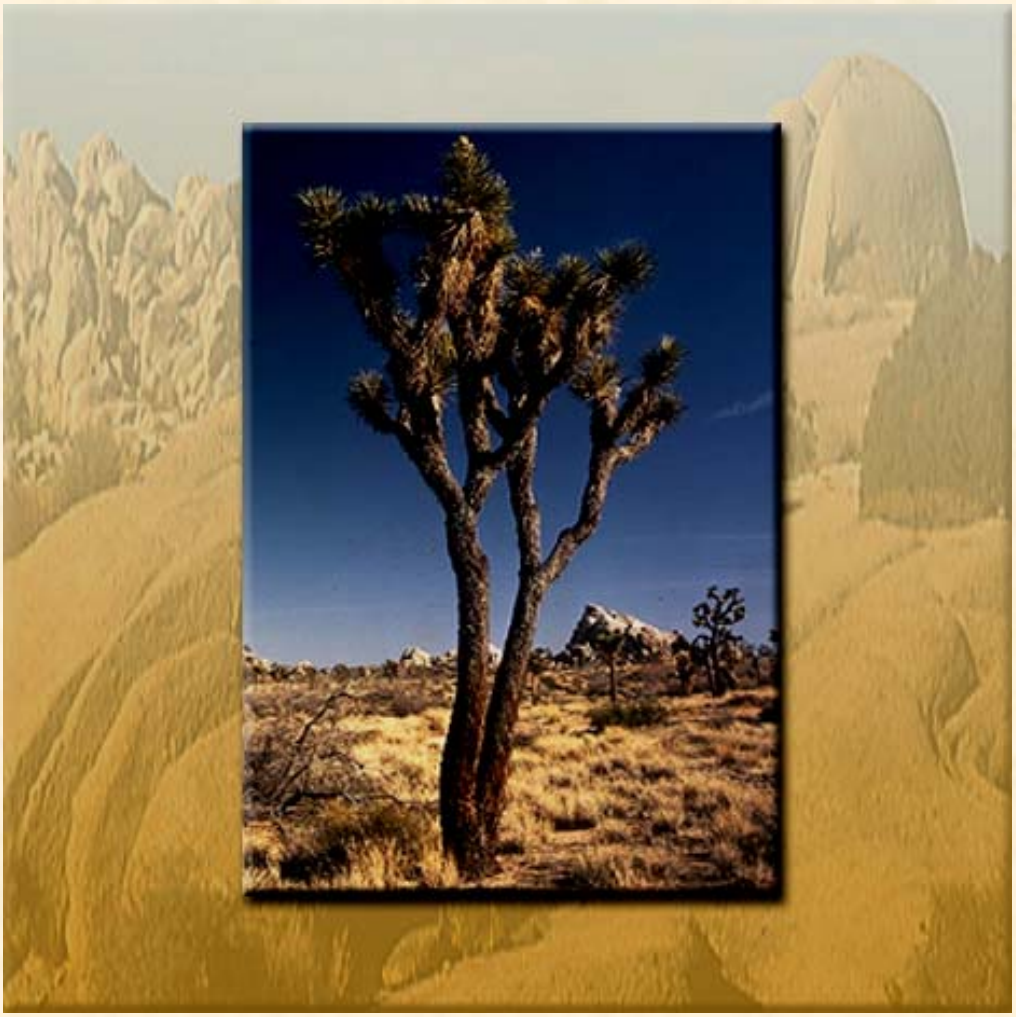
JOSHUA TREE NATIONAL PARK
FIRE MANAGEMENT PLAN
(TWENTYNINE PALMS, CALIFORNIA)



ENVIRONMENTAL ASSESSMENT
APRIL 2005

Joshua Tree National Park
Fire Management Plan Environmental Assessment

National Park Service
U.S. Department of the Interior

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PUBLIC SCOPING ANNOUNCEMENT
For the development of a Fire Management Plan

Dear Interested Public or Agency,

Joshua Tree National Park is seeking comments from interested public and affected agencies in preparation of a Fire Management Plan. A draft Fire Management Plan Environmental Assessment (EA) is available for public review and comment. This EA examines the possible impacts of implementing the proposed Fire Management Plan (FMP). The EA considers two alternative ways of meeting the park's fire management goals, in addition to the proposed action, and was prepared pursuant to the National Environmental Policy Act.

Joshua Tree National Park manages 794,000 acres, primarily of Mojave and Colorado desert ecosystems. The park seeks to protect the desert ecosystem, historic landscapes, cultural sites and the public's safety through the park's fire management plan. The public's input regarding the alternatives for fire management in the park is extremely important.

Public comments on this Environmental Assessment are open for 30 days and will be accepted through May 17, 2005. A copy of the EA is available at the park headquarters or on our web page at www. nps.gov/jotr . Responses to the EA can be provided by e-mail to jotr_publiccomments@nps.gov, by fax (760) 367-6392, or by mail to Curt Sauer, Superintendent, Joshua Tree National Park, 74485 National Park Dr., Twentynine Palms, Ca 92277.

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Chapter 1 - Purpose and Need

1.1 INTRODUCTION

This programmatic Environmental Assessment (EA) documents the results of a study of the potential environmental impacts of actions proposed in the Joshua Tree National Park fire management plan.

This EA has been prepared in compliance with:

- **The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal Actions having the potential to impact the quality of the environment;**
- **Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;**
- **National Park Service Conservation Planning, Environmental Impact Analysis, and Decision Making; Director's Order (DO) #12 and Handbook.**

The Purpose of an Environmental Assessment (EA)

There are three primary purposes of an EA:

- **To help determine whether the impact of a proposed action or alternative could be significant, thus indicating that an environmental impact statement (EIS) is needed;**
- **To aid in compliance with NEPA when no EIS is necessary by evaluating a proposal that will have no significant impacts, but that may have measurable adverse impacts; and**
- **To facilitate preparation of an EIS if one is necessary**

Key goals of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies, and the documents recording their results, such as this EA, focus on providing input to the particular decisions faced by the relevant officials. In this case, the Superintendent of Joshua Tree National Park is faced with a decision to develop the park's fire management plan as described below. This decision will be made within the overall management framework already established in the Joshua Tree National Park's 1994 General Management Plan and the 2001 Federal Wildland Fire Management policy and guidelines. Therefore the alternative courses of action that are, unless otherwise noted, crafted to be consistent with these documents.

In making decisions about National Park Service administered resources, the National Park Service is guided by the requirements of the 1916 Organic Act and other laws, such as the Clean Air Act, Clean Water Act, and Endangered Species Act. The authority for the conservation and management of the National Park Service is clearly described in the Organic Act, which states the agency's purpose: "...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future

generations." This authority was further clarified in the National Parks and Recreation Act of 1978: "Congress declares that...these areas, though distinct in character, are united...into one national park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

Joshua Tree National Monument was established as a unit of the National Park system by Presidential Proclamation No. 2193 on August 10, 1936 (50 Stat. 1760) because its "Lands contain historic and prehistoric structures and have situated thereon various objects of historic and scientific interest…it appears that it would be in the public interest to reserves such lands as a national monument, to be known as Joshua Tree National Monument." While the language in the presidential proclamation indicates a strong cultural resource emphasis, the legislative history reveals that another major reason for the establishment of the monument was preservation of the natural resources of the Colorado and Mojave Deserts. The natural resource preservation emphasis was so strong that the original name contemplated for the monument was Deserts Plants National Park.

Public Law 81-837, 64 Stat. 1033 reduced the size and revised the boundaries of Joshua Tree National Monument in 1950. Almost 300,000 acres that were known to contain significant mineral reserves were deleted, leaving the monument at approximately 560,000 acres. Public Law 103-433 added 234,000 acres to Joshua Tree National Monument and changed its status from national monument to national park.

The requirements placed on the National Park Service by these laws, especially the Organic Act, mandate that resources are passed on to future generations "unimpaired" (DOI, 2001a). An impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

- **Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;**
- **Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or**
- **Identified as a goal in the park's general management plan or other relevant NPS planning documents.**

An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result from an action necessary to preserve or restore the integrity of park resources or values (DOI, 2001b). This EA addresses whether the actions of the various alternatives proposed by the National Park Service at Joshua Tree National Park impair resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general

management plan or other National Park Service planning documents (see *Chapter 3 – Environmental Consequences*).

1.2 PURPOSE AND NEED

National Park Service (NPS) policy (*Director's Order #18: Wildland Fire Management)* requires that every park unit with burnable vegetation develop a fire management plan (FMP) approved by the park superintendent. The FMP serves as a detailed and comprehensive program of action to implement fire management policy principles and goals, consistent with the unit's resource management objectives. The park's fire management program, guided by federal policy and the park's resource management objectives, will serve to protect life, property, and natural and cultural resources.

Ecological and meteorological evidence indicates that lightning-caused fires were a major environmental force shaping the vegetation of North America for millions of years prior to human habitation (USDA, 2000b). Fire-adapted ecosystems developed, as did individual plant species dependent upon or adapted to wildland fire. According to fire ecologist Dr. Cecil Frost (1998), "…fire once played a role in shaping all but the wettest, the most arid, or the most fire-sheltered plant communities of the United States."

Historically, the occurrences of wildland fires in desert systems such as at Joshua Tree National Park were rare. Since fire was rare in this ecosystem, many desert species are intolerant and vulnerable to fires. While some species, can resprout after a fire, few species can tolerate successive burns. Blackbrush stands, for example, are substantially decreased or eliminated by fire, often killing mature shrubs and its seeds. After a fire, recovery is slow. Areas that were burned areas could take decades to return to their original condition.

Over the past 40 years, wildland fires have been occurring more frequently and with more severity with the establishment of non-native grasses such as red brome grass (*Bromus madritensis subsp. rubens*) and cheatgrass (*Bromus tectorum L*). Before 1965, most lightning fires burned less than one-quarter acre, after 1965 more large fires and more frequent fires have been recorded. In 1979 the Quail Mountain fire burned 6,000 acres; in 1995 the Covington fire burned 5,158 acres. And in 1999, the largest fire in Joshua Tree's history, the Juniper Complex fire burned 13,894 acres of slow-growing California junipers, pinyon pines, and Joshua trees. As these non-native grasses spread throughout the desert, they create a lasting hazard fuel source and continuous fuel beds that connect the clusters of vegetation in this once fragmented landscape, which allows wildland fires to spread unimpeded. To make matters worse, many times these non-native grasses actually increase in dominance after fire, creating conditions that promote repeated burning.

1.2.1 Human Health and Safety

A key component in meeting the underlying need is the protection and treatment of the wildland urban interface. The wildland urban interface refers to areas where wildland forests meet urban developments, or where forest fuels meet urban fuels (such as houses). These areas encompass not only the interface (areas immediately adjacent to urban

development), but also the continuous slopes and fuels that lead directly to the urban developments. Reducing the fire hazard in the wildland urban interface requires the efforts of federal, state, and local agencies, Tribes, and private individuals. "The operational role of federal and state agencies as partners in the Wildland Urban Interface are wildland fire fighting, hazard fuels reduction, cooperative prevention and education, and technical assistance. Structural fire suppression is the responsibility of tribal, state, or local governments" (USDA and USDI, 2003). "The primary responsibility for protecting private property and rural communities lies with individual property owners and local governments" (USDA and USDI, 2003). With treatment, a wildland urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend structures and/or communities. Areas in the park that form a wildland/urban interface are those areas that are in immediate proximity to the community of Yucca Valley, Black Rock housing development, and Quail Wash.

1.3 BACKGROUND

Joshua Tree National Park is located in Southern California in the counties of San Bernardino and Riverside. It lies along the east/west treading Transverse Ranges of the Little San Bernardino Mountains. The south boundary follows the base of these mountains along the northern perimeter of the Coachella Valley and the Monument's north boundary is defined by the Morongo Basin.

Of the park's current 794,000 acres, of which just over 765,155 acres are in Federal ownership administered by the National Park Service and 26,750 are nonfederal lands, 585,000 is designated wilderness. Surrounding lands include private, county, Bureau of Land Management, and Metropolitan Water District ownership.

As part of the Desert Protection Act, Joshua Tree National Monument was elevated to park status on October 31, 1994. The bill also added 234,000 acres. The new park boundary follows natural features and includes complete ecological units such as entire mountain ranges. Previous boundaries divided these ranges along survey lines. The additions provide better resource protection with easier boundary identification and monitoring and important habitat for desert bighorn sheep. Elevations in the park range from a low of 536 feet to a high of 5,814 feet at Quail Mountain.

The park contains two desert ecosystems; the Mojave and Colorado Deserts. Below 3,000 feet, the Colorado Desert encompasses the eastern part of the park and features natural gardens of creosote bush, ocotillo, and cholla cactus. The higher, moister, and slightly cooler Mojave Desert is the special habitat of the Joshua tree. In addition to Joshua tree woodlands, the western part of the park also includes some of the most interesting geologic displays found in California's deserts. Five fan palm oases also dot the park, indicating those few areas where water occurs naturally and wildlife abounds.

Joshua Tree National Park provides habitat for 824 higher plant species, 40 reptile species, 41 mammal species, and 240 bird species. The federal register lists one park reptile, the

desert tortoise, as threatened. In addition there are 22 animal species and 46 plant species of special concern being protected within the park.

Joshua Tree NP has one known paleontological area and potentially eight more. The park protects 582 archeological sites, 95 historic structures, 19 cultural landscapes, and houses 238,624 accessioned items in its museum collection.

Park staff maintains 88 miles of paved roads and 81 miles of unpaved roads, nine campgrounds with 523 campsites, two horse camps, and 10 picnic areas with 38 picnic sites. There are 32 trailheads and 191 miles of hiking trails throughout the park. Park staff greets visitors at three entrance stations, two visitor centers, and one nature center. Behind the scenes the park maintains 10 water treatment facilities, nine solar power stations, four maintenance facilities, eight employee housing units, and 95 vehicles.

1.4 FIRE MANAGEMENT OBJECTIVES

National Park Service Wildland Fire Management policies are found in Director's Orders #18 (DO-18) and require that all parks with vegetation capable of sustaining fire develop a wildland fire management plan that will meet the specific resource management objectives for that park and ensure that firefighter and public safety are not compromised. This guideline identifies fire as the most aggressive natural resource management tool employed by the National Park Service. DO-18 further states that all fires in the wildland are classified as either wildland fires or prescribed fires. Prescribed fires and wildland fire use may be authorized by an approved wildland fire management plan and contribute to a park's resource management objectives. Human-caused wildland fires are unplanned events and may not be used to achieve resource management objectives by a park.

DO-18 identifies three paramount considerations for each park's fire management program. They are:

- **Protect human life and property both within and adjacent to park areas;**
- **Perpetuate, restore, replace, or replicate natural processes to the greatest extent practicable; and**

Wildland **is an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.**

Wildland Fires **are any non-structural fires, other than prescribed fires, that occur in the wildland. This term encompasses fires previously called both wildland fires and prescribed natural fires.**

Prescribed Fires **are any fires ignited by management actions in defined areas under predetermined weather and fuel conditions to meet specific objectives.**

Wildland Fire Use **is the management of naturally ignited (*e.g.* lightning) wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans.**

Wildland/Urban Interface **is that line, area, or zone where structures and other human development meets or intermingles with undeveloped wildland or vegetative fuels.**

- **Protect natural and cultural resources and intrinsic values from unacceptable impacts attributable to fire and fire management activities.**

Objectives, as described in the park's 1994 General Management Plan, associated with the goal of preserving park resources that directly applies to fire management include:

- **Manage land and wilderness to preserve them unimpaired for future generations.**
- **Participate cooperatively in the preservation of ecological units that extend beyond the park boundary.**
- **Improve knowledge of natural and cultural resources.**
- **Manage visitation more effectively and reduce impacts associated with dispersed and poorly defined visitor use facilities.**
- **Educate park visitors regarding the NPS mission and the natural and cultural resources of the park.**
- **Facilitate cooperative planning throughout the California Desert Ecosystem with other public agencies and communities.**
- **Improve park circulation; focus on safety, visual quality, and visitor experience.**
- **Improve the effectiveness of park operations.**

Principle #3 of the *2001 Federal Fire Policy* states that "fire management plans, programs, and activities [will] support general and resource management plans and their implementation." This Fire Management Plan serves as a detailed and comprehensive program of action to implement Federal fire management policy principles and goals, which in turn support the park's general and resource management plan objectives, as well as its enabling legislation. Specifically:

- **GOAL: Protect human life and property within and adjacent to the park, through the implementation of a comprehensive interagency fire management program.**
    - **OBJECTIVE:**
        - **Ensure the fire program is in compliance with the Federal Wildland Fire Management Policy, NWCG Guidelines and Incident Qualification Guidelines prior to the established fire season.**
        - **Fire Education and Prevention Outreach programs are developed for local community and fire agencies.**

- **GOAL: To better understand the role of fire in desert ecosystems using science-based information or best professional judgment, to develop fire management planning strategies.**

  - **OBJECTIVE**
    - **Scientific research will be implemented starting 2005 and ending approximately 2010; to include Fire behavior and ecological effects in Blackbrush, Shrublands and Invasive Annual Grasslands of the Mojave Desert.**
    - **All burns will comply with state air quality regulations for smoke management during research projects and be done when weather and resource conditions are favorable.**

- **GOAL: Maintain high elevation plant communities, including blackbrush, Joshua tree woodlands, and pinon-juniper-oak woodlands, at their current condition.**

  - **OBJECTIVE**
    - **Suppress 95% of all fires within the first operational period. Suppress all wildfires through minimal impact suppression tactics.**
    - **Conduct annual meeting with cultural and natural resource staff to identify resources at risk and develop suppression strategies.**

- **GOAL: Promote an interagency approach to managing fires and minimizing costs of suppressing wildfires.**

  - **OBJECTIVE:**
    - **On an annual basis, review, update and initiate cooperative agreements to assure that interagency approaches to managing wildland fires are implemented.**

- **GOAL: Monitor and evaluate the effects of fire on park ecosystems in order to further refine program Objectives.**

  - **OBJECTIVE:**
    - **Continue to monitor existing fire effects research plots in accordance with the NPS Fire Monitoring Handbook.**
    - **Continue to monitor long-term Joshua tree fire effects study plots (annually).**
    - **Continue to collect data at the Juniper Fire Complex photo points and photo plots (annually).**

- **GOAL: Manage wildland fires so that Park cultural resources are protected from damage by suppression actions and fire.**

  - **OBJECTIVE:**
    - **Train staff, advisors, and inter-agency cooperators, and provide them with the necessary information related to cultural resources.**
    - **Ensure that the park Pre-suppression Plan is readily available and that any cultural updates are included.**
    - **Park annual fire refresher will train staff on the effects of initial attack on sensitive cultural resources.**
    - **Conduct one or more archeological surveys in sites of high fire risk.**

- **GOAL: Ensure that each fire incident has a Resource Advisor present with expertise in cultural and natural resources.**

  - **OBJECTIVE:**
    - **Create a list of NWCG qualified Resource Advisor availability, specifically tailored to park resource needs where possible.**

- **GOAL: Actively acquire and manage the best available information to develop and implement the FMP.**

  - **OBJECTIVE:**
    - **Produce a list of existing available data.**
    - **Compile information needs.**
    - **Develop a framework for making this data accessible for fire management.**
    - **Identify a data manager.**

1.5 SCOPING ISSUES AND IMPACT TOPICS

During the last week of June, 2002, the park distributed scoping letters to a mailing list of a number of individuals and organizations. The park also placed a press release in the local newspaper. The scoping letters and press release described the fire management activities outlined in the proposed Fire Management Plan and encouraged the public to provide their comments and concerns regarding the plan to the park via e-mail, telephone calls, or written correspondence. The public was also welcomed to visit the park office and speak personally with the appropriate staff members about the plan. In total, 15 comments were received during the scoping period.

The major issues and concerns that came from internal scoping meetings, and other public input (*e.g.* email, written correspondence) were evaluated. Issues determined to be important were those related to the effects of the proposed action, and those not already adequately addressed by laws, regulations, and policies. Important issues were considered in developing and evaluating the alternatives to the Proposed Action discussed in this EA.

1.5.1 Impact Topics Considered in this Environmental Assessment

Impact topics are derived from issues raised during internal and external scoping. Not every conceivable impact of a proposed action is substantive enough to warrant analysis. The following topics, however, do merit consideration in this EA:

Soils: Low and moderate-severity fires can benefit soils through a fertilization effect, while high-intensity fires can damage soils; therefore, impacts to soils are analyzed in this EA.

Water Resources (including Wetlands and Floodplains): National Park Service policies require protection of water resources consistent with the Federal Clean Water Act. Hazard fuel reduction treatments, prescribed fires and fire suppression efforts can adversely impact water quality (sediment delivery, turbidity); therefore, impacts to water resources are analyzed in this EA.

Vegetation: For the purpose of fire management, vegetation in the park has been organized according to three primary fuel model classification groups: Mojave Mixed Steppe (Joshua trees, galleta grass, needle grass), blackbrush scrub (blackbrush, Mojave yucca, Joshua tree, California juniper), and Mojavean Pinyon Juniper Woodland (pinyon pine, scrub oak, California juniper). Hazard fuel reduction treatments, prescribed fires, and fire suppression efforts can affect vegetation communities and rare plant species; therefore, impacts to vegetation are analyzed in this EA. Vegetation issues, in particular fragile desert plants/communities, were of concern in several of the scoping comments received.

Wildlife: There are resident populations of various species of reptiles, amphibians, birds, mammals, fish, and invertebrates that can be adversely and/or beneficially impacted by hazard fuel reduction treatments and wildland fire suppression. Therefore, impacts to wildlife are evaluated in this EA.

Threatened and Endangered Species: The Federal Endangered Species Act prohibits harm to any species of fauna or flora listed by the U. S. Fish and Wildlife Service (USFWS) as being either threatened or endangered. Such harm includes not only direct injury or mortality, but also disrupting the habitat on which these species depend. Currently there are several Federally and State listed species found within the park. Therefore, impacts to T&E species are analyzed in this EA.

Air Quality: The Federal 1970 Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect a park's air quality from adverse air pollution impacts. All types of fires generate smoke and particulate matter, which can impact air quality within the park and surrounding region. Air quality was an issue of concern brought up in several of the public scoping comments. In light of these considerations, air quality impacts are analyzed in this EA.

Visitor Use and Experience: The 1916 National Park Service Organic Act directs the Service to provide for public enjoyment of the scenery, wildlife and natural and historic resources of national parks "in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." Fire management activities can result in the temporary closure of certain areas and/or result in visual impacts that may

affect the visitor use and experience of the park. Therefore, potential impacts of the proposed FMP on visitor use and experience are addressed in this EA.

Cultural Resources: Section 106 of the National Historic Preservation Act of 1966, as amended, provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. Archeological and historical remains within the park represent evidence of man's efforts to use the natural resources. In more recent prehistoric and historic times the area now covered by the park was used by Cahuilla, Chemehuevi, Serrano, and Mojave people. Trails, important in the trade economy of these peoples, crossed the park. Archeological evidence of this more recent Native American use has been found in milling slicks in open areas and in rock shelters, although the largest single site is that of the late 19th century Indian village at the Twentynine Palms Oasis on the privately owned western portion. Cultural resource concerns and the traditional use of the park area by native peoples was brought up in public scoping.

Park Operations: Severe fires can potentially affect operations at national parks, especially in more developed sites like visitor centers, campgrounds, administrative and maintenance facilities. These impacts can occur directly from the threat to facilities of an approaching fire, and more indirectly from smoke and the diversion of personnel to firefighting. Fires have caused closures of facilities in parks around the country. Thus, the potential effects of the FMP alternatives on park operations will be considered in this EA.
Human Health and Safety: Wildland fires can be extremely hazardous, even life threatening, to humans, and current federal fire management policies emphasize that firefighter and public safety is the first priority; all fire management plans must reflect this commitment (NIFC, 1998). Because of the importance of this issue, human health and safety are addressed in this EA.

Wilderness: According to National Park Service Management Policies (2001), proposals having the potential to impact wilderness resources must be evaluated in accordance with National Park Service procedures for implementing the National Environmental Policy Act. Since over 580,000 acres of Joshua Tree National Park is designated wilderness, wilderness will be evaluated in this EA.

1.5.2 Impact Topics Considered but dropped from Further Analysis

NEPA and the CEQ Regulations direct agencies to "avoid useless bulk…and concentrate effort and attention on important issues" (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of proposed actions or projects have been judged to not be substantively affected by any of the FMP alternatives considered in this EA. These topics are listed and briefly described below, and the rationale provided for considering them, but dropping them from further analysis.

Soundscape: Noise is defined as unwanted sound. Fuels reduction, prescribed fires and fire suppression efforts can all involve the use of noise-generating mechanical tools and devices with engines, such as chain saws and trucks. Chainsaws, at close range, are quite loud (in excess of 100 decibels). The use of machines, such as chainsaws, would be infrequent in light of the limited hazard fuel reduction to be conducted in the park (on the

order of hours, days, or at most weeks per year). This is not frequent enough to substantially interfere with human activities in the area or with wildlife behavior. Nor would such infrequent bursts of noise chronically impact the solitude and tranquility associated with the park. Therefore, this impact topic is eliminated from further analysis in this EA.

Waste Management: None of the FMP alternatives would generate noteworthy quantities of either hazardous or solid wastes that need to be disposed of in hazardous waste or general sanitary landfills. Therefore, this impact topic is dropped from additional consideration.

Utilities: Generally speaking, some kinds of projects, especially those involving construction, may temporarily impact above and below-ground telephone, electrical, natural gas, water, and sewer lines and cables, potentially disrupting service to customers. Other proposed actions may exert a substantial, long-term demand on telephone, electrical, natural gas, water, and sewage infrastructure, sources, and service, thereby compromising existing service levels or causing a need for new facilities to be constructed. None of the FMP alternatives will cause any of these effects to any extent, and therefore utilities are eliminated from any additional analysis.

Land Use: Visitor and administrative facilities occur within the park. Fire management activities would not affect land uses within the park or in areas adjacent to it; therefore, land use is not included for further analysis in this EA.

Socio-economics: NEPA requires an analysis of impacts to the "human environment" which includes economic, social and demographic elements in the affected area. Fire management activities may bring a short-term need for additional personnel in the park, but this addition would be minimal and would not affect the neighboring community's overall population, income and employment base. Therefore, this impact topic is not included for further analysis in this EA.

Transportation: None of the FMP alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around the park. One exception to this general rule would be the temporary closure of nearby roads during fire suppression activities or from smoke emanating from wildland fires or prescribed fires. Over the long-term, such closures would not significantly impinge local traffic since they would be both very infrequent, and, in the case of prescribed fire, of short duration (on the magnitude of 1-2 hours). Therefore, this topic is dismissed from any further analysis.

Environmental Justice / Protection of Children: Presidential Executive Order 12898 requires Federal agencies to identify and address disproportionate impacts of their programs, policies and activities on minority and low-income populations. Executive Order 13045 requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency's

Environmental Justice Guidance; therefore, these topics are not further addressed in this EA.

Indian Trust Resources: Indian trust assets are owned by Native Americans but held in trust by the United States. Indian trust assets do not occur within Joshua Tree National Park and are therefore not evaluated further in this EA.

Prime and Unique Agricultural Lands: Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. There are no prime and unique agricultural lands found at Joshua Tree National Park; therefore, this impact topic is not evaluated further in this EA.

Resource Conservation, Including Energy, and Pollution Prevention: The National Park Service's *Guiding Principles of Sustainable Design* provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used such as resource conservation and recycling. Proposed project actions would not minimize or add to resource conservation or pollution prevention on the park and, therefore, this impact topic is not evaluated further in this EA.

Table 1-1 Impact Topics listed in the Joshua Tree National Park FMP EA

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Soils	Retained	NPS *Management Policies 2001*
Water Resources	Retained	Clean Water Act; Executive Order 12088; NPS *Management Policies*
Floodplains and Wetlands	Retained	Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; NPS *Management Policies*
Vegetation	Retained	Coastal Zone Management Act of 1972; NPS *Management Policies;* National Fire Plan
Wildlife	Retained	NPS *Management Policies*
Threatened and Endangered Species and their Habitats	Retained	Endangered Species Act; NPS *Management Policies*
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments of 1990; NPS *Management Policies*
Visitor Use and Experience	Retained	NPS *Management Policies*

Cultural Resources	**Retained**	**Section 106 of the National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; NPS *Management Policies***
Park Operations	**Retained**	**NPS *Management Policies***
Human Health & Safety	**Retained**	**NPS *Management Policies***
Wilderness	**Retained**	**The Wilderness Act; Director's Order #41; NPS *Management Policies***
Noise	**Dismissed**	**NPS *Management Policies***
Waste Management	**Dismissed**	**NPS *Management Policies***
Utilities	**Dismissed**	**NPS *Management Policies***
Land Use	**Dismissed**	**NPS *Management Policies***
Socioeconomics	**Dismissed**	**40 CFR Regulations for Implementing NEPA; NPS *Management Policies***
Transportation	**Dismissed**	**NPS *Management Policies***
Environmental Justice	**Dismissed**	**Executive Order 12898**
Indian Trust Resources	**Dismissed**	**Department of the Interior Secretarial Orders No. 3206 and No. 3175**
Prime and Unique Agricultural Lands	**Dismissed**	**Council on Environmental Quality 1980 memorandum on prime and unique farmlands**
Resource Conservation, Including Energy, and Pollution Prevention	**Dismissed**	**NEPA; NPS *Guiding Principles of Sustainable Design*; NPS *Management Policies***

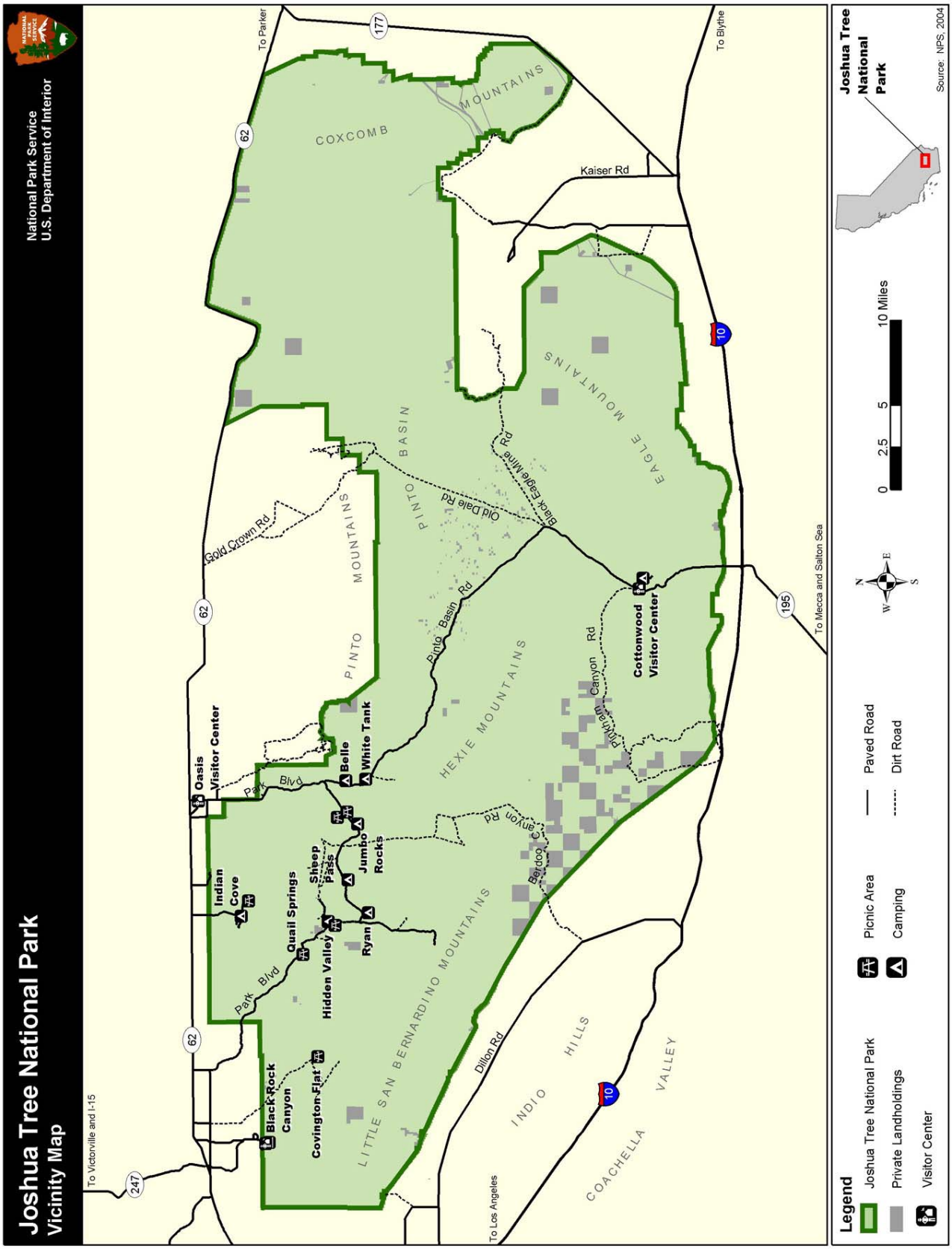

Figure 1-1 Joshua Tree National Park Vicinity

Chapter 2 - Issues and Alternatives

This Chapter describes the range of alternatives, including the Proposed Action and No Action Alternatives, formulated to address the purpose of and need for the proposed project. These alternatives were developed through evaluation of the comments provided by individuals, organizations, governmental agencies, and park specialists.

As this EA provides for a general, programmatic level of environmental impact analysis, separate from suppression activities, any future fuels management, prescribed burns or studies, wilderness fire management projects, or other fire-related activities proposed so as to implement the new fire program (and not specified in this EA) will first be subject to appropriate site- and project-specific environmental compliance (with opportunities for public comment).

2.1 Alternatives Considered But Not Analyzed Further in This EA

There were no alternatives that were developed during either internal or external scoping that contained fire management activities that were unreasonable.

2.2 Alternatives Considered and Analyzed in This EA

2.2.1 Alternative 1 (No Action Alternative) – Continue to Operate Under the Guidance of 1992 Fire Management Plan, Suppress Wildland Fires, Utilize Wildland and Prescribed Fire, and Manual/mechanical Reduction of Hazard Fuels.

Alternative 1, the No Action Alternative, is the continuation of the current management within the park. Under this alternative, the fire management program would utilize wildland fire suppression, wildland fire use, prescribed fire, and manual/mechanical hazard fuels reduction to achieve fire management objectives. Hazard fuels are defined at Joshua Tree National Park as non-native grasses such as red brome (*Bromus madritensis* subsp. *rubens*) and cheatgrass (*Bromus tectorum*). Blackbrush (*Coleogyne ramosissima*), however, is only considered a hazard fuel when it is found in high concentrations, and in areas where, in the event of a wildland fire, could endanger park structures or areas adjacent or within the wildland/urban interface. Areas of blackbrush considered to be hazard fuels would be reduced or eliminated by prescribed fire.

Fire Management Unit (FMU)

A FMU is any land management area definable by objectives, topographic features, access, values-to-be-protected, political boundaries, fuel types, or major fire regimes, etc., that sets it apart from management characteristics of an adjacent unit. FMUs are delineated in fire management plans (FMP). These units may have dominant management objectives and pre-selected strategies assigned to

Existing fire management units (FMUs) as designated in the Joshua Tree National Park 1992 Fire Management Plan, would remain within Joshua Tree National Park and would include wildland fire suppression zones, prescribed natural fire (naturally occurring wildland fire use zones), and resource restoration and hazard fuels reduction through the use of prescribed fire. Initial attack suppression actions would be taken on all human-caused wildland fires. Suppression actions would be taken on all escaped prescribed fires and lightning-caused fires that are within the suppression units. All wildland fire suppression activities would adhere to Minimum Impact Suppression Tactics (MIST) guidelines as outlined in Section 2.3 *Mitigation Measures and Monitoring*.

Under this alternative the park would be made up of three Fire Management Units (FMUs). Appropriate fire management policy within each FMU has been based upon terrain, vegetation, fire behavior/effects, accessibility, proximity to developed areas and local politics. Above all, the protection of human life and property is the greatest priority associated with each individual FMU management scheme.

The boundaries of FMU #1 (Suppression Unit) exist as administrative boundaries, two miles on the interior and one mile on the exterior side of the legislative boundary of Joshua Tree National Park, completely surrounding the Park. This narrow FMU contains approximately 354,560 acres (2/3 of which is in the Park) between the elevation extremes of 984 and 5,240 feet above mean sea level. All acreage within this FMU and inside the administrative park boundary is under the administrative jurisdiction of the NPS. The fire management objectives for FMU #1 in descending order of priority are:

- **Protect human life and property.**
- **Suppress all fire starts via Minimum Impact Suppression Tactics, including direct and/or indirect attack techniques, (*e.g.* use of natural fire breaks, changes in weather, physical barriers, lack of fuels, etc.), in the quickest most effective manner possible.**

FMU #2 (Prescribed Natural Fire Unit) occupies approximately 298,880 acres between the approximate elevation extremes of 1,080 and 5,516 feet above mean sea level. The exterior boundary of this unit coincides with the interior administrative boundary of FMU #1.The fire management objectives for FMU #2 in descending order of priority are:

- **Protect human life and property.**
- **Allow natural wildland fire to play its maximum role in influencing ecosystem dynamics of Joshua Tree National Park.**
- **As delicately as possible suppress, confine, or contain all known human caused fire. Also, suppress all starts which exceed Prescribed Natural Fire prescription.**

The acreage comprising FMU #3 (the Prescribed Fire Treatment Unit) is defined as a narrow band of park land in immediate proximity to the community of Yucca Valley, Black Rock housing development, and Quail Wash. It occupies approximately 8,960 acres between the

elevations of 3,600 and 4,842 feet above mean sea level and contains Mojave Mixed Steppe and Blackbrush Scrub fire groups. This area would normally be incorporated into FMU #1, however the fire management activities required here would differ from any other area in the park. The suppression strategies would be consistent with contain and control strategies of FMU #1. The need to incorporate prescribed fire treatments in FMU #3 is a result of the threat that hazardous fuel accumulations in this area now pose to urban encroachment upon the park. The fire management objectives for FMU #3 in descending order of priority are:

- **To protect human life and property.**
- **To suppress, contain, and/or control all wildland fires.**
- **Prescribe burn 10 acres/year with no more than 5 smoke-related complaints as a result of this activity.**
- **To use prescribed fire in a manner that effectively reduces or eliminates hazardous fuel threats to human life and property. This would be accomplished directly through the reduction of biomass or indirectly, through type converting Blackbrush and pinyon-juniper range to grass. The prescribed fire program would involve operations any time during the year, designed to prepare for and implement the program objectives. Any prescribed fire burning outside of its prescription will be immediately suppressed or contained.**
- **To develop a hazard fuel reduction prescription for Blackbrush**

2.2.2 Alternative 2 – Fire Management Plan to Include the Full Suppression of All Wildland Fires

Under this alternative, all wildland fires in the park, regardless of origin would be suppressed in a manner that minimizes adverse environmental and cultural impacts resulting from suppression activities. Examples of suppression tactics that might cause environmental harm include digging firelines within known or unknown cultural or ecologically sensitive areas and driving suppression vehicles off-road. Suppression would be accomplished through the use of confinement, containment, or control tactics and would adhere to minimum impact suppression tactics (MIST) guidelines as outlined in Section 2.3 *Mitigation Measures and Monitoring*. The concept of MIST is to use the least amount of forces necessary to effectively achieve the fire management protection objectives consistent with resource management objectives. It takes into account the impacts of suppression tactics and their long-term effects when determining how to implement an appropriate suppression response. Individual determinations would be dependent on the specific situation and circumstances of each fire (See Section 2.3, page 2-7, of this EA for specific minimum impact suppression tactics that would be considered for use at the park.).

Overall fire management objectives under this alternative would seek to limit fire spread and minimize acres affected by wildland fires, while ensuring public and firefighter safety, protecting the cultural, natural, and historic resources, and minimizing costs.

2.2.3 Alternative 3 (NPS Preferred Alternative) - Fire Management Plan to Include Wildland Fire Suppression, Manual/Mechanical Thinning to Maintain Defensible Space Around Structures, and Research Burns

Under this alternative, the fire management plan would suppress all wildland fires, conduct research burns, and provide for manual/mechanical hazard fuel reduction treatments only for the purpose of maintaining defensible space around structures. (Defensible space is defined as the area around a structure that can be treated in such a way as to reduce the chance of wildland fire reaching the structure.) All wildland fire suppression activities would be conducted in the same manner as in Alternative 2.

Hazard fuels reduction treatment areas would consist of manual/mechanical thinning up to a maximum distance of 100 feet around structures. Treatment would be accomplished through weed whacking and trimming of vegetation. There would be no ground disturbance, no removal of roots or burls and no use of pesticides. Manual/mechanical thinning is expected to be carried out in "wet" rain years, when there has been extensive plant growth. In "dry" rain years, it is expected that little vegetation growth would occur and no thinning or removal of vegetation would be required.

Joshua Tree National Park would be managed as a single fire management unit (FMU) with two types of fire protection areas (FPAs) identified within the FMU (research and mechanical hazard fuel removal). Joshua Tree National Park FPAs are differentiated by management objectives, fuels, political boundaries, and values-to-be-protected.

Under this alternative, minimal research burns may be conducted to further understanding of the relationship between wildland fires, native, non-native vegetation and the desert ecosystem. As part of a larger study, the Western Ecological Research Center of the USGS proposes to conduct research burns (totaling 40 acres) at two study sites within the park to represent possible regional variation and to provide information for localized areas where fires are a recognized problem for land managers. Both sites would be located in areas containing blackbrush scrub and invasive annual grassland. Blackbrush scrub will include emergent Joshua tree, (*Yucca brevifolia)* and California or Utah juniper, (*Juniperus californica* or *Juniperus osteosperma)* with invasive annual grasses in the interspaces between shrubs. The sites were selected because they contain the necessary vegetation, are on a gentle slope, are accessible from existing roads, and would not be visible to visitors traveling the main roads in the area (See Figure 2.2).

Using hand tools such as shovels, McClouds and Pulaskis, the fireline is proposed to be three-feet wide and would surround the burn sites. Fireline would involve the physical removal of organic material above ground. A blackline would also be created that surrounds the burn sites, and could be as wide as 30 feet. Blacklines would be created using fire to remove above ground organic material. Water and/or foam would be used to wet

down fuels surrounding the plots. This would prevent the experimental fires from escaping and becoming wildfires. Fire personnel would write the burn plan and conduct the fires.

The first research fire treatments would be applied in spring and summer 2005 or 2006, generally between May and September. Timing will depend on weather, burn indices, and other conditions described in the burn plan for the site. Seasonal fire treatment plots would be burned during the same or consecutive days in the blackbrush and invasive annual grassland portions of each site. A burn plan would be prepared in accordance with NPS standards prior to ignition. Sufficient fire suppression resources would be on-site to monitor the burn and to prevent escape of the fire into the surrounding area. Each fire would be allowed to extinguish naturally on its own within each treatment plot, but the spread of fire outside of the plots would be prevented by fire crews using hand tools, water, or foam at the discretion of the burn boss.

All research fire operations would be conducted in accordance with National Park Service Fire Policy and all pertinent rules and regulations. Firefighter and civilian safety is the number one priority. Burns would be coordinated with air quality regulators of the Mojave Air Quality Management District in order to ensure that air quality thresholds are not exceeded. Local fire and government officials and affected local communities would be notified of planned operations in advance of ignition to avoid unnecessary public reaction to smoke columns. Research Schedule: Dates are subject to change depending on weather and site conditions. Continued drought could result in only portions of the study being completed at either of the two study sites.

2.2.4 Actions Common to All Alternatives

The presence of designated wilderness areas places some constraints on actions that may be taken under any of the alternatives. During wildland fire suppression, protection of human life remains of paramount concern. However, wilderness considerations must be integrated into the decision-making process, and will determine the most appropriate management strategies for wildland fire management (NPS, 1999b). Wilderness values take precedence over cost and convenience when making these decisions.

The minimum requirement concept is used for making the determination of the most appropriate fire management strategies. This applies to actions under the No Action, as well as the two action alternatives. The minimum requirement concept is a two-step process:

> **(1) A determination as to whether or not a proposed management action is appropriate or necessary for the administration of the areas as wilderness, and does not pose a significant impact to the wilderness resources and character; and,**
>
> **(2) If the project is appropriate or necessary in wilderness, the selection of the management method (tool) that causes the least amount of impact to the physical resources and experiential qualities (character) of wilderness (NPS, 1999b).**

Additionally, the minimum tool would apply under all three alternatives. The minimum tool means

> **a use or activity, determined to be necessary to accomplish an essential task, which makes use of the least intrusive tool, equipment, device, force, regulation, or practice that will achieve the wilderness management objective. This is not necessarily the same as the term "primitive tool," which refers to the actual equipment or methods that make use of the simplest available technology (i.e., hand tools) (NPS, 1999b).**

While the minimum requirement and minimum tool place constraints on park actions, they also allow managers the flexibility to use the appropriate tool for the job. The use of generally prohibited activities or uses listed in Section 4(c) of the Wilderness Act may be authorized by park managers if they are deemed necessary to meet the minimum requirements for the administration of the area as wilderness and where those methods are determined to be the 'minimum tool' for the project (NPS, n.d). Thus while some situations may call for the use of hand tools only, others may allow for the use of mechanized equipment or power tools, in order to protect firefighter/public safety and/or to suppress damaging fires as quickly as possible.

Individual minimum tool determinations would be included in future NEPA compliance documents for fire management projects not specifically covered by this programmatic EA.

2.2.5 Environmentally Preferred Alternative

The National Park Service is required to identify the environmentally preferred alternative(s) for any of its proposed projects. That alternative is the alternative that will promote the national environmental policy expressed in NEPA (Section 101 (b)). This includes alternatives that:

1) **fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;**

2) **ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;**

3) **attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;**

4) **preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;**

5) **achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and**

6) **enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.**

In essence, the environmentally preferred alternative would be the one(s) that "causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (CEQ, 1978).

In this case, Alternative 3 is the environmentally preferred alternative for Joshua Tree National Park since it best meets goals 1, 2, 3, and 4 described above. Under this alternative, suppressing wildland fires and creating defensible space around park structures would help protect park resources and adjacent lands and structures from the threat of wildland fires. Conducting research burns would provide future knowledge on how wildland fire affects both native and non-native vegetation in the park. This knowledge will prove essential in future fire management planning. Alternative 1 is not the environmentally preferred alternative because use of wildland fire and prescribed fire may not afford enough protection to park resources nor address public concerns about escaped fire. Alternative 2 is not the environmentally preferred alternative because it lacks the benefit of providing important data on wildland fire effects. Alternative 3 best protects and helps preserve the historic, cultural, and natural resources in the park for current and future generations.

2.3 MONITORING AND MITIGATION MEASURES

The National Park Service will collect information on fuel reduction efforts, vegetative resources, and other objective-dependant variables after a fire. During prescribed fire research events, data will be collected regarding the current fire conditions such as fuel and vegetation type, anticipated fire behavior and fire spread, current and forecasted weather, smoke volume and dispersal. In addition, researchers will conduct long-term monitoring of the research areas to determine the long-term affects of fire on native and non-native vegetation.

Mitigation measures are prescribed to prevent and/or mitigate adverse environmental impacts that may occur from fire management activities.

2.3.1 Fire Management Activities

- **All suppression activities will follow Minimum Impact Suppression Tactics (MIST) guidelines. These include:**
  - **Keep fire engines or slip-on units on existing roads whenever possible; in the event that a vehicle would need to go off-road, fire personnel will walk in front of the vehicle to ensure no wildlife or cultural resources would be killed or damaged. This would only be done with approval of the superintendent for both wilderness and non-wilderness areas.**
  - **The use of heavy equipment such as bulldozers for constructing firelines would only be considered with the authorization of the superintendent or designee;**
  - **Use existing natural fuel breaks and human-made barriers, wet line, or cold trailing the fire edge in lieu of handline construction whenever possible (cold trailing is 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);
- **Keep fireline widths as narrow as possible when they must be constructed;**
- **Avoid ground disturbance within known natural and cultural resource locations.**
- **Use soaker hose, sprinklers or foggers in mop-up; avoid boring and hydraulic action;**
- **Minimize tree-cutting;**
- **All suppression actions will utilize the appropriate management response derived from the fire management objectives and developed in cooperation with the local fire response agencies;**
- **Protect air and water quality by complying with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements.**

- **In the rare case where handline construction might take place, erosion control methods would be used on slopes exceeding 10%;**

- **All sites where soil has been disturbed as a result of suppression activities will be rehabilitated to pre-fire conditions, to the greatest extent practicable.**

2.3.2 Air, Soil, and Water Quality (Including Floodplains)

- **The park will comply with the Clean Air Act, the Clean Water Act, and all other applicable federal, state, and local laws and requirements. Additionally:**

  - **The suppression response selected to manage a wildland fire will consider air quality standards.**
  - **Fire weather forecasts will be used to correlate prescribed fire research burn ignitions with periods of optimal combustion and smoke dispersal. Any smoke situation that arises and threatens any smoke-sensitive areas will entail immediate suppression action.**
  - **All sites where hazard fuel treatment work creates soil disturbance would be rehabilitated to pre-disturbance conditions, to the extent practicable.**
  - **Areas denuded of vegetation would be treated with standard erosion control techniques.**

2.3.3 Property

- **Park infrastructure, any other development, and adjacent non-agency land will be protected to the greatest extent feasible and appropriate during all fire management activities.**

2.3.4 Firefighter and Public Safety

- **Human health and safety: Firefighter and public safety is the highest priority in every fire management activity. In light of this:**

- **Only fully qualified personnel will be assigned fire management duties (unless assigned as trainees, in which case they will be closely supervised by an individual fully qualified for the given position).**
- **No fire management operation will be initiated until all personnel involved have received a safety briefing describing known hazards and mitigating actions, current fire season conditions, and current and predicted fire weather and behavior.**
- **Employee education and public outreach programs would emphasis actions and activities that increase firefighter and public safety.**
- **The park superintendent or designee may, as a safety precaution, temporarily close all or part of the park to the visiting public.**
- **Smoke on roadways will be monitored and traffic control provisions taken, in cooperation with local law enforcement agencies to ensure motorist safety during fire events at the park. The following procedures will be taken to compensate for reduced visibility when a paved road is affected by smoke (the incident commander or prescribed fire boss on a particular event will determine visibility levels):**
  - **Posting of "Smoke on Road" signs on either side of the affected area. Reducing the posted speed limit when visibility is strongly reduced and escorting vehicles as necessary.**
  - **Closing the road to traffic when visibility is severely reduced.**

2.3.5 Natural and Cultural Resources

- **During all suppression activities, the appropriate management response and Minimum Impact Suppression Tactics (MIST) guidelines (see Section 2.3.1) would be incorporated to the greatest extent feasible.**

- **Written prescriptions for all hazard fuel treatment activities for defensible space around structures, and research activities, would be developed by the park's fire management staff. All prescriptions would be reviewed and approved by the park's natural and cultural resource specialists prior to any treatment activities.**

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2.5 COMPARISON OF ALTERNATIVES

Table 2-2 briefly summarizes the environmental effects of the various alternatives. It provides a quick comparison of how well the alternatives respond to the project need, objectives, important issues and impact topics. Chapter 3 discusses the environmental consequences of the proposed alternatives in detail.

Table 2-2 Comparisons of Alternatives

	Alternative 1 – "No Action" Alternative: 1992 FMP, Wildland Fire Suppression, Prescribed and Prescribed Natural Fire Use, Hazard Fuels Reduction	Alternative 2 – Wildland Fire Suppression Only	Alternative 3 – The "NPS Preferred" Alternative - Wildland Fire Suppression, Research Burns, Hazard Fuels Reduction
Impact Topics			
Soils	Negligible to minor short-term soil erosion impacts resulting from fire suppression activities; minor short-term soil erosion impacts from prescribed fire activities; benefits to soil development and soil nutrification; minor adverse impacts to cryptobiotic soil crust resulting from fire management activities.	Negligible to minor short-term soil erosion impacts resulting from fire suppression activities	Negligible to minor short-term soil erosion impacts resulting from fire suppression activities; negligible to minor short-term soil erosion impacts from conducting research burns; benefits to soil development and soil nutrification; minor adverse impacts to cryptobiotic soil crust resulting from fire management activities; no adverse impacts from manual/mechanical thinning to maintain defensible space.
Water Resources (including wetlands and floodplains)	Negligible to minor indirect adverse water resources impacts from runoff resulting from wildland fire suppression and wildland and prescribed fire use	Negligible to minor indirect adverse water resources impacts from runoff resulting from wildland fire suppression	Negligible to minor indirect adverse water resources impacts from runoff resulting from wildland fire suppression; no impacts resulting from conducting research burns or manual/mechanical thinning.
Vegetation (including T&E species)	Minor direct adverse impacts from wildland fire suppression and wildland and prescribed fire use; Minor to moderate short-term to long-term impacts to native vegetative communities from wildland and prescribed fire; increased spread of non-native vegetation; possible beneficial impacts from soil development and soil nutrification from fire use; beneficial impacts to native vegetation as invasive exotics are removed in Adaptive Management Area; potential for the spread of invasive exotics on those areas where fire management activities caused soil	Minor direct adverse impacts from wildland fire suppression.	Minor direct adverse impacts from wildland fire suppression; minor short-term to long-term adverse impacts to vegetation as a result of research burns; potential for the spread of invasive exotics on those areas where fire management activities caused soil disturbance; negligible adverse impacts from manual/mechanical thinning around structures; moderate long-term impact to T&E species.

Table 2-2 Comparisons of Alternatives

	Alternative 1 – "No Action" Alternative: 1992 FMP, Wildland Fire Suppression, Prescribed and Prescribed Natural Fire Use, Hazard Fuels Reduction	Alternative 2 – Wildland Fire Suppression Only	Alternative 3 – The "NPS Preferred" Alternative - Wildland Fire Suppression, Research Burns, Hazard Fuels Reduction
	disturbance.		
Wildlife (including T&E Species)	Wildland fire suppression activities and wildland and prescribed fire use would temporarily displace some wildlife species; individual mortality of some species likely; not likely to adversely affect federal and/or state T&E species.	Wildland fire suppression activities would temporarily displace some wildlife species; individual mortality of some species likely; not likely to adversely affect federal and/or state T&E species.	Wildland fire suppression activities and conducting 40-acres of research burns would temporarily displace some wildlife species; individual mortality of some species likely; likely to have minimal to moderate adverse effect on federal and/or state T&E species; negligible adverse impacts to wildlife as a result of manual/mechanical thinning around structures.
Wilderness	Wildland fire suppression activities and prescribed natural fire use would have short to long-term minor to moderate impacts to areas designated as wilderness; minimum requirement would help minimize impacts from suppression activities; noise generated from wildland fire suppression activities would have short-term minor impacts to the wilderness character.	Wildland fire suppression activities would have short to long-term minor to moderate impacts to areas designated as wilderness; minimum requirement would help minimize impacts from suppression activities; noise generated from wildland fire suppression activities would have short-term minor impacts to the wilderness character.	Wildland fire suppression activities use would have short to long-term minor to moderate impacts to areas designated as wilderness; minimum requirement would help minimize impacts from suppression activities; noise generated from wildland fire suppression activities would have short-term minor impacts to the wilderness character.
Air Quality	Negligible to minor short-term adverse impacts to air quality resulting from wildland fire suppression activities and wildland and prescribed fire use.	Negligible to minor short-term adverse impacts to air quality resulting from wildland fire suppression activities.	Negligible to minor short-term adverse impacts to air quality resulting from wildland fire suppression activities and conducting research burns.

Table 2-2 Comparisons of Alternatives

	Alternative 1 – "No Action" Alternative: 1992 FMP, Wildland Fire Suppression, Prescribed and Prescribed Natural Fire Use, Hazard Fuels Reduction	Alternative 2 – Wildland Fire Suppression Only	Alternative 3 – The "NPS Preferred" Alternative - Wildland Fire Suppression, Research Burns, Hazard Fuels Reduction
Visitor Use and Experience	**Wildland fire suppression and prescribed fire use may cause short-term minor impacts to individual visitor use and experiences from fire crews in scenic vistas, appearance of aircraft retardant lines, reduction in scenic integrity, noise from aircraft, pumps, chainsaws and other power equipment, temporary closures of roads, trails and campgrounds, and smoke.**	**Wildland fire suppression may cause short-term minor impacts to individual visitor use and experiences from fire crews in scenic vistas, appearance of aircraft retardant lines, reduction in scenic integrity, noise from aircraft, pumps, chainsaws and other power equipment, temporary closures of roads, trails and campgrounds, and smoke.**	**Wildland fire suppression and conducting research burns would cause short-term minor impacts to individual visitor use and experiences from fire crews in scenic vistas, appearance of aircraft retardant lines, reduction in scenic integrity, noise from aircraft, pumps, chainsaws and other power equipment, temporary closures of roads, trails and campgrounds, and smoke; manual/mechanical thinning of hazard fuels would have negligible, short-term, adverse impacts on visitor use and experience from noise from mowers and weed whackers, and the presence of work crews.**
Park Operations	**Minor to moderate adverse impacts to park operations from a wildland fire occurring within the park. Wildland fire suppression activities would help reduce those impacts, however, suppression tactics could result in the short-term adverse minor impacts of temporarily closing the park to the public.**	**Minor to moderate adverse impacts to park operations from a wildland fire occurring within the park. Wildland fire suppression activities would help reduce those impacts, however, suppression tactics could result in the short-term adverse minor impacts of temporarily closing the park to the public.**	**Minor to moderate adverse impacts to park operations from a wildland fire occurring within the park. Wildland fire suppression activities would help reduce those impacts, however, suppression tactics could result in the short-term adverse minor impact of temporarily closing the park to the public. Long-term beneficial impacts of manual/mechanical to protect park structures.**
Health and Human Safety	**Potential for injury to workers from wildland fire suppression, and wildland and prescribed fire use; very minor exposure to smoke by workers and the public during prescribed fire activities.**	**Potential for injury to workers from wildland fire suppression; potential for minor exposure to smoke by workers and the public during prescribed fire activities.**	**Potential for injury to workers from wildland fire suppression, and wildland and conducting research burns; minor exposure to smoke by workers and the public during prescribed fire activities; slight potential for injury in hazard fuels reduction activities.**

Table 2-2 Comparisons of Alternatives

	Alternative 1 – "No Action" Alternative: 1992 FMP, Wildland Fire Suppression, Prescribed and Prescribed Natural Fire Use, Hazard Fuels Reduction	Alternative 2 – Wildland Fire Suppression Only	Alternative 3 – The "NPS Preferred" Alternative - Wildland Fire Suppression, Research Burns, Hazard Fuels Reduction
Cultural Resources	No impacts or minor adverse impacts to known cultural landscapes; potential for impacts to un-recorded sites; mitigations would lessen impacts from wildland fire suppression tactics to cultural resources.	Negligible to minor short-term adverse impacts to known cultural landscapes; potential for impacts to un-recorded sites; beneficial effects from protecting cultural resources from wildland fire.	Negligible to minor short-term adverse impacts to known cultural landscapes; potential for impacts to recorded and unrecorded sites; beneficial effects from protecting cultural resources from wildland fire.

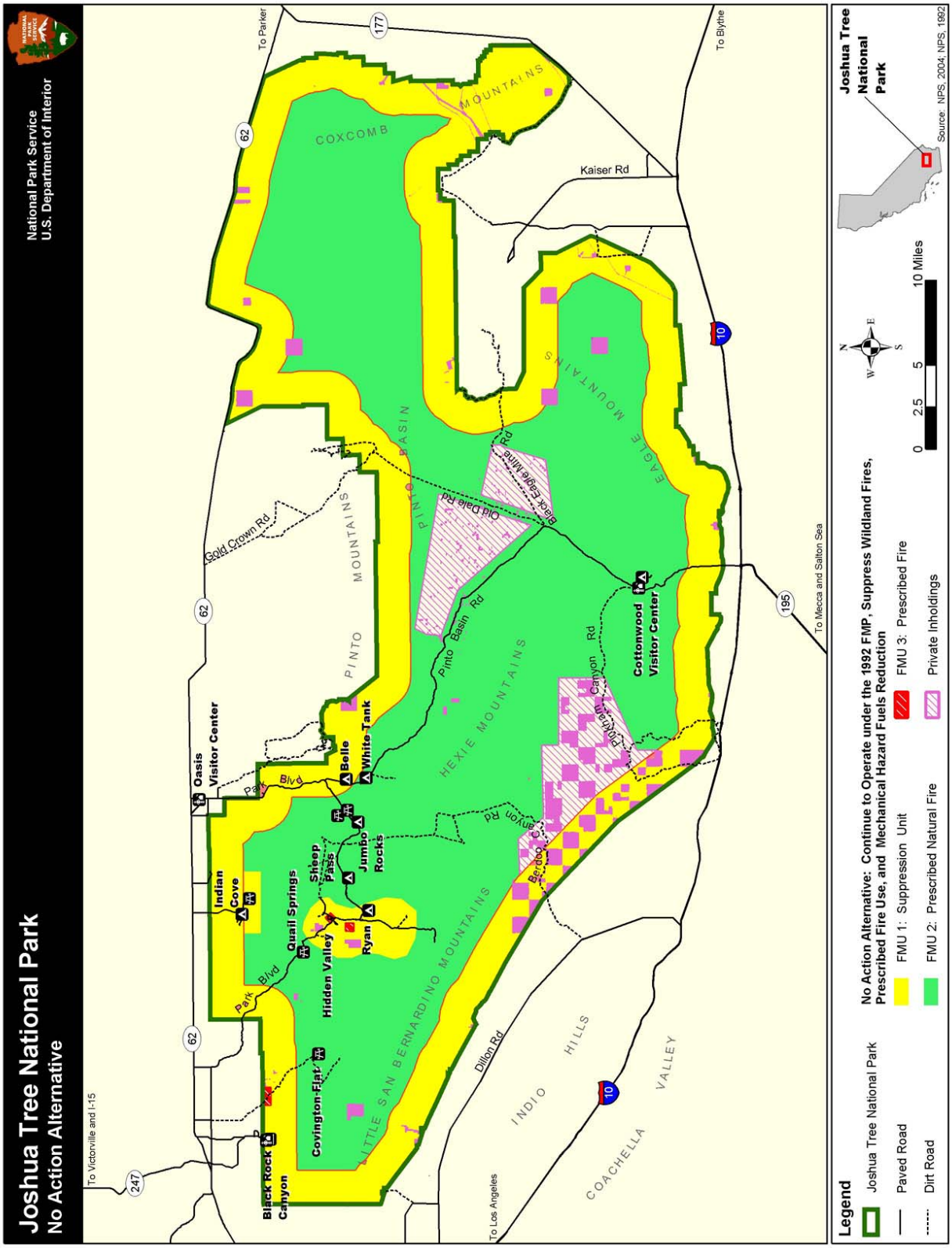

Figure 2-1 Joshua Tree National Park "No Action" Alternative

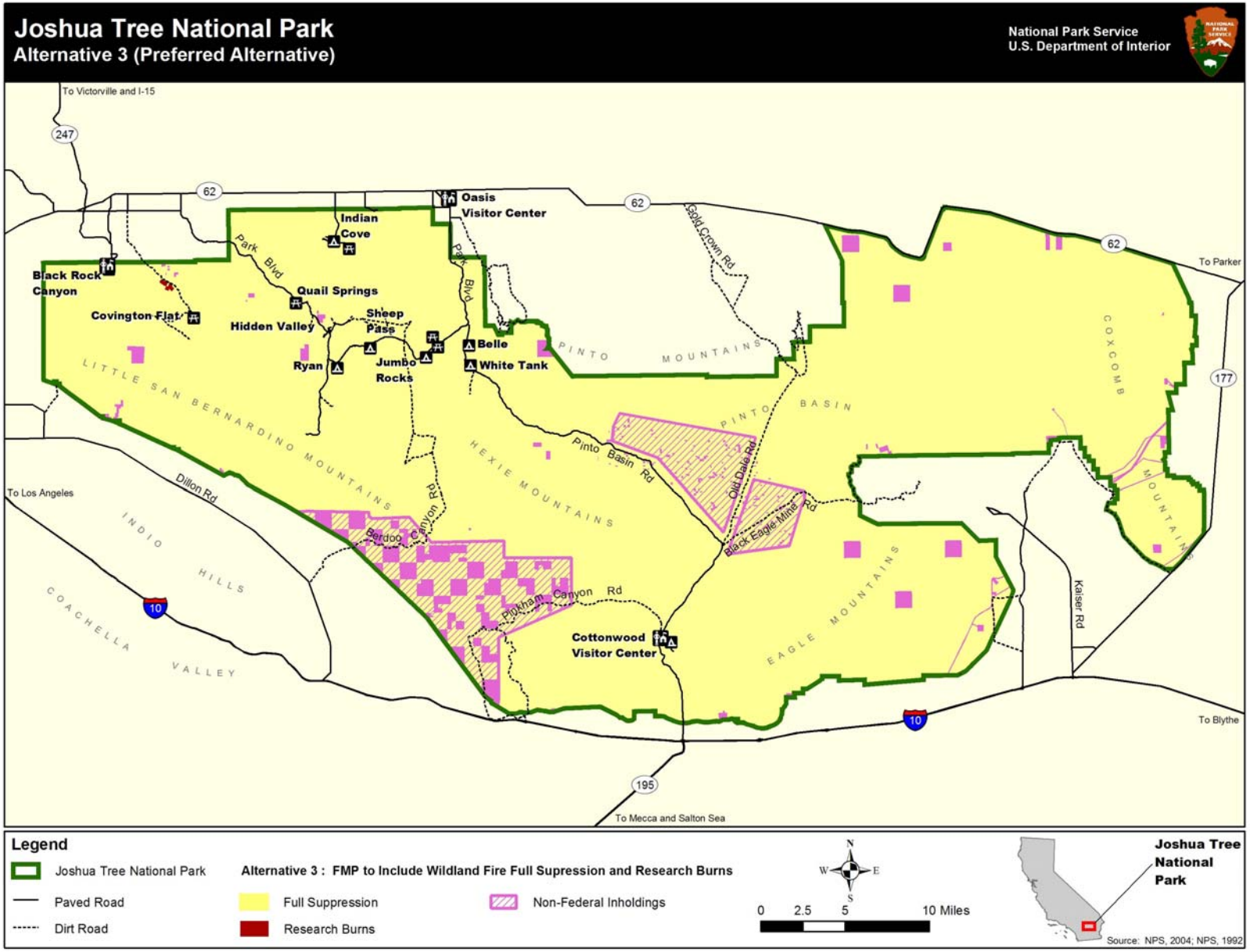

Figure 2-2 Joshua Tree National Park Alternative 2 and "NPS Preferred" Alternative

Chapter 3 – Environmental Analysis

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the action, the No-Action, or a third alternative. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided.

3.1 IMPACT DEFINITIONS

Table 3-1 depicts the impact definitions used in this Environmental Assessment. Significant impact thresholds for the various key resources were determined in light of compliance with existing state and federal laws, and compliance with existing Joshua Tree National Park planning documents.

Table 3-1 Impact Definitions

Resources	"Negligible" Impact	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
Soils	Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long- term effects to soils would occur.	The beneficial/adverse effects to soils would be detectable, but likely short-term. Damage to or loss of the litter/humus layers that causes slight localized increases in soil loss from erosion; effects to soil productivity or fertility would be small, as would the area affected; short-term and localized compaction of soils that does not prohibit re-vegetation; if mitigation were needed to offset adverse effects, it would be relatively simple to implement and likely successful.	The beneficial/adverse effects on soil productivity or fertility would be readily apparent, long-term, and result in a change to the soil character over a relatively wide area; fire severe enough to cause a noticeable change in soil community; intermittent areas of surface sterilization of soils that may cause some long-term loss of soil productivity that may alter a portion of the vegetation community; short-to long-term and localized compaction of soils that may prohibit some re-vegetation; mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The beneficial/adverse effects on soil productivity or fertility would be readily apparent, long-term, and substantially change the character of the soils over a large area in and out of the park. Damage to or loss of the litter/humus layers that would increase soil loss from erosion on a substantial portion of the burn area; fire severe enough to cause substantial damage to the soil community; substantial surface sterilization of soils that may cause long-term loss of soil productivity and that may alter or destroy the vegetation community over most of the burned area; long-term and widespread soil compaction that affects a large number of acres and prohibits re-vegetation; mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.	<u>Short-Term</u> Recovers in less than 3 years <u>Long-Term</u> Takes more than 3 years to recover

Table 3-1 Impact Definitions

Resources	"Negligible" Impact	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
Water Resources	Neither water quality nor hydrology would be affected, or changes would be either non-detectable or if detected, would have effects that would be considered slight, local, and short-term.	Adverse changes in water quality would be measurable, although small, likely short-term, indirect, and localized; localized and indirect riparian impacts that do not substantively increase stream temperatures or affect stream habitats; no alteration of natural hydrology of wetlands; A U.S. Army Corps of Engineers 404 permit would not be required; no filling or disconnecting of the floodplain; short-term impacts that do not affect the functionality of the floodplain; no mitigation measure associated with water quality would be necessary.	Adverse changes in water quality would be measurable and long-term but would be relatively local, direct and/or indirect; localized and indirect riparian impacts that may slightly increase stream temperatures or affect stream habitats; alteration of natural hydrology of wetlands would be apparent such that an U.S. Army Corps of Engineers 404 permit could be required; alteration of the floodplain apparent; wetland or floodplain functions would not be affected in the long-term; mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.	Adverse changes in water quality would be readily measurable, would have substantial consequences, direct and/or indirect, and would be noticed on a regional scale; localized and indirect riparian impact that may substantively increase stream temperatures or affect stream habitats; effects to wetlands or floodplains would be observable over a relatively large area and would be long-term, and would require a U.S. Army Corps of Engineers 404 permit; filling or disconnecting of the floodplain; long-term impacts that affect the functionality of the floodplain; mitigation measures would be necessary and their success would not be guaranteed.	Short-Term Recovers in less than 1 year Long-Term Takes more than 1 year to recover
Vegetation	No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be short- term, on a small scale, and no species of special concern would be affected.	Beneficial/adverse short-term direct effects to some individual native plants and would also affect a relatively small portion of that species' population; short-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; increase in invasive species in limited locations; occasional death of a canopy tree; mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.	The beneficial/adverse effects on some individual native plants along with a sizeable segment of the species' population in the long-term and over a relatively large area; long-term changes in plant species composition and/or structure, consistent with expected successional pathways of a given plant community from a natural disturbance event; increases in invasive species do not jeopardize the overall native plant communities; repeated death of canopy trees; mitigation to offset adverse effects could be extensive, but would likely be successful; some species of special concern could also be affected.	Considerable beneficial/adverse long-term direct effects on native plant populations, including species of special concern, and affect a relatively large area in and out of the park; violation of the Endangered Species Act of 1973; widespread increase in invasive species that jeopardizes native plant communities; mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.	Short-Term Recovers in less than 3 years Long-Term Takes more than 3 years to recover

Table 3-1 Impact Definitions

Resources	"Negligible" Impact	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
Wildlife/ Threatened and Endangered Species	There would be no observable or measurable impacts to native fish and wildlife species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within the range of natural fluctuations. No federally listed species would be affected or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Negligible effect would equate with a "no effect" determination in U.S. Fish and Wildlife Service terms.	Temporary displacement of a few localized individuals or groups of animals; mortality of individuals of species not afforded special protection by state and/or federal law; mortality of individuals that would not impact population trends; mitigation measures, if needed to offset adverse effects, would be simple and successful. The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. Minor effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement "likely..." or "not likely to adversely affect" the species.	Beneficial/adverse direct and indirect effects to wildlife would be readily detectable, long-term and localized, with consequences affecting the population level(s) of specie(s); mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. An individual or population of a listed species, or its critical habitat would be noticeably affected. The effect could have some long- term consequence to the individual, population, or habitat. Moderate effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species.	Beneficial/adverse direct and indirect effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region; violation of the Endangered Species Act of 1973; mortality of a number of individuals that subsequently jeopardizes the viability of the resident population; extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed. An individual or population of a listed species, or its critical habitat, would be noticeably affected with a long- term, vital consequence to the individual, population, or habitat. Major effect would equate with a "may effect" determination in U.S. Fish and Wildlife Service terms and would be accompanied by a statement of "likely..." or "not likely to adversely affect" the species or critical habitat.	<u>Short-Term</u> Recovers in less than 3 years <u>Long-Term</u> Takes 3 or more years

Table 3-1 Impact Definitions

Resources	"Negligible" Impact	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
Air Quality Class I	No changes would occur or changes in air quality would be below or at the level of detection, and if detected, would have effects that would be considered slight and short-term.	Adverse changes in air quality would be measurable, although the changes would be small, short-term, and the effects would be localized; temporary and limited smoke exposure to sensitive resources; no air quality mitigation measures would be necessary.	Adverse changes in air quality would be measurable, would have consequences, although the effect would be relatively local; all air quality standards still met; short-term exposure to sensitive resources; air quality mitigation measures would be necessary and the measures would likely be successful.	Adverse changes in air quality would be measurable, would have substantial consequences, and be noticed regionally; violation of state and federal air quality standards; violation of Class II air quality standards; prolonged smoke exposure to sensitive receptors; air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.	Short-Term Recovers in 7 days or less Long-Term Takes more than 7 days to recover

Table 3-1 Impact Definitions

Resources	"Negligible" Impact	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
Visitor Use & Experience	Visitors would be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative.	Temporary displacement of recreationists or closure of trails, and recreation areas during off-peak recreation use; temporary or short-term alteration of the vista, or temporary presence of equipment in localized area; smoke accumulation during off-peak recreation use. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.	Beneficial/adverse direct changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely express an opinion about the changes.	Permanent closure of trails and recreation areas; conflict with peak recreation use; long-term change in scenic integrity of the vista; substantive smoke accumulation during peak recreation use. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.	Short-Term Occurs only during the treatment effect Long-Term Occurs after the treatment effect
Human Health & Safety	Human health and safety would not be affected, or the effects would be at low levels of detection and would have an appreciable effect on human health and safety.	The effects would be detectable and short-term, but would not have an appreciable effect on public health and safety; potential for small injuries to any worker or visitor (e.g. scrapes or bruises); limited exposure to hazardous compounds or smoke particulates at concentrations below health-based levels; if mitigation were needed, it would be relatively simple and likely successful.	The effects would be readily apparent and long-term, and would result in substantial, noticeable effects to public health and safety on a local scale; non-life threatening injuries to any worker or visitor; limited exposure to hazardous compounds or smoke particulates at concentrations at or slightly above health-based levels; mitigation measures would probably be necessary and would likely be successful.	The effects would be readily apparent and long-term, and would result in substantial noticeable effects to public health and safety on a regional scale; serious life-threatening injuries to any worker or member of the public; limited or prolonged exposure to hazardous compounds or smoke particulates at concentrations well above health-based levels; extensive mitigation measures would be needed, and their success would not be guaranteed.	Short-Term Occurs only during the treatment effect Long-Term Occurs after the treatment effect
Cultural Resources	Impact is at the lowest levels of detection - barely measurable with any perceptible consequences, either adverse or beneficial, to cultural resources. For purposes of 106, the determination	For archeological resources, the impact affects an archeological site(s) with modest data potential and no significant ties to a living community's cultural identity; temporary, non-adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural	For archeological resources, the impact affects an archeological site(s) with high data potential and no significant ties to a living community's cultural identity; temporary adverse effects to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and traditional cultural properties, but would not	For archeological resources, the impact affects an archeological site(s) with exceptional data potential or that has significant ties to a living community's cultural identity; long-term adverse impacts to registered cultural resource sites, eligible cultural resource sites, sites with an undetermined eligibility, and	Short-Term Treatment effects on the natural elements of a cultural landscape (e.g., three to five years until new vegetation returns). Long-Term

Table 3-1 Impact Definitions

Resources	"Negligible" Impact	"Minor" Impact	"Moderate" Impact	"Major" Impact	Duration
	of effect would be no adverse effect.	properties; no effect to the character defining features of a National Register of Historic Places eligible or listed structure, district, or cultural landscape. For purposes of 106, the determination of effect would be no adverse effect.	diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized. For purposes of 106, the determination of effect would be adverse.	traditional cultural properties that would diminish the integrity of the cultural resource to the extent that its National Register eligibility is jeopardized. For purposes of 106, the determination of effect would be adverse.	Because most cultural resources are non-renewable, any effects would be long-term.
Park Operations	Park operations would not be affected or the effect would be at or below the lower levels of detection, and would not have an appreciable effect on park operations.	The beneficial/adverse direct and indirect effects would be detectable and likely short-term, but would be of a magnitude that would not have an appreciable effect on park operations; short-term suspension of non-critical park operations; negligible impact to park buildings and structures; if mitigation were needed to offset adverse effects, it would be relatively simple and likely successful.	The beneficial/adverse effects would be readily apparent, be long-term, and would result in a substantial change in park operations in a manner noticeable to staff and the public; long-term suspension of all park operations (1 to 2 days); detectable adverse impacts to park buildings and structures; mitigation measures would probably be necessary to offset adverse effects and would likely be successful.	The beneficial/adverse effects would be readily apparent, long-term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations; prolonged suspension of all park operations; substantial adverse impacts to park buildings and structures; mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.	Short-Term Effects lasting for the duration of the treatment action Long-Term Effects lasting longer than the duration of the treatment action.
Wilderness	A change in the wilderness character could occur, but it would be so small that it would not be of any measurable or perceptible consequence.	A change in the wilderness character and associated values would occur, but it would be small and, if measurable, would be highly localized.	A change in wilderness character and associated values would occur. It would be measurable, but localized.	A noticeable change in the wilderness character and associated values would occur. It would be measurable, and would have a substantial or possibly permanent consequence.	Short-Term Recovers in less than one year Long-Term Takes more than one year to recover.

3.2 SOILS

3.2.1 Affected Environment

Throughout the park, most soils are poorly developed. The eastern half is mostly alluvial deposits with no true soil structure. This granitic fill ranges from boulder size through gravels and coarse sand. These are modern deposits consisting of fan gravels and other alluvium being deposited by present drainage systems (NPS, 1994).

The prevailing winds of the Mojave Desert are from the west. Much of the wind blown sand, picked up in the open expanses, is carried eastward and deposited in sheets and dunes. The Pinto Basin has extensive sand deposits but few well-developed dune systems. The only real soil formation exists in the large basins of the Covington Flats. Granitic in origin, this area does have poorly developed soil horizons (NPS, 1994).

Throughout the Mojave Desert and also within Joshua Tree National Park, soil surfaces are often populated by biological crusts. These crusts, known as cryptobiotic soil crusts, are made up of non-vascular plants and microbes including lichens, mosses, and cyanobacteria (DOI, 2001c). These organisms play a major role in soil stabilization. In addition, these crusts also play a role in moderating fire frequency and intensity. Native plants found within Joshua Tree National Park are naturally widely spaced, and do not allow wildland fires to spread far under normal conditions. Biological crusts that occupy these open spaces hinder the establishment of non-native plant species, such as red brome and cheatgrass, which allows wildland fires to spread farther and also increase fire frequency.

While somewhat tolerant of low-intensity fires, fire can decrease the amount of soil algae found in the crust, although species composition may not change. However, under low-intensity blazes, soil crusts usually remain intact and inhibit erosion that may occur following a fire (DOI, 2001c). These soil crusts, however, are fragile and susceptible to damage by physical disturbances. After disturbances, soil particles are more likely to dislodge and erode via wind or water (DOI, 2001c). Recovery time depends on the ecosystem, species composition, and soil type, but can range from 10 to 250 years. The desert soil surface is very sensitive and took hundreds of years to form. A single vehicle can cause damage that can take decades or hundreds of years to heal. During desert maneuvers in the 1940s, armored vehicles left tracks that are still visible today.

3.2.2 Environmental Consequences

Soil impacts were qualitatively assessed using professional judgment based on investigations of soil characteristics and information from literature reviews and the Park's 1994 General Management Plan.

3.2.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact soils include activities associated with wildland fire suppression (*e.g.* using off-road vehicles, digging firelines, and using large amounts of water), managed wildland and prescribed fire use, and mechanical hazard fuels treatments.

Under this alternative, minor adverse impacts to soils from the suppression activities would be short-term to long-term and minor. Minor and localized soil compaction and disturbance (mixing top layers of soil, breaking cryptobiotic soil crust) would occur if fire suppression vehicles drove off-road to combat wildland fire. Digging firelines, if deemed necessary, would result in minor, localized soil disturbance. Lastly, using large amounts of water to extinguish fires could result in minor and localized erosion and soil disturbance.

When areas that contain cryptobiotic soil crusts are disturbed from any of these actions, the soil that lies beneath these crusts would become more susceptible to erosion. To minimize potential soil impacts from suppression activities, vehicles would be restricted to roads whenever and wherever possible. If it were necessary for vehicles to drive off-road, the least number of vehicles necessary would be used, and only one set of track would be made (*e.g.* one truck would follow the other). Existing natural fuel breaks and human-made barriers (*e.g.* trails, roads), wet line, or cold trailing the fire edge would be used in lieu of fireline construction whenever possible. If building firelines were necessary, they would be located outside of highly erosive areas, steep slopes, and other sensitive areas. To avoid boring and hydraulic action of fire hoses, soaker hose, sprinklers or foggers in mop-up would be utilized. Following fire suppression activities, fire lines would be re-contoured.

Impacts to soils from suppression activities would be minor because the suppression treatments would be localized (*e.g.* only those areas where suppression actions are taking place) and also because of mitigations that would be done to minimize those impacts. The impacts would be short-term in areas without cryptobiotic soil crusts and long-term in areas where the crusts had been disturbed. Cryptobiotic soil crusts are highly susceptible to soil-surface disturbance and can take many years to recover.

The use of prescribed natural fire and prescribed fire to achieve resource management objectives under this alternative would have both beneficial and minor short-term adverse impacts to soils. The use of wildland or prescribed fire would release nutrients into the soil and the fertilization effects of ash would provide an important source of nutrients for vegetation in the area. Benefits include increased nitrification of soils, higher pH, and increasing of minerals and salt concentrations in the soil. Additionally, the ash and charcoal residue resulting from incomplete combustion aids in soil buildup and soil enrichment by being added as organic matter to the soil profile. Studies of non-desert grassland ecosystems have found that the added material works in combination with dead and dying root systems to make the soil more porous, better able to retain water, and less compact while increasing needed sites and surface areas for essential microorganisms, mycorrhizae, and roots (Vogl, 1979; Wright and Bailey, 1980). Some of these benefits may also occur in desert ecosystems.

If a prescribed fire exceeded a burn prescription and burned "hot", resulting in areas of high-burn severity, the organic layer of the soil could be consumed and soil layers could become water repellent. Such water repellent soil conditions are generally temporary (Frederick, et al, 2003),

If a prescribed fire exceeded a burn prescription and burned "hot", resulting in areas of high-burn severity, the organic layer of the soil could be consumed and soil layers could become water repellent. Such water repellent soil conditions were found in a study of sagebrush ecosystems (Frederick, et al, 2003). Water repellancy was found to be generally temporary , so that during the first minutes (or longer) of rainfall, water beads on or near the soil surface and quickly runs off the plot. Water repellency then deteriorates as rainfall continues, resulting in a gradual recovery in the infiltration capacity of the soil. (Frederick, et al, 2003). Fire management personnel would contain and/or suppress out-of-prescription fires, minimizing the potential for and effects of any high-burn severity prescribed fires

3.2.2.2 Alternative 2

Proposed activities with the potential to impact soils include activities associated with suppressing wildland fires (*e.g.* Using off-road vehicles, digging firelines, and using large amounts of water). General impacts to soils from suppressing wildland fires would be similar to those described in the "No Action" Alternative.

3.2.2.3 Alternative 3 (NPS Preferred Alternative)

Proposed activities with the potential to impact soils include activities associated with suppressing wildland fires (*e.g.* using off-road vehicles, digging firelines, and using large amounts of water), conducting research burns, and mechanical thinning of hazard fuels near structures.

General impacts to soils with regards to wildland fire suppression would be similar to those described in the "No Action" Alternative. Adverse and beneficial impacts to soils from conducting research burns would also be similar to those described in the "No Action" alternative, but on a smaller scale (*e.g.* a total of 40-acres). Lastly, the use of manual/mechanical treatments would have no adverse impacts to soils, since treatments would consist of weed-whacking and trimming, activities that would be above the soil surface.

3.2.3 Conclusion

All three alternatives would have short-term to long-term, direct, and adverse impacts on soils. However, with the implementation of mitigation measures, impacts would be minimized. The "No Action" would have the most impacts, both adverse and beneficial than either Alternative 2 or the "NPS Preferred" Alternative.

The implementation of either of the alternatives would not impair soil resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other National Park Service planning documents.

3.3 WATER RESOURCES (INCLUDING WETLANDS AND FLOODPLAINS)

3.3.1 Affected Environment

Naturally occurring water is rare in the park. There are over 120 known water sources in the park, including springs, wells, seeps, and one short perennial stream. Flows from springs and seeps range from seasonal dampness to about seven gallons per minute. The majority of the springs flow from fractures and joints in the igneous and metamorphic

basement complex, and appear to be supported by local aquifers. Past monitoring indicates that discharge at some springs is decreasing, and compared to historic accounts surface water has decreased significantly from 50 years ago. The cause is uncertain and may be attributable to climate changes, changes in vegetation, sampling error, water pumping and use, or natural variation (NPS, 1994).

Several oases, encircled by California fan palms, are found in the park and provide a dramatic contrast to their surroundings. They symbolize the importance of water in shaping the landscape and sustaining life in the desert (NPS, 1994).

Three artificial impoundments (Barker Dam, Cow Camp, and Keys Lake) contain significant amounts of water most years. These are considered historic features that were constructed to supply water for ranching. Barker reservoir is drained periodically in order to get rid of goldfish introduced by visitors. Populations of native and introduced waterfowl and other wildlife have developed around the reservoirs (NPS, 1994).

Floods and flash floods occur in all of the drainages in the park. Surface flows in most drainages only result from heavy precipitation and last only a few hours or days. Though most visitor facilities (with the exception of headquarters) appear to be outside major floodplains, no formal studies have been conducted. Numerous flood-prone drainages cross park roads. Future road designs must consider the drainages and must not disrupt the natural water and sediment transport capabilities of these channels. Flow is so infrequent that interruptions of traffic are rare.
Headquarters and the Oasis of Mara are on an alluvial floodplain with numerous scattered channels. The flood hazard has not been formally evaluated. It is assumed to be somewhat mitigated by surrounding roads and other development that disrupt surface flow patterns (NPS, 1994).

The park has very few wetlands. The wetland habitats are associated with the five oases. Lack of defined trails and heavy visitor use around the Cottonwood Oasis has resulted in damage to vegetation, soils, and the spring. There are riparian areas in Smithwater Canyon and near the historic dams at Keys Ranch, Cow Camp and Barker Reservoir. Some springs support prolific vegetation but with little or no surface water (NPS, 1994).

3.3.2 Environmental Consequences

Water resource impacts were qualitatively assessed using professional judgment based on investigations of water resources, literature reviews, and information from the Park's 1994 General Management Plan.

3.3.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact water resources include activities associated with wildland fire suppression, wildland and prescribed fire use, and reducing hazard fuels.

Adverse indirect impacts to the water resources of Joshua Tree National Park resulting from the activities proposed under this alternative would be short-term and minor. The principal impacts to water quality resulting from wildland fire suppression stem from erosion-induced suspended sediments, and turbidity. Turbidity is a visual property of water and it measures the amount of suspended particles in water, such as silt, clay, plankton, microscopic organisms and organic matter. Sediment is the soil that gets in the water and then settles at the bottom. Sediment can degrade water quality and affect the aquatic organisms that live there. Sedimentation decreases available habitat for aquatic. However, while, the potential for an increase in turbidity and sediment delivery into any of the park's water bodies as a result of soil erosion following suppression activities exists, as described under Section 3.1.2.1, the degree of soil erosion would be minor and localized.

The use of fire retardants or foams during suppression activities could potentially cause short and long-term impacts to water resources if misapplied or mishandled. Retardants contain ammonia and phosphate or sulfate ions, which can change the chemistry of a water body, thus making it lethal to aquatic organisms. The degree of impact would depend on the volume of retardant/foam dropped into the water body, the size of the water body. For example, if an 800-gallon drop is made into a fast flowing river, it is likely that the lethal effects to aquatic resources will be short-lived as dilution below the toxic level is quickly achieved. On the other hand, a 3,000-gallon drop in a stagnant pond would likely cause toxic levels to persist for some time (USDA, 2004b). However, since mitigation measures would limit the use, type, and proximity to water bodies of fire retardants, impacts to water quality will be minimal. Manual/mechanical reduction of hazard fuels would not impact the water quality of the park because of the limited scope of the thinning and its proximity to water sources.

Prescribed and prescribed natural fire use could have short-term minor adverse impacts on water quality in the park. These fires would be carefully monitored, and managing these fires through containment and suppression activities would have similar impacts to those that occur during wildland fire suppression activities. However, the prescribed and prescribed natural fire themselves could also result in short-term minor adverse impacts to water quality. After a managed fire, with a reduction of vegetation, runoff could increase. This could lead to turbidity and sedimentation of surface water resources in the park. In addition, organic material (ash) could also be introduced into nearby surface waters by wind or transported by runoff. As a result, there could be changes in the pH and nutrient levels of the water. Adding ashes to water raises the pH, turning it more basic. As a result, organisms that had been living successfully in the water may be adversely affected, and others, such as algae, may grow better. Increased algae production could result in a more diverse population of insect larvae, changing the balance of life in the water from what it was before the fire. Impacts to water quality from prescribed and prescribed natural fire use would be minor, simply due to the lack of water resources in the park, lack of precipitation that could lead to runoff, and if in the event that a managed fire were determined to be burning out of prescription, it would be suppressed immediately.

In addition, this alternative is unlikely to lead to any changes in the park's surface water. Fire disturbance could create greater runoff during storm events. Every attempt would be made to exclude wildland fires from these surface water areas. Prescribed fire would not be

used in these areas. Moreover, these activities would not involve the filling or disconnection of the floodplain, and would not affect the functionality of the floodplain. There would be no impacts to any of the wetlands found within the park from wildland fire suppression activities.

3.3.2.2 Alternative 2

Proposed activities with the potential to impact water resources include suppressing wildland fires. General impacts with regards to wildland fire suppression would be the same as those described in the "No Action" Alternative.

3.3.2.3 Alternative 3 (NPS Preferred Alternative)

Proposed activities with the potential to impact water resources includes suppressing wildland fires, conducting research burns, and maintaining defensible space through manual/mechanical thinning. General impacts with regards to wildland fire suppression and reducing hazard fuels would be the same as those described in the "No Action" Alternative.

There would be no impacts to water resources as a result of conducting research burns at the park because there are no springs, tanks, seepages or wells within the immediate research area.

Manual/mechanical thinning around park structures would not have any impacts to water resources, because it would not involve any significant ground disturbance that would lead to erosion.

3.3.3 Conclusion

Adverse indirect impacts to water quality resulting from any of the alternatives would be similar in nature, short-term and negligible to minor. All effects are short-term or produce minor amounts of sediment, and because mitigation features designed into the plan help limit the amount of sediment that could reach a water body.

The implementation of any of the alternatives would not impair water resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other National Park Service planning documents.

3.4 VEGETATION

3.4.1 Affected Environment

The vegetation in the area varies with the topography, elevation, and gradient. It is estimated that more than 850 plant species live in the park (NPS, 1994). Below 3,000 feet, creosote bush, mesquite, yucca, ocotillo, and species of cactus dominate the Colorado

Desert (or low desert). Whenever moisture conditions are favorable, palo verde (*Cercidium microphyllum*), and desert willow (*Chilopsis linearis*) may also appear. In Pinto Basin, creosote bush, white burroweed, several species of grass, and many species of cactus grow. The sand hills are often dominated by spring annuals following significant rain events, whereas the open habitat of the creosote shrub, which is found in the Pinto Basin, can be dominated by the non-native annual grasses (*Schismus spp*).

Vegetation types in the park have been grouped into three primary fuel model classifications (NPS, 1994):

- ***Mojave Mixed Steppe***
  - **Joshua trees, galleta grass, needle grass**

- ***Blackbrush Scrub***
  - **blackbrush, Mojave yucca, Joshua tree, California juniper**

- ***Mojavean Pinyon Juniper Woodland***
  - **pinyon pine, scrub oak, California juniper**

The Mojave Desert is biologically more diverse than the Colorado Desert, probably due to more precipitation and geologic and topographic ranges. In the Mojave, mixed steppe densities of Joshua trees vary dramatically. The thickest forests within Joshua Tree NP are in Covington Flats, Lost Horse, and Queen Valley areas.

The transition zones between the two deserts provide for an increased biodiversity. Common shrubs such as desert senna (*Senna armata*), bladder pod (*Isomeris arborea*), jojoba (*Simmondsia chinensis*), desert mallow (*Sphaeralcea ambigua)*, paper bag bush (*Salazaria mexicana*), (*encelia spp.*), (*vigueria spp.*), white ratany (*Krameria grayi*), and four-o'clock (*Mirabilis multiflora Nyctaginaceae*) are common species down here. Other shrubs in these areas include jimsonweed (*Datura stramonium*) and coyote melon (*Cucurbita palmata*). After adequate rainfall, many different species of wildflowers emerge, including extensive areas of Bigelow coreopsis (*Coreopsis bigelovii*), sand verbena (*Abronia villosa*), (*phacelia spp.*), evening primrose (*Oenothera macrocarpa*), blazing star (*Mentzelia involucrata*), pincushion (*Chaenactis stevioides*), chia (*Salvia columbarie*), and others. A few groves are near the southern boudnary of the Mojave Desert, close to Indian Cove and at Headquarters at Twenty Nine Palms (NPS, 1994).

Plants in this region have evolved features that enable them to survive the region's harshness. However, many of these same features also make them highly susceptible to fire. For example, seeds of many plants that lie dormant at the soil surface are often consumed by even the most infrequent low-intensity surface fires. Many grass species in the region reproduce by both above ground stolons which lie exposed to fire. Also, much of the desert shrub community is dependent upon the availability of water near the soil surface. Shallow rooted plants are damaged directly when fuels are sufficient to carry fire. Indirectly these species may be damaged when surface fuels are removed by fire, exposing the ground to more sunlight, resulting in loss of critical soil moisture (USDA, 2004a).

Many non-native plant species have become well-established in Joshua Tree National Park. These plants displace native species and quickly colonize any disturbed area, natural or human-caused. Of these, the red brome grass (*Bromus madritensis*) and cheatgrass (*Bromus tectorum*) are the two most pervasive species in the park. Both species shorten fire return intervals and their increased presence has promoted fires in areas where fire was previously infrequent due to insufficient fuels. Once these species become established they may increase fire frequency by enhancing potential for start and spread. In general, red brome and cheatgrass produce an abundant and continuous cover of persistent fine fuels, promoting fast, "hot" fires (USDA, 2004a). In fact, these non-native grasses thrive in post-fire landscapes, partly due to temporary increases in the availability of soil nutrients after desert fires (Brooks and Pyke, 2001).

3.4.2 Environmental Consequences

Vegetation impacts were qualitatively assessed using professional judgment based on the presence/absence of plant species, literature reviews, and by determining the number of acres impacted.

3.4.2.1 Alternative 1 (No Action)

Proposed activities with the potential to directly impact vegetation include suppressing wildland fire, prescribed and prescribed natural fire use, and mechanical thinning of hazard fuels.

Fire suppression activities could result in the mortality of plants and trees in the areas where wildland fire suppression is taking place. Digging firelines, removing trees, and setting backfires are all examples of wildland fire suppression tactics that could cause mortality of plant species. These impacts are expected to be minor and long-term because the loss of individual members of a given plant species would not jeopardize the viability of the populations on and adjacent to the park. Also, they would be limited to the area of treatment only. Any fire suppression activities that resulted in soil disturbance (*e.g.* building firelines) would have minor indirect impacts by making those areas more susceptible to the spread of invasive exotic plant species that thrive in open disturbed areas. In addition, wildland fire suppression would have beneficial impacts to native vegetation that is not adapted to fire by minimizing the total area affected by a wildland fire.

The use of prescribed and prescribed natural fire use could lead to long-term, minor to moderate adverse impacts to the native vegetative communities found within the park. Historically, fire within the park was a rare event, and only involved limited acreages. As a result, much of the vegetation within the park is not well-adapted to fire. However, the spread of non-native species, such as red brome grass and cheatgrass and the subsequent increase in fuel loads, fire frequencies have increased within the park. In addition, once established, red brome grass and cheatgrass actually thrive with frequent fires. For example, within the Mojave Desert, red brome prefers disturbed sites, especially in areas where shrubs have been removed by fire (USDA, 2004a). Red brome shows vigorous vegetative growth in blackbrush communities where shrubs have been removed by fire.

Red brome is prominent the first 2 to 3 postfire years in blackbrush communities, after which perennial grasses and shrubs dominate (USDA, 2004a).

Cheatgrass is also highly adapted to a regime of frequent fires. Cheatgrass has a very fine structure, tends to accumulate litter, and dries completely in early summer, thus becoming highly flammable and often creating continuous fuel (USDA, 2004a). By the time of burning, most cheatgrass seeds are already on the ground, and those not near the heat of burning shrubs can survive and allow cheatgrass to pioneer in the newly burned area. Even if fire comes when cheatgrass plants are still green and kills them before they can set seed, there may be enough viable cheatgrass seed in litter and upper layers of soil for plants to reestablish (USDA, 2004a).

This increase in fire frequency and increases in non-native species has lead to changes in the native vegetative communities, especially blackbrush scrub, which can take many years to recover after a fire. Table 3-1 describes the affects fire has on some specific species found within the three vegetative communities at Joshua Tree National Park. Unless otherwise noted, fire effects information was collected from the U.S. Forest Service's Fire Effects Information System (USDA, 2004a).

Table 3-1 Fire Effects on Vegetative Communities at Joshua Tree National Park

Vegetative Communities	Fire Effects on Specific Species
Mojave Mixed Steppe	Joshua tree generally sprouts vigorously from the roots, stump, or rhizomes after foliage is removed or damaged by fire. The numerous, fast-growing rhizomes are well protected from heat by overlying layers of soil. Galleta grass, and desert neddlegrass are temporarily set back by fire, they reestablish their preburn densities within 3-4 growing seasons.
Blackbrush Scrub	Blackbrush stands are substantially decreased or eliminated by fire; fire usually kills blackbrush seeds and mature shrubs. Blackbrush is susceptible to fire and slow to reestablish; it is generally removed from the site for 25 to 30 years. Mojave yucca is generally not killed by fire even when above-ground vegetation is totally consumed and can sprout from the roots or from nodules located on the stem base after aboveground foliage is partially or totally consumed by fire. California juniper is a nonsprouting, fire-sensitive species that is usually killed by fire
Mojavean Pinyon Juniper Woodland	Pinyon pine is very sensitive to fire and may be killed by even low-severity surface burns, especially when trees are less than 4 feet tall. Pinyon is particularly susceptible when individuals are >50% defoliated by fire. Fire kill of pinyon may be more extensive on flat to gently rolling terrain; in rough terrain, islands of unburned trees may be left on ridges and hills. Crown fires kill pinyon of all age classes. Scrub oak is top-killed by fire; however it can sprout from the root crown and rhizomes following fire.

Fire management activities under this alternative would not likely adversely affect any Federally-listed plant species or any state-listed sensitive species that may be located within

the park. As detailed in section 2.3, (Mitigation and Monitoring), whenever possible, fire suppression activities would avoid any disturbance within known natural sites (*e.g.* critical habitat, known areas where T&E species exist, known denning sites, spotter walking in front of suppression vehicles). When a wildland fire suppression activity (*e.g.* hand line construction) is not discretionary and deemed necessary to protect human life or property in or around these resource locations, it would involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible. In addition, as stated in the National Park System's 2001 Management Policies, if a federally or state listed species were to be documented within the park boundaries, active management programs would be undertaken to inventory, monitor, restore, and maintain the listed species' habitats, control detrimental non-native species, control detrimental visitor access, and re-establish extirpated populations as necessary to maintain the species and habitats upon which they depend. The park would also manage designated critical habitat, essential habitat, and recovery areas to maintain and enhance their value for the recovery of threatened and endangered species. Measures taken to protect those species, or their required habitat, would supersede any management activities outlined in the FMP in the event any of those management activities would negatively impact the listed species.

3.4.2.2 Alternative 2

Proposed activities with the potential to directly impact vegetation include activities associated with wildland fire suppression. In general, short-term adverse impacts to vegetation from wildland fire suppression activities would be similar to those described under the "No Action" Alternative.

3.4.2.3 Alternative 3 (NPS Preferred Alternative)

Proposed activities with the potential to directly impact vegetation include activities associated with wildland fire suppression, manual/mechanical thinning hazard fuels, and conducting research burns.

In general, short-term adverse impacts to vegetation from wildland fire suppression activities would be similar to those described under the "No Action" Alternative.

Minor, direct, short-term to long-term adverse impacts to vegetation resulting from research burns would include the removal of the majority of blackbrush plants and the potential spread of red brome and cheatgrass within the treatment areas. Regeneration is expected to occur under natural conditions. Indirect impacts to understory grass species are expected to occur. Galleta resprouts from rhizomes following fire. It is described as a fire tolerant species. With repeated burns, galleta may spread at the expense of other shrubs. Use of research-driven prescribed fire as a component of ecosystem restoration may cause short-term decrease in herbage production of some species but long-term would cause increases in production and abundance. Direct impacts to vegetation due to a disturbance invader species may occur as well. With the threat of frequent wildfires, blackbrush may not return to burned sites. Direct impacts to sagebrush, often a prevalent understory shrub would occur. Sagebrush would not be excluded from prescribed fire. It is believed that sagebrush may be reduced in the short-term from prescribed fire and

potentially in the long-term as well if native grass species return to or increase in areas previously dominated by sagebrush. All changes in vegetation species abundance, density, and diversity would be monitored on the vegetation and fuels monitoring plots that have been established by USGS throughout the treatment and control areas. Indirect impacts to vegetation (further removed in time from the action itself) would result in increased native vegetation species diversity and density in all areas.

Manual/mechanical thinning of hazard fuels near structures would have negligible adverse impacts to vegetation. Although some blackbrush near structures might need to be cleared, the treatment area would be small, consisting only of the area within 100 feet of a structure. The removal of individual plants in these areas would not be enough to impact vegetation communities within the park.

3.4.3 Conclusion

Both alternatives 2 and 3 would result in minor, long-term and localized adverse impacts to native vegetation found within the park by wildland fire suppression and, in the case of the Alternative 3, the NPS Preferred Alternative, through conducting research burns. Adverse impacts to vegetation resulting from Alternative 1, the "No Action" Alternative, would result in minor adverse impact from wildland fire suppression and minor to moderate adverse impacts resulting from prescribed and prescribed natural fire use. In all three alternatives, impacts from fire management activities would be lessened with the use of mitigations.

Implementing either of the proposed alternatives would not impair vegetation resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other National Park Service planning documents.

3.5 WILDLIFE (INCLUDING THREATENED AND ENDANGERED SPECIES)

3.5.1 Affected Environment

Large mammals in the park include desert big-horn sheep *(Ovis canadensis*), mule deer (*Odocoileus Hemionus*), and mountain lion (*Felix concolor*). Bobcats (*Felis rufus)* are common, as are many small animals. Approximately 350 vertebrate species inhabit the park. The most common are mice and wood rats, white-tailed antelope squirrel (*Ammospermophilus leucurus*), chipmunk (*Tamias striatus*), coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), and two species of fox. There are approximately a dozen species of bats. Invertebrates are also common, but little has been done to systematically inventory them. Two poisonous spiders are found, the black widow (*Latrodectus hesperus*) and the brown recluse (*Loxosceles reclusa*). Another common spider is the nonpoisonous tarantula (*Eurypelma californicum*). Scorpions in the park range up to four inches in length and are among the less toxic varieties. Various centipedes, millipedes,

and ticks can be found along with a multitude of other insects, including ants, beetles, dragonflies and wasps (NPS, 1994).

Only the red-spotted toad *(Bufo punctatus*) and the California tree frog (*Hyla californiae*) have been reported. Of many small lizards present, the side-blotched lizard (*Uta stansburiana)* is the most common. Additionally, there are several species of horned lizards (*Phrynosoma spp.*) and 20 known species of snakes in the park.

Large numbers and varieties of birds (more than 270 different species) live in or fly through the park, which is adjacent to a major migratory flyway in the Coachella Valley. During stormy weather, many areas are critical stopover sites for species such as loon (*Gavia spp.*), herons (*Ardea spp.)*, grebes (*Aechmophorus spp.*), and avocets (*Recurvirostra spp.*). Birds most commonly seen in the park are the Gambel's quail (*Callipepla gambelii*), black-throated sparrow (*Amphispiza bilineata*), Western scrub jay (*Aphelocoma californica*), common raven (*Corvus corax*), roadrunner (*Geococcyx californianus*), and several wrens (*Campylorhynchus spp.*). Additionally, the park hosts both summer and winter migratory species. The oases seem to be important stopping places on the western flyway and have semiannual visits of large numbers of turkey vultures (*Cathartes aura*).

The federally threatened desert tortoise, Mohave Desert population, (*Gopherus agassizii*) is the only listed animal species known to occur in the park.

3.5.2 Environmental Consequences

The effects of the alternatives on wildlife were qualitatively assessed using professional judgment based on literature reviews, general knowledge, and research specific to the area.

3.5.2.1 Alternative 1 (No Action)

Proposed activities with the potential to affect wildlife include activities associated with wildland fire suppression such as building fire lines and removing vegetation, utilizing prescribed and prescribed natural fires for resource management needs, and manual/mechanical thinning hazard fuels.

General impacts resulting from activities proposed under this alternative would be minor, adverse, and short-term. All wildland fire suppression and thinning activities could result in the short-term displacement of wildlife or individual mortality of wildlife species. The loss of individuals of a non-threatened or endangered species, however, would only result in short-term minor adverse impacts as they would not jeopardize the viability of the populations on and adjacent to the park. After the suppression event, populations would rebound after one year.

Wildland fire suppression would adversely affect the Federally listed threatened species found within the park. As detailed in section 2.3, (Mitigation and Monitoring), whenever possible, fire suppression activities would minimize any disturbance within known natural sites (*e.g.* critical habitat, known areas where T&E species exist, known burrows, spotter

walking in front of suppression vehicles). When a wildland fire suppression activity (*e.g.* hand line construction) is not discretionary and deemed necessary to protect human life or property in or around these resource locations, it would involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.

There would be minimal adverse impacts to desert tortoises from fire management activities (*e.g.* prescribed and wildland fire use, mechanical thinning of hazard fuels). As stated in the National Park System's 2001 Management Policies, if a federally or state listed species were to be documented within the park boundaries, active management programs would be undertaken to inventory, monitor, restore, and maintain the listed species' habitats, control detrimental non-native species, control detrimental visitor access, and re-establish extirpated populations as necessary to maintain the species and habitats upon which they depend. The park would also manage designated critical habitat, essential habitat, and recovery areas to maintain and enhance their value for the recovery of threatened and endangered species. Measures taken to protect those species, or their required habitat, would supersede any management activities outlined in the FMP in the event any of those management activities would negatively impact the listed species.

Generally, direct impacts of prescribed and wildland fire use on wildlife include disturbance or mortality of individuals or groups of individuals. Normally, larger mammals and birds would move away from a fire, escaping any direct impacts. However, the availability of adjacent suitable habitat may be critical for local populations. Some bird losses may occur in nesting sites if fires coincide with nesting season. A local herbivore population decline may in turn result in a loss of prey items for carnivores. Loss of some reptiles and amphibians may also occur, but immediate population declines of non-threatened or endangered species would usually be insignificant.

Animals which utilize dense ground vegetation for food and cover may be reduced initially unless islands of vegetation remain intact or suitable habitat is available outside the burn area. Increased predation pressure can occur due to losses in prey populations. Animals with specific habitat requirements or territorial animals with narrow ranges may be impacted by habitat loss. In many ecosystems, beneficial effects of fire far outweigh and offset any direct or indirect wildlife losses (Vogl 1967). However, in desert ecosystems the beneficial effects of fire are delayed, due to slow regrowth of habitat. Non-native plant species are often the first to return after fire, with a consequent long-term effect on the amount and quality of food sources and of cover for wildlife.

3.5.2.2 Alternative 2

Proposed activities with the potential to impact wildlife include activities associated with suppressing wildland fires.

General wildlife impacts with regards to wildland fire suppression would be similar to those described in the "No Action" Alternative. General adverse impacts to wildlife during these activities would be minor and would include short-term behavioral impacts, long-term loss of some habitat, and the long-term isolated loss through mortality of non-threatened and endangered individuals.

3.5.2.3 Alternative 3 (NPS Preferred Alternative)

Proposed activities with the potential to impact wildlife include activities associated with suppressing wildland fires, manual/mechanical thinning of hazard fuels near structures, and conducting research burns.

General wildlife impacts with regards to wildland fire suppression and manual/mechanical thinning of hazard fuels would be similar to those described in the "No Action" Alternative. Conducting research burns would have similar impacts to wildlife to those impacts resulting from prescribed and wildland fire use described under the "No Action" Alternative, however, these minor adverse impacts would only affect 40 acres during one year, as compared to 10-acres per year and unknown amount of acres burned by naturally occurring and managed wildland fires in the "No Action" Alternative.

The research burn location is adjacent to the habitat of the silvery legless lizard (*Anniella puedra*) and will likely have moderate impact.

Manual/mechanical thinning to maintain defensible space would only have negligible adverse impacts to non-threatened or endangered wildlife. The area to be maintained by thinning is comparatively small and is close to park structures. Therefore it is less likely to be frequented by wildlife than are remote areas of the park. Park personnel would be on the lookout for any wildlife that would occur within the treatment areas, and would avoid contact with any species found. Should any species be displaced, they would most likely find suitable habitat adjacent to the treatment areas.

Fire management activities under this alternative would likely not adversely affect any federally listed threatened or endangered species found within the park. In April of 2004, consultation was initiated with Chris Otahal, Endangered Species Biologist at the Carlsbad California Field Office of the U.S. Fish and Wildlife Service (USFWS) regarding any federally listed species that could occur at Joshua Tree National Park, and the potential impacts the proposed actions could have on those species. A biological assessment was sent to USFWS in October of 2004.

3.5.3 Conclusion

Wildland fire suppression activities described for all alternatives would temporarily displace some wildlife species, and increase the possibility of individual mortality of some species. These impacts however, would be long-term and minor. Prescribed and wildland fire use described in the "No Action" Alternative, and research burns conducted in the "NPS Preferred" Alternative would have direct impacts on wildlife, including disturbance of habitat, displacement or mortality of individuals or groups of non-threatened individuals.

The implementation of any of the alternatives would not impair wildlife resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment

of the park, and (3) identified as a goal in the park's general management plan or other National Park Service planning documents.

3.6 WILDERNESS

3.6.1 *Affected Environment*

Wilderness is defined in the 1964 Wilderness Act (P.L. 88-577) as a place where natural forces, not human ones, predominate. It is "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." By law these wilderness areas "shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness" (16 U.S.C. 1131). The Joshua Tree wilderness of nearly 600,000 acres is the largest such area near the urban complexes of southern California. The wilderness offers visitors an opportunity to see an area that is predominantly free of roads, buildings, development, powerlines, and many of the visual intrusions associated with modern life. Wilderness offers solitude, tranquility, quiet contemplation, and freedom to study a place that is substantially unaffected by human activity. Joshua Tree National Park contains several wilderness units, such as the geologic area that encompasses the rugged

- **Wonderland of Rocks, a geologic area that which displays the gigantic rugged monzonites.**
- **A large portion of the Little San Bernardino Mountains possesses a fine desert plant community and the Nelson bighorn sheep range comprises another wilderness unit. This unit spreads from the rugged mountains along the west boundary and extends to the Geology Tour Road. It encompasses such features as Covington Flats, which contains some of the largest Joshua trees in the park, and Quail and Stubbe springs, which serve as water sources for the park's wildlife. Lost Horse Valley, a flat, broad expanse that showcases Mojave desert vegetation, is also found in Wilderness Unit 2, as is another portion of the Little San Bernardino Mountains that forms the backdrop for Lost Horse and Pleasant Valleys.**
- **The expansive Wilderness Unit 3 comprises a large section of the Hexie Mountains, which form a scenic horizon for Pleasant Valley. The major portion of the Hexie Mountains provides the background for Pinto Basin, Pleasant Valley and comprises part of the bighorn sheep range. Again, this wilderness unit showcases Mojave desert vegetation, and the south-facing slopes of the Hexie Mountains support an extravagant display of barrel cactus.**
- **Wilderness Unit 4 contains a small portion of the Cottonwood Mountains and features the Colorado desert vegetation, a subsection of the Sonoran desert. The broad expanse of the Pinto Basin makes up Wilderness Unit 5. The Pinto Mountains to the north form a panoramic backdrop for the Basin. The sheer size**

of the basin quickly dwarfs man. The encircling mountains and starkness of the basin, void of evidence of man, form lasting impressions of a desert environment. A low ridge of sand dunes bisects the western part of the basin.

- **Wilderness Unit 6, The Eagle Mountains to the south of the Pinto Basin, contain draws and washes that contain some of the finest palm oases in the park. These unique mountains share vegetation common to both the higher, cooler Mojave and the lower, drier Colorado deserts. Native palm trees can be found growing next to the higher-country junipers. This unit is an excellent example of the transition zone that melds the two great deserts together.**
- **Wilderness Unit 7 found in the arid northeast section of the park encompasses some of the most remote, least traveled areas of Joshua Tree National Park. The Coxcomb Mountains with their display of majestic, craggy peaks enclose the northeast section of the Pinto Basin.**

The California Desert Protection Act of 1994 added several sections of wilderness. These new desert areas completed the ecological units in the Coxcomb and Eagle Mountains and provide added protection to the park's wildlife, particularly the threatened desert tortoise and the bighorn sheep.

NPS Management Policy directs that "fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness. The park's fire management and wilderness plans together will identify the natural and historic roles of fire in the wilderness and will provide a prescription for response to natural and human caused wildfires. Actions taken to suppress wildland fire will use the minimum requirement concept and will be conducted in such a way as to protect natural and cultural features and to minimize the lasting impacts of the suppression actions and the fires themselves." Joshua Tree NP management of designated wilderness is guided by NPS Management Policies, and the park's Backcountry and Wilderness Plan. NPS Management Policies direct that parks manage wilderness as follows:

> ***"All management decisions affecting wilderness must be consistent with a minimum requirement concept…When determining minimum requirement, the potential disruption of wilderness character and resources will be considered before, and given significantly more weight than economic efficiency and convenience. If a compromise of wilderness resource or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable."***

3.6.2 Environmental Consequences

Impacts to wilderness were evaluated qualitatively by examining the letter and spirit of the 1964 Wilderness Act and NPS policies.

3.6.2.1 Alternative 1 - No Action

Proposed activities with the potential to impact areas designated as wilderness include the noise and activities associated with wildland fire suppression and managed wildland fires.

Under this alternative, in some instances, naturally occurring wildland fire could be used as a management tool in the designated wilderness areas of the park. These managed wildland fires would have minor to moderate short-term to long-term adverse effects on designated wilderness within the park. Fire is a natural force, and thus managed wildland fire is deemed by federal land managers as being inherently compatible with wilderness character and values. However, as non-native grasses continue to expand into the wilderness areas, wildland fire continues to increase in both frequency and severity. Because fire is considered an infrequent event within Joshua Tree, increased managed wildland fire use may have minor adverse impacts to the wilderness character of the park.

Wildland fire suppression may take place in the designated wilderness of the park. The park must weigh values at risk, including human life, nearby improvements, wilderness values, habitat, and wildlife values. Per Director's Order #41 on Wilderness Preservation and Management (NPS, 1999b), wildland fire suppression would require the use of minimum impact suppression tactics (MIST) within areas of designated wilderness so as to minimize the effect of temporary human disturbances and intrusions and must be consistent with a minimum requirement concept. The use of chainsaws, portable pumps, and helicopters for all fire operations may be considered minimum tools on most fires to enhance firefighter safety and expedite control of unwanted fires in endangered species habitat. However, not all fires would utilize mechanized equipment or power tools. Within Joshua Tree National Park, because of its vast size, vehicle use within designated wilderness may be approved for wildland fire suppression. Most wildland fires however would be fought utilizing basic firefighting tools such as shovels and pulaskis, while other fires would be placed in containment or confinement strategies and would utilize natural boundaries.

Wildland fire suppression activities conducted in the wilderness area would have minor to moderate, short-term to long-term adverse impacts to wilderness depending upon the size and effort needed to suppress those fires. For smaller fires, the average visitor would probably be unable to distinguish the areas where firefighters had worked versus the natural appearance of the wilderness. However, wildland fire suppression for moderate and larger fires could include construction of fire lines, use of temporary helicopter landing areas, and would have a noticeable effect on wilderness values. Some effects include cut brush and trees, ruts from tires, and possible fire lines. These impacts would be difficult to mitigate fully during full-scale fire suppression, but would be reduced through the use of MIST (See Section 2.3). Post-fire rehabilitation would reduce the visual and ecological impacts of large fire suppression activities, as listed in the minimum impact tactics.

Other adverse impacts from suppression activities that could affect the park's wilderness character include noise generated from wildland fire suppression activities, and visual impacts from the presence of firefighters and machinery. These impacts would be short-term and minor, as they would only last as long as suppression activities took place.

3.6.2.2 Alternative 2

Proposed activities with the potential to impact areas designates as wilderness include noise and activities associated with wildland fire suppression.

General impacts associated with wildland fire suppression activities would be similar to those described in the "No Action" Alternative.

3.6.2.2 Alternative 3 – NPS Preferred Alternative

Proposed activities with the potential to impact areas designated as wilderness include noise and activities associated with wildland fire suppression. Research burns would not be conducted in wilderness. General impacts associated with wildland fire suppression activities would be similar to those described in the "No Action" Alternative.

3.6.3 Conclusion

All three alternatives would have short-term to long-term minor to moderate adverse impacts to the designated wilderness areas from wildland fire suppression activities. Adverse impacts (*e.g.* noise, visual impacts) from all three alternatives would be mitigated through the use of a minimum requirement assessment and Minimum Impact Suppression Tactics. This mitigation would prevent impairment and preserve wilderness resources or values identified as a goal in the park's planning documents. The use of fire for resource management purposes in the Alternative 1 is consistent with the restoration and preservation of wilderness values as described in the Wilderness Act.

Under all three alternative, designated wilderness areas would retain their "wilderness character," would receive no permanent improvements or human habitation, and would still appear "to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable" (Section 2(c), Wilderness Act).

The implementation of any of the alternatives would not impair wilderness resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other National Park Service planning documents.

3.7 AIR QUALITY

3.7.1 Affected Environment

The wilderness area of Joshua Tree National Park is designated as a Class I airshed by the Clean Air Act (CAA) amendments of 1977. Under the CAA amendments of 1990, any addition to a Class I wilderness is also made part of the Class I area. Thus, the 1994 additions to the Joshua Tree wilderness are Class I areas. This classification allows the least incremental increases in particulate and sulfur dioxide pollutants. The CAA also imposes an affirmative responsibility to protect the air quality related values (including visibility) of Class I areas. Federal land managers have an "affirmative responsibility" to air quality related values in their Class I areas. These values include visibility, terrestrial and aquatic flora and fauna, and historic and archeological resources.

The U.S. Environmental Protection Agency (EPA) promulgated rules in 1980 that included language directed at "reasonably attributable" sources of visibility impairment. With the addition of section 169B in the CAAA of 1990, Congress addressed "regional haze" visibility in the nation's national parks and wilderness areas. The USEPA has determined that all 156 mandatory Class I areas across the nation demonstrate impaired visibility based on Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data (USEPA, 1999).

The EPA published final regional haze regulations on July 1, 1999 (64 FR 35714). The rules are directed at four emission sources of visibility impairment: stationary sources (industry), mobile sources (vehicles), area sources (*e.g.*, gas stations, dry cleaners, etc.), and the use of prescribed fire. The combustion of vegetation produces various chemical compounds. These compounds include nitrogen oxides (NOx), organic compounds, carbon monoxide, and particulate matter or small particles (PM). The pollutants that affect visibility that derive from vegetative burning are PM10, PM2.5, nitrates, ozone, organic carbon, and elemental carbon. Ozone, which can form "smog" or haze, is not directly produced by fires, but as a byproduct of the chemical reaction other combustion products (NOx and volatile organic compounds or VOC's). About 90 percent of smoke particles from wildland and prescribed fires are PM10 and about 70 percent are PM2.5 (USEPA, 1998). The goal of the regional haze program is to show continuous improvement in monitored visibility in the Class I areas so that natural background conditions are restored by 2064. The rules require that each state submit a State Implementation Plan (SIP) to the EPA to implement the emissions reductions necessary to improve visibility in the parks and wilderness areas.

"Criteria Pollutants" for which National Standards have been set under the Clean Air Act

Carbon Monoxide (CO) is a colorless odorless, toxic gas produced by the .incomplete combustion of organic materials used as fuels CO is emitted as a by-product of essentially all combustion.

Ozone (0_3) is a photochemical oxidant and major constituent of smog. Ozone is formed when two precursor pollutants, hydrocarbons (VOC s) and nitrogen oxides, react chemically in the presence of sunlight.

PM_{10} are fine particles less than 10 micrometers in diameter. PM_{10} includes solid and liquid material suspended in the atmosphere and formed as a result of incomplete combustion.

$PM_{2.5}$ are fine particles less than 2.5 micrometers in diameter. PM_{10} includes solid and liquid material suspended in the atmosphere and formed as a result of incomplete combustion.

Sulfur Dioxide (SO_2) is a corrosive and poisonous gas produced mainly from the burning of sulfur-containing fuel. It is also a precursor to acid precipitation.

Nitrogen Oxides (NOx) are poisonous and highly reactive gases produced when fuel is burned at high temperatures, causing same of the abundant nitrogen in the air to burn as well.

Lead (Pb) is a toxic heavy metal, the most significant emissions of which derive from gasoline additives, iron and steel production, and alkyl lead manufacturing.

National Park Service fire management activities which result in the discharge of air pollutants (*e.g.* smoke, carbon monoxide, and other pollutants from fires) are subject to, and must comply with, all applicable federal, state, interstate, and local air pollution control requirements, as specified by Section 118 of the Clean Air Act, as amended (42 USO 7418). However, it is not the primary intent of the Clean Air Act to manage the impacts from natural sources of impairment (*e.g.* prescribed and wildland fires). Smoke from these fires is considered an inevitable by-product.

While fires are not considered point sources of emissions, they tend to be spatially distributed singular events, and temporary impacts to visibility are recognized, expected, and managed. This may include temporary closures or warnings during the progress of management approved, ecologically essential fires. These fires are termed ecologically essential because fire plays a principal, and in some cases a dominant role, in maintaining the integrity of park resources.

One of the main factors determining the degree of air pollution from prescribed and wildland fires is smoke dispersion. Smoke dispersion is a function of ventilation, which refers to the process within the atmosphere that mixes and transports smoke away from its source. Ventilation is a function of stability, mixing height, and transport winds. Mixing height is defined as the upper limit of a mixed layer in unstable air, in which upward and downward exchange of air occurs. The transport wind is the arithmetic average (speed and direction) of wind in the mixing layer.

Joshua Tree National Park is located within both the Mojave Desert Air Quality Management District (MDAQMD) and the South Coast Air Quality Management District (SCAQMD). The Joshua Tree portions of MDAQMD and SCAQMD currently exceed federal and state ozone standards and state particulate matter standards. They are also expected to exceed the new fine particulate matter standards as well as the new 8-hour ozone standard.

Generally the summer months have the worst levels of smog, due to seasonally high temperatures. Heat and ultraviolet radiation act as a catalyst to convert reactants (NOX and VOC) to products (smog). Generally, during the winter months, the heat required to drive the reaction is usually not present, resulting in clearer skies. Unseasonably warm temperatures during the winter months, are usually associated with Santa Ana winds that oppose the prevailing winds. Therefore, any smog formed by heat during the summer months is typically forced into the Los Angeles Basin.

Very small amounts of air pollutants are generated in the park and are primarily from automobiles and dust on roads. Automobile exhaust and emissions from diesel generators contribute only minor amounts of pollutants. Vehicle traffic on park roads, especially the unpaved roads, is very light and probably only contributes slightly to particulate emissions. The National Park Service removed two diesel-powered generators from the remote Cottonwood facility and replaced them with a 21-kw photovoltaic power system.

Visibility is a significant air quality-related value of Joshua Tree NP. The park contains several magnificent desert vistas, such as a 360º panorama from Ryan Mountain. Standard

visual range averages 50 miles and is highest during the winter, lower during fall and spring, and lowest during summer.

3.7.2 Environmental Consequences

Air quality impacts were qualitatively assessed using literature reviews and professional judgment based on consideration of fuel levels and types, size of area that could burn, and knowledge of air chemistry.

3.7.2.1 Alternative 1 (No Action)

Proposed activities that would have adverse impacts to air quality include suppressing wildland fires, and prescribed and prescribed natural fire use.

Under this Alternative, wildland fire suppression would have short-term air quality impacts. Normally, smoke impacts to the park and surrounding communities would be minimized, as most suppressed wildland fires would be kept relatively small in size and would have mitigation fire suppression actions taken. Some fires that escape initial attack or that must be placed in confinement or under a containment strategy due to difficult terrain, firefighter safety concerns, or lack of resources, would gain size in acreage and consequently could increase quantities of air pollution released into the air. Air pollution increases would normally last only a few days, or until the fire is contained and mop-up begins.

Smoke from wildland fires also has adverse impacts to the overall visibility in the park. The extent of impact to visibility would depend on the fire size, duration and location. Most small fires would produce some visible smoke in the area where the fire was located, but would have minimum impact on air quality or overall visibility. Larger fires would affect views for a larger area downwind, creating haze that obscured or partially obscured some views.

Direct adverse impacts to air quality from prescribed and prescribed natural fire use would be short-term, and would be minor to moderate. The impacts would be dependent on fuel loading and burn intensity and duration. However, during treatments with prescribed fire and wildland fire use incidents, if NAAQS cannot be met or if significant visibility impairment occurs, ignition would be halted and the burn would be suppressed or allowed to burn out. Prescribed fires ignited to meet resource and protection objectives (*e.g.* hazard reduction, etc.) and naturally ignited wildland fires managed for resource benefits can collectively reduce years of fuel accumulation, resulting in long-term benefits to regional and local air quality through reduced emissions.

Prior to any prescribed fire, the park would request an open burning permit from Mojave Air Quality Management District and San Bernardino and Riverside Counties. The permit identifies the location and size of the proposed prescribed fire, as well as the fuel types to be burned. Each prescribed fire plan would include smoke trajectory maps and identify smoke-sensitive areas. Fire weather forecasts will be used to correlate ignitions with periods of optimal combustion and smoke dispersal. Mitigation measures would be defined

in the plan and arrangements made prior to ignition to ensure that designated resources are available if needed to implement the mitigation measures. Prescribed fire would not be implemented when atmospheric conditions exist that could permit degradation of air quality to a degree that negatively affects public health. (Federal and state air quality standards will be the basis for this decision.) Any smoke situation that arises and threatens any smoke-sensitive areas will entail immediate suppression action.

Smoke generated by management-ignited prescribed fires would be managed to minimize degradation of air quality and visibility. The park's guidelines for smoke from a management-ignited prescribed fire are:

1. **All burn plans will have clear objectives and will monitor impacts of smoke on the human and natural environments.**

2. **Prescribed burns ignited in proximity to structures will only be ignited during periods of low visitation and if the prevailing winds will carry the smoke away from the structures.**

3. **Current and predicted weather forecasts will be utilized along with test fires to determine smoke dispersal.**

4. **Smoke dispersal will be visually monitored on a continuous basis at set intervals during the course of all prescribed burns. If air quality standards are exceeded or smoke creates a hazard or nuisance, especially in or near smoke sensitive areas, the prescribed burn will be extinguished.**

5. **An Air Quality Monitoring Plan will be developed and implemented for management-ignited prescribed fires larger than 100 acres and expected to last for more than three days.**

6. **When management-ignited prescribed fires are conducted, notification will include the Bureau of Land Management (BLM); local communities that may experience smoke; park staff; and park visitors.**

3.7.2.2 Alternative 2

Proposed activities that would have adverse impacts to air quality include activities associated with suppressing wildland fires. General impacts to air quality resulting from suppressing wildland fires would be the same as those described in the "No Action" Alternative.

3.7.2.3 Alternative 3 (NPS Preferred Alternative)

Proposed activities that would have adverse impacts to air quality include activities associated with suppressing wildland fires, manual thinning of hazard fuels to maintain defensible space, and conducting research burns.

Impacts to air quality resulting from fire suppression under this alternative would be the same as those described in the "No Action" Alternative.

Adverse impacts to air quality as a result of research burns would be short-term and negligible. There would be a release of smoke during the burning of the plots during the spring and summer burn treatments. Due to the small acreage being burned, the smoke is anticipated to be generally imperceptible to populations in the town of Joshua Tree or Yucca Valley. The smoke would dissipate quickly due to prevailing winds from the southeast. The proposed action would not cause air quality thresholds for the Mojave Air Quality Management District to be exceeded. There would be no adverse impacts to air quality from manually thinning hazard fuels.

3.7.3 Conclusion

Alternative 1, the "No Action" Alternative would have the most adverse impacts to air quality of the three alternatives through its use of prescribed fire and prescribed natural fire, however, these adverse impacts would be short-term and minor. The implementation of any of the alternatives would not impair air quality resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other National Park Service planning documents.

3.8 VISITOR USE AND EXPERIENCE

3.8.1 Affected Environment

The deserts of California have incurred dramatic human development in the last fifty years. Increased populations have meant increased visitation. The park is about 120 miles east of Los Angeles. Over 18 million people live in the greater Los Angeles/San Diego area and the population is expanding rapidly. In 2003, there were a total of over 1.28 million total visits to the park, up from approximately 1.18 million from the year before (NPS Visitation Database Reports http://www2.nature.nps.gov/npstats/npstats.cfm). About half the annual visitation takes place between February and May.

Despite the fact that Joshua Tree NP is largely a frontcountry day use destination for most visitors, backcountry use has also increased in recent years (recorded by backcountry camper nights). Activities include hiking, picnicking, rock climbing, interpretive walks and talks, and camping. Only about .5 percent of all of the park visitors spends the night in the park's backcountry. Bicycling has been permitted on public roads, both paved and dirt. The park offers an extensive network of dirt roads that make for less crowded and safer cycling than the paved main roads.

Outstanding opportunities for hiking and exploring on the park's trail system and cross-country exist. Trails range from the relatively easy nature trails to the longer 16-mile Boy Scout Trail or the strenuous 7.5-mile Lost Palms Oasis trail. Cross-country possibilities

abound. Other popular attractions include the park's oases and a wide variety of remnants of the gold mining era.

The most intensively used backcountry and wilderness areas in the park are in Hidden Valley and the Wonderland of Rocks. These areas provide some of the most popular and diverse rock climbing in the United States, and accessibility to most of the area by car and foot is excellent. Massive boulders and rock outcrops make Joshua Tree National Park a world-renowned rock climbing area. Its reputation brings climbers from throughout the world to the park. Skilled and novice technical rock climbers are attracted to the climbing opportunities. Approximately 5,400 routes exist on 700 rock formations that are concentrated over about 100,000 acres. These formations vary in size and can support from one to 40 different climbing routes.

Viewing and studying scenery, plants, and wildlife are the primary visitor activities, followed by general recreational activities (*e.g.* hiking, camping, picnicking, rock scrambling), and viewing and studying cultural sites. Joshua Tree NP is also popular with technical rock climbers because of the quality of the climbing and ready access to the rocks and camps.

3.8.2 Environmental Consequences

Impacts to visitor use and experience were qualitatively assessed using professional experience in light of the intensity and duration of fire management activities. Visual resource impacts in this environmental assessment were assessed in terms of scenic integrity, visual wholeness, and unity of the landscape.

3.8.2.1 Alternative 1 (No Action)

Depending on size, area and time of year a wildland fire occurs, wildland fire suppression activities may cause short-term minor impacts to individual visitor use and experiences. There would be some minor adverse impacts to visitor use and experience during and immediately following wildland fire suppression activities. Short-term reduction in scenic integrity, however, would be minor because fire management activities would likely involve only short-term presence of vehicles and people. Adverse impacts would include the presence of engines and fire crews in scenic vistas, appearance of aircraft retardant lines, reduction in scenic integrity, noise from aircraft, pumps, chainsaws and other power equipment, temporary closures of roads, trails and campgrounds, and smoke. Recreational areas may be closed for extended periods to protect human safety, and also to provide the area to recover.

Following a wildland fire, visual scars may be noticeable from the firelines that were constructed to contain the fire. Areas that were burned would be visible to the public after suppression, but the area would generally be small in size. This minor impact would be short-term, as mitigations to repair damage to soils would be conducted, and as vegetation returns to the area, erasing the visual impacts of the fire. Visual impacts resulting from a charred landscape are subjective, while some visitors may dislike the sight of

charred/burned landscape, some people see a charred/burned landscape as part of a natural process, and are intrigued by the sight.

There would also be some short-term reduction in scenic integrity and visitor use and experience during and immediately following any prescribed and prescribed natural fire treatments from the presence of engines and fire crews, and the charred treatment areas. Short-term reduction in scenic integrity, however, would be minor because fire management activities would involve only short-term presence of vehicles and people. As stated above, visual impacts resulting from a charred landscape is subjective, and contingent upon personal taste. Prescribed and prescribed natural fire can also have long-term, minor adverse impacts on visitor use. Recreational opportunities found within any of the treatment areas may be temporarily closed to visitors during a burn to protect the public and to minimize damage to the resource. Some areas would be temporarily closed.

Prescribed and prescribed natural fire use near roads can potentially create minor, short-term inconvenience to visitors due to smoke and reduced visibility during the fire. Smoke accumulation would be temporary since prescribed fires would be ignited under favorable conditions for smoke dispersion. Any prescribed fires would likely produce short-term smoke accumulations that impact local visual quality, however, these impacts would be minimized through the use or mitigation measures outlined in section 2.3.2.

3.8.2.2 Alternative 2

Under Alternative 2, visitor use and experience adverse impacts would be short-term and minor, and would be similar to those described under the "No Action" Alternative with regards to wildland fire suppression.

3.8.2.3 Alternative 3 (NPS Preferred Alternative)

Under Alternative 3, visitor use and experience adverse impacts would be short-term and minor, and would be similar to those described under the "No Action" Alternative with regards to wildland fire suppression.

Adverse impacts to visitor use and experience resulting from conducting research burns on approximately 40 acres would be short-term and minor. However, adverse impacts to scenic integrity would be moderate and long-term.

3.8.3 Conclusion

All three alternatives would have only short-term minor adverse impacts on visitor use and experience resulting from wildland fire suppression activities. However, Alternative 1, the "No Action" Alternative would have the most short-term minor adverse impacts with its use of prescribed and prescribed natural fire. Also, hazard fuels reduction activities proposed in Alternative 3 would have short-term, minor, adverse impacts to the scenic integrity of the park.

3.9 PARK OPERATIONS

3.9.1 Affected Environment

The Superintendent of Joshua Tree National Park administers all aspects of management including programs, staffing, facilities, and relationships with groups, agencies, and the general public. In the event of a wildland fire the key person for general information dispersal is the park's Public Information Officer, who generates press and public information releases from information supplied by the Fire Management Officer and is responsible for the overall implementation of the Public Information Plan. The Superintendent's office is responsible for the distribution of pertinent fire information to existing landholders within the park.

The general staff, with the Interpretation division taking the lead, is responsible for the dissemination of accurate fire information to the visiting public. This includes educating the visiting public to the role of natural fire in the park ecosystem. Park interpreters will inform the public of wildland fire policy and status through talks and informal contact at the Visitor Center. In conjunction with the Fire Management Officer and Resources Management Division, Interpretation Division will ensure park-wide compliance with the public information plan.

3.9.2 Environmental Consequences

Impacts to park operations were qualitatively assessed using professional judgment based on consideration of the overall size of the site, National Park Service personnel, and park structures.

3.9.2.1 Alternative 1 (No Action)

Park operations can be disrupted by wildland fires when developed areas and other values are threatened from wildland fires. In the event of a wildland fire, the park could see short-term minor to moderate adverse impacts to park operations resulting from demands relating to traffic control and law enforcement, possible emergency medical services, fire information services, transporting supplies and personnel, closing the park to the public, and follow-up maintenance work. However, by actively suppressing any wildland fire that may occur with the aid of fire management personnel from nearby local, state, and federal agencies, park operations and park facilities would not likely be affected under this alternative. In the event of a wildfire within or adjacent to the park, park operations could be temporarily affected depending on the severity of the fire and situation at hand as visitors and non-essential park personnel were evacuated to off-site and safe locations.

There would be no adverse impacts to park operations as a result of prescribed or prescribed natural fire use.

3.9.2.2 Alternative 2

General impacts to park operations with regards to wildland fire suppression would be similar to those described in the "No Action" Alternative.

3.9.2.3 Alternative 3 (NPS Preferred Alternative)

General impacts to park operations with regards to wildland fire suppression and conducting prescribed research burns (~40-acres) would be similar to those described in the "No Action" Alternative. Creating and maintaining defensible space around park structures would have long-term beneficial impacts to park operations as greater protection from wildland fires is given to park structures.

3.9.3 Conclusion

All three alternatives would have similar minor to moderate adverse short-term effects on park operations resulting from wildland fires. However, by actively suppressing any wildland fires that may occur on the site, impacts to park operations from wildland fires would be minimized.

3.10 HUMAN HEALTH AND SAFETY

3.10.1 *Affected Environment*

Joshua Tree National Park has a comprehensive fire management plan dedicated to ensuring the safety of the public and park employees. Numerous safety measures are followed to maintain the highest safety standards possible for park employees, residents, visitors and neighbors

Fire management activities are inherently risky, involving hard physical work in difficult terrain, sometimes under adverse weather conditions. For personnel, the hazards of wildland fire suppression and wildland and prescribed fire use include falling limbs and trees, smoke inhalation, burns, heat exhaustion, use of sharp tools, power tools, risks involved with helicopter flights in mountainous terrain, and cross-country travel across rugged terrain.

For visitors, residents and neighbors, the hazards of fire include the effects of smoke and the risk of fire burning across trails or boundaries. Hazard fuel reduction and prescribed fire are both activities that are pre-planned to minimize risks to human health and safety.

3.10.2 *Environmental Consequences*

Human health and safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, literature review of type and extent of injury caused by equipment and conditions.

3.10.2.1 Alternative 1 – No Action

Under this alternative, activities that potentially could have the greatest threat to human health and safety would be those associated with wildland fire suppression and smoke inhalation.

Adverse impacts on human health and safety from wildland fire suppression activities could range from minor to major, from small injuries and bruises to accidental death. Factors most likely to adversely impact firefighter health and safety include sprains, strains, cuts, bruises, burns, and smoke inhalation from accidental tripping and falling, injuries from the use of firefighting equipment, falling trees, and, in severe cases, injuries from wildland fires. While each crew member is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines would minimize accidents. The risks of this work would be mitigated through the use of established safety precautions, as listed under section 2.3.2.

Smoke inhalation can also pose a threat to human health and safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM 2.5), and total suspended particulate (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000a).

Adverse impacts of smoke on public health would normally be minor and short-term, as the park is located in a rural area, without large concentrations of people. There is no way to limit completely the impacts of smoke on the local communities, or sensitive receptors (*e.g.* private residences, visitor center) from wildland fires. Park staff would pay close attention to projected fire behavior and weather conditions to determine the potential extended impacts on the public. Neighbor notification and public education and warnings would be needed during episodes of heavy smoke, so that people who are smoke-sensitive can respond appropriately to limit their exposure. Use restrictions applied to areas of prescribed fires would minimize or eliminate public human health and safety concerns resulting from smoke exposure and fire injuries.

The risks of wildland fire burning onto privately-owned lands would be mitigated through aggressive fire suppression of all unplanned fires. This would be facilitated by a coordinated interagency response to ignitions.

When using prescribed fire, mitigation measures, such as construction of fire lines, the presence of engines, and strict adherence to prescribed fire plans, would minimize the potential for an out-of-prescription burn or escape. Elements of the prescribed fire plan that relate to ensuring a safe burn include such measures as fuel moisture, wind speed, rate of fire spread, and estimated flame lengths. While the potential for a fire escape will always exist when conducting prescribed fires, that potential is extremely small. Recent statistics summarized by the National Interagency Fire Center report that approximately 1% of prescribed fires on federal lands required suppression activities of some kind. In most cases, these prescribed fires jumped a control line and suppression tactics were

successfully used to control them. Out of the 1% of prescribed fires that required suppression, 90% were controlled without incident. Statistically, this result leaves about 0.1% of prescribed fires that required major suppression actions (Stevens, 2000).

Prior to the ignition of any prescribed fire in the park, all the burn parameters of the existing and approved prescribed fire burn plan must be met to ensure a safe and effective prescribed fire. Visiting public will be informed and educated by park staff whenever prescribed burns take place. In the event of potentially hazardous wildland fires within the park, the park superintendent and appropriate staff would coordinate public notification efforts within and outside the park. The extent of public notice would depend on the specific fire situation. In every case, assuring visitor and park staff safety would take priority over any other activities.

3.10.2.2 Alternative 2

Under this alternative, activities that potentially could have the greatest threat to human health and safety would be those associated with wildland fire suppression and smoke inhalation.

The general impacts to human health & safety under this Alternative with regards to wildland fire suppression would be similar to those under the "No Action" Alternative.

3.10.2.3 Alternative 3 – NPS Preferred Alternative

Under this alternative, activities that potentially could have the greatest threat to human health and safety would be those associated with wildland fire suppression and smoke inhalation.

The general impacts to human health & safety under this Alternative would be similar to those under the "No Action" Alternative. There would be negligible adverse impacts from manual/mechanical thinning around park structures (*e.g.* small scrapes and bruises, pulled muscles).

3.10.3 Conclusion

Under all three alternatives, there is the potential for injury to workers from suppressing wildland fires. Under alternatives 1 and 3 there is the additional potential for injury to workers from carrying out prescribed fire activities and conducting mechanical thinning. Under alternatives 1 and 3 the potential for minor exposure to smoke by workers and the public during prescribed fire is slightly increased.

3.11 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic

preservation officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions.

3.11.1 Affected Environment

The park contains the early Pinto culture sites and traces of other prehistoric and historic American Indian cultures, as well as those of Euro-American gold mining, homesteading, and subsistence cattle ranching. The park is archeologically, ethnographically, and historically diverse. It exhibits a continuum of cultural adaptation and includes a significant collection of prehistoric and historic American Indian artifacts and late 19th century and early 20th century non-Indian artifacts. These artifacts document the parks importance to east-west migrations from prehistoric times. The remnants of past human occupations illustrated the adaptations that different groups made to the arid desert environment. The park currently protects over 15 cultural landscapes, 582 archeological sites, 95 historic structures, and houses 238,624 accessioned items in its museum collection.

While there were 19 potential landscapes, a Level I Cultural Landscape Inventory (CLI) was done on the Oasis of Mara and it was found to not have integrity as a historic landscape; however, it is still eligible as an archeological site and possibly a traditional cultural property. The Keys Ranch, Cow Camp, and Barker Dam landscapes had one Level II CLI and have been looked at for eligibility by the State Historic Preservation Officer. These three National Register sites are one landscape in three discontinuous units, all connected by road corridors. The National Park Service and SHPO have agreed and signed off on the eligibility of these sites, but the National Register status has not changed.
Archeological and historical remains within the park represent evidence of man's efforts to use the natural resources. Two major periods of aboriginal occupation separated by several thousand years are represented. The oldest period is found in Pinto Basin sites, one of the first "early man" areas to be identified in California. These post-Pleistocene sites contain choppers and large projectile points indicative of a big game economy (Schroth, 1994).

In more recent prehistoric and historic times the area now covered by the park was used by Cahuilla, Chemehuevi, Serrano, and Mojave people. Trails, important in the trade economy of these peoples, crossed the park. Archeological evidence of this more recent Native American use has been found in milling slicks in open areas and in rock shelters, although the largest single site is that of the late 19th century Indian village at the Twentynine Palms Oasis on the privately owned western portion.

Tools of more recent prehistoric people indicate adaptation to a desert environment. Primary sources of food were seeds and small animals; mobility was essential for finding sufficient feed and water for survival. No structures of substance remain but natural rock features such as rock overhangs, caves and rockpiles were used for shelter. Natural "tanks", or potholes, were used as water sources supplementing springs and oases. Smaller caves and crevices were used to store food in ollas for future needs. Extensive rock art concentrations are located east of Cottonwood Springs, south of Fortynine Palms Oasis,

the Desert Queen mine area, and the largest concentration found in the Wonderland of Rocks.

During the last quarter of the 19th century and the first third of the 20th century, there was a steady influx of ranchers, homesteaders, and miners hoping to make their fortunes in cattle or gold, or both. Six sites representative of mining and ranching operations are on the National Register of Historic Places. Ranch sites are the Ryan House and Lost Horse Well, Barker Dam, Cow Camp, and the Desert Queen Ranch (Keys Ranch). Wall Street Mill and Desert Queen Mine represent mining operations. Lost Horse Mine and two oases, the Twentynine Palms Oasis (Oasis of Mara) and the Cottonwood Oasis, known for their historical significance, have been nominated and declared eligible for inclusion to the National Register. Four mining sites have been determined eligible by SHPO. They are the Pinyon Historical Mining District, Eagle Cliff Mine and Pinto Wye Arrastra; in addition, El Dorado Mine and Mill structures associated with historic sites in the park have been included in the List of Classified Structures.

3.11.2 Environmental Consequences

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during wildland fire suppression, and hazard fuel reduction activities.

3.11.2.1 Alternative 1 (No Action)

Proposed activities with the potential to impact known and unknown cultural resources include wildland fire suppression activities, and prescribed and wildland fire use. When dealing with wildland fires there is always a degree of uncertainty when trying to predict the potential impacts on cultural resources. The effects of fire on cultural resources are still not well-understood or documented. For example, post-fire observations are often unable to distinguish between damage to archaeological resources caused by the fire itself from damage that was pre-existing. Thus, the following discussion of potential impacts of fire and fire management on cultural resources is of necessity both in general and speculative terms.

Both wildland fires and wildland fire suppression could adversely impact landscapes, structures, or sites. Fires themselves can and often do destroy historic structures or properties, especially those constructed of wood or other flammable material.

The vulnerability of subsurface archaeological resources and artifacts to fire depends not only on the nature of the materials themselves but also on the duration of the fire, moisture content, fuel loads, and intensity of the fire. Hotter surface fires penetrate more deeply into the subsurface and can potentially cause more damage. Glass bottles can be cracked or broken for example. On the other hand, ceramics or objects carved or chipped from stone are likely to be more resistant to fire and heat (N.W.C.G., 2001). In addition, clearing firelines associated with fire suppression can damage unknown subsurface cultural and archaeological resources by exposing, crushing, or removing them.

Since all of Joshua Tree National Park is desert environment with sparse fuel, the major concerns for cultural resources in fire management are the loss of historic structures and the adverse impact of ground disturbance from construction of fire lines either during prescribed burns or wildland fire suppression. During all wildland fire suppression, the minimum impact suppression tactics policy would be incorporated to the greatest extent feasible and appropriate for the given situation. Tactics directly or indirectly facilitating the protection of landscapes, structures, sites, or the ethnographic value to tribal members include:

- **Keeping fire suppression vehicles on existing roads whenever possible; when driving off-road is deemed necessary, the least number of vehicles needed would be used, they would drive in only one set of tracks, and a crew member would walk in front of the trucks looking for natural and cultural features to avoid.**

- **Keeping fireline width as narrow as possible when it must be constructed.**

- **Avoiding ground disturbance within known archeological/cultural/historic resource locations. When fireline construction is necessary in proximity to these resource locations it will involve as little ground disturbance as possible and be located as far outside of resource boundaries as possible.**

- **Have archaeologists available to assist crew at the fire line when possible.**

- **Using soaker hose, sprinklers or foggers in mop-up; avoiding boring and hydraulic action.**

While mitigations would be used to protect known cultural resources, there would be the potential for fire suppression and management activities to affect unrecorded cultural resource sites. These activities (*e.g.* digging of firelines, driving suppression vehicles off-road) can break or crush artifacts, or expose artifacts making them vulnerable to the elements or collectors.

Since both prescribed and prescribed natural fires would not be allowed near any known cultural sites, there would not likely be any adverse impacts. The vulnerability of unknown subsurface artifacts to fire depends not only on the nature of the materials themselves but also on the intensity of the fire. Hotter surface fires penetrate more deeply into the subsurface and can potentially cause more damage. Glass bottles can be cracked or broken, for example. On the other hand, ceramics or objects carved or chipped from stone are likely to be more resistant to fire and heat. However, in general, the concern for direct fire damage to prehistoric sites in Joshua Tree is small. The type of fires that would be utilized to meet resource management needs typically remain below 900°F and have a residence time of half an hour or less. This type of fire is likely to do very little damage to archeological artifacts and resources at even shallow depths (Wiltz, 2004). Exceptions to this would be organic materials such as basketry and wooden implements and pollen grains used to assess diet and environmental conditions of the past can be destroyed.

There would be the potential for fire management activities to affect unknown cultural resources within the site. Overall, however, the "No Action" Alternative would likely not adversely impact known cultural resources in the park.

3.11.2.2 Alternative 2

Proposed activities with the potential to adversely impact known and unknown cultural resources activities associated with suppressing wildland fires.

General impacts, in regards to wildland fire suppression would be the same as those described in the "No Action" Alternative.

3.11.2.3 Alternative 3 (NPS Preferred Alternative)

Proposed activities with the potential to adversely impact known and unknown cultural resources activities associated with suppressing wildland fires, manual/mechanical reducing hazard fuels, and conducting research burns.

General impacts, in regards to wildland fire suppression would be the same as those described in the "No Action" Alternative.

There would be no adverse impacts to any of the park's cultural landscapes, or cultural resources on the National Register of Historic Places from either manual/mechanical thinning or conducting research burns, since there are no known cultural resources located within the treatment areas. There would, however, be the potential for fire management activities to affect unknown cultural resources within these treatment areas. Manual/mechanical thinning would not involve sub-surface activities or heavy equipment and is therefore unlikely to affect undiscovered cultural resources. All prescriptions would be reviewed and approved by the park's cultural resource specialist prior to any treatment work around park structures to ensure no harm would come to any cultural resources or landscapes that may be located in the treatment areas. In addition, these activities would not likely cause any significant ground disturbance, which could damage unknown cultural artifacts.

The park has initiated consultation regarding possible impacts to cultural resources from the FMP with the State Historic Preservation Officer (SHPO).

3.11.3 Conclusion

Under all three alternatives there would be the potential to adversely impact unrecorded cultural resources through fire management activities. However, Alternative 3 would contribute most to long-term protection of cultural resources through the wildland fire suppression and creating defensible space around park structures. In addition, the area impacted by prescribed research burns is much less than the area impacted by prescribed and prescribed natural fires, thus decreasing the possibility of damage to unknown cultural resources and artifacts.

The implementation of any of the alternatives would not impair cultural resources or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other National Park Service planning documents.

3.12 CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 USC 4321 *et seq*.), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non- Federal) or person undertakes such other actions" (40 CFR 1508.7).

The cumulative impacts analysis for the fire management plan environmental assessment considers the past, present, and reasonably foreseeable future actions on land uses that could add to (intensify) or offset (compensate for) the effects on the resources and that may be affected by the fire management plan alternatives. Cumulative impacts vary by resource and the geographic areas considered here are generally the park and areas adjacent to the park. In some instances, activities may result in both negative and positive impacts when considering the short and long-terms.

There are no current or foreseeable future actions on land uses planned at Joshua Tree National Park that would have any effects on any of the actions proposed in the alternatives. Past actions of the park that could potentially add to (intensify) include the past use of prescribed and wildland fire which may have led to the increased spread of non-native grasses, which has led to increased fuel loads and the increased potential for wildland fires.

Since any of the alternatives would not result in any significant adverse cumulative impacts and only minor beneficial cumulative impacts (*e.g.* protection of cultural resources from wildland fire), if any of the three alternatives were selected, there would be no contribution to the cumulative impacts to any of the natural or cultural resources at Joshua Tree National Park.

Chapter 4 – Consultation and Coordination

4.1 COMPLIANCE REQUIREMENTS

Joshua Tree National Park is currently managed based on the direction of the approved 1994 General Management Plan. National Park Service (NPS) policy (*Director's Order #18: Wildland Fire Management)* requires that every park unit with burnable vegetation develop a fire management plan (FMP) approved by the park superintendent. The FMP serves as a detailed and comprehensive program of action to implement fire management policy principles and goals, consistent with the unit's general management objectives. The park's fire management program, guided by federal policy and the park's resource management objectives, will serve to protect life, property, and natural and cultural resources. The proposal to prepare a fire management plan for Joshua Tree National Park is consistent with the park's management documents and with the Federal environmental laws and agency regulations listed below.

4.1.1 Federal

4.1.1.1 National Environmental Policy Act

The National Environmental Policy Act requires the consideration of the environmental effects of proposed Federal actions. The act also ensures that environmental information is available to public officials and members of the public before decisions are made and before actions are taken. This Environmental Assessment has been prepared in accordance with the National Environmental Policy Act to evaluate the impacts of the project on the human and natural environment and provide an opportunity for the public to review and comment on the project. Following public and agency review, the Director of the Pacific Western Region will make a determination concerning whether or not the project would result in significant impacts on the human environment. If the project would not significantly impact the human environment, the Regional Director will issue a "Finding of No Significant Impact." If the project would significantly impact the human and natural environment, the Regional Director will issue a "Notice of Intent" to prepare an Environmental Impact Statement.

4.1.1.2 Consultation with the U.S. Fish and Wildlife Service

The purposes of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.) (ESA), include providing "a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." According to the ESA, "all Federal departments and agencies shall seek to conserve endangered species and threatened species" and "[e] ach Federal agency shall…insure that any action authorized, funded, or carried out by such agency…is not likely to jeopardize the continued existence of listed species or threatened species".

The U. S. Fish and Wildlife Service administer the ESA. The effects of any agency action that may affect endangered, threatened, or proposed species must be evaluated in

consultation with either the U.S. Fish & Wildlife Service or National Marine Fisheries Service, as appropriate. Implementing regulations that describe procedures for interagency cooperation to determine the effects of actions on endangered, threatened, or proposed species are contained in 50 CFR 402. Section 7 of the ESA requires all Federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat. The U.S. Fish and Wildlife Service has indicated that the proposed project will not have an adverse effect on any federally listed threatened or species of special concern.

The NPS initiated informal consultation on threatened and endangered species by contacting the
USFWS on April 2004. Chris Otahal, Endangered Species Biologist at the USFWS Carlbad Office indicated that the only federally list species at the site was the desert tortoise, and that the USFWS had no concerns regarding adverse effects on this species from any of the proposed fire management activities. The park sent the USFWS office the Biological Assessment (BA) on October 13, 2004.

4.1.1.3 Consultations with the State Historic Preservation Officer (SHPO)

Section 106 of the National Historic Preservation Act, as amended (36 CFR 800), requires federal agencies to consider the effects of projects they fund, permit, or license on historic properties that are listed or eligible for listing in the NRHP. Compliance with Section 106 requires agencies to initiate consultation during the project's early planning stages with appropriate parties, including the pertinent State and/or Tribal Historic Preservation Officer(s); identify historic properties within the project's area of potential effect; and determine what impact, if any, the project will have on those resources. Section 106 consultations and NEPA are two separate, distinct processes. They can and should occur simultaneously, and documents can be combined, but one is not a substitute for the other. They should, however, be coordinated to avoid duplication of public involvement or other requirements. The information and mitigation gathered as part of the 106 review must be included in the NEPA document, and the 106 process must be completed before a finding of no significant impact (FONSI) or the official record of decision (ROD) can be signed on a proposal that affects historic properties (DOI, 2001a).

If the agency, in consultation with the other consulting parties, determines that the project has the potential to have an adverse impact on historic properties, further consultation must occur to seek ways to avoid, minimize, or mitigate the effects. Therefore, the SHPO will have the opportunity to review and comment on this proposed Fire Management Plan. The NPS has initiated consultation with the State Historic Preservation Officer.

4.2 LIST OF PREPARERS

The Mangi Environmental Group

- **Joel Gorder, Project Manager**
- **Rachel Shaw, Environmental Analyst**

- **Rebecca Whitney, Geographic Information Systems (GIS) Analyst**

National Park Service – Joshua Tree National Park

- **Judy Bartzatt, Chief Ranger**
- **Paul Deprey, Chief of Resource Management**
- **Gary Lindberg, GIS Specialist**
- **Jan Sabala, Cultural Resource Manager**
- **Tasha LaDoux, Biologist**
- **Amy Fesnock, Biologist**
- **Luke Sabala, Physical Scientist**

4.3 PUBLIC SCOPING COMMENTS

The public was asked to comment on five possible alternatives for the fire management plan. These alternatives included:

1. **Appropriate suppression of all wildland fires; .**

2. **Appropriate suppression of wildland fire, allowing wildland fire use for resource benefits, manage a prescribed fire program with mechanical fuels reduction;**

3. **Appropriate suppression of all wildland fire, no wildland fire use, mechanical fuels reduction and manage a prescribed fire program;**

4. **Appropriate suppression of wildland fire, wildland fire use, mechanical fuel reduction and no prescribed fire program; and**

5. **Hazard fuel reduction through mechanical and or chemical treatment.**

Details of the scoping process and the issues that arose from it are described in Chapter 1, Section 1.5 – *Scoping Issues and Impact Topics*.

4.4 DISTRIBUTION

This Environmental Assessment will be placed on formal public review for 30 days and will be distributed to a variety of interested individuals, agencies, and organizations that request a copy of the EA, including those listed under "Consultation and Coordination". These parties will be notified by letter that the EA is available for review and will be instructed on how to obtain a copy of the EA.

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APPENDIX A

CONSULTATIONS WITH UNITED STATES FISH AND WILDLIFE SERVICE, AND THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICE

United States Department of the Interior

NATIONAL PARK SERVICE
Joshua Tree National Park
74485 National Park Drive
Twentynine Palms, California 92277-3597

IN REPLY REFER TO:
L7621 (JOTR-R)
N1621 (JOTR-R)

October 13, 2004

Field Supervisor
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road
Carlsbad, California 92009

Dear Mr. Jim Bartel:

The National Park Service is requesting formal consultation for the Fire Management Plan and the associated fire management activities proposed for Joshua Tree National Park, pursuant to section 7 of the Endangered Species Act of 1973, as amended. The project involves suppression activities, fire research, and non-fire fuel treatment (mechanical hazard fuel reduction).

Through conversations with your office, we have determined the project falls within suitable habitat for the federally threatened desert tortoise (*Gopherus agassizii*). The project has the potential to affect critical habitat (Pinto Mountain and Chuckwalla CH units) as well as significant portions of the Joshua Tree Desert Wildlife Management Area. We anticipate impact to desert tortoise habitat at the following levels: 65.0 acres associated with the fire research, ~670 acres associated with non-fuel fire treatments, and ~6020 acres associated with suppressing wildland fires for the ten-year life span of the Fire Management Plan. The proposed mitigation measures will minimize impacts to desert tortoise.

We believe this project may affect, and is likely to adversely affect the desert tortoise, but will not jeopardize its continued existence. We believe the attached Biological Assessment includes the necessary information to initiate the consultation process. Please contact our park wildlife ecologist, Amy Fesnock, with questions at 760-367-5578. We look forward to your response to our request by November 19, 2004 and anticipate the Biological Opinion concluding the consultation process by March 19, 2005.

Sincerely,

Curt Sauer
Superintendent

Enclosure

cc: Judy Bartzatt -- JOTR
Chuck Heard -- MOJA

United States Department of the Interior

NATIONAL PARK SERVICE
Joshua Tree National Park
74485 National Park Drive
Twentynine Palms, California 92277-3597

IN REPLY REFER TO:

H4217 (JOTR)

March 15, 2005

Mr. Wayne Donaldson
State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Mr. Donaldson:

This letter is being sent to inform you that Joshua Tree National Park is about to complete its new Fire Management Plan (FMP) and Environmental Assessment (EA), which includes a proposed change in fire management at the park. Initially a public notice of intent to conduct an EA was announced in June of 2002 seeking input into this plan. Also, to comply with Section 106 of the National Historic Preservation Act, in accordance with the Advisory Council on Historic Preservation's regulations (36 CFR Part 800.8(c)), we are notifying you of our intention to utilize this document to address our National Historic Preservation Act section 106 responsibilities.

The new FMP/EA is a plan designed to assist the park in the implementation of all fire-related activities within the park. These include research burns, mechanical thinning, and wildfire suppression. The National Park Service has developed three alternatives through the National Environmental Policy Act process that include "no action" (continue to use the 1992 plan); full suppression; and wildland fire suppression as well as research burns and hand and mechanical thinning of up to 100' of defensible space around structures. The third option is the NPS-preferred alternative.

All alternatives have been developed from park legislation, public scoping, the Joshua Tree National Park 1994 General Management Plan/Environmental Impact Statement and other park plans, the 2001 Federal Wildland Fire Management Policy and guidelines, as well as suggestions from park staff.

Under the preferred alternative the park will identify historic properties in all proposed research and thinning areas, in accordance with 36 CFR 800.4, and make recommendations prior to any undertakings. Generally, there is little concern for direct fire damage to prehistoric sites at Joshua Tree National Park since fuel accumulations are not likely to produce high levels of heat concentrated in a given areas for long periods of time. The major concern for cultural resources at the park is from the impact of ground disturbances from fire management activities such as the construction of firelines during emergency wildland fire suppression. Minimum Impact

Suppression Tactics will be used at all times to minimize these potential effects. In all cases of ground disturbance during a wildland fire an archeologist will be consulted before ground is broken whenever possible. Ideally, an archaeologist will be on site as soon as possible during large wildland fires, especially if inventories show significant concentrations of cultural resources in the affected area.

It has been determined that there would be no adverse impacts to any of the park's cultural landscapes or cultural resources from either thinning of hazard fuels around structures or from conducting research burns, since there are no known cultural resources located within the proposed treatment areas. Under all three alternatives there would be the potential for minimal adverse impacts to unrecorded cultural resources through wildland fire management activities. However, the use of Minimum Impact Suppression Tactics and the presence of an archeologist on site should mitigate the possible effects.

If you should any questions or require additional information, please contact Jan Sabala by telephone at 760-367-5570, or by email at Jan_Sabala@nps.gov.

Sincerely,

Curt Sauer
Superintendent

United States Department of the Interior

NATIONAL PARK SERVICE
Joshua Tree National Park
74485 National Park Drive
Twentynine Palms, California 92277-3597

IN REPLY REFER TO:

H4217 (JOTR)

March 15, 2005

Mr. John M. Fowler
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 809
Washington, DC 20004

Dear Mr. Fowler:

This letter is being sent to inform you that Joshua Tree National Park is about to complete its new Fire Management Plan (FMP) and Environmental Assessment (EA), which includes a proposed change in fire management at the park. Initially a public notice of intent to conduct an EA was announced in June of 2002 seeking input into this plan. Also, to comply with Section 106 of the National Historic Preservation Act, in accordance with the Advisory Council on Historic Preservation's regulations (36 CFR Part 800.8(c)), we are notifying you of our intention to utilize this document to address our National Historic Preservation Act section 106 responsibilities.

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Suppression Tactics will be used at all times to minimize these potential effects. In all cases of ground disturbance during a wildland fire an archeologist will be consulted before ground is broken whenever possible. Ideally, an archaeologist will be on site as soon as possible during large wildland fires, especially if inventories show significant concentrations of cultural resources in the affected area.

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If you should any questions or require additional information, please contact Jan Sabala by telephone at 760-367-5570, or by email at Jan_Sabala@nps.gov.

Sincerely,

Curt Sauer
Superintendent

APPENDIX B

Minimal Impact Suppression Techniques and Burned Area Emergency Rehabilitation Guidelines

The change from fire control to fire management has added a new perspective to the roles of fire managers and firefighters. The objective of fire management is to make unique decisions with each fire start, to consider the land and resource objectives, and to decide the appropriate suppression response and tactics which results in minimum costs and resource damage. Fire management now means managing fire "with time" as opposed to "against time." This way of doing business involves not just the firefighter, but all levels of resource management.

In the National Park Service, fire management requires fire managers and firefighters to select actions commensurate with the fire's potential or existing behavior, while leaving minimal environmental impact.

This appendix is intended to serve as a guide for the Incident Commander and Planning Section Chief, Operations Section Chief, Logistics Section Chief, Division/Group Supervisors, Strike Team/Task Force Leaders, Single Resource Bosses, Firefighters, and Burned Area Emergency Rehabilitation (BAER) teams.

Accomplishment of minimum impact suppression techniques originates with instructions that are understandable, stated in measurable terms, and communicated both verbally and in writing. Evaluation of these tactics both during and after implementation will further the understanding and achievement of good land stewardship ethics during fire management activities.

Minimum Impact Suppression Techniques for Agency Administrators, Incident Management Teams and Firefighters

The following guidelines are for park superintendents, incident management teams, and firefighters to consider. Some or all of the items may apply, depending upon the situation.

<u>Command and General Staff</u>

1. Evaluate each and every suppression tactic during planning and strategy sessions to see that they meet superintendent's objectives and minimum impact suppression techniques guidelines.
2. Include agency resource advisor and/or local representative in all planning and strategy sessions.
3. Discuss minimum impact suppression techniques with overhead during overhead briefings, to gain full understanding of tactics.
4. Ensure minimum impact suppression techniques are implemented during line construction as well as other resource disturbing activities.

<u>Planning Section</u>

1. Use resource advisor(s) to evaluate that management tactics are commensurate with land/resource objectives and incident objectives. A resource advisor should be involved in the development of the Wildland Fire Situation Analysis. The resource advisor should

consult with a biologist, botanist, geologist, ecologist, cultural resource staff, and other specialists as needed. The resource advisor should provide input to the Planning Section and Incident Commander, and will review shift plans to assess the potential effects of planned actions.

2. Use an assessment team to get a different perspective of the situation.

3. Seek concurrence with US Fish and Wildlife Service.

4. Use additional consultation from "publics" or someone outside the agency, especially if the fire has been or is expected to be burning for an extended period of time.

5. Adjust line production rates to reflect the minimum impact suppression techniques.

6. Use brush blade for line building—when dozer line is determined necessary tactics.

7. Leave all Joshua trees in fireline.

8. Ensure that instructions for minimum impact suppression techniques are listed in the incident action plan.

9. Detail objectives for extent of mop-up necessary—for instance: " XX meters within perimeter boundary."

10. If helicopters are involved, use long line remote hook in lieu of helispots to deliver/retrieve gear.

11. Anticipate fire behavior and ensure all instructions can be implemented safely.

12. In extremely sensitive areas, consider use of portable facilities (heat/cook units, latrines).

<u>Operations Section</u>

1. Emphasize minimum impact suppression techniques during each operational period briefing.

2. Explain expectations for instructions listed in incident action plan.

3. Consider showing minimum impact suppression techniques slide-tape program or video to the crews upon arrival at airport/incident.

4. Consider judicious use of helicopters—consider long lining instead of new helispot construction.

5. Use natural openings so far as practical.

6. Minimize or avoid water sites (i.e. oases, springs) disturbance, sedimentation, and actions that will disturb aquatic habitat.

7. Consider use of helicopter bucket drops and water/foam before calling for air tanker/retardant.

8. Chemical Fire Retardant, Foam and Fuel.

a. Wherever possible, avoid using chemicals when there is a potential for contamination of water sites (based on proximity, wind direction, wind speed, size and frequency of loads, etc.) Avoid use of retardant or foam within 300 feet of water site. Use of retardant should also be conducted only after consulting with resource advisors.

b. Do not pump directly from water site if chemical products are going to be injected into the pump or pumping system. If chemicals are needed, use a fold-a-tank from which to pump water.

c. If possible, dipping of helicopter buckets will occur only after chemical injection systems (storage containers) have been removed from the bucket or helicopter.

d. Keep refueling, fuel storage, and fuel trucks away from water sites and utilize spill pads and/or containment units.

e. Use spill pads under portable pumps and fuel cans/fuel lines connected to pumps.

f. The park should develop a contingency plan identifying procedures to be initiated should a chemical spill or contamination occur.

10. Monitor suppression tactics/conditions.

11. Distribute field guide to appropriate supervisory operations personnel.

12. Dispose of chemical spill pads according to the park's hazardous waste plan.

<u>Logistics Section</u>

Ensure that actions performed around areas other than Incident Base, i.e. dumpsites, camps, staging areas, helibases, etc., result in minimum impact upon the environment.

<u>Division/Group Supervisor and Strike Team/Task Force Leaders</u>

1. Ensure crew superintendents and single resource bosses understand what is expected.

2. Discuss minimum impact tactics with crew.

3. Ensure dozer and falling bosses understand what is expected.

4. If helicopters are involved, use natural openings as much as possible; minimize cutting only to allow safe operations.

5. Avoid construction of landing areas in high visitor use areas.

6. Monitor suppression tactics/conditions.

<u>Crew Superintendents</u>

1. Ensure/Monitor results expected.

2. Discuss minimum impact suppression techniques with crew.

3. Provide feedback on implementation of tactics—were they successful in halting fire spread, what revisions are necessary?

4. Look for opportunities to further minimize impact to land and resources during the suppression and mop-up phase.

Minimum Impact Suppression Technique Implementation Guide

Minimum impact suppression techniques require an increased emphasis to do the job of suppressing a wildland fire while maintaining a high standard of caring for the land. Actual fire conditions and your good judgment will dictate the actions you take. Consider what is necessary to halt fire spread and ensure it is contained within the fire line or designated perimeter boundary.

<u>Safety</u>

1. Safety is of utmost importance.

2. Constantly review and apply LCES, the 18 Situations That Shout Watch Out and 10 Standard Fire Orders.

3. Be particularly cautious with:

a. Burning snags you allow to burn down.

b. Burning or partially burning live and dead trees.

c. Unburned fuel between you and the fire.

d. Identify hazard trees with either an observer, flagging and/or glow-sticks.

e. Any felled or burned trees located within designated buffers shall be retained onsite.

f. Be constantly aware of the surroundings, of expected fire behavior, and possible fire perimeter one or two days hence.

Fire Lining Phase

1. Select procedures, tools, and equipment that least impact the environment.

2. Give serious consideration to use of water as a fireline tactic (fireline constructed with nozzle pressure, wetlining).

3. Avoid the use of tractors and heavy equipment in water sites (i.e. oases, springs).

4. In light fuels, consider:

a. Cold trail line.

b. Allow fire to burn to natural barrier.

c. Consider burn out and use of "gunny" sack or swatter.

d. Constantly re-check cold-trailed fireline.

e. If constructed fireline is necessary, use minimum width and depth to check fire spread.

5. In medium/heavy fuels, consider:

a. Use of natural barriers and cold-trailing.

b. Cooling with dirt and water, and cold trailing.

c. If constructed fireline is necessary, use minimum width and depth to check fire spread.

d. Minimize bucking to establish fireline; preferably build line around logs.

6. Aerial fuels—brush, trees, and snags:

a. Adjacent to fireline: limb only enough to prevent additional fire spread.

b. Inside fireline: remove or limb only those fuels which if ignited would have potential to spread fire outside the fireline.

c. Brush or small trees that are necessary to cut during fireline construction will be cut flush with the ground.

7. Trees, burned trees, and snags:

a. Minimize cutting of trees, burned trees, and snags. If possible, do not fall trees.

b. Live trees will not be cut, unless determined that they will cause fire spread across the fireline or seriously endangers workers. If tree cutting occurs, cut stumps flush with the ground.

c. Scrape around tree bases near fireline if hot and likely to cause fire spread.

d. Identify hazard trees with either an observer, flagging and/or glow-sticks.

8. When using indirect attack:

a. Do not fall snags on the intended unburned side of the constructed fireline, unless they are an obvious safety hazard to crews working in the vicinity.

b. On the intended burnout side of the line, fall only those snags that would reach the fireline should they burn and fall over. Consider alternative means to falling, i.e. fireline explosives, bucket drops.

9. Avoid increasing fire intensities within critical habitat during burnout or backfire operations.

<u>Mop-up Phase</u>

1. Consider using "hot-spot" detection devices along perimeter (aerial or hand-held).
2. Light fuels:
- **a. Cold-trail areas adjacent to unburned fuels.**
- **b. Do minimal spading; restrict spading to hot areas near fireline only.**

3. Medium and heavy fuels:
- **a. Cold-trail charred logs near fireline; do minimal scraping or tool scaring.**
- **b. Minimize bucking of logs to check for hot spots or extinguish fire: preferably roll the logs.**
- **c. Return logs to original position after checking or ground is cool.**
- **d. Refrain from making bone-yards: Burned/partially burned fuels that were moved would be arranged in natural position as much as possible.**
- **e. Consider allowing larger logs near the fireline to burnout instead of bucking into manageable lengths. Use lever, etc. to move large logs.**

4. Aerial fuels—brush, small trees and limbs: remove or limb only those fuels, which if ignited, have potential to spread fire outside the fireline.
5. Burning trees and snags:
- **a. First consideration is to allow a burning tree/snag to burn itself out or down (Ensure adequate safety measures are communicated).**
- **b. Identify hazard trees with an observer, flagging, and/or glow-sticks.**
- **c. If burning trees/snags pose serious threat of spreading firebrands, extinguish fire with water or dirt. Felling by chainsaw will be last means.**

<u>Camp Sites and Personal Conduct</u>
1. Use existing campsites if available.
2. If existing campsites are not available, select a campsite that is unlikely to be observed by visitors/users.
3. Camps, staging areas, and base heliports will be located away from water sites (i.e. oases, springs) and will be identified on a map prior to implementation.
4. Select impact-resistant sites such as rocky or sandy soil, or openings within sparsely spaced light brush.
5. Change camp location if ground vegetation in and around the camp shows signs of excessive use.
6. Do minimal disturbance to land in preparing bedding and campfire sites. Do not clear vegetation or do trenching to create bedding sites.
7. Toilet sites should be located a minimum of 200 feet from water sites. Holes should be dug 6-8 inches deep. Consider the use of vault toilets in large spike camps.
8. Select alternate travel routes between camp and fire if trail becomes excessive.
9. Evaluate the option of coyote camps versus fixed campsites in sensitive areas.

<u>After Fire Suppression Activities are finished</u>
1. Firelines:
- **a. After fire spread is secured, fill in deep and wide firelines and cut trenches.**
- **b. If cultural and natural resource advisors recommend seeding, firelines may be fertilized and seeded with an approved seed mix.**
- **c. Waterbar, as necessary, to prevent erosion, or use wood material to act as sediment dams. Waterbars or drain dips should be constructed at a 30 to 45 degree**

angle to the fireline. A berm height is not to exceed six inches in height. Assure downslope end of waterbar is open and has adequate length to prevent runoff from reentering the line below.

d. Ensure stumps from cut trees/large size brush are cut flush with ground.

e. Camouflage cut stumps, if possible.

f. Any trees or large size brush cut during fireline construction should be scattered to appear natural.

2. Camps (main and spike) and Helibases:

a. Restore campsite to natural conditions as much as possible.

b. Scatter fireplace rocks, charcoal from fire; cover fire ring with soil; blend area with natural cover.

c. Clean up trash, rake up wood chips, and remove any matting placed down to limit impacts.

d. Pack out all garbage and unburnables.

e. Block any new access routes and post closure signs.

f. If cultural and natural resource advisors recommend seeding, impacted areas may be fertilized and seeded with an approved seed mix. Heavily compacted soils may need to be ripped prior to application of seed and fertilizer.

3. Tractor lines/Safety Zones: If an emergency circumstance required the use of a tractor line, the following measures would be recommended:

a. Waterbars should be constructed at a 30 to 45 degree angle. Height of waterbars should not exceed 18 inches. Space 50 feet apart on slopes greater than 30 percent and 100 feet apart on slopes between 10 and 30 percent. The downslope side of the waterbar needs to be opened and of adequate length to allow free flow of water off the tractor line.

b. Breakup and pull all berms, tractor piles and windrows. Lop and scatter slash on disturbed areas to achieve 50 percent ground cover on disturbed sites.

4. General:

a. Remove all signs of human activity (plastic flagging, small pieces of aluminum foil, litter).

b. Restore helicopter landing sites.

c. Cover, fill in latrine site.

d. For any non-system roads: implement erosion control standards and restore the road to a pattern of use prior to its fire suppression usage.

<u>Cultural Resources and Minimum Impact Suppression Techniques</u>

Fire program undertakings with the potential to effect cultural resources include conducting prescribed burns and suppression or monitoring of wild fires. The scale, severity, and type of impacts vary for each type of undertaking. The majority of undertakings will occur as a function of planned management actions and program managers are liable for resource protection during these actions. However, wild fire incidents are unplanned events that have great potential to impact cultural resources. The best form of protection available for these events is to develop action guidelines and conduct preventative maintenance where appropriate. Preventative maintenance in general consists of fuel load reduction around identified cultural resources. Management guidelines in the event of wildfire are provided below:

Guidelines for cultural resource protection during wildfire suppression:

- **Cultural resource digital databases and GIS layers will maintained in a current status and available on compact disks during fire season to expedite the management decision-making process.**
- **The park archeologists will be notified immediately in the event of wildfire.**
- **An archeological resource specialist and/or resource advisor will be assigned to the incident management team if extended attack is required.**
- **When Native American cultural sites are threatened by fire, or fire suppression activities affiliated tribes will be notified.**
- **Identified historical structures, archeological districts, cultural landscapes, and archeological sites determined eligible or listed on the National Register of Historic Places will be priorities in resource protection planning.**

Burned Area Emergency Rehabilitation Guidelines

A Burned Area Emergency Rehabilitation (BAER) team, which should include a wildlife biologist, will be assigned to fires over 100 acres in size, if deemed necessary by the cultural and natural resources management staff. After a fire is declared out, a biologist should review the suppression and rehabilitation efforts to see if conservation measures were successfully implemented. Where large fires affect more than ten percent of a sub-watershed, it is recommended that a scientific group of experts be convened to prepare a peer reviewed assessment or analysis of the short term and long term effects from the wildfire, suppression actions, and rehabilitation. The assessment should also recommend actions (if there are any) that may be appropriate for the burned or unburned areas within the watershed.

<u>Stabilization and Rehabilitation Effectiveness Monitoring</u>

A basic level of effectiveness monitoring will be implemented for all stabilization and rehabilitation projects. Different monitoring protocols and strategies will be developed according to the needs anticipated on a case-by-case basis. Very long term monitoring protocols will be developed based on resource needs. Stabilization and rehabilitation actions in fire suppression infrastructure areas (fire line, dozer line, helibases, drop zones, spike camps, etc) will be regularly monitored for treatment effectiveness and exotic weeds and maintained on a biannual basis for three years after the fire. Monitoring will be preformed by an appropriately trained National Park Service resource professional or technician.

<u>Areas of Unique Ecological Concern</u>

Desert Tortoise Habitat. Natural plant succession will occur over time, but in the short term may lack an appropriate vegetation component because of brush and shrub succession. Revegetation of desert tortoise habitat areas could include the planting of native species, as well as the use of vertical mulching. Road improvements or closing may be proposed where roads pose a risk to wildlife habitat.

<u>Endangered Species Act Consultation Process</u>

Endangered Species Act (ESA) regulations require identification and evaluation of effects to threatened, endangered and proposed species of all Federal agency programs and

activities. This includes wildland fire management activities and Burned Area Emergency Rehabilitation (BAER) activities. BAER activities are emergency measures needed to prevent loss of life or property or to minimize unacceptable degradation of resources (see FSM 2523). The BAER program and most of its activities are usually considered emergency response actions, and ESA consultation is implemented under direction given under Emergency Procedures of Section 7 of the ESA (50 CFR 402.05). Emergencies under the ESA include "situations involving an act of God, disasters, causalities, national defense, or security emergencies, etc."

There are several documents that provide direction for emergency consultation under the ESA with the regulatory agency, the Fish and Wildlife Service (FWS). The main source is the emergency consultation procedures given in the ESA implementing regulations at 50 CFR 402.05. Further direction is provided in Chapter 8 of the March 1998 FWS Endangered Species Consultation Handbook, and in Forest Service Manual 2671.45f. In addition, individuals may refer to the FWS Director's memo of September 21, 1995, and to Secretary of the Interior's directive of August 20, 2001, on the topic of emergency consultation (see http://news.fws.gov/issues/fire.html).

Emergency response procedures under Section 7 provide for expedited informal consultation for fire suppression and related activities at the time the action is taken. The procedures provide for immediate agency response to wildland fire situations while incorporating listed species concerns into the response as time and the situation permit. In the initial stages, the FWS will provide recommendations to minimize effects of the emergency response on listed species or critical habitat. If adverse effects to listed species or proposed species occur during the response, consultation with the FWS should be initiated as soon as practicable. Emergency consultation assesses the effects of the emergency response activity only (usually including BAER actions), not the effects of the emergency (e.g., wildland fire) itself. The Endangered Species Consultation Handbook, pages 8-3 and 8-4, describe emergency consultation procedures.

With respect to Section 7 consultation, BAER activities usually are considered emergency actions (they are when "approved, burned-area emergency rehabilitation measures are expeditiously installed prior to the time when damaging or degrading events are likely to occur"). Normally, additional BAER activities would not be considered emergency actions if proposed several weeks or months after the originally-approved BAER activities. Any subsequent proposed burned area "restoration" activities that are not included in BAER plans are not considered emergency actions, and consultation under the ESA is to follow normal procedures.

During the emergency, BAER teams and responsible officials should be in contact with FWS while developing any BAER plans that could affect listed or proposed species, or that could affect their habitat, including designated or proposed critical habitat. The FWS will provide suggestions on how to minimize impacts. Upon completion, approved BAER plans should be sent to the regulatory agencies as soon as possible. As soon after the emergency as is practicable, there is a need to close the consultation loop with written documentation of the effects of BAER and suppression actions. This can be by individual fire, or by the

batching of multiple fires, and can include assessments of both the suppression activities and the BAER treatments for each fire.

BAER activities should be documented, and subsequent effects determinations made for threatened, endangered, or proposed species and proposed or designated critical habitat. Documentation is to include a description of the emergency (fire), rationale for the expedited consultation, and an evaluation of the impacts of the fire and of the BAER response, together with a discussion of how any FWS recommendations were implemented and their results. Since BAER activities are designed to mitigate adverse effects of the fire to listed species, proposed species and/or designated or proposed critical habitat, effects of the activities are usually minimal and require only informal consultation. However, if there were a case where BAER activities result in adverse affects, formal consultation would be required.

<u>Vegetation Resources Concerns</u>

Revegetation. In most cases, revegetation will be allowed to progress naturally following fire. Some areas may require assistance accomplished by planting trees, shrubs, forbs and grasses which will be decided on a case-by-case basis. Only plants native to Joshua Tree National Park will be used and propagules will be collected in the park whenever possible. In certain extreme situations, native plants may be purchased; the origin of the plants will be as near to the park as possible.

Fire suppression infrastructure (fire line, dozer line, helibases, drop zones, spike camps, etc) areas will be seeded and mulched to provide ground cover that protects against erosion, decreases establishment of exotics, and promotes soil health recovery. This will be decided on a case-by-case basis and only grass seed native to Joshua Tree National Park will be used. Straw used in the park for mulch must be certified weed-free. Wood chips and shredded bark may be used as mulch in certain situations to be decided on a case-by-case basis.All litter will be removed.

Exotic Plants. Suppression impacts such as firelines, spike camps, dozer lines, and helispots will be monitored and treated for three years. Exotic plants in the immediate area or upland of the disturbed area will also be monitored and treated to decrease seed recruitment. All exotic plants will be removed.

Snags. Snags should be retained whenever possible for wildlife benefit. Numerous bird and mammal species present at Joshua Tree NP are dependent on snags for nesting, denning, or foraging. Snags, or live trees with extensive root damage from fire, should be felled when public safety is at risk or when property damage would likely occur from tree failure.

<u>Geologic Resources and Hydrology Concerns</u>

Culverts. When replacing or installing new culverts, with safety as the primary driver, all efforts should be made to install the culvert at the natural hydrologic grade. "Shotgun" culverts will not be installed. Energy dissipaters, such as large rocks, will be installed below the culvert exit point as needed. Installation will be preformed by experienced

equipment operators and a National Park Service geologist or hydrologist. Post fire watershed modeling will be used to determine the dimensions of each culvert. Disturbed ground will be mulched with native vegetation and/or seeded with natives and mulched with weed-free straw.

Culverts in and below burned areas will be monitored and maintained prior to and immediately after precipitation events during the first year after the fire. For two years after the first year the fire, culverts will be monitored and maintained on a monthly basis. Monitoring will include an assessment of the condition of the culvert including entry and exit points, determination if the culvert has overtopped, evidence of saturation of fill material within the hydrologic crossing, and exotic weeds. Monitoring will be preformed by a National Park Service geologist, hydrologist, or suitably trained physical science technician. All exotic weeds will be removed.

Dozer-Line. All dozer line installed as result of a fire will be rehabilitated to pre-fire conditions. Dozer-line will be returned to natural grade, re-vegetated and monitored for rehabilitation effectiveness per monitoring and re-vegetation guidelines listed above.

Hand-Line. All hand line installed as result of a fire will be rehabilitated to pre-fire conditions. Hand-line will be returned to natural grade and mulched with native vegetation gathered along the hand-line. Hand-lines will be made unusable as trails. All litter will be removed.
Helispots. All helispots will be rehabilitated to pre-fire conditions unless authorized by the park. Helispots will be re-vegetated and monitored for rehabilitation effectiveness per monitoring and re-vegetation guidelines listed above

Fire Camps. All fire camps will be rehabilitated to pre-fire conditions. Fire camps will be re-vegetated and monitored for rehabilitation effectiveness per monitoring and re-vegetation guidelines listed above

Drop Zones. All drop zones will be rehabilitated to pre-fire conditions. Drop zones will be re-vegetated and monitored for rehabilitation effectiveness per monitoring and re-vegetation guidelines listed above

Hill Slope Erosion. Methods acceptable for hill slope erosion control include:
- **Hand seeding and hand straw mulching when these actions are specified.**
- **Contour straw wattles.**
- **Soil netting.**
- **Erosion control blankets.**
- **Other proposed treatments will be reviewed by National Park Service personnel on a case-by-case basis.**

No contour felling and log erosion barriers will be allowed, except in extreme cases with the Superintendent's approval. Only natural materials will be utilized. All installation will be preformed by trained personnel and supervised by National Park Service geologist or hydrologist. Hill slope erosion control structures will be monitored for effectiveness and exotic weeds and maintained immediately after precipitation events for the first year after

the fire and monthly for two years after the first year of the fire. Monitoring will be preformed by a National Park Service geologist, hydrologist or physical science technician. All exotic weeds will be removed.

Roads and Trails. Methods for stabilization and rehabilitation of roads and trails include:
- **Remove logs and slash along impacted park roads.**
- **Road rehab of fire suppression impacts.**
- **Install armored low water fords and armor road crossing fill.**

Water Quality. Water quality will be monitored in areas where life, property, and natural resources are threatened. Water quality parameters monitored will be consummate with the value at risk.

Water Channels. No check dams will be installed. No trash racks will be installed except when life and property are threatened. No diversion channels will be constructed except when life, property, and natural and cultural resources are threatened. No removal of debris from channels and floodplains except when life and property are threatened. No instream (see definition in Hill Slope Erosion section above) energy dissipaters will be installed except immediately below culverts.

<u>Information and Public Education Concerns</u>
In the event of a wildfire at Joshua Tree National Park where emergency stabilization and rehabilitation is needed, education and information efforts will be used to inform park visitors, neighbors and interagency partners on the rehabilitation efforts. These efforts will address the nature of the emergency, the current status of park resources and visitor amenities, what visitors can expect at the park, the anticipated nature of resources and visitor amenities at scheduled periods over the next few years. Over a three year period after the emergency, National Park Service public information and education specialists will implement an appropriately-scaled media campaign that includes:
- **Frequent regular press releases**
- **Informational flyers**
- **Displays and information boards at the park visitor center and in the rehabilitation area**
- **Park web page updates**
- **Public service announcement on fire rehabilitation activities**
- **Public presentations to local community groups and organizations**
- **Articles in local newspapers, and,**
- **Interpretive hikes into affected watersheds and programs.**

<u>Soundscape Concerns</u>
Timing of restoration activities should be completed without further adversely impacting the environment. As it relates to soundscapes, two main concerns should be addressed in BAER implementation plans: natural soundscapes important to wildlife and natural soundscapes expected by park visitors. Wildlife can be disturbed by heavy equipment, repetitive blasts, and proximity to humans working, depending on the species and time of year. Soundscape issues related to wildlife will be incorporated into consultation under the

Endangered Species Act for threatened and endangered species. Additionally, soundscape concerns will be addressed for all other wildlife species when there is information available of the effect that a rehabilitation action may have on a species.
A natural soundscape is an important reason why many visitors come to National Park sites. Modification to vegetation can have an immediate, short term adverse impact on a trail if too much vegetation is removed and traffic noise is audible. BAER team actions will take into consideration the impact of their actions on the park visitor in the short term and in the long term. In cases where little can be done to mitigate an adverse soundscape impact, public information and education materials and methods will be used to address this issue.

Viewshed Concerns
Little can quickly be done to improve viewsheds affected by wildland fire. Despite this, scenery is an important reason why many visitors come to National Park sites. Stabilization and rehabilitation actions designed to improve natural resource conditions will need to be taken into consideration by the BAER team. In cases where little can be done to mitigate an adverse scenery impact, public information and education materials and methods will be used to address this issue.

Recreational Concerns
Joshua Tree National Park visitors are often repeat-visit individuals who return to a favorite trail, or hiking area. In the event of a stabilization and rehabilitation effort, portions of the park may not be safe for visitors—or park amenities may be reduced. In these cases, public information and education materials and methods will be used to address recreational concerns. Redirecting the public to different parts of the park may be necessary. Also, increasing amenities not typically available in redirected areas may be necessary to meet the needs of the visiting public.

Cultural Resource Concerns
Federal land managing agencies are required to consult with Federal, state, local, and tribal governments/organizations, identify historic properties, assess adverse effects to historic properties, and mitigate adverse effects to historic properties while engaged in any Federal or federally assisted undertaking (36 CFR Part 800). Fire program activities have the potential to adversely affect cultural resources present at Joshua Tree National Park. Effects from these activities include the direct effect of fire itself, the direct effect of fire program operational activities, and the indirect effects of fire and operational activities on cultural resources.

Specific details relating the various direct and indirect effects of fire program undertakings on the various types of cultural resources found at Joshua Tree National Park are defined in the Environmental Consequences section of this document. In general the following guidelines will be followed for all fire program undertakings where appropriate. It is anticipated that the following procedures will ensure compliance with applicable laws and regulations and will mitigate adverse effects of fire and fire program:

- **A National Park Service professional will coordinate consultation with park affiliated tribes and the California Office of Historic Preservation.**

· A National Park Service archaeologist will identify cultural resources within the area of potential impact for the undertaking. In general, this is completed in three phases: reviewing archeological site records, project data, and historical overviews/literature; consulting with Native American groups, historic architects, and cultural landscape specialists; conducting field archeological inventories.

· A National Park Service cultural resource professional will assess of potential adverse effects to cultural resources.

A National Park Service professional , in consultation with the National Park Service Pacific West Regional Office cultural resource staff, will develop appropriate management recommendations to mitigate adverse effects to cultural resources. General strategies currently employed for cultural resource protection include:

· Avoiding cultural resources during fire program operational activities.

· Excluding fire from cultural resources.

· Minimizing the impact of fire through fuel load reduction around cultural materials.

· Preventative maintenance consisting of hazard fuel reduction at or around cultural resources.

· Employing minimum impact suppression techniques in the vicinity of cultural resources.

· Monitoring archeological sites as defined in the Cultural Resources Fire Monitoring Plan