

**National Park Service
U.S. Department of the Interior**



Big Bend National Park, Texas

**Fire Management Plan
Environmental Assessment**



Fire Management Plan

Environmental Assessment

Big Bend National Park • Texas

Abstract

Big Bend National Park needs to update its fire management plan (FMP) incorporating new policies and advances in fire research and operations. In developing the FMP staff considered public health and safety, the use of fire to accomplish resource management objectives, the need to base the program on science, and that the process be open and cooperative. Three alternatives are retained for analysis in this Draft Environmental Assessment (EA). The No Action Alternative, Alternative A, follows the current management direction and is retained as a basis for comparing other “action” alternatives. Alternative A uses prescribed burns and manual thinning to protect developments. Restrictive decision criteria governing natural ignitions have resulted in suppression of most lightning strikes. Alternatives B and C maintain protection of developments and sensitive resources, but reduce the likelihood of high-severity fire by allowing more fire to reduce hazard fuels. Prescriptions and decision criteria are more flexible than under No Action allowing fuel loads to be reduced to safer levels more quickly. Under Alternative B there is confidence that despite decades of suppression, habitats and species will recover following potentially widespread fire. Proponents of Alternative C are more cautious and propose using fire effects information from research burns to understand how to introduce fire without compromising park values and resources. For these reasons, Alternative C is the NPS preferred and environmentally preferred alternative. Fire management strategies proposed for Big Bend National Park would result in some short-term adverse effects to plants, animals and views. Reduction of fuels, particularly in the Chisos Mountains, is expected to reduce the likelihood of high-severity fire resulting in long-term benefits for the park.

Public Comment

If you wish to comment on this Environmental Assessment, you may mail comments to the name and address below. This environmental assessment will be on public review for 30 days and we will accept comments until June 31, 2005. Please note that names and addresses of people who comment become part of the public record. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Send comments to:

John H. King, Superintendent
Big Bend National Park
Panther Junction
Texas 79834

Direct technical inquiries to:

Richard Gatewood (Fire Ecologist) at 432-837-7056

Obtain the EA by:

Accessing the park web site at: www.nps.gov/bibe/home.htm or calling
Raymond Skiles (BBNP Wildlife Biologist) at 432-477-1145

United States Department of the Interior • National Park Service • Big Bend National Park

Executive Summary

Overview

Big Bend National Park needs to update its fire management plan (FMP) to incorporate new policies and advances in fire research and operations. Original meetings suggested that any change in fire policy could lead to significant or controversial consequences under NEPA guidelines, thus an Environmental Impact Statement (EIS) was proposed. Analysis of the three fire management alternatives retained for consideration, however, suggests much smaller impacts than originally thought and none were found to be significant or controversial. Subsequently a notice of intent NOI was published in the Federal Register on December 17, 2004 to announce the change from drafting an EIS to draft an Environmental Assessment, hereafter EA. The level of analysis of effects is the same for both documents however the approval process, is more streamlined for an EA because its findings reveal no significant impacts to the environment from the proposed management actions.

Goals and objectives for the fire program, and resources and values most likely impacted by fire were identified at an internal scoping meeting at the park December 11 and 12, 2002. Staff used two documents, the NEPA mandatory topics and the NPS Environmental Screening Form to develop the direction for fire program activities and the three fire management alternatives. Two public scoping meetings were held at Alpine and Study Butte, Texas, on the 26 and 27th of June 2003, respectively, to comment on staff findings. NPS staff from Denver and Phoenix involved in the review of the EA amended the impact topics in November 2003. They expanded the scope of life and property to include neighbors and boundary issues, added two new topics, watershed effects and resources for the fire program, and enlarged vegetation to include fire effects to wilderness, unique habitats, and exotic species. An Interdisciplinary Team (IDT) representing resource specialists from the park together with a cooperating agency, the University of Arizona, has been primarily responsible for developing this EA.

Four themes and corresponding chapters shape this EA. Chapter I identifies the needs and purpose of the FMP in meeting fire program goals and objectives and the areas or topics most likely to be affected by fire within the park. These eight impact topics were distilled from the extensive list developed in the internal scoping meeting. They are (1) life and property, (2) visitor experience, (3) local economy, (4) vegetation (5) threatened and endangered species (6) cultural resources (7) watershed effects, and (8) resources for the park fire program. Chapter II examines alternative fire management approaches, dismisses unreasonable ones, and looks at how well the remaining alternatives meet the fire program goals. Chapter III provides the background for the impact topics. Chapter IV analyzes the potential environmental consequences of the proposed fire management alternatives on the impact topics.

Fire Management Alternatives

The fire management alternatives differ with respect the extent the four fire management tools are employed – (1) natural fire also called wildland fire or lightning ignitions, (2) suppression, (3) prescribed fire (ignited by management to accomplish resource objectives), and (4) non-fire treatments such as mechanical and manual thinning. Fire is used to accomplish resource objectives within fire management units (FMUs). FMUs are distinct areas of the park with designated fire management strategies.

Alternative A, the No Action Alternative, continues the management direction laid out in the Big Bend 1994 FMP. This alternative has two FMUs. FMU 1 is a geographic area containing developments, a mile buffer strip along the park boundary, populations of threatened and endangered species, cultural resource sites and a northwesterly triangle bounded by the northern park border and State Highway 118 and US Highway 385. Fuel reduction is achieved by prescribed burning and manual or mechanical thinning. Suppression of all other fires is mandatory in FMU 1 including along the park boundary to contain fire on federal lands. The second FMU 2 covers the rest of the park and allows natural ignitions. Strict criteria governing initial decisions on fires however, have meant few fires have been allowed to burn. These criteria were preceded by a overgrazing prior to the park's establishment which, coupled with

suppression, have changed the park's fire regime allowing an increase in shrub cover in the desert. In the upper elevations of the park a reduction in fire occurrence has served to increase the amount of dead and downed woody debris on the forest and woodlands floor and increase the density of trees and shrubs. This increase in available fuel increases the probability of high-severity fire that could forever affect endemic and charismatic species, and alter views and habitats greatly valued by the public.

Alternative B, or Full Wildland Fire Use also has two FMUs. The first FMU 1 contains the same elements as Alternative A without the northwestern area bounded by the highways and with more flexible criteria governing management of fire along the park boundary. Where neighbors agree, the one-mile boundary buffer under Alternative A has been removed to allow fires to burn to man-made or natural topographic barriers such as the rivers or dry washes, cliffs, roads or bare areas. Fire-fighting safety and efficiency is expected to be greatly improved, and impacts to soils and vegetation from suppression activities reduced. The second FMU 2 allows for wildland fire throughout the rest of the park where fires will be allowed to burn within prescriptions at low to moderate intensities. Decision criteria allowing natural ignitions are more flexible and broad under this alternative, and more natural ignitions are expected to reduce fuels, create mosaics of burned and unburned vegetation that would benefit wildlife, facilitate post-fire recovery and provide greater plant diversity. Prescribed fire objectives are to maintain or enhance mature woody vegetation, especially the long-lived, mature trees in the Chisos. Prescriptions to meet these objectives will need to be developed.

Proponents of Alternative B advocate urgent reduction of fuel loads, particularly in the Chisos where a major natural fire has been absent for over 100 years resulting in significant fuel increases. Resource managers acknowledge the growing risk of a stand-replacing fire as fuels build up and fires continue to be suppressed under Alternative A. Allowing more natural fire is proposed even when the fire effects are unknown and may be adverse. Proponents of this alternative are confident that allowing more burns now will be less costly in the long-term than investing resources in high-cost suppression of a widespread, high-severity fire. Alternative B may ultimately reduce the risk of large-scale, high-intensity fires to a greater degree than the other alternatives.

Alternative C or Progressive Wildland Fire Use outlines a process for reintroducing fire safely while balancing public values and safety, responsibilities for rare and endangered species, and improving ecosystem health. This Alternative also has two FMUs. Prescriptions for protecting developments, threatened and endangered species, cultural resource sites and managing boundary fires are the same as FMU 1 in Alternative B. Under FMU 2 natural ignitions are allowed within prescriptions and where fuel levels indicate that wildland fire can burn safely, the same as Alternative B. To protect highly valued mature trees, charismatic, rare, and relict plant species in the Chisos, FMU 2 also has a Special Treatment Zone. Fires may be allowed within prescription depending on site, or suppressed until research results indicate likely outcomes. These proposed research fires form the third component of Alternative C aimed at supporting science-based management in the park. Fire effects will be monitored with respect to sensitive species and habitats, at differing intensities, and in different seasons. This information builds on work begun in the late 1970s and early 1980s and will allow more informed management decisions on the reintroduction of wildland fire into sensitive habitats and landscapes, help facilitate the restoration of native grasslands, possibly maintain and enhance habitat of listed species, and contribute to the control of invasive exotics in concert with other measures.

Alternative C allows for the measured introduction of low to moderate intensity wildland fire particularly in the Chisos based on the results from research burns. These results provide the stepping-stones to understanding how to reintroduce fire safely into a landscape following overgrazing prior to the park establishment and 60 plus years of a fire suppression management policy. This alternative acknowledges that historical vegetation communities, and fire return intervals are not well documented and a more careful, research-based approach to introducing fire is warranted. Resource managers also acknowledge

that fuel levels will continue to increase in the Chisos while research results are being understood and that a stand-replacing fire could occur before research results are applied.

Summary of Alternatives

Alternative A maintains the current direction suppressing most natural fires and allowing fuels to increase; Alternative B allows natural ignitions where fuels assessment has occurred, and may reduce hazard fuels quickest; and, Alternative C proposes research burns to gain knowledge about fire management in complex habitats to improve future management decisions, thereby providing greatest long-term protection of valued resources.

Elements Common to All Alternatives

Fuel treatments:

1. **Wildland fire use:** Wildland or natural fires are ignited by lightning and are most common preceding the summer monsoon followed by a second peak in mid July. More wildland fire is allowed under Alternatives B and C with flexible decision criteria governing ignitions. Resource managers prefer natural fire as a tool as it is more cost effective than prescribed burning of similar area, and it occurs during seasons when fires historically occurred. Fires are monitored daily or more frequently in accordance with the Fire Monitoring Handbook (UDSI 2003) and the Wildland Fire Implementation Plan. The park will continuously update information on fire location, size, behavior, smoke dispersal, road closures and safety conditions, making this information available to every division within the park, and to merchants and visitors.
2. **Prescribed fire:** Under predetermined conditions or prescriptions, resource managers intentionally ignites fires to achieve resource objectives. Prescribed fire is proposed to reduce fuels around buildings, remove hazard fuels in the vicinity of cultural resource sites, maintain habitats of listed species, restore grasslands, or aid in the control of exotics, and where appropriate restore or maintain natural vegetation or reduce excessively high fuel loadings throughout the park.
3. **Monitoring precedes and follows prescribed burns** to record vegetation species and conditions and characterize fuel conditions and document changes following the fire. Surveys for cultural resources and sensitive species are also conducted prior to a prescribed burn and mitigating actions are taken. A prescribed burn program for the park began in 1980 and new projects outlined until 2012. Weather and fire behavior will be monitored throughout prescribed burns and mitigation measures developed prior to the burn. The Fire Monitoring Handbook (USDI 2003) will be used as a basis for monitoring but will be modified as more research data becomes available. Multiple low intensity prescribed burns may be needed to reduce fuels sufficiently to allow wildland fire to resume in some areas of Big Bend. The long-term objective is to, where reasonable, diminish the role of prescribed fire and to more fully allow naturally fire to resume its natural ecological role in the park. In time prescribed fire may be indentified as tool to use on an ongoing basis to maintain some sites, which may include cultural landscapes.
4. **Non-fire treatments:** Fuels may be reduced mechanically with chainsaws or manually with handheld tools to reduce fuels or create firebreaks. The park uses these methods around buildings and intends to also use them around historic buildings and sites where fire and or suppression activities could cause permanent damage. Expected expansion of the cultural resource inventory through monitoring activities will necessitate more attention to maintain these sites and possibly an increase in non-fire treatments.

Information collection

5. **Monitoring** is a key feature to gain knowledge about the dynamics of fire disturbance on vegetation. Baseline data on vegetation is required prior to prescribed burns for all alternatives. More monitoring

is proposed under the action alternatives to better understand fire effects on species and sensitive habitats, fire dynamics under different intensities to help meet natural and cultural resource objectives. Most monitoring will occur under Alternative C – pre and post-fire monitoring of research burns and prescribed fire, and all other fire related activities that may provide useful data and which the park has the resources to measure. Guidelines for monitoring are to meet criteria for scientific research and enable incorporation into management decisions and operations.

Management approaches

6. The park is guided by “Appropriate Management Response” (AMR) that assesses weather, staffing and available equipment, threats to resources, land use, regional issues and other concerns in making a management decision about whether to suppress, contain, or allow a fire to burn. It means that a variety of responses are possible for a given set of circumstances. Unplanned Human caused fires, such as from unattended camp fires, discarded cigarettes or arson, are automatically suppressed using tactics that causing the least amount of damage to resources, people and property. Minimal Impact Suppression Techniques (MIST) are tools available to achieve the AMR. MIST is employed to minimize damage to the landscape while providing safety and meeting resource protection objectives, especially in wilderness. Staging areas and firelines are placed where they will do least damage. Natural breaks are used where possible minimizing ground disturbance or tree cutting. Agency resource advisors will be consulted to determine appropriate management tactics. Heavy equipment such as dozers and road graders will not be allowed for fire suppression operations unless under extreme emergency conditions with the approval of the park superintendent.

Restoration and mitigation

7. Resource managers preplan to avoid fire accidents. Extreme conditions or sudden changes in weather do not always allow the prevention of damage to resources that may require emergency stabilization and rehabilitation. Measures to initiate rehabilitation are developed in consultation with specialists such as archeologists, hydrologists, plant ecologists, and wildlife managers who help identify treatments and write the short and long-term rehabilitation plan following a fire. They then help implement and monitor plans which may include cutting stumps, brushing handlines, recontouring drainage lines, removing trash, planting in burned areas, installing erosion control devices, and felling hazardous trees. Specific mitigative measures are outlined in Chapter II.

Education and communication

8. Communication is key to implementing the many components of a fire program. Methods of coordinating fire activities and notification of all park staff, concessionaires, neighbors and the public is being updated to improve fire-fighting efficiencies and public safety. Cooperation with neighboring landowners and agencies is in place under the existing FMP. Fine-tuning these park-neighbor agreements to allow suppression at natural or man made boundaries is expected to improve firefighter safety and reduce damage to soils and vegetation. Updating these agreements is an on-going process and will be pursued when staff resources are available. Further development of these agreements with state agencies moves the park towards interagency cooperation, a goal of the Federal Fire Policy. Agreements with Mexico and surrounding state agencies will help provide cohesive fire management of approximately 2.1 million acres of protected Chihuahuan Desert lands.

Unique to Alternative C

Research burns

Research burns are prescribed burns used to obtain specific information about fire effects on particular species or habitats, and to record fire dynamics under prescribed burning conditions. Collection of this information begun in the later 1970s and early 1980s, will guide restoration of particular habitats such as grasslands, improve understanding of how to stimulate or maintain diversity of species, to maintain or improve habitat for listed species, guide reintroduction of fire into heavily fueled areas, and increase

understanding of how to use fire in the control of exotic plant species. Data collection priorities are understanding how to introduce fire in sensitive habitats where park values are at greatest risk.

Analysis of Environmental Impacts

Analysis of the effects of the three FMP alternatives was applied to the following eight impact topics.

Impact topic (1): Life and Property

Fire is an effective tool for reducing hazard fuels, but it is also a threat to the public, firefighters, park staff, developed areas, and neighboring properties.

Impact topic (2): Visitor Experience

Fire program activities may result in road closures and deter visitors; conversely some visitors are interested in fire and the post-fire activities offer interpretative opportunities.

Impact topic (3): Local Economy

Fire events provide business for local merchants and firefighters but may deter visitors. More routine fire events are likely to be better for the local economy than a single large high-severity fire.

Impact topic (4): Vegetation

Fire will benefit many species and habitats in the long-term but will kill and injure some plants in the short-term. Sensitive habitats require special consideration in fire planning. Allowing large-scale fire in wilderness maintains desirable mosaic patterns of burned and unburned vegetation. Fire can lead to increases in fire adapted exotic plants but can also contribute to their control.

Impact topic (5): Threatened and Endangered Species

Protecting federally listed species from fire require careful precautions to safeguard individuals, populations, and their habitats over the long-term; fire however, may be essential to maintain habitats.

Impact topic (6): Cultural Resources

Fire may help reduce hazard fuels and maintain historic views but can also damage and destroy structures, landscapes and artifacts.

Impact topic (7): Watershed Effects

Fire can remove vegetation and organic matter contributing to erosion and debris flows.

Impact topic (8): Resources for the Park Fire Program

The action alternatives propose more routine fire program activities and more natural ignitions; fighting fires safely, meeting monitoring, planning and compliance needs necessitates additional training, staff and resources.

All of these proposed fire management strategies would result in some short-term adverse effects, such as the death of individual plants and animals and disruption of habitat. Alternative A in allowing fuels to continue to increase across the park, may result in the greatest damage from high-severity fire under extreme weather conditions. An outcome of such fire in the Chisos may be the removal of soil organic matter initiating watershed erosion, destruction of soil seed sources slowing revegetation, and suppression activities damaging unidentified archeological sites and possibly converting woodlands and forests to shrubland or grassland communities. Alternative B may reduce fuels at a greater rate, but in allowing more fire also increases the injury rate to plants and animals, and exposes firefighters to risk more frequently, and could result in undesirable unintended consequences. Outcomes over the longer-term are unknown but the threat of high-severity fire in the Chisos is reduced. Alternative C seeks to reduce fuels

over a longer-time frame than Alternative B but sooner than Alternative A and reduce the potential for undesirable unintended consequences.

Resource managers understand that weather and climate dynamics may mean an extreme fire event or events could occur before the proposed management policies under Alternative B or C can realize their expected benefits. Should a high-severity fire occur under extreme conditions, it is possible that all alternatives will have the same outcomes – particularly in the Chisos Mountains.

Recognizing that fire is a natural feature in the Big Bend landscape, the park proposes under the preferred alternative, Alternative C, to reintroduce natural fire immediately where it is safe to burn, reduce fuels cyclically through prescribed burns to allow natural ignitions in the back country, expand protection for developments and cultural resources, and to learn more about fire effects and dynamics in sensitive habitats through research burns, fire effects monitoring or prescribed burns conducted in similar fuels and vegetation in other areas. Suppression over many years has translated into a liability for the park that is being addressed in this EA

TABLE OF CONTENTS

Chapter I : Introduction.....	13
Purpose for Action.....	13
Need for Action	13
Policies and Regulations.....	14
Contributors to the Plan.....	18
The Planning Process.....	19
Environmental Issues.....	20
Impact Topics	21
Chapter II : Fire Management Alternatives	25
Introduction	25
Big Bend Fire Program.....	29
Elements Common to All Alternatives.....	29
No Action Alternative- Alternative A:	39
Alternative B: Full Wildland Fire Use.....	44
Alternative C: Progressive Wildland Fire Use	50
Summary of Reasonable Alternatives	57
Environmentally Preferred Alternative (NEPA Sections 101 and 102)	57
Chapter III : Affected Environment	67
Impact Topic (1): Life and Property.....	67
Impact Topic (2): Preservation of Visitor Experience.....	70
Impact Topic (3): Local Economy.....	71
Impact Topic (4): Vegetation.....	71
Impact Topic (5): Threatened and endangered species	84
Impact Topic (6): Cultural Resources.....	99
Impact Topic (7): Watershed Effects.....	101
Impact Topic (8) Resource Support for the Fire Program.....	102
Chapter IV: Environmental Consequences	107
Impact Topic (1). Life and Property	108
Impact Topic (2): Preservation of Visitor Experience.....	111
Impact Topic (3). Local Economy.....	114
Impact Topic (4): Vegetation.....	116
Impact Topic (5): Threatened & Endangered Species.....	121
Impact Topic (6): Cultural Resources.....	130
Impact Topic (7): Watershed Effects.....	134
Impact Topic (8): Resources for the Fire Program.....	137
Chapter V: Consultations and Preparers	141
Preparers	141
Chronology	143
Glossary	145
Literature Cited.....	149

LIST OF FIGURES

Figure I-1 Location of Big Bend National Park.....	16
Figure II-1: Plot of the burned area for each fire year from 1948 to 2003 and the preceding 5-yr average precipitation.	27
Figure II-2 Location of documented fires at Big Bend National Park.....	28
Figure II-3: Alternative A: No Action Alternative	42
Figure II-4: Decision Tree for Initial Action on Ignitions. Alternative A.....	44
Figure II-5: Alternative B: Full Wildland Fire Use	47
Figure II-6: Decision Tree for Initial Action on Ignitions for Alternative B & C	48
Figure II-7: Alternative C: Progressive Wildland Fire Use	55
Figure III-1 Number of Campers in the Chisos in 2003	68
Figure III-2 Cause and Number of Fires at Big Bend National Park.....	69
Figure III-3 Vegetation Categories under Big Bend FMP	75
Figure III-4 Vegetation Types in Chisos Mountains.....	76

LIST OF TABLES

9.

Table I-1:Goals and Objectives of the Big Bend Fire Management Plan.....	19
Table I-2 Impact Topics	22
Table I-3: NEPA Mandatory Topics.....	23
Table II-1 Probability of occurrence for total burned area for Big Bend National Park.....	27
Table II-2: Schedule of prescribed burns under the three alternatives.....	34
Table II-3: Summary of prescriptions under 1994 FMP	41
Table II-4: Prescribed burn program 1980-2003.	43
Table II-5: Lightning Ignitions 1980-2004	43
Table II-6: Prescriptions for Prescribed and Wildland Fire Use For Alternative (B)	49
Table II-7: Prescriptions for Alternative C	56
Table II-8 Major Characteristics of Fire Management Alternatives	59
Table II-9: Effectiveness of Alternatives in Meeting Goals and Objectives.....	60
Table II-10: Impact Summary	62
Table III-1: Special Status Wildlife Species Associated with Big Bend National Park	89
Table III-2: Sensitive Plant Species under all Alternatives.....	96
Table III-3: Current Fire Program Resources	104
Table III-4: Additional Staffing Needs	105
Table III-5: Staff Traing Needs.....	105

10. LIST OF APPENDICES

Appendix A: Full list of issues related to fire management planning at Big Bend National Park.....	157
Appendix B. Fire Effects on Dominant Plant Species in Big Bend National Park.....	161
Appendix C. Cultural Resource Matrix	171
Appendix D. Plant and Animal Species referred to in this EA.....	181
Appendix E: Watershed areas and potential impacts following high-severity fire.....	185

