, aerial water drops can cause gullies to form in the top soil potentially exposing or displacing buried artifacts. Fire retardants would temporarily discolor anything on which it lands and could have some unknown chemical impact on archaeological features.

A severe wildfire would greatly alter the historic scenery at these sites, which includes dense, green trees and shrubs. In the years after a severe wildfire, indirect effects on the two sites could include a enlargement of rodent populations which would increase the amount of burrowing activity in Spruce Tree House resulting in the altering of artifact arrangements. Bare patches of sterilized soils are more likely to erode, potentially exposing, burying, or shifting artifacts. Any avoidable damage done to these sites could offend American Indian peoples who have ancestral ties to Mesa Verde.

Visitor Use and Park Management:

Until a severe fire burns in this small canyon, there would be no effect to visitor use or park management by adopting the No Action alternative. Since a fire here is inevitable and large wildfires usually occur under the most extreme burning conditions, the short-
term impact on visitors would be dramatic because the area would be severely burned and the area closed to visitation until rehabilitation takes place which could be months. Damage to Spruce Tree House and the petroglyph panel would diminish the visitor experience and reduce visitation to this part of the park. Consequently, fewer visitors would visit the Archeological Museum, the Mesa Verde Museum Association bookstore, and the concessionaire gift shop and cafeteria.

In the event of a large fire, park staff would need to invest a great deal of time and effort protecting the sites from additional damage after the fire is out and rehabilitating the sites. The park would need to keep visitors out of the area, professionally assess the damage to Spruce Tree House and Petroglyph Point, and develop and adopt mitigation measures.

Adopting the No Action alternative would have no immediate effect on current noise conditions experienced by park visitors.

Vegetation:

An extreme wildfire in this canyon would kill virtually all the Douglas firs, pinyon pines, junipers, and antelope bitterbrush in this area. Initial reestablishment of coniferous trees could take 100 years or more. Most of the rest of the canyon's vegetation would be reduced to ashes, but would sprout the following spring. After many years, Gambel oak and other shrubs would recover, but the landscape would be altered in the long-term from the present forested environment to a shrubbier environment. Large areas of bare soil would be rapidly invaded by noxious exotic weeds such as musk thistle, Canada thistle, and grass.

Threatened and Endangered Species:

Adopting the No Action alternative would have no net effect on any species listed as threatened, endangered, or of special concern by the federal or Colorado state governments. Even in the event of a major wildfire, the overall impact to these species would be the same whether or not these small project sites are treated.

Wildlife:

Adopting the No Action alternative would have no effect on current wildlife populations or species diversity.

Water, Wetlands, and Floodplains:

There are no floodplains or wetlands in the project area. The spring north of Spruce Tree House would be unaffected by the adoption of the No Action alternative.
Geology and Soil:

Adopting the No Action alternative would have no immediate effect on the soils in the project area. A severe wildfire, however, could result in patches of sterilized soils and increased erosion.

Air Quality and Viewshed:

Adopting the No Action alternative would have no immediate effect on the current conditions in air quality or the viewshed.

Cumulative Effects:

No cumulative effects were identified for the No Action alternative. It should be reemphasized, however, that fuel loads would continue to increase and remain a growing threat.

Impacts of Alternative B. Mechanical Hazard Fuel Reduction (Proposed Action)

Under this alternative the National Park Service would continue to suppress all fires in the project area as quickly and efficiently as possible. In addition, an immediate effort would be made to reduce the amount of fuel in front of the project sites through the use of mechanical thinning. It is likely that suppression efforts would be successful most of the time. The supplemental action to reduce fuels at Spruce Tree House and Petroglyph Point would reduce fire intensities in their immediate areas. It is, therefore, less likely that conditions may result in a fire that cannot be controlled or render these archeological resources indefensible from wildfire.

Cultural Resources:

Adopting the fuel reduction strategy would result in no significant adverse effect on the cultural resources of the two sites. There could be some direct, but inadvertent contact with surface artifacts during the fuel reduction work or indirect impacts from erosion after work is completed, particularly at the midden site immediately below the Spruce Tree House alcove. In the long-term, however, a severe wildfire and its much greater potential to harm these resources would be far less likely to occur at these two sites. As a result, the two archeological sites would be far less likely to suffer irreversible damage from a fire when it does occur. Fire suppression activities such as hand line cutting and aerial drops of water or fire retardant chemicals could be avoided near the two sites.

In the event of a wildfire, burning conditions would be less intense than a wildfire without pretreatment of fuels. However, there still would be a significant alteration of the historic scenery at these sites, which includes dense, green trees and shrubs. The new scenery would not accurately resemble the deforested prehistoric condition either,
since this consisted of extensive farms on the mesa tops. Post fire conditions under this alternative would reduce the risk of indirect effects on the two sites such as increased rodent burrowing activity or areas of bare sterilized soil which could expose, bury, or displace artifacts or human remains. Reducing the potential for damage to these sites would protect the interests of the American Indian peoples who have ancestral ties to Mesa Verde.

The Colorado State Historic Preservation Office and the Advisory Council on Historic Preservation will receive a copy of this environmental assessment. No actions described in this plan may begin until they concur that these actions would have no adverse affect on cultural resources listed on the National Register of Historic Places which includes Spruce Tree House and the petroglyph panel at Petroglyph Point.

Visitor Use and Park Management:

The two sites probably would need to be closed to the public for about one week under the Proposed Action in order to safely conduct the fuel reduction operation. Since the treatment zone is limited to a few small areas in front of the project sites, the inevitable fire here is still likely to occur under the most extreme burning conditions. Fire intensity would be reduced in the treatment areas. The short-term impact of a wildfire on visitors would be dramatic because the area would be severely burned and the area closed to visitation until rehabilitation takes place. Damage to Spruce Tree House and the petroglyph panel would be avoided, thereby preserving most of the local visitor experience and maintaining visitation to this part of the park. Consequently, visitors would continue to visit at current levels the Archeological Museum, the Mesa Verde Museum Association bookstore, and the concessionaire gift shop and cafeteria.

In the event of a large fire, park staff would need to invest a great deal of time and effort protecting the sites from additional damage after the fire is out by stabilizing and rehabilitating the sites. The park would need to keep visitors out of the area, professionally assess any damage that may have occurred to Spruce Tree House and Petroglyph Point, and develop and adopt mitigation measures. These post fire management activities would be far less involved and expensive than if the sites' burned with the fuels left in their current, untreated condition.

The noise of cutting equipment and fuel extraction vehicles would last a week or less. Fewer visitors would be impacted by this noise than under normal circumstances if the area were closed to visitation. Nevertheless, visitors at the museum, post office, and the overlook behind the Chief Ranger's Office would perceive the noise.

Vegetation:

An extreme wildfire in this canyon would kill virtually all the Douglas firs, pinyon pines, Utah junipers, and antelope bitterbrush in this area. Initial reestablishment of coniferous trees could take 100 years or more. The two sites pretreated by fuel reduction under the Proposed Action would be much more likely to maintain some or
most of their mature conifer trees. These surviving patches could act as a seed source
that could accelerate the reestablishment of the conifers all over this area. Most of the
rest of the canyon's vegetation would be reduced to ashes, but would sprout the
following spring. After many years, Gambel oak and other shrubs would recover, but
the landscape would be altered in the long-term from the present forested environment
to a more shrubby environment. The mechanical thinning process is not expected to
result in a significant increase in weeds. After a wildfire, large areas of bare soil would
be rapidly invaded by noxious exotic weeds such as musk thistle, Canada thistle, and
cheatgrass, but the areas that would be pretreated would see less damage to the soil
and fewer invasive weeds.

Threatened and Endangered Species:

Adopting the Proposed Action would have no net effect on any species listed as
threatened, endangered, or of special concern by the federal or Colorado state
governments. With the locations of species of special concern marked, the mechanical
thinning process would not directly or significantly affect any sensitive species. Even in
the event of a major wildfire, the impact to these species would be about the same
whether or not these small areas are treated. Treated areas would burn with less
intensity, which could spare some individual plants. The more open canopy after fuel
treatment could benefit the Mesa Verde stickseed.

Mesa Verde National Park contacted the U.S. Fish and Wildlife Service to discuss the
potential impacts this project could have on listed and other sensitive species. On July
8, 1998 their office in Grand Junction, Colorado gave informal consent that the project
would have no effect on threatened or endangered species. Concurrence over Section
7 of the Endangered Species Act will not be complete until they review the entire
environmental assessment and provide a written response.

Wildlife:

Adopting the Proposed Action would have no significant effect on current wildlife
populations or species diversity. Some closed-canopy and hole-nesting bird species
may become slightly less common in the treatment areas while some open-canopy
species may become slightly more common. Since most of the tallest Douglas firs
would be left standing, there should be little impact on roosting Turkey Vultures.

Water, Wetlands, and Floodplains:

There are no floodplains or wetlands in the project area. The spring north of Spruce
Tree House would be unaffected by the Proposed Action. Removal of many larger
trees in the canyon below the spring source could slightly reduce the local transpiration
rate while the more intense solar radiation could slightly increase the local evaporation
rate. The net effect of these two changes is not known, but they could result in no
change, a minor increase, or a minor decrease in the amount of surface water in the
canyon bottom's ephemeral pools. As the forest recovers, any changes would become

19
less and less evident. The fuel reduction activities and decrease of vegetative cover following thinning may cause a local increase in soil erosion, which could slightly reduce water quality in the ephemeral pools. Within a few years, the soil would stabilize and water quality would return to normal.

Geology and Soil:

Adopting the Proposed Action may cause a local increase in soil erosion. Whereas a severe wildfire could result in patches of sterilized soils and a marked increased in erosion, a lower intensity fire within the treatment areas resulting from hazard fuel reductions would suffer far less damage. Accelerated erosion on the refuse midden in front of the Spruce Tree House alcove could impact subsurface artifacts (see Cultural Resources above).

Air Quality and Viewshed:

Adverse impacts to air quality as a result of fuel reduction would be very minor and of short duration. This would include exhaust fumes from chainsaws and brush cutters. These fumes would disperse rapidly.

The view of Spruce Tree House would be modified by the thinning of the tree cover. With less vegetation in the canyon bottom, however, the cliff dwelling would be more clearly visible to visitors on the mesa rim. The fire break south of Spruce Tree House would be visible from the Petroglyph Point Trail and the Spruce Canyon Trail.

Cumulative Effects:

Mechanical reduction of hazard fuels around developed areas of the park has been ongoing since a plan was approved in 1993. Limited use of prescribed burning for fuel reduction in certain areas is expected to begin this year. Actions similar to the ones proposed in this Hazard Fuel Reduction Plan and Environmental Assessment are being planned for many of the other mesa top and alcove cliff dwelling sites in Mesa Verde, but will be analyzed in another environmental assessment. The area involved in this particular plan is very small. It is part of a greater effort to protect the park's prehistoric sites, historic sites, modern infrastructure, commercial private property, and the well being of park visitors. Nevertheless, the total area of the park impacted by hazard fuel reduction is still only a tiny fraction of the entire park. For this reason, no significant cumulative effects were identified for the Preferred Action.
CONSULTATION AND COORDINATION

Consultation and coordination has and will continue to be made with these offices:

United States Department of the Interior
  National Park Service
  Intermountain Support Office
  Intermountain Regional Office, Denver, CO

United States Department of the Interior
  U.S. Fish and Wildlife Service Field Office, Grand Junction, CO

United States Government
  Advisory Council on Historic Preservation, Denver, CO

State of Colorado
  Colorado State Historic Preservation Office, Denver, CO

PLANNING TEAM

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REFERENCES


Arnold, Joseph F., Donald A. Jameson, and Elbert H. Reid. 1964. The Pinyon Pine Type of Arizona: Effects of grazing, fire and tree control. USDA Forest Service Production Resource Report No. 84.


Traylor, Diane; Hubell, Lyndi; Wood, Nancy; Fiedler, Barbara 1979. The La Mesa Fire Study: Investigations of Fire and Fire Suppression on Cultural Resources in Bandelier National Monument.
