

Bandelier National Monument



Photo by: K. Honig

Fire Management Plan 2005

**Fire Management Plan
Bandelier National Monument**

**Fire Management Plan
For
Bandelier National Monument**

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4/20/05
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I. Introduction

A. Need for a Fire Management Plan

Bandelier National Monument and the surrounding Jemez Mountains have a long history of wildland fire. The restoration of fire, as a natural disturbance process, to its historic role at Bandelier is one of the Monument's highest management priorities.

The Presidential Proclamation (No. 1322) that established Bandelier National Monument on February 11, 1916 stated that "...certain prehistoric aboriginal ruins...are of unusual ethnological, scientific, and educational interest...and...the public interest would be promoted by preserving these relics of a vanished people, with as much land as may be necessary for the proper protection thereof..." Accordingly, the Organic Act of 1916 and other National Park Service (NPS) policies and Director's Orders require that the NPS serve as land stewards to Bandelier National Monument, protecting the natural and cultural resources in perpetuity. Furthermore, NPS Wildland Fire Management Guidelines (RM-18, 2001) require that all park units with vegetation that can sustain fire have a written fire management plan (FMP) that addresses natural and cultural resource fire issues and is responsive to park needs. All fire management plans must also meet the terms of the National Environmental Policy Act (NEPA).

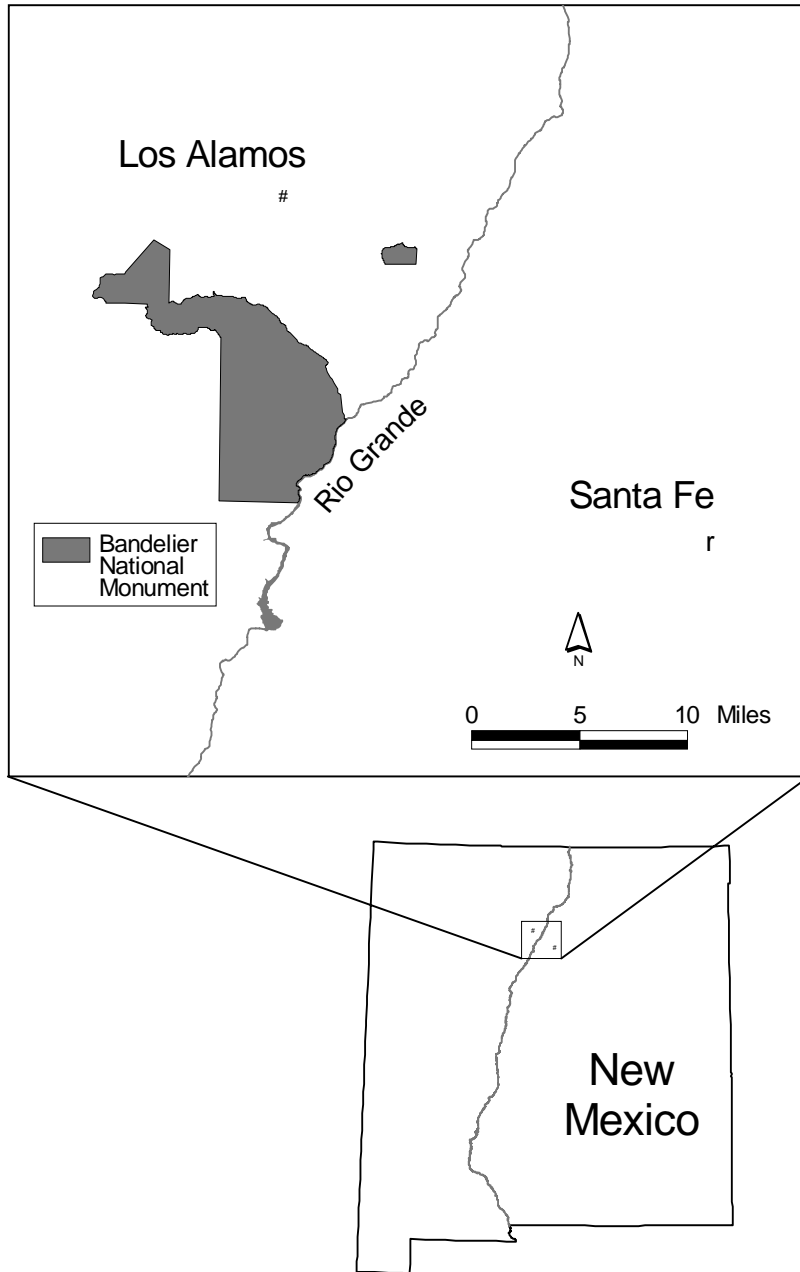
To comply with these policies and guidelines, it is imperative that Bandelier institutes this up to date fire management plan to consider advances in fire science knowledge; new technologies and fire-fighting techniques; long term solutions to new and current resource challenges; the most up to date science-based research and monitoring, and new information about sensitive, threatened, or endangered species. This plan also takes into account the changes that have occurred to Monument resources since the 1997 FMP such as landscape scale tree mortality due to drought conditions and beetle infestations.

This Fire Management Plan has been prepared to serve as a detailed program of action, which will provide specific guidance and procedures for accomplishing Monument fire management objectives. The implementation of this plan will define levels of protection necessary to ensure safety and protection of facilities and resources; will minimize undesirable environmental impacts of fire management, and will define levels of fire use to restore and perpetuate natural processes given current understanding of the complex relationships in natural ecosystems.



B. Bandelier National Monument

Figure 1.1 Bandelier National Monument



3/1/05 K.Beeley, Bandelier National Monument

Fire Management Plan Bandelier National Monument



Bandelier National Monument is located on the southern portion of the Pajarito Plateau in the Jemez Mountains at the southern edge of the Rocky Mountains in north-central New Mexico. It is approximately 10 miles southwest of Los Alamos and 50 miles northwest of Santa Fe (Figure 1.1). The Monument's northern boundary is situated on the rim of a large volcano (now the Valles Caldera National Preserve) that collapsed approximately one million years ago after its enormous eruption. The area is now composed of volcanic ash and lava flows that have been eroded into deep canyons separated by narrow mesas. Within the Monument's boundaries are some 33,750 acres (15,742 hectares) of rugged canyons, mesas, and mountain slopes. The Monument spans an elevational gradient from the Rio Grande at 5,300 ft (1,590 meters) to the summit of Cerro Grande at 10,199 ft (3,109 meters), an altitudinal range of 4,899 ft. (1,519 meters) (Figure 1.2).

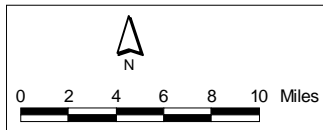
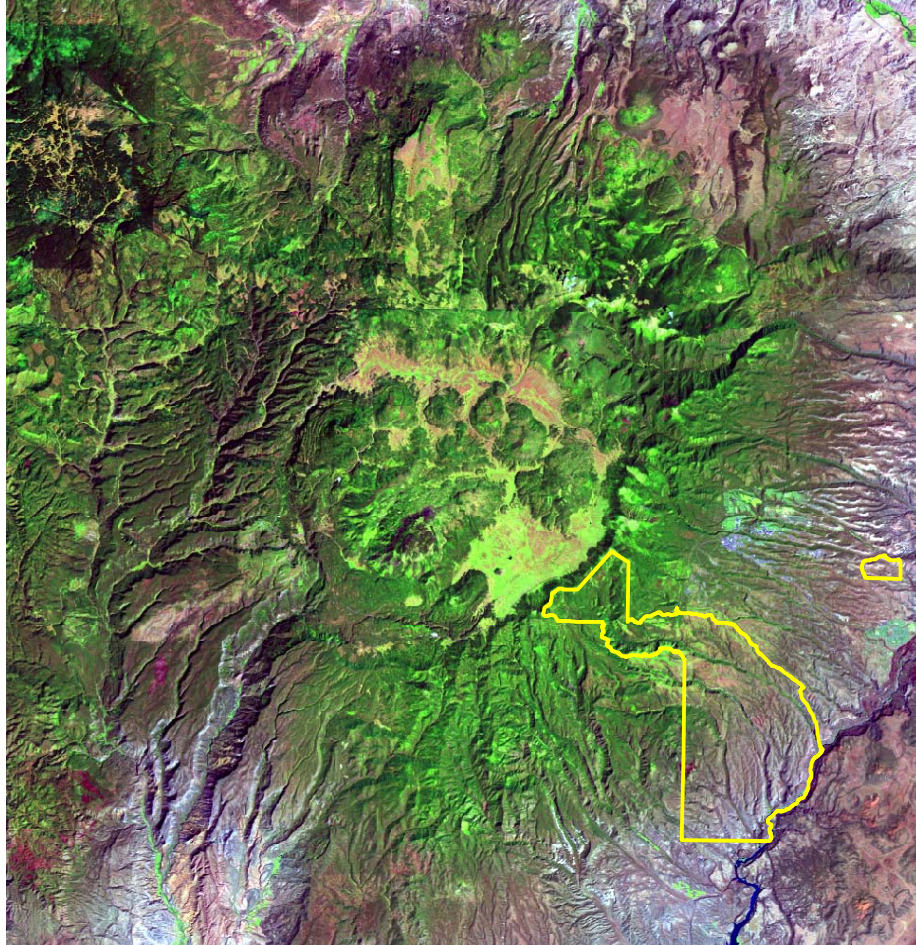
The diversity of habitats created by the range of elevations, topographic aspects, climates, and soils support a variety of associated wildlife, such as elk, black bear, and mountain lion, and are populated by an equally diverse assemblage of plant life. Thus, within a single days' walk from the banks of the Rio Grande to the summit of Cerro Grande, one traverses moist canyon bottoms, juniper grassland communities, pinyon-juniper woodlands, ponderosa pine forests, mixed conifer forests, and mountain meadows. Bandelier contains over 750 taxa of vascular plants, including many sensitive species such as the yellow lady's slipper (*Cypripedium calceolus*) and grama grass cactus (*Pediocactus papyracanthus*).


The primary reason Bandelier was designated a National Monument in 1916 was to preserve and protect its high concentration of cultural resources. The Monument contains approximately 2750 recorded archeological sites that span in time from the Paleoindian period (10,000 years ago) to the historic period (from 1600 to present). The Monument includes ancient hunting camps, "cavate" structures (rooms that have been carved into the soft tuff bedrock), 300-room pueblos, small farming hamlets, and the remains of historic corrals and log cabins, as well as other cultural resources. Bandelier is also home to the largest collection of Civilian Conservation Corps (CCC) era buildings and features, most of which are preserved in the Bandelier National Monument CCC Historic District. This National Historic Landmark commemorates the accomplishments of the CCC and its contributions to the history of the NPS.

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Figure 1.2 Bandelier National Monument and the Valles Caldera in the Jemez Mountains



 Bandelier National Monument
Satellite image is from Landsat 1994

3/1/05 K.Beeley, Bandelier National Monument



C. Compliance Actions

The *Bandelier Fire Management Plan Environmental Assessment (EA)/Assessment of Effect* was prepared in compliance with the requirements of the NEPA, the National Historic Preservation Act (NHPA) of 1966 (as amended), the Endangered Species Act (ESA) of 1973, as amended, and the Wild and Scenic Rivers Act. The legal authority for preparing and implementing the *Bandelier Fire Management Plan* is the 1916 Organic Act for the National Park Service: 16 United States Code (USC) 1 through 4.

As required by NEPA, Bandelier National Monument prepared the *Bandelier National Monument Fire Management Plan EA/Assessment of Effect* which was signed March 14, 2005. Four alternatives for managing wildland and prescribed fire, maintaining and restoring ecosystems, reducing hazardous fuels, and protecting cultural resources in the Monument were proposed. Environmental impacts of two alternatives were examined. At the conclusion of the NEPA process, one alternative was selected to form the fundamental core of Bandelier's new FMP. This plan is the working document for guiding wildland fire management actions and activities in Bandelier National Monument.

D. Collaboration

Bandelier's FMP and EA/Assessment of Effect were formulated and completed with the participation of five broad groups of people:

- ✧ An Interdisciplinary Team (IDT) composed of National Park Service and United States Geological Survey staff. This team consists of the following personnel: Superintendent, Fire Management Officer, Assistant Fire Management Officer, Fire Information Officer, Fire Ecologist, Chief of Resources, Outdoor Recreation Planner, Archeologists, Wildlife Biologist, Vegetation Specialist, United States Geological Survey Research Scientist, Protection Ranger, and Chief of Maintenance.
- ✧ Internal reviewers. This includes expertise from the National Park Service Intermountain Region and Santa Fe Support Office.
- ✧ Other consulting Agencies, including the United States Forest Service, New Mexico State Historic Preservation Office, and the United States Fish and Wildlife Service.
- ✧ Local Native American tribal Governments.
- ✧ The Public. Three public scoping meetings were held in Los Alamos, Santa Fe, and Albuquerque in 2003.

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Bandelier fire management staff worked closely with fire staffs from the Santa Fe National Forest, Los Alamos National Laboratory/DOE, and Los Alamos County in all stages of the development of this Fire Management Plan. Efforts centered on maintaining common terminology, between agencies, and creating compatible strategies across common boundaries. Where possible, links or bridges to cooperators' planning documents have been made and noted.

E. Authorities Under Which This Plan is Developed

Authority for carrying out a fire management program at Bandelier National Monument originates with the NPS Organic Act, August 25, 1916. The Act, in part, states that the primary goal of the NPS is to preserve and protect the natural and cultural resources found on lands under its management in such manner as will leave them unimpaired for future generations.

Management Authorities (Directors Order-18, November 1998 and Reference Manual (RM-18), February 1999) are the guiding documents for FMP implementation in the NPS.

Service-wide fire management policy is expressed in the current revisions of the Directors Orders and attendant Reference Manual, and "The Wildland and Prescribed Fire Management Policy: Implementation and Reference Guide". The Monument's fire management objectives conform to the referenced documents.

II. Relationship to Land Management Planning/Fire Policy

A. National Level Regulations and Policies

Wildland fire management activities conducted by the NPS are guided by NPS Management Policies (NPS, 2001), and the 2001 Federal Fire Policy. Director's Order 18 guides the development of NPS policy relative to fire management, and dictates the program requirements for fire management plans. These requirements are listed in table II.1. The *Bandelier Fire Management Plan* has been prepared in accordance with all relevant policies and guidelines.



National Park Service Management Policies

Table II.1 National Park Service fire management program requirements

<p>National Park Service policy directing development of fire management plans—Director’s Order 18: Wildland Fire Management Section 5: Program Requirements</p>
<p>Every park area with burnable vegetation must have a fire management plan approved by the Superintendent.</p>
<p>All approved fire management plans will:</p> <ul style="list-style-type: none"> • Reinforce the commitment that firefighter and public safety is the first priority. • Describe wildland fire management objectives, which are derived from land, natural, and cultural resource management plans and address public health issues and values to be protected. • Address all potential wildland fire occurrences and consider the full range of wildland fire management actions. • Promote an interagency approach to managing fires on an ecosystem basis across agency boundaries and in conformance with the inherent ecological processes and conditions characteristic of the ecosystem. • Include a description of rehabilitation techniques and standards that comply with resource management plan objectives and mitigate immediate safety threats. • Be developed with internal and external interdisciplinary input and reviewed by appropriate subject matter experts and all pertinent interested parties, and approved by the park Superintendent. • Comply with NEPA and any other applicable regulatory requirements. • Include a wildland fire prevention analysis and plan. • Include a fuels management analysis and plan. • Include procedures for short- and long-term monitoring to document that overall programmatic objectives are being met and undesired effects are not occurring.

Federal Wildland Fire Management Policy

The Interagency Federal Wildland Fire Policy Review Working Group revised the Federal Wildland Fire Management Policy in 2001. Bandelier’s 1997 FMP was based on the 1995 policies and the new FMP will be based on the 2001 policy revisions. The policy’s main elements are listed in Table II.2.

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Table II.2 Main Elements of the 2001 Federal Wildland Fire Management Policy

Policy Element	Policy
Safety	Firefighter and public safety is the first priority. All fire management plans and activities must reflect this commitment.
Ecosystem Sustainability	The full range of fire management activities will be used to help achieve ecosystem sustainability including its interrelated ecological, economic, and social components.
Response to Wildland Fire	Fire, as a critical natural process, will be integrated into land and resource management plans and activities on a landscape scale, and across agency boundaries. Response to wildland fire is based on the ecological, social, and legal consequences of the fire. The circumstances under which a fire occurs, and the likely consequences for firefighter and public safety and welfare, natural and cultural resources, and values to be protected dictate the appropriate management response to the fire.
Use of Wildland Fire	Wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role. Use of fire will be based on approved fire management plans and will follow specific prescriptions described in operational plans.
Rehabilitation and Restoration	Rehabilitation and restoration efforts will be undertaken to protect and sustain ecosystems, public health, and safety, and to help communities protect infrastructure.
Protection Priorities	The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be based on the values to be protected, human health and safety, and the costs of protection. Once people have committed to an incident, these human resources become the highest value to be protected.
Wildland/Urban Interface	The operational roles of federal agencies as partners in the wildland/urban interface are wildland firefighting, hazardous fuels reduction, cooperative prevention and education, and technical assistance. Federal agencies may assist with exterior structural protection activities under formal Fire Protection Agreements that specify mutual responsibilities of the partners, including funding.

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Policy Element	Policy
	(Some federal agencies have full structural protection authority for their facilities on lands they administer; they may also enter into formal agreements to assist state and local governments with full structural protection.)
Planning	Every area with burnable vegetation must have an approved fire management plan. Fire management plans are strategic plans that define a program to manage wildland and prescribed fires based on the area's approved land management plan. Fire management plans must provide for firefighter and public safety; include fire management strategies, tactics, and alternatives; address values to be protected and public health issues; and be consistent with resource management objectives, activities of the area, and environmental laws and regulations.
Science	Fire management plans and programs will be based on a foundation of sound science. Research will support ongoing efforts to increase our scientific knowledge of biological, physical, and sociological factors. Information needed to support fire management will be developed through an integrated interagency fire science program. Scientific results must be made available to managers in a timely manner and must be used in the development of land management plans, fire management plans, and implementation plans.
Preparedness	Agencies will ensure their capability to provide safe, cost-effective fire management programs in support of land and resource management plans through appropriate planning, staffing, training, equipment, and management oversight.
Suppression	Fires are suppressed at minimum cost, considering firefighter and public safety, benefits, and values to be protected, consistent with resource objectives.
Prevention	Agencies will work together and with their partners and other affected groups and individuals to prevent unauthorized ignition of wildland fires.
Standardization	Agencies will use compatible planning processes, funding mechanisms, training and qualification requirements, operational procedures, values-to-be-protected methodologies, and public education programs for all fire management activities.
Interagency Cooperation and Coordination	Fire management planning, preparedness, prevention, suppression, fire use, restoration and rehabilitation, monitoring, research, and education will be conducted on an interagency basis with the involvement of cooperators and partners.
Communication	Agencies will enhance knowledge and understanding of wildland fire

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Policy Element	Policy
and Education	management policies and practices through internal and external communication and education programs. These programs will be continuously improved through the timely and effective exchange of information among all affected agencies and organizations.
Agency Administrator and Employee Roles	Agency administrators will ensure that their employees are trained, certified, and made available to participate in the wildland fire program locally, regionally, and nationally as the situation demands. Employees with operational, administrative, or other skills will support the wildland fire program as necessary. Agency administrators are responsible and will be held accountable for making employees available.
Evaluation	Agencies will develop and implement a systematic method of evaluation to determine the effectiveness of projects begun under the 2001 Federal Wildland Fire Management Policy. The evaluation will assure accountability, facilitate resolution of areas of conflict, and identify resource shortages and agency priorities.

Other Relevant Regulations and Policies

Table II.3 Other relevant regulations and policies listed by topic

Topic	Relevant Regulations and/or Policies
Air Quality	Federal Clean Air Act; Clean Air Act Amendments of 1990; National Park Service Management Policies 2001
Endangered or Threatened Species and Their Habitats	Endangered Species Act; National Park Service Management Policies 2001
Soils	National Park Service Management Policies 2001
Vegetation	National Park Service Management Policies 2001
Water Quality and Hydrology	Clean Water Act; Executive Order 12088; National Park Service Management Policies 2001
Wetlands and Floodplains	Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; National Park Service Management Policies 2001

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Topic	Relevant Regulations and/or Policies
Wilderness	Director's Order 41; National Park Service Management Policies 2001
Wildlife	National Park Service Management Policies 2001
Cultural Resources	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order 28; National Park Service Management Policies 2001
Economics	40 CFR 1500 Regulations for Implementing NEPA
Energy Requirements and Conservation Potential	National Park Service Management Policies 2001
Environmental Justice	Executive Order 12898
Indian Trust Resources	Department of the Interior Secretarial Order No. 3206 and Secretarial Order No. 3175
Public Health and Safety	National Park Service Management Policies 2001
Sustainability and Long-term Management	NEPA, 40 CFR 1500 Regulations for Implementing NEPA, National Park Service Management Policies 2001
Visitor Use and Experience	Organic Act; National Park Service Management Policies 2001

B. Relationship of Bandelier's Fire Management Plan to other Bandelier Plans

Existing management plans at Bandelier, such as the 1990 Statement for Management (NPS, 1990) and the 1995 Resource Management Plan (NPS, 1995a), provide general guidance for all activities in the Monument. The Resource Management Plan (NPS, 1995a) identifies the need for a fire management program and includes goals and objectives pertaining to the restoration and maintenance of ecosystems and ecosystem processes through the use of fire. It also addresses the topic of fire and cultural resources.



III. Wildland Fire Management Goals and Strategies

A. General Management Considerations

Bandelier's fire management program seeks to safely and effectively manage wildland and prescribed fires, while providing for the protection of life, property, and the Monument's natural and cultural resources. The program's aim is to recover, maintain, increase, or facilitate the interaction of native ecosystem processes in an effort to restore and perpetuate the native diversity, resiliency, resistance, and sustainability of Bandelier's natural environments. The program is based on the most up to date scientific research and monitoring (at a variety of spatial scales), and considers past and present human disturbances and effects on the natural and cultural environment. The fire program is also based on the adaptive management concept and therefore implements deliberate and measurable actions that are monitored to determine if the conditions produced are favorable, sustainable, and maintain or improve ecosystem health.

B. Wildland Fire Management Goals

Bandelier's FMP prescribes actions necessary to implement Servicewide fire management policies (DO-18) (NPS, 2003) and to achieve the Monument's fire and resource management goals and objectives. The following fire and resource management goal is identified in Bandelier's Resource Management Plan (NPS, 1995), Fire Management Plan (NPS, 1997), and Strategic Plan (NPS, 2000a):

1. Provide the means for staff and the public to preserve, protect, understand, and enjoy the natural and cultural resources of Bandelier National Monument through an integrated program where management activities support naturally functioning ecosystems consistent with cultural resource preservation needs.

Bandelier's Fire Management Plan identifies three additional goals:

1. Educate, inform, consult, collaborate, and maintain cooperative fire planning with other land agencies, landowners, and local communities.
2. Achieve ecologically sustainable vegetative conditions across broad vegetation communities by restoring a natural range of variability and bio-diversity. These conditions are described as Desired Future

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Conditions (DFCs) and are explained in detail in chapter 3 E under “Bandelier Fuel Types and Desired Future Conditions.”

3. Identify and mitigate hazards related to the Wildland Urban Interface (WUI) through coordination and collaboration with neighboring agencies and landowners over time and across boundaries.

The following fire management objectives support these goals:

1. Protect life, property, and Bandelier’s natural and cultural resources from the effects of unwanted fire.
2. Prevent or mitigate impacts due to fire suppression activities.
3. Institute and maintain a comprehensive Fire Information and Education Program.
4. Restore and maintain fire-dependent ecosystems with the appropriate use of fire.
5. Use prescribed fire to meet fire and resource management goals and objectives.
6. Allow natural fires to function in fire dependent ecosystems.

The following fire management strategies may be implemented to maximize the opportunity of achieving the above stated objectives:

Objective 1: Protect life, property, and Bandelier’s natural and cultural resources from the effects of unwanted fire.

- Give primary consideration to firefighter, employee, and public safety and provide for the safety of Bandelier’s visitors, neighbors, and employees during all phases of fire management operations.
- Conduct all fire management activities commensurate with applicable laws, policies, and regulations.
- Suppress all unwanted fires in Bandelier.
- Cooperate extensively with adjacent land management agencies to facilitate safe and prompt suppression of wildfires in the interagency mutual aid zone.
- Efficiently use available fiscal resources to suppress wildfires.
- Use prescribed fire and/or mechanical treatments in Bandelier’s developed zones to reduce the risk of property damage due to wildland fire and to provide for human safety and resource protection.
- Create defensible space zones around structures and developed areas in the Monument by using manual and mechanical treatments and/or prescribed fire to clear vegetation and reduce continuity of fuels.
- Implement a cooperative fire prevention program to eliminate unplanned human-caused ignitions.

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- Conduct inventories, identify sensitive natural and cultural resources, and develop mitigation plans that provide for the preservation and protection of Bandelier's natural and cultural resources.

Objective #2: Prevent or mitigate impacts due to fire suppression activities.

- Use Minimum Impact Suppression Tactics (see Appendix D for a detailed description) and rehabilitate disturbed areas to protect and mitigate impacts on Bandelier's natural, cultural, wilderness, and scenic resources.
- Ensure that a resource advisor is present and/or consulted on all major fire program activities.
- Inform and train firefighters about the impacts of fire suppression on Bandelier's sensitive natural and cultural resources.
- Avoid the use of non-native seed to rehabilitate sites disturbed by wildland fires or their suppression.

Objective 3: Institute and maintain a comprehensive Fire Information and Education Program.

- Conduct wildland fire prevention, information, education, and other activities in communities within and abutting the Monument, working in collaboration with local communities and county, state, and federal agencies with fire management interests.
- Educate employees and the public about the scope and effect of wildland and prescribed fire management, including fuels management, smoke management, resource protection, fire prevention, hazard/risk assessment, mitigation, rehabilitation, the wildland/urban interface problem, and the role of fire in ecosystem management.
- Emphasize interagency communications for fire management activities, such as job training, sharing of staff, sharing of resources, and evaluation of fire management actions and activities.
- Maintain relationships with the Native American community and encourage their participation in the management of traditional gathering areas. Facilitate the transfer of knowledge about fire management and traditional cultural practices.
- Collaborate with county and state air resources agencies to monitor smoke levels and manage smoke-related effects on visitors, residents, and employees.

Objective 4: Restore and maintain fire-dependent ecosystems with the appropriate use of fire.

- Using the best available scientific data, continue to refine and develop a range of desired future conditions and ecologically sound fire and resource management objectives for Bandelier's vegetation and wildlife communities.

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- Include fire and resource management objectives specific to each prescribed fire in the prescribed fire burn plan.
- Use fire to promote the maintenance of native vegetation and discourage non-native vegetation invasions.
- Utilize research and monitoring to improve our understanding of the role of fire in Bandelier's vegetation and wildlife communities. Based on this information, modify actions and strategies to achieve fire and resource management goals and objectives.

Objective 5: Use prescribed fire to meet fire and resource management goals and objectives.

- Where applicable, restore fuel loads and plant community structure and composition to ranges of natural variability comparable to pre-anglo settlement (pre 1880) using a predetermined regimen of management-ignited prescribed fires.
- Use management ignited prescribed fires to reduce hazardous fuels and minimize the occurrence of unnaturally intense wildland fires.
- Avoid prescribed fires that would reduce air quality below federal, state, and local regulations.
- Train Bandelier's staff and cooperators to conduct safe, objective-oriented prescribed fires consistent with DO-18 requirements.
- Ensure that a resource advisor is present or consulted on all prescribed fires.
- Institute and maintain a Fire Ecology Program that, at a minimum, utilizes the National Park Service's Fire Monitoring Handbook (NPS, 2001b) and Fire Effects Assessment Tool to ensure that fire effects are monitored, recorded, and evaluated for all prescribed fires in Bandelier.

Objective 6: Allow natural fires to function in fire dependent ecosystems.

- Allow naturally ignited (lightning) fires to burn in areas where the fuel load and vegetative structure does not promote sustained extreme fire behavior.
- Allow Wildland Fire Use (WFU) within constraints of policy (NPS, 2003).
- Ensure that a resource advisor is present or consulted on all WFU.

C. Wildland Fire Management Options

Fire suppression

Suppression involves extinguishing a wildland fire that is burning outside of prescription parameters (e.g. rate of spread is too high), is not meeting fire and resource objectives, is in a location designated as a suppression zone, or may pose an immediate threat to life or property. All non-planned human caused fires will be suppressed. Tactics for suppression are varied and depend on the

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particular situation (e.g. location, weather, safety considerations, etc.) for each individual fire. Suppression actions can include hand crews cutting a line around the fire perimeter to remove live and dead vegetation; water and retardant drops from aircraft; manual and mechanical thinning; “burn out” situations in which fire is used to remove live and dead vegetation in an effort to stop the fire; and “cold trailing” in areas of low fuel loads, where crews physically feel the ground and put out “hot spots.”

In areas with sensitive natural or cultural resources, Minimum Impact Suppression Tactics (MIST) (see Appendix D) are used and/or resource advisors are consulted.

Wildland Fire Use

Wildland Fire Use is the practice of allowing a naturally ignited wildland fire to burn in a predefined geographic area, under specific prescription parameters, to accomplish fire and resource management goals and objectives. The safety of firefighters and the public is the number one concern in managing a WFU. Through pre-planning, fire monitoring, and appropriate management response, many wildland fires can be managed to protect values at risk as well as to obtain resource benefits. Elements of managing a WFU include public information and education, fire behavior and fire effects monitoring, and coordination with other agencies.

Note: Values at risk are defined in this document as an assessment of resources, such as property, structures, natural and cultural resources, and economic, political, environmental, and social values, which may be affected by an incident now and in the foreseeable future.

Prescribed fire

Prescribed fires are intentionally lit under predetermined conditions to meet fire and resource management goals and objectives. Prescribed fires include pile burning, where vegetation is cut and moved to a central location and burned, or broadcast burning, where fires are ignited within a predefined area and allowed to move through the vegetation within those boundaries. All environmental compliance must be met prior to any fire ignition and a written and approved prescribed fire plan must exist. Within the prescribed fire plan are detailed prescription parameters that must be followed.

Non-fire fuel treatments

Non-fire fuel treatments include manual and mechanical thinning. In general, thinning involves removing live and dead vegetation (fuels) according to a prescribed plan to meet specific objectives related to hazardous fuels management. Thinning is also used as a pre-treatment for prescribed burning to

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remove smaller diameter trees, ladder fuels, shrubs, snags, and ground litter to help keep the fire within the designated area or to protect specific resources. When multiple burns are needed to reduce hazardous levels of fuels, thinning pre-treatments can expedite the process by several years. Thinning is also used in suppression actions and as an effective treatment to reduce fuels in the WUI.

Adaptive management

Adaptive management is generally considered to be the process of continually adjusting management strategies in response to new information, knowledge, or technologies. The City of Boulder (Colorado) Forest Ecosystem Management Plan (1999) states the following comprehensive definition of adaptive management: "A process for implementing management decisions that requires monitoring of management actions and adjustment of decisions based on past and present knowledge. Adaptive management applies scientific principles and methods to improve management decisions incrementally as experience is gained and in response to new scientific findings and societal changes."

The adaptive management cycle begins with developing a plan that articulates the project's goals, objectives, and strategies. The plan is then implemented and the actions and responses are monitored. The results of this monitoring are evaluated to determine if the actions were appropriate and achieved the stated goals and objectives, or if a change in action or method is necessary to meet objectives.

Fire Ecology Program

In order to use prescribed fire on NPS lands, RM-18 (NPS, 2003) mandates that a Fire Ecology Program be in place. This vegetation monitoring program uses the best available information (such as data collected on-site, scientific journals, and knowledge from resource specialists) to formulate realistic objectives for desired future resource conditions. Involving the Monument staff at many levels, as well as local scientists from universities or cooperating/neighborhood agencies, is important to this process. Once desired future resource conditions are agreed upon, specific and measurable objectives are written, a desired degree of certainty in the results is determined, and vegetation sampling protocols are established and implemented. After the data has been collected, it is used to evaluate if fire and resource management objectives are being met and to determine if additional research is needed. If unexpected trends are identified, objectives may need to be revised and/or the program re-evaluated. When this information is used to re-evaluate program goals or objectives, the adaptive management process comes full-circle.

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The over-riding goals and objectives of the Fire Ecology Program are to:

1. Use an adaptive management approach to work with resource and fire managers to identify resource management challenges, desired future conditions, and monitoring objectives for vegetation types to be treated with prescribed fire.
2. Record basic fire behavior and weather information for all prescribed fires.
3. Establish and implement a sampling design and data collection protocol for each vegetation community to be treated with prescribed fire.
4. Document and analyze short and long-term fire effects on vegetation.
5. Use all available information to determine if fire and resource management objectives are being met.
6. Identify where or if additional fire effects research is needed.

Fire monitoring

Monitoring of all fires, including suppression fires, WFU, and prescribed fires, involves the systematic collection and recording of data on fuels, topography, weather, air quality, and fire behavior. At a minimum, monitoring at Bandelier follows the protocols outlined in the NPS Fire Monitoring Handbook (NPS, 2001c). This fire behavior and weather information is broadcast over radios to all fire personnel during the fire event and then later provided to fire managers in a report. All prescribed fire monitors are trained and certified in both basic fire behavior and prescribed fire monitoring techniques.

D. Description of Wildland Fire Management Strategies by Fire Management Unit (FMU)

For the purposes of guiding the management of fire, Bandelier recognizes four possible fire situation designations (“units”) that could be applied to all geographic areas in the Monument. These designations were created in collaboration with other land agencies and interested organizations including the Bureau of Land Management, the United States Forest Service, Bureau of Indian Affairs, state agencies, and county and city governments who have jurisdiction on lands adjacent to the Monument. Units were created to ensure that management of wildland fires and fuels would be well coordinated among the various agencies that manage public lands in and surrounding the Monument.

The designations, or units, identify which fire management activities and strategies have been applied to specific areas in the Monument. The characteristics and objectives of each unit are listed in Table III.1 below.

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Table III.1 Characteristics and objectives of each fire management unit.

Unit Number	Characteristics	Objectives
1	<p>In unit 1, wildland fire is typically <u>not</u> desired.</p> <p>Areas generally have a high fuel hazard with fire regimes 1, 2, or 3, and condition class of 3; and/or wildland fires would threaten life or property such as in residential areas and in other areas with high-value natural, cultural, or structural resources such as watersheds, developed recreation sites, private lands, and areas where there is little or no social tolerance for wildland fire.</p>	<p>Provide highest level of fire protection in this unit.</p> <p>Emphasize full fire suppression response over other responses to wildland fires.</p>
2	<p>In unit 2, wildland fire is typically <u>not</u> desired but there could be exceptions when the fire environment (fuel, weather, topography) is conducive to WFU.</p> <p>Areas are generally in close enough proximity that fire could carry into a unit 1 area and/or have a high fuel hazard with fire regimes 1,2, or 3 and condition class 3, but the natural, cultural, or structural values are not as high as in unit 1. Also areas where there is a low social tolerance for wildland fire, although tolerance for fires is higher than in unit 1.</p>	<p>Provide high level of fire protection.</p> <p>Emphasize suppression other than full control responses (contain, control, confine).</p>
3	<p>In unit 3, wildland fire is typically desired but there are exceptions when the fire environment (weather, fuel, topography) would lead to unacceptable impacts, or fire is socially unacceptable.</p> <p>Areas are generally outside the WUI, communities at risk, municipal watersheds, and other areas containing high-value natural, cultural, or structural resources.</p> <p>There is at least a moderate level of social tolerance for wildland fires.</p>	<p>Allow fire to serve its natural role in the ecosystem</p> <p>Emphasize WFU as the primary strategy except where environmental or social conditions dictate otherwise.</p>

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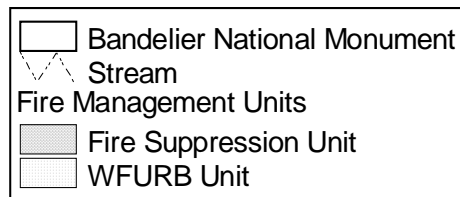
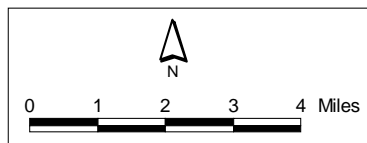
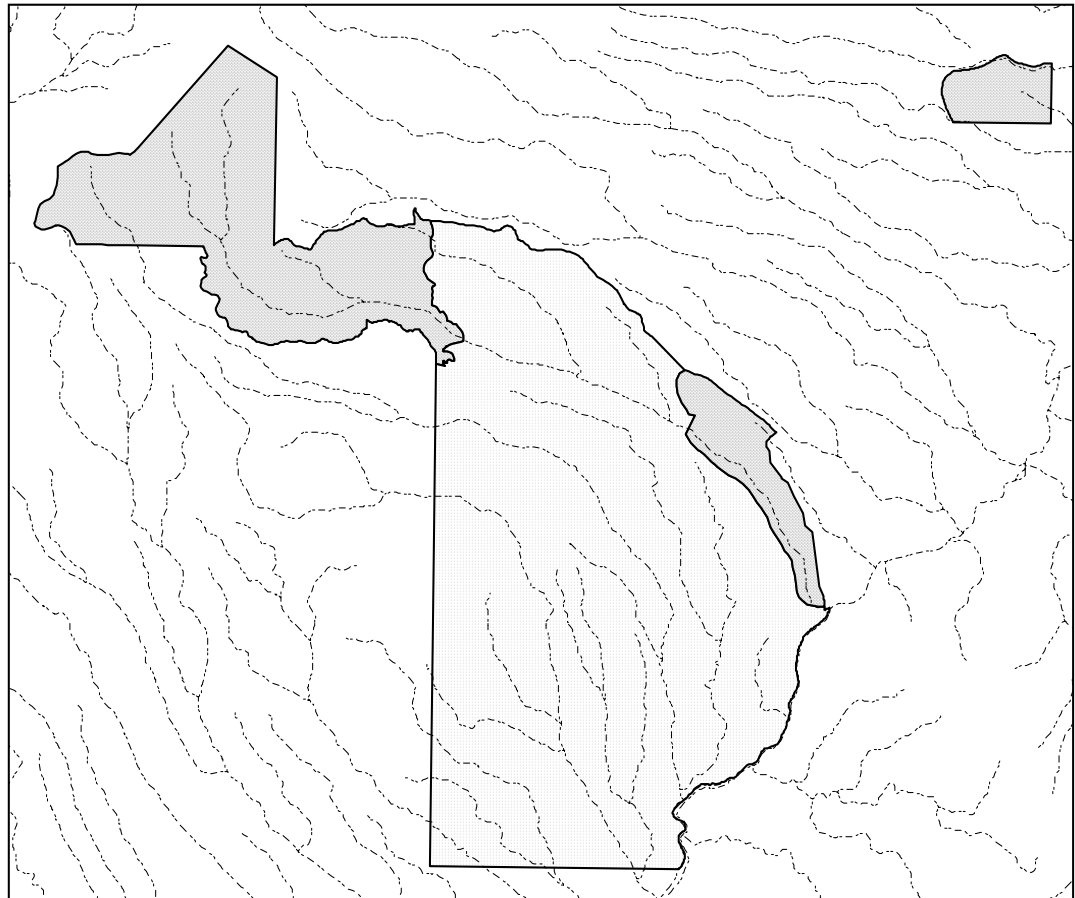


4	In unit 4, wildland fire is desired. Areas are generally located away from WUIs, communities at risk, municipal watersheds and other areas containing high-value natural, cultural, or structural resources, such as within the interior of designated wilderness or other largely unroaded and undeveloped areas, and/or where there is a high level of social tolerance of wildland fires.	Allow fire to serve its natural role in the ecosystem. Emphasize WFU as the primary strategy.
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At present, Bandelier is divided into two areas, Unit 1: fire suppression and Unit 3: WFU unit (Figure 3.1). Units 2 and 3 have not been applied to areas within the Monument, but do exist on adjacent federal lands.

Figure 3.1 Fire Management Units in Bandelier National Monument



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Unit 1: fire suppression unit. All natural ignitions within the boundaries of Unit 1 are declared unwanted wildland fires and are suppressed. However, prescribed fires in this unit are utilized for the purposes of hazard fuel reduction and natural and cultural resource management.

This unit consists of three geographic areas within the Monument:

1. The visitor center, headquarters, and the mesa-top developed area. This also includes trailheads in and around Frijoles Canyon Headquarters area. These features, along with attendant utilities, large cultural sites, and other values are at risk for potential damage or destruction resulting from wildland fire.
2. Apache Mesa, west of the Upper Frijoles Crossing trail and the entire Upper Frijoles watershed.
3. The detached Tsankawi unit.

Unit 3: Wildland Fire Use unit. All natural ignitions which meet prescription parameters as well as fire and resource management goals and objectives are allowed to burn in this unit.

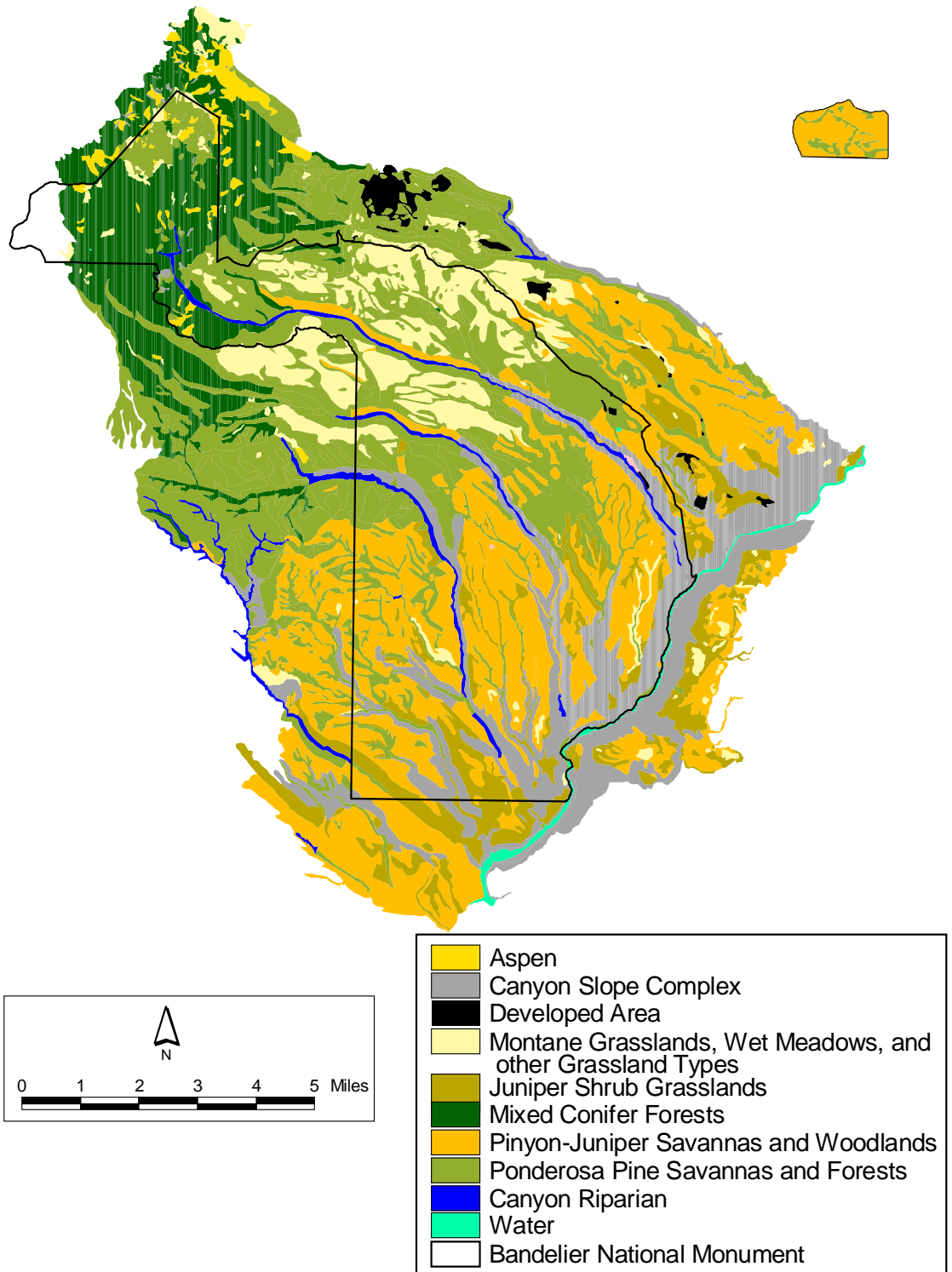
This unit comprises all of the remaining Monument lands. It lies south of State Route 4 between the Ponderosa Pine Campground and approximately one mile west of the Bandelier entrance station. In addition, the mesas between Frijoles and Alamo canyons and all the land south of Alamo Canyon to the Monument boundary is included in this unit.

E. Bandelier Fuel Types and Desired Future Conditions

The vegetation community classification presented below was developed for management purposes to provide convenient and easily recognized groupings of major plant assemblages that occur at Bandelier. This classification is useful primarily at a landscape scale, therefore considerable variability may exist within the defined types. An overview of the vegetation communities at Bandelier and their relative distribution can be seen on the accompanying vegetation maps of Bandelier: Main Unit (Figure 3.2) and Tsankawi Unit (Figure 3.3).

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Figure 3.2 Vegetation Communities in Bandelier National Monument

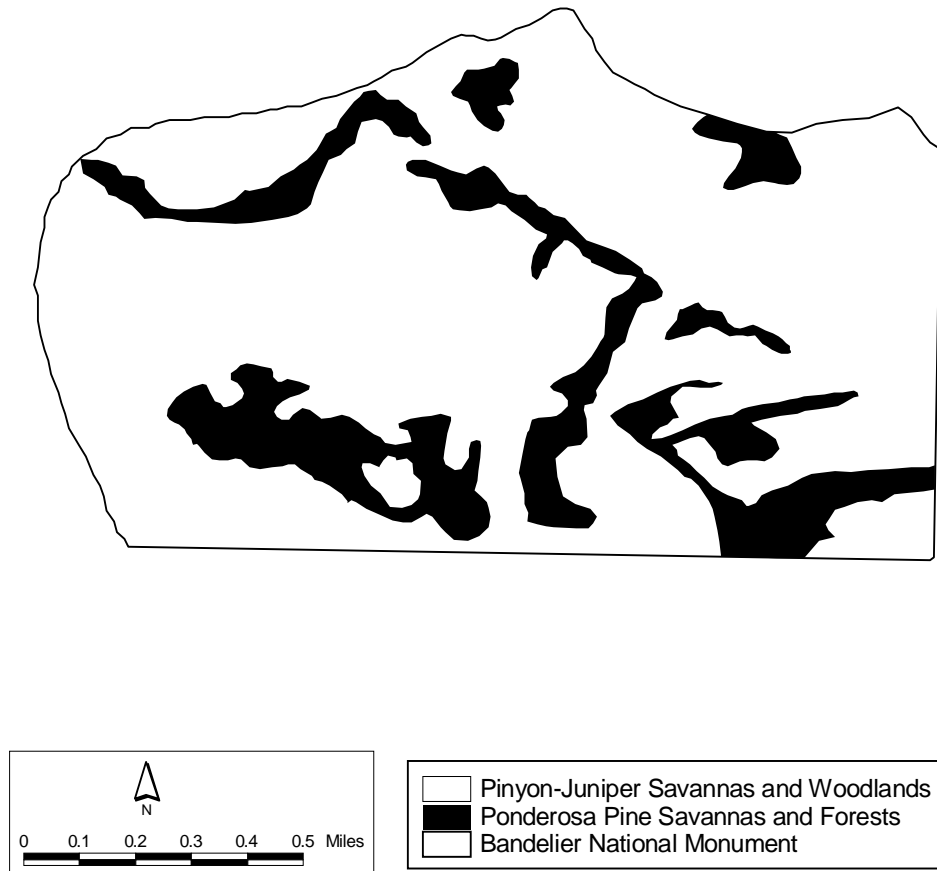


3/1/05 K.Beeley, Bandelier National Monument

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Figure 3.3 Vegetation Communities in Tsankawi Unit, Bandelier National Monument



3/1/05 K.Beeley, Bandelier National Monument

A general elevational sequence of the major vegetation cover types within Bandelier from the eastern boundary of the Monument along the Rio Grande at 5,300 ft to the summit of Cerro Grande at 10,200 ft would proceed as follows: juniper-shrub grasslands occur from 5,300 ft to approximately 6,200 ft; pinyon-juniper woodlands from 6,200 to 7,000 ft; ponderosa pine forests 7,000 to 7,500 ft; and mixed conifer forests consisting of ponderosa pine, Douglas fir, white fir, Engelmann spruce, blue spruce, aspen, and limber pine from 7,500 to 10,200 ft. Grassland, shrub, and aspen types are primarily found on southerly exposures within the mixed conifer zone. Detailed descriptions of vegetation communities are below.

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Also included under each vegetation community classification is a description of the fire behavior fuel model (see figure 3.4 for a map of Bandelier's fuel models). These mathematical fire behavior fuel models were developed by Rothermel (1972) and Albin (1976) to provide a quantitative basis for rating fire danger and predicting fire behavior. This can be valuable in fire control efforts and when assessing potential damage to resources. There are thirteen different models that provide a description of fuel properties, such as the fuel load, fuel bed depth, and moisture of extinction of dead fuels (the moisture at which fire will not spread) that are typical of a particular fuel complex (vegetation community). These fuel characteristics, which differ between vegetation communities, are then used to estimate the potential fire behavior (Anderson, 1982). The National Fire Danger Rating System (NFDRS) values are also noted for each fire behavior fuel model.

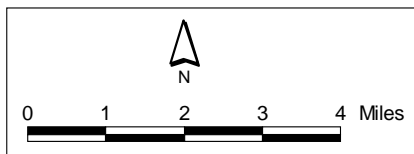
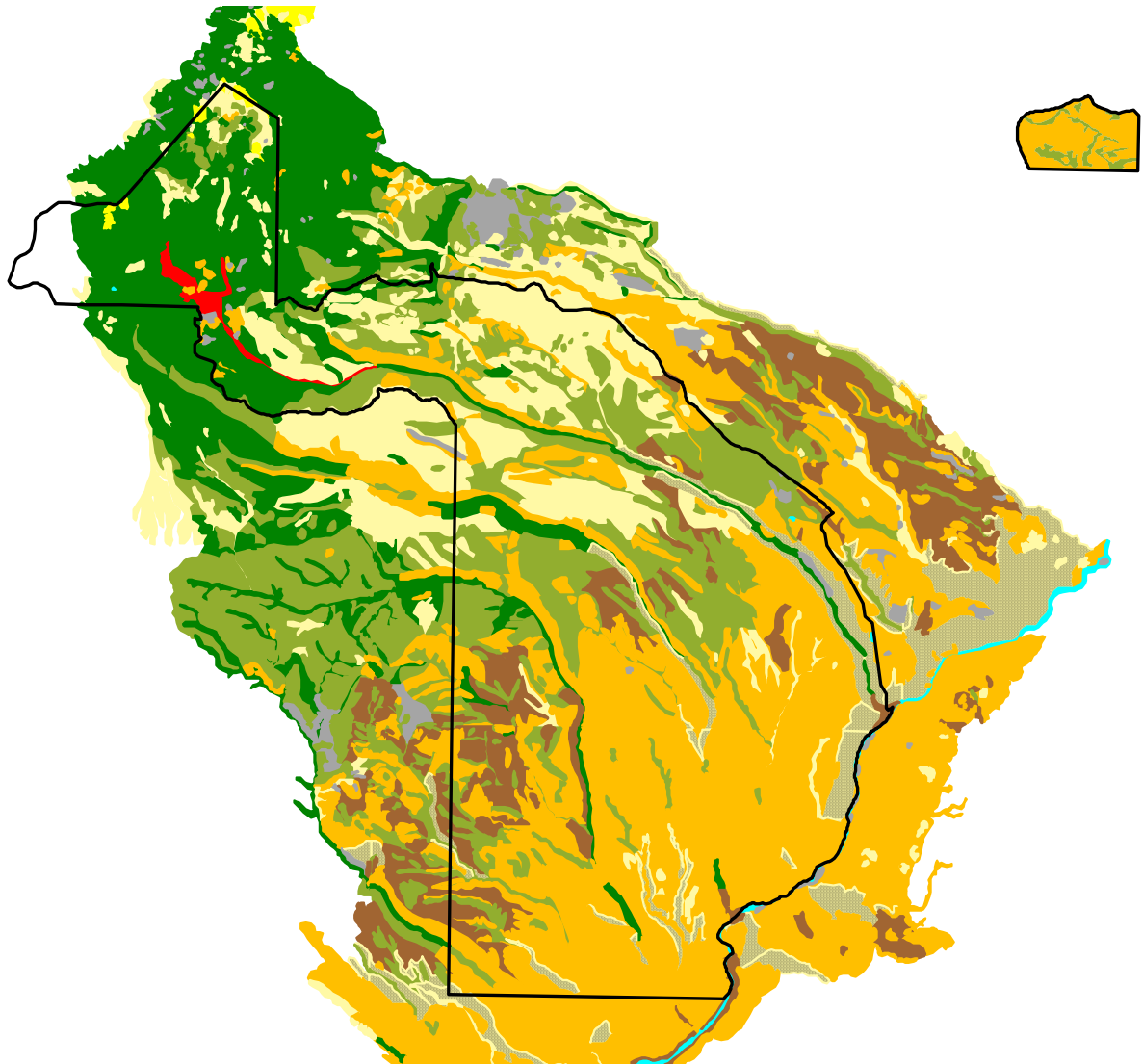
One of the main goals of the fire management program at Bandelier is to achieve ecologically sustainable vegetative conditions across broad vegetation communities by restoring a natural range of variability and biodiversity. These vegetative conditions are described below as DFCs for each vegetation community.

Desired future conditions of Bandelier's plant communities are based on inferences about the nature and status of these plant communities prior to historical landuse patterns (beginning around 1880). While precise information about vegetative characteristics (i.e. structure and composition) within Bandelier prior to 1880 is incomplete, historic accounts from oral, written, and photographic records provide some general impressions. Tree age class information can provide a higher resolution record of pre-1880 forest structure, but only for the specific sites sampled. In addition, defining precise structural targets is complicated by spatial and temporal variability inherent in plant communities as influenced by site conditions, climate, and their effects on individual species recruitment and mortality. Process oriented, functional definitions for target conditions (i.e. in terms of a historic fire frequency and fire behavior) may be more practical since they acknowledge the inherent variability in natural systems. In addition, functional definitions can provide a realistic measure of community stability, since processes like fire can be directly correlated with stand structure. Since DFCs cannot be precisely defined on the basis of existing information, only general recommendations will be made. Target conditions will be defined from both a structural and functional perspective. As additional information becomes available, we will continue to refine management objectives relative to desired future conditions.

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Figure 3.4 Fire Behavior Fuel Models in Bandelier National Monument



	Short grass, models 1 or A
	Grass understory, models 2 or C
	Tall grass, models 3 or L
	Brush, models 4 or B
	Brush, models 5 or F
	Short needles, models 8 or G
	Long needles, models 9 or C
	Heavier fuels, models 10 or U
	Water
	Bare ground or developed area
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Juniper-shrub grasslands:

Characterized by the presence of a one-seed juniper overstory (frequently occurring as a result of tree invasion since 1880) with an understory of various shrubs, grasses and forbs. Typical shrubs may include wavyleaf oak, mountain mahogany, skunk bush, apache plume, rabbit brush, and big sagebrush. This type is found on the lower mesas and canyon slopes and on elevated benches along the Rio Grande corridor. In addition to relict juniper savanna communities, this type incorporates former shrub and grassland communities recently invaded by juniper as a result of historic grazing and loss of fire regime.

Fire behavior fuel model:

The juniper-shrub grasslands are a fire behavior fuel model 5. This correlates with the NFDRS model D. Fire is generally carried in the surface fuels (litter, grasses, and forbs) and is typically not very intense because surface fuels are light and sparse. Table III.2 lists the fuel model values for estimating fire behavior for model 5.

Table III.2 Fuel model values for estimating fire behavior, model 5

Total fuel load of dead and live materials < 3 inch	3.5 tons/acre
Dead fuel load of materials .25 inch	1.0 tons/acre
Live fuel load (foliage)	2.0 tons/acre
Fuel bed depth	2.0 feet
Moisture of extinction (dead fuels)	20%

Desired future conditions for this type include grass, forb, and shrub dominated communities with scattered mature trees (<10% cover) and herbaceous ground cover sufficient to stabilize soils and carry fire (at intervals of less than 2 years). Isolated patches of juniper dominated woodlands (canopy cover >30%) may occur on shallow soil or rocky substrate sites.

Pinyon- juniper savannas and woodlands:

Generally characterized by overstory dominance of Colorado pinyon pine and/ or one-seed juniper overstory with a potentially diverse shrub, grass and forb understory. Dominant shrubs include wavyleaf oak and mountain mahogany. This community is located elevationally between the juniper-shrub grasslands and ponderosa pine types and is distinguished from the former by increased tree canopy cover and presence of pinyon pine. Embedded within this type are at least two distinct entities: older growth woodlands on rocky, shallow soil sites and recently invaded savanna

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communities on deeper, more productive soil sites. Since the 1950's, pinyon and juniper have expanded their ranges upslope into the ponderosa community while juniper has invaded downslope into former grassland and shrub dominated communities; density of trees has increased dramatically throughout. These changes are thought to be a result of historic grazing and loss of fire regime since 1880 (Allen, 1989). Alligator juniper becomes an important component of woodlands on steep rocky slopes in the southern portion of the Monument.

Fire behavior fuel model:

The pinyon- juniper savannas and woodlands are a fire behavior fuel model 6. This correlates with the NFDRS models F and Q. Fire carries through the shrub layer, requiring moderate winds (> 15 to 20 mi/hr at 20 ft. level). Fire will drop to the ground at low wind speeds or at openings in the stand. Table III.3 lists the fuel model values for estimating fire behavior for model 6.

Table III.3 Fuel model values for estimating fire behavior, model 6

Total fuel load of dead and live materials < 3 inch	6.0 tons/acre
Dead fuel load of materials .25 inch	1.5 tons/acre
Live fuel load (foliage)	0 tons/acre
Fuel bed depth	2.5 feet
Moisture of extinction (dead fuels)	25%

Desired future conditions for the pinyon-juniper savanna include a savanna-like community that maximizes a diverse shrub and grass-forb understory. Major tree species include both pinyon and juniper in varying proportions depending on local site conditions. Mature tree canopy coverage averages less than 15%, with herbaceous and/ or shrub ground cover sufficient to stabilize soils and carry fire (at intervals of 10-25 years). These communities would typically be located on deeper and more productive soil sites where sufficient herbaceous cover can sustain frequent fires of intensity necessary to maintain open stand structure.

Desired future conditions in the pinyon-juniper woodland include tree dominated woodland communities with canopy coverages generally exceeding 30%; herbaceous understories are sparse with fire return intervals in excess of 25 years. These communities would typically be located on rocky, shallow soil sites which limit herbaceous productivity, limit fire frequency and intensity, and promote woody plant dominance.

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Ponderosa pine savannas and forests:

Dominated by a mature ponderosa pine overstory (from open savanna structure to closed canopy) with a variety of grass-forb, shrub, and tree understories depending on elevation and aspect as well as recent fire history. Fire suppression and overgrazing in ponderosa pine forests have resulted in increasing both stand densities of ponderosa as well as recruitment of pinyon-juniper (upslope) and mixed conifer (downslope). Areas recently altered by catastrophic crown fire (i.e. La Mesa and Dome fire areas) are included under other grassland types since they are currently lacking the characteristic mature ponderosa pine overstory.

Fire behavior fuel model:

The ponderosa pine savannas and forests are a fire behavior fuel model 9. This correlates with the NFDRS model E, P, U. Fire carries through the surface litter at slow to moderate speeds. Concentrations of dead and down woody materials contribute to the torching of trees, spotting, and possibly crowning. Table III.4 lists the fuel model values for estimating fire behavior for model 9.

Table III.4 Fuel model values for estimating fire behavior, model 9

Total fuel load of dead and live materials < 3 inch	3.5 tons/acre
Dead fuel load of materials .25 inch	2.9 tons/acre
Live fuel load (foliage)	0 tons/acre
Fuel bed depth	.2 feet
Moisture of extinction (dead fuels)	25%

Desired future conditions for this type are communities with ponderosa pine as the dominant tree overstory, but encompassing both a wide range of cover values (from open savanna with approximately 5% mature tree cover to nearly closed canopy) and mixed age structure (i.e. seedlings, mid-story trees, overstory trees, dead snags, and dead and down logs). Trees in excess of several hundred years would be scattered throughout with understories of grass-forb, shrub, and other tree species variable depending on aspect, elevation, and time since last fire. Overstory tree canopy cover and understory ladder fuels would generally be broken and patchy, effectively mitigating opportunities for continuous crown fire runs, while allowing limited torching of closed canopy patches. Accumulations of surface fuels (litter, duff, slash, logs, etc.) would be consumed periodically by low intensity, surface fire avoiding widespread damage to soils, mature canopy root systems, and perennial herbaceous cover.



Mixed conifer forests:

Mixed conifer forests, occurring on mountain slopes and within upper canyon drainages, are characterized by a mixed overstory of mostly coniferous species (i.e. dominated Douglas fir with subdominants being ponderosa pine, white fir, aspen, Engelman spruce, and limber pine. Blue spruce is common in mesic meadow situations where it may form nearly pure stands. Douglas fir is common throughout with ponderosa pine becoming dominant on dry mountain slopes and ridges. In the absence of fire, aspen clones can become over topped by coniferous species and grazing pressures can accelerate conversion of aspen to mixed conifer type through the combined effects of browsing on aspen saplings and consumption of fine fuels. At high elevations on northern exposures (primarily outside Monument boundaries), corkbark fir and Engelman spruce also become an important component of the mixed conifer type. Absence of fire from this type, as a result of fire suppression activities, has resulted in increased densities of the more shade tolerant trees in the understory, reduced herbaceous and shrub cover, and heavy fuel loading. Within this type are two sub-components distinguished by stand structure and species composition and a function of location and fire regime.

The common and widespread sub-component is distinguished by uneven stand structure with older growth, open stand structure, and an herbaceous/ shrub understory maintained by fire return intervals less than 15 years. The second sub-component is more limited in extent; it is distinguished by a uniform, even-aged stand structure which is maintained by episodic crown fire return intervals (>100 years) and is often localized to steep, upper elevation, canyon systems, or north facing slopes. The cool, moist conditions in these settings and associated species composition that produces compact ground litter, precludes surface fire in most years. Even aged structure is reflective of episodic mortality and establishment following fire events.

Fire behavior fuel model:

The mixed conifer forests are a fire behavior fuel model 10. This correlates with the NFDRS model G. Fires burn in the surface litter and ground fuels with moderate to high intensity and speed. There is generally a large amount of dead and down fuel greater than 3 inches in diameter present on the forest floor. Crowning, spotting, and torching of individual trees are more frequent in this fuel type. Table III.5 lists the fuel model values for estimating fire behavior for model 10.

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Table III.5 Fuel model values for estimating fire behavior, model 10

Total fuel load of dead and live materials < 3 inch	12.0 tons/acre
Dead fuel load of materials .25 inch	3.0 tons/acre
Live fuel load (foliage)	2.0 tons/acre
Fuel bed depth	1.0 feet
Moisture of extinction (dead fuels)	25%

Desired future conditions for the common sub-component (uneven age type) of this vegetation community are mixed conifer forests with several species sharing dominance depending on local site conditions and with a full range of age classes (i.e. seedlings, midstory trees, overstory trees, dead snags, and dead and down logs). Trees in excess of several hundred years would be scattered throughout with understories of grass-forb, shrub, and other tree species variable depending on aspect, elevation, and time since last fire. Overstory tree canopy cover and understory ladder fuels would be broken and patchy, effectively mitigating opportunities for continuous crown fire runs, while allowing limited torching of canopy patches. Accumulations of surface fuels (litter, duff, slash, logs, etc.) would be consumed periodically by low intensity, surface fire avoiding widespread damage to soils, mature canopy root systems, and perennial herbaceous cover. Fire disturbance would likely reveal former patches of montane meadow, aspen, and ponderosa types now embedded within the mixed conifer.

Desired future conditions for the uniform age mixed conifer type would be similar to current conditions with expectations that episodic crown fire will continue to impose mortality and recruitment cycles in excess of 100 years and maintain uniform stand structure.

Aspen groves:

These communities are dominated by an overstory of aspen (often to the exclusion of other species) with an understory of grasses and forbs. It is considered a potentially long-lived, but fire dependent seral stage which colonizes 'holes' created in mixed coniferous forests created by crown fire. These aspen clones will yield dominance to mixed conifer establishment in the absence of periodic fire.

Fire behavior fuel model:

The aspen groves are a fire behavior fuel model 8. This correlates with the NFDRS model H and R. Fire generally moves slowly through the surface layer with short flame lengths, although occasional heavy fuel

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concentrations may occur which cause the fire to flare up. Table III.6 lists the fuel model values for estimating fire behavior for model 8.

Table III.6 Fuel model values for estimating fire behavior, model 8

Total fuel load of dead and live materials < 3 inch	5.0 tons/acre
Dead fuel load of materials .25 inch	1.5 tons/acre
Live fuel load (foliage)	0 tons/acre
Fuel bed depth	.2 feet
Moisture of extinction (dead fuels)	30%

Desired future conditions for this type include maintenance and possible expansion of existing clones through periodic fire disturbance. This is a dynamic community which is dependent on episodic fire mortality, sprouting, and establishment to maintain itself.

Montane grasslands, wet meadows and other grassland types:

This assemblage includes several grass dominated communities currently distributed as localized patches and becoming embedded within the mixed coniferous type through progressive tree invasion due to the absence of fire. Montane grasslands are grass and forb dominated openings within mixed conifer or aspen forests on southerly exposures of upper mountain slopes. Occasionally intermingled with montane meadows are rock fields (felsenmeers) which can support patchy shrub and forb growth where soils have accumulated. Wet meadow areas are similarly situated grassy openings within mixed conifer forests, but located at the low gradient base of mountain slopes where snow runoff accumulates in late spring. Other montane grasslands include those grassy areas of more recent origin which may exist as a result of recent crown fire or mechanical clearing. All of these grasslands are interspersed with or bounded by stands of mixed conifer and aspen and can be considered a fire dependent seral stage since they will yield to mixed conifer establishment in the absence of fire. Patches of shrub (i.e. gambel oak and mountain spray) and scattered coniferous trees are often present in all types. In addition to active fire suppression, some of these grassland areas (i.e. wet meadows) have been subject to intensive overgrazing which has facilitated the establishment of exotic perennial grasses and forbs (i.e. white clover, dandelion, and Kentucky blue grass). Other grassland types include former ponderosa pine forests converted to grass and shrub (gambel oak and New Mexico locust) dominated systems by recent catastrophic crown fire; recovery of these areas to ponderosa pine forest is not anticipated for up to several hundred years.

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Fire behavior fuel model:

The montane grasslands, wet meadows, and other grassland types are a fire behavior fuel model 1. This correlates with the NFDRS models A, L, and S. Fire moves through cured grasses and associated materials at rapid speeds. Table III.7 lists the fuel model values for estimating fire behavior for model 1.

Table III.7 Fuel model values for estimating fire behavior, model 1

Total fuel load of dead and live materials < 3 inch	.74 tons/acre
Dead fuel load of materials .25 inch	.74 tons/acre
Live fuel load (foliage)	0 tons/acre
Fuel bed depth	1 feet
Moisture of extinction (dead fuels)	12%

Desired future conditions for these grassland types would be to expand existing acreage to reclaim areas recently colonized by mixed conifers during the last 100 years. Native herbaceous (grass and forb) and shrub species should predominate (with <5% tree cover) and cover of non-native species should be steady to declining. Boundaries of grassland and forest type continue to be dynamic over the span of hundreds of years relative to fire disturbance regime and climatic patterns.

Canyon slope complex:

This complex resembles the vegetation type on adjacent mesas and mountain slopes, but with additional floristic elements favoring steep, rocky or extreme north/south exposures as well. Reference should be made to the dominant overstory vegetation (i.e. pinyon-juniper, ponderosa pine, and mixed coniferous canyon slope complex). Within the upper elevation mixed coniferous type, the canyon slope community is not distinguishable from the adjacent mountain slope and mesatop communities. At lower elevations, the canyon slope complex becomes more distinct from the adjacent mesa top vegetation types (i.e. lower elevation ponderosa and pinyon-juniper woodlands) and relative to these has lower densities of trees, higher densities of shrubs, and a more robust grass cover. Typical shrubs on lower elevation canyon slopes may include wavyleaf oak, mountain mahogany, mock orange, and mountain spray. Predominance of junipers less than several hundred years in age on the lower canyon slopes may suggest either grazing pressures interrupted fire regimes by consuming fire fuels or severe drought truncated age

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structure. The often rocky substrate of canyon slopes afford enhanced stability to plants established in favorable microsites and steep slopes have limited the potential for grazing. Intense fire runs have converted portions of formerly forested canyon slopes (at all elevations) into shrub communities. Fire frequencies on canyon slopes have not been well documented but could be expected to be within the low end of ranges reported for adjacent communities given adequate continuity of fuels. In areas with poor fuel continuity typical of rocky substrate areas, fire occurrence was undoubtedly much less frequent than in adjacent communities.

Fire behavior fuel model:

This complex would most likely have a fire behavior fuel model of 4 or 6. This correlates with the NFDRS models B and O, or F and Q, respectively. However, because this complex can resemble the vegetation type on adjacent mesas and mountain slopes, reference should be made to the dominant overstory vegetation (i.e. pinyon-juniper, ponderosa, or mixed conifer) when determining the fire behavior fuel model.

Desired future conditions for this complex are maintenance of existing conditions, since this is considered to be one of the most intact plant communities within the Monument.

Canyon riparian:

This complex is a narrow riparian zone which includes dominant overstory elements from vegetation types immediately upslope and those additional floristic elements requiring enhanced moisture regimes. Reference should be made to the dominant overstory vegetation (i.e. pinyon-juniper, ponderosa, or mixed conifer canyon bottom complex). Some common species associated with this riparian zone include: narrowleaf cottonwood, boxelder, mountain maple, birch, alder, gambel oak, cherry and New Mexico olive. Most of Bandelier's sensitive plants are associated with perennial moisture found in the upper canyons areas. Periodic beaver dam activity within this zone has left notable impacts in the form of abandoned dams and associated pond terraces (upper canyon) and mortality through cutting of numerous large diameter cottonwoods (lower canyon). This is a fairly intact community in most areas where the historic use was limited to seasonal grazing. Areas developed for more intensive uses (i.e. agriculture, housing, and visitor use) such as Frijoles Canyon between Long House and the stable can be dominated by exotic perennial grasses or invasive native shrubs. Fire regimes for canyon bottom areas are comparable to the adjacent community.

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Fire behavior fuel model:

The fire behavior fuel model that corresponds most closely with the narrow riparian component of this vegetation type is a fuel model 8, which could carry into a model 4 or 6. When considering areas that are adjacent to or more upslope from the narrow riparian zone, reference should be made to the dominant overstory vegetation (i.e. pinyon-juniper, ponderosa, or mixed conifer).

Desired future conditions for this complex would include maintenance of dominant native overstory and understory species with associated reduction of exotic species. Maintenance of stable watershed conditions (i.e. through preservation of effective vegetative cover) and high water quality are also desired features of this system. Discharge and water quality are measured quantitatively at the Frijoles Gauge located near Monument headquarters.

IV. Wildland Fire Management Program Components

A. General Implementation Procedures

Bandelier National Monument will implement a wide range of fire management strategies and tactics as components of the overall fire management program. The program components include:

- ◆ Preparedness
- ◆ Wildland Fire Suppression
- ◆ Wildland Fire Use
- ◆ Prescribed Fire
- ◆ Non-Fire Fuel Treatments
- ◆ Emergency Rehabilitation and Restoration
- ◆ Public Information and Education
- ◆ Adaptive Management

Each of these program components will be described in detail within this chapter.

One element which is common to all program components is safety. Safety will be part of each activity, will be a written goal in each treatment/activity plan, and will be addressed at every briefing and after action review.

B. Wildland Fire Suppression

1. Range of Potential Fire Behavior

Bandelier National Monument is comprised of seven main fire behavior fuel models:

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Fuel model 1 exists in the montane grasslands, wet meadows, and in areas previously burned by crown fires. Grasslands are generally not continuous but tend to be interspersed with areas of Fuel model 6. Grasslands are very flashy fuels and when cured can easily carry fires between wooded areas.

Fuel model 4 is located in scattered areas, primarily on the canyon slopes where fires have converted portions of formerly forested slopes (at all elevations) into shrub communities. Due to the patchy nature of this type, reference should be made to the dominant overstory vegetation on adjacent mesas and mountain slopes.

Fuel model 5 is found on the lower mesas and canyon slopes and on elevated benches along the Rio Grande corridor. Fire is generally carried in the surface fuels and is typically not very intense because surface fuels are light and sparse.

Fuel model 6 is the predominant fuel model in the lower elevations of the Monument. The decadent pinyon-juniper woodlands and forests found in most areas of the Monument have insufficient and discontinuous fuels that cannot sustain fire without significant wind.

Fuel model 8 describes the vegetation in both the narrow canyon riparian corridor and the scattered aspen groves in mixed conifer forest. Fire in this fuel model generally moves slowly through the surface layer with short flame lengths, although occasional heavy fuel concentrations may occur which cause the fire to flare up.

Fuel model 9, ponderosa pine savannas and forests dominate the mid-elevations of the Monument. Fire suppression and overgrazing in ponderosa pine forests have resulted in increasing stand densities. Fire in this fuel type carries through the surface litter at slow to moderate speeds. Concentrations of dead and down woody materials contribute to the torching of trees, spotting, and possibly crowning.

Fuel Model 10 characterizes the mixed conifer forests which occur on high mountain slopes and within upper canyon drainages. Fire generally burns in the surface litter and ground fuels with moderate to high intensity and speed. There is generally a large amount of dead and down fuel greater than 3 inches in diameter present on the forest floor. Crowning, spotting and torching of individual trees are relatively more frequent in this fuel type.

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Table IV.1 Range of Potential Fire Behavior by Fuel Model

Fuel Model	Conditions	Rate of Spread (ch/hr)	Flame Length (feet)	Remarks
1 Grasslands	Normal	3-62	0-4	Direct Attack would normally be effective on these fires
	Severe	66-570	4-11	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered
4 Canyon Slope	Normal	5-57	5-17	Flanking Attack would normally be effective on these fires
	Severe	110-263	24-38	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered
5 Juniper-Shrub Grasslands	Normal	.5-16	.5 – 5	Direct Attack would normally be effective on these fires
	Severe	36-83	7.5-12	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered
6 Pinyon-Juniper Woodlands	Normal	2-25	1.5-5	Direct Attack would normally be effective on these fires
	Severe	47-125	7-12	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered
8 Aspen/Riparian	Normal	.2 - 1.5	.5 - 1	Direct attack would normally be effective on these fires.
	Severe			Direct attack would normally be effective on these fires.
9 Ponderosa Pine	Normal	3-7	1-2.5	Direct attack would normally be effective on these fires.
	Severe	7-41	3-7	A combination of Direct and Indirect Attack and/or aerial would need to be used
10 Mixed Conifer	Normal	1 – 6	1.5 – 4.5	Direct attack would normally be effective on these fires.
	Severe	10-29	6-10	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered



Outputs for these conditions used the following variables in Behave Plus to calculate the Rate of Spread and Flame Length for normal and severe conditions.

Normal: 0-4 mph midflame windspeed, 6-10% fine fuel moisture. 0-10% slope with 10% 10-hour and 100-hour fuel moistures.

Severe: 6-10 mph midflame windspeed, 2-5% fine fuel moisture. 0-10% slope with 5% 10-hour and 100-hour fuel moistures.

2. Preparedness

Preparedness is defined in the National Wildland Fire Coordinating Group's glossary as "Condition or degree of being ready to cope with a potential fire situation." Preparedness activities take place year-round, but usually peak just prior to fire season in the early spring.

a) Interagency planning and cooperation

The Bandelier National Monument Fire Management Officer (FMO) is a board member of the Santa Fe Zone Board. The Santa Fe Zone Board meets monthly on a year-round basis. Other members include:

- * Santa Fe National Forest
- * Bureau of Land Management
- * Bureau of Indian Affairs – Eight Northern Pueblos
- * Los Alamos National Laboratory
- * New Mexico State Forestry
- * Santa Fe City Fire Department
- * Santa Fe County Fire Department
- * Los Alamos County Fire Department

The FMO is also a member of the Interagency Wildfire Management Team (IWMT). The IWMT is an information sharing group based in Los Alamos which was established after the 1996 Dome Fire which burned on the Santa Fe National Forest and Bandelier National Monument. The fire, which at times threatened the Los Alamos National Laboratory and the town of Los Alamos, highlighted the need for interagency cooperation and coordination. The IWMT has been meeting bi-weekly since 1996 and is open to any interested agency, group or individual. Core members of the IWMT include:

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- * Los Alamos National Laboratory
- * Los Alamos Fire Department
- * Los Alamos County Emergency Management
- * Bandelier National Monument
- * Santa Fe National Forest

b) Training

In accordance with RM-18, Chapter 6, all employees assigned dedicated fire program management responsibilities at Bandelier shall meet established interagency and NPS competencies and concomitant qualifications.

Departmental policy requires that all personnel engaged in suppression and prescribed fire duties meet the standards set by the National Wildfire Coordinating Group (NWCG). The Interagency Qualifications and Certification Systems (IQCS) meets or exceeds all NWCG standards. All employees dispatched or assigned to Wildland or prescribed fires will be qualified unless assigned as trainees.

Fire management training is based upon criteria specified within the training curriculum within NWCG 310-1 (<http://fire.r9.fws.gov/fm/pms/docs/docs.htm>), Wildland Fire Qualification Guide, and NWCG Prescribed Fire Job Qualifications Guide (NWCG 2000).

A training needs analysis will be developed each year for the Fire Management Program and for each employee. This assessment will provide the basis to determine which training courses will be required and which employees will attend them. Courses identified will be based on position needs, individual development plans, course availability, and availability of funds. This analysis will also be forwarded to the Zone training coordinator who will incorporate Bandelier's needs with others within the Zone. The compiled Zone need analysis will then be forwarded to the Regional training coordinator.

On-duty physical training (pt) time of at least 3 hours per week will be authorized to all personnel required by their position to pass an arduous duty work capacity test.

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c) Annual Preparedness Activities

Preseason

- ◆ Annual medical exams will be scheduled for permanent full time personnel in January or February. Furloughed staff, seasonal employees, and emergency firefighters will have exams scheduled as soon after hiring or returning to duty as possible. Exams must be complete, and doctor's permission obtained prior to taking the work capacity test (pack test).

Starting with the 2005 fire season, all firefighters are subject to mandatory drug testing prior to entering on duty.

- ◆ Red-Cards, Training, qualifications and experience will be updated annually for all permanent and returning seasonal staff. Red-card documentation will be entered for new employees when they arrive on duty. It is the responsibility of the employee to provide the needed documentation to the Fire Program Management Assistant prior to the issuance of a red-card.
- ◆ Preparedness reviews will be conducted annually. The timing of the reviews will generally be in coordination with seasonal hiring and training schedule. Preparedness reviews will use as a guide the format in the Interagency Preparedness Checklists. The standards reflected in the checklists are established national policy requirements. The checklists reflect the agency standard for operations and performance in each area of review and are not arbitrary standards set by the review team. Current editions of the checklists can be found at http://www.fire.blm.gov/Standards/BLM_Preparedness_Checklists.htm
- ◆ Review Fire Management Plan, including step-up plan, dispatch plan and multi-year fuels plan.
- ◆ Review agreements
- ◆ Inventory fire cache
- ◆ Check operation of fire equipment

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Fire Season

- ◆ Conduct daily equipment and vehicle checks
- ◆ Brief fire staff daily on fire weather, behavior, situation and safety and brief all park staff as appropriate.
- ◆ Conduct emergency preparedness actions authorized in step-up plan.
- ◆ Review needs for severity request with interagency cooperators as appropriate.
- ◆ Report staffing to Santa Fe Zone Dispatch

Post Season

- ◆ Critique fire season including all fire management activities (i.e. wildland fire suppression, wildland fire use, prescribed fires, non-fire fuels treatments, prevention and education, rehabilitation and restoration, and adaptive management).
- ◆ Perform personnel evaluations
- ◆ Submit training and experience records to Fire Program Management Assistant for input to IQCS.

d) Fire Weather and Fire Danger

- Weather Stations

The NPS operates a RAWS station at the Bandelier Fire Tower (290801). Daily observations are maintained by fire management staff and fire danger calculations are run. Bandelier also has access to RAWS stations at the Jemez Ranger District Office via Santa Fe Zone Dispatch. Jemez Station (290702) observations are monitored during fire season and as needed for projects.

The National Weather Service, Albuquerque Office, distributes morning fire weather forecasts, afternoon updates, fire weather watches and red flag warnings as specified in their annual operating plan. This information is available on the internet at

<http://www.srh.noaa.gov/data/ABQ/FWFABO>

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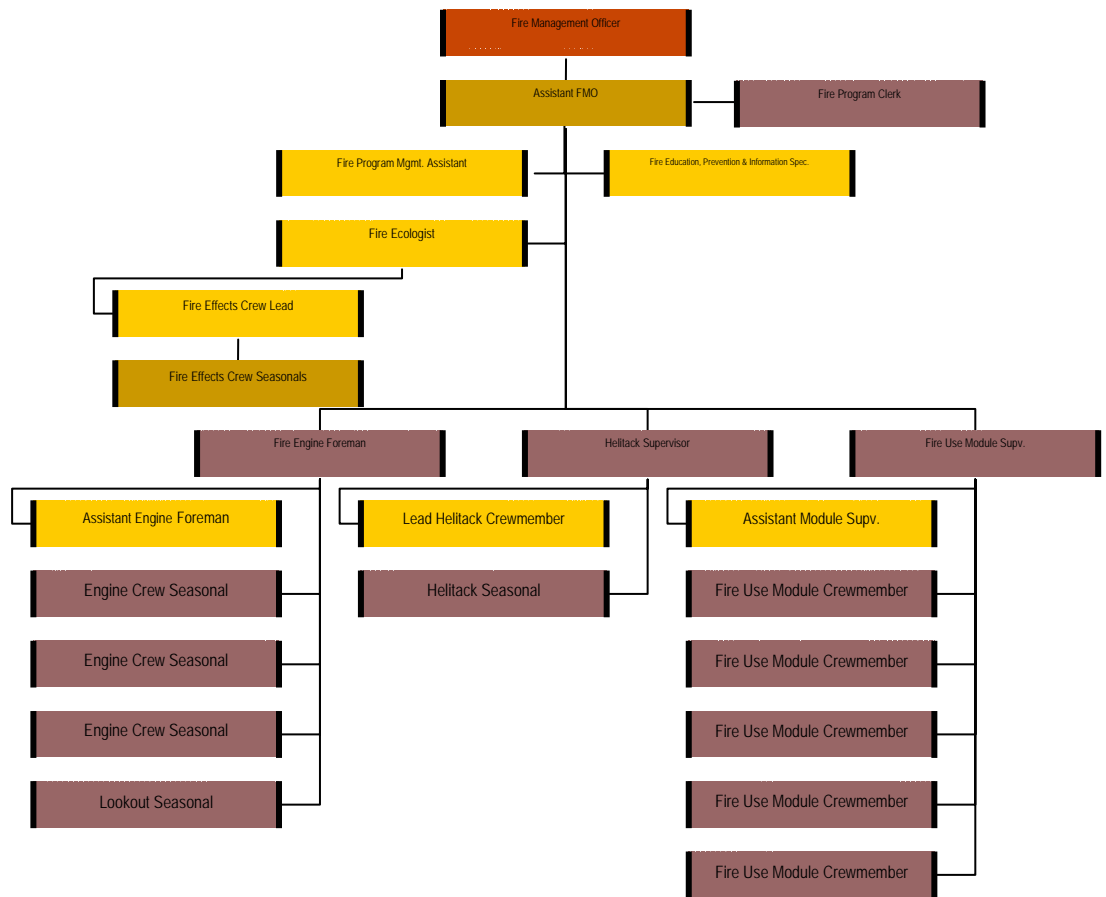


- National Fire Danger Rating System (NFDRS)

Fire danger indices are calculated using the NFDRS. The current NFDRS is utilized by all federal and most state agencies to assess fire danger conditions

e) Staffing Plan

The following organizational chart shows the current fire staffing for Bandelier National Monument.



The FY2005 Staffing Deficiencies Analysis shows that full staffing for Bandelier would include increasing the current Fire Engine Foreman from 13/13 to permanent-full-time, increasing the current Assistant Engine Foreman from 13/13 to 20/6, and adding a GS-06 fire effects monitor for 20 payperiods. Additionally the Cluster Engine Analysis shows that an increase in engine staffing from 1 engine to 2 engines would be justified.

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Step-up

The step-up staffing plan is a documented procedure designed to direct incremental preparedness actions taken by Bandelier personnel in response to increasing fire danger. These actions are delineated by staffing classes. Fire days are broadly divided into five staffing classes based upon daily calculations of the energy release component (ERC) in NFDRS. The ERC is an compilation index that integrates the effects of weather, fuels, and topography to estimate potential fire behavior and the corresponding level of effort required to contain a fire. The staffing classes relate to the expected severity of fire conditions.

The Step-up plan should be reviewed annually and is included in Appendix E.

f) Bandelier Dispatch Plan for fire reporting

The dispatch plan is a procedure to be used by Monument staff or the public to report a wildland fire. The actions to be taken by a person reporting a fire, and the actions for fire staff upon receiving the report of a fire are outlined.

This dispatch plan has time sensitive information such as names and phone numbers. The plan should be reviewed annually and is included in Appendix H.

g) Aviation Management Plan

Bandelier has developed a joint aviation plan with the adjoining Santa Fe National Forest. The purpose of the Santa Fe National Forest/Bandelier National Monument Interagency Aviation Management Plan is to align aviation planning and operations to a national standard. The Aviation Management Plan is attached as Appendix I.

3. Pre-attack plan

The Monument's fire management office will maintain a pre-attack file of maps that list facilities, roads, water sources, buildings/structures, hazards, and sensitive resources. The file also includes information such as contact numbers and names which must be updated as changes occur. A pre-attack Wildland Fire Situation Analysis (WFSA) will also be located in the file. The pre-attack plan files will be reviewed at a minimum yearly, and will be updated as needed. All duty officers for the Monument are

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responsible to know the location of the pre-attack file, and for being familiar with the contents.

The Santa Fe Zone dispatch office maintains and updates the forest supply plan which contains lists of available contracts for supplies, resources and food. All supplies and resources will be ordered through the dispatch system for wildland fire incidents.

4. Initial Attack (IA)

All wildland fires will be evaluated to determine the appropriate management response. An appropriate management response will determine which actions (e.g. fire suppression or allowing the fire to burn to meet pre-stated objectives) will be implemented in response to the wildland fire. Public and firefighter safety is always the primary consideration.

All dispatching of wildland fire resources within the Santa Fe Zone is done by agreement through the Santa Fe Zone Dispatch Center located at the Santa Fe National Forest Supervisors Office. The Santa Fe Zone IA operating plan is reviewed and updated annually.

a) Initial Attack Priority Setting

IA priority setting is broadly based upon the FMU's developed for this plan. Four FMU's, which range from "no fire allowed", to "fire is desirable and allowed," have been identified in the plan. Two of these units, unit 1 and unit 3, have been selected for implementation within the Monument. These FMU's were developed by fire managers with input from internal and interagency cooperators. Considerations such as values at risk have been included in the development of the FMU's.

b) Criteria for Appropriate Initial Attack Response

All non-planned human caused fires and those within FMU 1 will be suppressed and a Wildland Fire Implementation Plan (WFIP) Stage 1 (fire situation only) will be completed by the IA incident commander. Suppression responses are to be commensurate with the values-to-be-protected, firefighter and public safety, and cost efficiency. Minimum Impact Suppression Tactics that effectively accomplish wildland fire management objectives with the least cultural and environmental impact will be used.

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Confine and contain tactics may be used for the purposes of public or firefighter safety, or to minimize resource damage. Confine and contain tactics may not be used specifically to benefit resource objectives.

All natural fires and those within FMU 3 will at a minimum have a completed WFIP Stage 1 and a Go/No-Go Decision Criteria Checklist completed. As stated in the *Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide* (DOI/DOA, 2005), the Decision Criteria Checklist must be completed within 2 hours of IA. The Superintendent is the official responsible for approving the WFIP. If a fire exceeds or changes the Go/No-Go checklist, the FMO and Superintendent will complete a WFSA. A WFIP Stage II or a WFSA must be prepared within 24 hours after Stage I completion when warranted.

c) Confinement as an Initial Attack Strategy

Confinement tactics can be considered as an IA strategy and an appropriate management response. The primary objectives will include firefighter and public safety along with costs commensurate with the values being threatened. This tactic cannot be used to meet resource objectives. Fires managed under this tactic must not conflict with the FMU objectives in which it is burning. This strategy can also be employed if the fire is expected to exceed IA capabilities and is identified as a strategy in the WFSA. The preparation of a WFIP or WFSA should be done to manage the fire as the fire conditions changes or management considerations dictate.

d) Typical Response Times

Response times will vary depending on the time of year and the staffing class level. The Monument maintains a minimum of one (and the capability of four) type 6x engine(s) which is staffed approximately April-September. Staffing can be extended based upon local fire danger and zone preparedness level. When staffed, the response time for an engine for wildland fire dispatch will be:

Staffing Level I-II: <15 minutes
Staffing Level III: <10 minutes
Staffing Level IV-V: <5 minutes

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During the height of the fire season and/or during severity conditions, Santa Fe Interagency Helitack (including a Type III helicopter w/ module) is located at the Interagency Fire Center at TA-49. When staffed and available, the response time for helitack for wildland fire dispatch is <5 minutes.

e) Restrictions and Special Concerns

A consistent set of mitigation measures will be applied to the actions in this FMP to ensure that natural and cultural resources and the quality of visitor experiences are protected. The intent of the mitigation measures is to avoid, minimize, and mitigate adverse impacts whenever possible. Detailed descriptions of each mitigation measure are provided in Section X – Protection of Sensitive Resources. See Table IV.2 for a brief summary of the mitigation measures.

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Table IV.2. Brief summary of mitigation measures that may be implemented as part of Bandelier's Fire Management Plan.

Topic	Mitigation Measure	Responsible Party
Special Status Species	Presence of species in the project area will be determined; seasonal restrictions may be implemented; certain nesting trees or important habitat may be protected from fire; fire may be restricted in some sensitive habitats. In or near special status plant populations: ground disturbance will be avoided; natural barriers will be used for fire line construction; fire line will be rehabilitated; plant response will be monitored.	Wildlife Biologist, Vegetation Specialist, and appropriate fire staff
Soils/Erosion	Mulching. Aerial or hand seeding with native plants. Contour felling and bucking of small trees or using straw wattles. Slashing by felling, lopping, limbing and scattering of trees. Sand/soil bags and trenching. Rock and log grade stabilizers. Check dams constructed with rock, fence, logs, straw bales, or straw wattles. Mechanical treatments will preferably be conducted when soil is frozen and/or with slash on the ground. Soil will be raked after treatments.	Appropriate fire staff and natural and cultural resources staff
Water Resources	Proportion of steep slopes burned in a watershed will be minimized; burns that are continuous up both sides of the vertical gradient of a watershed will be avoided; thinning activities will be conducted at least 200 ft. from stream.	Appropriate fire staff
Aspen and Deciduous Shrubs	Monitoring and research of deciduous species will be conducted; burning activities in selected aspen groves will be evaluated; exclosures will be created or installed for protection or study.	Appropriate fire staff and natural resource staff
Non-Native Species	Use of fire to control non-native species. Monitoring will be conducted before and after fire treatments and if non-native plants are found, removal techniques will be developed and/or fire practices may be modified.	Appropriate fire staff, Fire Effects Specialist, and natural resources staff

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Topic	Mitigation Measure	Responsible Party
Pile Burning	Piles will be kept small (the size of a small car averaging <8' wide by <6' high).	Appropriate fire staff
Snags and Slash	Flush cut snags and standing vegetation if they present a threat to human life or safety. Lop and scatter vegetation to 18 inches or less, burn during prescribed fire or pile burn outside of fire season (October-April). Cut snags and standing vegetation to control a wildland fire.	Appropriate fire staff and natural resource staff
Fire Retardant	Fire retardant will only be used for initial attack on a fire. Use beyond initial attack must be approved by the Superintendent.	Appropriate fire staff
Cultural Resources	Pre-incident planning may include protection of known cultural resources as appropriate. Research and experimentation of effects of fire on cultural resources. Remove hazardous fuels from certain cultural sites. Crews will avoid or minimize walking over structural elements. Inform and educate crews on identification of cultural resources. Cultural or resource management staff will be on-site during incident response or fire management treatments to protect or avoid cultural resources. Cultural resource staff will aid in positioning crews, holding lines, spike camps, helispots, drop zones, and other fire suppression related facilities to avoid or minimize impacts in culturally sensitive areas. Cultural staff will advise fire teams where emergency fuel reduction could reduce or avoid impacts on known important cultural resources.	Appropriate cultural resource staff or resource management staff and fire staff
	Archeological sites within fire management units will be treated through evaluating the removal of: dead trees from structural elements; 3-inch diameter and smaller trees (cactus and other non-tree vegetation will remain), large (> 5 in. diameter) ponderosa pine growing in structures. Larger (> 3 in. diameter) juniper trees growing in structures will be retained, unless determined to be detrimental to	Appropriate cultural resource staff or resource management staff and fire staff

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Topic	Mitigation Measure	Responsible Party
	integrity or stability of structure. Dead, woody material (> 3 in diameter) will be hand carried off structural elements, lighter slash may remain.	
Wilderness	All fire management activities proposed in wilderness will require the use of the Minimum Requirements Decision Guide to determine the appropriate tools necessary to accomplish management objectives. As a general rule, motorized and/or mechanized equipment will not be allowed in wilderness areas. Minimum Impact Suppression Tactics (MIST) will be used in all wilderness areas (Appendix D).	Appropriate fire staff
Air Quality	Monitoring of air quality within Monument and adjacent to project area. If smoke accumulation is above authorized limits, aggressive suppression actions will occur until air quality improves.	Appropriate fire and resource staff
Unplanned Fire Events	Resource advisors notified of fire ignition location. If features or resources are located that require mitigation, action points will be established and mitigation plans will be developed.	Appropriate natural and cultural resource staff and fire staff

5. Extended Attack and Large Fire Suppression

a) Determining Extended Attack Needs

A wildland fire will be considered to be in extended attack status when:

- (1) The Initial Attack Incident Commander (IC) does the Complexity Analysis that recommends a higher level organization.
- (2) The Superintendent and/or Fire Management Officer recommend a higher level of organization after completing a complexity analysis.
- (3) Containment is not expected prior to the second burning period.
- (4) The Initial Attack IC requests additional resources that result in the fire attaining a complexity rating at the Type III level.

Any of the above will require the development of a WFSA.



b) Wildland Fire Situation Analysis

When an incident has exceeded IA capabilities, the designated IC, FMO or Monument Superintendent, will prepare a WFSA. The WFSA is a management tool to aid line officers, fire managers, and Incident Management teams in analyzing the complexity of a given fire situation. The WFSA is used to develop alternative strategies for suppression of escaped fires and the evaluation of the net effect of each of those alternatives. The Superintendent or their delegated official will be the approving authority for the document.

Threshold Conditions Triggering a WFSA:

- A WFSA shall be initiated when an initial attack suppression response fails after the first burning period.
- A prescribed fire exceeds prescription and can not be returned within prescription parameters with on-site prescribed fire resources and/or funding within one burning period.
- Fire is projected to leave NPS jurisdiction and is anticipated that IA may not be successful.
- Fire is projected to be beyond the capability of the NPS and cooperating agencies resources.

A copy of the WFSA is located at
<http://www.fs.fed.us/fire/wfsa>.

In multi-jurisdictional incidents, the WFSA will be completed jointly by all cooperators having jurisdictional responsibility and the related fire protection authority.

The Intermountain Regional Office will be notified at once for large fires and for fires requiring additional support, or as soon as reasonable for all other incidents.

c) Complexity Decision Process

This process is a guideline that is used by the Agency Administrator and Fire Manager to determine what type of management is needed for a particular incident. A "Guide for Assessing Fire Complexity Analysis and Complexity Analysis Worksheet" may be found in the Interagency

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Standards for Fire and Aviation Operations 2005, Appendix L and M.

d) Delegation of Authority

The Delegation of Authority (DOA) is a letter written from the Park Superintendent to the IC of an Incident Management Team before turning over management of a fire, giving him/her the authority over the management of the wildland fire. This letter usually addresses all the operational objectives, WFSAs selected alternative, limitations and constraints as well as any other resource issues that need to be identified by the Agency Administrator. A sample DOA is located in the Interagency Standards for Fire and Aviation Operations 2005, Appendix R.

6. Exceeding existing WFIP

If it is determined that the original decision and the selected response will not meet fire management objectives, the fire shall be declared an "escaped wildland fire" and a WFSAs will be completed. See *Threshold Conditions Triggering a WFSAs* in Section IV, 5, b. above.

7. Minimum Impact Suppression Tactics

All fire management activities in Bandelier will rely on tactics that result in a minimum amount of resource damage while maintaining the safety of firefighters, personnel and the public as the highest priority. A comprehensive description of MIST is listed in RM-18, Chapter 9, exhibit 5.

8. Rehabilitation Guidelines

Often the impacts of fire suppression and other management actions require some rehabilitation. Short and long term impact mitigation measures are outlined in Reference Manual RM-18, Department of Interior (DOI) Burned Area Emergency Rehabilitation (BAER) Handbook, and Director's Order-18. Monument guidelines for rehabilitation include the following:

- The minimum requirements decision guide shall guide actions to mitigate actual or potential damage from wildland fire.
- Mitigation of suppression damage will be specified in incident action plans.

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- BAER plans will be prepared as necessary to specify long-term mitigating actions, submitted to the Intermountain Regional Office within five (5) days following control of a wildland fire.

Refer to Chapter X – Protection of Sensitive Resources, for identification of sensitive resources important to track in terms of damage from fire suppression or from fire effects.

9. Reporting and Documentation

A **WFIP stage I**, fire size-up will be prepared for every wildland fire.

A **WFSA** will be prepared for every fire which escapes IA/holding actions.

Individual Fire Report (DI-1202)

Refer to DI-1202 Reporting Instructions and RM-18, Chapter 17, for reporting standards.

Fire Experience and Qualifications – (Red Card)

Documentation of fire training and experience will be submitted to the Fire Management Office. Red Cards will be issued by the FMO based on interagency standards.

Delegation of Authority

Whenever an out-of-park incident management team is ordered, the local IC must provide a briefing to the incoming management team (Interagency Standards for Fire and Fire Aviation Operations 2005, appendix S) and the Superintendent must provide a written limited delegation of authority and a briefing package to the incoming IC (Interagency Standards for Fire and Fire Aviation Operations 2005, appendix R).

C. Wildland Fire Use

WFU is the practice of allowing a naturally ignited wildland fire to burn in a predefined geographic area, under specific prescription parameters, to accomplish fire and resource management goals and objectives.

1. Objectives of WFU

The safety of firefighters and the public is the number one concern in managing a WFU. Through pre-planning, fire monitoring, and appropriate management response, many wildland fires can be managed to protect values at risk as well as to obtain resource benefits. Elements of managing a WFU include public information and education, fire behavior and fire effects monitoring, and coordination with other agencies.

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2. Parameters

Four FMUs are delineated for the Jemez Mountains. Two of the four identified FMU's are identified within Bandelier. A description and map can be found in Section III, D. This mapping was done in collaboration with other agencies and interested organizations, including the BLM, NPS, Bureau of Indian Affairs (BIA), pueblos, New Mexico State agencies, and counties and city governments who have jurisdiction on adjacent lands. This was done to insure that management of wildland fires and fuels would be well coordinated among the various agencies that manage public lands surrounding the Monument.

FMUs provide a landscape-level assessment and desired condition description of the fire management situation. FMUs help identify which of the different wildland fire management strategies to apply to specific geographic areas in the Monument.

FMU number and desired management response to wildland fires is as follows:

Table IV.3 Fire Management Unit Descriptions Summary

FMU 1:	Wildland fires are not desired (appropriate management response).
FMU 2:	Wildland fires are usually not desired, with some exceptions (appropriate management response)
FMU 3:	Wildland fires are usually desired, with some exceptions
FMU 4:	Wildland fires are desired

If a naturally ignited fire in the Monument is within FMU 3 and meets the appropriate Interdisciplinary Team guidelines and prescriptive criteria, the appropriate response may be to manage the fire for resource benefits. The direction for implementing WFU can be found in the *Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide* (DOI/DOA, 1998). The WFIP is located within this Policy. Later, if it is determined that the selected response will not meet fire management direction and objectives, the fire shall be declared an "escaped wildland fire."

Additional factors influencing the determination to implement WFU are location of the ignition, predictions and risk assessment, complexity analysis, safety concerns, external concerns, estimated costs, fire behavior predictions, values at risk, and seasonality (early-late in the fire season).

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All fire use projects must receive the approval of the regional fire management officer when regional or national planning levels are at Level IV or above. Details on the Southwest Area planning levels and national planning levels can be found in the interagency Mobilization Guides which are updated and distributed annually.

3. Pre-planning

FMUs delineate appropriate management response within the FMU but more importantly near the edge of FMUs where the adjacent FMU has a different emphasis and response according to the values at risk. (See figure 3.1)

The adjoining Bandelier and Dome Wildernesses have been designated as an area where WFU is allowed by both agencies. This designation was made in cooperation with the Forest Service so that WFU fires could be managed across boundaries in this area. In this case, a single interagency WFIP will be prepared by both agencies during the initial decision-making phase of the fire.

4. Implementation Procedures

The complete implementation process is described, with example forms provided in the *Wildland and Prescribed Fire Policy Implementation Procedures Reference Guide* (DOI/DOA, 1998). This process will be followed in order to meet RM-18 guidelines for a WFU program.

5. Potential Impacts

Potential Impacts and topics of concern are addressed in Section X – Protection of Sensitive Resources. Mitigation measures are detailed for each topic addressed.

6. WFU Organization

All WFU incidents will be managed by a qualified fire use manager (FUMA). Appropriate organizational levels will be identified through the WFIP, keeping in mind an evaluation of local capabilities. Fire Use Management Teams (FUMT) or Incident Management Teams (Type 1 or 2) can augment WFU, when exceeding local capabilities. Both types of teams can be ordered through the dispatch mobilization system.

Fire Management Plan Bandelier National Monument



The desired staffing and qualifications at the Monument for WFU implementation includes:

- 1 Fire Use Manager (FUMA)
- 1 Long Term Analyst (LTAN)
- 2 Holding/Ignition Specialists
- 4 Fire Monitors (FEMO)

Any positions identified in the WFIP which can not be filled by Monument personnel will be resource ordered through the dispatch mobilization system. The Monument, in coordination with local cooperators, will strive to have personnel qualified to these levels.

7. Public Information and Interpretation

Wildland Fire Use Incident Information

Bandelier's Fire Management Staff will coordinate with Los Alamos National Laboratory, the Santa Fe National Forest, Valles Caldera National Preserve, neighboring Pueblos, Los Alamos County Fire Department, New Mexico State Forestry, and other interested organizations in all aspects of public information relating to a wildland fire use incident within or adjacent to the park. The following steps will be taken to facilitate the awareness of Bandelier's fire management policies, objectives, and actions:

- The Fire Management Officer and the Fire Education, Prevention and Information Specialist (FEPIS) will work together to effectively inform and educate National Park Service employees, agency partners, and the public about the fire management program and the role of fire in Bandelier.
- During ongoing fires, the fire management staff, primarily through the FEPIS, will be responsible for fire information dissemination. The fire management staff will communicate orally and in writing the current fire situation to Bandelier and other NPS employees, interagency partners, local communities and media. Press releases will be written by the FEPIS or the Chief of Interpretation and released to local and national media when necessary. Should the incident evolve in complexity to the point where a Fire Use Team or an Incident Management Team is assigned, the Fire Information Officer attached to that team will assume responsibility for fire information dissemination.

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- When fires are visible and likely to continue for an extended period of time, the fire management staff may choose to establish a fire information center to be staffed by the FEPIS and/or additional information officers. All requests for incident information will be directed to the center, where accurate and timely information will be compiled, organized and disseminated to the public and news media.

8. Reporting and Documentation

The permanent project record for each WFU incident will include:

A WFIP stage I will be completed for all potential WFU Fires. Stage II and Stage III documentation, as well as re-validations (as appropriate) will also be completed and filed in the Fire Management Office. Cost tracking and the operational plan, including monitoring observations and evaluations, will also be kept on file.

All WFU fires will have a form 1202 completed upon conclusion of the project. The 1202 will be submitted to the Fire Management Office for input into the shared application computer system (SACS).

All WFU incidents will additionally be tracked through the National Fire Plan Operations and Reporting System (NFPORS). Information for NFPORS updates and completion reporting will be submitted to the Fire Management Office for entry.

D. Prescribed Fire

Prescribed fires are intentionally lit under predetermined conditions to meet fire and resource management goals and objectives. Prescribed fires include pile burning, where vegetation is cut and moved to a central location and burned, or broadcast burning, where fires are ignited within a predefined area and allowed to move through the vegetation within those boundaries. All compliance must be met prior to any fire ignition and a written and approved prescribed fire plan must exist. Within the prescribed fire plan are detailed prescription parameters that must be followed.

1. Planning and Documentation

Prescribed burn plans must be approved by the Superintendent prior to ignition.

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Planning and execution of the prescribed fire management program will use qualified personnel and will follow the guidelines stated in RM-18. Refer to RM-18 for guiding all aspects related to implementing the prescribed fire program. Use of interagency cooperators is encouraged in planning and implementing prescribed burns. All prescribed burn plans will be reviewed by interagency Cooperators prior to Superintendent's approval.

a) Annual Activities

Bandelier will annually review the multi-year fuels treatment plan (appendix K) as part of the annual FMP review. Activities will be identified and prioritized each spring, in cooperation with an interdisciplinary team, for implementation in the following fiscal year. Projects will be entered into NFPORS.

Projects that are approved and funded through the NPS Intermountain Region will be implemented using a treatment plan/scope of work approved by the Superintendent. Progress and completion of projects will be entered into NFPORS as appropriate.

b) Long-term Strategy

Prescribed fire will be used to meet a variety of fire and resource management goals and objectives. Meadows will be burned to remove tree encroachment and promote the growth of grasses and forbs. Forested areas will be burned to reduce fuels and create gaps in the canopy to promote growth of understory species. Woodlands will be burned to reduce stem density of pinyon and juniper and increase grass and herbaceous production. Prescribed fire will also be used to replicate historic fire frequencies in Bandelier's lower elevation ponderosa pine forests.

Prescribed fire will also be used to reduce heavy accumulations of live and dead vegetation (fuels). Once these areas are treated, the continuity of fuels will be reduced, helping to prevent rapid, intense, and uncontrolled fires that could damage natural or cultural resources or threaten life and property.

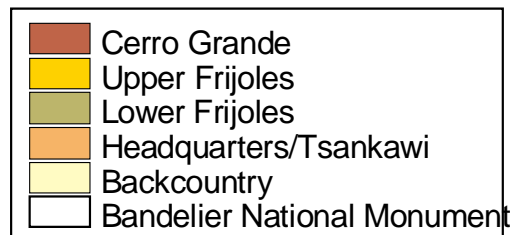
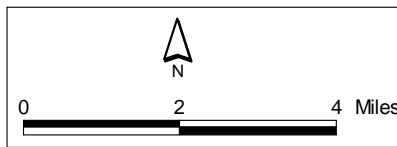
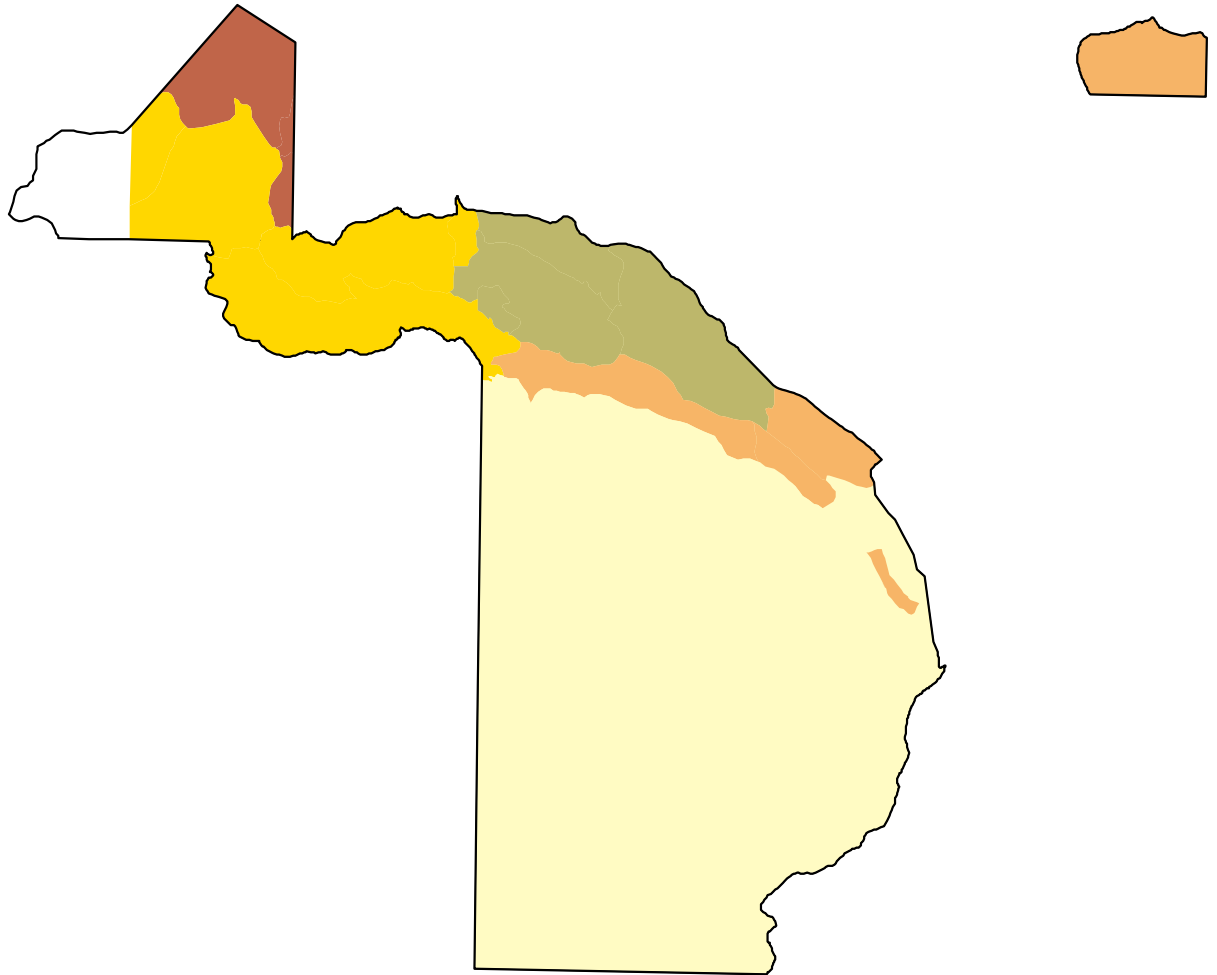
For purposes of planning and management, Bandelier is divided into 5 large treatment units. These treatment units are further divided into individual project areas

Fire Management Plan Bandelier National Monument



in which activities can be accomplished in 1-5 year timeframes. (see figures 4.1 and 4.2)

Figure 4.1 Fire Management Treatment Units in Bandelier National Monument

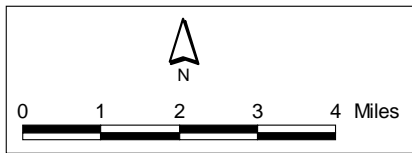
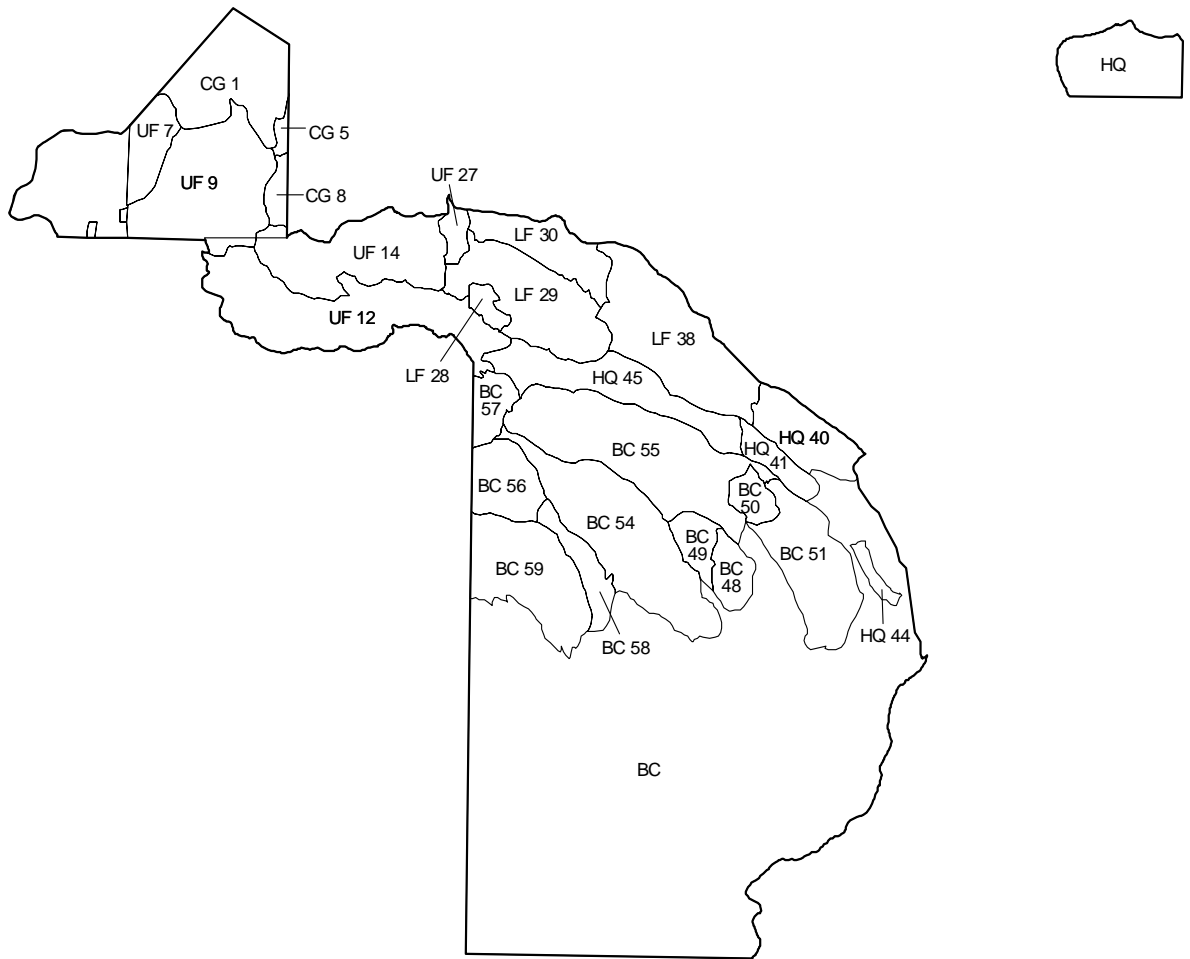


3/1/05 K.Beeley, Bandelier National Monument

Fire Management Plan Bandelier National Monument



figure 4.2 Fire Management Project Areas in Bandelier National Monument



- CF - Cerro Grande
- UF - Upper Frijoles
- LF - Lower Frijoles
- HQ - Headquarters/Tsankawi
- BC - Backcountry
- Bandelier National Monument

3/1/05 K.Beeley, Bandelier National Monument

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c) Prescribed Fire Organization

All prescribed fires will be managed by a qualified prescribed fire burn boss, level 1 or 2. Appropriate organizational levels will be identified through the individual prescribed fire burn plan.

The desired staffing and qualifications at the Monument for prescribed fire implementation includes:

- 1 Prescribed Fire Manager (RXM2)
- 2 Prescribed Fire Burn Boss level 2 (RXB2)
- 2 Holding/Ignition Specialists
- 4 Fire Monitors (FEMO)

Any positions which can not be filled by Monument personnel will be resource ordered through the dispatch mobilization system. The Monument will strive to have personnel qualified to these levels.

d) Monitoring

Bandelier's Fire Ecology Program is responsible for conducting fire and fire effects monitoring before and after fire and non-fire treatments. Permanent vegetation plots are installed and data is collected pre and post treatment (at defined intervals) to determine if fire and resource management objectives are being met or if additional research is needed. If unexpected trends are identified, the fire program is re-evaluated and/or objectives are revised. When this information is used to re-evaluate the fire program and revise goals or objectives, the adaptive management process comes full-circle

e) Evaluation

Each prescribed fire will have an approved burn plan. After completion of a prescribed fire, participating personnel will review the fire, elements contained in the burn plan, complete any monitoring and evaluation requirements, then critique the fire. The objective will be to understand and improve prescribed fire techniques, operations, prescriptions and the fire effects. At minimum, the critique will be attended by the burn boss and FMO.

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f) Reporting and Documentation

Prescribed fires will have a form 1202 completed upon conclusion of the project. The 1202 will be submitted to the Fire Management Office for input into SACS.

The prescribed fire burn plan, including monitoring observations and evaluations will be kept on file at the Monument.

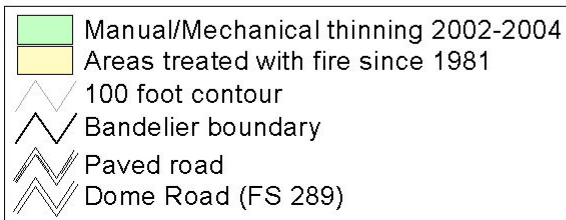
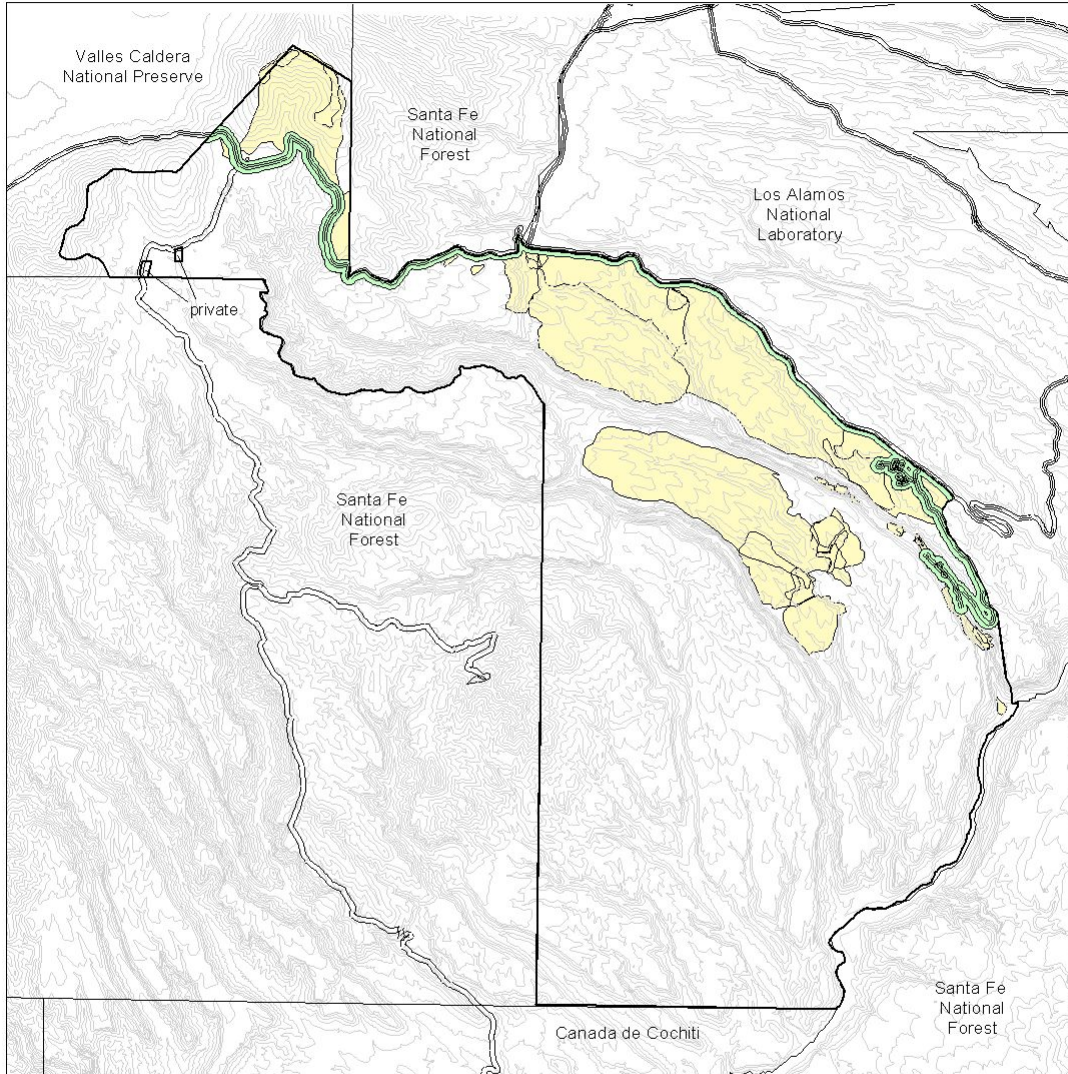
All fire funded projects will be tracked through NFPORS. Information for NFPORS updates and completion reporting will be submitted to the Fire Management Office for entry.

**Fire Management Plan
Bandelier National Monument**



g) Historic Fuel Treatments (Prescribed Fire)

**Figure 4.3 Historic Fire Management Treatments
Bandelier National Monument**



4/21/2005 K. Beeley, Bandelier National Monument

h) Local Burn Plan Requirements

Planning and execution of the prescribed fire management program will use qualified personnel and will follow the guidelines stated in RM-18. Refer to RM-18 for guiding all

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aspects related to implementing the prescribed fire program. Use of interagency cooperators is encouraged in planning and implementing prescribed burns. All prescribed burn plans will be reviewed by interagency cooperators prior to Superintendent's approval.

2. Exceeding Prescription

Each prescribed burn plan will identify resources needed to safely and successfully ignite, execute, and hold the prescribed fire within the range of prescriptive parameters identified. Resources identified in the adequate holding resources worksheet for inside and outside the project area in the prescribed fire plan consider the capabilities of existing on-site resources and will be utilized for those rare events when the burn may become unsuccessful. If a prescribed fire exceeds the parameters within the written prescription, the outside resources identified in the adequate holding resource worksheet may be used to bring the fire back within the written prescription parameters for one burning period. Any prescribed fire that exceeds written prescription parameters and cannot be brought under control within this one burning period will be declared a wildfire and a WFSA will be prepared as described in the fire suppression section of this plan.

3. Air Quality and Smoke Management

The fire management program at Bandelier will be in full compliance with interstate, state, and local air pollution control regulations as required by the Clean Air Act, 42 U.S.C. § 7418. The NPS is a signatory to the "New Mexico Smoke Management, Memorandum of Understanding (MOU)" and will follow the requirements of that document. Necessary state air quality clearance and permits will be obtained prior to the initiation of a prescribed fire program. During WFU activities smoke will be monitored for trajectory, mixing height, and impact to air quality sensitive areas. State guidelines, forms and further information are located at the New Mexico Environment Department's website http://www.nmenv.state.nm.us/aqb/SMP/smp_index.html

The main smoke sensitive areas in and around Bandelier include:

- State Highway 4
- Los Alamos
- White Rock
- Los Alamos National Laboratory

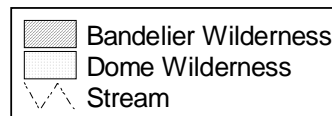
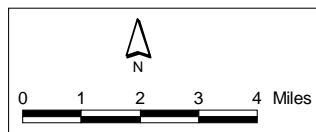
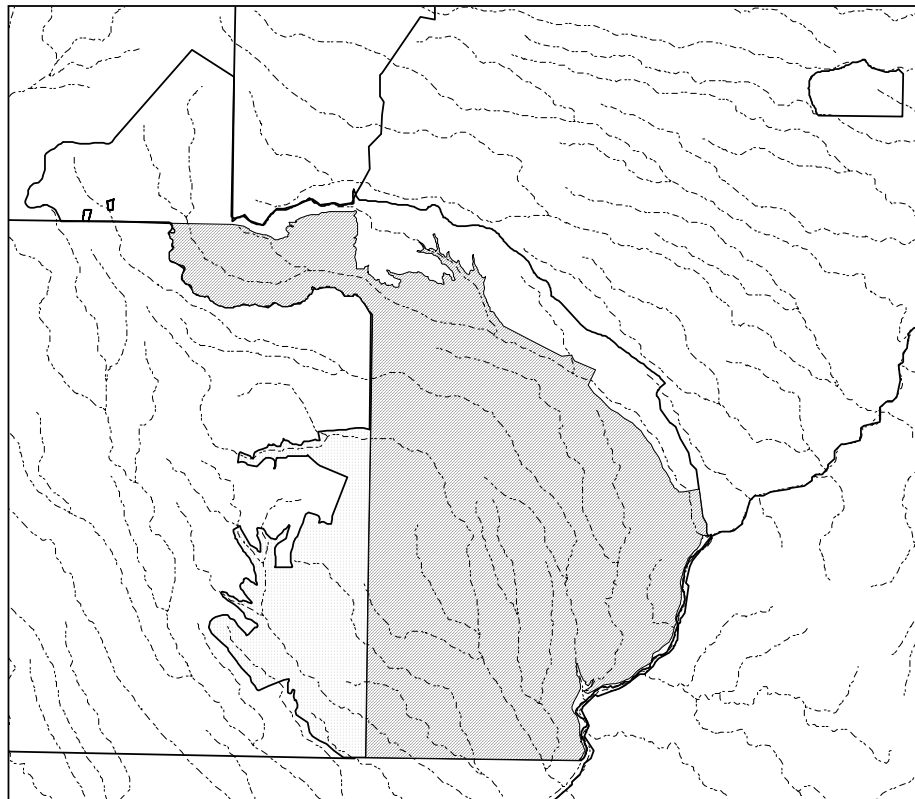
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The Dome Wilderness within Bandelier is identified as a Class I air shed. (See figure 4.4 below)

Mitigation measures for smoke impacts will be followed and an intensive public information program to explain the purpose of the prescribed fire program and possible smoke impacts will be utilized to ensure public acceptance of the prescribed fire program.

Figure 4.4 Bandelier's Wilderness and the USFS Dome Wilderness Area



9/27/04 K.Beeley, Bandelier National Monument

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E. Non-Fire Fuel Applications

Non-fire fuel treatments include manual and mechanical thinning. In general, thinning involves removing live and dead vegetation (fuels) according to a prescribed plan to meet specific objectives related to hazardous fuels management. Thinning is also used as a pre-treatment for prescribed burning to remove smaller diameter trees, ladder fuels, shrubs, snags, and ground litter to help keep the fire within the designated area or to protect specific resources. When multiple burns are needed to reduce hazardous levels of fuels, thinning pre-treatments can expedite the process by several years. Thinning is also used in suppression actions and as an effective treatment to reduce fuels in the WUI.

1. Annual Activities

Bandelier will annually review the multi-year fuels treatment plan (appendix K) as part of the annual FMP review. Activities will be identified and prioritized each spring, in cooperation with an interdisciplinary team, for implementation in the following fiscal year. Projects will be entered into NFPORS.

Projects that are approved and funded through the NPS Intermountain Region will be implemented using a treatment plan/scope of work approved by the Superintendent. Progress and completion of projects will be entered into NFPORS as appropriate.

2. Special Considerations and Restrictions

Potential impacts and topics of concern are addressed in Section X – Protection of Sensitive Resources. Mitigation measures are detailed for each topic addressed.

3. Monitoring

Bandelier's Fire Ecology Program is responsible for conducting fire and fire effects monitoring before and after fire and non-fire treatments. Permanent vegetation plots are installed and data is collected pre and post treatment (at defined intervals) to determine if fire and resource management objectives are being met or if additional research is needed. If unexpected trends are identified, the fire program is re-evaluated and/or objectives are revised. When this information is used to re-evaluate the fire program and revise goals or objectives, the adaptive management process comes full-circle

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4. Evaluation

Each non-fire fuel application will have an approved treatment plan. After completion of a non-fire fuels application, participating personnel will review the project, elements contained in the treatment plan, complete any monitoring and evaluation requirements, then critique the project. The objective will be to understand and improve fuels management techniques, operations, prescriptions, and the effects. At minimum, the critique will be attended by the project manager and FMO.

5. Reporting and Documentation

The individual non-fire fuel treatment plan, including monitoring observations and evaluations, will be kept on file at the Monument.

All fire funded projects will be tracked through NFPORS. Information for NFPORS updates and completion reporting will be submitted to the Fire Management Office for entry.

6. Historic Treatments

Non-fire fuels treatments have been accomplished along major roads and around developed areas. These treatments are shown on figure 4.3.

F. Emergency Rehabilitation and Restoration

Often the impacts of fire suppression and other management actions require some rehabilitation. Short and long term impact mitigation measures are outlined in RM-18, DOI BAER Handbook, and DO-18. Monument guidelines for rehabilitation include the following:

- The Minimum Requirements Decision Guide shall guide actions to mitigate actual or potential damage from wildland fire.
- Mitigation of suppression damage will be specified in incident action plans.
- BAER plans will be prepared as necessary to specify long-term mitigating actions, submitted to the Intermountain Regional Office within five (5) days following control of a wildland fire.

Refer to Chapter X – Protection of Sensitive Resources, for identification of sensitive resources important to track in terms of damage from fire suppression or from fire effects.

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G. Adaptive Management

Adaptive management at Bandelier will be used to guide fire management activities. The first step in this process is to draw on the best available science, monitoring, and emergent technologies to develop a fire management plan that articulates Bandelier's fire and resource management goals, objectives, and strategies. The implementation stage will be completed over time and all actions and responses will be monitored by Bandelier's Fire and Resource Management Staff. The results of this monitoring will be used to determine whether the actions had the desired effects, whether more information is needed, and whether the actions or prescriptions need to be modified to meet the Monument's goals and objectives. If the adaptive management process identifies other actions not covered under the approved EA, a new NEPA document will be prepared before project implementation.

V. Organization and Administration

A. Roles and Responsibilities

Superintendent

- Responsible for making the Go/No Go Decision, signing the WFSA or WFIP and periodic assessment to validate the WFSA or WFIP decision.
- Approves prescribed fire plans and non-fire treatment plans.
- Approves restrictions and declares part or whole Monument closures when needed.
- Issues a written delegation of authority in the event an Incident Management Team is assigned to a wildland fire.

Fire Management Officer

- Responsible for ensuring that the fire management program is managed within DOI and NPS guidelines.
- Ensures implementation of fire management plan and is responsible for and coordinates wildland fire and prescribed fire and fuels programs.
- Evaluates fire activity in terms of fire behavior and firefighter safety and makes recommendations to the superintendent for restrictions and/or closures.
- Responsible for coordination of annual review of the FMP.
- Responsible for WFSA planning and preparation, staffing assistance in respect to monitoring, and advisory assistance in terms of escalating staffing due to increases in complexity and fire behavior.
- Coordinates Bandelier's fire management activities with cooperating agency representatives. Including pursuing and/or maintaining cooperating agreements necessary to carry out this plan.

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Chief Ranger

- Evaluates fire activity in terms of public and employee safety and makes recommendations to the Superintendent for restrictions and/or closures.
- Schedules patrols to ensure restrictions and/or closures are enforced.
- Designs and implements the Monument's evacuation plan at the discretion of the Superintendent.

Chief of Resource Management

- Assists FMO with prescribed fire and non-fire fuels program coordination and compliance.
- Participates in WFSA or WFIP development, or designates a resource advisor for this purpose.
- Assigns a resource advisor on wildland fires as appropriate.

Fire Education, Prevention and Information Specialist

- Provides public and employee information in regards to fire danger, restrictions, and ongoing projects. Coordinates media releases with cooperating agencies, and works to produce interagency releases as appropriate.
- Prepares prevention messages, and ensures prevention messages are included in interpretive activities.
- Develops prescribed fire and fuels treatment information program.
- Acts as Fire Information Officer (FIO) on Monument projects and incidents.

Park Archeologist

- Acts as a cultural resource advisor on wildland fire and planning activities
- Plans and implements mitigation measures to avoid/minimize adverse impacts on cultural resources due to fire related activities.
- Acts as liaison with the State Historic Preservation Officer (SHPO).
- Ensures compliance with terms of the MOU between Bandelier and the New Mexico SHPO.
- Documents the effects of fire related activities on cultural resources.

B. Interagency Coordination

Interagency cooperators and local coordination efforts are described in Section I.D and Section IV.B.2.a of this plan. Additionally, the following agreements have been established.

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- Santa Fe Zone Initial Attack Operating Plan
- Interpark Agreement between Bandelier National Monument, Pecos National Historical Park, and Fort Union National Monument
- New Mexico Joint Powers Agreement
- Land use agreement at TA-49 between DOE and Bandelier
- Operating agreement for TA-49 between LANL, Santa Fe National Forest and Bandelier (expired currently being revised for signature for 2005 fire season)
- New Mexico Smoke Management, Memorandum of Understanding

C. Fire Program Funding

FIREPRO funds are provided through the Department of Interior firefighting account, and are no-year, non-ONPS funds distributed to each Park by the Fire Program Management Center, through the national fire budget office.

Bandelier National Monument's current (2004) base program funding is just under one million dollars for just over 16 full time employees (fte). This amount does not include supplemental funding for fuels projects, fire incidents, construction, or fairshare. All fire positions are FIREPRO funded. Bandelier has no ONPS funded fire fte.

All FIREPRO funding activities must comply with instructions prescribed in RM-18.

Bandelier National Monument is currently involved in the Fire Program Analysis (FPA) process along with our local federal cooperators. Bandelier is located in the Jemez Mountains Fire Planning Unit. Future funding (fiscal year 2007 and beyond) will be determined through the FPA process.

D. Updates and Reviews

The FMO is responsible to initiate review of this FMP annually. See Section XI – Fire Critiques and Annual Review for minimum annual requirements.

VI. Monitoring and Evaluation

Bandelier's Fire Ecology Program uses the best available information (such as data collected on-site, scientific journals, and knowledge from resource specialists) to formulate realistic objectives for desired future vegetative conditions. Once the desired future resource conditions are agreed upon, specific and measurable objectives are written, a desired degree of certainty in the results is determined, and vegetation sampling protocols are established and implemented. After data is collected on vegetation monitoring plots, it is

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continually used to evaluate if fire and resource management objectives are being met and to determine if additional research is needed. If unexpected trends are identified, the fire program is re-evaluated and/or objectives are revised. When this information is used to re-evaluate the fire program and goals or objectives are revised, the adaptive management process comes full-circle.

The Fire Ecology Program goals and objectives are to: 1) Use an adaptive management approach to work with fire and resource managers to identify resource management challenges, desired future vegetative conditions, and treatment and monitoring objectives for vegetation communities to be treated with fire or thinning activities. 2) Gather information on basic fire behavior and weather conditions during prescribed fires. 3) Establish and implement a sampling design and data collection protocol for vegetation communities to be treated with fire or thinning activities. 4) Document and analyze short and long-term fire effects on vegetation communities. 5) Use all available information (fire behavior observations, weather conditions, data collected on vegetation plots, and scientific literature) to determine if fire and resource management objectives are being met. 6) Identify where or if additional fire effects research is needed. See Appendix J for a detailed description of Bandelier's Fire Ecology Program in the ***Bandelier Fire Monitoring Plan***.

VII. Fire Research

Fire and its effects in the Jemez Mountains and Bandelier National Monument have been studied from a number of different viewpoints. Some research concentrated primarily on fire history (Allen, 1995; Allen 2002; Swetman 1996, Touchan, 1995). Some research focused on the wildlife (Johnson, 1994; Delaney, 1997). Other researchers looked at fire in relationship to the cultural resource (Traylor, 1990; Trembour, 1990; Ruscavage-Barz, 1999; Steffen 2002).

Bandelier and the Jemez Mountains will certainly continue to be the object of continued fire research, particularly in light of recent large fire activity.

VIII. Public Safety

Wildland fire can present a hazard to persons engaged in suppression activities, residents in the area, and to the public visiting Bandelier. The safety of all people in the area is the primary concern of the IC. For many fires, the entire perimeter is easily monitored and it is unlikely it will spread far. In these cases, the concern is to keep the public out of the immediate fire area and far enough away that suppression activities will not be hindered. Under no circumstance will anyone be permitted near a fire without the appropriate training and personal protective equipment required. The Chief Ranger will coordinate with the fire IC to ensure that all public safety concerns are recognized and addressed.

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In the case of a larger wildland fire that has the potential to spread, Monument visitors may be in areas of concern. Visitors will be informed at Monument entrance points and at the visitor center regarding the fire and areas where caution should be exercised. All efforts will be made to inform backcountry hikers of evacuation plans.

In extreme situations where the rate of fire spread constitutes an immediate threat, all efforts will be made to alert the public of the danger. Signs will be placed at each trailhead warning hikers and backcountry users if there are fires in the area. If smoke produced during wildland or prescribed fire creates a safety concern, signs will be placed on the roads. Roads will be closed or escorted convoys established if visibility on roads is impaired.

Temporary closure of Bandelier or a portion of the Monument may be needed when large or erratic fire behavior endangers visitor and employee safety. When a fire threatens to escape from the Monument or has the potential to do so, adjacent authorities will be given as much advance notice as possible in order to take appropriate action.

IX. Information and Education

The Fire Management Public Information and Education Program will expand ongoing efforts to educate employees and the public about the scope and effect of wildland fire management, including fuels management, resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management. The Public Information and Education Program will increase public awareness and support of the fire management program by communicating the program's goals and objectives and utilizing national fire communication strategies.

The Public Information and Education Program goals are:

- To provide year-round education on fire management and fire ecology.
- To work within and promote the interagency relationship established with agencies adjacent to Bandelier including the Santa Fe National Forest, Department of Energy/Los Alamos National Laboratory, Los Alamos County Fire Department, and all partners within the Santa Fe Zone.
- To work within and promote the relationships established with community groups, environmental groups, and other interested non-governmental partners.

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- To provide accurate and timely incident information for local, regional, and national fire operations as needed.
- To provide local communities, Monument employees and families, and Monument visitors with information on fire safety, fire prevention, defensible space, and fuels management.

An important reference for fire information work is being developed in conjunction with Santa Fe Zone partners. Specific operational procedures (checklists, media contacts, web update information, etc.) are outlined within this document.

Communication methods

The Fire Information and Education Program interfaces and communicates with the public through personnel and multi-media services. Both are described in detail below.

Personnel services:

Interpretive programs – Bandelier’s Fire Education, Prevention, and Information Specialist will integrate fire messages into hikes, tours, displays, site bulletins, and campfire programs.

Employee training – Bandelier will annually coordinate new and seasonal employee training sessions to improve staff understanding of the fire and fuels management program.

Education programs – Bandelier will develop programs and incorporate fire ecology concepts into curriculum-based education programs, summer day camp programs, and teacher workshops.

Roving – When fire operations occur within or close to Bandelier, employees (including temporary hires, interns) and interagency partners will be stationed when possible at strategic locations to answer questions about the current fire activity and explain the fire management program.

Special events – Bandelier will participate in local events to promote the fire management program and fuels management practices.

Public meetings - The Monument may conduct special public meetings related to specific fire events, planning efforts, fuels projects, or any other matter where dissemination of information is needed or desired.

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Multi-media services:

Web information – Bandelier’s Fire Education, Prevention, and Information Specialist will provide necessary information to the webmaster of the NPS fire site in Boise, ID and will provide material for the Bandelier web site.

Significant fire activity/mechanical treatments will be reported on the Inside NPS website for fire news, under Fire Portal Reporting. After completion of the activity, an entry will be made to close out the activity

Media stories – Bandelier will communicate with print, radio, and television outlets through press releases and interviews.

Printed handouts – Bandelier will include fire information in regular Monument publications, such as the Monument newspaper.

Visitor center exhibits, waysides, and bulletin boards – Bandelier will provide interpretive information in visitor centers and wayside exhibits.

Evaluation

Bandelier’s Fire Education, Prevention, and Information Specialist will prepare an annual report on the Fire Information and Education Program that documents the accomplishments for the year. This report will be presented to the Monument administrators, the regional Fire Management Office in Denver, Colorado and to the national communications program in Boise, Idaho.

X. Protection of Sensitive Resources

A. Mitigation measures: natural resources

Special-Status Species (Plants and Wildlife):

During the planning phase of any fire management activity, the presence of special-status species in the area will be determined. Monument personnel will evaluate existing databases and maps and may request additional surveys for field verification. Site-specific mitigations will be developed and implemented. As per formal consultation with the U.S. Fish and Wildlife Service, which determined a “may affect, and is likely to adversely affect the Mexican Spotted Owl or its designated critical habitat”, appropriate mitigations will be implemented to protect federally

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listed species. WFU actions will be constrained if they pose undesirable disturbance to important habitat for special-status wildlife, or if they threaten populations of special-status flora. If a prescribed fire unit includes habitat for special-status species, actions will be taken to avoid nesting season and/or other sensitive periods of time for plants and animals. Providing direct protection of certain areas (such as nesting trees), altering the time or season of burning, or simply not allowing fire into parts of the unit are examples of possible mitigation measures for sensitive plants and wildlife.

Additional mitigation measures specific to special status plants are listed below:

- 1a. Where possible, avoid ground disturbing activities such as line construction, manual or mechanical treatments, or pile burning in areas of known special status plant populations and in areas of suitable habitat (which includes moist, somewhat open, grassy understories in mixed coniferous forests of mesic canyon bottoms and relatively open, grassy pinyon-juniper woodlands of gentle slope, usually in proximity to basaltic canyon rims).
- 1b. Prohibit trail widening, trail anchored line construction, and canyon bottom line construction above Alcove House.
- 1c. Only in emergency situations, construct fire line through suitable habitat by using natural barriers such as the stream bed to delimit the burn area. As a last resort, if no natural barriers exist, construct fire line by using minimal line construction techniques (i.e., removal of duff layer only) to link natural barriers. Rehabilitate all fire line by pulling the duff back onto the line after the fire is declared out.
2. Monitor special status plant response to fire management activities.

Threatened or Endangered Species:

Only those mitigation measures specific to federally listed threatened or endangered species are included below.

Bald Eagle

General:

- There will be no manual or mechanical thinning actions or prescribed fire taking place within bald eagle winter roosting habitat.
- WFU Activities:
- A wildlife resource advisor would be consulted for any WFU in bald eagle winter roosting habitat.

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- Surveys for bald eagles may be conducted, and if roosting habitat is occupied, fire may be directed away from the area or be monitored to avoid destruction of critical roosting habitat components.
- WFU would be constrained if undesirable disturbances to bald eagles or suitable roosting habitat occur.
- All suppression activities necessary to extinguish a WFU would follow Minimum Impact Suppression Tactics (Appendix D).
- Large diameter trees and snags used for perching and roosting would be protected during fire management activities; and avoided during construction of hand lines used in suppression efforts.

Mexican spotted owl

General:

- All planned fire management activities within occupied SNA's will take place during the non-breeding season (1 September – 28 February).
- A wildlife resource advisor would be consulted for every fire management activity within suitable spotted owl habitat.
- Surveys to detect spotted owls would be conducted during the same year of the planned fire management activity and would precede that activity. Surveys would generally cover designated suitable nesting areas (SNAs) and nesting and roosting zones (NRZs) within 600 m of the planned fire management activity.
- If spotted owl presence is detected, occupancy/reproductive status surveys will be conducted to locate spotted owls and determine their nesting status.
- If spotted owls are nesting outside a mapped SNA, a new SNA will be established.

Thinning Activities within SNAs and NRZs:

- Only low soil impact mechanical apparatus would be used in all SNAs and NRZs outside wilderness areas. No chainsaws or mechanical thinning would be allowed inside SNAs and NRZs within designated wilderness.
- Retain as many of the naturally occurring large dead and down logs (>12 inches dbh) as possible.
- Maintain as much of the overstory as possible.
- Mortality of trees 18 inches dbh or larger shall be avoided.

Prescribed Fire and WFU Activities within SNAs and NRZs:

- In general, backing fires will be used to limit the rate of spread and intensity of fires in those areas.
- Where fuels are heavy and relatively dry, low density strip fires or spot fires (placing spots of fire on the ground at specified intervals as opposed to a continuous line) will be used within SNAs.

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- If conditions favor relatively intense fire behavior and undesirable effects, SNAs will be treated at night using the appropriate firing direction and pattern.
- Fuel pockets will be manually broken up, during the non-breeding season, to prevent excessive heat exposure to individual overstory trees in SNAs during prescribed fires.
- A spotted owl advisor will work directly with the burn boss on all prescribed fires that involve either an occupied SNA or assumed occupancy NRZ.
- WFU would be constrained if undesirable disturbances to spotted owls or suitable habitat occur.

Monitoring Activities:

- Mexican spotted owls and their habitat will be monitored to confirm anticipated effects and to detect any unanticipated effects.
 - Photo points will be established in all SNAs to record before, immediately post burn, and 5 years post burn.
 - Spotted owl occupancy and reproductive status will be monitored before and after fires in any SNA.

Soils:

During any fire management activity, impacts to soils will be minimized and areas with a high probability of erosion will be stabilized by utilizing the best available technology and rehabilitation methods. These methods will be determined by Monument fire and resource management staff, and could include the following: mulching, seeding with native plants, contour felling, slashing, sand/soil bags, trenching, grade stabilizing, and check dams. For each method where digging is involved, site specific archeological compliance will be conducted to avoid impacts to cultural resources. A brief description of each method is below.

Mulching:

Mulching is an effective tool for providing instant ground cover to reduce the erosive action of raindrops hitting bare soil and to disperse overland flow. Mulching may be used on highly erodible soils, areas that burned very hot and lost all ground cover, and on fire lines that have crossed drainages. Hand Mulching provides 100% ground cover on sensitive sites, but is an expensive, labor intensive treatment. Strip mulching is less expensive and may be more practical in some areas. It is applied in contour strips about 25 to 50 feet apart on burned slopes, covering approximately 50% of the land surface. Mulching may be used in conjunction with seeding to provide a protective cover for seeds and reduce soil moisture evaporation.

Seeding with native plants:

Seeding with native plants can be used to provide ground cover that will protect the soil from raindrop splash and surface runoff. It can also provide a stabilizing root mass to bind soil particles together. Seeding

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may be used to protect areas with highly erodible soils, areas that burned hot and lost all ground cover, areas adjacent to drainages that burned hot, and areas where the soil seed bank was destroyed. Seeding can be accomplished aurally or by hand. Aerial seeding has a rapid production rate and a low cost per acre. Hand seeding is optimal in small areas, usually less than 25 acres.

Contour felling:

Contour felling can be used to catch and hold soil and sediment, and to disperse overland water flow. This treatment can be applied by felling small trees, bucking them to a manageable length, and limbing them so they lay flat on the soil surface. They can then be placed on contour and, where possible, braced against stumps.

Straw wattles are tube-shaped bundles of straw of various lengths that can also be used to provide an effective barrier to soil movement. They work following the same principle as contour felling.

Slashing:

Slashing can be used to increase ground cover, stabilize soils, protect plant seeds, and reduce erosion. This treatment involves felling, lopping, limbing, and scattering of trees. It is most effective on lower angle slopes.

Sand/soil bags:

This treatment involves digging a shallow trench, using the soil removed from the trench to fill sand bags, and placing the filled sand bags directly down slope from the trench. The trench provides a catchment area for soil moving downhill and the sand bags provide a contour barrier.

Trenching:

Trenches can be dug with hand tools or with machinery (following the Minimum Requirements Decision Guide (Arthur Carhart National Wilderness Training Center, 2002) (hereafter, Carhart Center, 2002) and approval from the Superintendent), depending on the location. Trenches can disperse water flow, provide areas for water infiltration, and provide a catchment site for soil moving downhill. This is a useful treatment on soils with hydrophobic layers within 6 inches of the surface and areas that have little or no other on site material.

Grade stabilizing:

Grade stabilizing reduces channel down cutting, decreases water velocity, and maintains correct width/depth ratios in streams. It reduces sediment load in perennial streams by trapping and metering sediment through the system. There are two different types of grade

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stabilizers that may be used: rock grade stabilizers and log grade stabilizers. Rock grade stabilizers are generally used in smaller, intermittent, or ephemeral streams where there is plenty of rock on the surrounding slopes (rock is not removed from the streambed to construct the dam). Rock dams require organic matter, such as twigs, duff, and conifer needles to seal the structure properly. Log grade stabilizers are also used in smaller, intermittent, or ephemeral streams. There must be dead standing or down wood nearby to construct the dam.

Check dams:

Check dams can be used in intermittent or small perennial drainages to replace large debris that may have been burned out during the fire. Check dams prevent sediment from entering perennial streams and provide a barrier to soil movement. They can be constructed with rock and fence, logs, straw bales, or straw wattles.

Additionally, the following mitigation measures in regard to mechanical treatments will be implemented:

- Minimize the effects of soil compaction due to mechanical thinning activities by spreading slash on the ground.
- Conduct mechanical thinning activities during winter months when the soil is frozen.
- Rake appropriate areas after mechanical treatments.

Water resources:

The following mitigation measures in regard to water resources will be implemented:

- For prescribed fire, minimize the proportion of steep slopes (> 30%) within a watershed that are burned to minimize sediment loading.
- Avoid conducting burns that have the potential to be continuous up both sides of the vertical gradient of a watershed.
- When possible, conduct thinning activities at least 200 feet away from streams.

Aspen and deciduous shrub species:

The following mitigation measures in regard to aspen and deciduous shrub species will be implemented:

- Fire and resource personnel will conduct monitoring and research of aspen and deciduous shrub species response to fire.
- Implement mitigation measures prior to prescribed burning if deemed necessary by research and monitoring results. Examples of

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mitigation measures may include but are not limited to: 1) evaluate burning activities in selected aspen groves based on information gathered from research and monitoring, and 2) create or install exclosures to protect or study response of deciduous species.

Non-native species:

Control of non-native plant species with fire

Fire may be an effective tool for managing some non-native plant species. If fire is determined to be the appropriate tool for control of non-native species, the Fire Management Division would prepare a prescribed fire plan. This prescribed fire plan would include fire prescriptions, site preparation plans, and monitoring needed to carry out the non-native species control actions.

Non-native species invasion and fire management activities

Recognizing that fire management activities cause disturbance, opportunities exist for non-native plant species colonization. For example, in some areas fire suppression has contributed to the invasion of non-native thistles. The Fire Management Division is responsible for the monitoring of non-native plants before (if possible) and after fires through its Fire Ecology Program. This monitoring will continue and the Fire Management Division will participate in efforts to control non-native species. If non-native plants are found, the Monument Fire Ecologist and natural resources staff will develop appropriate mitigation measures (i.e. cutting seed heads and manually removing plants). Additionally, the Fire Management Division will modify their prescribed fire practices if certain activities are determined to contribute to invasions of non-native plants.

Pile burning:

To ensure that impacts from pile burning would be minimized, piles would be kept small (the size of a small car) to minimize the extent of vegetation and soil damage and also to allow mycorrhizal fungi and other soil organisms to re-colonize patches of sterilized soil. This would also facilitate nutrient cycling processes and help plants to reestablish. Raking duff from adjacent areas over the burn-pile footprint will also be considered on a case-by-case basis for the operational plan when burning piles.

Snags and slash:

Snags (standing dead trees) and other standing vegetation are generally cut during fire management activities when they present a threat to human life and safety or are a hazard to property or a valued resource. They may also be felled to control a wildland fire. In the event that a snag or live vegetation must be cut down, it will be cut flush with the ground (or as close to the ground as possible).

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Debris from cut vegetation (slash) will either be lopped and scattered to a depth of no more than 18 inches and burned during a subsequent prescribed fire, or piled and burned outside of fire season (October-April).

B. Mitigation measures: Cultural resources

Pre-incident planning

- Planning for fire management actions will include protection of known cultural resources using various measures as recommended by cultural resource staff and as identified in the MOA with the State Historic Preservation Office (SHPO) (see MOA with SHPO below).
- Cultural resource inventories will be completed for each fire management project area to identify resources that may be important and are susceptible to adverse impacts from fire or fire management actions.
- Known cultural resources will be evaluated for hazardous fuels, and those fuels may be reduced as part of ongoing fuel reduction programs.
- Bandelier will conduct long-term research and experimentation about the effects of fire on cultural resources.
- Bandelier will continue to consult with Native American tribes about fire management planning and specific fire management actions in order to identify issues and resources of concern and to implement the most appropriate treatments.
- In traditional use areas, fire managers will consider the needs of cultural practitioners to access and use traditional resources.

Incident response

- Fire management teams will solicit the advice of archeologists, cultural resource specialists, and/or other resource management staff on cultural resource issues and concerns to avoid impacts to cultural resources.
- To avoid damage to cultural resources, archeologists, cultural resource specialists, and/or other resource management staff will, whenever possible, aid in positioning crew camps, holding lines, spike camps, helispots, drop zones, and other fire suppression related activities in culturally sensitive areas.
- Archeologists, cultural resource specialists, and/or other resource management staff will be assigned as resource advisors to fire management teams to advise of known important cultural resources in areas where potential impacts of fire could be reduced or avoided through emergency fuel reduction.

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The possible impacts of fire and fire management activities on cultural resources will be mitigated by the following actions:

- Prior to the start of work, archeologists, cultural resource specialists, or other resource management staff will instruct crews in identification of cultural materials and review federal and state laws protecting archeological sites and artifacts.
- All cultural sites within the project area will be identified and located by an archeologist, cultural resource specialist, or other resource management staff member. These sites may be avoided during fire management activities.
- An archeologist, cultural resource specialist, or resource management staff member will be present on site during fire management treatments to identify structural elements, supervise directional tree felling, and placement of slash.
- Crews will avoid or minimize walking over structural elements.
- Following each project or treatment, a report will be sent to the SHPO.

Archeological sites within FMU's will be treated under the same conditions as prescribed for the surrounding vegetation with the following modifications:

- Dead trees, regardless of species, will be evaluated for removal from structural elements of sites. Non-structural elements of sites will be treated using the same prescription as for the surrounding landscape.
- Three inch diameter and smaller trees will be evaluated for removal. Cactus and other non-tree vegetation will be retained.
- Larger (> 3 inch) diameter junipers growing in structures will be retained unless an Archeologist, cultural resource specialist, or resource management staff member determines it would be detrimental to the stability or integrity of the structure.
- Larger (> 5 inch) diameter unstable ponderosa pines growing in structures will be removed.
- Heavy fuels (any dead woody material greater than 3-inch diameter) will be hand-carried off structural elements. Lighter slash can remain per recommendation of an Archeologist, cultural resource specialist, or resource management staff member.

MOA with the State Historic Preservation Office

All fire management actions and activities must follow the guidelines established in the FMP MOA for §106 consultation on a project specific basis. This MOA will be signed by the State of New Mexico Historic Preservation Officer and the Superintendent of Bandelier National Monument. Bandelier's §106 consultation requirements outlined in this MOA include development of project-specific fire management treatment plans that may include prescribed burning, manual thinning, or other treatments analyzed in the EA. The

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treatment plans define the proposed actions, and the anticipated level of fire intensity and resulting severity of impacts on cultural resources will also be identified if the project includes prescribed fire. Project areas that contain unsurveyed tracts of land on slopes less than 30 degrees will be subjected to intensive surveys. Project areas that have been previously inventoried will be assessed for the presence of historic properties through examination of Bandelier's cultural resource base maps, the Monument's archeological site database, and the List of Classified Structures (LCS). Monument archeologists will visit each known site within a proposed project area and assess the potential for adverse effects. In this site-specific assessment, the archeologist will determine whether any sites will require special protective measures to mitigate the effects of the project.

The Monument, in consultation with the SHPO, will follow the procedures described in 36 CFR 800.4(c) to evaluate the historical significance for all historic properties within an Area of Potential Effect (APE). Furthermore, the Monument will seek comments from all potentially interested Pueblo Indian groups, pursuant to National Register Bulletin 38, in order to identify potential Traditional Cultural Properties (TCPs) located within the APE, and will then apply National Register criteria and evaluate the historical significance of those properties identified. Copies of all recommendations of eligibility for the National Register will be submitted to the SHPO for concurrence.

For every prescribed fire plan, the Monument will document the results of the field inventory and consultation efforts with Pueblos regarding properties of traditional religious and cultural value, and identify any proposed measures to avoid any potential adverse effects to historic properties. As part of consultation with SHPO and other consulting parties, the Monument will submit the report for review and comment. The report will present a determination of no historic properties affected pursuant to 36 CFR 800.4(d)(1), no adverse effect, pursuant to 36 CFR 800.5(b) for the project(s); or historic properties may be adversely affected pursuant to 36 CFR 800.5(a)(1).

If avoidance of adverse effects is not possible, the Monument will work to resolve adverse effects with the SHPO and other appropriate parties in accordance with 36 CFR 800.6. If the Monument determines that adverse effects cannot be avoided or resolved, or if SHPO objects to a finding of no adverse effect, the Monument may rescind some prescribed fire or thinning activities in the analysis area and consult further in accordance with 36 CFR 800.6 to resolve the adverse effects.

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C. Mitigation measures: fire retardant

To minimize impacts to natural and cultural resources, fire retardant will only be used for IA on a fire. Beyond initial attack, it will require approval from the Superintendent.

D. Mitigation measures: wilderness

NPS Management Policies, Section 6.3.9 states the following:

“Fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness. The park’s fire management and wilderness management plans must identify and reconcile the natural and historic roles of fire in the wilderness, and will provide a prescription for response, if any, to natural and human-caused wildfires. If a prescribed fire program is implemented, these plans will also include the prescriptions and procedures under which the program will be conducted within wilderness. Actions taken to suppress wildfires will use the minimum requirement concept, and will be conducted in such a way as to protect natural and cultural resources and to minimize the lasting impacts of the suppression actions.”

All fire management activities in wilderness are conducted without the use of motorized equipment or transport, except under conditions that warrant an evaluation using the Minimum Requirements Decision Guide (Carhart Center, 2002) to determine whether motorized tools would be more effective in a particular case. According to NPS Management Policies (NPS, 2001a), use of motorized equipment in wilderness will be authorized only “if determined by the Superintendent to be the minimum requirement needed by management to achieve the purposes of the area as wilderness, including the preservation of wilderness character and values; or in emergency situations (search and rescue) involving the health or safety of persons actually within the area. Such management activities will be conducted in accordance with all applicable regulations, policies, and guidelines, including minimum requirement protocols as practicable.”

Minimum Impact Suppression Tactics will be used in wilderness (see Appendix D for a summary of Minimum Impact Suppression Tactics). Slash and debris may be scattered to reduce the visual effects in wilderness.

E. Mitigation measures: air quality

All prescribed burning and pile burning will comply with State of New Mexico air quality guidelines and smoke management regulations. A site-specific prescribed burn plan will be prepared for each project and will include all of the required elements related to air quality in RM-18.

Monument staff will monitor air quality adjacent to project areas and within developed areas of the Monument. Unhealthy or hazardous accumulations of

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smoke will trigger an aggressive suppression action that will continue until the air quality attains acceptable levels. When adjacent land management agencies are managing prescribed fires or wildland fires, cooperation and coordination will be initiated to minimize cumulative smoke impacts.

F. Mitigation measures: unplanned fire events

In the case of unplanned fire events, such as WFU, Monument resource advisors will immediately be notified of the fire ignition location and of the intent to manage the fire within a maximum manageable area (MMA). If necessary, efforts will be made to send resource specialists into the area to perform basic inventory work. If resource advisors locate features or resources that require mitigation, *action points* (geographic locations at which mitigation actions are triggered if fire reaches the point) will be established and mitigation plans developed. If the fire reaches an action point, the mitigation plan will be implemented. It may take several days to weeks before this occurs, or it is also possible that the fire may not reach the identified action point.

XI. Fire Critiques and Annual Review

The FMO is responsible to initiate review of this FMP annually. The Superintendent will certify by signature that continued management of wildland fire utilizing this plan is acceptable.

The minimum components of an annual review will include:

- Review of the FMP components including appendices
- Update of the Multi-year Fuels Plan
- Update of the Dispatch Plan
- Update of the Pre-attack files
- Review of the step-up plan
- Review of cooperative agreements

XII. Consultation and Coordination

Extensive consultation and coordination was accomplished through the NEPA process resulting in the Bandelier Fire Management Plan EA/Assessment of Effect. For more detailed information please refer the EA/Assessment of Effect (Appendix L).

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XIII. Appendices**



- A. References Cited**
- B. Glossary**
- C. Acronyms**
- D. Minimum Impact Suppression Tactics**
- E. Step-up Plan**
- F. Pre-Attack Plan**
- G. Restrictions and Closures**
- H. Dispatch Plan**
- I. Aviation Plan**
- J. Multi-year Fuels Plan**
- K. Monitoring Plan**
- L. Compliance – EA**

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Appendix A

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APPENDIX B – GLOSSARY

Aboriginal: Native, indigenous.

Adaptive Management: A type of natural resource management that implies making decisions as part of an on-going process. Monitoring the results of actions will provide a flow of information that may indicate the need to change a course of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.

Appropriate Management Response: The response to a wildland fire is based on an evaluation of risks to firefighter and public safety, the circumstances under which the fire occurs, including weather and fuel conditions, natural and cultural resource management objectives, protection priorities, and values at risk. The evaluation must also include an analysis of the context of the specific fire within the overall local, geographic area, or national wildland fire situation.

Archeological: Having to do with the study of the buildings, graves, tools and other objects which belonged to people who lived in the past, in order to learn about their culture and society

Artifact: An object that was made, used, and/or transported by humans that provides information about human behavior in the past.

Aspect: The direction a slope faces. For example, a hillside facing east has an eastern aspect.

Backcountry: Areas of the monument generally without modern developments, such as roads and utilities.

Backing fire: Fire spreading, or ignited to spread, into (against) the wind or downslope. A fire spreading on level ground in the absence of wind is a backing fire.

Biological Diversity (Biodiversity): The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and the ecological processes that connect everything in a common environment.

Broadcast Burning: Intentional burning within well defined boundaries for reduction of fuel hazard, as a resource management treatment, or both.

Burned Area Rehabilitation: The full range of post-fire activities to rehabilitate and restore fire damaged lands, including protection of public health and safety.

Burn Out: Setting fire inside a control line to consume fuel between the edge of the fire and the control line.

Burn Plan: A written operational plan for a prescribed fire. Requirements for the burn plan are detailed in RM-18.

Canopy: The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.

Catastrophic Fire: See stand replacing fire.

Clone (aspen clone): a plant which is genetically identical to the parent plant.

Cold Trailing: A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

Collaboration: Managers, scientists and citizens working together to plan, implement and monitor land management activities. The intention is to engage people who have information, knowledge, expertise and an interest in the health of natural ecosystems and nearby communities.

Control Burn: See Prescribed Fire or Burn.

Cooperators: Federal, state, and local agencies and Indian tribes that participate in planning and conducting fire management projects and activities.

Crown Fire: A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.

Cultural Resource: Includes historic properties such as archeological sites, traditional cultural properties, cultural landscapes, historic structures, as well as specific cultural values.

Cultural Landscape: The spatial distribution of cultural activities across a landscape at a given moment in time.

Defensible Space: Adequate space (free from flammable vegetation) between structures and flammable vegetation, which allows firefighters a safe working area within which to attack an oncoming wildfire.

Direct Attack: Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

Diurnal: Having a daily cycle or occurring every day.

Diversity: The distribution and abundance of different plants and animals within an area.

Duff: The partially decomposed organic material of the forest floor that lies beneath the freshly fallen twigs, needles and leaves. The fermentation and humus layers of the forest floor.

Duty Officer: A designated fire supervisor in charge of coordinating fire activities for that day. The Duty Officer is responsible for knowing fire resources and their availability for assignment

Ecosystem: An arrangement of living and non-living things and the forces that move them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildland fire are two of the forces that act within ecosystems.

Endangered Species: Those plant or animal species that are in danger of extinction throughout all or a significant portion of their range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.

Episodic: Occurring or appearing at usually irregular intervals.

Erosion: The wearing away of land or soil by the action of wind, water, or ice.

Ethnographic Resources: Resources that relate to the aspect of cultural anthropology concerned with the descriptive documentation of living cultures.

Exotic: Non-native plant and animal species.

Extended Attack: A wildland fire that has not been contained or controlled by initial attack forces and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander. Extended attack implies that the complexity level of the incident will increase beyond the capabilities of initial attack incident command.

Extreme Fire Behavior: Extreme implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of

fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

Fauna: The animal life of an area.

Fine Fuels: Fuels that ignite readily and are consumed rapidly by fire (e.g., cured grass, fallen leaves, needles, small twigs less than ¼ inch diameter, also referred to as 1-hour fuels).

Fire Frequency: A general term referring to the recurrence of fire in a given area over time.

Fire Management Activities: Include fire planning, fire management strategies, tactics, and alternatives, prevention; preparedness, education, and addresses the role of mitigation, post-fire rehabilitation, fuels reduction, and restoration activities in fire management.

Fire Management Plan: A strategic plan that defines a program to manage wildland fires based on an area's approved land management plan. Fire Management Plans must address a full range of fire management activities that support ecosystem sustainability, values to be protected, protection of firefighter and public safety, public health and environmental issues, and must be consistent with resource management objectives and activities of the area.

Fire Management Units: Geographic areas based upon similar values such as desired landscape conditions, strategies to manage fires, post-fire restoration strategies, fuels management strategies and other management values such as wildland urban interface, natural or cultural resources.

Fire Regime: The combination of fire frequency, predictability, intensity, severity, seasonality, and extent that is characteristic of fire in a particular ecosystem.

Fire Return Interval: Describes the average range of years between naturally occurring fire events in different vegetation types. Expressed as the arithmetic average (mean fire return interval) of all fire intervals in a given area over a given time period.

Fire Return Interval Departure: The number of fire return intervals that would have occurred naturally in the absence of fire suppression.

Flanking: Attacking a fire by working along the flanks either simultaneously or successively from a less active or anchor point and endeavoring to connect two lines at the head.

Flora: The plant life of an area.

Floristic Elements: Different species present in the flora.

Fuel Hazard: A fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.

Fuel load: The amount of combustible material (dead plants and trees, litter, and duff) that is found in an area.

Fuel Model: Simulated fuel complex for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

Fuels: Plants and woody vegetation, both living and dead, that are capable of burning.

Fuels Management: The planned manipulation and/or reduction of living and dead forest fuels for forest management and other land use objectives.

Fuels Treatment: The treatment of fuels that left untreated, would otherwise interfere with effective fire management or control. For example, prescribed fire can reduce the amount of fuels that accumulate on the forest floor.

Habitat: The area where a plant or animal lives and grows under natural conditions.

Hand line: A line cleared of all vegetation and fuels (down to mineral soil) used to help control a fires spread. Width varies depending on fuel type.

Helispots: Areas cleared of vegetation and dead and down fuels used to land helicopters.

Herbaceous: Referring to a plant that has little or no woody tissue and usually persists only for a single growing season.

Hibernacula: The places in which an animal hibernates or overwinters.

Holding line: A natural or human-made line that is used to limit the spread of a fire. A holding line can either be a line clear of burnable fuels, or a line that is pretreated by water or retardant to be made fire resistant.

Incident: An occurrence either human-caused or natural phenomenon, that requires action or support by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Indirect Attack: A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks or fuelbreaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions

Infiltration: Flow of water from the land surface into the subsurface.

Initial Attack: The aggressive response to a wildland fire based on values to be protected, benefits of response, and reasonable cost of response.

Interdisciplinary Team: A diverse group of professional resource specialists who analyze the effects of Alternatives on natural and other resources. Through interaction, participants bring different points of view and a broader range of expertise.

Interagency Coordination: Collaboration, communication among cooperating agencies.

Intermittent Stream: A stream that flows only at certain times of the year when it receives water from streams or from some surface, such as melting snow.

Ladder Fuels: Fuels, such as branches, shrubs or an understory layer of trees, which allow a fire to spread from the ground to the canopy.

Landscape: A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts.

Limbing: Removal of large tree limbs to reduce fuel load and the potential for crown fires.

Litter: The top layer of forest floor, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles; little altered in structure by decomposition.

Long-term Risk: A risk to be experienced within the next 50 to 100 years.

Lopped: Plants or trees having the top or outer parts cut off.

Management Action: Any activity undertaken as part of the administration of the national park.

Manual Thinning: A method used to trim limbs from trees as well as cut down individual trees and other vegetation using a chainsaw, crosscut saw, or axe.

Mechanical Thinning: A method used to cut down trees and other vegetation using vehicles, equipment, and other specialized apparatus.

Mesic: Characterized by intermediate moisture conditions, neither decidedly wet nor decidedly dry. The mid-range of the moisture scale from wet to dry.

Mop Up: Action that entails securing or cleaning up the fire after fireline is established (could be internal or around the perimeter).

Mutual Aid: A system wherein two or more fire departments, by prior agreement, operate essentially as a single agency to respond routinely across jurisdictional boundaries to render mutual assistance in combating fire emergencies.

Mycorrhizal: Refers to a mutually beneficial association between a fungus and the roots of a plant.

Native (Species): Any species of plant or animals native to a given land or water area by natural occurrence.

Nutrient Cycling: The passage of nutrients through an ecosystem so that they eventually become available once again to the primary producers.

Operational Plan: A written plan of action for a specific project or incident. Examples of operational plans could include burn plans, incident action plans, or non-fire treatment plans.

Overstory: Overstory is the larger, taller trees of growth which occupies a forest area and shades young trees, hardwoods, brush, and other deciduous varieties which are growing beneath the larger trees (i.e., understory).

Perennial: A plant which continues to grow after it has reproduced, usually meaning that it lives for several years.

Pile Burning: Controlled burning of slash (trees, brush, branches) removed during thinning.

Prescribed Fire or Burn: Any fire ignited by management actions to meet specific objectives. Prescribed fires are conducted in accordance with prescribed fire plans.

Prescribed Fire Plan: A plan for each prescribed fire. Plans are documents prepared by qualified personnel, approved by the agency administrator, and include criteria for the conditions under which the fire will be conducted (a prescription).

Prescription: Measurable criteria that define the conditions under which a prescribed fire will be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, and environmental, geographic, administrative, social, or legal considerations.

Projects (or project areas): From the National Fire Plan Operations and Reporting System (NFPORS) A collection of Treatments and Activities. A Project is defined by the user but is generally considered to be the area of planning. All the Treatments in a Project are approved and conducted under a single NEPA decision document. A Project is persistent – it is not limited to any time period. A Project has a Centroid, a Name, and may be associated with the HFRA.

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Red Card: Fire qualification card issued to fire rated persons showing their training needs and their qualifications to fill specified fire suppression positions in a large fire suppression or incident organization.

Resources: The natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.

Or:

Personnel, equipment, services and supplies available, or potentially available, for assignment to incidents. Personnel and equipment are described by kind and type, e.g., ground, water, air, etc., and may be used in tactical, support or overhead capacities at an incident.

Resource Advisor: a person who is knowledgeable about the natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.

Riparian Area: The area along a watercourse or around a lake or pond.

Roost: A place to rest or sleep.

Section 7: The section of the Endangered Species Act that requires all Federal agencies, in "consultation" with the Service, to insure that their actions are not likely

to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

Section 106 consultation: Refers to **§106** of the National Historic Preservation Act, which requires federal agencies to take into account the effects of their proposed undertakings on properties included or eligible for inclusion in the National Register of Historic Places and give State Historic Preservation Officers/Tribal Historic Preservation Officers and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed undertakings.

Sensitive Species: Plant or animal species which are susceptible to habitat changes or impacts from activities.

Seral stage: Any stage of development of an ecosystem from a disturbed, un-vegetated state to a climax plant community.

Short-term Risk: A risk to be experienced within the next 10 to 15 years. For example, prescribed burns can disturb habitat in the short-term, but in the long-term the fire resiliency of the habitat may be improved.

Slash: Debris left as a result of forest and other vegetation being altered by forestry practices and other land use activities (e.g., timber harvesting, thinning and pruning, road construction, seismic line clearing). Slash includes material such as logs, splinters or chips, tree branches and tops, and uprooted stumps, trees and shrubs.

Snag: A standing dead tree. Snags are important as habitat for a variety of wildlife species and their prey.

Special Status Species: Species federally listed as threatened or endangered under the Endangered Species Act of 1973, as amended (ESA); species that are proposed or are candidates for listing under ESA or federal species of concern that are not protected pursuant to ESA but are monitored for conservation status; and State of New Mexico listed threatened or endangered species and special status plant species.

Species: A class of individuals having common attributes and designated by a common name; a category of biological classification ranking immediately below the genus or subgenus; comprising related organisms or populations potentially capable of interbreeding.

Spike Camps: A camp is a geographical site(s), within the general incident area, separate from the incident base, equipped and staffed to provide sleeping, food, water, and sanitary services to incident personnel. Spike camps are generally small and highly temporary. These occur mostly in areas inaccessible by road and are frequently supplied by helicopter or pack-train.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and which start new fires beyond the zone of direct ignition by the main fire.

Stand: A group of trees that occupies a specific area and is similar in species, age, and condition.

Surface fuels: All materials lying on or immediately above the ground including needles or leaves, duff, grass, small dead wood, downed logs, stumps, large limbs, low brush, and reproduction.

Taxa: Any grouping within the classification of organisms, such as species, genus, and order.

Threatened Species: Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973.

Torching: The burning of the foliage of a single tree or a small group of trees, from the bottom up. (Syn. CANDLING)

Treatments: From the National Fire Plan Operations and Reporting System (NFPORS): The work activity that takes place on the Treatment Unit and is directly aimed at accomplishing goals of the National Fire Plan BARR or HFR. A Treatment is planned and conducted in one Fiscal Year.

Treatment Units: From the National Fire Plan Operations and Reporting System (NFPORS):

The tract of land where a *unique set* of Treatments_i is conducted. In the Hazardous Fuels Reduction module, Treatment Units are always 2-dimensional (Unit of Measure is acres). A Treatment Unit is persistent and has a Centroid_i(location). This means that once created, a Treatment Unit is permanently kept in the database.

Tuff: A rock composed of the finer kinds of volcanic detritus, usually fused together by heat.

Understory: The trees and woody shrubs growing beneath branches and foliage formed collectively by the upper portions of adjacent trees.

Values at Risk: A total assessment of resources, such as property, structures, natural and cultural resources, and economic, political, environmental, and social values, which may be affected by an incident now and in the foreseeable future.

Watershed: The entire region drained by a waterway, lake, or reservoir. More specifically, a watershed is an area of land above a given point on a stream that contributes water to the streamflow at that point.

Wilderness: Wilderness is a congressionally mandated area withdrawn from location and entry under the US mining laws.

Wildland Fire or Wildfire: Any non-structural fire that occurs on wildlands that is not a prescribed fire.

Wildland Fire Implementation Plan (WFIP): A progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for resource benefits. A full WFIP consists of three stages. Different levels of completion may occur for differing management strategies (i.e., fires managed for resource benefits will have two-three stages of the WFIP completed while some fires that receive a suppression response may only have a portion of Stage I completed).

Wildland Fire Situation Analysis (WFSA): A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions

Wildland Fire Use: A natural (lightning) ignited fire that is managed to meet resource benefits. Also known as Wildland Fire Use for Resource Benefit.

Wildland Urban Interface: A line, area, or zone where structures and other human development meet or intermingle with undeveloped land or naturally occurring flammable fuels.

ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
BAER	Burned Area Emergency Rehabilitation
BLM	Bureau of Land Management
BW	Backcountry/wilderness
CFR	Code of Federal Regulations
CG	Cerro Grande
Ch	Chain (1 chain =66 feet)
DFC	Desired Future Conditions
DO	Director's Order (refers to National Park Service Director)
DOA	Delegation of Authority
DOE	Department of Energy
DOI	Department of Interior
EA	Environmental Assessment
FMO	Fire Management Officer
FMU	Fire Management Unit
Fte	Full time equivalent – used to calculate staff hours
FUMA	Fire Use Manager
FUMT	Fire Use Management Team
HQ	Headquarters
IA	Initial Attack
IC	Incident Commander
IDT	Inter-Disciplinary Team
IQCS	Interagency Qualifications and Certification System
LCES	Lookouts, Communications, Escape Routes and Safety Zones
LCS	List of Classified Structures
LF	Lower Frijoles
MIST	Minimum Impact Suppression Tactics
MMA	Maximum Manageable Area
MOA	Memorandum of Agreement
MPH	Miles per hour
NEPA	National Environmental Protection Act
NFDRS	National Fire Danger Rating System
NFPORS	National Fire Plan Operations and Reporting System
NHPA	National Historic Preservation Act
NPS	National Park Service
NRZ	Nesting/Roosting Zone
NWCG	National Wildfire Coordinating Group
RM-18	National Park Service Reference Manual-18: Wildland Fire Management
SACS	Shared Application Computer System
SHPO	State Historic Preservation Office
SNA	suitable nesting area

**Fire Management Plan
Bandelier National Monument**

TCP	Traditional Cultural Properties
UF	Upper Frijoles
USC	United States Code
WFIP	Wildland Fire Implementation Plan
WFSA	Wildland Fire Situation Analysis
WFI	Wildland Fire Use also known as Wildland Fire Use for Resource Benefit
WUI	Wildland Urban Interface

MINIMUM IMPACT SUPPRESSION TACTICS

NWCG Guidance on Minimum Impact Suppression Tactics

In Response To the

10-YEAR IMPLEMENTATION PLAN FOR REDUCING WILDLAND FIRE RISKS TO
COMMUNITIES AND THE ENVIRONMENT

POLICY

The change from **fire control** to **fire management** has added a new perspective to the role of fire manager and the firefighter. Traditional thinking that “the only safe fire is a fire without a trace of smoke” is no longer valid. Fire Management now means managing fire "with time" as opposed to "against time." The objective of putting the fire dead out by a certain time has been replaced by the need to make unique decisions with each fire start to consider the land, resource and incident objectives, and to decide the appropriate management response and tactics which result in minimum costs and minimum resource damage.

This change in thinking and way of doing business involves not just firefighters. It involves all levels of management. Fire management requires the fire manager and firefighter to select management tactics commensurate with the fire’s potential or existing behavior while producing the least possible impact on the resource being protected. The term used to describe these tactics is “Minimum Impact Suppression Tactics”, commonly called MIST. Simply put: MIST is a ‘do least damage’ philosophy.

MIST is not intended to represent a separate or distinct classification of firefighting tactics but rather a mind set - how to suppress a wildfire while minimizing the long-term effects of the suppression action. MIST is the concept of using the minimum tool to safely and effectively accomplish the task. MIST should be considered for application on all fires in all types of land management.

While MIST emphasizes suppressing wildland fire with the least impact to the land, actual fire conditions and good judgment will dictate the actions taken. Consider what is necessary to halt fire spread and containment within the fireline or designated perimeter boundary, while safely managing the incident.

Use of MIST **will not** compromise firefighter safety or the effectiveness of suppression efforts. Safety zones and escape routes will be a factor in determining fireline location. Accomplishments of minimum impact fire management techniques originate with instructions that are understandable, stated in measurable terms, and communicated both verbally and in

writing. They are ensured by monitoring results on the ground. Evaluation of these tactics both during and after implementation will further the understanding and achievement of good land stewardship ethics during fire management activities.

GUIDELINES

The intent of this guide is to serve as a checklist for all fire management personnel. Be creative and seek new ways to implement MIST.

INCIDENT MANAGEMENT CONSIDERATIONS

Fire managers and firefighters select tactics that have minimal impact to values at risk. These values are identified in approved Land or Resource Management Plans. Standards and guidelines are then tied to implementation practices which result from approved Fire Management Plans.

- Firefighter and public safety cannot be compromised.
- Evaluate suppression tactics during planning and strategy sessions to ensure they meet agency administrator objectives and MIST. Include agency Resource Advisor and/or designated representative.
- Communicate MIST where applicable during briefings and implement during all phases of operations.
- Evaluate the feasibility of Wildland Fire Use in conjunction with MIST when appropriate for achieving resource benefits.

(1) RESPONSIBILITIES

Agency Administrator or Designee

- Ensure agency personnel are provided with appropriate MIST training and informational/educational materials at all levels.
- Communicate land and fire management objectives to Incident Commander.
- Periodically monitor incident to ensure resource objectives are met.
- Participate in incident debriefing and assist in evaluation of performance related to MIST.

Incident Commander

- Communicate land and fire management objectives to general staff.
- Evaluate suppression tactics during planning and strategy sessions to see that they meet the Agency Administrator's objectives and MIST guidelines.
- Monitor operations to ensure MIST is implemented during line construction as well as other resource disturbing activities.
- Include agency Resource Advisor and/or local representative during planning, strategy, and debriefing sessions.

Resource Advisor

- Ensure interpretation and implementation of WFSA/WFIP and other oral or written line officer direction is adequately carried out.

- Participate in planning/strategy sessions and attend daily briefings to communicate resource concerns and management expectations.
- Review Incident Action Plans (IAP) and provide specific direction and guidelines as needed.
- Monitor on the ground applications of MIST.
- Provide assistance in updating WFSA/WFIP when necessary.
- Participate in debriefing and assist in evaluation of performance related to MIST.

Planning Section

- Use Resource Advisor to help assess that management tactics are commensurate with land/resource and incident objectives.
- Ensure that instructions and specifications for MIST are communicated clearly in the IAP.
- Anticipate fire behavior and ensure all instructions can be implemented safely.

Logistics Section

- Ensure actions performed around Incident Command Post (ICP), staging areas, camps, helibases, and helispots result in minimum impact on the environment.

Operations Section

- Evaluate MIST objectives to incorporate into daily operations and IAP.
- Monitor effectiveness of suppression tactics in minimizing impacts to resources and recommend necessary changes during planning/strategy sessions.
- Communicate MIST to Division Supervisors and Air Ops/Support during each operational period briefing. Explain expectations for instructions listed in Incident Action Plan.
- Participate in incident debriefing and assist in evaluation of performance related to MIST.

Division/Group Supervisor and Strike Team/Task Force Leader

- Communicate MIST objectives and tactics to single resource bosses.
- Recommend specific tasks on divisions to implement MIST.
- Monitor effectiveness of suppression tactics in minimizing impacts to resources and recommend necessary changes to Operations Section Chief.

Single Resource Bosses

- Communicate MIST objectives to crew members.
- Monitor work to ensure that crews are adhering to MIST guidelines and specific incident objectives.
- Provide feedback to supervisor on implementation of MIST.

IMPLEMENTATION

Keep this question in mind: What creates the greater impact, the fire suppression effort or the fire?

Safety

- Apply principles of LCES to all planned actions.
- Constantly review and apply the 18 Watch Out Situations and 10 Standard Fire Orders.
- Be particularly cautious with:
 - Burning snags allowed to burn.

- Burning or partially burned live and dead trees.
- Unburned fuel between you and the fire.

Escape Routes and Safety Zones

- In any situation, the best escape routes and safety zones are those that already exist. Identifying natural openings, existing roads and trails and taking advantage of safe black will always be a preferred tactic compatible with MIST. If safety zones must be created, follow guidelines similar to those for helispot construction.
- Constructed escape routes and safety zones in heavier fuels will have a greater impact, be more time consuming, labor intensive and ultimately less safe.

General Considerations

- Consider the potential for introduction of noxious weeds and mitigate by removing weed seed from vehicles, personal gear, cargo nets, etc.
- Consider impacts to riparian areas when siting water handling operations.
 - Use longer draft hoses to place pumps out of sensitive riparian areas.
 - Plan travel routes for filling bladder bags to avoid sensitive riparian areas.
- Ensure adequate spill containment at fuel transfer sites and pump locations. Stage spill containment kits at the incident.

Fire Lining Phase

- Select tactics, tools, and equipment that least impact the environment.
- Give serious consideration to use of water or foam as a firelining tactic.
- Use alternative mechanized equipment such as excavators and rubber tired skidders rather than bulldozers when constructing mechanical line.
- Allow fire to burn to natural barriers and existing roads and trails.
- Monitor and patrol firelines to ensure continued effectiveness.

Ground Fuels

- Use cold-trail, wet line or combination when appropriate. If constructed fireline is necessary, use minimum width and depth to stop fire spread.
- Consider the use of fireline explosives (FLE) for line construction and snag falling to create more natural appearing firelines and stumps.
- Burn out and use low impact tools like swatters and gunny sacks.
- Minimize bucking to establish fireline: preferably move or roll downed material out of the intended constructed fireline area. If moving or rolling out is not possible, or the downed log/bole is already on fire, build line around it and let the material be consumed.

Aerial fuels—brush, trees, and snags:

- Adjacent to fireline: limb only enough to prevent additional fire spread.
- Inside fireline: remove or limb only those fuels which would have potential to spread fire outside the fireline.
- Cut brush or small trees necessary for fireline construction flush to the ground.
- Trees, burned trees, and snags:
 - Minimize cutting of trees, burned trees, and snags.

- Do not cut live trees unless it is determined they will cause fire spread across the fireline or seriously endanger workers. Cut stumps flush with the ground.
- Scrape around tree bases near fireline if hot and likely to cause fire spread.
- Identify hazard trees with flagging, glowsticks, or a lookout.
- When using indirect attack:
 - Do not fall snags on the intended unburned side of the constructed fireline unless they are an obvious safety hazard to crews.
 - Fall only those snags on the intended burn-out side of the line that would reach the fireline should they burn and fall over.

Mopup Phase

- Consider using “hot-spot” detection devices along perimeter (aerial or hand-held).
- Use extensive cold-trailing to detect hot areas.
- Cold-trail charred logs near fireline: do minimal scraping or tool scarring. Restrict spading to hot areas near fireline.
- Minimize bucking of logs to check for hot spots or extinguish fire: preferably roll the logs and extinguish the fire.
- When ground is cool return logs to original position after checking.
- Refrain from piling: burned/partially burned fuels that were moved should be arranged in natural positions as much as possible.
- Consider allowing larger logs near the fireline to burn out instead of bucking into manageable lengths. Use a lever, etc. to move large logs.
- Use gravity socks in stream sources and/or combination of water blivets and fold-a-tanks to minimize impacts to streams.
- Personnel should avoid using rehabilitated firelines as travel corridors whenever possible because of potential soil compaction and possible detrimental impacts to rehab work.
- Avoid use of non-native materials for sediment traps in streams.
- Aerial fuels (brush, small trees, and limbs): remove or limb only those fuels which if ignited have potential to spread fire outside the fireline.
- Burning trees and snags:
 - *Be particularly cautious when working near snags* (ensure adequate safety measures are communicated).
 - The first consideration is to allow a burning tree/snag to burn itself out or down.
 - Identify hazard trees with flagging, glow-sticks or a lookout.
 - If there is a serious threat of spreading firebrands, extinguish with water or dirt.
 - Consider felling by blasting, if available.

Aviation Management

Minimize the impacts of air operations by incorporating MIST in conjunction with the standard aviation risk assessment process.

- Possible aviation related impacts include:
 - Damage to soils and vegetation resulting from heavy vehicle traffic, noxious weed transport, and/or extensive modification of landing sites.
 - Impacts to soil, fish and wildlife habitat, and water quality from hazardous material spills.
 - Chemical contamination from use of retardant and foam agents.
 - Biological contamination to water sources, e.g., whirling disease.

- Safety and noise issues associated with operations in proximity to populated areas, livestock interests, urban interface, and incident camps and staging areas.
- Helispot Planning
 - When planning for helispots determine the primary function of each helispot, e.g., crew transport or logistical support.
 - Consider using long-line remote hook in lieu of constructing a helispot.
 - Consult Resource Advisors in the selection and construction of helispots during incident planning.
 - Estimate the amount and type of use a helispot will receive and adapt features as needed.
- Balance aircraft size and efficiency against the impacts of helispot construction.
- Use natural openings as much as possible. If tree felling is necessary, avoid high visitor use locations unless the modifications can be rehabilitated. Fall, buck, and limb only what is necessary to achieve a safe and practical operating space.

Retardant, Foam, and Water Bucket Use

- Assess risks to sensitive watersheds from chemical retardants and foam. Communicate specific drop zones to air attack and pilots, including areas to be avoided.
- Fire managers should weigh use of retardant with the probability of success by unsupported ground force. Retardant may be considered for sensitive areas when benefits will exceed the overall impact. This decision must take into account values at risk and consequences of expanded fire response and impact on the land.
- Consider biological and/or chemical contamination impacts when transporting water.
- Limited water sources expended during aerial suppression efforts should be replaced. Consult Resource Advisors prior to extended water use beyond initial attack.

Logistics, Camp Sites, and Personal Conduct

- Consider impacts on present and future visitors.
- Provide portable toilets at areas where crews are staged.
- Good campsites are found, not made. If existing campsites are not available, select campsites not likely to be observed by visitors
- Select impact-resistant sites such as rocky or sandy soil, or openings within heavy timber. Avoid camping in meadows and along streams or shores.
- When there is a small group try to disperse use. In the case of larger camps: concentrate, mitigate, and rehabilitate.
- Lay out camp components carefully from the start. Define cooking, sleeping, latrine, and water supplies.
- Prepare bedding and campfire sites with minimal disturbance to vegetation and ground.
- Personal Sanitation:
 - Designate a common area for personnel to wash up. Provide fresh water and biodegradable soap.
 - Do not introduce soap, shampoo or other chemicals into waterways.
 - Dispose of wastewater at least 200 feet from water sources.
 - Toilet sites should be located a minimum of 200 feet from water sources. Holes should be dug 6-8 inches deep.

- If more than 1 crew is camped at a site strongly consider portable toilets and remove waste.
- Store food so that it is not accessible to wildlife, away from camp and in animal resistant containers.
- Do not let garbage and food scraps accumulate in camp.
- Monitor travel routes for damage and mitigate by:
 - Dispersing on alternate routes or
 - Concentrating travel on one route and rehabilitate at end of use.
- If a campfire is built, leave no trace of it and avoid using rock rings. Use dead and down wood for the fire and scatter any unused firewood. Do not burn plastics or metal.

Restoration and Rehabilitation

- Firelines:
 - After fire spread has stopped and lines are secured, fill in deep and wide firelines and cup trenches and obliterate any berms.
 - Use waterbars to prevent erosion, or use woody material to act as sediment dams.

Maximum Waterbar Spacing	
Percent Grade	Maximum Spacing, Feet
< 9	400
10 – 15	200
15 – 25	100
25 +	50

Table 1, Maximum Waterbar spacing.

- Ensure stumps are cut flush with ground.
- Camouflage cut stumps by flush-cutting, chopping, covering, or using FLE to create more natural appearing stumps.
- Any trees or large size brush cut during fireline construction should be scattered to appear natural.
- Discourage the use of newly created firelines and trails by blocking with brush, limbs, poles, and logs in a naturally appearing arrangement.
- Camps:
 - Restore campsite to natural conditions.
 - Scatter fireplace rocks and charcoal from fire, cover fire ring with soil, and blend area with natural cover.
 - Pack out all garbage.
- General:
 - Remove all signs of human activity.
 - Restore helicopter landing sites.
 - Fill in and cover latrine sites.
- Walk through adjacent undisturbed areas and take a look at your rehab efforts to determine your success at returning the area to as natural a state as possible.



Bandelier National Monument

Fire Management Staffing Chart

Step-Up Plan

ERC	Staffing Class	Action
0-12	I (Low)	<ul style="list-style-type: none"> ✎ Staff is in training and planning for readiness ✎ Red-card qualifications are maintained, yearly physicals and work capacity test (pack test) are kept up-to-date ✎ Engine 9-1 is fire ready (April-September) ✎ Contact information for red-carded personnel is kept up-to-date
13-26	II (Moderate)	<ul style="list-style-type: none"> ✎ Engine Captain is aware of all resources available for Initial Attack ✎ Fire Roads and Helispots are prepared for operational use ✎ Resource Advisor(s) is identified and scheduled
27-54	III (High)	<ul style="list-style-type: none"> ✎ Includes all actions for class II ✎ Maintain daily staffing reports to FMO and Santa Fe Zone (April-Sept) ✎ Duty officer for Bandelier is identified and known to Park and Zone dispatch ✎ Superintendent is briefed on situation, outlook and staffing as conditions warrant. ✎ Lookout may be activated based on outlook and activity ✎ Daily fire weather and safety briefings are conducted (Apr-Sept) ✎ Fire qualified personnel will have PPE and IA gear immediately available.
55-58	IV (Very High)	<ul style="list-style-type: none"> ✎ Includes all actions for class III ✎ Fire and protection personnel may be called to work extended hours or weekends at the discretion of the FMO ✎ IA crew is within a 5 minute hike from vehicles after 1400 hours. ✎ Aerial recon will be requested by duty officer if lightning activity has occurred the same or previous day ✎ FMO recommends any restrictions and/or closures to the Superintendent. ✎ Coordinate with local cooperating agencies (see restrictions and closure guidelines) ✎ Up to 6 emergency firefighters plus supervision are on duty. ✎ Any prescribed fire or hazard fuels projects will be evaluated daily. Projects may be postponed/cancelled or mitigated if they pose an unacceptable fire risk.
59+	V (Extreme)	<ul style="list-style-type: none"> ✎ Includes all actions for class IV ✎ Appropriate actions will be taken on new or on-going Wildland Fire Use for Resource Benefit incidents. ✎ Minimum 2 engines will be on 7-day staffing (Apr-Sept). Duty Officer will have call-back list for IA crew (Oct-Mar) ✎ Days off may be cancelled for red-carded personnel (work/rest guidelines will be strictly adhered to) ✎ Lookout will be staffed 7-days/week (Apr-Sept). ✎ Type II crew and type III IC may be placed in ordered stand-by in Park.

Bandelier National Monument
Pre Attack Plan

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Introduction

This Pre Attack plan provides general information regarding Bandelier National Monument and specific information regarding the fire management program. Information is included on local weather, fuels/fire behavior, and dispatch procedures for visiting/incoming operational resources. Logistical information is also included for things such as communications, supplies and facilities.

This plan has been prepared in advance for all-risk management. Specific incident information is not provided here, but should be obtained from incident supervisors.

Overview of Bandelier National Monument

Bandelier National Monument is located on the southern portion of the Pajarito Plateau in the Jemez Mountains at the southern edge of the Rocky Mountains in north-central New Mexico. It is approximately 10 miles southwest of Los Alamos and 50 miles northwest of Santa Fe. The Monument's northern boundary is situated on the rim of a large volcano (now the Valles Caldera National Preserve) that collapsed approximately one million years ago after its enormous eruption. The area is now composed of volcanic ash and lava flows that have been eroded into deep canyons separated by narrow mesas. Within the Monument's boundaries are some 33,750 acres (15,742 hectares) of rugged canyons, mesas, and mountain slopes. The Monument spans an elevational gradient from the Rio Grande at 5,300 ft (1,590 meters) to the summit of Cerro Grande at 10,199 ft (3,109 meters), an altitudinal range of 4,899 ft. (1,519 meters) (Figure 1.2).

The diversity of habitats created by the range of elevations, topographic aspects, climates, and soils support a variety of associated wildlife, such as elk, black bear, and mountain lion, and are populated by an equally diverse assemblage of plant life. Thus, within a single days' walk from the banks of the Rio Grande to the summit of Cerro Grande, one traverses moist canyon bottoms, juniper grassland communities, pinyon-juniper woodlands, ponderosa pine forests, mixed conifer forests, and mountain meadows. Bandelier contains over 750 taxa of vascular plants, including many sensitive species such as the yellow lady's slipper (*Cypripedium calceolus*) and grama grass cactus (*Pediocactus papyracanthus*).

The primary reason Bandelier was designated a National Monument in 1916 was to preserve and protect its high concentration of cultural resources. The Monument contains approximately 2750 recorded archeological sites that span in time from the Paleoindian period (10,000 years ago) to the historic period (from 1600 to present). The Monument includes ancient hunting camps, "cavate" (rooms that have been carved into the soft tuff bedrock) structures, 300-room pueblos, small farming hamlets, and the remains of historic corrals and log cabins, as well as other cultural resources. Bandelier is also home to the largest collection of Civilian

Conservation Corps (CCC) era buildings, most of which are preserved in the Bandelier National Monument CCC Historic District. This National Historic Landmark commemorates the accomplishments of the CCC and its contributions to the history of the NPS.

Weather

Fire Weather Zones and Forecasts

The National Weather Service, Albuquerque Office, distributes morning fire weather forecasts, afternoon updates, fire weather watches and red flag warnings as specified in their annual operating plan. This information is available on the internet at <http://www.srh.noaa.gov/data/ABQ/FWFABO>

BANDELIER IS LOCATED IN FIRE WEATHER ZONE 102.

Spot Weather Forecasts

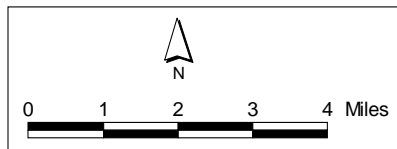
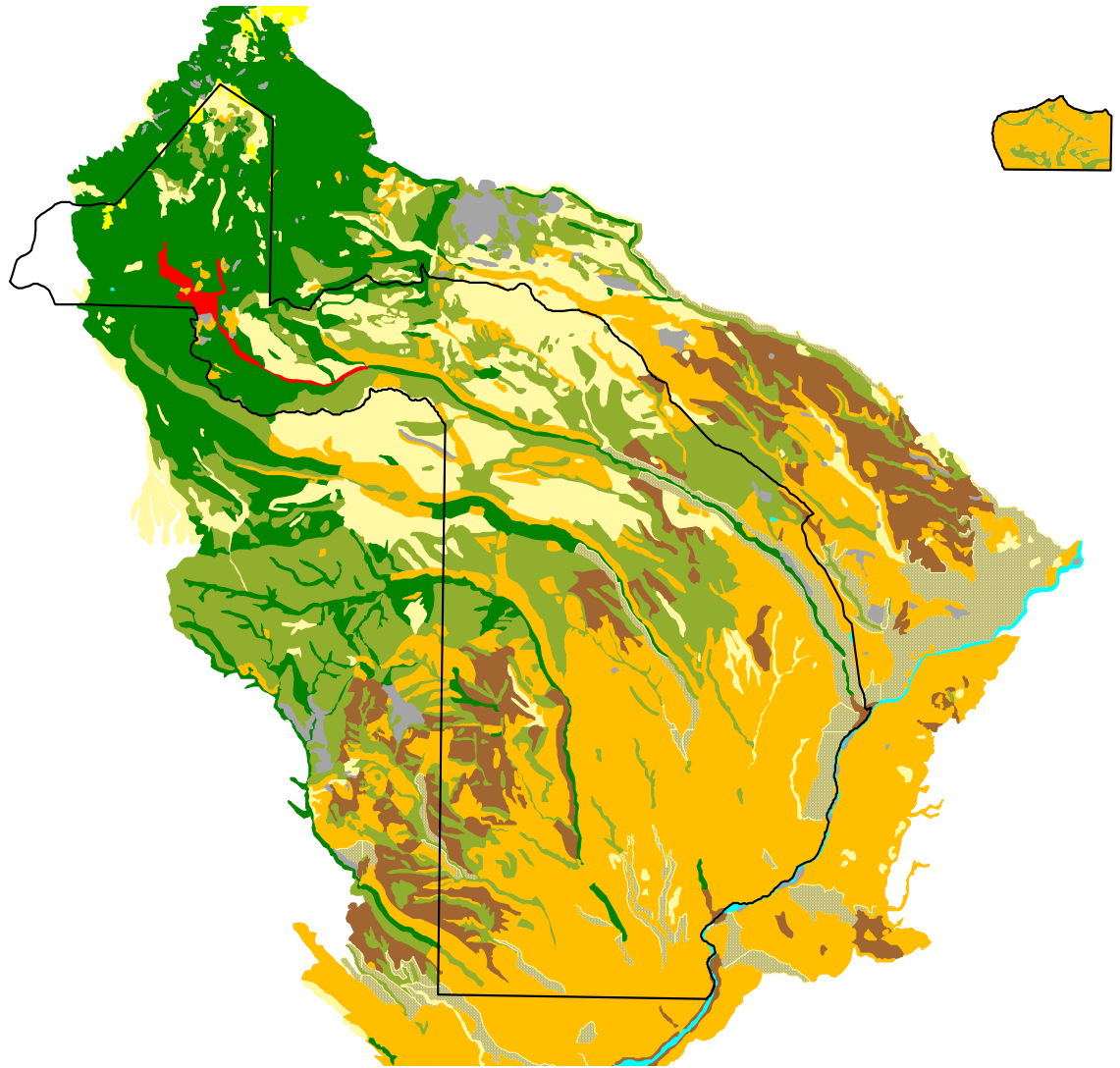
Spot weather forecasts are available through the National Weather Service, Albuquerque Office. When on an incident a spot weather forecast can be obtained through zone dispatch (172.3000) or via the internet at <http://spot.nws.noaa.gov/cgi-bin/spot/spontmon?site=abq>











Locations of weather stations

The NPS operates a RAWS station at the Bandelier Fire Tower. Daily observations are maintained by fire management staff and fire danger calculations are run. Bandelier also has access to RAWS stations at the Jemez Ranger District Office via Santa Fe Zone Dispatch. Jemez Station observations are monitored during fire season and as needed for projects.

Fire Behavior/Fuels

Figure 1 Fire Behavior Fuel Models in Bandelier National Monument



-  Short grass, models 1 or A
-  Grass understory, models 2 or C
-  Tall grass, models 3 or L
-  Brush, models 4 or B
-  Brush, models 5 or F
-  Short needles, models 8 or G
-  Long needles, models 9 or C
-  Heavier fuels, models 10 or U
-  Water
-  Bare ground or developed area

9/27/04 K.Beeley, Bandelier National Monument

Bandelier National Monument is comprised of seven main fire behavior fuel models:

Fuel model 1 exists in the montane grasslands, wet meadows, and in areas previously burned by crown fires. Grasslands are generally not continuous but tend to be interspersed with areas of Fuel model 6. Grasslands are very flashy fuels and when cured can easily carry fires between wooded areas.

Fuel model 4 is located in scattered areas, primarily on the canyon slopes where fires have converted portions of formerly forested slopes (at all elevations) into shrub communities. Due to the patchy nature of this type, reference should be made to the dominant overstory vegetation on adjacent mesas and mountain slopes.

Fuel model 5 is found on the lower mesas and canyon slopes and on elevated benches along the Rio Grande corridor. Fire is generally carried in the surface fuels and is typically not very intense because surface fuels are light and sparse.

Fuel model 6 is the predominant fuel model in the lower elevations of the Monument. The decadent pinyon-juniper woodlands and forests found in most areas of the Monument have insufficient and discontinuous fuels that cannot sustain fire without significant wind.

Fuel model 8 describes the vegetation in both the narrow canyon riparian corridor and the scattered aspen groves in mixed conifer forest. Fire in this fuel model generally moves slowly through the surface layer with short flame lengths, although occasional heavy fuel concentrations may occur which cause the fire to flare up.

Fuel model 9, ponderosa pine savannas and forests dominate the mid-elevations of the Monument. Fire suppression and overgrazing in ponderosa pine forests have resulted in increasing stand densities. Fire in this fuel type carries through the surface litter at slow to moderate speeds. Concentrations of dead and down woody materials contribute to the torching of trees, spotting, and possibly crowning.

Fuel Model 10 characterizes the mixed conifer forests which occur on high mountain slopes and within upper canyon drainages. Fire generally burns in the surface litter and ground fuels with moderate to high intensity and speed. There is generally a large amount of dead and down fuel greater than 3 inches in diameter present on the forest floor. Crowning, spotting and torching of individual trees are relatively more frequent in this fuel type.

Table 1 Range of Potential Fire Behavior by Fuel Model

Fuel Model	Conditions	Rate of Spread (ch/hr)	Flame Length (feet)	Remarks
1 Grasslands	Normal	3-62	0-4	Direct Attack would normally be effective on these fires
	Severe	66-570	4-11	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered
4 Canyon Slope	Normal	5-57	5-17	Flanking Attack would normally be effective on these fires
	Severe	110-263	24-38	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered
5 Juniper-Shrub Grasslands	Normal	.5-16	.5 – 5	Direct Attack would normally be effective on these fires
	Severe	36-83	7.5-12	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered
6 Pinyon-Juniper Woodlands	Normal	2-25	1.5-5	Direct Attack would normally be effective on these fires
	Severe	47-125	7-12	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered

8 Aspen/Riparian	Normal	.2 - 1.5	.5 - 1	Direct attack would normally be effective on these fires.
	Severe			Direct attack would normally be effective on these fires.
9 Ponderosa Pine	Normal	3-7	1-2.5	Direct attack would normally be effective on these fires.
	Severe	7-41	3-7	A combination of Direct and Indirect Attack and/or aerial would need to be used
10 Mixed Conifer	Normal	1 – 6	1.5 – 4.5	Direct attack would normally be effective on these fires.
	Severe	10-29	6-10	Direct Attack would not be effective at the head of these fires. Indirect and/or aerial attack would need to be considered

Outputs for these conditions used the following variables in Behave Plus to calculate the Rate of Spread and Flame Length for normal and severe conditions.

Normal: 0-4 mph midflame windspeed, 6-10% fine fuel moisture. 0-10% slope with 10% 10-hour and 100-hour fuel moistures.

Severe: 6-10 mph midflame windspeed, 2-5% fine fuel moisture. 0-10% slope with 5% 10-hour and 100-hour fuel moistures.

Special Concerns

The following table is a summary of topics of special concern and mitigation measures at Bandelier. For the full text with more details, please refer to the Fire Management Plan.

Table 2. Brief summary of mitigation measures that may be implemented as part of Bandelier’s Fire Management Plan.

Topic	Mitigation Measure	Responsible Party
Special Status Species	Presence of species in the project area will be determined; seasonal restrictions may be implemented; certain nesting trees or important habitat may be protected from fire; fire may be restricted in some sensitive habitats. In or near special status plant populations: ground disturbance will be avoided; natural barriers will be used for fire line construction; fire line will be rehabilitated; plant response will be monitored.	Wildlife Biologist, Vegetation Specialist, and appropriate fire staff
Soils/Erosion	Mulching. Aerial or hand seeding with native plants. Contour felling and bucking of small trees or using straw wattles. Slashing by felling, lopping, limbing and scattering of trees. Sand/soil bags and trenching. Rock and log grade stabilizers. Check dams constructed with rock, fence, logs, straw bales, or straw wattles. Mechanical treatments will preferably be conducted when soil is frozen and/or with slash on the ground. Soil will be raked after treatments.	Appropriate fire staff and natural and cultural resources staff
Water Resources	Proportion of steep slopes burned in a watershed will be minimized; burns that are continuous up both sides of the vertical gradient of a watershed will be avoided; thinning activities will be conducted at least 200 ft. from stream.	Appropriate fire staff
Aspen and Deciduous Shrubs	Monitoring and research of deciduous species will be conducted; burning activities in selected aspen groves will be evaluated; exclosures will be created or installed for protection or study.	Appropriate fire staff and natural resource staff

Topic	Mitigation Measure	Responsible Party
Non-Native Species	Use of fire to control non-native species. Monitoring will be conducted before and after fire treatments and if non-native plants are found, removal techniques will be developed and/or fire practices may be modified.	Appropriate fire staff, Fire Effects Specialist, and natural resources staff
Pile Burning	Piles will be kept small (the size of a small car averaging <8' wide by <6' high).	Appropriate fire staff
Snags and Slash	Flush cut snags and standing vegetation if they present a threat to human life or safety. Lop and scatter vegetation to 18 inches or less, burn during prescribed fire or pile burn outside of fire season (October-April). Cut snags and standing vegetation to control a wildland fire.	Appropriate fire staff and natural resource staff
Fire Retardant	Fire retardant will only be used for initial attack on a fire. Use beyond initial attack must be approved by the Superintendent.	Appropriate fire staff
Cultural Resources	Pre-incident planning may include protection of known cultural resources as appropriate. Research and experimentation of effects of fire on cultural resources. Remove hazardous fuels from certain cultural sites. Crews will avoid or minimize walking over structural elements. Inform and educate crews on identification of cultural resources. Cultural or resource management staff will be on-site during incident response or fire management treatments to protect or avoid cultural resources. Cultural resource staff will aid in positioning crews, holding lines, spike camps, helispots, drop zones, and other fire suppression related facilities to avoid or minimize impacts in culturally sensitive areas. Cultural staff will advise fire teams where emergency fuel reduction could reduce or avoid impacts on known important cultural resources.	Appropriate cultural resource staff or resource management staff and fire staff
	Archeological sites within fire management units will be treated through evaluating the removal of: dead trees from structural elements; 3-inch diameter and smaller	Appropriate cultural resource staff or resource management staff

Topic	Mitigation Measure	Responsible Party
	trees (cactus and other non-tree vegetation will remain), large (> 5 in. diameter) ponderosa pine growing in structures. Larger (> 3 in. diameter) juniper trees growing in structures will be retained, unless determined to be detrimental to integrity or stability of structure. Dead, woody material (> 3 in diameter) will be hand carried off structural elements, lighter slash may remain.	and fire staff
Wilderness	All fire management activities proposed in wilderness will require the use of the Minimum Requirements Decision Guide to determine the appropriate tools necessary to accomplish management objectives. As a general rule, motorized and/or mechanized equipment will not be allowed in wilderness areas. Minimum Impact Suppression Tactics (MIST) will be used in all wilderness areas (Appendix D).	Appropriate fire staff
Air Quality	Monitoring of air quality within Monument and adjacent to project area. If smoke accumulation is above authorized limits, aggressive suppression actions will occur until air quality improves.	Appropriate fire and resource staff
Unplanned Fire Events	Resource advisors notified of fire ignition location. If features or resources are located that require mitigation, action points will be established and mitigation plans will be developed.	Appropriate natural and cultural resource staff and fire staff

Fire Danger

ERC and Staffing

The step-up staffing plan is a documented procedure designed to direct incremental preparedness actions taken by Bandelier personnel in response to increasing fire danger. These actions are delineated by staffing classes. Fire days are broadly divided into five staffing classes based upon daily calculations of the energy release component (ERC) in NFDRS. The ERC is a compilation index that integrates the effects of weather, fuels, and topography to estimate potential fire behavior and the corresponding level of effort required to contain a fire. The staffing classes relate to the expected severity of fire conditions.

ERC	Staffing Class	Action
0-12	I (Low)	<ul style="list-style-type: none"> ✎ Staff is in training and planning for readiness ✎ Red-card qualifications are maintained, yearly physicals and work capacity test (pack test) are kept up-to-date ✎ Engine 9-1 is fire ready (April-September) ✎ Contact information for red-carded personnel is kept up-to-date
13-26	II (Moderate)	<ul style="list-style-type: none"> ✎ Engine Captain is aware of all resources available for Initial Attack ✎ Fire Roads and Helispots are prepared for operational use ✎ Resource Advisor(s) is identified and scheduled
27-54	III (High)	<ul style="list-style-type: none"> ✎ Includes all actions for class II ✎ Maintain daily staffing reports to FMO and Santa Fe Zone (April-Sept) ✎ Duty officer for Bandelier is identified and known to Park and Zone dispatch ✎ Superintendent is briefed on situation, outlook and staffing as conditions warrant. ✎ Lookout may be activated based on outlook and activity ✎ Daily fire weather and safety briefings are conducted (Apr-Sept) ✎ Fire qualified personnel will have PPE and IA gear immediately available.
55-58	IV (Very High)	<ul style="list-style-type: none"> ✎ Includes all actions for class III ✎ Fire and protection personnel may be called to work extended hours or weekends at the discretion of the FMO ✎ IA crew is within a 5 minute hike from vehicles after 1400 hours. ✎ Aerial recon will be requested by duty officer if lightning activity has occurred the same or previous day ✎ FMO recommends any restrictions and/or closures to the Superintendent. ✎ Coordinate with local cooperating agencies (see restrictions and closure guidelines) ✎ Up to 6 emergency firefighters plus supervision are on duty. ✎ Any prescribed fire or hazard fuels projects will be evaluated daily. Projects may be postponed/cancelled or mitigated if they pose an unacceptable fire risk.
59+	V (Extreme)	<ul style="list-style-type: none"> ✎ Includes all actions for class IV ✎ Appropriate actions will be taken on new or on-going Wildland Fire Use for Resource Benefit incidents. ✎ Minimum 2 engines will be on 7-day staffing (Apr-Sept). Duty Officer will have call-back list for IA crew (Oct-Mar) ✎ Days off may be cancelled for red-carded personnel (work/rest guidelines will be strictly adhered to) ✎ Lookout will be staffed 7-days/week (Apr-Sept). ✎ Type II crew and type III IC may be placed in ordered stand-by in Park.

Table 3 Bandelier National Monument Step Up Plan Staffing Chart

Operations

Aviation

Helispot/Helibase Locations

The primary base for helicopter operations at Bandelier is the TA-49 helibase. A secondary helispot, located within the Monument just north of the fire tower on the main entrance road, can be activated if necessary.

Flight Routes, Restrictions

From March 1 through October 15, overflights below 2000 feet AGL are prohibited over most of the Monument due to resource concerns. Outside of these dates other flight restrictions apply. When planning for projects where flights must enter the “no-fly zone” consultation with Bandelier’s Chief of Resource Management or Wildlife Biologist is mandatory.

During periods of high fire danger when wildfire can pose a significant threat to habitat, fire management will take the appropriate suppression response. This may include flights into the “no-fly zone” for reconnaissance or suppression. When such flights happen, resource management will be contacted as soon as practical, and when possible they will be contacted prior to flight. Flights into designated wilderness must be approved by the Superintendent.

The airspace located over Los Alamos National Laboratory is restricted. All flights below 12,000 feet MSL are restricted. Flights in or near the Lab will be coordinated with Gene Darling, LANL Emergency Services at 667-6211. TA-49 helibase is located within the restricted airspace. Procedures for entering and departing TA-49 helibase should be coordinated with the helibase manager.

Details can be found in the Interagency Aviation Management Plan

Water Sources

Map is in development by Santa Fe NF.

Staging

The primary staging location for fire operations within Bandelier National Monument is the interagency fire center at TA-49. Secondary staging locations for smaller numbers of vehicles could be located at Graduation Flats, on FR 289, or at the ski trail parking area at the junction of Hwy 4 and FR 289.

Closures

Emergency closure of part, or, all of Bandelier can be authorized by the Superintendent as necessary. Closure requests should be coordinated with the Chief Ranger prior to approval by the Superintendent.

Evacuations

All evacuations must be coordinated by the incident IC through the Chief Ranger. The Monument's evacuation plan (draft) contains specific guidance on the evacuation of visitors and Monument personnel.

(Draft) Evacuation plan is on file in the Fire Management Office

Logistics

Dispatch

Radio Communications

Use clear-text for all radio communications.

Local Bandelier frequencies are to be used for non-fire and non-emergency communications.

Fire and emergency dispatch is done through Santa Fe Zone Dispatch on Santa Fe Net (172.30000, Channel 6 on most Bandelier radios). Santa Fe Dispatch goes by the call sign "Santa Fe"

▪ **Frequencies**

Table 4 Radio Frequencies

Pos	Scan	Channel_Name	RX Freq	TX Freq	RX Value	TX Value
1	_	1-SFCREW	170.47500	170.47500	02	_
2	X	2-LAGOON	170.05000	169.40000	103.5 Hz 1A	103.5 Hz 1A
3	X	3-DOME	170.05000	169.40000	151.4 Hz 5Z	151.4 Hz 5Z
4	X	4-LOCAL1	168.35000	168.35000	02	_
5	X	5-LOCAL2	164.80000	164.80000	02	_
6	X	6-SF NET	172.30000	172.30000	02	_
7	_	7-SF RPT	172.30000	171.55000	67.0 Hz XZ	131.8 Hz 3B
8	_	8- BIA	172.75000	172.75000	127.3 Hz 3A	127.3 Hz 3A
9	_	9-TAC 1	168.05000	168.05000	02	_
10	_	10-TAC 2	168.20000	168.20000	02	_
11	_	11-TAC 3	168.60000	168.60000	02	_
12	_	12- NMSF	159.42000	159.42000	156.7 Hz 5A	156.7 Hz 5A
13	X	13-R3AIR	166.6875	166.6875	02	_
14	_	14- WX	162.55000	162.55000	_	_

ZONE: BANDFIRE Zone Scan: YES

Important Phone Numbers

Table 5 Phone Contact List

Location/person	Phone Number	Ext.	Fax or Cell	Radio
Fire Office –TA-49	672-3861	553	661-8895 fax	TA-49
Fire Cache	662-3942	556	662-3935 fax	
Fire Use Module Office (mesa)	672-3648	33	670-1586 cell	
Fire Effects Monitors Office (mesa)	672-3648	28/29	670-9436 cell	
Helitack Office	672-3861	557	660-1989 cell	Helicopter 341
Bandelier Fire Tower	672-3861			Bandelier Tower
Bandelier HQ	672-3861	0	672-9607 fax	701
Entrance Station	672-1004			
FMO – Gary Kemp	672-3861	550	660-7156 cell	930
AFMO – Marla Rodgers	672-3861	551	660-6088 cell	931
Engine Foreman – Frank Gonzales	662-3942	556	660-6134 cell	933
Fire Program Asst. – Jerrie Wilson	672-3861	552	660-4470 cell	902
Fire Information – Jim Whittington	672-3861	555	660-7918 cell	904

Location/person	Phone Number	Ext.	Fax or Cell	Radio
Santa Fe Zone Dispatch	438-7800		438-7853 fax	Santa Fe
LANL EOC	667-6211			EM-3
Los Alamos Fire Department	667-4055			
Los Alamos Police Department	662-8222			

Local Transportation, Food, Lodging and Supplies

No local BPA's exist for transportation, food, lodging or supplies. All purchasing is done on an as needed basis. Following is a partial listing of area businesses that could be used to supply crews or individuals.

MOTELS

1. Hampton Inn: White Rock (WR), State Route 4, 672-3838
2. Holiday Inn Express: Los Alamos (LA), 2455 Trinity, 661-1110
3. Los Alamos Inn: LA, 220-1 Trinity, 662-7211
4. Hill Top House: LA, Trinity and Highway 502, 662-2441
5. Super 8: Espanola, 811 S. Riverside Drive, 505-753-5374
6. Days Inn: Espanola, 807 S. Riverside Drive, 505-747-1242

FOODSTORES

1. Smith's: WR, State Route 4, (has a deli), 672-3811
2. Smith's: LA, Mari-Mac Village, (has a deli), 662-7210
3. Ed's Supermarket: LA, 1183 Diamond Drive, 662-9491
4. Pueblo Plaza Supermarket: Pojoaque, 455-2178
5. Wal Mart: Espanola, 1610 N. Riverside Drive, 505-747-0414

RESTAURANTS

1. Pizza Hut: WR, State Route 4, 672-1265 Sun-Th 11-9, F-Sat 11-10, CC
2. Pizza Hut: LA, 166 Central Park Square, 662-2411 M-Th 11-9, F-Sun 11-10, CC
3. Sonic Drive-in: LA, 1695 Trinity, 662-3345 Sun-Th 7am-11pm, F-Sat 7am-12midnight, no CC
4. McDonald's: LA, 1247 Trinity, 662-5100 6am-9pm, no CC
5. LA Café: LA, 1247 Central, 662-8980 M-F 11-2, Sun 10:30-2, CC
6. LA Subs: LA, 1715 Iris, 662-2423 M-F 5:30am-3:30pm, Sat 5:30am-2, CC
7. The Hill Diner: LA, Trinity Drive, 662-9745 11am-8pm, CC
8. Tony's Pizza: LA, 723 N. Central, 662-7799 M-F 11-2, M-F 5-8:30, Sat 4-8:30, CC

9. Chiliworks: LA, 1743 Trinity, 662-7591 take out only, Tu-F 6-1, Sat 7-11, no CC
10. Subway: LA, 1350 Central, 662-7883 10am-8pm, CC
11. China Moon: LA, 121 Central Park Square 662-2883 M-F 11-2:30,4:30-9,Sun 11:30-2:30,4:30-9, CC
12. Viola's: LA, 1360 Trinity, 662-5617 M-F 7:30-2, Sat 7:30-1, CC
13. Quizno's Subs: LA, 172 Central Park Square, 662-0999 10am-9pm, CC
14. Allied Foods: LA, 751 Central Ave., 662-2777 M-F 10:30-5:30, grill 11-3, Sat until 4, CC
15. Hi Speed Dining: LA, 216 DP Road, 661-6666 M-F 11-3, CC
16. American Legion: LA, 1325 Trinity, 662-7772 M-F 6:30-10, 11-1:30, CC

PHARMACIES

1. Smith's: WR, State Route 4, 672-9457
2. Smith's: LA, Mari-Mac Village, 662-4777
3. LAMC: LA, 3917 West Road, 662-4281
4. LAMC: WR, Rover Drive, 672-3701

CAMERA, FILM, AND OFFICE SUPPLIES

1. LA Stationers: 1907 Central, 662-4229
2. Brownell's Hallmark: Mari-Mac Village, 662-6501
3. Office Depot: SF, 2016 Cerrillos, 474-7181
4. Office Max: SF, 3003 St. Francis, 988-1752

BOOT REPAIR AND SALES

1. Red Wing Boots: SF, 3232 Cerrillos Road, 471-6283
2. Borrego's Bootery: LA, 1631 Central 663-0608

GAS STATIONS

1. Colomex Oil and Gas--Chevron: LA, 2373 Trinity, 662-2148
2. Quick Stop: LA, 3701 Arkansas 662-3774
3. Hilltop 24 Hour Gas Service: LA, Trinity at Central, 662-2441
4. Los Alamos Shamrock: LA, 1239 Trinity, 662-7931
5. Los Alamos Shell: LA, 2591 Trinity, 662-6100

6. Exxon: LA, 1399 Diamond, 662-2227
7. Exxon: WR, 128 State Route 4, 672-3856
8. Quick Stop: WR, State Route 4 and Rover, 672-9207
9. Phillips 66: WR, State Route 4 and Rover, 672-3106

AUTO REPAIR AND PARTS

1. Automotive Professionals: LA, 99 DP Road, 662-6929
2. Glover's: LA, 208 DP Road, 662-7647
3. Knecht Automotive: LA, 201 Knecht, 662-9743 Towing
4. Napa Auto Parts: LA, 1247 Central, 662-2868
5. Auto Zone: LA, 610 Central, 662-0903
6. RPM Automotive: LA, 1731 Trinity, 662-7721 Towing
7. Rocky Mountain Automotive: WR, 105 Longview, 672-0558 Towing
8. Herman's Automotive: WR, 51 Rover, 672-1046

VEHICLE RENTAL

1. Budget: SF, 1946 Cerrillos, 984-1596 Albuquerque Airport, 247-3443
800-527-0700
2. Advantage: SF, 1907 St. Michael's, 983-9470 Albuquerque Airport, 247-1066
800-574-6000
3. Alamo: Albuquerque Airport, 842-4222 888-426-3299
4. Avis: SF Airport, 471-5892 Albuquerque Airport, 842-4080 800-831-2847
5. Beaver Toyota: SF, 1500 St. Michael's, 982-1901
6. Thrifty: SF, 2865 Cerrillos, 474-3365 Albuquerque Airport, 842-8733 800-
847-4389
7. Hertz: SF Airport, 471-7189 Albuquerque Airport, 842-4235 800-654-31

VEHICLE LEASING

1. Henry Valencia GM Leasing: Espanola, 613 Paseo de Onate, 505-753-2356
2. Rio Valley Ford: Espanola, 531 Onate, 983-4691
3. Santa Fe Chevrolet Leasing: SF, SF Auto Park, 471-3700

TRUCKS

1. U-Haul Trucks: Pojoaque, 455-7051
2. Budget Truck Rental: SF, 1946 Cerrillos, 983-6539

HARDWARE

1. Metzgers: WR, State Route 4, 672-3856
2. Metzgers: LA, 1607 Trinity, 662-3715
3. LA Home Improvement: 232 DP Road, 662-5371

RENTALS

1. Tony's Rentals: SF, 3147 Cerrillos, 471-1024
2. Gil's Rentals: Espanola, 1-505-753-2833
3. Capital Rentals: SF, 2869 Trades West Road, near Siler Road, 471-6187
4. Rental Service Corp: SF, 2707 Cerrillos, 473-2244
5. The Rental Place: SF, 1100 Siler Road, 473-1099
6. Frank's Supply: LA, 268 DP Road, 661-1100

COMPUTERS

1. Rocky Mountain Business Systems: SF, 1730 Cerrillos, 983-1181
2. Bill's Computer Shop: LA, 148 Central Park Square, 662-6020

COMMUNICATIONS

1. Radios: SF, A-1 Communications Supply, 441 Cerrillos, 982-4488
2. Motorola Radios: SF, Computel Communications, 988-4749, Advanced Communications and Electronics, 7504 Avenger Way, 474-6662
3. Qwest: 800-603-6000 service, 800-954-1211 repair

TOILETS

1. L and L Portable Toilets: SF, Agua Fria Road, 471-1372 or 1-800-428-7406
2. Li'l Stinker Portable Toilets: SF, Mobile Phone: 690-2345, or 982-8040

ICP/Base Camp Locations

ICP/Base Camps have been set up for past incidents at Graduation Flats on FR 289, or at TA-49. Graduation Flats is located on Forest Service Land and use should be coordinated through the Santa Fe National Forest. TA-49 is located on Los Alamos National Laboratory/DOE lands and use should be coordinated through the LANL EOC.

Appendix 1 – Pre Attack WFSA

Documentation is ongoing, file is located in BAND Fire Management Office

Appendix 2 – Sample Delegation of Authority
Sample Delegation of Authority:
Delegation of Authority
Bandelier National Monument

As of **Time, Date**, I have delegated authority to manage the **Fire Name, Fire Number**, at Bandelier National Monument, to Incident Commander **Team IC and Team Name** Incident Management Team.

The **fire name** fire, which originated on **Date**, is burning in the **Location**. My considerations for management of this fire are:

1. Provide for firefighter and public safety.
2. Manage the fire with as little environmental damage as possible. The guide to minimum impact suppression tactics (MIST) is attached.
3. Key cultural features requiring priority protection are:
4. Key resources considerations are:
5. Restrictions for suppression actions include:
6. Minimum tools for use are.
7. My agency Resource Advisor will be.
8. Manage the fire cost-effectively for the values at risk.
9. Provide training opportunities for the resources area personnel to strengthen our organizational capabilities.
10. Minimum disruption of visitor use consistent with public safety.

(Signature and Title of Agency Administrator) (Date)

Amendment to Delegation of Authority **(if appropriate)**

The Delegation of Authority dated **date**, issued to Incident Commander **IC name** for the management of the **fire name** Fire, **fire number**, is hereby amended as follows. This will be effective at **time, date**.

Text of amendment here

(Signature and Title of Agency Administrator) (Date)

Appendix 3 – Briefing Checklist Template

Briefing Checklist

Situation

Fire name, location, map orientation, other incidents in area
Terrain influences
Fuel type and condition
Fire weather (previous, current, and expected)
Winds, RH, temperature, etc.
Fire behavior (previous, current, and expected)
Time of day, alignment of slope and wind, etc.

Mission/Execution

Command
Incident commander/immediate supervisor
Commander's intent
Overall strategy/objectives
Specific tactical assignments
Contingency plans

Communications

Communication plan
Tactical, command, air-to-ground frequencies
Cell phone numbers
Medivac plan

Service/Support

Other resources
Working adjacent and those available to order
Aviation operations
Logistics
Transportation
Supplies and equipment

Risk Management

Identify known hazards and risks
Identify control measures to eliminate hazards/reduce risk
Anchor point and LCES
Identify trigger points for disengagement/re-evaluation of operational plan

Questions or Concerns?

Appendix 4 - Agency Administrator's Briefing to Incident Management Team

4.1 Agency Administrator's Briefing to Incident Management Team

General Information
Name of Incident:
Type of Incident:
Incident Start Date:
Approximate Size of Incident:
Location:
Time:
Cause:
General Weather Conditions:
Local Weather or Behavioral Conditions:
Land Status:
Local Incident Policy:
Resource Values Threatened:
Private Property or Structures Threatened:
Capability of Unit to Support Team (Suppression and Support Resources):
1. Command Information/Written Delegation of Authority
Agency:
Agency Administrator's Representative:
Transition
Name of Current Incident Commander:

**Fire Management Plan
Bandelier National Monument**

Timeframe for Team to Assume Command: Date: Time:
Recommended Local Participation in IMT Organization:
Current IC and Staff Roles Desired after Transition:
Other Incidents in Area:
Other Command Organizations (Unified/Area/MAC):
Local Emergency Operations Center (EOC) Established:
Trainees Authorized:
Legal Considerations (Investigations in Progress):
Known Political Considerations:
Sensitive Residential and Commercial Developments, Resource Values, Archeology Sites, Roadless, Wilderness, and Unique Suppression Requirements:
Local Social/Economic Considerations:
Private Representatives such as timber, utility, railroads, and environmental groups:
Incident Review Team Assigned (FAST, Audit, Other):
Incident Commander:
Agency Administrator:
Local Public Affairs:

2. Other:
3. Unit FMO:
4. Expanded Dispatch:
5.
Local Public Affairs:
6.
Other:
Safety Information
7. Accidents and Injuries to Date:
8. Condition of Local Personnel:
9. Known Hazards:
10. Injury and Accident Reporting Procedures:
Planning Section/General Information
Access to Fax and Copy Machines:
Access to Computers and Printers:
Existing Pre-Attack Plans:
Other Nearby Incidents Influencing Strategy/Tactics/Resources:
Training Specialist Assigned or Ordered:
Training Considerations:
Situation Unit
General Weather Conditions/Forecasts:

**Fire Management Plan
Bandelier National Monument**

Fire Behavior:
Local Unusual Fire Behavior and Fire History in Area of Fire:
Fuel Type(s) at Fire:
Fuel Type(s) Ahead of Fire:
Resources Unit /Refer to Attached Resource Orders
Personnel on Incident (General):
11.
Equipment on Incident (General):
Resources on Order (General):
Incident Demobilization Procedures:
Operations Section
Priorities for Control, Wildland Fire Situation Analysis Approved:
Current Tactics:
Incident Accessibility by Engines and Ground Support:
Air Operations
Air Tactical Group Supervisor:
Airtankers Assigned:
Effectiveness of Airtankers:
Air Base(s): Telephone:
Logistics Section/ Facilities Unit
ICP/Base Pre-Plans: Yes No
ICP/Base Location:
Catering Service/Meals Provided:
Shower Facilities:
Security Considerations:

**Fire Management Plan
Bandelier National Monument**

Incident Recycling:		
12.		
Supply Unit		
Duty Officer or Coordinator Phone Number:		
Expanded Dispatch Organization:		
Supply System to be Used (Local Supply Cache):		
Single Point Ordering:		
Logistics Section /Communications		
NFRC System on Order: Type:	Yes	No
Local Network Available:	Yes	No
Temporary:		
Cell Phone Cache Available:	Yes	No
Landline Access to ICP:	Yes	No
Local Telecom Technical Support:		
Ground Support Unit		
Route to ICP/Base:		
Route From ICP/Base to Fire:		
Medical Unit:		
Nearest Hospital or Desired Hospital:		
Nearest Burn Center, Trauma Center:		
Nearest Air Ambulance:		
Finance Section		
Name of Incident Agency Administrative Representative:		
Name of Incident Business Advisor (If Assigned):		
Agreements and Annual Operating Plans in Place:		

**Fire Management Plan
Bandelier National Monument**

Jurisdictional Agencies Involved:
Need for Cost Share Agreement:
Cost Unit
Fiscal Considerations:
Cost Collection or Trespass:
Management Codes in Use:
Procurement Unit
Buying Team in Place or Ordered:
Contracting Officer Assigned:
Copy of Local Service and Supply Plan Provided:
Is All Equipment Inspected and Under Agreement:
Emergency Equipment Rental Agreements
Compensation/Claims Unit
Potential Claims:
Status of Claims/Accident Reports:
Time Unit
Payroll Procedure Established for T&A Transmittal:

Restrictions and Closures Guideline

Decisions regarding the implementation of fire restrictions and/or closures should be based on fuels conditions and weather patterns. Other considerations are the level of human-caused fire incidents being experienced, social and economic impacts, potential high risk occasions (4th of July, etc.), and large fire activity occurring in the Zone. Bandelier will try to coordinate restrictions and closures as closely as possible with local cooperating fire agencies.

Four Stages

The following general definitions will help determine what “stage” of restriction/closure is appropriate. The four stages are:

Stage I (restriction) – The first stage occurs when there is an increasing fire danger and/or an increasing preparedness level, and the risks of keeping the forest open to all activities begins to be outweighed by the risks inherent in doing so. Stage I imposes restrictions aimed at preventing the start of wildfires based on human activities that are known to be high risk, specifically smoking, campfires, and fireworks.

Definition: No smoking outside of vehicles, or buildings. No open campfires outside of developed sites. No fireworks.

Stage II (restriction) – As the risks increase, the Superintendent may choose to move to Stage II. This stage intensifies the restrictions from Stage I by focusing on activities that, although normally managed under permit or contract, have a relatively high risk of causing a fire start.

Restrictions under Stage II will affect Monument users and will have additional economic impacts to contractors, permittees, and others. Therefore, the decision to move to Stage II will involve a risk benefit assessment as well as consideration of economic and social impacts.

Definition: In addition to Stage 1 restrictions, Stage II adds prohibitions for explosives, chainsaw or other internal combustion engines (possibly during certain hours), welding, and using a motor vehicle off of developed roads. Also requires approved spark arresters.

Stage III (partial closure) – Stage III is the closure of specific areas of the Forest. This stage is selected when the ability to mitigate risks using Stage I or II restrictions is no longer viable. The social, economic, and political impacts of implementing a partial closure at this point are outweighed by the benefits associated with virtually eliminating the potential for human-caused fire starts.

Definition: Partial closure, with very few exceptions (as detailed in the closure order).

Stage IV (closure) – Stage IV is full closure. This stage is selected when the ability to manage risks using Stage III closures is no longer viable. The social, economic,

and political impacts of implementing a full closure at this point are outweighed by the benefits associated with virtually eliminating the potential for human-caused fire starts.

Definition: Full closures, with very few exceptions (as detailed in the closure order

RULE OF THUMB—Restrictions/Closures

There are 4 different stages (levels) of restriction/closures in response to fire risk:

Stage I (1st Level)--No smoking outside of vehicles, or buildings. No open campfires outside of developed sites. No fireworks.

Stage II (2nd Level)--In addition to Stage I, adds prohibitions for explosives, chainsaw or other internal combustion engines (possibly during certain hours), welding, and using a motor vehicle off developed roads; further restricts use of campfires.

Stage III (3rd Level)--The closure of specific areas of the Monument (as detailed in the Closure Order)

Stage IV (4th Level)--Full closures (as detailed in the Closure Order)

Exemptions

Exemptions should be managed and mitigated according to risks and benefits. The restrictions/orders need to progressively focus on those members of the public and activities over which there is the least amount of active control. This will frequently mean that activities of the public should be restricted long before activities occurring under contract or permit are restricted or reach the same level of restriction.

The rationale used by authorized officers for granting or denying exemptions should be documented in writing. Exemptions will be authorized through an entry/activity permit.

Emergency Closures

Emergency Closures have a severe impact on the park staff and the public and are discouraged except under the most severe conditions. They should not be justified by fire danger alone and should be driven by firefighter and public safety, high potential for human caused fire, limitations of resources, number of fires in the Zone, etc.

Initiating and Rescinding Restrictions or Closures

1. The Fire Management Officer (FMO) will recommend implementation or rescinding of restrictions or closures to the Superintendent guided by the Restrictions and Closures Criteria Chart.
2. The FMO will also initiate discussions with adjacent land managers regarding the recommendations.
3. Once a decision is made to implement or rescind fire restrictions or closures, the FMO, Public Information Officer, or AFMO will initiate media notification via the Monument's Information Officer. A news release will also be distributed to the park staff and local agency cooperators. Restriction and/or Closure notices will also be posted on the Southwest Area Coordination Center's web page.
4. Closure and Restriction orders will be issued by the Chief Ranger's office and signed by the Superintendent. A copy of the signed order will be filed in the Fire Management Office.
5. Signs will be posted in the Monument and information will be distributed by the Entrance Station and Visitor Center personnel regarding fire restrictions or closures and are the responsibility of the respective Divisions.

Restrictions and Closures Criteria

Stage 1 fire restrictions, as defined in cooperation with the Santa Fe National Forest, are the baseline level at Bandelier. Stage 1 is in effect at Bandelier year-round, unless elevated as needed and indicated by the charts below.

Criteria	Yes	No
Weather Trends: Obtain the zone fire weather forecast from the National Weather Service in Albuquerque. If the weather trend is favorable for large fire growth for the next 5-7 days check yes.		
Calculated Energy Release Component from NFDRS: If the calculated ERC is above the 90 th percentile check yes.		
Calculated 1000 Hour Fuel Moisture from NFDRS: If the calculated 1000 hour fuel moisture is below the 10 th percentile check yes		
Live and dead fuel moisture sampling: Field sampled results. If live Ponderosa Pine is <100% and 1000 hour dead fuels are <15% check yes.		
Regional Preparedness Level: Check yes if zone is at preparedness level IV or V.		

If four or five of the above criteria are answered "yes" stage 2 restrictions are indicated. Continue to the next table to see if further restrictions possibly closures are indicated.

Criteria	Yes	No
Weather Trends: Obtain the zone fire weather forecast from the National Weather Service in Albuquerque. If the weather trend is favorable for large fire growth for the next 5-7 days check yes.		
Calculated Energy Release Component from NFDRS: If the calculated ERC is above the 97 th percentile check yes.		
Calculated 1000 Hour Fuel Moisture from NFDRS: If the calculated 1000 hour fuel moisture is below the 3 rd percentile check yes		
Live and dead fuel moisture sampling: Field sampled results. If live Ponderosa Pine is <90% and 1000 hour dead fuels are <7% check yes.		
Regional Preparedness Level: Check yes if zone is at preparedness level IV or V.		

If four or five of the above criteria are answered "yes" stage 3 –partial closures may be appropriate.

Stage 4 – Total closures at Bandelier would only be indicated in the case of an existing fire which immediately threatens visitors and park personnel. Such incidents will be managed by the Monument's Evacuation Plan.

**Dispatch Plan
2005**

When report of smoke or fire is received get as much information as possible from the caller. The following list should be filled in.

- * Location of smoke or fire

- * Location of caller

- * Name and phone number of caller

- * Color of smoke

- * Size of fire

- * Type of fuel

- * Character of fire (running, creeping, etc.)

- * Anyone on the fire

- * Anyone in the area of the fire or vehicles leaving the scene

Bandelier Daytime Call list		
Name	Radio #	Phone ext.*
Gary Kemp	930	550
Marla Rodgers	931	551
Frank Gonzales	933	556
Jerome Martinez	934	556
Jerrie Wilson	902	552
Rob Gauss	903	553
Carl Newman	401	530
Dispatch	701	0

*** phone number 505-672-3861**
alternate phone number for TA-49
662-7065 or 662-7297

Bandelier After hours Call list		
Name	Cell Phone	Home phone
Gary Kemp	660-7156	672-9672
Marla Rodgers	660-6088	672-0486
Frank Gonzales	660-6134	587-2495
Jerome Martinez	660-9566	
Jerrie Wilson	660-4470	852-3084
Carl Newman	412-0076	661-6515

Relay the above information to the first available person on the call list.

For Bandelier Employees ONLY: during fire season a daily staffing list will be posted on the server on the P:\ drive. Call the person listed as "duty officer" for the day.

OR

From the field, call "TA-49" or "701" (park dispatch) by radio. A dispatcher will relay the information to the duty officer.

Fire Management Actions:

✎ For Fires within (or threatening) Bandelier National Monument *during normal duty hours:*

- Duty Officer is notified of fire
- Duty Officer will dispatch closest resources as available
- If Santa Fe Zone dispatch has not been notified, Duty officer will call to notify.
- Any additional resources needed will be ordered through Santa Fe Zone Dispatch.
- Santa Fe Zone dispatch operating plan will be followed for all interagency fires
 - Duty officer will notify FMO, or acting
 - FMO will notify Superintendent, or acting

Duty Officer- A designated Bandelier fire supervisor in charge of coordinating fire activities for that day. The Duty Officer is responsible for knowing fire resources and their availability for assignment.

Fire Management Officer (FMO) – The Division Chief for Fire at Bandelier. Current FMO is Gary Kemp. The FMO will designate an acting FMO when he is away from the office.

✎ For Fires within (or threatening) Bandelier National Monument *after hours/non-worked holidays or weekends:*

- Duty Officer is notified of fire
- Duty Officer will dispatch closest resources as available
- If Santa Fe Zone dispatch has not been notified, Duty officer will call to notify.
- Any additional resources needed will be ordered through Santa Fe Zone Dispatch.
- Santa Fe Zone dispatch operating plan will be followed for all interagency fires
- Duty officer will notify FMO, or acting
- FMO will notify Superintendent, or acting

✎ For Fires outside of Bandelier National Monument:

- Duty Officer is notified of fire
- Duty officer will call to notify the appropriate agency
- Santa Fe Zone dispatch operating plan will be followed for all interagency fires

Other Agency Phone Numbers	
Santa Fe National Forest Zone Dispatch also Valles Caldera and State Lands	438-7800
Los Alamos County Fire Department	667-4055
Sandoval County Fire Department	505-867-4581
Santa Fe County Fire Department	986-2460
Rio Arriba County Sheriffs Department	505-753-3320



Bandelier National Monument



2005 Aviation Management Plan

National Park Service
Bandelier National Monument
HCR 1, Box 1, Suite 15
Los Alamos, NM 87544

Signatures and Approvals

Submitted: _____ **Date:** _____
Bob Skeen, Forest Aviation Officer/Helitack Supervisor

Concurred: _____ **Date:** _____
Grady Wilson, Monument Aviation Officer/Helitack

Reviewed: _____ **Date:** _____
Cliff Chetwin, Regional Aviation Manager (NPS)

Approved: _____ **Date:** _____
Darlene Koontz, Park Superintendent

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- Cost Comparison Travel Worksheet
- OAS-110, BLM 9400-1a

1.0 Aviation Plan

1.1 PURPOSE

The purpose of this plan is to provide direction and guidance with aviation planning and operations inside the Park. This plan is designed to accompany and supplement National/Regional Aviation Management Plans and direction to derive one complete planning document.

1.2 OBJECTIVES

The aviation management objectives for Bandelier National Monument is to provide safe, efficient and economic use of aircraft in conjunction with land management, visitor protection, and fire suppression work. It is believed that this goal may only be accomplished with thorough risk assessment, planning and management. This document is only a tool with which effective planning may be accomplished. Responsibility and the corresponding authority for management is assigned to individuals on-scene and in the dispatch sections to maintain vigilance and hold to the standards established in this and other plans in order to assure safety in all aspects of our operations.

1.3 PHILOSOPHY

SAFETY: The highest priority in any aviation activity will be personal safety through risk identification, established proactive mitigating controls and accident prevention.

Personnel performing aviation activities will meet agency or interagency qualification standards. Personnel need to be service orientated, exhibiting professionalism and integrity.

Management has the responsibility and opportunity to enhance the Aviation Program with a commitment to aviation safety and efficiency.

2.0 Organization and Responsibility

Chapter

2

2.1 PARK SUPERINTENDENT

Darlene Koontz

505-672-3861 ex. 501

The Park Superintendent is responsible for all aviation activities at Bandelier National Monument and has delegated the authority to an Aviation Officer (AO) to supervise, monitor, inspect, and train users of aircraft. The Superintendent is involved in the planning process through the AO, the Regional Aviation Manager, and DOI-AM. The Superintendent ensures that qualified personnel plan projects and activities involving the use of aircraft in advance. The Superintendent approves aviation plans for the Park.

2.2 MONUMENT AVIATION OFFICER

Grady Wilson

505-672-3861 ex. 557

The Park Aviation Officer (AO) is responsible for general supervision and guidance of Monument Aviation Management. The AO will enforce aircraft operations policy and standards in all situations and will initiate action for aircraft incident/accident reports and investigations. The AO will monitor all aerial activities for compliance with Park Service Policy, Departmental Manuals (DM 350-354), and FAA regulations. The AO has the authority to order Aircraft Rental Agreement (ARA) aircraft and approve projects.

2.3 SANTA FE DISPATCH

Santa Fe Dispatch

505-438-7800

Lorreta Sandoval (Dispatcher)

505-438-7852

Renee Isackson (Dispatcher)

505-438-7649

All aircraft and emergency related flights are dispatched from the Santa Fe Zone Dispatch Center. Dispatch flight follows aircraft ordered for fire and emergency services unless other flight following procedures have been established.

2.4 HELITACK SUPERVISOR

The Helitack Supervisor works under the administrative direction of the Espanola District Fire Management Officer. The Supervisor is responsible for management of the TA-49 Helibase, risk and hazard analysis, planning, coordinating, and supervision of helitack operations. The Supervisor is the Contracting Officers Representative (COR) for the Forest Exclusive Use Helicopter Contract. The Supervisor will coordinate all helitack activities through Santa Fe Dispatch. The Supervisor also manages the Forest/Monument Helicopter Crewmember (HECM) training program.

2.5 HELICOPTER MANAGER

A qualified Helicopter Manager will be assigned, as required, to each helicopter activity through Dispatch, or in the case of the Forest Exclusive Use Helicopter through the Helitack Supervisor. Once the helicopter is dispatched it will be under the control of the Helicopter Manager, who will be responsible to the Incident Commander (IC) or Project Manager until it is released. The Helicopter Manager is responsible for managing all aspects of helicopter operations in accordance with established operating procedures and safety standards.

2.6 FLIGHT MANAGER / CHIEF OF PARTY

A Flight Manager or Chief of Party (COP) will normally be designated by Dispatch whenever a transport mission involves multiple personnel. When only one person is traveling that person will be the Chief of Party. The duties and responsibilities are listed in the Interagency Aviation Pocket Guide, April 1997 and in the Incident Response Pocket Guide, January 2002.

Pilots employed by and contracted by the Forest Service and Park Service will be approved and responsible to:

- Ensure safe accomplishment of the mission.
- Maintain flight proficiency and mission currency in accordance with applicable guides, policy, and regulation.
- Brief passengers on operational and emergency procedures.
- Cancel, postpone, or change flights when existing or impending conditions make those flights unsafe. The decision of the pilot-in-command is final.

2.8 ALL EMPLOYEES

All Federal Employees share responsibility for aviation safety and are expected to take timely action to prevent unsafe conditions. Employees have the responsibility to initiate appropriate action when an unsafe act or condition is observed. Employees will not tolerate willful deviation from aviation policy, regulation, or guidance. They will immediately report to their supervisor, Dispatch, local aviation officer, or line officer any aviation operation that they believe is being conducted in a hazardous manner.

3.0 Aviation Management Activities

Operational planning of all aviation activities will give the utmost concern for safety. All aviation projects will be reviewed by the Park Aviation Officer to assure conformance to regulation and policy. The major aircraft use will involve fire suppression, fire detection/reconnaissance, aerial ignition, external load cargo transport, and resource management.

The planning for these activities is contained in this document. Generic Aviation Project Plans are included in Chapter 7 of this document. They may be modified for the conditions and used to support projects. Any aviation project not described in this plan should be submitted as soon in the planning process as possible to obtain approval. The Bandelier National Monument Superintendent will approve project plans after review by an AO for projects within the Park.

3.1 FIRE SUPPRESSION

Fixed and rotary-wing aircraft may be used for initial attack and large fire support. Request for aircraft will be made through Santa Fe Dispatch following preplanned dispatch procedures or the discretion of Fire Management. Dispatch will be responsible for flight following and resource tracking for all initial attack aircraft.

Resource tracking and flight following for aircraft supporting large fires will be the joint responsibility of Dispatch and the Incident Command Organization for that fire.

When multiple Air Tankers are ordered, or when air tankers are ordered for use over congested areas, or when there is a mix of multiple aircraft working over an incident Dispatch shall order a Lead Plane and/or Air Attack Group Supervisor for that incident.

Recon / detection flight may be requested by fire management as needed. These flights may be made with either fixed or rotary-wing aircraft. All flights will be requested through Santa Fe Dispatch. These flights shall remain above 500 feet AGL. Flights will follow planned routes; other airspace users and area hazard maps will be considered when planning routes. Dispatch will be notified of the planned route and of any deviations to the planned route.

3.3 EXTERNAL LOAD CARGO TRANSPORT

Cargo transport to remote locations can be completed using helicopter external load transport methods. Flight request for external load missions shall be reviewed by an AO. If the mission is within the scope of normal helitack operations and established standards then a project plan for that mission will not normally be required. If the proposed project is complex or outside standards of the Interagency Helicopter Operations Guide (IHOG) then an aviation project plan must be submitted and approved.

3.4 AERIAL IGNITION

Aerial ignition projects will be planned in accordance with the Interagency Aerial Ignition Guide. Aerial ignition plans for projects are contained within this document and within the Helibase/Helicopter Plan and shall be used for all aerial ignition projects on the Forest or Monument.

Plastic Sphere Dispenser is available at TA-49 Helibase. Sphere dispensers may be ordered through Dispatch following established equipment ordering procedures. Several Plastic Sphere Dispenser Operators (PLDO) are available locally. No approved helitorches or qualified helitorch modules are available locally.

3.5 ADMINISTRATIVE TRAVEL

Small aircraft may be used for moving firefighters to fires or other personnel to training/meetings etc. when it is the most efficient method of travel. Requests for aircraft for administrative travel can be made through Dispatch. In addition to the

pilot filing an FAA flight plan, the sending dispatcher is responsible for resource tracking and informing pilots of flight following procedures. Pilots will be instructed to check in at intermediate stops (schedule permitting) and at the destination. For non-emergency flights OMB Circular No. A-123 and OMB Circular No. A-126 require a cost analysis to justify the use of government owned or leased aircraft. Completion of Forest Service form FS-5700-11 or OAS form OAS-110 will meet this requirement.

3.6 VEGETATION/WILDLIFE MONITORING AND INVENTORY

Monitoring and Inventory flights may be made with either fixed or rotor-wing aircraft. Project and Program Managers should consult with an AO when planning monitoring and inventory projects. Planning for these flights need to consider other airspace users, flight hazards, flight following, frequency use, aircraft cost, and aircraft type. Normally these flights will be non-special use and will remain above 500 feet AGL. A qualified COP or Flight Manager will be identified for each flight. When utilizing a helicopter for projects, a qualified helicopter manger is required however need not be on-board.

3.7 VALLE ELK MONITORING PROJECT

Flights to monitor elk over the Forest in and around the Valle Caldera, Cerro Grande Fire area, Bandelier NM, and Los Alamos National Laboratory occur on an ongoing basis. Radio tracking methods are used to monitor wildlife. These flights use Aircraft Rental Agreement (ARA) fixed wing aircraft and take-off and land at Los Alamos Airport. Each flight remains well above 500 feet AGL. The Flight Manager for each flight is provided by Bandelier and ordered through the Park AO. The Superintendent approves each aircraft request for these flights. After an individual flight is approved, the Flight Manager or AO will notify Dispatch no later than one day before the planned flight. Dispatch will flight follow each flight. Flight following check-ins will include each take-off and landing, on each tracking station, and off each tracking station. 15 minute check-ins will not be required, though check-ins will not exceed 30 minutes.

3.8 OTHER AVIATION PROJECTS

Other occasional aviation uses may include Aerial Photography, Aerial Mulching, Aerial Seeding, Aerial Application, Law Enforcement, Media Flights, Training Flights, and Resource Management.

If any proposed flight or project is not covered by an appropriate established aviation plan then an Aviation Project Plan will be prepared. This includes the use of aviation resources for Job Service or End Product Contracts (Park Service End Product Contracts require regional approval). The responsible individual will prepare an Aviation Project Plan and submit the plan for review and approval. As a minimum this plan will cover the elements listed in IHOG chapter 3. Project plan templates contained in this document and the Intermountain Aviation Management Plan meet these requirements.

4.0 Aviation Training

This chapter outlines the aviation training that is available locally and the process for obtaining local training. Currency requirements for aviation related positions are every three years. Certain aviation training is required every three years, bi-annually, or annually.

4.1 INTERAGENCY AVIATION SAFETY TRAINER

Bob Skeen

505-662-3934

The local Aviation Safety Trainer is available to provide required basic aviation safety training to Department of Interior Employees, and basic aviation training required for certain aviation qualifications. In some circumstances the Trainer can issue completion certificates for equivalent training. (i.e. B3 certificate for completion of S-271 Helicopter Crewmember)

4.2 HELICOPTER CREWMEMBER (HECM) TRAINING PROGRAM

The HECM Training Program is available to the employees of the Santa Fe NF and Bandelier NM. The program offers required classroom training and on-the-job training assignments leading to the completion of HECM taskbooks.

S-271 Helicopter Crewmember training is offered annually every spring and is open to those who meet the prerequisites of Fire Fighter (FFT2) with one season of fire experience. District/Local Fire Management Officers (FMO) is responsible for initiating HECM taskbooks. Once a HECM taskbook has been initiated the trainee can request a training assignment with the Santa Fe Exclusive Use Helitack Crew. Commitments for trainee assignments are a minimum of one week and are available early May through mid June. Supervisor and FMO approval are required for trainee assignments. Request for trainee assignments are made through the Helitack Supervisor.

4.3 BASIC AVIATION SAFETY (B-3)

Park Service Employees who work with aircraft are required to have a Basic Aviation Safety class every three years. Initial training must be taken in the classroom. Web-based training may be used for refresher only. B-3 classroom training may be requested through the Local Aviation Safety Trainer.

4.4 AVIATION MANAGEMENT TRAINING FOR SUPERVISORS (M-3)

Park Service Employees, having management or supervisory oversight responsibilities for programs using aviation resources for mission accomplishment, are required to have M-3 every three years. M-3 classroom training may be requested through the Regional Aviation Officer or the DOI-AM Aviation Safety Trainer.

4.5 FLIGHT MANAGER / CHIEF OF PARTY (COP) TRAINING

Flight Manager (formally Chief of Party) training is required for Forest Service Employees who travel on transport missions on contract aircraft other than scheduled air carriers. Classroom training for Flight Manager may be requested through the Local Aviation Trainer. At the discretion of the Trainer, Basic Aviation Safety may substitute for Flight Manager training. For the purpose of Flight Manager, this training may initially be web-based.

4.6 WEB-BASED AVIATION TRAINING

<http://www.iat.nifc.gov/>

Several aviation lesson modules are available on-line and can be accessed at <http://www.iat.nifc.gov/>. Many of these modules are required for various aviation related positions. Included are all of the modules required for B-3 refresher. The following modules are currently available;

- A-101: Aviation Safety
- A-104: Overview of Aircraft Capabilities & Limitations
- A-105: ALSE Aviation Life Support Equipment
- A-106: Aviation Mishap Reporting
- A-107: Aviation Policy and Regulations 1
- A-108: Pre-Flight Briefing and Debriefing

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A-109: Aviation Radio Use

A-110: Aviation Transport of Hazardous Materials

A-111: Flight Payment Document

A-113: Crash Survival

A-204: Aircraft Capabilities & Limitations

4.7 OTHER AVIATION TRAINING

Other aviation training may be available locally and can be scheduled as needed. S-270 Basic Aviation Operations, Long-line training, Helitack Refresher, PLDO Refresher are examples of other aviation training that may be available.

5.0 Aviation Operational Policy

All aviation activities shall comply with the following policy, regulations, direction, and guides as applicable;

- Applicable Federal Aviation Regulations (FAR's)
- DOI Departmental Manual DM 350-354 Aviation Policy
- Interagency Helicopter Operations Guide (IHOG)
- Forest Service Health and Safety Code (FSH 6709)
- DOI-AM Operational Memorandums
- DM-60, RO-60, and IMR Aviation Supplement
- Interagency Airspace Coordination Guide
- Aviation Transport of Hazardous Material Guide
- Interagency Aerial Ignition Guide (AIG)
- Interagency Helicopter Rappel Guide (IHRG)
- Applicable DOI OAS Handbooks

These documents are incorporated as policy into this aviation plan by reference. Conflicts between Forest Service and Department of Interior policy do exist. Forest employees shall comply with Forest Service policy. Park Service employees shall comply with Park Service and Department of Interior policy. The most stringent policy shall apply to interagency operations involving both the Park and Forest.

Further information specific to helicopter and helibase operations is contained in the Helicopter / Helibase Operations Plan.

5.1 AIRCRAFT

Except for scheduled air carrier service, all aircraft shall carry a current (non-expired) Data Card issued by the Forest Service or DOI-AM. The aircraft will only be used for missions for which it is approved. Approved missions are listed on the Data Card. Some cooperator and military aircraft are approved through agreement. These aircraft will carry an approval letter from the Regional Aviation Officer or DOI-AM. Pilots, not approved through agreement, must also carry a pilot approval card issued by the Forest Service or DOI-AM. No aircraft, pilot or crew will be utilized that has not been approved and carded by the Forest Service or DOI-AM, for the mission to be flown.

The Forest Exclusive Use Helicopter is a ASTAR-350 B3. The helicopter and pilot are inspected and approved by the Region. Contract dates are from May 6 through July 6. Call When Needed (CWN) and Aircraft Rental Agreement (ARA) may be used for administrative uses, fire, transport, or project work if they are approved for the mission. These aircraft are ordered through established dispatch procedures.

Use of State / local government, military, or other federal agency aircraft require prior inspection and approval by DOI-AM or the Forest Service. Written approval for the use of military aircraft must come from the National Office or the Director of Aviation Management. Proposed flights on these aircraft must be requested and consultation with the Aviation Officer is mandatory.

5.2 FIRE FLIGHT REQUEST

Flights for fire suppression and other emergencies are requested and ordered through Santa Fe Dispatch following preplanned dispatch procedures or Fire Management discretion. Fire Management includes; Fire Management Officers, Air Attack Group Supervisors, or Fire Incident Overhead.

5.3 NON-FIRE FLIGHT REQUEST AND APPROVAL (Park Service)

All non-fire flights shall be submitted to the Park AO and passed to the superintendent for approval. Program Managers, Project Leaders, and Supervisors may submit flight requests.

5.4 FLIGHT REQUEST REQUIRED INFORMATION

Flight Request information must be supplied on a BLM Form 9400-1A. Required information must include; request date, flight date and time, mission information, departure and landing location, passenger/cargo information, flight itinerary, aircraft information, management/cost codes, pilot, flight manager, flight following information, and radio frequencies. For Bandelier flights signature lines or page for review and approval must be included.

5.5 AUTHORIZED PASSENGERS

Unless prior approval is obtained only Federal employees essential to the mission will be authorized to fly. Line Officers may approve non-federal employees and media to fly if their presence is advantageous to the Government. For Forest Service missions approval must be documented on a Day Trip Authorization form (FS-5700-12). For Park Service missions approval must be documented on BLM form 9400-1a.

5.6 HELICOPTER USE IN WILDERNESS AREAS

Normally helicopter use in designated wilderness will not be allowed. For a particular project if helicopter use is deemed essential approval for landing in wilderness areas can be approved by the Park Superintendent or acting.

For wildfire and life threatening emergencies approval for helicopter use in wilderness areas is pre-approved during times of high fire danger. The Park Superintendent should be consulted as soon as possible to mitigate any concerns.

5.7 BANDELIER NO-FLY ZONES

From March 1 through October 15 overflights below 2000 feet AGL are prohibited over most of the Park due to resource concerns. See map in chapter 8. Outside of these dates other flight restrictions apply. When planning for projects where flights must enter the “no-fly zone” consultation with Bandelier’s Chief of Resource Management (672-3861 ext 540) or Wildlife Biologist (672-3861 ext 546) is mandatory.

During periods of high fire danger when wildfire can pose a significant threat to habitat, fire management will take the appropriate suppression response. This may include flights into the “No-Fly” zones for reconnaissance or suppression. When such flights happen Resource Management will be contacted as soon as practical, and when possible they will be contacted prior to flight.

6.0 Accident Prevention

Bandelier National Monument considers it essential to safeguard against human injury, property loss and damage to the environment. Accident prevention is accomplished through vigilant planning, risk management, hazard mitigation, strict adherence to policy and guidelines, and coordination.

6.1 PROJECT PLANNING

All special use aviation projects will require completion of an Aviation Safety Project Plan (351 DM 1.7 and FSM 5710.5) prior to project implementation. These plans require thorough review and Superintendent approval. Consultation with the AO or Helitack Manager is mandatory during the planning process. Project request should be submitted as early as possible to allow enough time for the planning and approval process. Many Special Use Plans for common recurring projects are contained within this document. Chapter 3 of the IHOG should be used as a guide for preparing Project Aviation Safety Plans.

6.2 RISK MANAGEMENT

Risk management principles and techniques will be applied to all aviation operations. This involves the identification of all the hazards associated with the operation, the assessment of hazards, identification of mitigation measures, and the identification of appropriate controls.

When planning and time allow a Deliberate Risk Assessment will be made. When the urgency of the situation does not allow for a Deliberate Risk Assessment then a Rapid Risk Assessment should be made. “Rapid” does not mean “hasty” or

“uninformed”. These situations would normally involve fire suppression operations or SAR when there are high-risk hazards associated with not flying.

Risk Decisions will be based on the following principles:

- Accept no unnecessary risk.
- Decisions should be made at a level that corresponds to the degree of risk.
- Accept risks only if the benefits clearly outweigh the potential consequences.
- Safety is given priority over mission accomplishment.

6.3 BRIEFINGS

Briefings for pilots, crewmembers, and associated personnel will be held prior to any operation or project. Pilots assigned to this Forest/Park and visiting pilots and crews will be briefed on pertinent portions of the Aviation Plan, Helicopter Operations Plan, Radio Frequencies and Communications, local hazards and conditions, and the Forest/Park Hazard Map. Prior to each flight passengers will be given a passenger safety briefing by the pilot or qualified Helitack personnel.

6.4 HAZARD MAPS

The AO will ensure that an Aerial Hazard Map is compiled and updated annually or as needed. The Hazard Map will be available at Santa Fe Dispatch and each Forest/Park aviation facility for review by flight crews. The Hazard Map is printed in a wall version and a small 8 X 11 inch version. These maps are also available online at; <http://fsweb.santafe.r3.fs.fed.us/gis/index.html>.

6.5 AIRSPACE COORDINATION

The AO, Dispatchers, and on-scene Aviation Personnel are all responsible for airspace coordination. Personnel involved in aviation operations shall follow processes and procedures outlined in the Interagency Airspace Coordination Guide (IACG).

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A Temporary Flight Restriction (TFR) will normally be requested when an aviation operation involves multiple aircraft of different types, is near or in an area with a high concentration of aircraft (i.e.: near navigation aids), over or near congested area, or is likely to attract media and public attention.

6.6 MTR’S AND SPECIAL USE AIRSPACE

Several Military Training Routes (MTR) overlie for forest. Minimum altitude for some of these routes is as low as 250 feet AGL. Locations of MTR’s can be found in DOD Flight Information Publication AP/1B, the Forest Hazard Map, and on Aeronautical Sectional Charts. The most current MTR information is found in the AP/1B which is updated every 56 days. Dispatch will make efforts as soon as possible to de-conflict airspace when aviation activities are near or under TFR’s.

Route	Scheduling Activity	Phone Number	Operating Hours
IR-109	Cannon AFB	505-784-2279	Continuous
IR-111	Cannon AFB	505-784-2279	Continuous
IR-137	Kirtland AFB	505-853-5701	Continuous
IR-308	Kirtland AFB	505-853-5701	Continuous
VR-1175	Tinker AFB	405-736-7719/7710	Sunrise-Sunset
VR-1176	Tinker AFB	405-736-7719/7710	Sunrise-Sunset
SR-212	Kirtland AFB	505-853-5701	Continuous

R-5101 is the Restricted Airspace located over Los Alamos National Laboratories. All flights below 12,000 feet MSL are restricted. Flights in or near R-5101 will be coordinated with Gene Darling, LANL Emergency Services at 505-667-6211. TA-49 Helibase is located within R-5101. Procedures for entering and departing TA-49 Helibase are outlined in the Helicopter / Helibase Operations Plan.

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6.7 AIRCRAFT ACCIDENTS / INCIDENTS**

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Aviation incidents shall be filed on a SAFECOM Report form within 24 hours. SAFECOM's may be submitted through the AO or submitted online through the Aviation Safety website (FS) http://www.fs.fed.us/fire/av_safety/safecoms/index.html or the DOI-AM homepage (Park) <http://www.oas.gov/>. Anyone observing an aviation incident may submit a SAFECOM and are strongly encouraged to do so.

When an accident occurs:

- Give First Aid as needed.
- Notify Santa Fe Dispatch.
- Order back-up medical or SAR resources as needed.
- Notify Aviation Officer
- Document events and secure the accident site.

In the event of an accident of missing aircraft, Santa Fe Dispatch will use the Aircraft Pre-Accident Plan for guidance in procedures dealing with the event and notification process. The Park Aviation Officer will follow Incident / Accident Procedures as outlined by Agency guidelines. All accidents will be reported to the Park Regional Aviation Officer and DOI-AM Safety Manager as appropriate for the agency involved. Due to the interagency nature of some projects it may be appropriate to notify both the Forest/Park Regional Aviation Officers and the DOI-AM Safety Manager.

7.0 Aviation Safety Plans

This chapter contains aviation plans for common and recurring aviation projects. This chapter supplements the Aviation Plan and Helicopter Operations Plan. The intent of this chapter is to provide direction and planning for routine aviation projects. “Routine” shall be defined as those missions that the crew and pilot are trained and qualified for, and are similar to missions that would normally be carried out during fire support missions. Examples of this would be the transportation of persons and cargo, external cargo transport, and recon flights. Special use project not covered in this plan will require a separate plan and approval.

Project Managers will be responsible for providing job codes or management codes for each project. In any detailed cost analysis is needed the Project Manager or Helicopter Manager will complete the analysis.

Before each project a **Project Air Plan Safety Briefing** will be completed. A copy of this briefing is included at the end of this plan.

7.1 RISK ANALYSIS COMMON TO ALL FLIGHTS

Risk management is a decision-making process. Everyone involved in an operation should have a part in risk management. Those at the ground level are ideally situated to identify hazards and determine their risk. They can also recommend to the decision maker what controls are appropriate. The process of managing risks makes operations safer without compromising the mission.

The following chart depicts those risk and hazards that are common to all aircraft operations. Each Operations Plan will identify other risk/hazards that are associated with those specific activities. If risk/hazards identified in this section require special emphasis, they may be included in the Operating Plan as well.

Phase	Hazard/Risk ID	Risk Assessment	Controls Options	Residual Risk
All	Aircraft Airworthiness	High	Aircraft provided by a contractor shall comply will all Federal Air Regulations and respective state regulations.	Low
All	Compliance with directives	High	All aircraft will be operated in a safe and prudent manner in accordance with the specific FAR's and Agency policies. Should an emergency occur, the pilot shall follow established emergency procedures.	Low
All	Aircraft Loading	High	The pilot is responsible for the proper loading of aircraft. Loading will be under the pilots direction and will be inspected by pilot prior to takeoff. Loading shall always be within allowable center of gravity (CG) limits and the certified gross weight shall not be exceeded. The actual useful load will not exceed that which will ensure safe handling and performance of the aircraft. Reductions in loads will be made for density altitude, and substandard landing fields.	Low
All	Cargo Storage	Medium	Accessory equipment, baggage, or cargo will be securely fastened to the aircraft to prevent; (1) injury to the occupants; (2) damage to the aircraft; (3) interference with piloting or jamming of the controls; or (4) adverse change in performance characteristics of the aircraft. Hazardous Materials: Each aircraft manager will follow "Aviation Transport of Hazardous materials" (see IHOG).	Nil
Resource Flights	Known Hazards and Operational Information	High	Before missions, pilots will be thoroughly briefed on other aviation traffic, terrain, and location of surface hazards, such as box canyons, radio towers. Power cables, and telephone lines. No person shall engage in any aviation activity unless that person has been briefed by the pilot or the Project Air Officer or representative o safety and emergency procedures.	Low
All	Flight Crew Fatigue	High	Flight duty limitations as specified in IHOG page 3-21, Appendix A4, A40, 41 will be adhered to.	Low
Ground Operations	Aircraft Fueling	High	Fuel handling will be done in accordance with DOI/Forest Service and NFPA 407 standards and contract requirements. Micronic fuel filters will be used. Bonding will comply with contract and NFPA 407 requirements. "Hot Fueling" will only be permitted in accordance with contract requirements. Other than the pilot, no personnel shall be onboard during fueling. Federal personnel will not fuel contractor or rental agreement aircraft.	Low
Helicopter Flight Operations	Personnel unfamiliar with operations around helicopters	Very High	All passengers will receive a briefing from the pilot or qualified helicopter crewmember before each flight. Passengers will remain under the direction and control of the pilot or helicopter crewmember.	Medium

7.2 FIRE MANAGEMENT AVIATION PROJECT PLAN

Supervision: The project aviation manager will be the Incident Commander and the Helicopter Managers. Other qualified personnel will be assigned as needed.

Project Name and Objectives: Fire Management. The objective is the safe, effective use of aviation resources to meet fire management objectives.

Justification: Aviation resources are the most cost effective and timely means of providing equipment and personnel on the fireline in remote locations. Their use is weather and availability dependent. The alternative is to use various means of ground transportation and ground-based suppression techniques.

Project Dates: Fire management activities can occur at any time.

Location: Only approved airports, landing strips, helibases, helispots, and landing areas will be used. The Aviation Officer, Incident Commander, or their representative gives approval. The pilot or helicopter manager may approve helispots for first time use.

Projected Cost of Aviation Resources: Aviation resources are considered expensive and costs will be assessed daily.

Aircraft: Only agency-approved aircraft will be used in fire management activities.

Participants: Only personnel approved by the agency and Incident Commander will be involved in aviation activities. These will vary by the needs of the specific incident.

Flight Following and Search and Rescue: Flight following will usually be done by the Helicopter Manager or Helibase organization set up for a specific incident. Air tankers or Smokejumpers will normally flight follow with the FAA or home dispatch to the incident and then coordinate with Santa Fe Dispatch and incident personnel. Dispatch will flight follow with local resources used for initial attack.

Hazard Analysis:

Phase	Hazard/Risk ID	Risk Assessment	Controls Options	Residual Risk
Airport Operations	Midair Collision	High	AIM Standard traffic patterns will be utilized at uncontrolled airports. Base Managers will brief pilots on local patterns and hazards.	Medium
Retardant Delivery	Low Level Obstacles	Very High	Leadplanes will be used to the maximum extent possible for hazard identification and traffic control. Incident Commanders will brief tankers on known hazards until the arrival of ATGS/Leadplane. All participating aircrews will identify hazards to the IC, ATGS, etc.	High
Retardant Delivery	Unannounced Aircraft	Very High	Arriving aircraft will call 3 minutes out from the incident. IC, ATGS, or Leadplane as appropriate will clear aircraft into the incident or assign holding instructions.	Low
Long Line	High Winds	High	Long line operations will be discontinued when Pilot or ground crew determine that aerial delivery by this method is not efficient. Wind limitations will not be exceeded.	Medium
Long Line	Improper Release	High	Cargo hooks will be tested prior to each mission. Pilots will ensure that they are dropping on the proper target and there are no personnel under the drop. Long Line delivery will be used only to the extent necessary, and will be terminated when ineffective.	Medium
Helicopter Maneuvering	Blade Strike	Very High	Pilots will use ground crew for Marshaling to the maximum extent possible. Minimum size for dip sights/helispots without ground assistance will be 1 rotor blade length clearance on all sides.	High

Personal Protective Equipment (PPE): Full compliment of PPE to include; nomex, nomex or leather gloves, flight helmet, and leather boots will be worn for helicopter flights. A hardhat with chinstrap and hearing protection may be substituted for a flight helmet for passenger transportation during fire suppression operations between established and managed Helibase/ helispots. Fixed wing flights below 500 feet AGL, requires occupants to wear nomex, gloves, and leather boots. PPE for fixed wing operations above 500 feet AGL is optional. Contractors will comply with PPE requirements of their contract.

Load Calculations and Weight-and-Balance: The pilot is responsible for the completion of the load calculations and weight-and-balance limits prior to flight. The Pilot and Helicopter manager are responsible for proper aircraft loading.

7.3 ADMINISTRATIVE TRAVEL PROJECT AVIATION PLAN

Supervision: The Chief of Party is responsible for the safe conduct of the trip.

Project Name and Objective: Air Travel. The objective is to use aviation resources in the safe and efficient transportation of employees.

Justification: Agency resources have been determined to be the most efficient and timely means of providing transportation of employees. The alternative is to use scheduled commercial transportation, which will not meet cost and time requirements.

Project Dates: Continuous.

Location: Only approved airports, landing strips, helibases, and helispots will be used. The Aviation Officer, Incident Commander, or their representative gives approval.

Projected Cost of Aviation Resources: Fixed wing aircraft cost from \$1.00 per NM to over \$5.00 per NM depending on type of aircraft and capabilities required. Aviation resources are considered expensive and cost will be assessed for each flight.

Aircraft: Only agency-approved aircraft will be used. Aircraft will be ordered through Santa Fe Dispatch.

Pilots: Only agency-approved pilots will be used.

Participants: All personnel in travel status need to consider the use of aviation for transportation. Flights that involve non-federal personnel will need to be approved in advance.

Flight Following and Search and Rescue: Pilots will file FAA flight plans unless VFR flight following with Dispatch is established. Pilots will check-in via telephone at destinations and stops when flight schedule allows. Pilot will advise scheduling dispatch of arrival at destination and will advise of contact procedures during standby periods.

Hazard Analysis:

Phase	Hazard/Risk ID	Risk Assessment	Controls Options	Residual Risk
Climb	In-Flight Icing	Very High	During Winter operations aircraft will be capable of flight into known icing, unless conditions are clear and blue and forecast to stay that way.	Medium
Cruise	Running Fuel Tanks Dry	Medium	Pilots will monitor fuel transfer so as to avoid running tanks dry.	Low
Ground Operations	Passengers straying into hazardous areas	High	Pilot will escort passengers to and from aircraft.	Nil
Departures/Arrivals	Mid-Air Collision	High	Pilots will conform to sterile cockpit IAW Far 135. Pilots will allow and encourage passengers to assist in identifying potential traffic conflicts.	Low

Personnel Protective Equipment: Special protective equipment is not required unless the flight is made in a helicopter.

Load Calculations and Weight-and-Balance: The pilot is responsible for completion of load calculations and weight-and-balance limits prior to flight. Pilot will confirm that load does not exceed limitations. The Pilot is responsible for approving the loading of his/her aircraft.

7.4 FIRE DETECTION PROJECT AVIATION SAFETY PLAN

Supervision: Paul Orozco the Forest Fire Management Officer is responsible for the overall supervision of Fire Detection flights.

Project Name and Objectives: Fire Detection.

Project Dates: Spring and Summer.

Location: Fire detection flights are flown on the Forest/Park following periods of lightning activity. Specific routes are chosen with consideration of lightning detection maps.

Projected Cost of Aviation Resources: Cost varies depending on flight route and aircraft available. Additional flight time and corresponding costs will be incurred when fires are detected due to mapping, resource coordination, etc.

Aircraft: Only agency-approved aircraft will be used. Aircraft will be ordered through Santa Fe Dispatch.

Pilots: Only agency-approved pilots will be used.

Participants: Aerial observers, air tactical group supervisors, trainees and others as authorized by the Aviation Officer or Fire Management Officer.

Flight Following: Check-ins with Santa Fe Dispatch is required on departure, landing, and 15 minute intervals. If a check-in is missed and contact can not be established the Forest/Park pre-accident plan will be initiated.

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Phase	Hazard/Risk ID	Risk Assessment	Controls Options	Residual Risk
During Flight	Weather, Poor Visibility, High Winds, Low Clouds	High	Minimum Visibility 5 miles. Maximum wind 25 knots. Minimum cloud ceiling 1500 feet AGL.	Low
During Flight	Other Aircraft MTR Resource Aircraft	Medium	Pilot and observer will be briefed on MTR and activity of any resource aircraft. VFR hemispheric altitudes will be flown when possible. Minimum flight altitude in cruise will be 2000 feet AGL when possible.	Low
Target Location	Low Altitude Obstructions Power Lines Towers	Very High	Minimum flight altitude is 500 feet AGL.	Low
All Phases	Fatigue Duty Limitations Task Saturation	Medium	Observers and pilots will comply with FAR 135 and agency flight time and duty limitations. Crews are also authorized relief when fatigue, stress, etc. warrant. Observers will prioritize as follows; Target Location, FB Report Resource Order. ATGS will be ordered if incident becomes complex.	Low

Personal Protective Equipment: PPE is not required for fixed wing reconnaissance flights above 500 feet AGL.

Load Calculations and Weight and Balance: The pilot is responsible for the completion of load calculations and weight and balance limits prior to flight. Load must be within limitations and remain within limits considering fuel consumption.

7.5 LONG LINE EXTERNAL LOAD PROJECT AVIATION SAFETY PLAN

Supervision: The Project Aviation Officer shall be a qualified Helicopter Manager.

Project Name and Objectives: Long Line Project. The objective is to deliver supplies, materials, or equipment to remote sites or work locations.

Justification: Air transportation is the most cost effective and timely means of delivering supplies, materials, and equipment to many remote locations.

Project Dates: Long Line projects may occur anytime of year.

Location: Forest/Park wide.

Projected Cost of Aviation Resources: The cost of the Forest exclusive use helicopter is \$771.00 per flight hour. Flight hours will vary depending on location and duration of project.

Aircraft: Most long line projects will be completed using the Forest exclusive use helicopter. This aircraft is a ASTAR-350 B3 helicopter. Other aircraft likely to be used are exclusive use aircraft on neighboring Forests or local Call-When-Needed aircraft.

Pilots: All primary and relief pilots of the exclusive use helicopter mentioned are carded and approved for long line external loads.

Participants: As a minimum two persons will perform each project. One will be at either end of the project. One will be the Helicopter Manager or Project Aviation Manager and the other will be a qualified Helicopter Crewmember. The Project Aviation Manager will provide communications and oversee the project.

Flight Following and Emergency Search and Rescue: Established flight following procedures with Santa Fe Dispatch will be followed. At the discretion of the Project Aviation Manager local flight following can be performed if the Helicopter Manager can maintain communications with the helicopter at both ends of the project and Santa Fe Dispatch.

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Phase	Hazard/Risk ID	Risk Assessment	Controls Options	Residual Risk
Longline Operations	Inadvertent release of load	High	All longline releases will be tested during preflight. Helicopter manager and Project manager will have a radio capable of communicating with the pilot to direct/coordinate pickup and delivery. Loads will be hovered prior to committing to flight. Loads will not be jerked. Flight paths will be planned so that persons, vehicles, or structures are not overflowed with long line loads.	Medium
Longline Operations	Ground Personnel Injury	High	Hookup personnel will be briefed on hookup and exit procedures. Hook shall be placed on ground before load is attached to hook.	Medium
During Flight	Weather, Poor Visibility, High Winds, Low Clouds	High	Minimum Visibility 5 miles. Maximum wind 25 knots. Minimum cloud ceiling 1500 feet AGL.	Low
During Flight	Other Aircraft MTR Resource Aircraft	Medium	Pilot and observer will be briefed on MTR and activity of any resource aircraft. VFR hemispheric altitudes will be flown when possible. Minimum flight altitude in cruise will be 2000 feet AGL when possible.	Low
All Phases	Fatigue Duty Limitations	Medium	Observers and pilots will comply with FAR 135 and agency flight time and duty limitations. Crews are also authorized relief when fatigue, stress, etc. warrant.	Low

Personal Protective Equipment: The pilot will wear PPE required by the contract. Hardhat with chin strap, ear and eye protection, gloves, and leather boots are required for persons operating within the safety circle of the helispots. All other project participants will wear field clothes as required by Health and Safety Code Handbook.

Load Calculations and Weight and Balance: The pilot is responsible for the completion of load calculations and weight and balance limits prior to flight. The assigned Helicopter Manager will confirm proper completion prior to the daily project briefing. The Pilot and Helicopter Manager will preflight the rigging of each load. Deficiencies will be corrected prior to flight. The Helicopter Manger and Pilot will approve the choking of each load.

7.6 AERIAL IGNITION PROJECT AVIATION SAFETY PLAN

Supervision: The local zone FMO or Burn Boss will be the Project Aviation Manager. The Helicopter Manager(s) will be assigned for each project.

Project Name and Objectives: Each burn has its own descriptive name. The objective is to meet Forest/Park resource goals and objectives.

Project Dates: Management Ignited fires can be planned for Spring, Summer, or Fall.

Location: Forest/Park wide.

Projected Cost of Aviation Resources: Cost for each project will be assessed. Aerial ignition is usually the most cost effective ignition method for large projects or projects in remote locations.

Aircraft: Aircraft must be inspected and approved for aerial ignition.

Pilot(s): Pilots must be approved for aerial ignition.

Participants: For Plastic Sphere Dispenser operations the Santa Fe Helitack crew will provide a Helicopter Manager, Dispenser Operator, and Helispot Manager. Other Forest/Park personnel may be used if qualified.

For Helitorch operations the local district will provide an engine with crew for fire protection. No personnel locally are qualified for helitorch operations. Qualified Helitorch Manager, Mix-Master, and Parking Tenders will have to be ordered.

Flight Following and Emergency Search and Rescue: Flight following will be performed by the Helicopter Manager during the application. Dispatch will flight follow the ferry flight. Search and Rescue services would be summoned by radio from Santa Fe Dispatch using established procedures.

**Fire Management Plan
Bandelier National Monument
Hazard Analysis:**

Appendix I

Phase	Hazard/Risk ID	Risk Assessment	Controls Options	Residual Risk
During Flight	Other Aircraft MTR Resource Aircraft	Medium	Pilot and observer will be briefed on MTR and activity of any resource aircraft. VFR hemispheric altitudes will be flown when possible. Minimum flight altitude in cruise will be 2000 feet AGL when possible.	Low
All Phases	Fatigue Duty Limitations Task Saturation	Medium	Observers and pilots will comply with FAR 135 and agency flight time and duty limitations. Crews are also authorized relief when fatigue, stress, etc. warrant. Observers will share radio communication task and prioritize tasks. Observers will maintain a sterile cockpit during take-off and landing.	Low
All Phases	High Operating Altitude	Very High	The Pilot and Helicopter Manager will monitor helicopter loading and aircraft performance. Most restrictive conditions will be used for load calculations.	Medium
Target Location	Low Altitude Obstructions Power Lines Towers	Very High	Minimize flight below 500 feet AGL to that which is absolutely necessary. High-level recon shall be performed before low level flight.	Medium

Personal Protective Equipment: The pilot will wear normal personal protective equipment required by the contract. Other personnel on the helispot will use protective clothing and equipment required by IHOG. The Helitorch Parking Tender will use a helmet and radio to communicate with the helicopter.

Load Calculations and Weight and Balance: The pilot is responsible for completion of the load calculations and weight and balance limits prior to flight. The assigned Helicopter Manager will confirm the proper completion prior to the daily operational briefing. The Pilot and Helicopter Manager are responsible for proper loading of the helicopter.

Burn Plan: Each individual burn plan shall contain an aerial ignition plan. Attached are plans to meet this purpose.

7.7 RAPPEL OPERATIONS AVIATION SAFETY PLAN

Supervision: A qualified Check Spotter will oversee the initial training and certification of rappellers. A qualified spotter will supervise each operational and training rappel.

Project Name and Objectives: The objective of rappel operations is to provide for the safe, efficient delivery of firefighters to wildland fires.

Justification: Rappelling is often the most expedient method of delivering firefighters to remote locations. It can also be the safest method considering hazards and risks associated with foot travel over rough terrain, changes in fire behavior over time, and the marginal nature of some helispots.

Project Dates: Rappel training and certification is yet to be determined. Operational and proficiency rappels occur throughout the fire season.

Locations: The Santa Fe Helitack crew follows Interagency Guidelines. Rappel operations can occur at any locations.

Projected Cost of Aviation Resources: Cost of the Forest Exclusive Use helicopter is \$771.00 per hour. 3 to 8 flight hours are estimated for training and proficiency rappels over the season. Rappel operations do not add any appreciable cost to fire suppression operations.

Aircraft: The Forest exclusive use helicopter is approved for rappel operations.

Pilots: Primary and relief pilots for the Forest exclusive use helicopters are all qualified for rappel operations or will be approved pending completion of training.

Participants: Members of the Santa Fe Helitack crew and qualified boosters.

Flight Following and Emergency Search and Rescue: Established flight following procedures with Santa Fe Dispatch will be followed. Local flight following can be used when working at established helibases of fires. During rappel operations radio volume may be turned down to ensure a sterile environment for the pilot and spotter.

**Fire Management Plan
Bandelier National Monument
Hazard Analysis:**

Appendix I

Phase	Hazard/Risk ID	Risk Assessment	Controls Options	Residual Risk
During Flight	Other Aircraft MTR Resource Aircraft	Medium	Pilot and observer will be briefed on MTR and activity of any resource aircraft. VFR hemispheric altitudes will be flown when possible. Minimum flight altitude in cruise will be 2000 feet AGL when possible.	Low
All Phases	Fatigue Duty Limitations Task Saturation	Medium	Observers and pilots will comply with FAR 135 and agency flight time and duty limitations. Crews are also authorized relief when fatigue, stress, etc. warrant. Observers will share radio communication task and prioritize tasks. Observers will maintain a sterile cockpit during take-off and landing.	Low
All Phases	High Operating Altitude	Very High	The Pilot and Helicopter Manager will monitor helicopter loading and aircraft performance. Most restrictive conditions will be used for load calculations.	Medium
Target Location	Low Altitude Obstructions Power Lines Towers	Very High	Minimize flight below 500 feet AGL to that which is absolutely necessary. High-level recon shall be performed before low level flight.	Medium
Rappel Phase	Rappeller Exposure/Experience	High	First year rappellers will perform live proficiency rappels from helicopters whenever possible. Experienced rappellers will perform proficiency rappels from simulators whenever possible to limit exposure.	Medium

Personal Protective Equipment: Pilot will wear a full compliment of PPE as required by contract. Spotters and rappellers will wear a full compliment of PPE as required by IHOG and the Interagency Helicopter Rappel Guide (IHRG). Rappel equipment will meet standards of the IHRG.

Load Calculations and Weight and Balance: The pilot is responsible for completion of the load calculations and weight and balance limits prior to flight. The assigned Helicopter Manager will confirm proper completion prior to operations beginning. Out-of-ground-effect (HOGE) calculations with the most restrictive conditions will be used for all rappel operations. The spotter and pilot are responsible for proper loading of the helicopter.

8.0 Attachments

Attachments to this plan include the following forms and documents:

Santa Fe Zone Aerial Hazard Map

Bandelier No-Fly Zones Map

Flight Request Form

Travel Worksheet (OAS-110)

Passenger Authorization (BLM 9400-1a)

Multi-year Fuels Plan (Timeline)

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<p>UF-9B Al Ayers -Contract Prep -Compliance</p> <p>UF-9C West Ski Trail -Cut/Haul -Pile Burn -Oversight</p> <p>UF-9E Inholdings Phase 1 -Cut/Haul -Pile Burn -Compliance -Oversight</p> <p>Entrance Road Phase 2 -Cut/Haul</p>	<p>UF-9A East Ski Trail -Compliance -Monitoring -Evaluation -Media support - Prep -Oversight -RX Burn</p> <p>UF-9B Al Ayers -RX Burn -Oversight -Media support - Monitoring</p> <p>UF-9C West Ski Trail -Contract Prep -RX Burn</p> <p>UF-9E Inholdings Phase 2 -Cut/Haul -Pile Burn -Compliance</p> <p>UF-7A -Compliance -Prep</p> <p>UF-7B -Compliance</p> <p>CG-1A -Compliance -Prep</p>	<p>UF-9E Inholdings -RX Burn -monitor/eval</p> <p>CG-1A -RX Burn -monitor/eval</p> <p>UF-7A -RX Burn -monitor/eval</p> <p>UF-7B -Cut/Haul -Pile Burn</p> <p>CG-5/8 -Compliance -Prep</p> <p>HQ-41 HQ to Alcove -Compliance -Prep</p> <p>UF-9F -Compliance -Prep</p> <p>UF-9D -Compliance -Prep</p> <p>UF-14 -Compliance</p>	<p>HQ-41 HQ to Alcove -RX Burn -monitor/eval</p> <p>CG-5/8 -RX Burn -monitor/eval</p> <p>UF-9F -RX Burn -monitor/eval</p> <p>UF-14 -Contract Thinning -Pile Burn</p> <p>CG-1B -Compliance -Prep</p> <p>HQ-44 Falls Trail -Compliance -Prep</p>	<p>UF-9D -RX Burn -monitor/eval</p> <p>CG-1B -RX Burn -monitor/eval</p> <p>HQ-44 Falls Trail -RX Burn -monitor/eval</p> <p>UF-14A -Prep</p> <p>UF-14B -Prep</p> <p>CG-1C -Compliance -Prep</p> <p>UF-12 -Compliance</p>	<p>CG-1C -RX Burn -monitor/eval</p> <p>UF-14A -RX Burn -monitor/eval</p> <p>UF-14B -RX Burn -monitor/eval</p> <p>UF-14C -Prep</p> <p>UF-12A -Prep</p> <p>UF-12B -Prep</p> <p>UF-27 -Compliance -Prep</p>	<p>UF-14C -RX Burn -monitor/eval</p> <p>UF-27 -RX Burn -monitor/eval</p> <p>UF-12A -RX Burn -monitor/eval</p> <p>UF-12B -RX Burn -monitor/eval</p> <p>UF-12C -Prep</p> <p>UF-12D -Prep</p> <p>LF-30 -Compliance -Prep</p>	<p>UF-12C -RX Burn -monitor/eval</p> <p>UF-12D -RX Burn -monitor/eval</p> <p>LF-30 -RX Burn -monitor/eval</p> <p>UF-12E -Prep</p> <p>UF-12F -Prep</p> <p>LF-28 -Compliance -Prep</p> <p>LF-29 -Compliance -Prep</p>	<p>UF-12E -RX Burn -monitor/eval</p> <p>UF-12F -RX Burn -monitor/eval</p> <p>LF-28 -RX Burn -monitor/eval</p> <p>LF-29 -RX Burn -monitor/eval</p> <p>HQ-45A -Compliance -Prep</p> <p>LF-38 -Compliance -Prep</p>	<p>LF-38 -RX Burn -monitor/eval</p> <p>HQ-45A -RX Burn -monitor/eval</p> <p>HQ-45B -Compliance -Prep</p> <p>HQ-45C -Compliance - Prep</p> <p>UF-7B -Prep</p> <p>UF-7C -Compliance -Prep</p>