



Bandelier National Monument

Archeological Site Hazardous Fuel Assessment Report



November 1, 1999

BANDELIER
NATIONAL MONUMENT

Memorandum

To: Superintendent, Bandelier National Monument

From: Archeological Sites Hazardous Fuels Assessment Program (ASHFAP)

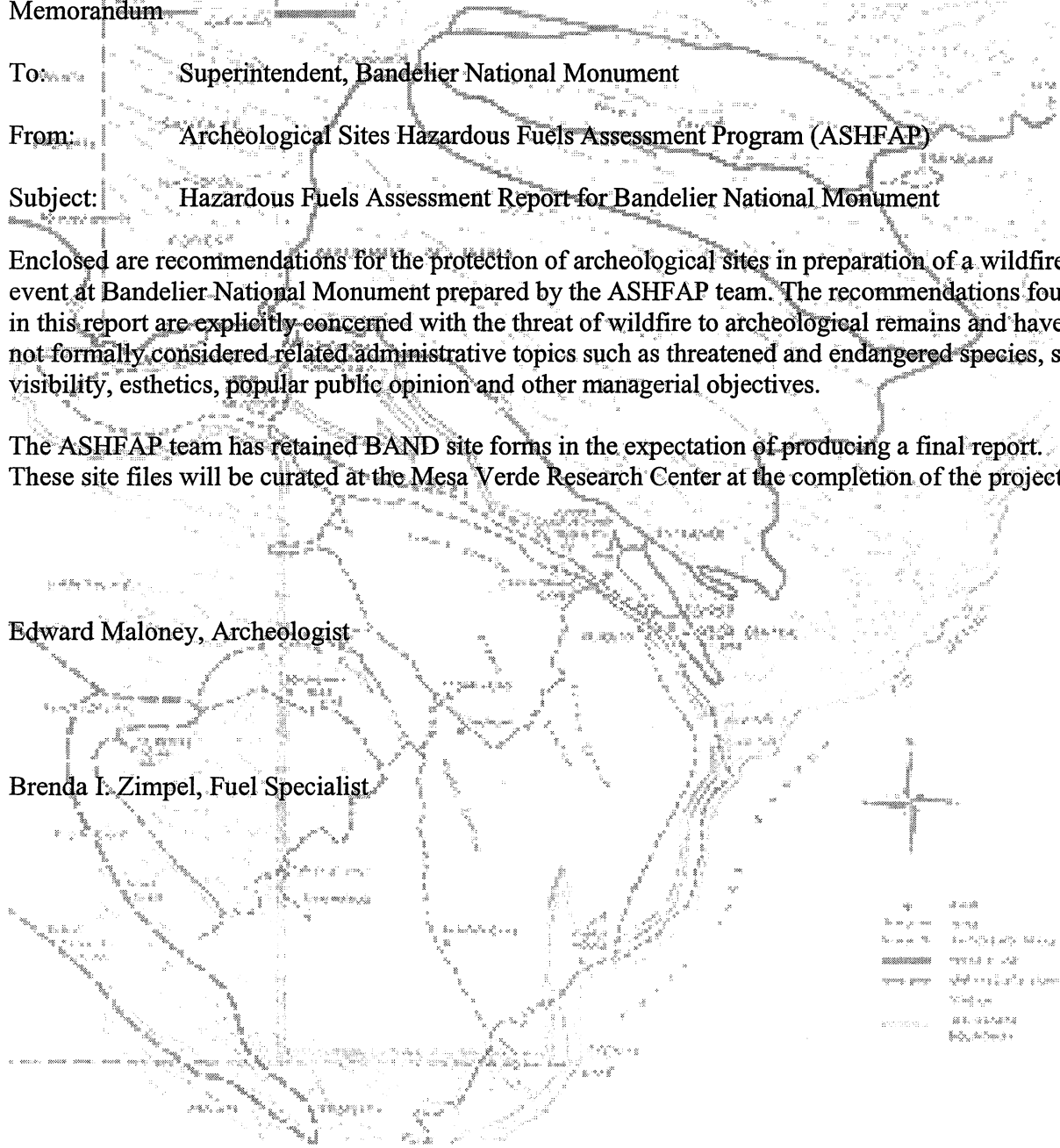
Subject: Hazardous Fuels Assessment Report for Bandelier National Monument

Enclosed are recommendations for the protection of archeological sites in preparation of a wildfire event at Bandelier National Monument prepared by the ASHFAP team. The recommendations found in this report are explicitly concerned with the threat of wildfire to archeological remains and have not formally considered related administrative topics such as threatened and endangered species, site visibility, esthetics, popular public opinion and other managerial objectives.

The ASHFAP team has retained BAND site forms in the expectation of producing a final report. These site files will be curated at the Mesa Verde Research Center at the completion of the project.

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Objective

The ultimate objective of the Archeological Site Hazardous Fuels Assessment Program (ASHFAP) is to offer suggestions that might protect, or at least minimize damage to, archeological resources from potential catastrophic wildfire events. A secondary objective of the ASHFAP team is to construct a precise photographic series that can be used by Park managers as a comparative baseline for application of assessment criteria on other sites that are suspected of having dangerously heavy fuel loads. A third objective of the team is to produce a set of hard data that is at once measurable, replicable, flexible, and applicable to a wide array of archeological sites and hazardous fuel types. A fourth objective of the ASHFAP team is to attempt to coalesce two widely disparate areas of expertise, cultural resource and fire management.

Background

The call for this program is the result of several recent wildland fires that have irreversibly damaged cultural remains in national parks. A century of fire suppression has led to a high accumulation of combustible fuels on and around irreplaceable archeological remains. This problem of fuel loads around cultural remains will only worsen with time. The Intermountain Region (IMR) has decided to take a proactive stance in terms of managing high fuel loads on cultural resources. The ASHFAP team represents the first attempt by IMR to address this problem.

Introduction

The ASHFAP team is composed of an archeologist, with degrees in anthropology, geology, and English, with a total of 20 years of professional experience, and a fuels specialist with a degree in biology and a total of nine years of professional experience. Both the Team members have specialized experience that played a direct role in our selection for this assignment. The archeologist worked on the Burn Area Emergency Rehabilitation (BAER) Team's Post-Wildfire Damage Assessment Projects at Bandelier National Monument (Dome Fire 1996) and Mesa Verde National Park (Chapin 5 Fire 1996). The fuel specialist worked on numerous wildfires and prescribed fires including Chapin 5, and has acted as Lead Fuel Technician on the North Rim, Grand Canyon National Park. It is important to emphasize that we were selected for the ASHFAP assignment primarily because of our combined field experience. During our start-up meeting with Dan O'Brien, Adrienne Anderson, Linda Towle, and Tim Oliverius we were informed that the ASHFAP assignment was not intended to be a research project, and that it was funded as an on-the-ground field project. We were instructed, and have attempted to provide the well-trained "dirt-dog" perspective in relation to the question, "How can fuels be managed to preserve archeological remains over the short and long terms?" In addition, the Team was instructed to keep its reports as concise as possible, to complete them as quickly as possible, and to stay in the field as much as possible. During the 1997 field season the ASHFAP team assessed and made recommendations on 82 sites in 12 National Parks and Monuments. 1998 represents the second field season that the Team has been active.

Site	Overall Risk Potential Value*	Labor Estimates
LA 16106	31	.5
LA 16107	32	.5
LA 77686	35	0
LA 77710	20	0
LA 3785	37	.5
LA 3789	38	0
LA 60294	41	0
LA 60299	39	0
LA 60304	42	0
LA 60306	34	0
LA 60307	56	2
LA 60309	48	2
LA 9006	41	.5
LA 60024	30	0
LA 90029	20	0
LA 90052	40	0
LA 60333	44	1.5
LA 60388	33	1
LA 60424	42	6
LA 115122	60	120
Total Labor =		134.5

TABLE 1. BANDELIER NATIONAL MONUMENT REDUCTION SITE PRIORITY LIST

*These values are based on a scale of 100 possible points.

Sites Assessed

Burn Unit 29

1. LA 16106

This site includes a one-room small structure that is located just south of the decommissioned Escobas Mesa fire road. No other surface artifacts are present.

This site was burned over during the 1998 prescribed fire event. Although the site shows no apparent damage within the room, there is a partially consumed ponderosa pine stump just outside the north wall that has caused a burned root cavity. This "stump hole" is not contributing to an increased rate of erosion to the site. However, the ASHFAP team suggests that this root cavity should be backfilled, since it is extremely flammable and could cause additional damage during the next fire event that passes over the site.

As a result of the recent prescribed fire, fuel loading on the site is low at present, and includes ~50% needle litter cast with mature ponderosa pine overstory. This forest has two distinct age classes, the youngest of which can be considered seedlings. The ASHFAP team believes that these pole-sized trees are present as a direct result of aggressive fire suppression. Fortunately, some of these small trees were killed off during the recent prescribed fire event. The Team suggests that this site be prescribed burned on a cyclical basis to maintain low fuel loads.

Recommendations

- Backfill the stump hole prior to the next fire event.
- An archeological monitor should be present during this work.
- Labor estimate is ½ hour (not including hike time).
- Prescribe burn on a cyclical basis to maintain low fuel loads.

2. LA 16107

This site is a three room small structure that is located just north of the decommissioned Escobas Mesa fire road. The site shows no other features and no exposed surface artifacts.

The site was burned over during the 1998 prescribed fire, and shows minor smoke-blackening on building stones, already being washed away by rainfall, but no other damage.

As a result of this fire, two medium-sized live ponderosa pine trees have been cut and removed from the site boundaries. These “hazard trees” could have toppled over at some point in the future, causing uplifting of the “root wad” and consequently damage to the site’s wall alignments. In addition, root damage to this architecture would have continued to increase, since the trees were not killed by the recent prescribed fire. However, now that these two trees have been cut, even a small ground fire can ignite the remaining stumps. The ASHFAP team suggests that this action has increased the potential for fire effects damage to the site during future wildfire events. This is because the possibility of “root running”, or “stump holing” has been increased by removal of these trees.

Recommendations

- The ASHFAP team suggests that these stumps should be covered with a fire retardant sealant to prevent future fire effects damage to the site.¹
- Stumps on or adjacent to sites should have handline constructed around them prior to management ignited prescribed fires.
- An archeological monitor should be present during this work.
- Labor estimate is ½ hour (not including hike time).
- Prescribe burn on a cyclical basis to maintain low fuel loads.

3. LA 77686

The site is a three room small structure located close to the decommissioned Escobas Mesa fire road. The site shows sparse scattered sherds and flakes.

This site was burned over during the recent prescribed fire event, and shows minor smoke-blackening and very minor thin oxidation on building stones as a result of this fire.

Fuels around the site include mature, single age ponderosa pine overstory with no remaining ladder fuels. There is a 90% needle cast and 30% herbaceous ground cover.

Recommendations

- The ASHFAP team suggests that this site should be prescribed burned on a cyclical basis to maintain low fuel loads, and thus, to reduce potential fire effects damage and future root damage to the structures.

¹ The fire resistant coatings information and products can be obtained from Flame Control Coatings, Inc., PO Box 786, 4120 Hyde Park Blvd. Niagara Falls, NY 14302, (716) 282-1399, Fax: (716) 285-6303.

4. LA 77710

This site is a small one-room storage unit that is located in an unnamed southeast flowing side drainage about halfway down the old Escobas Mesa fire road. The site shows no surface artifacts. Construction of the room takes advantage of a very shallow rock shelter that has preserved prehistoric mortar and plaster under the sheltered portion of one wall.

This site was burned over during the recent prescribed fire event, but shows no apparent damage from this fire, even to prehistoric mortar and plaster. In addition, there are several ponderosa pine pole-sized trees present that were cut before the prescribed fire, indicating an earlier fire suppression event. The site shows no damage from this event.

As a result of the prescribed fire, fuel loads around the site are low, and includes grasses, forbs and scattered scrub oak. It is fortunate that several of the pine seedlings near the room were killed, since this reduces future root damage to the site, as well as potential fire effects damage in future fire events.

Recommendations

- The ASHFAP team suggests that this site should be prescribed burned on a cyclical basis to maintain low fuel loads.

Burn Unit 38

5. LA 3785

This site is a typical mesa top small pueblo with a formal midden and extensive artifact scatter. The structure may have been two-storied prior to collapse. As with all the open or exposed prehistoric sites at BAND observed by the ASHFAP team, no flammable artifacts are exposed.

The site is located near the Burnt Mesa Trail in an unburned spot within the boundaries of the 1977 La Mesa Fire. As a result, fuel loads on the site is moderate, and includes an overstory of mature ponderosa pines, with an understory of open-canopy ponderosa, pinyon, and juniper. The site shows a moderate amount of grasses and forbs.

Recommendations

- Remove the moderate-sized juniper in the middle of the roomblock that has split down the middle. The tree's branches are currently in direct contact with the building stones separated only by litter cast. Even a small grass fire can cause torching of this tree, and consequently oxidize and exfoliate artifacts.
- Scatter debris outside the site boundaries.
- An archeological monitor should be present during this work.
- Labor estimate is ½ hour (not including hike time).
- Prescribe burn on a cyclical basis to maintain low fuel loads.

6. LA 3789

This site is a small mesa top pueblo that is located near the Burnt Mesa Trail. The site shows 4-6 rooms, an associated midden, and moderate artifact scatter. No flammable artifacts are exposed.

The site was burned over during the 1977 La Mesa Fire, but shows no apparent damage from this fire. Present fuels adjacent to the site include a mature ponderosa pine overstory, ponderosa pine, juniper, pinyon and oak sub-canopy, shrub and grass ground cover. The site has

no 1,000-hour fuels or overstory trees on the architecture, therefore, the site requires no fuel reduction at this time.

Recommendations

- The team suggests that the site be periodically burned to maintain low fuel loads.

7. LA 60294

This site is a one room small structure that is located close to the north rim of Upper Frijoles Canyon. No surface artifacts are exposed.

Fuels around the site include an open-canopy pinyon/juniper overstory (~20 feet) with a mahogany, oak, and current bush understory. Grasses and litter cast cover 80% of the ground surface. Areas of bare soil are increasing the rate of erosion on the site.

The site shows no sign of having burned over recently; however, there are a few pieces of very old charred debris present, thus implying that the site has experienced wildfire at some time in the past. There are no fuel load reduction recommendations at this time.

8. LA 60299

This site is a one room small structure located near the SE edge of Burnt Mesa. The site shows no surface artifacts, no standing walls, and no flammable artifacts.

There is no evidence of recent burning on or near the site, thus has a moderate fuel load consisting of a bushy pinyon/juniper overstory (~15-20 feet tall), mahogany understory, and little herbaceous ground cover. The ASHFAP team suggests that the area on and around the site should be prescribed burned to reduce further accumulations of fuel loads. In addition, since fire tends to convert fuels from heavier woody vegetation to lighter fuels (grasses and forbs), prescribed fire should be applied to reduce long-term erosion and root damage to the site.

9. LA 60304

This site is located near Highway 4 and was originally recorded as an extensive sherd and lithic scatter in 1987; however, the remains of an *jacal* small structure appear to be eroding out at present. No artifacts on this site appear *in situ*, and all are “pedestaled”, indicating that soils on the site are deflating rapidly.

Fuels around the site include open-canopy pinyon/juniper overstory (~35 feet tall) with a pinyon/juniper understory. There are few grasses and forbs on the site, indicating that the area was severely overgrazed in the past. This overgrazing episode is still contributing to erosion of the site. There are no signs of previous burning on or around the site.

Over the long-term, this vicinity should be prescribed burned. This would propagate grasses and forbs, and would reduce conversion from lighter fuels to woody fuels. Addition of grasses and forbs to this site’s environment will slow the rate of erosion and root damage, and will protect the site from extensive fire effects damage in future wildfire events. No mechanical fuel adjustment is recommended at this time.

10. LA 60306

This site is a moderate-density lithic and ceramic scatter located near Highway 4. All artifacts on the surface of the site are “pedestaled”, indicating rapid deflation of soils on the site.

Fuels on the site include moderate-density pinyon/juniper overstory, with scattered shrubs, grasses and forbs. There is abundant bare soil on and around the site. Evidence of previous burning is not present. No mechanical fuel adjustment is recommended at this time.

Over the long-term, the ASHFAP team suggests that a regime of cyclical prescribed burning for this site would propagate grasses and forbs and reduce invasion of woody fuels. This would reduce the rate of erosion and potential fire effects damage in the future.

11. LA 60307

This site is a 6-8 room mesa top pueblo located just south of Highway 4. The site shows a formal midden deposit and an extensive artifact scatter. The pueblo was looted long ago.

Fuels on the site include moderate-density pinyon and juniper, with widely scattered grasses and forbs. This shortage of light fuels is contributing to rapid deflation of soils on the site, especially within the midden. Prescribed burning of fuels on and around the site would slow this process and reduce potential fire effects damage.

Recommendations

- Mechanically remove all trees on and within 10 feet of rubble mound.
- Scatter debris outside the site boundaries.
- An archeological monitor should be present during this work.
- Labor estimate is 2 hours (not including hike time).
- Prescribe burn on a cyclical basis to maintain low fuel loads.

12. LA 60309

This site is a one-room small structure just south of Highway 4. The site shows two check dams and a light sherd and lithic scatter.

Fuels on the site include a pinyon/juniper overstory and understory that is approaching closed-canopy characteristics. There are widely scattered grasses and forbs and abundant bare soil areas. Similar to other sites in this neighborhood, the area appears to have been historically overgrazed, and the site is showing adverse effects from this episode in the form of rapid deflation of soils.

Recommendations

- Mechanically remove all live woody vegetation on and within 10 feet of rubble mound.
- Scatter debris outside the site boundaries.
- An archeological monitor should be present during this work.
- Labor estimate is 2 hours (not including hike time).
- Prescribe burn on a cyclical basis to maintain low fuel loads.

13. LA 90006

This site is a two-room small structure with a few associated sherds and flakes, and is located just south of Highway 4.

The northwest half of this site was burned over during the 1977 La Mesa Fire; however, the site shows no apparent damage from this event. Fuels on the site include moderate-density pinyon/juniper overstory, with scattered grasses and forbs, and abundant bare soil areas. As with other sites in this vicinity, soils on the site are deflating.

Recommendations

- Mechanically remove all live trees from the structure.
- Remove all 1,000-hour dead and down fuels from structure.
- Scatter debris outside the site boundaries.

- An archeological monitor should be present during this work.
- Labor estimate is 0.5 hours.
- Prescribe burn on a cyclical basis to maintain low fuel loads.

14. LA 90024

This site is a two-room small structure with two exterior vertical slab features and a few sherds and flakes.

The site was burned over by the 1977 La Mesa Fire, but now shows no damage from this event. Fuels on the site are mostly grasses (~3 feet tall) with oak and mahogany shrubs. No mechanical fuel adjustment is recommended at this time.

Recommendations

- Prescribe burn on a cyclical basis to maintain low fuel loads.

15. LA 90029

This site is located near Highway 4 and was originally recorded as a small structure. The ASHFAP team believes present evidence for this determination of function is so scant that the feature should be called "unknown". The site is a minimal small rock alignment and a few scattered sherds and flakes.

The site was burned over during the 1977 La Mesa Fire, but shows no apparent damage from this event. Fuels at present include only grasses and forbs. No fuel adjustment is recommended at this time.

Recommendations

- Prescribe burn on a cyclical basis to maintain low fuel loads.

16. LA 90052

This site is a small pueblo located in an unnamed drainage just above a two-meter tall slickrock cliff. The site contains a moderate flake and sherd scatter that has mostly washed down slope below the cliff.

The site was burned over during the 1977 La Mesa Fire. Fuels include a mature ponderosa pine overstory, oak sub-canopy and thick grass, forb and needle cast. No mechanical fuel reduction is recommended at present.

Recommendations

- Prescribe burn on a cyclical basis to maintain low fuel loads.

Burn Unit 40

17. LA 60333

This site is a two-room small structure with an associated sherd and lithic scatter. No flammable artifacts are exposed.

The area around the site was prescribed burned in the mid-1990's. The site shows some smoke-blackening on building stones as a result of this fire; however, this blackening is rapidly washing away with subsequent rainfall. This prescribed fire episode shows very spotty fire behavior, and most trees around the site were not affected. At present fuels include open-canopy pinyon/juniper overstory and understory, with scattered grasses and forbs, and abundant bare soil. There is a group of pinyon and juniper trees just north of the rooms that were killed by the

fire, which should be considered “hazard trees” and removed. As these trees continue to dry out over time they become an increasing threat to the site, since they will subsequently fall and burn more completely during the next fire event.

Recommendations

- Mechanically remove the heavily leaning tree in the NW corner of the site.
- Mechanically remove the standing dead trees on the structure.
- Mechanically remove the live juniper trees on the artifact scatter.
- Scatter debris outside the site boundaries. The debris could be placed under live trees, serving as a “jackpot” for the next fire, thus increasing overstory mortality.
- An archeological monitor should be present during this work.
- Labor estimate is 1.5 hours.
- Prescribe burn on a cyclical basis to further reduce fuel loads.

18. LA 60388

This site is a one-room small structure located just south of Highway 4 and the Monument’s entrance station. The site shows no surface artifacts at present.

The area around the site was prescribed burned in the mid-1990’s, but the site shows no apparent damage from this fire. There are two pinyon trees on and near the architecture that appear to have been minimally “limbed up”, possibly as a preparatory action for this prescribed fire. Fuels in the shallow canyon below the site include scattered ponderosa pine overstory with moderate-density pinyon/juniper and shrub understory. Fuels up slope of the site are open-canopy pinyon/juniper with open grass and bare soil areas.

Recommendations

- Mechanically remove the live trees on and within 10 feet of structure.
- Scatter debris outside the site boundaries. The debris could be placed under live trees, serving as a “jackpot” for the next fire, thus increasing overstory mortality.
- An archeological monitor should be present during this work.
- Labor estimate is 1 hour.
- Prescribe burn on a cyclical basis to further reduce fuel loads.

19. LA 60424

This site is a two-unit mesa top small pueblo located about 125 meters south of Highway 4. The larger house unit shows a formal midden deposit, and there is an extensive artifact scatter around both house units. Many artifacts and plants are “pedestaled”, indicating that soils on the site are deflating. There are at least four old looter’s pits, and the site appears to have been “excavated” at some time in the past.

There are no signs of previous burning around the site. Fuels at present include moderate-density pinyon/juniper with 20% herbaceous ground cover.

Recommendations

- Mechanically remove the live trees on and within 10 feet of structure.
- Mechanically remove all live and dead trees that are in areas of high sherd and lithic scatter concentrations.
- Scatter debris outside the site boundaries. The debris could be placed under live trees, serving as a “jackpot” for the next fire, thus increasing overstory mortality.
- An archeological monitor should be present during this work.

- Labor estimate is 6 hours.
- Prescribe burn on a cyclical basis to further reduce fuel loads.

20. LA 115122

This site is located in Red Canyon just off the Turkey Springs Trail in the southwest portion of the Monument. The site includes 36 rock art panels, three small structures, one rock shelter cist with original mortar and plaster, two small cavate storage units, five niches, and a prehistorically worn footpath. This location is the most extensive rock art site that is known within the boundaries of the Monument at this time.

Fuels on and down slope from the panel include open-canopy pinyon/juniper, with scattered shrubs, grasses, forbs and litter cast, and abundant slickrock and bare soil areas. The drainage bottom below the site shows ponderosa pine overstory with mixed riparian and pinyon/juniper understory. To the west of the site fuels have been effectively reduced by the passage of the Dome Fires in 1994 and 1996. There are no signs of previous burning on or east of the site.

There are several complex issues to consider when dealing with the fuel problem at LA 115122, which make it the most difficult site the ASHFAP team has assessed up to this point.

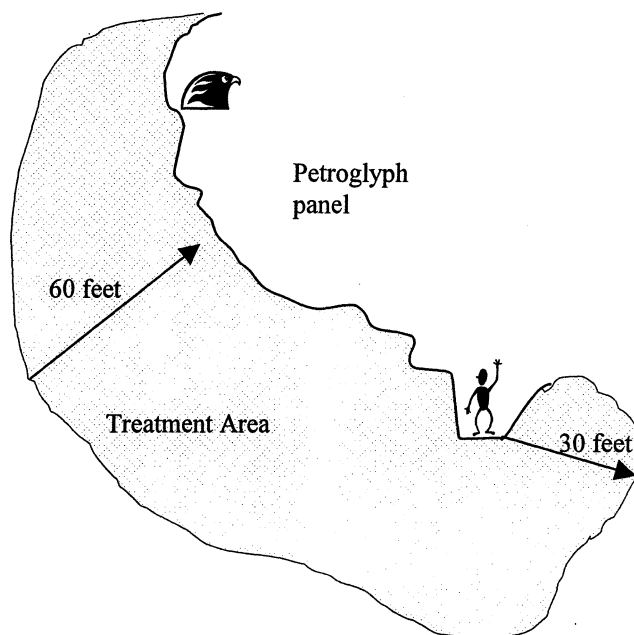
- 1) The location of the site is extremely remote. The Team estimates that from the Pumice Mines outside the Monument to LA 115122 is a strenuous 12-14 mile round trip hike. The location is relatively close to the Monument's western boundary.
- 2) The tuff bedrock on which the petroglyphs are pecked has a strong tendency to oxidize and exfoliate when subjected to heat. The petroglyphs themselves are only 1-3 mm. deep, and all are in exposed locations.
- 3) This is the most extensive rock art site known within the Monument.
- 4) Fuels in the immediate vicinity show no signs of previous burning. The site has been "near-missed" by large catastrophic wildfires twice in the last 5 years. The ASHFAP team considers this a fluke of variables such as ignition points, wind, and topography, or perhaps sheer luck. The Team believes this area will probably burn sooner, rather than later.
- 5) Trees actually on the site are relatively widespread, leaving many areas of boulder slickrock and bare soil. The structures on the site are prone to post-fire erosion.
- 6) The view outward from the site shows a vast expanse of heavily forested mesas and canyons extending to low elevation desert. The Team's travels in this area indicate that most of this vast forest is in roughly the same condition, meaning all of it has been overgrazed ("natural" wildfire regime is no longer possible), and all of it has experienced aggressive fire suppression (two distinct age classes of trees, one pre-suppression, the other post-suppression). The team believes much of this forest will be considered "closed-canopy" within the next half-century.
- 7) The lands that support this vast load of fuels cross many boundaries of land ownership and management status. Implementation of widespread fuel management programs will take decades, if it could ever be accomplished.

As a result of these circumstances, the ASHFAP team believes that aerial suppression (*water drops*) in front of the site is the only sure-fire way to protect this site from a large, plume dominated wildfire. The recommendations that follow can guarantee reasonable protection for

the site from a smaller wildfire event (and prescribed fire). The ASHFAP team believes there can be no guarantee of protection for the site when the “big one” occurs, since the plume alone resulting from this type of fire will be sufficient to severely damage the rock art panels.

Recommendations

- Mechanically remove all fuels in front of the site for 60 feet (see Figure 1.)
- Scatter debris far enough away from the treatment area that it will not add to any potential fire behavior near the site.
- An archeological monitor should be present during this work.
- Labor estimate is 120 hours (not including hiking time).



General Comments

Prehistoric Sites

Prehistoric sites at BAND are mostly buried by natural processes of erosion and deposition. The ASHFAP team believes that most of these sites have experienced wildfire at least once in their long histories, and that most have experienced several ancient wildfires. Consequently, many of these sites have attained a state of equilibrium with a *normal* wildfire regime. Because of this state of equilibrium the ASHFAP team located few prehistoric artifacts that showed fire effects damage. The Team believes that fire damage is caused by long residence time of smoldering, which can only be accomplished by the burning of heavy dead and down fuels and root cavities, deep forest litter, or large packrat middens and dung heaps. Ponderosa pine forests have the potential to cause severe damage to prehistoric archeological remains due to the increase in available biomass that could be consumed during a large fire, and subsequent post-fire erosion, if fuels are allowed to accumulate due to fire suppression activities.

Rock Art Sites

In general, pictographs (painted) tend to be located in dry areas at the rear of rock shelters and alcoves, otherwise, they would have long since washed away. Unless heavy fuels are ignited, such as packrat middens or dung heaps, these features are not usually effected by wildfire/wildland fire. Petroglyphs on the other hand, can be located almost anywhere, including much more exposed locations, and are more often damaged by fire.

Historic Sites

Historic European sites are always problematic in terms of protection from wildfire, because they usually contain a high percentage of flammable "old wood", and because they usually have not experienced wildfire and have not reached equilibrium with wildfire. Consequently, historic sites should be considered on an individual basis, in terms of fire protection.

Fire History

BAND has a very extensive history of large catastrophic wildfires within the past two decades. This results from a combination of historic overgrazing and aggressive fire suppression, which has contributed to conversion from lighter fuels to heavier fuels, resulting in increased fire effects damage to archeological remains. In addition, the Team believes that most of the fuels within the Monument are in the early- to middle stages of recovery from intensive manipulation by the prehistoric and historic inhabitants.

The Monument also has an aggressive prescribed fire program that has met with varying degrees of success depending on the fuel type. The ASHFAP team agrees that prescribed burning is necessary to control fuels, in order to prevent the more serious post-fire effects that result from large catastrophic wildfires.

Mechanical Thinning

Throughout the recommendations offered by the ASHFAP team, there is a consistent tendency to mechanically thin pinyon and juniper, and occasionally ponderosa pine regeneration, while the Team has not suggested the cutting of medium and large ponderosa pines. This is because of the strong tendency of ponderosa pine to "root run", or cause extensive damaging burned root cavities. (Although pinyon pine can sometimes root-run, it is generally not as extensive as ponderosa pine.) Once ponderosa pines are cut, even a small ground fire has the potential to cause root running.

Hazard Trees

The ASHFAP team observed one site, LA 16107, where archeologists cut small to medium-sized living ponderosa pines following a prescribed fire event. The Team suspects that this was done to stop root damage, to eliminate the potential for up-turning of the trees' root wads, and to protect the site from future fire effects damage. Ironically, this action may have actually increased the potential for root running.

The ASHFAP team nearly always recommends removal of pinyon and juniper from sites, because they generally do not root run, but almost never suggests removal of ponderosa pine. However, ponderosa pine can be removed from sites (for archeological purposes such as reducing root damage and up-turning of root wads), as long as the stumps are covered with a fire retardant sealer.

“Fire managers have long realized that all risks can not be eliminated. Rather risks need to be acknowledged and managed commensurable with fuel hazard levels and values-at-risk.” (Omi, 1997).

Bibliography

Omi, P.N. 1997. Fuels modification to reduce large fire probability. Final Report. USDA Fire Research Competitive Grant.