Fire Management Plan

1992 Revision

Joshua Tree National Monument

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

FIRE MANAGEMENT PLAN

JOSHUA TREE NATIONAL MONUMENT

REVISED SEPTEMBER 1992

Prepared by: Tom Patterson 9/4/92
Fire Management Officer, JOTR Date

Prepared by: Thomas W. Gavin 9/15/92
Regional Forester, WRO Date

Recommended by: David E. Moore 9/4/92
Superintendent, JOTR Date

Reviewed by: Douglas Eide 9/30/92
for Chief, Branch of Fire Mgt, WRO Date

Reviewed by: Chris Cameron 10/2/92
Chief, Branch of Fire Mgt, BIFC Date

Approved by: Ben Cebell 10-28-92
ACTING Regional Director, WRO Date

ABSTRACT

This text is the second revision of the original Joshua Tree National Monument Fire Management Plan written in December, 1982. It incorporates findings of the Interagency Fire Policy Review Report (1989) and acknowledges the fire management policy of the National Park Service (NPS-18, 1990). These policies recognize the natural or unnatural occurrence or absence of fire as an integral factor influencing all ecosystems. Within the text of this document is an interpretation and application of this national policy at the local level, specifically for Joshua Tree National Monument. In order to put the contents of this text into proper perspective interested parties should review these contents in relation to the enabling legislation which created the Monument. This legislation dictates that the area be set aside to preserve various objects of historical and scientific interest, both cultural and natural.

This plan has been written to provide the justification and foundation of a complete fire management program, addressing both fire suppression and prescribed fire. The thrust of the plan is to document the historical and current fire regimes of the area, to provide recommendations for suppressing wildfire while implementing a prescribed and prescribed natural fire program to accomplish management objectives and to outline a schedule and method for the implementation of these recommendations.

ACKNOWLEDGEMENTS

Many people have contributed to the completion of this plan. While it is impossible to specifically acknowledge all involved, the authors would like to make note of special contributions:

Dave Moore (Superintendent) and Kathy Billings (Management Assistant); their administrative and management support has placed renewed attention and importance on the Park's fire management program.

Bob Moon (Chief of Resources Management) who has provided the fire ecology expertise and documentation in the plan and who contributed heavily to the 1987 revision.

Dottie Clements and Melanie Spoo provided primary formatting, word processing and editorial direction throughout the plan.

Karen Arey and Greg Jarvis for their contribution of graphics work.

Dan Gosnell, USFS San Bernardino National Forest for layout.

Carol Henson, Fire Program Clerk, Joshua Tree National Monument for layout, word processing and proofreading.

Bruce Kilgore, Chief Scientist, WRO, whose solid support for the fire and resources management programs at Joshua Tree National Monument has contributed the involvement of his staff to the preparation of this text..

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PLANNING CONSIDERATIONS 1
1.2 PLANNING AUTHORITIES 1

2.0 COMPLIANCE WITH NATIONAL PARK SERVICE POLICY 2

3.0 DESCRIPTION OF THE PARK 3
3.1 LOCATION 3
3.2 TOPOGRAPHY 3
3.3 GEOLOGY 3
3.4 SOILS 3
3.5 CLIMATE 5
3.6 HYDROLOGY 5
3.7 VEGETATION 5
3.8 WILDLIFE 6
3.9 ENDANGERED AND THREATENED SPECIES 6
3.10 LIVESTOCK USE 7
3.11 AIR QUALITY 7
3.12 CULTURAL RESOURCES 7
3.13 EXISTING HUMAN USE 8

4.0 FIRE ENVIRONMENT 8
4.1 FIRE HISTORY/OCCURRENCE 8
4.2 IGNITION SOURCE/SEASON 9
4.3 FIRE EFFECTS 10
4.3.1 SOIL, WATER, WILDLIFE, AIR and NUTRIENTS 10
4.3.2 CULTURAL RESOURCES 12
4.3.3 VEGETATION 13
4.4 FUELS/FIRE BEHAVIOR 17

5.0 FIRE MANAGEMENT OBJECTIVES AND GOALS 19
5.1 FIRE MANAGEMENT PROGRAM OBJECTIVES 19
5.2 SPECIFIC FIRE MANAGEMENT PLANNING GOALS 19

6.0 FIRE MANAGEMENT STRATEGIES 20
6.1 PAST FIRE MANAGEMENT DIRECTION 20
6.2 CURRENT AND FUTURE FIRE MANAGEMENT DIRECTION 20
6.2.1 SUPPRESSION PROGRAM STRATEGIES 21
6.2.2 PRESCRIBED FIRE STRATEGIES 23

7.0 FIRE MANAGEMENT UNITS 25
7.1 FIRE MANAGEMENT UNIT #1: SUPPRESSION UNIT 25
7.1.1 LOCATION AND DESCRIPTION 25

7.1.2 OBJECTIVES 26
7.1.3 GOALS 27
7.1.4 OPERATIONAL CONSTRAINTS 27
7.1.5 SPECIAL CONSIDERATIONS/MANAGEMENT IMPLICATIONS 27
7.2 FIRE MANAGEMENT UNIT #2: PRESCRIBED NATURAL FIRE UNIT 28
7.2.1 LOCATION AND DESCRIPTION 28
7.2.2 OBJECTIVES 28
7.2.3 GOALS 29
7.2.4 SPECIAL CONSIDERATIONS/MANAGEMENT IMPLICATIONS 29
7.3 FIRE MANAGEMENT UNIT #3: MGT IGNITED PRESCRIBED FIRE UNIT. 29
7.3.1 LOCATION AND DESCRIPTION 30
7.3.2 OBJECTIVES 30
7.3.3 GOALS 30
7.3.4 SPECIAL CONSIDERATIONS/MANAGEMENT CONSIDERATIONS 31

8.0 FIRE MANAGEMENT ORGANIZATION AND RESPONSIBILITIES 31

9.0 WILDFIRE PROGRAM 33
9.1 FIRE PREVENTION PROGRAM 33
9.2 PRESUPPESSION PROGRAM 34
9.2.1 PROGRAM GOALS 34
9.2.2 TRAINING 34
9.2.3 FIRE EQUIPMENT/SUPPLIES 35
9.2.4 EMPLOYEE AVAILABILITY 35
9.2.5 COMMUNICATIONS 35
9.2.6 EMERGENCY PRESUPPRESSION PLAN (STEP-UP) 35
9.2.7 FIRE WEATHER FORECASTING 38
9.2.8 CONTINGENCY PLANNING 38
9.3 FIRE SUPPRESSION 38
9.3.1 DETECTION SYSTEMS 38
9.3.2 EMERGENCY FIREFIGHTERS 38
9.3.3 SUPPRESSION DISPATCHING PLAN 39
9.3.4 SIZE UP AND INITIAL ATTACK 39
9.3.5 EXTENDED ATTACK 40
9.3.6 SUPPRESSION OF PRESCRIBED OR PRESCRIBED NATURAL FIRES ... 40
9.3.7 USE OF NPS-WESTERN REGION WILDLAND FIRE RES. ADVISORS 41
9.3.8 REHABILITATION 41
9.3.9 INTERAGENCY COOPERATION 41
9.3.10 LAW ENFORCEMENT/ARSON INVESTIGATION 42
9.3.11 QUALIFICATION/CERTIFICATION 42
9.3.12 DEMOBILIZATION 42
9.3.13 AIRCRAFT OPERATIONS 42

10.0 PRESCRIBED FIRE PROGRAM 43
10.1 MANAGEMENT IGNITED PRESCRIBED FIRE 43
10.1.1 STANDARDIZED WESTERN REGION PRESCRIBED FIRE PLAN FMT 43
10.2 PRESCRIBED NATURAL FIRE OPERATIONS 44
10.2.1 PRESCRIBED NATURAL FIRE MOBILIZATION 44
10.2.2 FIRE SITUATION ANALYSIS TEAM (FSAT) 44
10.3 QUALIFICATION/CERTIFICATION 45
10.4 DEBRIS BURNING 45
10.5 PROTECTION OF SPECIAL RESOURCES 46
10.5.1 CULTURAL RESOURCES AT RISK 46
10.5.2 SENSITIVE SPECIES 47
10.6 INTERAGENCY COOPERATION 47
10.7 AIR QUALITY/SMOKE MANAGEMENT 47
10.7.1 STATE AND LOCAL CONSIDERATIONS 48

11.0 RESEARCH PROGRAM 48
11.1 PROPOSED RESEARCH 50
11.2 RESEARCH FIRES 51

12.0 MONITORING 51

13.0 PUBLIC SAFETY 51

14.0 PUBLIC INFORMATION AND EDUCATION 51
14.1 TARGET GROUPS 51
14.2 INFORMATION DISSEMINATION 52
14.2.1 IN-SERVICE PERSONNEL 52
14.2.2 VISITOR AND GENERAL PUBLIC 52
14.2.3 RELATED AGENCIES 54
14.3 INTERPRETATION OF PRESCRIBED NATURAL FIRES 54

15.0 PROGRAM ADMINISTRATION 55
15.1 RECORDS AND REPORTS 55
15.2 FISCAL MANAGEMENT 57
15.3 FIRE PROGRAM CRITIQUES 58

16.0 LITERATURE CITED 59

17.0 GLOSSARY OF TERMS 62

LIST OF TABLES

Table Number	Subject Matter	Page
1.	Effects of Fire on Cultural Resources, Joshua Tree National Monument, 1992	14
2.	Prescribed Natural Fire Prescription for Joshua Tree National Monument, 1992	24
3.	Staffing Classes and Corresponding BI's forJoshua Tree National Monument, 1992	36
4.	Step-up Plan, Joshua Tree National Monument, 1992	37
5.	Debris Burning Prescription for Joshua Tree National Monument, 1992	46
6.	Air Quality Regulations by Affected Counties Within Joshua Tree National Monument, 1992	49
7.	Public Information Plan, Joshua Tree National Monument, 1992	53
8.	Fire Management Records and Reports for Joshua Tree National Monument, 1992	56

LIST OF FIGURES

Figure #	Subject Matter	Page
1.	Location Map of Joshua Tree National Monument, 1992	4
2.	Fire Occurrence Map for Joshua Tree National Monument, 1992	10
3.	Fire Group Location Map for Joshua Tree National Monument, 1992	15
4.	Fire Management Decision Scheme, Joshua Tree National Monument, 1992	22
5.	Fire Management Unit (FMU) Map, Joshua Tree National Monument, 1992	26
6.	Joshua Tree Fire Management Organization and Responsibilities, 1992	32

APPENDICES

Appendix #	Subject Matter
A	Environmental Assessment for the Joshua Tree National Monument Fire Management Program, 1992-1997.
B	Fire Occurrence Data for Joshua Tree National Monument, 1964 to Present.
C	Operational Plan between California Department of Forestry and NPS, 1986.
D	Blanket Delegation of Authority, Joshua Tree National Monument, 1992.
E	Tentative Prescribed Burning Prescriptions for Type Converting Pinyon-Juniper Range at Joshua Tree National Monument, 1992.
F	Joshua Tree National Monument Fire Prevention Plan, 1992.
G	Wildland Fire Training Plan, Joshua Tree National Monument, 1992.
H	Joshua Tree National Monument Dispatch Plan, 1992.
I	California Prescribed Fire Preparedness Plan for California, 1992.
J	Cooperative Agreement between NPS-JOTR and 29 Palms Water District for Fire Suppression and Cooperation.
K	Operating Plan for the Federal Interagency Communication Center (NPS/BLM/USFS), 1992
L	Five Year Burning Program, Joshua Tree National Monument, 1992-1997.
M	Interagency Prescribed Fire Agreement for California, 1983.
N	Fire Monitoring Types, Joshua Tree National Monument, 1992.
O	Fire Effects in Joshua Tree National Monument, Study Plan, 1992.
P	Notification of Prescribed Burning Information, FICC Form, 1992.
Q	Memorandum of Understanding between Joshua Tree National Monument , South Coast Air Quality Management District and San Bernardino County Air Pollution Control District (Draft, 1992).
R	Escaped Fire Situation Analysis.

1.0 INTRODUCTION

This fire management plan is the second revision of the original fire management plan of 1982. Following a review of National Park Service fire management policy by the Interagency Fire Management Policy Review Team (1989), it was recommended that all NPS units hosting prescribed natural fire programs review their fire management plans to ensure these programs operate within acceptable environmental, interagency, political and public constraints.

1.1 PLANNING CONSIDERATIONS

The revision of this plan reflects this completed review at Joshua Tree National Monument and outlines operational procedures for implementation of a comprehensive integrated fire management program. This text has been written to satisfy the following planning considerations:

> Enlightened fire management now requires that fire as a natural ecosystem process be addressed for the Monument's biological communities. The plan documents the historical and present role of natural fire within the Monument.
>
> This document is intended to be an operational plan; its' recommendations will be implemented under the National Environmental Policy Act (NEPA) compliance document (Appendix A) and within the provisions of NEPA.
>
> The thrust of this plan is to document the historical recommendations for suppressing wildfire while implementing a prescribed fire program to accomplish management objectives and to outline a schedule and method for the implementation of these recommendations.

1.2 PLANNING AUTHORITIES

This plan has been formulated in order to satisfy the requirements that have been set forth within the National Park Systems Wildland Fire Management Guideline (NPS-18, 1990) which mandates that all areas with vegetation capable of sustaining fire will develop a fire management plan. It meets all the provisions outlined in Exhibit 1, Section II Chapter 5 of these guidelines.

This plan, in turn, takes its direction from various sources. First, the authority for fire management is found in the National Park Service Organic Act (Act of August 25, 1916), which states that the agency's purpose:

> "...is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for 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 the light of the high public value and the 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."

According to NPS Management Policies (1988):

> "Most natural fires are lightning-caused and are recognized as natural phenomena which must be permitted to continue to influence the ecosystem if truly natural systems are to be perpetuated."

The NPS Wildland Fire Management Guideline (NPS-18, 1990) further defines the Service wide goal of wildland fire management:

> "To achieve the resource objectives of the park through prevention of human-caused wildfire, to minimize the negative impacts on resources from all wildfires that occur, and to guide the use of prescribed fire as an integral part of the resources management program in a manner which minimizes the risk to the lives of employees, neighbors, and to their property."

2.0 COMPLIANCE WITH NATIONAL PARK SERVICE POLICY

The primary impetus for establishment of the Monument was the protection of unique desert vegetation systems. Wilderness designation for approximately 80% of Monument lands in 1976 was a major step toward the protection of the vegetation. However, the exclusion of a major natural process like fire precludes the perpetuation of natural compositions that have been affected by fire for 10,000 years.

The Monument's enabling legislation contains no information specifically directed at fire management activities in the Park and the General Management Plan for Joshua Tree National Monument has yet to be completed.

The Statement for Management for Joshua Tree National Monument (1985) as well as the Resources Management Plan define the objectives for managing the unit's natural resources. In part, they direct managers:

> "To perpetuate the native plants and animals for their essential roles in the natural ecosystem. Natural processes shall be relied upon to regulate both biotic as well as abiotic elements to the greatest extent possible." Resources Management Plan (NPS, Rev. 1992).

3.0 DESCRIPTION OF THE PARK

3.1 LOCATION

Joshua Tree National Monument is located in the Mojave Desert of Southern California (**Figure 1**). It lies along the east/west 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. The counties of San Bernardino and Riverside bisect the Monument latitudinally.

3.2 TOPOGRAPHY

The Monument is on the eastern end of the Transverse Ranges. These ranges include the Little San Bernardino, Cottonwood, Hexie, Pinto, Coxcomb and Eagle Mountains. The western half of the Monument is mostly above 4,000 feet in elevation. The eastern portion averages 2,000 feet above sea level. Large major valleys include the Pinto Basin, Juniper Flats, Covington Flats, Pleasant, Queen and Lost Horse Valleys. Mountains are typically steep and bisected by many steep canyons.

3.3 GEOLOGY

The Monument consists of low, generally northwest-trending mountains interspersed with intermontane valleys, a setting characteristic of much of the western Mojave region. It is dominantly a crystalline rock terrain, although its valleys are largely mantled by unconsolidated or poorly consolidated Quaternary surficial deposits. Rocks in the Monument comprise metamorphic assemblages that include Paleozoic and Precambrian rocks, widespread Mesozoic plutonic rocks that range from gabbro to quartz monzonite, and some local Cenozoic basalt. Some Precambrian rocks are about 800 million years old. At places, aplite and pegmatite dikes are associated with the granitic plutons. High seismic activity in the Monument area is largely attributable to the proximity of the San Andreas fault zone to the west and to elements of the Transverse Range fault within the Monument.

3.4 SOILS

Throughout the Monument, most soils are poorly developed. The eastern half is mostly alluvial deposits with no true soil structure. These soils range 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.

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 horizons. The A horizon is narrow but definable. A clay pan, approximately three feet below the surface, underlies most of the area.

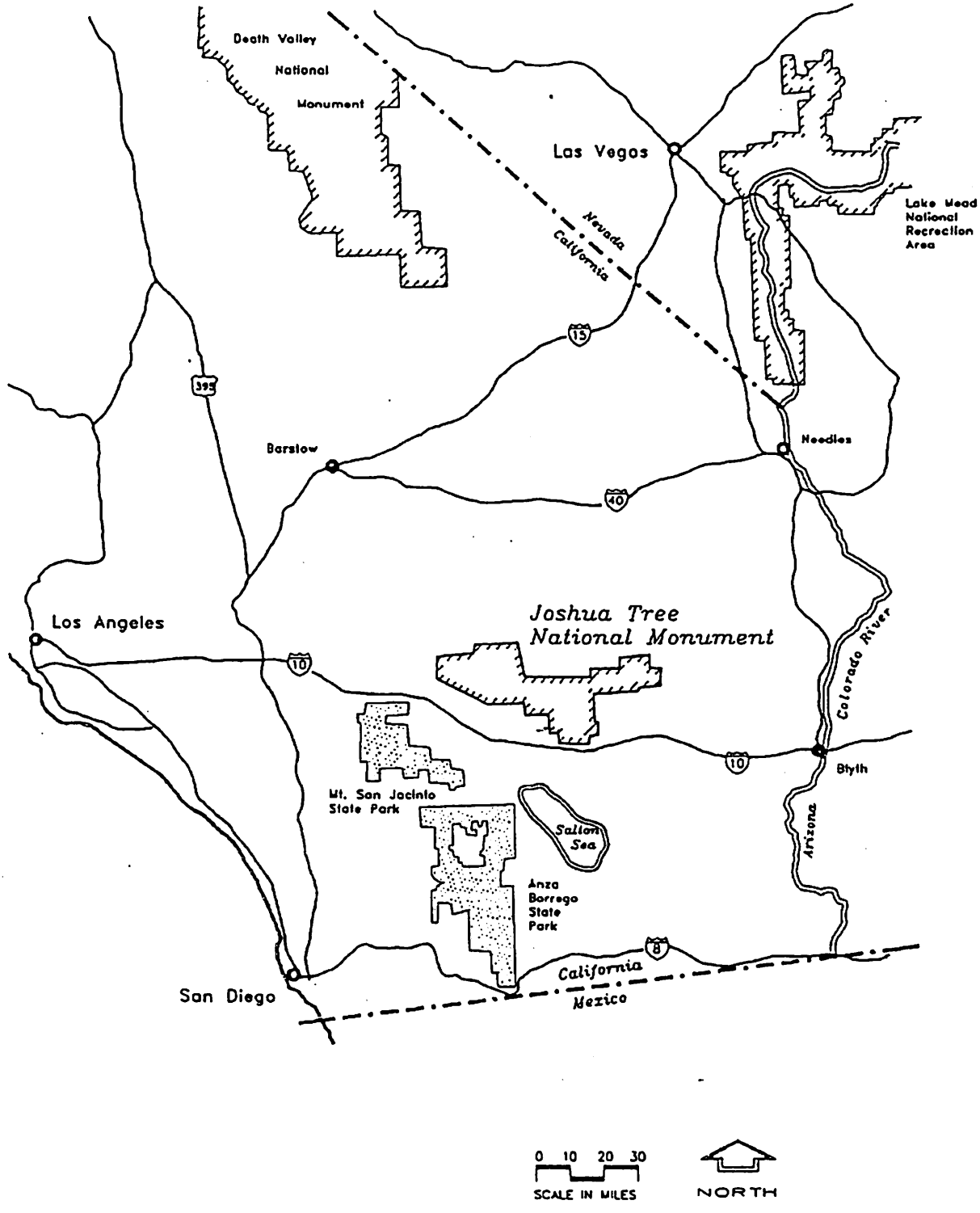


Figure 1. Location Map. Joshua Tree National Monument, 1992

3.5 CLIMATE

The Monument has an arid upland desert climate. Annual extremes typify the topographic dive[illegible]. Eastern lowlands frequently experience summer temperatures above 115 degrees F. Conversely, western higher elevations see winters with snow and extended periods of nighttime lows well below freezing. Typical summer months are characterized by high temperatures, low humidity and clear sunny days. Daily temperature extremes range from 30-60 degrees F. Generalizations about typical weather must be accepted as a composite of extreme variations.

Summer conditions can be dramatically affected by storm activity in July through September. Thunderstorms from the southwest or southeast bring high winds, lightning and sometimes heavy rain. Typical summer relative humidity runs below 20%. When storms approach, humidity may climb to above 40%. Unless a large quantity of precipitation is received, the humidity has usually dropped to normal 12 hours after the passage of a front.

3.6 HYDROLOGY

The hydrological nature of the area is simply that of groundwater following the zones of least resistance along the deeply fractured rock masses and deep loose gravels. Lacking well-developed, consolidated layers impervious to water, there are very few known water tables near the surface. The sparse rainfall fails to charge underground water sources. Surface water flows off and little of it percolates back into the aquifer.

Natural water sources are extremely rare. Most seeps and springs are intermittent and p[illegible]e insignificant quantities of water. Three artificial impoundments, Barker Dam, Cow Camp and Keys Lake do contain significant quantities of water most years.

Perennially flowing streams are nonexistent in the Monument and surrounding area. Occasional surface water flow of several hours duration does occur which is both sporadic and unpredictable. The average annual precipitation (mostly in winter) ranges from one to five inches a year for the various stations within the Monument boundary. Only two gauging stations are known to exist on any drainage basins associated with the Monument, both of which are operated by the U.S. Geological Survey.

There are over 120 known water sources, including springs, wells and seeps, in the area. The spring discharges range from seeps to a few gallons per minute. The great majority of the springs are the result of flow from fractures and joints in the igneous and metamorphic basement complex as the result of intersecting dikes or sill. In recent years the spring discharge has been decreasing. The most probable cause for this decrease is reduced recharge as the result of decreased precipitation during this time span.

3.7 VEGETATION

The diversity of the flora of the area is indicative of the Monument's location in a transitio[illegible]e between the Colorado Desert, generally at elevations below 2,000 feet, and the cooler and [illegible]er Mojave Desert at elevations from 2,000 to 5,000 feet. It is this diversity of plant life which, in part, contributed to the preservation of this area.

Vegetation types in the Park have been divided into three primary associations according to the classification system devised by Holland (1986):

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

These associations represent the different fuel types found in the Monument and are associated with characteristic fire behavior discussed in Chapter 4.4.

3.8 WILDLIFE

The rich flora is counterpart to equally diverse wildlife communities. Although large vertebrates such as deer and bighorn sheep are well established in the Monument, the greatest diversity of wildlife is found among the small vertebrates and invertebrate residents.

As would be expected, reptiles are richly represented in this area. Many snakes, lizards and the rapidly disappearing desert tortoise are found throughout the Monument.

Birds are numerous and diverse. More than 230 different species nest or visit habitats within the Monument. The Monument is adjacent to a major migratory flyway in the Coachella Valley. During stormy weather, many areas within the Monument become critical stopover sites for unexpected species such as loons, herons, egrets, grebes and avocets.

Mammals include bighorn sheep, mule deer, mountain lion, bobcat, coyote, grey fox, kit fox and many smaller species. Rodents are diverse and well represented throughout the Monument.

3.9 ENDANGERED AND THREATENED SPECIES

Three species of plants are currently listed as Category II, threatened or endangered, by the U.S. Fish and Wildlife Service. Until these species are reclassified, they must be managed as endangered species.

Foxtail Cactus Coryphantha vivipara var alversonii
California Ditaxis Ditaxis californica
Rock Pennyroyal Monardella robisonii

Rare vertebrate species include the desert bighorn sheep, Orvis canadensis, and desert tortoise, Gopherus agassizii.

3.10 LIVESTOCK USE

For a period of time from approximately 1875 to 1940, cattle were grazed in the Monument. While some areas received significant pressure, grazing was not extensive. Three areas, Queen and Lost Horse Valleys and the Covington Flats, were the primary grazing sites. According to Greene (1983), availability of water curtailed grazing in most locations.

3.11 AIR QUALITY

Good air quality is recognized as one of the Monument's natural resources. Some views have already diminished because of a gradual deterioration of air quality in recent decades, primarily caused by polluting sources in the Los Angeles basin.

Standard visual range in the Monument is highest during winter, lower during fall and spring, and lowest during summer. Smog related ozone concentrations follow a similar pattern peaking during summer months at levels frequently in violation of both state and federal standards.

Visibility is currently monitored by an automatic 35 mm camera system, and ozone is monitored by instruments employing U.V. absorption technology. Biological effects monitoring for ozone is also in progress, and visible injury to sensitive plant species has been attributed to ozone.

Besides existing air pollution sources from the Los Angeles basin, other sources may develop in the future. For example, a major sanitary landfill site southeast of the Monument is proposed and under consideration. Electrical generation facilities have also been proposed for construction in the Monument.

Air pollution is detectable in the Monument on most days. The Little San Bernardino Mountains form a barrier to the air pollution sources from the Los Angeles basin, with pollutants filtering into the Monument airshed from southwest to northeast.

Because of its Wilderness Units, Joshua Tree National Monument carries a mandatory Class I status as designated by Congress. The Clean Air Act (Section 169A) grants the Service substantial <u>authority</u> and <u>responsibility</u> in "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from man-made pollution."

3.12 CULTURAL RESOURCES

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 occur. 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.

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.

In more recent prehistoric and historic times the area now covered by the Park was used by Cahuilla, Chemehuevi, and Serrano 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 primarily in rock shelters, although the largest single site is that of the late 19th century Indian village at the Twentynine Palms Oasis.

More recent remains are the remnants of mining. During the last quarter of the 19th century and the first third of the 20th century, there was a steady influx of ranchers and miners hoping to make their fortunes in cattle or gold, or both.

These prehistoric and historic remains representing Joshua Tree's cultural inventories must be considered in fire management planning. Well over a thousand sites have been recorded.

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. Three mining sites have been recently nominated but no determination on their status has been made. They are the Pinyon Historical Mining District, Eagle Cliff Mine and Pinto Wye Arrastra. In addition, numerous structures associated with historic sites in the park have been included in the List of Classified Structures.

3.13 EXISTING HUMAN USE

There are almost 3,000 acres of private lands within the Monument. However, all but a few parcels are undeveloped. Residences are restricted to Whispering Pines near Covington Flats, the Randolph, Cohen and Ray properties.

There are no valid mining claims within the Monument. Cattle grazing has been prohibited since 1946.

The primary human use in the Monument is recreation and research.

4.0 FIRE ENVIRONMENT

4.1 FIRE HISTORY/OCCURRENCE

Joshua Tree National Monument exists in a portion of the Mojave Desert that does support burnable fuels. In the past forty years, the Monument has recorded more than 150 natural fires that have burned in excess of 12,500 acres. Additionally, in 1979 the Monument experienced the largest wildfire in Western Region.

Again in 1984, the two largest fires in Western Region were both desert fires in Joshua Tree and Death Valley National Monuments. At the outbreak of the "Siege of '87", the most devastatin season in California history, a 1,250 acre prescribed natural fire was converted to wildfire s and required a week to suppress. Compared to other more temperate systems of similar size (560,000 acres), this is a relatively small amount of fire. However, in the desert, fire is somewhat like rain; its occurrence may be rare and unpredictable, but occasionally the effects are spectacular.

Recent fire history for the Park, 1964 - 1991, is shown in appendix B. Records of fire history within the Park date back to 1945, exclusive of lost records for the years between 1969 -1973.

The most significant trend in fire history is the increase in large fires. From 1941 to 1965, no lightning caused fires exceeding 1/4 acre were reported. This information is based on statistical data from the Joshua Tree Yearly Fire Report Summary, since no individual fire reports were returned for this time period. Since 1965, at least one Class B or larger lightning caused fire occurred in 9 out of the 20 years. In just the past six years there have been 20 Class B or larger fires. More than 13,450 acres have burned since 1978. This includes one 6,142 acre, one 4,463 acre, and one 1,250 acre fire. For 24 years (1941-1965) there were no Class C or larger fires, during the next 14 years (1965-1978) there were four fires larger than Class B, and since 1979 the Monument has averaged four fires larger than Class B per season. Almost without exception, there have been no reburns of any significance within these historical fire sites.

4.2 IGNITION SOURCE/SEASON

Lightning has been the ignition source for 74% of the fires, while 26% have been human caused. The majority of both lightning and human caused fires have been discovered between 11 a.m. and 6 p.m. Over 34% of all fires have occurred in T2S, R8E, 14% have occurred in T2S, R7E, and 14% in T1S, R6E **(Figure 2)**. While an accurate analysis of fuel types has not been completed, the relative frequency of 90% of these fires have occurred in the following vegetation types, listed in descending order of importance: Mojave Mixed Steppe Group, Blackbrush Scrub Group, Mojavean Pinyon Juniper Woodland.

The fire season at Joshua Tree National Monument is May 18 to September 20. Approximately 75% of all fires have occurred during this period.

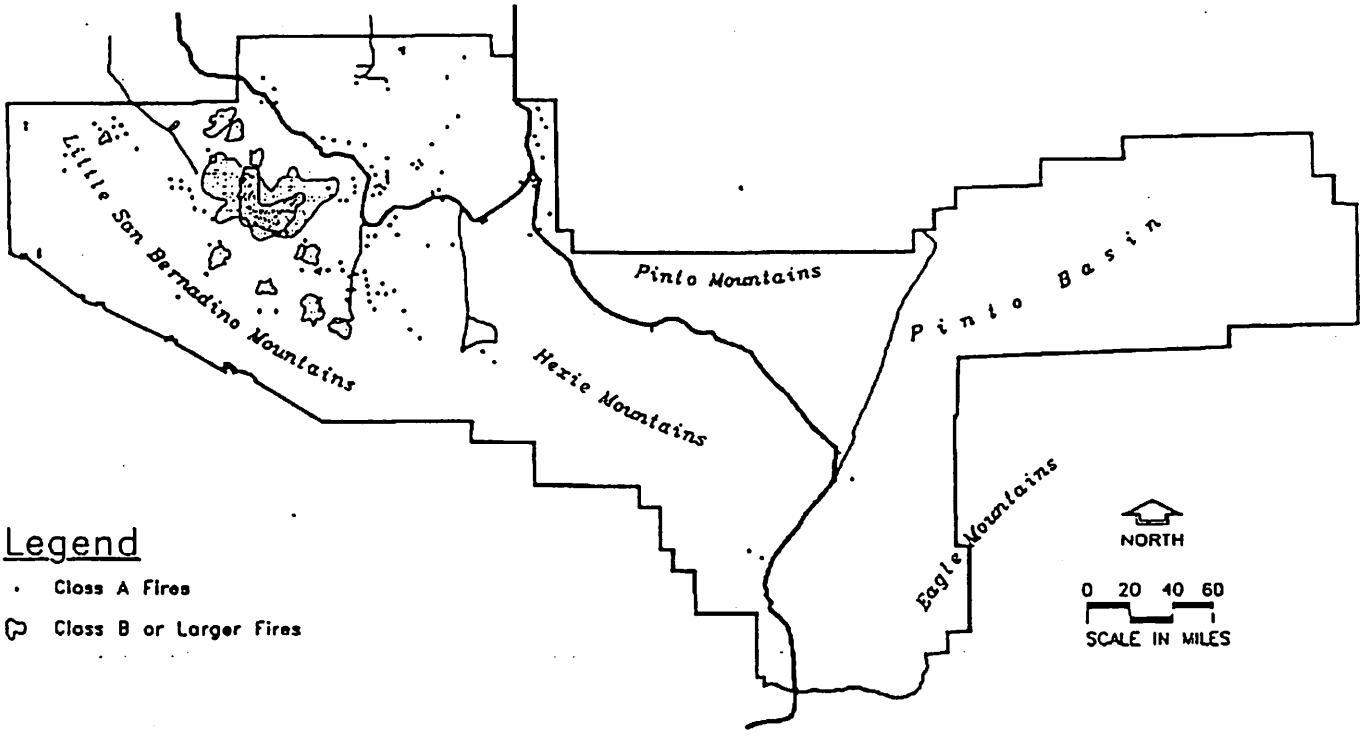


Figure 2. Fire Occurence Map for Joshua Tree National Monument (See Appendix A)

4.3 FIRE EFFECTS

4.3.1 SOIL, WATER, WILDLIFE, AIR and NUTRIENTS

The effects of fire on these components is best described by the U.S. Forest Service publications entitled, Effects of Fire on Fauna, Effects of Fire on Air, Effects of Fire on Soil, and Effect of Fire on Water, (U.S. Forest Service, 1978) and the Environmental Assessment for the Joshua Tree National Monument Fire Management Plan, 1992. (Appendix A) This series of publications summarizes the state of the art information regarding fire "mechanics" and expected post burn changes in micro-environments. These publications are important since the principles expressed throughout this literature provide the foundation for analyzing the benefits, damages and values of the various fire management alternatives considered at Joshua Tree National Monument. Only a brief elaboration of specific important points made in these publication is necessary within the context of this document.

Fire's effects on wildlife, both direct and indirect, are documented in such comprehensive reviews as Lyon et. al. (1978) and Kramp et. al. (1983).

Generally, direct impacts of fire on fauna include disturbance or mortality of individuals or groups of individuals. Larger mammalian vertebrates will generally move away from a fire. However, the availability of adjacent suitable habitat may be critical for local populations. A local herbivore population decline may in turn result in a loss of prey items for carnivores.

Birds are less likely to be directly affected by fire, but some losses may occur in nesting sites if fires coincide with nesting season. Riparian-dwelling reptiles and amphibians are usually protected from

heat and loss of cover. Loss of some **snakes, salamanders, lizards** and **toads** will occur, but immediate population declines are usually insignificant. Because of their diversity, riparian ha are especially sensitive. Fire which consumes streamside vegetation or upslope cover will adverse impacts on these rich resources, as well as on aquatic life and water quality.

Indirect effects on wildlife include habitat modification and shifts in species composition of communities. The quantity and quality of ungulate forage generally increases after burning. Kramp et. al. (1983) generalized that fire increased food for herbivores dependent on browse: browse species proliferate in early post-fire succession, and the nutritional quality of browse is high immediately following a fire.

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. Nevertheless, generally speaking, beneficial effects of fire far outweigh and offset any direct or indirect wildlife losses (Vogl 1967).

Of special concern at Joshua Tree National Monument are the effects of fire on native population of desert **bighorn sheep**.

In their review of seven bighorn case histories in the Northwest, Peek et. al. (1985) noted that fire can be beneficial to bighorn populations. In several cases, burning served to open forest can and heavier use of burned areas by sheep was documented in the years following a burn. More bighorn populations have been observed to increase following fires, though definite cause/effect relationships have not been established.

Conversely, fire can have negative effects on bighorn (Peek et. al. 1985). For example, if an extensive area is burned, inadequate forage may be left behind. Alternatively, competing species such as deer may be attracted to a burned-over area.

Hobbs and Spowart (1984) found that management ignited prescribed fires in the mountain shrub and grassland communities of Colorado significantly improved the qualities of winter diets of bighorn sheep and mule deer; both species fed selectively on the new green growth present in burned over areas. Graf (1981) recommended prescribed burning in desert bighorn sheep habitat to reduce pinyon and juniper and to increase preferred grass species.

Douglas and Kingsley (1981) advocated the use of prescribed burning specifically to improve bighorn habitat in the Grapevine Mountains of Death Valley. Beneficial effects were to include the reduction of canopy cover, since bighorn have been known to prefer areas with less than 30% ground cover. The authors maintained that prescribed fires would also burn over decadent stands of sagebrush and promote the growth of grass species. Douglas and Kingsley felt that both deer and bighorn would respond positively to prescribed fires at Death Valley, depending on the intensity of the fire and the degree of regrowth.

In 1984 a fire occurred at Death Valley that possibly affected park bighorn populations (Douglas 1985). The Saline Fire consisted of three fires in the Hunter Mountain area which burned over 6000 acres in June of that year. The fire burned over 50% of the bitterbrush (Purshia glandulosa) around Hunter Mountain, as well as decadent pinyon-juniper woodland and other mixed shrublands with

high fuel loadings. Subsequent wildlife surveys later that year (Douglas and Sanchez 1984a, 1984b) determined that the fire had stimulated considerable regrowth in the bitterbrush association, and that effects on bighorn would probably be positive. Three bighorn rams were observed feeding in the burned area in August of that year, and deer were present at the edge of the burn.

These observations are consistent with those of Klebenow in Nevada (1985), who found that in sagebrush-grassland associations or bitterbrush associations mule deer avoided recently burned areas because of the reduction in critical cover, returning to use the area only when adequate cover had been established. It thus seems unlikely that bighorn would experience extensive competition from mule deer in burned-over bitterbrush associations.

On the other hand, **mule deer** exhibited a long-term positive response to prescribed fires in Nevada and Arizona pinyon-juniper woodlands (Klebenow 1985, Stager and Klebenow 1987). Mule deer tended to favor the edges near remaining cover in the early post-fire stages, avoiding the burned area itself. In later stages (16-115 years post-burn), mule deer exhibited a more general use of the burned area, and favored burned areas over unburned.

Prescribed natural fire in Joshua Tree's pinyon-juniper communities is thus potentially immediately beneficial for park bighorn populations as woodland is converted to forbs and annual grasses; long-term beneficial effects are realized for mule deer as cover increases on-site. Fire in park grasslands and shrublands would tend to favor bighorn.

Hence, allowing lightning-caused fire to resume its natural role in the Monument will not adversely affect bighorn or mule deer populations; rather, both species will benefit from the natural, complex vegetation mosaics which result from such fires.

The **Desert Tortoise** was listed as threatened in 1990 by the US Fish and Wildlife Service. In 1978, John Barrow marked 51 tortoises in a 1 mi^2 site in the Pinto Basin. Alice Karl did a study in 1988 based on walking transects looking for sign. She estimated that 8-29 tortoises per km^2 might be found in 21% of the monument's area, but that higher densities of 30-58 per km^2 were present in only 2% of the area. Work by Monument staff in 1991 has showed that certain areas of the park contain relatively high tortoise density (up to 90 per km^2), however the areas of highest density are in the Pinto Basin, in FMU #2, in areas which have not been known to burn.

The areas in the Monument most likely to burn, including Queen Valley and Covington Flats, contain low tortoise densities (Karl, 1988). Although a few localized places within the area may have as many as 8-29 tortoises per km^2, most of region is characterized by 0-7 tortoises per km^2. Although work is now only beginning on tortoises in the monument, present knowledge indicates that fire in FMU #2 would have little effect on tortoise populations.

4.3.2 CULTURAL RESOURCES

There is considerable debate regarding the effects of fire on cultural resources. Generally speaking, fire harms all cultural resources directly, even though the damage to some of these resources only occurs after exposure to repetitive fires. The amount of direct damage depends on fire intensity **(Table 1)**.

Secondary impacts are created by erosion and vandalism. In all vegetation zones, observation

could have a high impact on unobserved sites. Some archeological sites are difficult to detect on the ground, and they cannot be observed from the air or from fixed fire lookouts. Historical sites are usually more visible, but some sites (for example, dugouts and cabin foundations) are as difficult to see as archeological sites. A detailed discussion of fire's effects on cultural resources has been assembled by Lissoway and Propper (1989).

Since all of Joshua Tree National Monument is desert environment with sparse fuel, the major concern for cultural resources in fire management is the adverse impact of ground disturbance from construction of fire lines either during prescribed fires or wildland fire suppression. In all cases of ground disturbance, whether by hand or machine, an archeologist should be consulted, if at all possible, before ground is broken. Ideally, an archeologist should be on site as soon as feasible during large wildland fires, especially if inventories show significant concentrations of cultural resources in the affected area.

In general, the concern for direct fire damage to prehistoric sites in Joshua Tree is small since fuel accummlations do not lend themselves well to producing high levels of heat concentrated in a given area for long periods of time. Fire threshold information indicates that unless a burning temperature of 500-600 degrees C is reached and maintained for at least 20 minutes, damage to most archeological sites is minimal (R. Kelly 1988: personal communication). Exceptions to this would be organic materials such as basketry and wooden implements.

A summary of the effects of fire on cultural resources is found in **Table 1.**

4.3.3 VEGETATION

An ecological assessment of the return of fire to vegetation systems in the Monument examines fire effects on the fire group displayed in **(Figure 3)**. Few studies have been conducted on fire effects on Mojave vegetation. Morphologically, plants in this region have, over time, developed features that enable them to survive the region's harshness. Ironically, these same features make them highly susceptible to fire. For example, seeds of many plants that lie dormant at the soil surface, in anticipation of rare moisture and temperature conditions suitable for germination, are often consumed by even the most infrequent low-intensity surface fires. Many grass species in the region reproduce by 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. These species may be indirectly damaged when surface fuels are removed by fire. Higher insolation results and critical soil moisture is exhausted.

Table 1. Effects of Fire on Cultural Resources, Joshua Tree National Monument, 1992

EFFECTS OF FIRE	
Type of Cultural Resource	Type of Fire*
Surface Archaeological	Low intensity - minimal High intensity - shatters lithics and groundstone. Ceramics are warped and paint is burned off.
Subsurface Archaeological	Low intensity - minimal High intensity - burning of fibrous, wood and pollen material. If into root-zone can cause C14 contamination.
Historical Sites	Related to how much and what burned. Loss of architectural and dating materials.
All Site Types	Lack of cover increases erosion which destroys site integrity. Increased visibility will contribute to increased vandalism.

*Low intensity fire is defined as having a fireline intensity of less than 300 BTU/ft/sec; high intensity fire has a fireline intensity greater than 300 BTU/ft/sec.

It is generally believed that true grasslands of the desert southwest have gradually given way to higher and higher densities of shrubs during the last 300 years. Nevertheless, it is debatable whether or not anything approaching a true grassland ever existed at Joshua Tree National Monument and what, if any, were the mechanisms by which the gradual dominance of brush has taken place. At any rate, the historical role of fire in this process was probably limited. Fire is being used throughout much of this region to maintain a brush-free range. The heavy brush component at Joshua Tree National Monument would suggest that the natural fire return intervals of the past have been low. Vogl (1971) suggests that deserts with less than 17 cm (7 in.) of precipitation probably escaped the influence of fire on their ecosystems because of the lack of fine fuel.

Fire Group 1: Mojave Mixed Steppe (Joshua trees, galleta grass, needle grass). Virtually nothing is known about fire effects on Joshua trees other than the fact that the species is intolerant of even low frequency, low intensity fires. Post fire mortality rates of 95% have been common within the Monument. Although described as a vigorous resprouter, Moon (pers. obser., 1987) notes that resprouting is unpredictable and variable. When resprouting does occur, survival of young sprouts may be affected by rodent and rabbit browsing. Nevertheless, where extensive fires have occurred in the Monument, adequate natural replacement of Joshua trees seems to be occurring by a combination of resprouting and seeding.

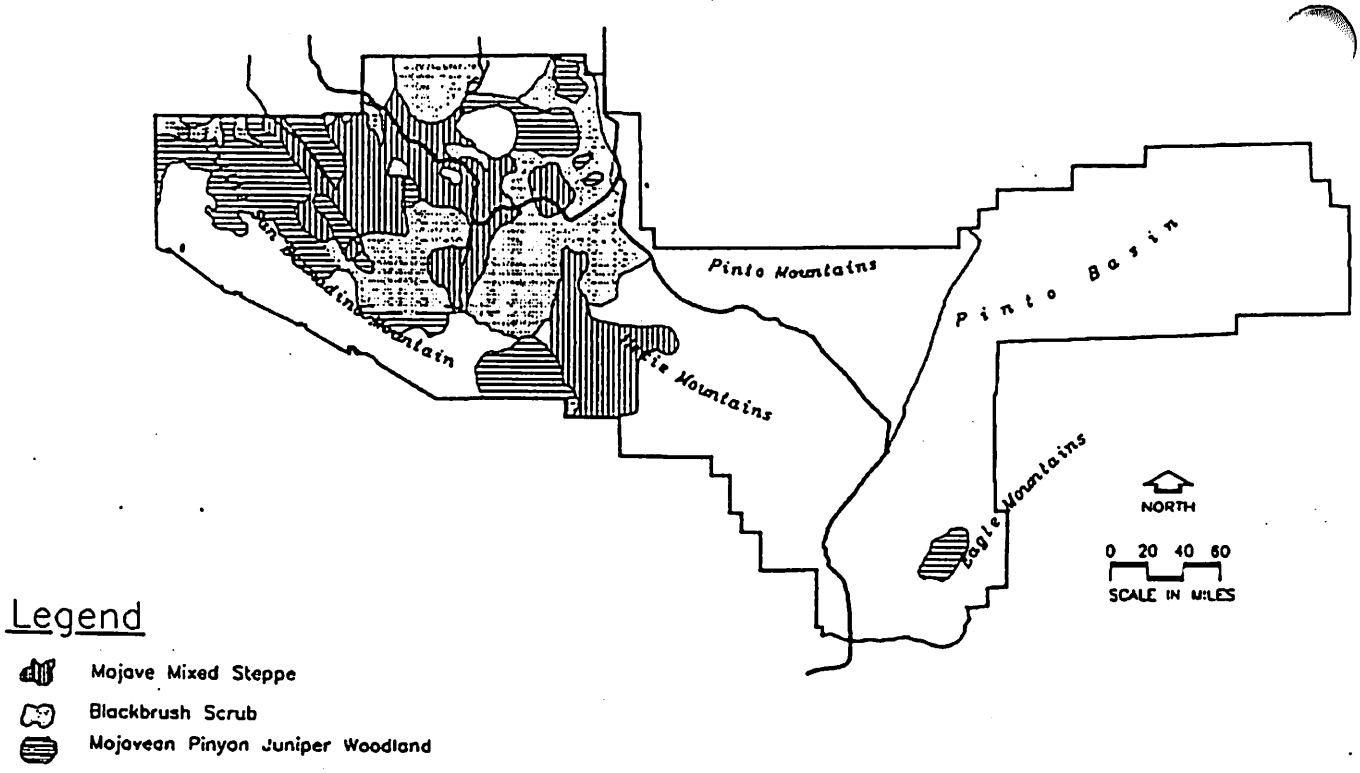


Figure 3. Fire Group Location Map for Joshua Tree National Monument, 1992 (See Appen

Galleta grass (Hilaria rigida), together with desert needlegrass (Stipa speciosa) are the two species most responsible for sustained fire spread within Joshua tree forests. Again, it is difficult to assess the exact response of these species to fire in the Monument. Most research has been conducted on galleta in higher rainfall regimes. However, close examination of post burn successional trends within the Monument suggest that although both species are temporarily set back by fire, they reestablish their preburn densities within 3-4 growing seasons. Most neddlegrasses are considered to be fire intolerant, especially in arid environments and when burned in June or July (Wright and Klemnedsen, 1965). Desert needlegrass, in Joshua Tree National Monument is most closely associated with Thurber needlegrass (Stipa thurberiana), which is the least fire resistant member of the genus. The phenological habits of this species indicate that it will gradually expand its range when subjected to periodic but infrequent fire. Individual clumps of this grass are usually completely consumed by fire due to the buildup of dead organic matter within the interior of the culm. Post burn regrowth originates from tillers on the outside of the culm which in essence expands the surface area over which each culm occupies. Although there is no information in the literature, desert needlegrass seems to respond much like Thurber needlegrass.

Galletta grass is moderately tolerant to fire (Jameson, 1962) and within the Monument, it is more aggressive than needlegrass in invading post burn sites. Dwyer and Pierper (1967), state that the grass can recover up to 75% the first growing season following fire when adequate soil mc exists. At Joshua Tree National Monument, old burns of up to 10 years in age are easily dete due to the visual contrasts between post burn pure Galleta grass stands and unburned, decadent blackbrush/pinyon-juniper stands. Such aggressiveness may be an indirect benefit to the

establishment of perennial grasses by helping to control competing shrubs as mesquite (Prosopis juliflora) and catclaw (Acacia greggii). Mojave yucca, which is often a characteristic component of this community is usually not harmed by fire (Humphrey, 1962).

Fire Group 2: Blackbrush Scrub (Blackbrush, Mojave yucca, Joshua tree, California juniper). Where dense stands of blackbrush occur, it is reasonable to assume that fire has been excluded and not due necessarily to human suppression activities. Since the species is non-sprouting, it is highly susceptible to fire (Beatley, 1966). Jenson and others (1960) have pointed out that blackbrush is slow to reinvade after fires in Nevada, where fire frequency is low and moisture is one of the most fire intolerant of all brush species associated with desert ecosystems. Since it is such a weak competitor, successional climax following fire is unpredictable (Bowens and West, 1976). The most logical post-fire successional pattern in Joshua Tree National Monument would seem to be from blackbrush to annual grasses, followed by a slower invasion of native perennial grasses interspersed with species of buckwheat and desert mallow. Blackbrush can be expected to reclaim these sites in a 20-40 year fire free interval (Moon, pers. obser., 1987).

The blackbrush communities at Joshua Tree National Monument are comprised of a limited variety of species with differing fire tolerances. Evidence suggests that many of these stands are in a transitional successional stage, towards more or less fire dependency, depending upon fire occurrence. The presence or absence of fire must be allowed to continue its role in depicting the species composition and densities of these blackbrush stands, even in the realm of unpredictable post burn successional patterns. The fire statistics within the text of this document suggest that fire size within the Monument has gradually increased over the years. The return of natural fire to these communities should stabilize this statistic at the expense of blackbrush expansion.

Fire Group 3: Mojavean Pinyon Juniper Woodland (Pinyon pine, scrub oak, California juniper). Historically, fire has been the dominant force controlling the distribution of pinyon-juniper, particularly juniper (Leopold 1924; Johnson 1962). In Joshua Tree National Monument, past grazing activities and/or drought have probably played a greater role in limiting the distribution of these species. In the Monument, their range typically is associated with rocky outcrops and shallow soils, acreage which lacks the fine fuels necessary for sustained fire spread.

The effect of fire on pinyon and non-sprouting trees depends largely upon the height and spatial distribution of trees, herbaceous fuel, weather conditions and season (Wright, 1982). Generally speaking, small trees (less than 4 feet) are easily removed by fire when fine fuels of 600-10000 lbs./acre exist (Jameson, 1962). In Joshua Tree National Monument, Juniperous californica has been seen to resprout after fire but will not vigorously invade rocky sites in the absence of fires. However, following the inspection of as many as 6 burned over sites within the Monument, Gavin (pers.observ. 1987) states that less than 5% of the trees examined showed evidence of resprouting. Pinyon and/or juniper trees greater than 4 feet in height are difficult to kill since larger trees are generally associated with greater crown closure, reducing fine fuel accumulations (Arnold it al, 1964; Dwyer and Pierper, 1967). Blackburn and Briner (1975) suggest that stands are easier to burn as the proportion of pinyon to juniper increases. It is generally believed that the period of greatest juniper tolerance to fire begins after maturity and is marked by the appearance of fruiting bodies. With Utah juniper, this begins at 33 years of age (Barney and Frischkenecht, 1974).

Fire within homogeneous stands of pinyon-juniper at Joshua Tree National Monument is not likely to force significant widespread ecological changes. Nevertheless, there remains the need to type-convert pinyon-juniper ranges in close proximity to the urban interface at the Monument due to their

association with blackbrush communities. Fires which originate in blackbrush ranges and spread upslope have the potential to drastically change the normal expected fire behavior of homogen pinyon-juniper stands. The higher intensities and flame heights associated with these condi could produce fire behavior which would exceed control with handtool suppression strategies. Once type conversion is completed, pinyon-juniper stands will need retreatment with fire every 20-30 years.

4.4 FUELS/FIRE BEHAVIOR

The dramatic increase in size Class B or larger fires is due to a combination of factors, the most likely being greater fuel continuity associated with the cessation of grazing, increased rainfall and the introduction of annual grass species. Fuel continuity is critical for the development of large fires in these arid systems. Grasses provide critical continuity as understory within many of the Monument's vegetation systems. There may have been significant changes in grass densities over the past 40 years. First, large bunch grasses, especially galleta, were primary forage species for cattle production.

Cattle were managed primarily in the high basins of the western end of the Monument where water and bunch grasses were available. Cattle were removed by about the late 1940's and it may have taken a couple of decades for original densities of grasses to return. Rainfall plays a critical role in the development and condition of grass communities. Reproduction as well as annual production respond rapidly to rainfall variations. An examination of rainfall trends provides significant insight into historical grass condition. During the period 1936 to 1975 annual rainfall averaged 3.7 inches. During this period, the only significant fire (122 acres) burned in 1968. However, rainfall for was above average at 6.28 inches. During the period of large fires from 1976-1984, rainfall averaged 7.4 inches (1981 only exception with 2.94 inches). Wright (1982) describes the combination of drought and grazing as having the most severe impacts on grass fuels. In some arid systems grass communities have been replaced by woody shrubs under this type of pressure. While this does not seem to have occurred suddenly at Joshua Tree we suspect that, because of the low annual precipitation, heavy impacts on grasses during the last ten years of grazing did occur. Although cattle were eventually removed, low rainfall may have prolonged recovery.

The available fuels in each of the characteristic fire groups are almost exclusively live fuels. While larger fuel sizes may occur in the Mojavean Pinyon Juniper Woodland Group, fine fuels such as cured grasses carry fire in all systems.

1. Mojave Mixed Steppe. Grasses and low shrubs provide fuel continuity between individual Joshua trees. Densities of Joshuas vary dramatically reaching maximum levels in upper elevation basins such as Covington Flats, Lost Horse and Queen Valleys. Flammability of trees varies with size. Trees under 8 feet and typically unbranched will burn but with relatively low intensity and no spotting. Larger trees with a significant layer of down-turned dead leaves burn with extreme intensity and may provide fire brands that produce significant spotting problems. While wind is not necessary to sustain fire in this fuel type, significant rates of spread are associated with high winds and low humidity. Although not extensively tested, it would appear that when the galleta grass h independently, the NFFL model 1 could be used to predict fire spread. Fine fuel loading estimated to be 300-500lbs./acre of grass, assorted brush species and forbs. Taken collectively with wind and Joshua trees, ROS/spotting potential would be expected to closely mimic NFFL

model 5 fire behavior. (Gavin, pers. comm., 1986).

Stipa speciosa, Hilaria rigida may also be found in pure stands, with a variety of small forbes and annual grasses. These fuels are relatively young and vigorous, and are located on old burn sites. They tend to be continuous on good soils and sparse on exposed rocky slopes. Most of Quail Mountain is covered by this group.

During fire season, the condition of these fuels can vary drastically with annual variations in precipitation. Fire behavior is accurately predicted by the tall grass model (NFFL 3).

2. Blackbrush Scrub. This group is abundant, sharing a nearly equal dominance with the Joshua Tree Group. It is typically found on flats and rolling hills of lower elevations and may occupy steeper slopes at higher elevations. It may be found in nearly pure stands on slopes but is more typically a complex combination of blackbrush, yuccas and occasionally juniper.

While blackbrush is a low shrub, the density of the fine branches provides fuel for flame heights that may exceed 10 feet. Fine fuel loading (grasses) between blackbrush clumps is highly variable throughout the Mojave Desert. Where topographic aspect is stressful on vegetative growth and conditions are not favorable for soil moisture retention, blackbrush density may prohibit the invasion of herbaceous vegetation between individual blackbrush plants. Where annual grasses are allowed to compete for available moisture, annual grass fuel loadings may be as high as 200 lbs./acre (Gavin, 1984). Wind is critical for fire to persist and spread in this fuel. The most rapid spread is not associated with winds above 10 mph however. High winds tend to over-ventilate the upper branches and allow the fine dead underbranches to burn out before critical ignition temperatures for the live fuels are reached. Maximum spread rates probably occur with winds of 7-10 mph. Spotting does not occur in pure stands. In mixed species compositions, spotting will be the result of fire brands from shrubs other than blackbrush. Repardless of fuel loading, the largest majority of blackbrush stands are capable of sustained firespread given the right meteorological conditions, although such fire behavior is not characteristic of any NFFL brush model.

3. Mohavean Pinyon Juniper Woodland. This group is composed of classic pinyon-juniper fuels including Pinus monophylla, Juniperus california and Quercus turbinella. However, most associations in the Monument are dominated by pinyon-scrub oak rather than pinyon-juniper. This group is found at higher elevations (4,000 feet) on south slopes and down to 3100 feet on north slopes. The largest continuous systems can be found in the Little San Bernardino Mountains along the ridge from Keys View to Stubbe springs. A large expanse of this group is located west of Covington Flats. Eureka Peak is a classic example of this area.

Much of this group is found in rugged mountainous terrain with large concentrations of fuels in canyon bottom and interspersed less densely throughout rocky areas with little or no ground fuels. In some areas fire behavior is typical for pinyon-juniper systems elsewhere. However, lack of continuity in most areas create high intensity pockets but with spread associated with scrub/grass interfaces or extreme winds.

5.0 FIRE MANAGEMENT OBJECTIVES AND GOALS

5.1 FIRE MANAGEMENT PROGRAM OBJECTIVES

The Joshua Tree National Monument fire management program objectives are listed in descending order of their priority:

- Protect human life and property both within and adjacent to the Park, through the implementation of a comprehensive fire management program.
- Suppress all wildfires at a minimum cost consistent with values at risk, while minimizing the impacts from suppression activities.
- In areas surrounding park developments and values at risk, reduce hazardous fuel accumulations to protect these areas from the threat of wildfire.
- Utilize management ignited prescribed fires to restore fuel loadings and ecosystem structure to within the natural range of variability in the vegetative communities which have been significantly altered by past fire suppression activities.
- Within the constraints of policy, permit lightning-caused fires (prescribed natural fires) to burn within prescription parameters in those vegetative communities in which fuel loading is within the range of natural variability.
- Monitor and evaluate the effects of fire management on Park ecosystems in order to further refine program objectives.
- Facilitate scientific investigation and research to refine prescriptions, determine natural fire regimes, and assist in implementation the fire management program goal.
- Promote an interagency approach to managing fire based on the Incident Command System.
- Actively participate in wildland fire mobilization by cooperation with national, regional, and management zone authorities.
- Provide a spectrum of interpretive and educational programs designed to foster under standing, recognition, and acceptance of the fire management program.

5.2. SPECIFIC FIRE MANAGEMENT PLANNING GOALS

This fire management plan will provide direction for the fire management program at Joshua Tree National Monument. The specific goals of this plan are to:

- Designate and describe fire management units for the Monument.
- Define the operational goals of each Fire Management Unit (FMU).

- Review the ecological role that fire plays in the Monument's biotic communities.
- Integrate fire as a natural process into Monument biotic communities to the fullest extent possible.
- Define fire management prescriptions for the different units.
- Provide for rapid, aggressive and safe suppression of all wildfires and response to prescribed natural fires by defining organizational responsibilities and decision making processes.

The specific fire management goals for each Fire Management Unit are described in Chapter 7.0.

6.0 FIRE MANAGEMENT STRATEGIES

6.1 PAST FIRE MANAGEMENT DIRECTION

Historically, Joshua Tree National Monument has operated under a total suppression policy. In 1982 a fire suppression plan was approved that included a policy for modified suppression of non-threatening fires. These procedures provided for low impact, cost effective forms of suppression for fires that did not pose immediate threats to property or safety. While this program proved effective on many small fires, it was difficult to coordinate on large fires. Additionally, it did not allow for the incorporation of prescribed and prescribed natural fire into the Park's natural resources management program.

In 1987, the first complex fire management plan was approved in the Park which further incorporated both a prescribed and prescribed natural fire program. Considerable acreage was burned under both the prescribed and prescribed natural modes until the program was subject to Servicewide suspension following the 1988 Yellowstone fires. These programs have remained in suspension and recently, all fires, regardless of cause, from 1988 to the present have been routinely suppressed.

6.2 CURRENT AND FUTURE FIRE MANAGEMENT DIRECTION

All fires at Joshua Tree National Monument are classified either as wildfires or prescribed fires. Prescribed fires include management ignited prescribed fires deliberately set or prescribed natural fires (lightning-caused) which are permitted to burn under prescribed conditions to achieve predetermined resource management objectives. All fires that do not meet the criteria for prescribed natural fires are classified as wildfires and will be suppressed. Wildfire suppression methods utilized will be those which minimize the impact of the action and the fire itself, commensurate with effective control (Minimum Impact Suppression Guidelines).

This fire management plan identifies actions to safely execute a full spectrum, comprehensive fire management program.

6.2.1 SUPPRESSION PROGRAM STRATEGIES

Wildfire suppression is an emergency operation and takes precedence over all other operations with the exception of safeguarding human life. The National Park Service recognizes three different levels of suppression strategy or intensity:

- **CONFINE:** To restrict the wildfire within predetermined boundaries, established either prior to, or during the fire. These identified boundaries will confine the fire, with no action being taken to put the fire out.

- **CONTAIN:** To restrict a fire to a defined area, using a combination of natural and constructed barriers that will stop the spread of fire under the prevailing and forecasted weather conditions, until out.

  Tactics include, but not limited to: direct, parallel and indirect lines with limited backfiring, extended hose lays, improved hand lines, mop up to 300 feet into fire area to secure perimeter from rekindle and firebrand sources. In most instances, at this level of effort, perimeter can be considered secure more quickly and with fewer resources required for extended mop up and patrol than compared with the confinement strategy.

- **CONTROL:** To aggressively fight a wildfire, through the skillful use of personnel, equipment, and aircraft to establish firelines around a fire to halt the spread and to extinguish all hot spots, until out.

  Tactics are directed at total suppression of the fire as quickly as possible. The objective is to attain "control" by the advent of the following burning period. With respect to suppression responses to wildfires, this is the most effective and time proven technique to achieve the goal of prompt fire control.

The command selection of any one of these suppression strategies is referred to as the Appropriate Suppression Response (ASR). An Escaped Fire Situation Analysis (EFSA) shall be completed when a prescribed burn is declared a wildfire, or when a wildfire escapes initial attack (NPS-18, Section III, Chapter 8, Page 3, Exhibits 1 & 2, and Appendix R). The strategy shall be selected with due consideration of wilderness policies and whichever strategy best meets applicable economic, social and environmental criteria. Fire operations must be aggressive to provide maximum safety for firefighters and for the public. The Superintendent's signature is required to authorize the document and subsequent actions. Strategic changes warrant revision of the EFSA and requires the Superintendent's signature. Adherence to this procedure shall provide essential oversight to fire suppression operations.

Suppression operations shall be implemented consistent with the ASR selected strategies. **Figure 4** represents a general scheme for selecting the appropriate initial fire management strategy (go-no-go decision)following all fire starts, regardless of cause and location, within the planning area. It is intended for posting together with the Park dispatch plan at headquarters and all other stations and should be kept current to reflect accurate operating procedures and proces

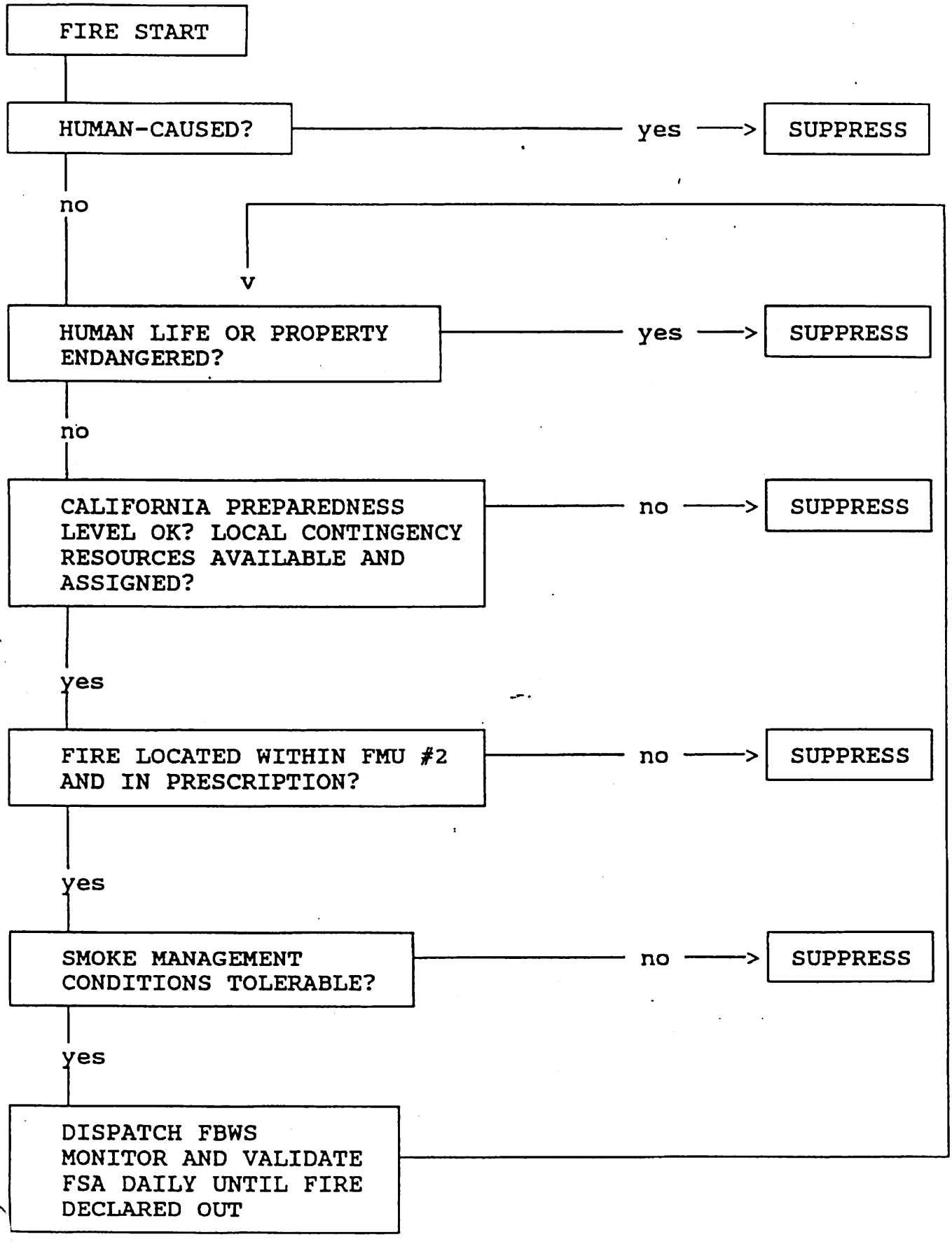


Figure 4. Fire Management Decision Scheme, Joshua Tree National Monument, 1992

6.2.2 PRESCRIBED FIRE STRATEGIES

Prescribed fire strategies at Joshua Tree National Monument will be designed around two prin purposes; to perpetuate natural processes and to reduce hazardous fuel accumulations.

A detailed scenario for managing prescribed natural fire (PNF) at Joshua Tree National Monument can be found in the Western Region Fire Monitoring Handbook (1992), Chapter 2.17, Table 4. In brief, a typical PNF is managed in three phases.

In phase one, the fire is discovered and a risk assessment is made, usually within a two hour time period. The most important decision to be made during this period is the initial designation of the fire as either a prescribed natural fire or a wildfire. This decision is initially made in the absence of detailed prescription data but rather is based primarily on the more subjective criteria listed in the Fire Management Decision Scheme **(Figure 4)**. While the urgency to make this initial fire designation is emphasized in what always appears to be a crisis situation from the onset, it is important to stress that once a fire has been officially designated as a wildfire, it will no longer be possible to manage the process as a PNF even if the fire fits within prescription. Usually it is the initial official designation by Monument personnel who discovered the fire and the Superintendent.

In phase II, decisions are based upon real reconnaissance data from the fire and are much better documented. Phase II will usually last from two hours to the end of the first burning period, during which time the following events usually occur:

- The Fire Situation Analysis Team (FSAT) meets to develop the FSA parts I and II. Th probably the first opportunity to actually verify that the fire is burning within prescript. **(Table 2)** and other constraints (Section 10.2). Primary concern during this time will focus on the potential growth and duration of the PNF to be managed.

- The Superintendent and possible members of FSAT discuss in greater detail the risks and assumptions that formed the basis for the phase one decisions. More time is spent looking at social, political, legal, economic and biological consequences associated with the long term management and/or escape of the PNF. Public safety is the major consideration at this stage of planning the PNF.

- A prescribed natural fire plan (PNFP) <u>may</u> be prepared for complex PNF's. The Western Region Prescribed Burn Plan format is often custom tailored to this purpose.

- The Superintendent or his designate approves the FSA and the PNFP (if one is necessary).

Phase III may last from the end of the first burning period up to several days post ignition. This phase allows for the process of daily reevaluation of the FSA and the risks associated with the continued management of the PNF. This daily revalidation must be undertaken with routine precision since as the fire increases in size, flexibility associated with the potential suppression of the fire decreases. Again, the primary concern throughout this process with be on the potential daily growth of the fire and the resources required to suppress the fire should it exceed prescrip or the early assumptions of FSAT. Based upon the daily revalidation of the FSA, the Superinten will either extend or discontinue the life of the PNF into another burning period via the NPS-PNF Decision Record (Section 10.2). Additionally, the FMO and FSAT may begin to seek assurance that critical resources that will be required as the PNF continues to grow will be available and assigned.

Table 2. Prescribed Natural Fire Prescription for Joshua Tree National Monument, 1992.

Prescription Element	Parameter (not to be exceeded)
1. Size/number of fires	2 if one remains less than 50 acres and total of 2 combined fires is less than 300 acres or 1 fire up to 6,000 acres
2. Active Fire Front	Total active fire front is 1 mile or less
3. BI	Less than 2 uninterrupted burning periods above a BI of 60.
4. CA Preparedness Level	Level I & II; no restrictions. Level III; FICC notifies South Zone of projected fire growth for next 24 hours. Level IV & V; no new complex PNF's. Existing PNF's will continue to be monitored if PBB certifies that fire has little chance of requiring suppression resources beyond those committed in the Fire Situation Analysis. (Appendix I)
5. Forecast	Unstable air masses or forecasted wet low pressure systems predicted. Forecasts of dry lightning or rapid or unpredictable frontal systems can justify the initiation of suppression actions along fire front
6. Smoke Dissipation	Vista visibilities are not violated for more than 72 hours in any impacted community. Emissions from PNF's will not exceed the regulations established by the Clean Air Act for Class I areas.
7. Spotting	No more than 1/8 mile without violation of parameter #1. More than one spot fire greater than 5 acres in size, burning independently of the main body should be suppressed or tied into the main body. No limit on spot fires within 1/8 of a mile of main body.
8. Probability of Ignition	Remains at 85% or greater for no more than two consecutive burning periods.

7.0 FIRE MANAGEMENT UNITS

Fire Management Units (FMU's) identify areas of the park which are assigned different protective policies and fire management objectives according to the human values and resources involved. By designating different FMU's, decision making processes regarding the use of fire and fire suppression is simplified for the Incident Commander and/or Fire Program Manager.

There are three Fire Management Units within Joshua Tree National Monument **(Figure 5)**. Appropriate fire management policy within each FMU have 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.

7.1 FIRE MANAGEMENT UNIT #1: SUPPRESSION UNIT

7.1.1 LOCATION AND DESCRIPTION

The boundaries of this FMU exist as administrative boundaries, two miles on the interior and one mile on the exterior side of the legislative boundary of Joshua Tree National Monument, completely surrounding the Monument. This narrow FMU contains approximately 354,560 acres (2/3 of which is in the Monument) between the elevation extremes of 984 and 5,240 feet above sea level. All acreage within this FMU and inside the administrative Park boundary are under the administrative jurisdiction of the NPS. Characteristically, management strategies have been greatly influenced by high Park visitation, special uses and encroachment by urban development. Fire Groups and 3, described in Section 4.3.3 occur within this unit. National Park Service responsibilities within the one mile outside the legislative boundaries of Joshua Tree National Monument are documented in the Cooperative Fire Protection Agreement between National Park Service - Joshua Tree National Monument and the California Department of Forestry (June 1992) found as Appendix C of this text. In addition to the mutual-threat suppression zone surrounding the perimeter of the Monument, suppression buffers will be established around developments such as campgrounds, historic structures and private inholdings within the Monument **(Figure 5)**.

The largest suppression subunit in the Monument's interior is located in the Lost Horse Valley and Hidden Valley areas. The perimeter of this zone is defined as follows: the eastern limit runs from the junction of Juniper Flats Road and Park Route 13 north along Park Routes 13 and 12 to Hidden Valley Campground; at the campground it follows the dirt road along the campground's eastern edge to the intersection known as Echo Tee; from here it follows the dirt road into Key's Ranch, at the intersection known as Key's West Gate the perimeter will follow the dirt road through the West Gate to Park Route 12; from here it follows Park Route 12 south to the intersection with the Lost Horse Ranger Station Road; from here it follows the dirt road through the station area and south to the intersection of the dirt road into the Randolph property; from this point the perimeter follows topographic features described as the base of the mountain west of the intersection, proceeding southwesterly skirting Section 18 to the point where the jeep trail terminates in Section 13, south along the base of the ridge through Section 13 into Section 24; at this point the perimeter will be defined as a line extending southeast to the prominent peak (4,928 feet) on the southeastern e of Section 19 where the perimeter crosses this peak following the same southeastern trend until it intercepts the Juniper Flats Road at a point where the road passes through the corner boundary

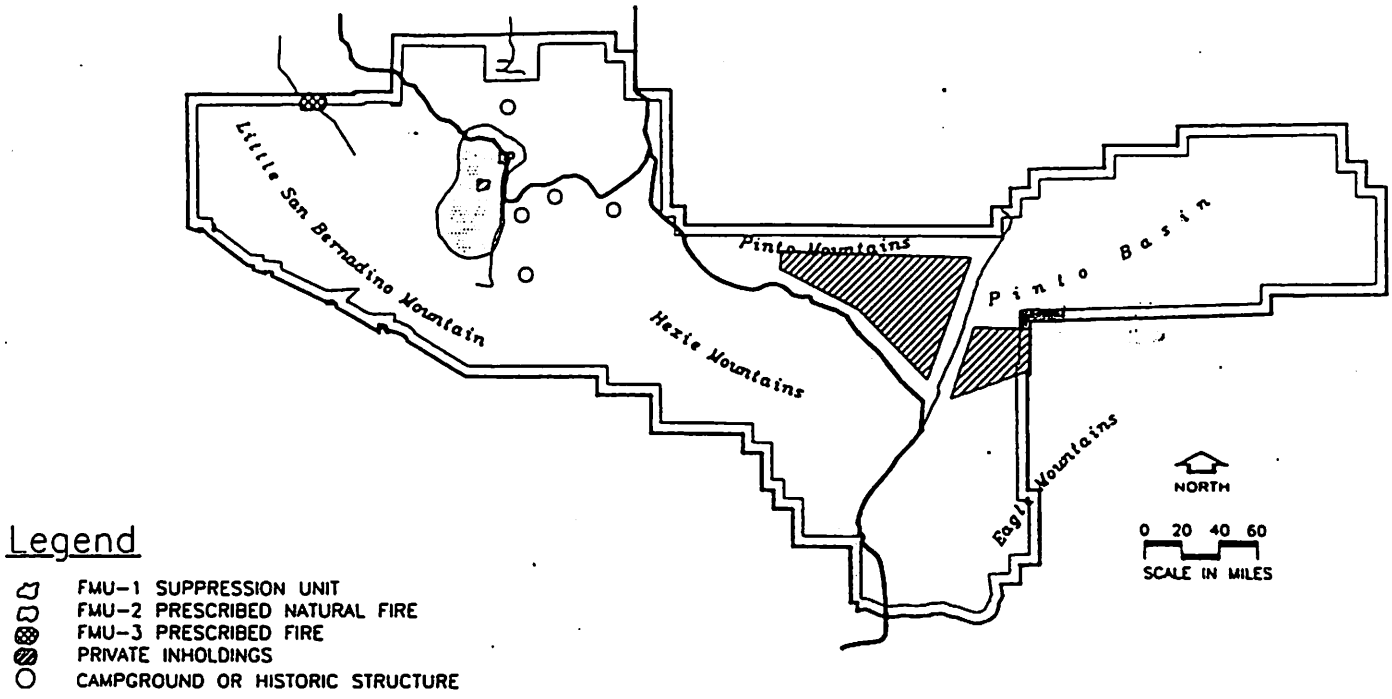


Figure 5. Fire Management Unit Map, Joshua Tree National Monument, 1992 (See Appendix A)

between sections 30 and 29; from here it follows the road northeast to its intersection with Park Route 13. It is important that this boundary be identified by physical features in order to avoid placing the IC in a position of second guessing his location and thus suppression strategy.

Suppression perimeters around campgrounds, structures and historic structures shall be maintained at an outward distance of 1/8 of a mile in all directions to prevent fire from damaging developments.

7.1.2 OBJECTIVES

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 (NPS 18), including direct and/or indirect attack techniques, ie. use of natural fire breaks, changes in weather, physical barriers, lack of fuels, etc., in the quickest most effective manner possible. Typically the CONTROL strategy (NPS-18, June 1990 Revision, Section III, Chapter 8, page 2) will be selected as the ASR.

This objective reflects the fact that although there is an urgent need to suppress fuels which threaten the park's boundary, over-aggressive actions are not warranted when there is no immediate threat to life or property.

Fires which start along or on the boundary between FMU #1 and FMU #2 should receive special consideration for PNF status in accordance with procedures described in Section 6.2.2. When it

is clear that such fires will not involve significant acreage within FMU #1, but rather have its spread momentum into FMU #2, the IC may choose to briefly delay a formal designation as wildfire or PNF until initial FSA information is available to guide a decision on designation.

The backfire or inactive fire front which faces the exterior of the Park boundary may receive minor holding or suppression actions which would not necessarily preclude managing the fire as a PNF once it moved into FMU #2; nevertheless once significant suppression actions are taken on the fire or the fire has been officially declared as a wildfire managed according to any of ASR strategies, it must be managed as a wildfire for its entire active life until declared out. Once a fire is declared a wildfire and burns into FMU #2, it is recommended that a CONTAIN strategy be considered to manage the fire.

- Implement our mutual aid responsibilities (outside Park) whenever possible.

7.1.3 GOALS

Specific long term fire management goals include:

- Limit fire starts to 2 acres or less in size when fire threatens human values.
- Whenever possible, use the least aggressive approach to suppressing fire.
- Limit initial attack (response) time to 1/2 hour.
- Exclude suppression actions and fires from known Category 2 Threatened and Endangered communities; Place priority on suppression actions which will exclude fire from Category 1 T & E communities where such communities have been identified within the Monument.

7.1.4 OPERATIONAL CONSTRAINTS

The operational constraints which affect all suppression operations within the Park are described in detail in the blanket Delegation of Authority (Appendix D).

7.1.5 SPECIAL CONSIDERATIONS/MANAGEMENT IMPLICATIONS

Fires burning in close proximity to the boundary between FMU #1 and #2 but not distinguishable with respect to location in either unit, will be considered to be in FMU #1.

Flanks which burn toward FMU #2 have no immediate suppression requirement when the ignition source has been natural; a CONFINE ASR may be selected to extinguish a wildfire which has moved into FMU #2. The Park will not accept fire for PNF consideration which is burning from outside its administrative jurisdiction and is being managed by another agency as a wildfire.

Direct attack must override a less aggressive strategy for suppression when the follc conditions occur:

- Unexpected fire runs develop.
- Total active fire perimeter exceeds 100 acres in size, all within FMU #1.

- The source of ignition occurs prior to 10:00 a.m. - this will eliminate fires which have the potential to take advantage of full burning day, accompanied by upslope winds.

- Fires are burning towards known historical and/or archeological sites.

- There is the possibility that smoke may reduce significantly the visibility in the communities of Yucca Valley, Joshua Tree and/or Twentynine Palms and adversely affect public health. A significant reduction occurs when:

  Road visibility in the Monument is reduced to less than 300 feet. When road visibilities are reduced to this level, appropriate traffic control will be necessary in accordance with the conditions. These visibility restrictions have been established in consideration of and in accordance with posted speed limits. Vista visibility in the Monument is reduced to less than 5-7 miles after ignition or anytime vista visibility dips to less than 3 miles, regardless of the visibility prior to ignition. The 7 mile visibility factor will be used in the front country of the Monument, (Western Region Fire Monitoring Hand book, 1992).

- If more than one separate fire is burning within the Monument, regardless of FMU, at any point in time.

7.2 FIRE MANAGEMENT UNIT #2: PRESCRIBED NATURAL FIRE UNIT

7.2.1 LOCATION AND DESCRIPTION

MU #2 occupies approximately 298,880 acres between the approximate elevation extremes of 1080 and 5516 feet above sea level. The exterior boundary of this unit coincides with the interior administrative boundary of FMU #1 with the following exception; the boundary in the area of Quail Wash and Covington Flats will follow the natural drainage of Smith Water Canyon. This area south and east of Smith Water Canyon will be in FMU #2. All areas north and west of the bottom of Smith Water Canyon drainage are included in FMU #1. All three Fire Groups occur within the unit as described in Section 4.3.3.

7.2.2 OBJECTIVES

The fire management objectives for FMU #2 in descending order of priority are:

- Protect human life and property.

- Allow natural fire to play its maximum role in influencing ecosystem dynamics of Joshua Tree National Monument.

- Supress all human caused fires. These starts, if allowed to burn, would effectively alter potential natural fire frequencies. Also, suppress all starts which exceed PNF prescription.

7.2.3. GOALS

The specific goals for FMU #2 are:

Manage all PNF's within the prescription criteria found within Table 2.

Intensively monitor all natural fires in order to better understand the role of fire within the Monument.

Develop or adapt fuel models for all vegetation types represented (conventional fire behavior models or through BEHAVE).

Map all category 2 T&E species; determine the effects of fire on these species in consultation with the U.S.F.W.

Keep all human caused starts to 25 acres or less.

Totally eliminate costly and unwarranted suppression actions and damage to resources.

Preserve native plant communities as described in the Natural and Cultural Resources Management Plan.

Maintain natural fuel loadings and variations in vegetative age classes (mosaics).

Continually refine the prescribed natural fire prescription to allow for the widest spectrum of fire behavior possible while maintaining the capacity to suppress fires for safety reasons.

7.2.4.SPECIAL CONSIDERATIONS/MANAGEMENT IMPLICATIONS

As previously discussed in the fire effects (ecological assessment) Section 4.3.3., widespread mortality of Joshua Trees may be linked in the future with the initiation of the PNF program. This is an acceptable consequence of the PNF management strategy.

7.3 FIRE MANAGEMENT UNIT #3 MANAGEMENT IGNITED PRESCRIBED FIRE UNIT

The prescription elements previously discussed in Chapter 6.2.2 were selected based upon their ability to predict when the prescribed natural fire strategy can be safely implemented, supplemented by minor holding actions via hand tools in FMU #2. They were not selected for their ability to produce or force post-burn fire effects, shifts in species composition or succession or to accomplish varying degrees of fuel consumption. The application of prescribed natural fire at Joshua Tree National Monument is based upon the premise that no evidence currently exists to

suggest that Monument fuels have been significantly altered from natural levels as a lack of past fire suppression efforts. To the contrary, Hastings and Turner (1965) conclude that "there is no reason to suppose that fires used to sweep the desert grassland frequently or on a large scale." As a consequence, they "reject the hypothesis that fire suppression has created changes in the fuel profile in the Mojave Desert".

7.3.1 LOCATION AND DESCRIPTION

The acreage comprising FMU #3 is defined as a narrow band of Monument 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 3600 and 4842 feet above sea level and contains Mojave Mixed Steppe and Blackbrush Scrub fire groups. This area would normally be incorporated into FMU #1, however the presuppression treatments required here will differ from any other area in the Monument. The suppression strategies will be consistent with CONTAIN and CONTROL strategies of FMU's #1. The need to incorporate presuppression treatments in FMU #3 is a result of the threat that hazardous fuel accumulations in this area now pose to urban encroachment upon the Monument. As this encroachment and untreated fuel loading are expected to increase in future years, so might the acreage within FMU #3.

7.3.2 OBJECTIVES

The fire management objectives for FMU #3 in descending order of priority are:

- To protect human life and property.
- To CONTAIN or CONTROL <u>all</u> wildfires.
- To use management ignited prescribed fire in a manner that will effectively reduce or eliminate hazardous fuel threats to human life and property. This will be accomplished directly through the reduction of biomass or indirectly, through type converting blackbrush and pinyon-juniper range.

7.3.3 GOALS

The fire management goals for FMU #3 are as follows:

- Prescribe burn 10 acres/year with no more than 5 smoke related complaints as a result of this activity.
- To maintain the current size or, if possible, reduce the acreage in this unit through application of prescribed fire.
- To develop a hazard fuel reduction prescription for blackbrush through BEHAVE.
- To continue to refine the Pinyon-Juniper prescription (Appendix E), designed to convert pinyon-juniper range to perennial grassland.
- Implement an effective smoke management program which will greatly reduce or eliminate all legitimate smoke related problems associated with the prescribed fire program.

- Organize an aggressive fire prevention program with emphasis on educating land-homeowners in methods of reducing wildland fire threats.

7.3.4 SPECIAL CONSIDERATIONS/MANAGEMENT CONSIDERATIONS

At the present time, the need to conduct hazard fuel reduction fires is critical. Therefore, management will initiate the management ignited prescribed fire program in an attempt to develop fire prescriptions. In the initial years of the program, the thrust of management activities within this FMU will be to create age class mosaics by jackpot burning, converting blackbrush and pinyon-juniper range to grasslands in a fuel bed configuration across Quail Wash. These mosaics will physically influence fire behavior via a change in the fuel model which will vary fire intensity within this boundary and reduce the intensities of fire moving from FMU #2 into FMU #1. Reduced fire intensities will provide greater flexibility to suppression forces responsible for initial attack with FMU #1.

8.0 FIRE MANAGEMENT AND RESPONSIBILITIES

An organizational structure chart for fire management at Joshua Tree National Monument is shown as **(Figure 6)**. The following formal positions have direct responsibility for the implementation of the fire management program at Joshua Tree National Monument.

Regional Director, Western Region

Authority for the approval of this plan rests with the Regional Director of the Western Reg National Park Service.

Superintendent

The Superintendent of Joshua Tree National Monument is responsible for the implementation of this plan. Under normal conditions, implementation authority and responsibility is delegated to the Management Assistant for fires within the administrative boundary of the Monument.

Management Assistant

The Management Assistant, provides direct supervision of the fire management program and FMO. With the assistance of the Fire Management Officer, he/she is responsible for assuring that qualified personnel manage each fire. All personnel assigned will meet the NPS qualifications as outlined in NPS-18 (1990), and the National Park Service Wildland Qualification System.

Fire Management Officer

The Fire Management Officer is responsible for direct coordination and management of all wildland fire activities within the boundaries of the Monument. The Fire Management Officer reports directly to the Management Assistant. Management activities will include the recruitment, training supervision of seasonal firefighters, maintenance of equipment, documentation and record keeping, field assignments and on-site fire management. The Fire Management Officer will be the primary wildfire contact for the Monument.

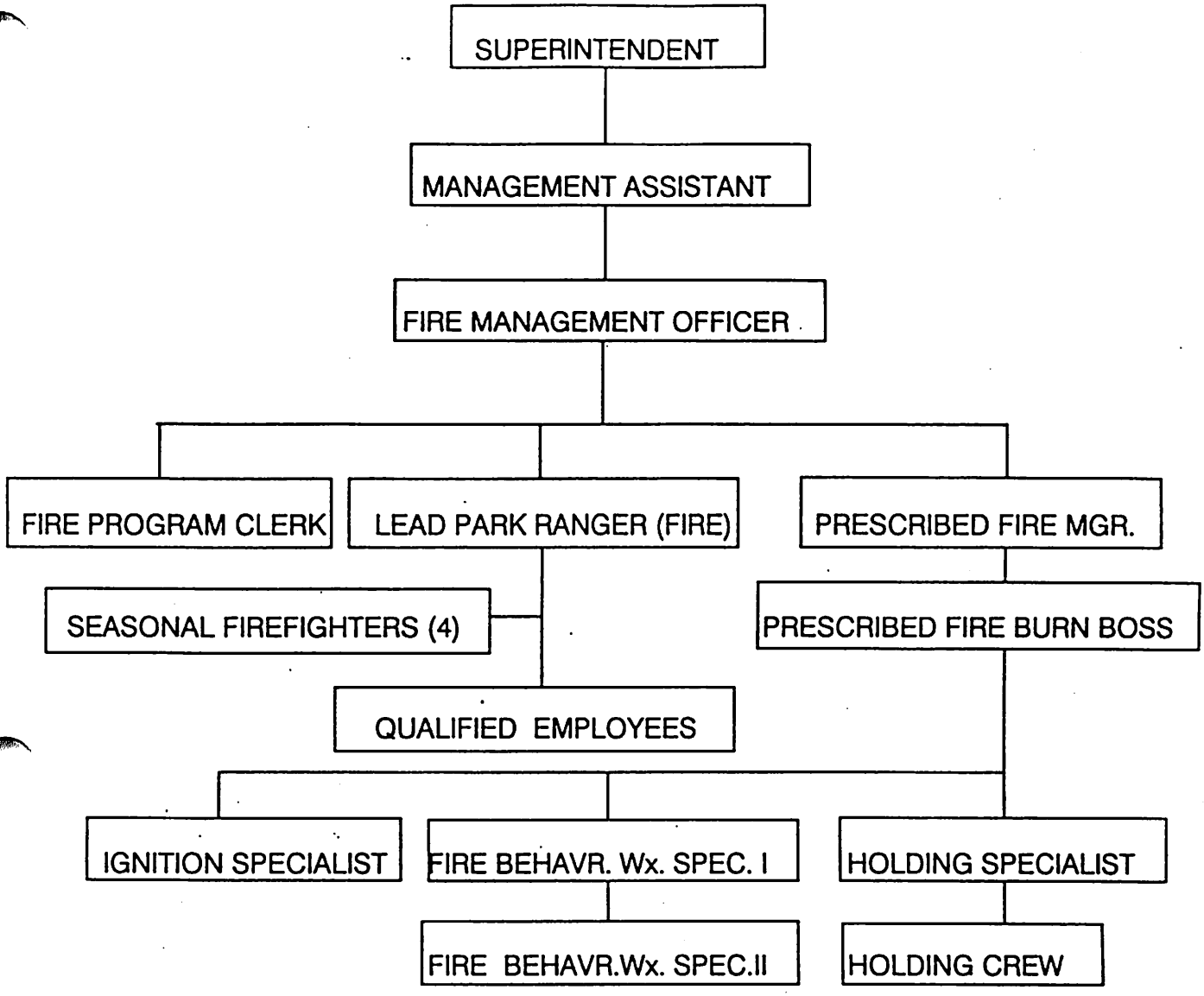


Figure 6. Joshua Tree Fire Management Organization and Responsibilities, 1992

District Rangers

District Rangers are responsible for the suppression of all wildfires within their respective a through the first burning period or until it is apparent that suppression of the fire requires extended attack resources.

Chief, Resources Management

The Chief, Resources Management will serve as Resource Advisor on all wildfires and will perform the duties of Prescribed Fire Manager and Prescribed Burn Boss during prescribed burns and prescribed natural fires. Additionally, The Chief of Resources Management, directly or through delegation, will coordinate the monitoring of fire effects in accordance with the Western Region Fire Monitoring Handbook (1992), and will develop rehabilitation plans that are required following suppression actions.

9.0 WILDFIRE PROGRAM

9.1 FIRE PREVENTION PROGRAM

Human caused fires are not part of the natural environment, but rather represent a human impact on the ecosystems of Joshua Tree National Monument. The fire prevention section of this plan addresses methods in which the number of human caused wildfires can be reduced.

A program to prevent human caused fires in an area which allows prescribed natural fires c confusing to the public. A special effort will be required in order to inform and educate the public about natural fires in relation to the ecosystem. The prevention program should include a public relations campaign aimed at helping visitors to understand that human caused wildfires are an unnatural disturbance and that such fires tend to occur in unnatural clusters around visitor use areas. A further goal of fire prevention is to increase public safety. An ongoing fire prevention effort is also necessary to achieve management efficiency in an era of restrained government spending.

Twenty-six percent of the fires which have occurred in Joshua Tree National Monument since 1964 have been human caused. Although lightning caused fires occur most frequently in July, August, and September; the occurrence of human caused fires is more evenly distributed throughout the year. The largest incidence of these fires occurs in January, April, May, June, and July. While most natural fires occur between 11 a.m. and 5 p.m., unnatural fires occur more generally throughout the day. In fact, 35% occur between 9 a.m. and noon. Approximately one third of all wildfires of Class B size or larger have been ignited by human activity.

Fire prevention at Joshua Tree National Monument will involve all divisions in the Park as it necessarily consists of a combination of public education, enforcement of fire regulations, fire inspections, and maintenance in visitor use areas.

The fire prevention analysis is attached to this plan as Appendix F. This appendix contain detailed prevention actions identified for specific areas or compartments within the Monume will be reviewed annually and updated if changes occur which alter the identified RISKS, HAZARDS, or VALUES.

9.2 PRESUPPESSION PROGRAM

Presuppression is the work done in advance of a wildfire to ensure an effective suppression action and includes recruiting and training, planning and organization, maintaining fire equipment and supplies. The objectives in this plan are to have a well trained and equipped fire management organization to suppress wildfires.

9.2.1 PROGRAM GOALS

Goals for the Joshua Tree National Monument presuppression program will consist of the following:

- Identify and annually review the Park's fire season and staffing classes, as a basis for revision of the Park's planned suppression efforts.
- Establish and annually reassess the Park's step-up plan, so as to assure the most effective response to ignitions within the Park.
- Develop an effective presuppression program to meet reasonable wildfire expectations for the Park:
- Continue to develop a cadre of qualified firefighters, trained and equipped for initial attack.
- Conduct regular wildfire and prescribed burning training for Park staff, in order to replace such expertise lost due to personnel transfers.
- Establish interagency contacts and agreements for additional resources necessary to control fires that escape the Park's limited initial attack capabilities.
- Maintain the Park's primary fire cache (20 person) at the Black Rock Interagency Fire Center and maintain two Type III engines (Model 60 & 61).
- Ensure all qualified firefighters within the Park have properly maintained fire packs.
- Ensure all patrol ranger vehicles have adequate fire fighting tools.
- Make available and encourage qualified firefighters to participate in proper physical conditioning.

9.2.2 TRAINING

The Fire Management Officer will recruit and train qualified fire management personnel. On-the-job training both technical and physical will be conducted by the Fire Management Officer, Chief of Resources Management, and District Rangers with cooperation and joint participation of personnel from the following agencies: Bureau of Land Management, U.S. Forest Service, and the California Department of Forestry.

There are three levels of qualifications for which training is designed. These are:

- Regular protection personnel who maintain red cards. The prerequisite training (S-130 190) is needed for qualification. These regular firefighters can be assigned duties on the unit during initial attack and on project fires.

- Regular personnel that have ICS certification, in addition to their qualifications, for assignment on and off the Monument.

- Seasonal firefighters.

A wildland fire training plan has been developed and appears as Appendix G. The training plan identifies the type and number of positions required to implement this plan. Additionally, a physical fitness program is mandatory for all three levels of firefighters.

9.2.3 FIRE EQUIPMENT/SUPPLIES

Fire equipment will be maintained in serviceable condition and in constant readiness. The Fire Management Officer will be responsible for the 20 person fire cache located at the Black Rock Interagency Fire Center. This is a shared facility with the Bureau of Land Management. NPS maintains two Type III engines, Model 60 and Model 61. BLM houses a Type III engine, Model 5 at the Station. District and Area Rangers will be responsible for the servicing and inventory of fire equipment assigned to their respective areas. Defective, unsafe, or worn out items will be repaired/replaced by the Fire Management Officer.

9.2.4 EMPLOYEE AVAILABILITY

During fire season, all red carded/fire related personnel will provide the Fire Management Office with their availability during off duty hours. Each employee subject to fire duty will have a fire pack and/or other necessary equipment needed to accomplish assigned tasks.

9.2.5 COMMUNICATIONS

During the initial attack of any wildfire, communications with Federal Interagency Communication Center (FICC) and fire management personnel will be conducted on the established Monument radio frequencies. Cooperative fire suppression forces from other agencies have been authorized to use these frequencies for operations within the Monument. When Monument resources have been requested to respond outside the Monument, FICC will obtain a tactical frequency when the resource order notification is established.

During extended attack operations a separate radio cache may be requested through FICC.

9.2.6 EMERGENCY PRESUPPRESSION PLAN (STEP-UP)

Emergency presuppression describes actions taken to provide extra coverage during extrem unusual fire danger. These are: thunderstorms, strong and dry wind events, or prolonged drought. The measurements of these factors are expressed in fire danger rating as respectively; Lightning Activity Level (LAL), Burning Index (BI), (Deeming et al. 1977).

Appropriate activities for emergency presuppression funds include hiring of emergency temporary firefighters, extending tours of duty for qualified fire staff, extending tours for detection functions, fire patrols during very high or extreme fire danger, and prepositioning resources. Leasing transportation for initial attack, including vehicles and aircraft to ensure prompt response to wildfires, is included.

Actions are specified by staffing class in the step-up plan (**Tables 3 and 4** respectively). Prepositioning of area resources and extra equipment leasing are extraordinary actions necessitating NPS regional level concurrence.

The Park Step-Up Plan is based on the burning index (BI) as defined in the National Fire Danger Rating System (NFDRS). Fire weather observations are taken hourly by a Remote Automatic Weather Station (RAWS) located at the Lost Horse Ranger Station. Data is transmitted by satellite and downlinked to the Boise Interagency Fire Center every three hours. This information can be accessed by the Federal Interagency Communication Center (FICC), in San Bernardino, CA. Burning indices are determined and a fire weather forecast is received from the FICC, the staffing plan for the next day is then announced at 1600 hours. The Monument's staffing plan is determined by the predicted BI. Staffing classes are established based on the cumulative frequency distribution on the burning index (Firdat Option - NFDR Fuel Model L and T).

The Step-Up Plan has been based upon a fire season which begins on May 18 and ends on September 20. The fire season for the Monument has been defined by a FIREFAMILY analysis. "Fire Season" is defined as the dates between which there exists a 10% chance of a fire occurring. During this period, the Lost Horse Weather Station will be monitored daily to provide data for fire danger analysis.

It will be the responsibility of the Fire Management Officer (FMO) to see that staffing needs are met in accordance with Step Up Plan requirements. The management actions associated with each staffing class can be seen in **Table 4**.

Table 3. Staffing classes, lightning activity level and corresponding burning indicies for Joshua Tree Naional Monument, 1992.

STAFFING CLASSES	BI	LAL	FIRE DANGER
MC-1	0-11		LOW
MC-2	12-24		MODERATE
MC-3	25-48		HIGH
MC-4	49-59	4	VERY HIGH
MC-5	60 and above	5	EXTREME

Table 4. Step Up Plan: Joshua Tree National Monument, 1992

STAFFING CLASSES	BI	MANAGEMENT ACTION
MC-1	0 - 11	Minimum of 3 qualified fire fighters. Engine equipped, able to respond. Normal tour of duty 0900-1800.
MC-2	12 - 24	Minimum of 3 qualified Initial Attack (I.A.) firefighters, engine must be staffed and maintain a 10 minute get-away. Project activities permitted. Normal tour of duty 0900-1800 seven days a week during fire season.
MC-3	25 - 48	Minimum of 3 qualified I.A. fire fighters on engine, 1 Patrol Ranger in the field. Engine must maintain a 10 minute get away time. Project activities will be permitted provided get away time can be maintained. One Resource Advisor must be on duty. Fire protection coverage during fire season will be 0900-1800, seven days a week. If the predicted or actual lightning activity level is 4, 5, or 6 automatically move to MC-4. If exceptional human caused risk exists, move to MC-4.
MC-4	49 - 59	Minimum of 5 qualified I.A. firefighters on engine. Two patrol rangers in field for prevention and detection. Engine must maintain a 5 minute get away time. Project activities will be permitted provided get away time can be maintained. One Resource Advisor must be on duty. Fire protection coverage will be 0900-1800, seven days a week. Six or seven day work week and extended tour of duty may be authorized for key management personnel, qualified personnel, detection and dispatch personnel. Reconnaissance aircraft and/or emergency firefighters may be hired, if needed. Efforts will be made to coordinate information with BLM.
MC-5	60/up	Minimum of seven qualified I.A. firefighters. Five on engine and two in the field for prevention and detection. Engine will have a get away time of 5 minutes. Project activities will not be permitted. One Resource Advisor must be on duty. Extended tours of duty will be authorized for firefighters until darkness. Six or seven day work week and extended tours of duty on a daily basis will be authorized for key management personnel, qualified personnel, detection and dispatch personnel. Cancellation of leave may be required. Reconnaissance air craft for detection and emergency firefighters may be hired. Open pit fires may be prohibited. Closure of campgrounds identified areas of the Monument will be considered. Efforts will be made to coordinate information, restrictions and closures with BLM and the local media.

9.2.7 FIRE WEATHER FORECASTING

A discussion of fire weather forecasting for the Park is found in Section 9.2.6. (step-up). Special orecasts such as spot weather forecasts are requested through FICC on the spot weather forecast form found on the back side of the Notification of Prescribed Burning Information form supplied by FICC and specific to the operations of this center (Appendix O).

9.2.8 CONTINGENCY PLANNING

All presuppression activities related to the implementation and scheduling of prescribed fires and prescribed natural fires must take into account current and historical seasonal demands for firefighting supplies and equipment. Presuppression contingency planning must involve a consideration of both the regional and national situation and the FMO has the responsibility to stay informed of current and expected preparedness levels, calculated daily by the California Department of Forestry and available through the FICC, San Bernardino. The Fire Contingency Plan for Wildland Fire Management Agencies of California is seen as Appendix I.

9.3 FIRE SUPPRESSION

Fire suppression includes all actions to extinguish or limit the growth of fires, regardless of the strategies and tactics chosen.

9.3.1 DETECTION SYSTEMS

ne capability of detecting a wildfire early is the key to all suppression activities. The following detection methods will be used as a part of the emergency presuppression plan for Joshua Tree National Monument.

- Lightning Detection - the Monument and surrounding area is covered by BLM's Lightning Detection System. Downstrikes are reported to the Monument through the FICC.

- Air Detection - since there are no fixed lookouts in the Monument, aerial, fixed-wing reconnaissance flights are ordered after periods of lightning activity through FICC.

- Patrols - fire detection patrols over and above regular patrols will be made during and after lightning activity or any fire emergency.

- Other - Monument employees and often visitors and residents detect fires. Efforts must be made to secure complete information and relay it to the FMO's office.

9.3.2 EMERGENCY FIREFIGHTERS

The Fire Management Office will maintain a roster of qualified personnel who may be involved in nergency presuppression type activities. Other seasonal or permanent employees may be used to fill fire presuppression needs as long as they have passed the step test, have a red card, and their supervisor approves. The involvement must not interfere with other regular duties.

9.3.3 SUPPRESSION DISPATCHING PLAN

Dispatch Plan - the Monument Dispatch Plan is designed to provide for a standard respons all reported fire incidents in areas for which Joshua Tree National Monument has fire protection responsibility. (Appendix H). This plan also includes coverage of the non-NPS lands in FMU #1. The dispatch plan will be activated after consultation with the Fire Management Decision Scheme displayed as **Figure 4.**

Objectives of Dispatch Plan

- To control 90% or more of unplanned ignitions at the initial attack stage during the first burning period. By activating a pre-planned system designed to move fire fighting resources in sufficient time and strength to hold loss of property and resources to a minimum.

- To provide for dispatching a standard, appropriate, suppression force with one radio call following the report of an incident.

- To minimize radio traffic during the initial attack stage of the incident so that needed information can be communicated. Factors considered in preparing this plan were unplanned ignitions, occurrence, topography, fuels access and personnel location.

9.3.4 SIZE UP AND INITIAL ATTACK

The Incident Commander, upon arriving at a wildfire, will inform the FICC of the size of the fire, rate of spread, fire potential, and manpower requirements.

For all wildfires beyond the handling capacity of Monument and/or local resources the FMO may request assistance through the FICC. The Incident Commander is responsible for all action taken on the fire from size up to demobilization. His/her decisions will be accepted and his/her requests serviced as quickly as possible.

Normally the District Ranger shall assign Incident Commanders (IC) to fires on their respective districts. On extended attacks, or on a potentially complex fire, the IC shall be designated by the Fire Management Officer. The responsibility and authority that go with that assigned position and other positions in the Incident Command System will be fully honored by all personnel on the fire, and in the Park, regardless of administrative rank. Positions deemed necessary to fulfill expanding duties shall be filled by separate individuals as that need arises.

The Fire Management Officer is responsible to order specialized overhead through FICC or to order an incident management team, as circumstances warrant. If the span-of-control of the incident organization exceeds the Type III level, then an incident management team should be requested. Individual qualifications may modify this either to fewer resources, or to higher complexity, depending upon circumstances at the time, as determined by the FMO and Superintendent.

9.3.5 EXTENDED ATTACK

the fire has not been declared CONTROLLED, at the end of the first operational period, and the fire has not been CONFINED or CONTAINED, then an Escaped Fire Situation Analysis (NPS-18, Chapter 8, Exhibit 2, and Appendix R) will be prepared by the Fire Management Officer for the Superintendent's approval. As fire complexity increases, the initial attack Incident Commander may be replaced at the direction of the District Ranger and/or after consultation with the Fire Management Officer. Depending upon fire behavior and potential complexity, the organizational expansion shall be guided by the Fireline Handbook 410-1 and Field Operations Guide 420-1.

The amount and type of assistance needed will depend on the present and expected incident circumstances and the Fire Complexity Analysis (NPS-18 Chapter 8, Exhibit 4). The management level of complexity planned and staffed at Joshua Tree National Monument is the Type III command level.

The procedure for managing the transition between Park and incident management teams is found in NPS-18, Chapter 8, Exhibit 6. The transfer of responsibility for suppression actions on a fire will be done officially via the Delegation of Authority (DOA) by the Superintendent or designated acting (Appendix D).

The escaped fire situation analysis shall be validated daily by the IC. When circumstances dictate a revised EFSA, it shall be prepared as joint responsibility of the Park Fire Situation Analysis Team (FSAT) (see Section 10.2.3), the IC and associated technical specialists and representatives of all agencies with jurisdictional responsibilities in the event of a multi-agency fire incident.

9.3.6 SUPPRESSION OF PRESCRIBED OR PRESCRIBED NATURAL FIRES

A NPS Prescribed Burn Boss/Prescribed Fire Manager is responsible for the command of all management fires both prescribed and/or prescribed natural fire. The level of qualification is dependent on fire complexity. The Burn Boss/PFM shall report to the FMO during all park prescribed fire operations.

The Burn Boss/PFM will perform the daily updates of the Fire Situation Analysis (FSA) that validate PNF prescription conformance, or indicate exceeded defined prescription parameters. The Burn Boss/PFM is responsible to initiate holding actions necessary to keep a fire within its geographic perimeter. The Burn Boss/PFM shall continue such holding actions in the case of fire behavior exceeding prescribed limits until the management fire has been officially declared as a wildfire by the PBB/PFM and accepted as such by the FMO and the defined command authority is transferred to another official. It is the responsibility of the FMO to initiate the orders for an Incident Commander to replace the Burn Boss. The transfer of authority and command shall proceed as smooth as circumstances can allow. The process must include a debriefing to include: organization in place, resource manifest and personnel, capacities and status, environmental factors, facility locations, and the most recent recon and field maps. The relieved Burn Boss/PFM shall also debrief with FMO, document the periods of the assignment, and then be available for reassignment by the IC.

The deciding factors to convert a management fire to wildfire may not be specifically related to the fire "escaping" a defined area. These factors may include: excessive regional deteriorating

conditions (projected or actual), deteriorating fire situation region-wide or nationally (reflected by elevating contingency levels), unavailability of qualified personnel, and other unforeseen circumstances.

Preparation of an EFSA is previously described in chapter 6.2.1. The appropriate suppression response (ASR) normally employed with FMU #2 to suppress prescribed natural fires will usually be CONFINE and/or CONTAIN.

When a management fire has been declared a wildfire, it cannot be subsequently reclassified as a management fire. Furthermore, the use of suppression funds on a fire require the total suppression of that fire, through the ASR.

9.3.7 USE OF NPS-WESTERN REGION WILDLAND FIRE RESOURCE ADVISORS

An NPS-Western Region Wildland Fire Resource Advisor will be assigned to all fires within the Park. The presence of this advisor is a mandatory, on-site requirement for all suppression actions which require significant soil disturbance or which utilize non-park personnel. (Regional Directors memorandum dated 5/01/92, file Y18, subject Wildland Fire Resource Advisors Task Book). In addition to satisfying all the formal training requirements specified in the NPS-Western Region Wildland Fire Resource Advisors Task Book (1992), this individual will also be trained in the following:

- Purpose and objectives of the Joshua Tree National Monument Fire Management Plan.
- Location of special ecological areas and features within the Park.
- Appropriate suppression considerations for protection of Park resource values.
- Appropriate Suppression Response (ASR) concepts and limitations.

9.3.8 REHABILITATION

All acreage impacted by suppression efforts will be rehabilitated in accordance with the NPS-Western Region Wildland Fire Resource Advisors Handbook (1992) and the funding guidelines established in the Director's memorandum dated November 28, 1989, file F30(9560), subject: Definitions of Fire Management Accounts, Fiscal Year 1990, and in conjunction with other guidelines found in NPS-18.

9.3.9 INTERAGENCY COOPERATION

Interagency cooperation is critical to the successful implementation of this plan. Mutual aid and joint decision making will occur between the agencies on all suppression incidents in close proximity to the park boundary, primarily in FMU #1. The following agencies may cooperate with the Park on large suppression actions:

- California Department of Forestry: An Interagency Agreement exists (Appendix C) with the California Department of Forestry which borders much of the northwestern boundary of

Joshua Tree National Monument. This agreement describes the assistance provided by the California Department of Forestry and the Monument to one another.

- Twentynine Palms Water District: A Cooperative Agreement exists (Appendix J) between Joshua Tree National Monument and the Twentynine Palms Water District which represents the Fire Department in regards to protection of life and property from fire and other emergencies. The response to assist shall be automatic upon notification of a fire or other emergency.

- Federal Wildland Fire Agencies: The Operation Plan for the Federal Interagency Communication Center (Appendix K) describes how to request fire resources to be used in Joshua Tree National Monument from the Bureau of Land Management and the U.S. Forest Service. Initial attack responses are automatic by activating the Area Dispatch Plan by FICC.

9.3.10 LAW ENFORCEMENT/ARSON INVESTIGATION

Human caused fires will be investigated by Monument law enforcement personnel and an incident report submitted through the Fire Management Officer to the Chief Park Ranger. If arson is known or suspected, firefighters shall protect and control the scene, and notify FICC at once. The Chief Ranger shall request assistance from arson investigators of cooperating agencies, or technical assistance from the Regional Office. All other fire security needs may be met through normal dispatching procedures.

9.3.11 QUALIFICATION/CERTIFICATION

A Park Wildland Fire Training Plan has been developed, and appears as Appendix G of this plan. The training plan identifies the type and number of suppression and prescribed fire positions required to implement this plan and to fulfill interagency needs.

All suppression personnel will meet NIIMS fire qualifications for the positions to which they are assigned, and they will receive training for advanced fire assignments.

The use of trainee assignments will be limited to working with qualified personnel after consideration of the training costs which must be borne by the Park for participation in such training.

9.3.12 DEMOBILIZATION

Demobilization will be in accordance with the NWCG Fireline Handbook.

9.3.13 AIRCRAFT OPERATIONS

A Cooperative Interagency Agreement exists between the U.S. Forest Service, the Bureau of Land Management and the National Park Service for the joint acceptance and operation of aviation resources (Appendix K). Requests for these services are made through the Federal Interagency Communication Center.

The fixed-wing aircraft and helicopter guidelines (NPS-60 and OAS Regulations) are on file at the Fire Management Office and provide details for requesting retardant and drops. There are no restrictions which have been placed on helicopter landing locations in the Park; no permanently located helispots have been designated in backcountry areas. Helitack qualified personnel are available on request from FICC.

10.0 PRESCRIBED FIRE PROGRAM

10.1 MANAGEMENT IGNITED PRESCRIBED FIRE

A fire management program that allows suppression actions to be taken in an otherwise prescribed natural fire unit may be augmented by a program of management ignited prescribed fires, in order to reduce fuel accumulations and duplicate natural ecosystem processes lost as a direct result of suppression actions. This plan acknowledges that boundary considerations may dictate that prescribed natural fire cannot have a role in the fire dynamics of all areas within the Park.

The management ignited prescribed fire program for the Park will be continually refined as a more comprehensive hazard fuels inventory is completed in the Park. Information gathered in this inventory will be used to annually revise the five year burning program as seen in Appendix L. The general goals and objectives are defined in Section 10.1. Hazard fuel reduction needs will be based on aerial photography and vegetation mapping of the border area of FMU #1 between FMU #2.

In the immediate future only acreage within FMU #3 is scheduled for prescribed burning treatment. As boundary fuel surveys are completed and other hazardous fuel accumulations are identified around inholdings and adjacent to high visitor use areas (ie. Whispering Pines, Keys Ranch, etc.) additional acreage may be placed in FMU #3.

The tentative fire prescriptions for blackbrush and pinyon-juniper vegetation types are found as Appendix E. Both prescriptions require further refinement through application.

The prescribed fire program involves operations during the entire year, designed to prepare for and implement the program objectives. These operations include planning, reconnaissance, evaluation, documentation, prescription analysis, interagency coordination, smoke management, fire effects monitoring, personnel management, and fiscal analysis. National Park Service guidelines (NPS-18, 1990) require pre-burn coordination and public notification. The pre-burn notification list will be included in each prescribed burn plan. In addition, agency guidelines require documentation and reporting of prescribed fires. All management ignited prescribed fires are reported on the NPS Wildland Fire Management Computer System (NPS-WFMCS) daily situation report. Prescribed fire planning is documented in the FIREPRO subsystem of the NPS-WFMCS. All prescribed fires will be reported using the DI-1202 (Individual Fire Report) and entered into the NPS-WFMCS. The prescribed burn boss will complete the post-burn summary including a tactics summary and the cost analysis (see WR Burn Plan format).

10.1.1 STANDARDIZED WESTERN REGION PRESCRIBED FIRE PLAN FORMAT

The Standardized Western Region Prescribed Fire Plan (approved in Regional Director's memorandum dated April 4, 1989, file Y18(WR-RNR), subject: Western Region Prescribed Fire Plan format) and a NPS Fire Complexity Analysis (NPS-18, 1990) must be completed and approved by the Superintendent prior to the ignition of all prescribed burns. The NPS Complexity Analysis

determines the minimum fire staff (overhead positions) required for the implementation of all management ignited prescribed fires. Each plan must also be approved by the Prescribed Fire Manager or Prescribed Burn Boss. A qualified Prescribed Burn Boss will implement each prescribed fire.

10.2 PRESCRIBED NATURAL FIRE OPERATIONS

10.2.1 PRESCRIBED NATURAL FIRE MOBILIZATION

Mobilization of qualified prescribed fire resources is described in the NPS Western Region Wildfire/ Prescribed Natural Fire Mobilization Guide which is part of the California Interagency (USFS/BLM/ NPS) Mobilization Guide. A fire behavior/weather specialist (FBWS I/II) will initially be the first to be dispatched to most potential prescribed natural fires.

10.2.2 FIRE SITUATION ANALYSIS TEAM (FSAT)

The PBB or PFM is in essence the Incident Commander for each prescribed natural fire. Other planning overhead assigned to a prescribed natural fire will usually operate as members of the Fire Situation Analysis Team (FSAT). This body will work for the PBB or PFM to prepare the FSA, Parts I and II initially, to be forwarded to the Superintendent for approval. Signature authority for approval of the FSA rests solely with the Park Superintendent.

The following are the only positions authorized to sign as "Acting" in the absence of the Superintendent:

- Management Assistant — Decision Level
- Chief, Resources Management — Decision Level

FSAT will be composed of the following positions:

- NPS qualified Prescribed Burn Boss I, II, or Prescribed Fire Manager, depending on fire complexity.
- Fire Behavior Weather Specialist I
- Chief Ranger
- Resource Specialist (NPS-WR Wildland Fire Resource Advisor qualified)
- A representative of Air Resources Board (ARB), preferably the local Air Pollution Control Officer (APCO).
- A representative from BLM or CDF (when PNF is within 1 mile of FMU #1 boundary).

FSAT must meet within two hours of detection of a potential prescribed natural fire. Park dispatch shall advise and request team members to meet, probably at the Black Rock Interagency Fire Center. In situations when a decision must be made immediately, park dispatch shall coordinate the transfer of information among FSAT members. All decisions shall be documented via ICS 214,

Unit Log. FSAT will develop and review the appropriate FSA documentation and identify a preferred alternative for managing the PNF. This document must be completed and submitted to the Decision Level of approval within 16 hours or the fire must be managed as a wildfire.

The Superintendent or his/her designated acting shall sign, approve or disapprove the selected alternative and revalidate the decision on a daily basis (NPS-PNF Daily Decision Record).

Once a prescribed natural fire is demobilized, the FSAT will compile the final record which will at a minimum consist of the following documentation:

* DI-1202 (Individual Fire Report)
* FSA Part I and II
* PNF Decision Record
* Daily fire weather and spot weather forecasts
* Fire progression map
* Narrative
* Operations critique
* Cost Summary

10.3 QUALIFICATION/CERTIFICATION

Prescribed fire personnel will meet the mandatory training prerequisites set forth by the NPS Prescribed Fire Qualification System (see Associate Director's memorandum, dated November 29, 1989, file Y14 (FIRE), subject: NPS Prescribed Fire Qualifications) and displayed within the NPS Wildland Fire Management Computer System (WFMCS). Certification of Prescribed Burn Bosses will be done in accordance with the above memo and the Regional Director's memorandum dated December 18, 1989, file Y14(WR-OR), subject: Use of Western Region Prescribed Burn Certifiers. The Park Fire Management Officer will make an annual determination of the number of trained prescribed fire personnel required to implement this plan, and will revise the Park training plan accordingly (Appendix G).

10.4 DEBRIS BURNING

Prescribed fire will also be used by Park personnel to eliminate biodegradable debris and slash produced by maintenance activities, such as the disposal of exotic vegetation, tree hazards, unsalvageable vegetation from construction projects, etc. as per the procedures specified in the Regional Director's memorandum dated November 18, 1986, file code Y1421 (WR-RN), subject: Debris Burning. A single generic Western Region Prescribed Fire Plan approved by a qualified Prescribed Burn Boss will be generated annually to cover debris and slash burns.

Debris burns may be conducted by persons without wildland fire qualifications, as long as all personnel wear appropriate personal protective gear, the Fire Management Officer has notified appropriate agencies (air quality, FICC) and neighbors, obtained all permits, and developed appropriate safety and evacuation plan to enact in case of injuries or other emergencies. The crew should include someone who has previously conducted a similar type of burn at the site. **Table 5** shows the standard prescription parameters required for Park debris burning.

Table 5. Debris Burning Prescription, Joshua Tree National Monument, 1992

Designated Burn Date/Permit Obtained > 1/10 acre/materials	
Burn to occur out of fire season	
Temperature:	Less than 70° F
Winds:	Less than 10 MPH
Piles to be cured 10 days	
All debris burning to be conducted at Borrow Pit; debris burning elsewhere in the park must receive prior approval from FMO.	

10.5 PROTECTION OF SPECIAL RESOURCES

10.5.1 CULTURAL RESOURCES AT RISK

Numerous archeological sites, historic structures and other cultural sites and objects exist throughout the Park (Park files, Resources Management Division). Many of these resources could potentially be damaged or destroyed by prescribed or prescribed natural fires. All identified resources will be protected from fire impacts to the fullest extent possible through the following procedures:

- Impacts on cultural resources must be analyzed and mitigation measures specified in the Fire Situation Analysis, Parts I and II, and in all prescribed burn unit plans. The Park Cultural Resources Management Specialist and/or the Regional Archeologist will be consulted during these analyses if cultural resources have the potential to be impacted.

- Resource base maps showing known archeological and historical sites are on file in the Resources Management Office and will be considered by burn bosses and Fire Behavior/ Weather Specialists (FBWS) assigned to prescribed fire projects.

- The Park Cultural Resources Management Specialist or Regional Archeologist must clear each burn unit prior to ignition and will be kept informed of the status and locations of all prescribed natural fires. He/she will provide on site inspections for unsurveyed areas, and the Burn Boss will comply with all specified protection measures within the constraints of maintaining a control of the fire.

- Park FBWS I/II will be trained on the location of cultural resources and historic sites and in the identification of archeological artifacts and will promptly notify the appropriate fire management and resource personnel of any findings.

10.5.2 SENSITIVE SPECIES

Potential impacts on sensitive species will be considered by the PBB/PFM during the planning phase of each prescribed and prescribed natural fire. Location maps and habitat information are maintained in the Park Resources Management Office and on-site surveys will be conducted for unsurveyed areas or when impacts seem likely. Potential impacts must be analyzed and mitigation measures specified when warranted within the Fire Situation Analysis, Parts I and II, or the burn plan.

For federally listed Threatened or Endangered species, the impacts analysis will include consultation with the Endangered Species Office of the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act. The California Endangered Species Office will be consulted about impacts on any state listed rare or endangered species. Special protection measures recommended by these agencies will be implemented to the fullest extent possible.

For other sensitive species, special protection measures may be appropriate in accordance with the Park management goal of preserving natural biological diversity. Special protection may be warranted if sensitive species have declined due to human impacts on critical habitat or individual populations. In general, however, fire will be allowed to play its natural role in influencing the abundance and distribution of these species just as for any other species. Fire is an important factor in stimulating the vigor and abundance of many sensitive species, especially those characteristic of early successional stages following fire. Impact analysis for sensitive species must include information about the beneficial as well as the detrimental impacts of burning. Frequently, the absence of fire can be more of a threat to these species than a fire itself.

10.6 INTERAGENCY COOPERATION

An Interagency Prescribed Fire Agreement has been signed by NPS and other land management agencies in California (Appendix N). This agreement defines the parameters for the sharing of resources on prescribed fires.

10.7 AIR QUALITY/SMOKE MANAGEMENT

The fire management program at Joshua Tree National Monument must be particularly sensitive to the objective of maintaining clean air standards and unobstructed visibilities. The Monument currently exists as the only Class I area in the rapidly deteriorating air basin of Southern California. Regional haze and unhealthful air quality has become the rule rather than the exception for much of the Southern California area during summer months dominated by high pressure systems.

The volumes of smoke generated by prescribed natural fires and prescribed fires can serve to decrease visibilities both within the Park and in nearby communities, especially Yucca Valley and Twentynine Palms. Smoke generated by management fires must be managed in compliance with the legal requirement of the Clean Air Act (42 U.S.C. 1857 et seq.), the California Clean Air Act, and local regulations, and will be monitored by Park personnel in accordance with the Western Region Fire Monitoring Handbook (NPS, 1992). The Handbook also contains guidelines for mitigating effects of smoke from wildfires.

10.7.1 STATE AND LOCAL CONSIDERATIONS

Responsibility for air quality related to open burning in California has been delegated to the counties. They have responsibility for issuing permits, defining conditions when burning will be permitted, and determining what materials may be burned. The planning area is situated in two counties; San Bernardino and Riverside (South Coast Air Basin). The smoke management regulations are listed in **Table 6.** A draft memorandum of understanding between the Monument, San Bernardiono County Air Pollution Control District and the South Coast Air Quality Management District appears as Appendix Q in this plan.

11.0 RESEARCH PROGRAM

The fire management research program at Joshua Tree National Monument will be focused primarily on fuel model and prescription refinement and specifically the effects of fire on the Joshua Tree. The fuel modeling/prescription refinement research will be informally accomplished over time through the Park wide application and monitoring of the prescribed and natural fires. New data pertaining to fire behavior in the Park will be disseminated through subsequent revisions of this plan.

Table 6. Air Quality Regulations by Affected Counties Within Joshua Tree National Monument, 1992

Rule 444 Open Fires Clause (h) Wildland Vegetation Management Burning
Both the South Coast Air Quality Management District and the San Bernardino County Air Pollution Control District conforms to Rule 444. Neither county has developed site specific air quality regulations to further supplement the California "Open Fires" Guidelines. These regulations were adopted by the State Air Quality Control Board, on October 8, 1976, and amended on October 2, 1987. Rule 444 specifically lists regulations specific to wildland vegetation management.
(1) Wildland vegetation management burning shall not be conducted until an implementation plan is approved by the Executive Officer. Such plan shall: (A) Apply to all burning which meets the definition of wildland vegetation management burning, regardless of whether such burning also meets another definition in Title 17, Section 80100 of The California Administrative Code. (B) Limit the ignition of fires to approved devices. (C) Regulate the total acreage or tonnage of vegetation that may be burned each day within the District. (D) Regulate burning or require mitigation when the meteorological conditions otherwise cause smoke to create or contribute to an exceedance of a state or federal ambient air quality standard or cause a public nuisance. (E) Require the vegetation to be burned to be free of tires, rubbish, tar paper or construction debris, and reasonably free of dirt or soil. (F) Require the vegetation to be in a condition which will facilitate combustion and minimize the amount of smoke emitted during combustion. (G) For projects exceeding a predetermined size or tonnage threshold level, or for projects situated in zones specified by the District, the following information shall be provided to the District for review and approval in advance of the proposed burning: (i) location and specific objectives of the burn project; (ii) acreage or tonnage, type, and arrangement of vegetation to be burned; (iii) directions and distances to nearby sensitive receptor areas; (iv) fuel condition, combustion, and meteorological prescription elements developed for the project; (v) projected schedule and duration of project ignition, combustion, and burndown; (vi) specifications for monitoring and verifying critical project parameters; and (vii) specifications for disseminating project information.

11.1 PROPOSED RESEARCH

Typically, most fire management programs require extensive fire history research as the foundation for proposing management strategies. At Joshua Tree National Monument, fire has undoubtedly played a role in shaping the biological systems within the Monument for at least 10,000 years. Scientists speculate that unlike many other areas in California, the natural fire return interval at Joshua Tree probably greatly exceeds the years of most effective suppression efforts in the Park. It is unlikely that these efforts alone have had a significant effect on species composition, succession or fuel loadings and that other factors such as drought and grazing have played the major role in shaping such changes.

Fire history research has not been proposed for Joshua Tree due to the following reasons:

- The majority of fire history studies conducted are based upon tree ring chronologies. This analysis is not possible within Joshua Tree National Monument due to the absence of a suitable tree species. In order to reconstruct natural fire frequencies in desert areas, carbon dating techniques are used to examine charcoal remains. These techniques are time consuming, require a high degree of expertise and are unjustifiably expensive. In the end, such analyses yield data that are highly subjective due to the degree of interpretation required throughout the process.

- Fuel loadings in the remote sections of the Monument do not significantly differ from acreages with similar species composition and vegetative density in the front country. It is reasonable to assume, therefore, that man's activities (Native American, European and present day) have played a very minor role in shaping the fire regimes currently present within the Monument. Once this premise is accepted, the need to recreate a "natural fire history" becomes less important since in actuality, it would be expected to closely resemble the lightning patterns and recent historical frequency data depicted in **Figure 2**.

A proposed statement has been prepared by the USFS Pacific Southwest Research Station and it addresses the need for a fire effects study to be conducted within the Monument specifically addressing the issue of the Joshua Tree's resistance and adaptations to fire (Appendix O). This research will attempt to determine exactly what factors are related to Joshua Tree mortality during varying fire intensities and other site conditions.

The management schemes presented within the text of this document is proposed for implementation following the careful review of what little literature is currently available regarding fire history and ecology in the desert southwest. Our understanding of fire's role in these systems may be incomplete; however, there is little disagreement among the scientific community that the continued suppression of the rare natural fire in this desert is damaging to Park ecosystems and contrary to the mission of the National Park Service. The "common sense" knowledge of the natural systems at play within Joshua Tree National Monument mandates the wise management of natural ignitions now and until such time when available research suggests otherwise. In the meantime, "in-park" research will continue through practical and safe application of fire. Fire effects monitoring plots have been installed and will be intensively monitored in FMU #3 containing Fire Groups 1 and 2, in compliance with the WR Fire Monitoring Handbook, 1992. A great deal will be learned from this program in relation to fire behavior and effects.

11.2 RESEARCH FIRES

Procedures for conducting research fires can be found in the Regional Director's memorandum dated February 7, 1990, file Y14 (WR-OR), subject: Research Fires. All phases of the fires implementation process will be done in accordance with standards for such projects as described in NPS-18 (1990 revision). Additionally, pre- and post-burn monitoring or research must incorporate the minimum acceptable standards (MAS) for sampling design and techniques as stated in the Western Region Fire Monitoring Handbook (NPS, 1992).

12.0 MONITORING

All wildland fires, including prescribed natural fires, prescribed fires and wildfires, will be monitored in accordance with the minimum acceptable standards (MAS) as set forth in the Western Region Fire Monitoring Handbook (NPS, 1992). A description of each defined monitoring type for Joshua Tree National Monument is found as Appendix P.

13.0 PUBLIC SAFETY

The Fire Management Officer will disseminate information on all potentially hazardous fires to all divisions. The Fire Management Officer will make recommendations to the Park Superintendent through the Management Assistant on potentially hazardous situations.

All active fires will be routinely monitored and evaluated for safety as conditions change. If necessary, areas of the Park may be closed due to fire hazards (intense burning activity, dense smoke, etc.) as per recommendations found in the Western Region Fire Monitoring Handbook (NPS, 1992). The Park's Visitor Protection Division will be charged with enforcing all closures. The Burn Boss will ensure that closure and informational signs on all prescribed fires are properly posted.

All divisions will inform the public of potential dangers, closures and regulations in the course of all public contacts.

14.0 PUBLIC INFORMATION AND EDUCATION

Although the general public has in recent years become more informed about the role of natural fire in the ecosystem, the large number of catastrophic wildland fires of recent years has produced many concerns and fears. To reduce these public concerns and gain acceptance and support for this fire management plan, the public must be kept informed of fire management goals, policies and activities.

14.1 TARGET GROUPS

There are three target groups with specific information needs. Those groups include:

1. In-service personnel directly or indirectly involved in the implementation of the fire management program.

2. Visitor and general public including:

- Park user public.
- Special interest groups.
- Local communities and private inholdings.

3. Related agencies, including those adjacent to our boundaries. These agencies are indirectly affected by any fire activity within the Park. They are directly effected by a variety of factors including:

- Fire encroachment along boundaries.
- Visual effects of smoke.
- Use of their available personnel and resources, in support of the Park fire activities.
- Other members of the public.

Each of these three target groups has special concerns and informational needs which should be met to assure effective implementation of the fire management program.

14.2 INFORMATION DISSEMINATION

14.2.1 IN-SERVICE PERSONNEL

Keeping this group aware of fire management activities is essential to the effective dissemination of information to the general public. It is important to assure that the entire staff is familiar with the Fire Management Plan, the Park's role in wildfire suppression, and the employees' role within the fire management scheme. This is accomplished through an on-going education program, which includes training, all employee meetings and active participation by Park staff in the Park's wildfire program.

14.2.2 VISITOR AND GENERAL PUBLIC

It is important to recognize the public's right to know and need to receive accurate information. The key person for general information dispersal will be the Park's Public Information Officer, who will generate 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 shown as **Table 7**. The Superintendent's office will assure prompt distribution of pertinent fire information to in-holding owners.

The general staff, with Interpretation 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, Division of Interpretation will ensure park-wide compliance with the public information plan shown as **Table 7**.

Table 7. Public Information Plan, Joshua Tree National Monument, 1992

TASK	EMPLOYEE RESPONSIBLE	DATE
1. Revise Fire Management Plan as needed. Provide the public a chance to review FMP revisions.	Fire Management Officer	As Needed
2. Conduct training session for employees. Write employee newsletter and issue to all employees.	Fire Management Officer and Resource Management	5/1
3. Update mailing list of all interested parties and mail out newsletter with information on Fire Management Program.	Fire Management Officer and Public Information Officer	5/1
4. Issue press releases about upcoming fire season to local T.V., newspaper, and radio stations.	Public Information Officer	4/15
5. Prepare fire management brochure.Distribute year round.	Interpretation	Year-Round
6. Prepare fire management posters and post on all Park bulletin boards.	Interpretation	5/1
7. "Naturally-Caused Fire" signs at backcountry trailheads where prescribed natural fires are likely to occur.	Fire Management Officer	5/1
8. Incorporate the Fire Management Program into Interpretive walks, talks, and campfire programs. Prepare a slide program for visitor centers and amphitheaters.	Interpretation	5/15 to 10/1
9. Prepare magazine article for both local publications and nationwide special interest magazines such as conservation, outdoor recreation, and fire management magazines.	Public Information Officer	Ongoing

14.2.3 RELATED AGENCIES

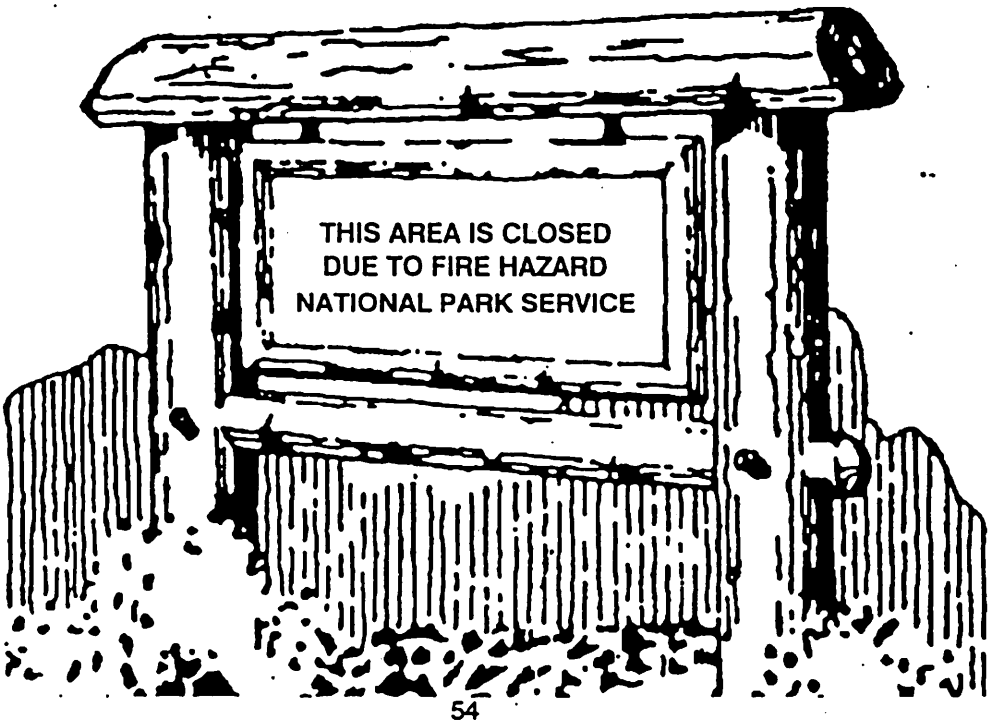
Other federal agencies, as well as state and local agencies have a vested interest in the Park's fire activities. It is the Fire Management Officer's responsibility to assure that an open line of communication is maintained with all affected agencies. During active fires, communication with other fire agencies and issuance of updates will be made through FICC.

14.3 INTERPRETATION OF PRESCRIBED NATURAL FIRES

A list of highly qualified NPS interpreters specifically trained and experienced in the interpretation of prescribed natural fires is on file at the WRO Branch of Fire Management. In the event that specialized or sensitive interpretation of large prescribed natural fires is required and the Park has exhausted its in-house resources for this activity, a name request can be made through interagency dispatch centers for persons whose names appear on this list. In addition, the following will be necessary during prescribed natural fires:

At Fire Start	During the Fire	Post-Fire
Set up "Naturally-Caused Fire" signs in area of fire.	Verbally inform wilderness visitors of prescribed natural fire.	Place Interpretive signs in area of fire if it is visible from public use areas.
Post "Fire Closure" signs as necessary.	Inform wilderness users as fire conditions mandate conditions.	Remove any "Fire Closure" signs.

Following are examples for the signs called for above:



15.0 PROGRAM ADMINISTRATION

15.1 RECORDS AND REPORTS

The records and reports necessary for implementation of the Park's fire management program are described in **Table 8.**

Table 8. Fire Management Records and Reports for Joshua Tree National Monument, 1992

RECORD/ REPORT	REVISION FREQUENCY	PERSONS RESPONSIBLE	DISTRIBUTION
Fire atlas	Annually	FMO	Park
DI-1202	Per incident	IC	FMO/WFMCS
Fire weather records	Daily/RAWS	FMO	FMO
FMP revision	Every 5 years	FMO	Park/WRO
FIREPRO submission	Annual	FMO	WRO/BIFC/Park
Situation report	Daily	FMO	FICC/BIFC/WRO
National situation report	As requested	FMO	Requester
Fire Danger/MC	Daily	FICC	Park
FSA/NPS Complexity Analysis	Per PFN	FBWS/FMO/FSA Team	Supt/Chiefs
EFSA	Per wildfire	IC	FMO/Supt
WR Burn Plan/NPS Complexity Analysis	Per Rx Burn	PBB or PFM	FMO/Supt
Job Task Books	As required	Trainee	FMO
Individual Fire Training and Experience Entry	As needed	FMO	Employee
Red Cards	Annual	FMO	Firefighters
NPS-PNF Decision Record	Daily with PNF	PBB/FMO/Supt	FMO/Files
Training Analysis	Annual	FMO	WRO/BIFC/Park
Hazard Fuels Project Requirement	Annual	FMO	WRO/BIFC
Hazard Fuels Project Completion	Per project	FMO	WRO/BIFC

15.2 FISCAL MANAGEMENT

Fire management operations are funded from two distinct and separate sources: National Park Service (ONPS) funds and Fire Program funds (FIREPRO).

ONPS funds are those obtained from Congress as a part of the regular budget process and are the same funds used for operation of the rest of the Park. These funds support maintenance functions in the Park including; support phone and utility bills, fixed water systems and physical plant upkeep, mechanic and journeyman services.

Administration, Resources Management, Interpretation, and Ranger Services support the fire program in program direction, accounting, budget tracking, compliance oversight, public information, air quality and endangered species monitoring, and response to emergency services. These costs have not been tracked, nor estimates generated.

Fire funds are allocated through the Branch of Fire Management. The use of these funds is set by NPS-18 and the FIREPRO manual. For the planning year 1992, there are seven Primary Work Elements (PWE's) involved in these funds:

- 340. These funds are for the Prescribed Natural Fire program and activities in support of that function. Supplemental support from Western Region Office to Joshua Tree National Monument may be provided in the case of extended Prescribed Natural Fire incidents.

- 341. These funds are for site specific Hazard Fuel Reduction projects and their support.

- 342. These funds are for permanent salaries and support to permanent positions.

- 346. These funds are often referred to as FIREPRO funds. These funds are to provide a level of readiness (define a standard formula) to meet the "normal" fire season, June 15 - September 30.

- 381. These funds are often referred to as Emergency Presuppression funds. These funds provide enhanced response capabilities during periods of very high or extreme fire danger.

- 382. These funds are often referred to as Fire Suppression funds. These funds pay the cost of actual fire suppression. However, they may not be used to pay the base salary of any regular Park Service employee except base "8" special project employees.

- 385. These funds are programmed for emergency rehabilitation use.

Confusion often exists over the transition from 340 to 382 funds should a prescribed natural fire require at least partial suppression. As long as the activities on a burn are of a monitoring nature, 340 is the appropriate account. Should minor containment actions be required on a burn, the fire remains a prescribed natural fire as long as 382 funds are not spent on the containment activity. Any use of 382 funds requires the fire to be classified as a wildfire and suppressed using the appropriate suppression response. It cannot be reclassified subsequently as a prescribed natural fire.

Additional discussion as to the use of National Park Service FIREPRO funds is found in Section 4, Chapter 1 of NPS-18. Determination as to the appropriateness of the funding sources will be made by the Fire Management Officer and by the Administrative Officer.

15.3 FIRE PROGRAM CRITIQUES

All wildland fires, including prescribed and natural fires will be appropriately reviewed in accordance with NPS-18 (1990). A fire critique will be coordinated by the Incident Commander no later than 30 days after the fire is declared out. All fire shelter deployments and/or entrapments will be reviewed. The approval signature on the Individual Fire Report (DI-1202) will serve as sufficient documentation of informal review for normal complexity fires involving Class A and B acreages in which no unusual events occurred. The purpose of conducting fire reviews as defined in NPS-18 (1990) include one or more of the following:

- To examine the progress of an on-going fire incident and to confirm effective decisions or correct deficiencies.
- To identify new or improved procedure, techniques, or tactics.
- To compile consistent and complete information to improve or refine park, regional, or national fire management programs.
- To examine anomalous fire-related incidents in order to determine cause(s), contributing factors, and where applicable, recommend corrective actions. If negligence is indicated, the circumstances will be reported and investigated in accordance with applicable regulations, policies, or guidelines.
- To ensure cost effectiveness of fire management operations.

16.0 LITERATURE CITED

Barney, M.A., and N.C. Frischknecht. 1974
Vegetation changes following fire in the pinyon-juniper type of west central Utah. J. Range Manage. 27:91-96

Barrow, J. 1978.
Aspects of ecology of the desert tortoise Gopherus agassizii, at Pinto Basin, Joshua Tree National Monument, Riverside County, California. Unpublished masters thesis.

Blackburn, Wh. H., and A.D. Bruner. 1975
Use of fire in the manipulation of the pinyon-juniper ecosystem: A Symposium. Utah State University, Logan, pp. 91-96

Douglas, C.L. 1986
Wildlife Management Plan for the Cottonwood Mountains, Death Valley National Monument, California.CPSU/UNLV Contrib. No. 006/35. 23pp.

Douglas, C.L. 1986. Management recommendations for improving
wildlife habitat degraded by man in the Black Mountains, Death Valley National Monument. CPSU/UNLV Contrib. No. 006/38. 25 pp.

Douglas, C.L., and K.J. Kingsley. 1981.
Bighorn habitat evaluation and management guidelines for the Grapevine Mountains, Death Valley National Monument. CPSU/UNLV Contrib. No. 006/36. 39pp.

Douglas, C.L., and P.G. Sanchez. 1984a.
Wildlife census in the sothern Cottonwood Mountains, Death Valley National Monument I. CPSU/UNLV Contrib. No.006/28 6pp.

Douglas, C.L., and P.G. Sanchez. 1984b.
Wildlife census in the southern Cottonwood Mountains, Death Valley National Monument II. CPSU/UNLV Contrib. No. 006/31 4 pp.

Dunn, W.C. 1984
Ecological relationships between desert bighorn and feral burros in Death Valley National Monument, California. National Park Service, CPSU/UNLV Contrib. No. 006/32 144pp.

Dwyer, D.D. and R.D. Pieper. 1967
Fire effects on blue grama-pinyon-juniper rangeland in Mew Mexico. J. Range Manage. 20:359-362

Fire Management Policy Review Team. 1989. Final Report on Fire
Management Policy. U.S. Department of Agriculture and U.S. Department of the Interior. 20pp.

Gavin, T.M. Jr. 1986
Personal observation/communication made during employment as Western Regional Forester while visiting Joshua Tree National Monument, CA

Gavin, T.M. Jr. and G. Garner. 1981
The effects of fire on an alkali sacaton flat in Brewster County, Texas. Masters Thesis, Sul Ross State University, Alpine, Texas. 212pp

Graf, W. 1981
Habitat protection and improvement. Pp. 310-319 in Monson, G., and L. Sumner, eds., The Desert Bighorn, Its Life History, Ecology and Management. Tucson, AZ: Univ. of Ariz. Press. 370 pp.

Greene, Linda W. 1983
A history of land use in Joshua Tree National Monument. U.S.D.I. - N.P.S., Denver Service Center pub.

Hobbs, N.T. and R.A. Spowart. 1984
Effects of prescribed fire on nutrition of mountain sheep and mule deer during winter and spring. J. Wildl. Manage. 48: 551-560

Holland, R.F. 1986
California Natural Diversity Data Base. State of California, The Resources Agency, Department of Fish and Game. 156pp.

Humphrey, Robert R. 1958
The desert grassland: A history of vegetational change and an analysis of causes. Bot. Rev. 24:193-252

Jameson, D.A. 1962
Effects of burning on a galleta-black grama range invaded by junper. Ecology 43:760-763

Johnsen, T.N. 1962
One-seed juniper invasion of Northern Arizona grasslands. Ecol. Monorr. 32:187-207

Karl, A.E. 1988.
Investigations of the status of the desert tortoise, Gopherus agassizii, in Joshua Tree National Monument. Unpublished masters thesis, National Park Service/University of Nevada,Las Vegas No.040/02. 60 p.

Kilgore, Bruce M. 1985
The role of fire in wilderness: a state-of-knowledge review. U.S.D.A. Forest Service Gen. Tech. Report. Intermountain Research Station, Ogden, Utah. (From Nat. Wilderness Conference Proceedings. 1985)

Klebenow, D.A. 1985
Big game response to fire in sagebrush-grass rangelands. Pp.53-57 in Sanders, K., and J. Durham, eds., Rangeland Fire Effects: A Symposium. Boise, ID: USDI, Bureau Of Land Management. 124pp.

Klebenow, D.A. and A.D. Bruner, 1976.
Determining factors necessary for prescribed burning. Use of prescribed burning in western woodland and range ecosystem; a symposium, p. 69-74. Utah State Univ., Logan.

Leary, James P. 1977
Investigation of the vegetational communities of Joshua Tree National Monument, California. Tech. Report #2, N.P.S. Contract CX8000400016, U.N.L.V., Dept. of Bio. Sciences.

Leopold, A. 1924
Grass, brush, timber and fire in Southern Arizona. J. For. 22(6):1-10

Lissoway, J., and J.Propper. 1988.
Effects of fire on cultural resources. Paper delivered at the Effects of Fire in Management of Southwestern Natural Resources Symposium (Tucson, Arizona, November 14-17,1988).

Moon, R. 1987
Personal observations made during employment as Natural Resources Management Specialist, Joshua Tree National Monument, CA. Fire Management Plan for Joshua Tree National Monument.

National Park Service. 1916
Organic Act.

National Park Service. 1985
Statement for Management, Joshua Tree National Monument. 43pp.

National Park Service. 1992.
Joshua Tree National Monument Natural and Cultural Resources Management Plan. 105pp.

National Park Service. 1990.
Wildland Fire Management Guideline, NPS-18. USDI, NPS

National Park Service. 1978.
National Parks and Recreation Act.

National Park Service. 1991.
Western Region Fire Monitoring Handbook. USDI, NPS. 133pp.

National Park Service. 1992.
Wildland Fire Resource Advisor's Task Book

Peek, J.M., D.A. Demarchi, R.A. Demarchi and D.E. Stucker. 1985
Bighorn sheep and fire: seven case histories. Pp. 36-43 in Lotan, J.E. Brown, eds., Fire's Effects on Wildlife Habitat - Symposium Proceedings. Ogden, UT: USDA Forest Service Intermountain Research Station General Technical Report INY-186. 96 pp.

Stager, D.W., and D.A. Klebenow. 1987
Mule deer response to wildfire in Great Basin pinyon-juniper woodland. Pp.572-579 in R.L. Everett (compiler), Proceedings-Pinyon-Juniper Conference, Reno, NV, January 13-16, 1986. Ogden, UT: USDA Forest Service, Intermountain Research Station. 581 pp.

Truesdell, P.S. 1969
Postulates of the prescribed burning program of the Bureau of Indian Affairs. Proc. Tall Timbers Fire Ecology Conf. 9:235-240

U.S.Forest Service, U.S.D.A. 1978
Effects of Fire on Air. Proceedings from the National Fire Effects Workshop, Denver, CO. General Tech. Rep., WO-9. 40pp

U.S.Forest Service, U.S.D.A. 1978
Effects of Fire on Water. Proceedings from the National Fire Effects Workshop, Denver, CO. General Tech. Rep., WO-10. 28pp

U.S.Forest Service, U.S.D.A. 1978
Effects of Fire on Soil. Proceedings from the National Fire Effects Workshop, Denver, CO. General Tech. Rep., WO-11. 32pp

U.S.Forest Service, U.S.D.A. 1978
Effects of Fire on Fauna. Proceedings from the National Fire Effects Workshop, Denver, CO. General Tech. Rep.,WO-12

Vogl, R.J. 1967
Controlled burning for wildlife in Wisconsin. Tall Timbers Fire Ecology Conference proceedings 6: 47-96.

Vogl, R.J. 1971
The future of our forest. Ecol. Today 1(1):6-8. 58pp

White, L.D. 1980
Factors affecting the creosote bush(Larrea tridentata) to burning. Ph.D. dissertation, University of Arizona, Tucson, 96pp

Wright, H.A. 1980
The role and use of fire in the semidesert grass-shrub type. U.S.D.A. Tech. Rep. INT-85. Int. For. and Range Exp. Sta. Bull. 24pp

Wright, H.A. and W. Bailey. 1982
Fire Ecology, John Wiley and Sons press. New York. 501pp

Wright, H.A. and J.O. Klemmedson. 1965
Effects of fire on bunchgrasses of the sagebrush-grass region in southern Idaho. Ecolgy 46:680-688

17.0 GLOSSARY OF TERMS

AFFIRMS	Administrative and Forest Fire Information and Management System. It is a user-oriented, interactive computer program that permits entry of fire weather observations and forecasts. It performs the computation of fire danger indices, both observed and predicted. Additional information and services are available, including storage data.
AGENCY REPRESENTATIVE	Individual assigned to an incident from an assisting or cooperating agency who has been delegated full authority to make decisions on all matters affecting that agency's participation at the incident. Agency representative report to the incident liaison officer.
AREA COMMAND	An organization established to ensure intercoordination for command operations, planning and logistics matters.
ASSISTING AGENCY	An agency directly contributing suppression, rescue, or service resources to another agency.
COMMAND STAFF	The command staff consists of the information officer, safety officer, and liaison officer, who report directly to the incident commander.
CONFINE	A suppression strategy intended to confine a wildfire within predetermined natural boundaries, until out.
CONTAIN	A suppression strategy intended to restrict a wildfire to a certain area, using natural or constructed barriers that will stop the spread of the fire given the prevailing and forecasted weather conditions, until out.
CONTROL	A suppression strategy in which a wildfire is fought aggressively through the skillful use of personnel, equipment, and aircraft to establish fire lines around a fire to halt its spread, and to extinguish all hotspots until out.
DIRECT ATTACK	A method of suppression that treats the fire with all its burning edges as a whole by wetting, cooling, smothering or chemically separating it from unburned fuel.
DISPATCH	The implementation of a command decision to move a resource or resources from one place to another.
ESCAPED FIRE	This is a fire that has exceeded or is anticipated to exceed initial action capabilities or the fire management direction or prescription. Fire resulting from a failed fire plan.
EFSA	The Escaped Fire Situation Analysis is a decision making process that produces a document outlining suppression alternatives considered for a fire that has escaped initial attack. It must be reviewed prior to each shift to determine if it is still valid. If not, a revision will be prepared.
ERC	Energy Release Component is a measure of the amount of energy that would be released from a single square foot during the time that single square foot was within the flaming front. It is weighted towards the larger fuels. Past observations have shown that fires become difficult to contai or control when the ERC value reaches the 80th percentile level.
FUEL	The materials which are burned in a fire: duff, litter, grass, dead branch wood, snags, logs, stumps, weeds, brush, foliage, and, to a limited degree, green trees.

FUEL LOADING	Amount of dead fuel present on a particular site at a given time; the percentage of fuel available for combustion changes with the season.
INCIDENT	An occurrence or event, either human-caused or natural phenomena, that requires action by emergency service personnel to prevent or minimize loss of life or danger to property and/or natural or cultural resources.
INCIDENT ACTION PLAN	The incident action plan, which is initially prepared at planning meeting, contains general control objectives reflecting the overall incident strategy and specific action plans for the next operational period. When complete, the incident action plans will have a number of attachments.
INCIDENT COMMANDER	The individual responsible for managing all incident operations.
INCIDENT COMMAND TEM (ICS)	The combination of facilities, equipment, personnel, procedures, and SYS-communications operating within a common organizational structure with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident.
INDIRECT ATTACK	A method of suppression in which the control line is mostly located along natural or human made firebreaks, favorable breaks in topography, or at a considerable distance form the fire. All intervening fuels are backfired or burned out. The strip to be backfired is wider than in the parallel method and usually allows a choice of the time when burnout or backfiring will be done.
INITIAL ATTACK	The control efforts taken by resources that are the first to arrive at an incident.
NFDRS	National Fire Danger Rating system.
OVERHEAD PERSONNEL	Personnel who are assigned to supervisory positions including incident commander, command staff, general staff, directors, supervisors and unit leaders.
PRESCRIBED BURNING	The deliberate ignition of a fire in accordance with an established manage ment plan to accomplish specific objectives under given prescription for weather and fuel conditions.
PRESCRIBED FIRE	The skillful application of fire to natural fuels under conditions of weather, fuel moisture, soil moisture, etc., that will allow confinement of the fire to a predetermined area and at the same time will produce the intensity of heat and rate of spread required to meet certain objectives in the areas of silviculture, wildlife management, grazing, hazard reduction, etc. the overall objective of prescribed fire is to employ fire scientifically to realize maximum net benefits with minimum damage and acceptable cost.
PRESCRIBED NATURAL FIRE	A lightning-caused fire allowed to burn in certain areas and during conditions that meet prescription criteria, and can achieve approved resources management objectives.
PRESUPPRESSION	Activities done to reduce hazardous fuels around developed areas. These may include prescribed burning, limbing trees and removal of dead and down woody debris and brush.
PROBABILITY OF IGNITION	A rating of the probability that a firebrand (glowing or flaming ember) will cause a fire providing it lands on receptive fuels. It is calculated from air temperature, fuel shading and fuel moisture.

SPOTTING	Behavior of a fire producing sparks or embers that are carried by convection columns and/or the wind and that start new fires beyond the zone of direct ignition by the main fire.
STRIKE TEAM	Specified combinations of the same kind and type of resources with common communication and a leader.
SUPPRESSION	All actions intended to extinguish or limit the growth of fires, regardless of the strategies and tactics chosen.
TYPE I, II, AND III INCIDENT MANAGEMENT TEAM	Interagency incident management teams are classified as Type I, II and III. Type I teams are composed of preselected, highly qualified personnel available to assign to complex fire situations. There are 18 teams nation wide that rotate assignments. Type II teams consist of local interagency personnel who are fire-qualified. Type III teams are extended attack management teams from the agency.
UNIFIED COMMAND	A method for all agencies or individuals who have jurisdictional responsibility, and in some cases, those who have functional responsibility at the incident, to contribute to 1) determine overall objectives for the incident and 2) select a strategy to achieve the objectives.
WILDFIRE	A fire that is not burning in accordance with established prescription criteria.

APPENDICES

Appendix #	Subject Matter
A	Environmental Assessment for the Joshua Tree National Monument Fire Management Program, 1992-1997.
B	Fire Occurrence Data for Joshua Tree National Monument, 1964 to Present.
C	Operational Plan between California Department of Forestry and NPS, 1986.
D	Blanket Delegation of Authority, Joshua Tree National Monument, 1992.
E	Tentative Prescribed Burning Prescriptions for Type Converting Pinyon-Juniper Range at Joshua Tree National Monument, 1992.
F	Joshua Tree National Monument Fire Prevention Plan, 1992.
G	Wildland Fire Training Plan, Joshua Tree National Monument, 1992.
H	Joshua Tree National Monument Dispatch Plan, 1992.
I	California Prescribed Fire Preparedness Plan for California, 1992.
J	Cooperative Agreement between NPS-JOTR and 29 Palms Water District for Fire Suppression and Cooperation.
K	Operating Plan for the Federal Interagency Communication Center (NPS/BLM/USFS), 1992
L	Five Year Burning Program, Joshua Tree National Monument, 1992-1997.
M	Interagency Prescribed Fire Agreement for California, 1983.
N	Fire Monitoring Types, Joshua Tree National Monument, 1992.
O	Fire Effects in Joshua Tree National Monument, Study Plan, 1992.
P	Notification of Prescribed Burning Information, FICC Form, 1992.
Q	Memorandum of Understanding between Joshua Tree National Monument , South Coast Air Quality Management District and San Bernardino County Air Pollution Control District (Draft, 1992).
R	Escaped Fire Situation Analysis.

Appendix A

ENVIRONMENTAL ASSESSMENT FOR THE JOSHUA TREE NATIONAL MONUMENT FIRE MANAGEMENT PROGRAM, 1992-1997

Appendix F

JOSHUA TREE NATIONAL MONUMENT
FIRE PREVENTION PLAN 1992

The objective of the wildfire prevention plan is to minimize unacceptable loss due to human caused fires.

During the summer of 1991, an analysis was completed to identify the potential impacts of wildfire and to provide planned actions, on a priority basis, for implementation by Monument staff. The prevention analysis was performed according to the NPS Wildland Fire Prevention Handbook and it identified an assessment of Risk, Hazard, and Value components. Ratings of **HIGH, MODERATE,** and **LOW** were assigned to each component. These ratings are relative and not absolute.

The Monument has been divided into 8 prevention compartments. These compartments should not be confused with the Fire Management Units described in chapter 7.0 of the Fire Management Plan. The compartments were developed according to the amount of visitation, fuel and topography similarities, and identified values. Hidden Valley Compartment #3 for instance contains several historic landmarks and recreational developments therefore it is rated as high priority. Pinto Basin Compartment #7 however contains few values or hazards and it is less of a concern therefore prevention actions would be directed toward areas of high risks, hazards and values.

Implementation of this plan will be achieved by the following general action items:

1. Education - informing the visitor on fire safety and prevention through the use of signing, mass media, and printed material.

2. Engineering - clearing vegetation around campfire rings and Monument structures.

3. Enforcement - Road and backcountry patrols will ensure compliance with regulations concerning campfire restrictions and fireworks prohibitions.

<u>Specific Fire Prevention Compartment Ratings/ Action Items</u>

Compartment 1 Black Rock

RISK. Moderate - Escaped campfires, off road vehicles, illegal campfires, shooters and smoker fires are all possible in this compartment.

HAZARDS. High - Dense juniper and pinyon complex mixed with blackbrush and fine flashy fuels on low to moderate slopes.

VALUE. High - Campground facilities, residences and Black Rock Interagency Fire Center as well as wildlife habitat.

Prevention Measures Required

1. Weed abatement around fire rings.
2. Fire safety messages posted on bulletin boards in campground.
3. Printed information handed out in visitor center.
4. Fire regulation signs posted.
5. Routine patrol of campground and Black Rock District maintained.

Person responsible - Black Rock District Ranger

Compartment 2 Whispering Pines

RISK. High - Private inholdings, easy accessibility from outside Monument boundary, off road vehicle use, illegal shooters and smoker fires are all possible sources of human caused fires.

HAZARDS. High - Dense pinyon and juniper complex dominate the higher elevations. Lower slopes and valleys are characterized by blackbrush and perennial grasses.

VALUE. High - Private inholdings and NPS easements contain numerous structures. Prime wildlife habitat.

Prevention Measures Required

1. Education of remaining property owners on fire safety.
2. Provide a more secure gate into Nolina Cove to discourage off road vehicle use and trespassers.
3. Place fire regulation signs at Covington Flats entrance.

Person responsible - Black Rock District Ranger

Compartment 3 Hidden Valley

RISK. High- Heavy visitation, illegal camping, past history of escaped campfires, off road vehicle use.

HAZARDS. Moderate - Annual grasses, Joshua Trees, Yucca cactus and brush dominate in the valleys. Within the Wonderland of Rocks are scattered stands of scrub oak, Pinon Pine, and manzanita. Slopes are low to moderate.

VALUE. High - Several National Historic Landmarks such as Keys Ranch and the Wall Street Mill as well as many camping and picnic facilities. Private inholdings. Prime wildlife habitat.

Prevention Measures Required

1. Post fire prevention measures on all bulletin boards.
2. Fire regulation signs posted at Hidden Valley Campground and the West Entrance Station.

3. Outdoor fire safety brochures handed out at the West Entrance Station and available in information boxes.

4. Routine patrol of Lost Horse District.

Responsible person(s) - Lost Horse District Ranger and Information Specialist

Compartment 4 Indian Cove

RISK. Moderate - Moderate visitation and group camping. Illegal camping and fires outside of designated fire pits, smokers and backcountry hikers.

HAZARDS. Moderate - Lower elevations consist of creosote brush mixed with Yucca cactus, catsclaw and non continuous grasses.

VALUE. Moderate - Primitive campground facilities. Native Fan Palm Oasis and prime bighorn sheep habitat.

Prevention Measures Required

1. Outdoor fire safety brochures available at visitor center.
2. Fire prevention message posted on bulletin boards.
3. Fire regulation sign posted at entrance to Indian Cove Campground.
4. Fire safety discussed during campfire programs.
5. Routine patrol of campground and backcountry areas.

Responsible person(s) - Indian Cove Sub-District Ranger and Park Naturalists.

Compartment 5 Queen Valley

RISK. High - Heavy visitor use especially in the campgrounds of this compartment. Illegal campfires, smokers, and backcountry hikers all represent a risk of human caused fires.

HAZARD. Moderate - Open valleys dominate this compartment. Joshua trees, annual grasses and isolated areas of blackbrush can be found at higher elevations.

VALUE. High - several campgrounds, picnic areas, and historical sites are found in this compartment.

Prevention Measures Required

1. Outdoor fire safety brochures handed out at entrance stations and visitor center.
2. Fire safety messages posted on bulletin boards.
3. Fire safety discussed at campfire programs.
4. Fire regulation signs posted at North Entrance and at campgrounds.
5. Routine vehicle and backcountry patrols conducted.

Responsible person(s) - Lost Horse District Ranger and Park Naturalists.

Compartment 6 Lost Horse

RISK. Moderate - Backcountry hikers, illegal campfires, and smokers are all risks.

HAZARDS. Moderate - Joshua trees, annual grasses in the lower elevations. Above 4,000 ft. continuous areas of blackbrush and pinyon/juniper may be found.

VALUE. Moderate - Lost Horse Mine and wildlife habitat.

Prevention Measures Required

1. Fire regulation sign posted at entrance to Pushwalla Canyon and Park Rt #13.
2. Outdoor fire safety brochures available in information boxes.
3. Routine vehicle and backcountry patrols.

Person responsible - Lost Horse District Ranger

Compartment 7 Pinto Basin

RISK. Low - Some visitor use near mine sites, illegal campfires, smokers, and off road vehicle use.

HAZARD. Low - Area is dominated by widely scattered creosote brush and non-continuous fuels.

VALUE. Moderate - Some historical mining sites and structures, wells and a bighorn sheep guzzler in the Coxcomb Mountains.

Prevention Measures Required

1. Backcountry and vehicle patrols.
2. Post fire regulation sign at Gold Crown Road where it enters the Monument.

Responsible person - Cottonwood District Ranger

Compartment 8 Cottonwood

RISK. High - heavy visitation, illegal campfires, smokers and off road vehicle use.

HAZARD. Moderate - Fan palm oasis, blackbrush, juniper and annual grasses above 3,000 ft. Low to moderate slopes.

VALUE. High - Campground facilities, residences, native fan palm oasis and bighorn sheep habitat.

Prevention Measures Required

1. Outdoor fire safety brochures handed out at visitor center.
2. Fire regulation sign posted at South Entrance and Cottonwood Campground.
3. Fire safety messages posted on bulletin boards.
4. Routine vehicle and backcountry patrols.

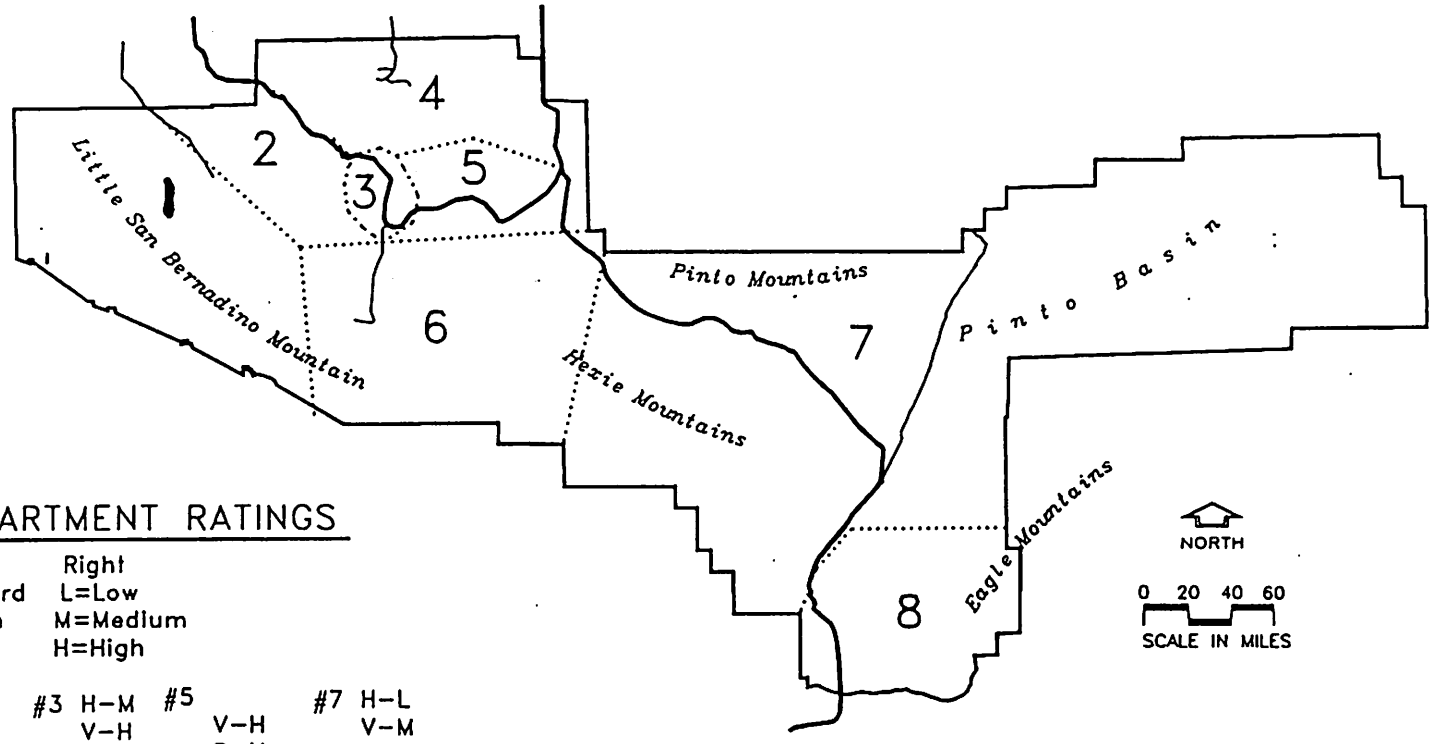
Person responsible - Cottonwood District Ranger

Fire Prevention Plan Evaluation

The Monument's Fire Prevention Program will be evaluated annually as follows:

1. If general and specific action items have been implemented and no damaging fires occur in high priority compartments the plan is working and no significant changes are required.

2. If general and specific action items have been implemented and damaging fires have occurred in high priority compartments the planned activities need to be evaluated to determine why they are not working and strategies should be changed.



COMPARTMENT RATINGS

Left	Right
H=Hazard	L=Low
V=Value	M=Medium
R=Risk	H=High

#1	H-H	#3	H-M	#5		#7	H-L
	V-H		V-H		V-H		V-M
	R-M		R-H		R-H		R-M
#2	H-H	#4	H-M	#6	H-M	#8	H-M
	V-H		V-M		V-M		V-H
	R-H		R-M		R-M		R-H

Appendix G

JOSHUA TREE NATIONAL MONUMENT
TRAINING PLAN, 1992

Appendix G Joshua Tree National Monument Training Plan. 1992

Position Title	# Personnel Required	# Qualified Personnel	Target Position(s)
Firefighter Type II	8 - 10	5	members of all divisions
Firefighter Type I	2	2	members of all divisions
Crew Boss	2	1	patrol rangers
Engine Boss	2	1	Black Rock Dist. Rgr Fire Mgt Officer
IC Type III	2	1	patrol ranger Fire Mgt. Officer
IC Type IV	3	0	L.H.,B.R. Dist. Rgrs Fire Mgt Officer
Information Officer	1	0	Information Specialist
FBA	1	0	Biological Tech.
Safety Officer	2	1	Cottonwood patrol ranger
PFM	1	1	Chief, Resources Mgt
PBB I	1	0	Fire Mgt Officer
FBWS II	3	2	Resources personnel Fire Mgt Officer
FBWS I	1	0	Biological Tech.
Ignition Specialist	1	0	patrol ranger
Holding Specialist	1	0	patrol ranger

Appendix H

JOSHUA TREE NATIONAL MONUMENT
DISPATCH PLAN, 1992

Appendix H. Joshua Tree National Monument Dispatch Plan, 1992

All fire detection or reports of fires within the Joshua Tree National Monument will immediately be forwarded to FICC. Initial reports will include:

- Name of person reporting the incident.
- Telephone number of person reporting.
- Location of fire incident.
- Fire size.
- Time of day.
- Cause - if possible.

FICC will notify CDF or BLM immediately if the initial fire report indicates the fire is in the suppression unit. The closest available resource, regardless of jurisdiction will respond. FICC, JOTR, BLM and CDF will coordinate information on units and personnel responding.

If the initial report indicates the fire is within the Prescribed Natural Fire Unit (FMU #2), FICC will contact the Prescribed Fire Manager (PFM). The PFM will ensure that a qualified Prescribed Burn Boss (PBB) and Fire Behavior/Weather Specialist are sent to the scene in order to initiate the Fire Situation Analysis (FSA). Decisions regarding the management of natural ignitions as long as it is projected to stay within FMU #2 within the following burning period, are dictated by the contents of the FSA.

When units arrive at an incident, they will inform FICC and complete and forward a Report of Conditions listed below:

- Location - legal if possible.
- Estimated size
- Fire behavior
    1) smoldering
    2) creeping
    3) running
    4) crowning
    5) spotting
- Fuel type
    1) grass
    2) brush
    3) Joshua tree
    4) tree
    5) vehicle/structure
- Wind speed and direction. General weather.
- Can handle? If not, what's needed?

FICC will immediately dispatch the Resource Advisor.

If the first unit determines that the fire can be handled by units responding, FICC will then be kept informed on fire situation. If the first unit determines that the fire or fires cannot be handled by units responding, requests for specific resources as needed will be forwarded FICC. FICC will order from cooperating agencies the requested resources.

Requested resources from cooperating agencies will receive from FICC:

- Fire order number
- Location of fire - legal description
- Incident # or name
- Incident Commander name
- Name of Monument contact on fire
- Radio frequencies

FICC will receive from cooperating agency:

- Estimated time of arrival of resource requested
- Unit leader name

When cooperating agency resource arrives at fire, contact with Monument personnel and Incident Commander will be made. Incident Commander will contact FICC as to arrival of resource. FICC will record:

- Dates
- Time of release of cooperating agencies resources
- Estimated time of arrival home

In the event a particular fire appears likely to become a project fire, not contained or controlled by the initial attack forces, the Incident Commander will request an incident management team. The transition will be executed according to the Incident Command System.

Appendix I

1992 CALIFORNIA INTERAGENCY PREPAREDNESS PLAN

United States Department of the Interior

NATIONAL PARK SERVICE

WESTERN REGION
600 HARRISON STREET, SUITE 600
SAN FRANCISCO, CALIFORNIA 94107

IN REPLY REFER TO:

Y1421 (WR-OR)

May 22, 1992

Memorandum

To: California Fire Management Officers/Chief Rangers, GRCA/SAGU Fire Management Officers

From: Chief, Branch of Aviation and Fire Management, Western Region

Subject: Preparedness Plan

The 1992 California Preparedness Plan has been approved for implementation; a copy of this document has been enclosed for your information. The document is largely unchanged from the 1991 version, except for the definition of Contingency Reserve.

The Preparedness Plan directs that at Level IV, no new prescribed natural fires are allowed, "except those certified by the line officer to the appropriate representative to have little or no significance." The document contains no further definition of "significance," which therefore requires each Superintendent and Fire Management Officer to develop park specific criteria.

Guidance for the development of this criteria is provided in NPS-18. A worksheet for quantifying the complexity of a prescribed fire is located in Section III, Chapter 5, page 16 and Exhibit 4. NPS-18 requires that all prescribed fires will have a complexity rating assigned via the completion of the worksheet. A blank copy of this worksheet is enclosed.

We suggest that for the purpose of meeting the requirements of the Preparedness Plan, a significant fire be defined as a fire with a complexity point total greater than the range which defines the normal staffing structure. Additional requirements may be imposed; for example, if any individual rating value is seven or greater, the fire is automatically significant.

The use of the complexity worksheet should provide guidance to the park staff in the decision to allow to burn, or to suppress, a new natural fire during periods of significant state or national wildfire activity.

Related to the Preparedness Plan is the availability of adequate personnel for the management of the prescribed fire. Prescribed natural fires may cover thousands of acres and persist for months. This workload may fatigue the park's Fire Behavior and Weather Specialists, as well as other personnel associated with fire management or administration.

The rotation of personnel from other parks, regions, or agencies will alleviate some of the strain imposed by the prescribed fire. Enclosed is a list of both qualified and trainee Fire Behavior and Weather Specialists. These personnel may be requested and sent to the prescribed natural fire through normal dispatch procedures. Costs are charged to the prescribed natural fire's account.

The use of these personnel will result in greater consistency of fire monitoring and evaluation skills across the region and within the National Park Service. Fire Management Officers are encouraged to use this list, both to provide training opportunities as well as to strengthen or to temporarily relieve the local fire monitoring staff.

If you have questions on the Preparedness Plan, complexity worksheet, or list of Fire Behavior and Weather Specialists, please contact me or Tom Nichols at 415-744-3878.

Chris Cameron

Chris Cameron

PREPAREDNESS PLAN

FOR WILDLAND FIRE

AGENCIES OF CALIFORNIA

Bill Teie, Chief of Fire Control Operations, CDF — 5/18/92 Date

Chris Cameron — 4/21/92 Date
Chris Cameron
Chief, Branch of Fire Management
NPS Western Region

Pat Kidder — 4-21-92 Date
Pat Kidder
State Fire and Aviation Officer, BLM

C. Richard Aronson — 4-21-92 Date
C. Richard Aronson
State Fire and Rescue Coordinator, OES

for Ray Quintana — 5/21/92 Date
Richard A. Henry
Director Aviation and Fire Management, USFS

PREPAREDNESS PLAN FOR WILDLAND FIRE AGENCIES OF CALIFORNIA

PARTICIPANTS - This document is prepared and endorsed by the California Wildfire Coordinating Group which represents the following agencies:

1. United States Forest Service
2. California Department of Forestry and Fire Protection
3. Bureau of Land Management
4. National Park Service
5. Office of Emergency Services
6. Contract Counties

PURPOSE - The development of a statewide preparedness plan will serve two primary purposes within the state:

1. to coprdinate workforce and equipment needs for prescribed fire and wildfire suppression activities.

2. to ensure that prescribed fire use and fire protection responsibilities do not exceed State wildland fire agency capabilities, and are coordinated with state and national suppression needs.

PREPAREDNESS LEVEL DEFINITIONS - Five preparedness levels are recognized within California, and are defined as follows:

General Preparedness Level Descriptions

PREPAREDNESS LEVEL I:

Description - Little or no commitment of statewide interagency resources. Most units have low to moderate wildfire severity. No large wildfire activity. Normal prescribed fire operations may be in progress.

Management Direction/Consideration	Responsibility
A. All units will be staffed at their normal, budgeted initial attack level, and will determine appropriate actions. Normal reporting procedures are used.	local unit*

* USFS- Forest NPS - Park, Monument, etc.
CDF- Ranger Unit
BLM- District

B.	Preparedness levels (zone, statewide and national) provided to all units via normal dispatch channels daily.	Dispatchers
C.	Provide status report to BIFC and CDF/SAC daily	Zone/Region Coordinators*

PREPAREDNESS LEVEL II:

Description - statewide interagency resources are adequate to manage the existing wildfire and prescribed fire situation. Numerous Class A, B, and C fires are occurring, and a potential exists for Class D, or larger fires. Mobilization of resources to or from, other states is anticipated, or is occurring.

Management Direction/Consideration		Responsibility
A.	Continue Preparedness Level I activities.	local unit
B.	Evaluate status of prescribed fires daily as they relate to the Preparedness Plan.	local unit
C.	Preparedness levels (zone, statewide, and national) are provided to all units via normal dispatch channels daily.	Dispatchers
D.	Monitor changing fire situation, and report to next higher level daily.	Zone/Region Coordinators

* North Zone = USFS NZ coordinator
CDF Region II FCO

South Zone = USFS SZ coordinator
CDF Region III FCO

PREPAREDNESS LEVEL III:

Definition - High potential for Class D and larger fires to occur, with several fires Class D, or larger, fires existing. Requests for resource priority and competition for interagency resources beginning to occur. When a prescribed burn is scheduled to occur, or in progress, or a prescribed natural fire is in progress, the appropriate Zone/Region Coordinator will be informed through agency channels of date of ignition, acres planned or predicted to burn within the next 24 hours, and acres burned from previous day.

Management Direction/Consideration	Responsibility
A. Continue Preparedness Level II activities.	local unit
B. Evaluate, document, and provide information to appropriate Zone/Region Coordinator through agency channels that prescribed fire objectives can, or can not, be accomplished given increasing wildfire activity and resource commitment.	local unit
C. Ensure fire qualified personnel are available for fire assignment.	all levels
D. Coordinate fire restriction information Coordinators	Zone/Region
E. Monitor prescribed fire status and effect on zone and State resources and confer with appropriate agency representatives.	Zone/Region Coordinators
F. Preposition resources, inform and/or coordinate as needed.	Zone/Region Coordinators
G. Assess statewide wildfire situation, and report to BIFC daily.	Zone/Region Coordinators
H. Intensify coordination efforts with all fire protection agencies.	CALMAC* Agency* Representatives

* California Multi-Agency Coordination Group, which is activated in Sacramento. Previously known as SACMAC.

PREPAREDNESS LEVEL IV:

Definition - Class D and larger fires are common. Statewide competition exists for interagency resources. Allow no new prescribed burns. Allow no new prescribed natural fires except those certified by the line officer to the appropriate representative to have little or no significance.

Management Direction/Consideration	Responsibility
A. Continue Preparedness Level III activities.	local unit
B. Certify daily to appropriate representative that prescribed fire(s) currently in unit is/are expected to remain in prescription.	local unit line officer*
C. No new prescribed burns or new significant prescribed natural fires.	local unit
D. Restrict current prescribed fires to a safe point where contingency reserve resources can be released for wildfire activities.	local unit
E. Units with fire activity provide fire priorities and other pertinent information to their appropriate levels.	local unit
F. Evaluate the need to activate coordination centers to appropriate MAC level. When CALMAC group is activated, coordinate efforts with BIFC. If implemented:	Chair of CWCG
1. Consider prepositioning resources within state.	CALMAC group
2. Provide BIFC with fire priorities and other pertinent information.	CALMAC group
3. Alert units through normal channels of the possibility of going to Preparedness Level V.	CALMAC group

* USFS- Forest Supervisor BLM- District Manager
CDF- Region Chief NPS- Superintendent
Contract County- County Fire Chief

PREPAREDNESS LEVEL V:

Definition - CALMAC group is fully activated. Statewide and/or national resources are heavily committed, or have potential to be exhausted. Military support may be mobilized. Allow no new prescribed burns. Allow no new prescribed natural fires except those certified by the line officer to the appropriate representative to have little or no significance.

Management Direction/Consideration	Responsibility
A. Continue Preparedness Level IV activities.	local unit
B. No new prescribed burns or new significant prescribed natural fires.	local unit
C. Units report twice daily on resource status, at times specified by CALMAC group.	local unit
D. Assess statewide/national situation for determination of need for resources.	CALMAC group
E. Daily briefing at 1000 for appropriate line officers.	CALMAC group

PREPAREDNESS LEVEL DETERMINATION - CDF Sacramento office will monitor the Preparedness Levels daily. Levels I, II, and III will be declared by Zone/Region Coordinators. Levels IV and V can only be declared if a majority of the membership of the CWCG agrees, and a date and time established for implementing that level. Each zone may have its own preparedness level.

Each representative will initiate the restrictions imposed by the preparedness level upon those lands within their jurisdiction. Federal agencies will impose those restrictions which are required by the National Preparedness Plan as well.

GUIDELINES FOR DETERMINING PREPAREDNESS LEVEL - The following information will be used to determine preparedness levels for North Zone, South Zone, or for the entire state:

1. Current California and National Fire Situation
2. National Preparedness Level
3. Predicted Fire Potential
4. Firefighting Resource Availability

REPORTING REQUIREMENTS - Each agency will report the status of engines, handcrews, and aircraft by 1100 each morning in the following categories:

1. OUT OF SERVICE - Resources that cannot be placed on an incident due to personnel being off duty, down for repair, missing key personnel, etc.

2. ASSIGNED - Any resource that is committed to an incident or prescribed fire by an order number.

3. CONTINGENCY RESERVE - Those resources that are identified in the prescribed fire plan that are needed to perform the holding actions to keep the prescribed fire within designated boundaries. They are also the resources which would be required to meet suppression objectives if an escape occurs. These resources must be committed to the fire and are not available for dispatch to other fires, unless replacement resources are ordered and received in a timely manner (four hours or less) to make up the deficiencies.

4. AVAILABLE - Any resource that is on duty and available for Initial Attack and/or off-unit assignment.

REPORTING PERIODS - The normal reporting period will be from 4/1 - 11/1 in South Zone and 5/1 - 10/1 in North Zone unless unusual fire weather conditions occur State Wide or Nationally that would require additional reporting time frames. Each Zone will coordinate this information and time period.

Prescribed Fire Complexity

To determine the requisite management level of a prescribed fire, determine the Burn Complexity, using the below factoring criteria, then refer t Prescribed Fire Qualification System flowchart.
Rate each element on a scale of 1 to 10 and multiply by the weighting factor to determine the weighted subvalues to determine the total weighte value, and thence the required staffing structure.

PRESCRIBED BURNS:

COMPLEXITY ELEMENT/ (WEIGHTING FACTOR)	RATING VALUE	WEIGHT SUBVALUE	LOW BURN COMPLEXITY	HIGH BURN COMPLEXITY
1. Potential for escape. (10)			Very Low probability.	High probability.
2. Values at risk. (10)			Very little risk to people, property, resources.	Great risk to people, property, resources
3. Fuels/fire behavior. (5)			Mostly uniform & predictable.	Great variability & unpredictability. Prescriptio includes very low fuel moisture conditions.
4. Fire duration. (5)			Fires gen. of short duration & require little management.	Fires of long duration & require continous mana; ment.
5. Smoke/air quality. (7)			Smoke impacts are low or insignificant.	Smoke sensitive are frequently affected.
6. Ignition methods. (3)			Simple & rarely hazardous.	Highly technical or freq. hazardous.
7. Management team size. (3)			Burn requires a few generalized positions.	Burn requires large team of separate, specialized positions.
8. Treatment objectives. (7)			Objectives simple & easy to achieve. Prescriptions are broad & encompass safe burning conditions.	Objectives are difficult to achieve. Prescriptions restrictive or burning conditions are risky.
Total Weighted Value:				

*STAFFING STRUCTURE:
NORMAL STRUCTURE: 50 - 338 weighted value points
COMPLEX STRUCTURE: 339 - 500 weighted value points

PRESCRIBED NATURAL FIRE:

1. Potential for escape. (10)			Very Low probability.	High probability of escape.
2. Values at risk. (10)			Very little risk to people, property, resources.	Great risk to people, property, resources.
3. Fuels/fire behavior. (5)			Mostly uniform & predictable.	Great variability & unpredictability. Prescriptio includes very low fuel moisture conditions.
4. Fire duration. (5)			Fires gen. of short duration & require little management.	Fires of long duration & require continous mana; ment.
5. Smoke/air quality. (7)			Smoke impacts are low or insignificant.	Smoke sensitive areas are frequently affected.
Total Weighted Value:				

*STAFFING STRUCTURE:
NORMAL STRUCTURE: 37 - 247 weighted points
COMPLEX STRUCTURE: 248 - 370 weighted points

*A Prescribed Fire Manager (PFM) is required when agency administered lands are involved with 5 or more burns of low complexity, more than 1 burn of high complexity or any combination of the two.

Prepared by (PBB/PFM/FMO) _____ Date _____

Appendix J

COOPERATIVE AGREEMENT BETWEEN THE JOSHUA TREE NATIONAL MONUMENT AND THE TWENTYNINE PALMS WATER DISTRICT

MOU/Agreement No. MU 8330-3-0001

MEMORANDUM OF UNDERSTANDING

BETWEEN

JOSHUA TREE NATIONAL MONUMENT

and the

TWENTYNINE PALMS WATER DISTRICT

I. Background

A. Purpose

1. The purpose for this Memorandum of Understanding (hereinafter referred to as MOU) is to provide mutual aid assistance for fire protection or other emergency on lands administered by Joshua Tree National Monument (hereinafter referred to as JTNM) and the Twentynine Palms Water District (hereinafter referred to as Twentynine Palms Fire).

B. Authority

1. The statutes found in 42 U.S.C. 1856 and 16 U.S.C. 1b(1) provide authority for the National Park Service (hereinafter referred to as NPS) to enter into reciprocal agreements and render emergency fire suppression and cooperative assistance to nearby fire agencies to extinguish fires and to preserve life and property.

2. The President of the Twentynine Palms Water District Board of Directors has signature authority to enter into agreements with JTNM regarding fire suppression services on NPS administered lands.

3. The Park Superintendent has signature authority to enter into agreements with the Twentynine Palms Water District regarding fire suppression and other emergency services on NPS administered lands and to provide reciprocal assistance.

II. Statement of Work

A. Fire on NPS Administered Lands

1. In the event of a structural or wildland fire, Twentynine Palms Fire agrees to:

   a. Respond to the fire with a minimum of one engine and qualified crew with safety and firefighting equipment.

   b. Recognize that NPS policies and requirements may necessitate special or unique fire suppression procedures that may differ from Twentynine Palms Fire procedures. Twentynine Palms Fire personnel will adhere to NPS requirements when requested to do so by the Park Superintendent or designated representative.

2. JTNM agrees to:

   a. Provide qualified wildfire suppression personnel with safety and firefighting equipment.

   b. Provide a resources advisor for all fire activities.

   c. Solicit and accept recommendations from Twentynine Palms Fire command personnel in structural fire and rescue procedures insofar as they do not conflict with NPS policies.

B. Fire Adjacent To Exterior Park Boundary

1. In the event of a wildfire on lands occurring within one mile on the exterior side of the legislative boundary of Joshua Tree National Monument, JTNM agrees to:

   a. Respond to the fire with available qualified wildfire suppression personnel and equipment.

   b. Cooperate with Twentynine Palms Fire command personnel in the suppression of the fire.

2. Twentynine Palms Fire agrees to:

   a. Establish a clear command structure and provide assignments and instructions to NPS personnel.

b. Consult with Park Superintendent or designated representative if the fire threatens NPS administered lands.

C. Notification

1. Fire suppression resources will be activated by contacting the Federal Interagency Communications Center (FICC) at (909) 383-5651. FICC has established procedures for notification of the Twentynine Palms Fire dispatcher.

D. General Provisions

1. JTNM and Twentynine Palms Fire mutually agree to the following:

a. In the execution of this MOU, employees or agents of Twentynine Palms Fire are not considered to be NPS employees.

b. The mutual assistance provided for herein shall be furnished by the assisting agency at no cost to the other agency.

c. "Other emergency" as used in this MOU means any incident to which either party normally responds, including, but not limited to fire, rescue, medical aid, hazardous materials spill, gas leak, etc.

d. JTNM and Twentynine Palms Fire waive all claims against each other for compensation for any loss, damage, personal injury, or death occurring in consequence of activities pursuant to this MOU.

e. If while providing mutual assistance to the other, either party has the need to release or reassign its equipment or personnel, it shall do so only after notifying the incident commander in charge of the operation. Assisting personnel and equipment shall be the first to be released unless otherwise agreed to by both agencies.

f. Participation in joint training sessions in areas covered by this MOU will be encouraged.

E. Evaluation

1. The parties will jointly review the effectiveness of this MOU annually. The MOU may be amended at any time by the written mutual consent of the parties. The approved amendment will immediately become part of this MOU.

III. Term of MOU

A. The term of this MOU is five (5) years, commencing upon the date of signature of the final signatory party to the MOU.

IV. Key Officials

A. Joshua Tree National Monument

1. The Fire Management Officer has the authority and responsibility for managing this MOU on behalf of the Park Superintendent.

2. The Chief, Resources Management is the designated wildland fire resource advisor for JTNM.

B. Twentynine Palms Water District

1. The Chief, Twentyine Palms Fire Department has the authority and responsibility for managing this MOU on behalf of the Twentynine Palms Water District.

V. Reports

A. Each party is responsible for its respective timekeeping and other required records and reports.

VI. Termination

A. This MOU may be terminated by either party by providing thirty (30) days notice to the other party.

VII. Required Clauses

A. During the performance of this agreement, the participants agree to abide by the terms of Executive Order 11246 on non-discrimination and will not discriminate against any person because of race, color, religion, sex or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex or national origin.

B. No member or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

David E. Moore, Superintendent Joshua Tree National Monument	Date
Owen Gillick, President Board of Directors	Date

Appendix K

FEDERAL INTERAGENCY COMMUNICATIONS CENTER OPERATION PLAN 1992

March 1992

SAN BERNARDINO NATIONAL FOREST

BUREAU OF LAND MANAGEMENT - CALIFORNIA DESERT DISTRICT

NATIONAL PARK SERVICE - JOSHUA TREE NATIONAL MONUMENT

NATIONAL PARK SERVICE - DEATH VALLEY NATIONAL MONUMENT

FEDERAL INTERAGENCY COMMUNICATIONS CENTER

OPERATION PLAN

1992

FEDERAL INTERAGENCY COMMUNICATIONS CENTER

OPERATION PLAN

1992

APPROVED BY:

SIGNATURE _____ DATE 3.19.92
Gene Zimmerman
Forest Supervisor
San Bernardino National Forest

SIGNATURE _____ DATE 19 mar 1992
Gerald Hillier
District Manager
California Desert District
Bureau of Land Management

SIGNATURE _____ DATE 19 March 1992
Dave Moore
Park Superintendent
Joshua Tree National Monument
National Park Service

SIGNATURE _____ DATE 19 March 1992
Ed Rothfuss
Park Superintendent
Death Valley National Monument
National Park Service

TABLE OF CONTENTS

Agency Organization and Directory.....Page 1

Glossary of Terms.....Page 2

Dispatch Procedures.....Page 3,4,5

F.I.C.C. Organizational Chart.....Page 6

F.I.C.C. Extended Large Incident Management Plan.....Page 7,8

Multi-Agency Incident Coordination.....Page 9

Communication Management.....Page 10,11

San Bernardino FICC Financial Summary.....Page 12,13,14

AGENCY ORGANIZATION AND DIRECTORY

Normally all incidents occurring on Government lands administered by the San Bernardino National Forest, Bureau of Land Management, California Desert District, National Park Service, Joshua Tree National Monument, and National Park Service, Death Valley National Monument, will be directed through the Federal Interagency Communications Center (FICC).

The Communications Center can be reached by radio, on a 24 hour basis year round by calling "San Bernardino".

Following is a list of Dispatchers, Agency Staff Officers and their respective business phone numbers:

FICC STAFF PERSONNEL

Tom Sensintaffar (ac)	Center Manager	USFS	(714) 383-5538
Vacant	Operations Dir.	BLM	(714) 383-5654
Vacant	Operations Dir.	USFS	(714) 383-5654
Vacant	Shift Supervisor	USFS	(714) 383-5654
Larry Stanford	Shift Supervisor	BLM	(714) 383-5654
Sam Tapper	Shift Supervisor	BLM	(714) 383-5654
Bud Parrott (acting)	Shift Supervisor	USFS	(714) 383-5654
Sandy Nieman	Shift Supervisor	USFS	(714) 383-5654

FOREST SERVICE STAFF OFFICERS

John Hatcher	Forest FMO	USFS	(714) 383-5535
Russ Johnson	Deputy Forest FMO	USFS	(714) 383-5536
VACANT	Forest FPO	USFS	(714) 383-5537
Gene Zimmerman	Forest Supervisor	USFS	(714) 383-5630
Ron Huxman	L.E. Coordinator	USFS	(714) 383-5700

BUREAU OF LAND MANAGEMENT STAFF OFFICERS

Dick Franklin	District FMO	BLM	(714) 697-5355
Don Orsburn	Asst.District FMO	BLM	(619) 247-9002
Doug Waggoner	Fire Mgmt. Spec.	BLM	(714) 697-5357
Dick Crowe	Asst.Dist.Mgr. Ops	BLM	(714) 697-5346
Gerald Hillier	District Manager	BLM	(714) 697-5204
Felicia Probert	District Ranger	BLM	(714) 697-5330

NATIONAL PARK SERVICE, JOSHUA TREE

Tom Patterson	Park Ranger / FMO	NPS	(619) 367-3523
Paul Henry	Chief Ranger	NPS	(619) 367-3523
Dave Moore	Park Superintendent	NPS	(619) 367-6376
Kathy Billings	Management Assistant	NPS	(619) 367-6376

NATIONAL PARK SERVICE, DEATH VALLEY

Chris Ward	Chief Ranger	NPS	(619) 786-2331/2515
Mike Rondas	Staff Ranger	NPS	(619) 786-2330/2515
Ed Rothfuss	Park Superintendent	NPS	(619) 786-2331

GLOSSARY OF TERMS

The following are terms and Incident Command System agency designators as used in this Operation Plan for the Federal Interagency Communications Center.

Administrative Unit refers to one or more of the respective agencies involved:

San Bernardino National Forest

Bureau of Land Management - California Desert District

National Park Service - Joshua Tree National Monument

National Park Service - Death Valley National Monument

Each Administrative Unit has an Agency Administrator.

ADMINISTRATIVE UNITS	AGENCY DESIGNATORS	AGENCY ADMINISTRATOR
San Bernardino National Forest	BDF	Forest Supervisor
Bureau of Land Management California Desert District	CDD	District Manager
National Park Service Joshua Tree National Monument	JTP	Park Superintendent
National Park Service Death Valley National Monument	DVP	Park Superintendent

DISPATCH PROCEDURES

AUTHORITIES

San Bernardino National Forest, Bureau of Land Management California Desert District, Park Service Joshua Tree National Monument, and Death Valley National Monument Policy for action and lines of authority.

The Dispatcher's work under the administrative supervision of the Federal Communications Center Manager. While performing dispatching duties, the dispatchers act with full authority and on behalf of the Forest Supervisor, District Manager, and Park Superintendents.

Established channels of authority in dispatching for each agency will be recognized at all times.

OPERATING PROCEDURES

All Fire, Law Enforcement and 9-1-1 emergency incidents will be reported immediately and directly to the San Bernardino Communications Center for action. When a fire occurs the Area Dispatch Plan will be activated.

Good judgement of values, risk, topography, fuels, closest resource concept and expenditures must be used in covering those areas that have been depleted of initial attack resources due to an incident. The Dispatcher will, in most cases, fill these vacated areas with enough resources for initial attack purposes.

During a large incident all resources necessary for control of the incident will be utilized.

When non-fire personnel are needed for an incident the Dispatcher will contact the Chief Officer or their designate for recruitment of personnel.

Any emergency mechanical failure to a fire management vehicle or radio equipment will be reported immediately to the Communications Center. Dispatchers will notify either the equipment fleet manager or communication technician so priorities for repairs can be established.

Initial I.C. upon arrival at an incident, will establish communications with the communications center and advise dispatchers of the situation. This will enable the dispatcher to continue action whether it be additional resources or reduction of resources.

During a non fire related incident interagency resources will be utilized as needed on a case by case basis for assistance by hire.

During an incident of any size or type, the Dispatchers at the Communications Center will fill requests from the I.C. for all aircraft, manpower, equipment and supplies. The dispatcher will immediately notify the appropriate agency Chief Officer of all incidents occurring in their respective units and keep Chief Officers abreast of current status of events.

During periods of multiple incident occurrence or when resources become scarce, a coordinating staff, composed of representatives for the USFS, BLM, and NPS will function to coordinate the allocations of all agencies resources.

The Communications Center will be advised of the issuance of burning permits, and will notify our cooperators of the date, time, and legal description where burning will take place.

It is important that all incidents be given a descriptive name and or number as soon as possible for each agency.

Fire weather forecast will normally be given daily at 1600 hours. During adverse weather conditions, updated fire weather forecasts may be given as conditions change.

The units or sub-units will advise the Communications Center if aerial recon is needed for ongoing incidents or thunderstorms. The dispatcher will issue flight plans for all aircraft using only USFS, BLM and CDF approved aircraft. The Dispatcher will recruit and fill the qualified air observer position as needed. Lightning recons will be coordinated with available information received from the ALDS lightning detection system.

All aircraft requests for fire will be coordinated and ordered through the Communications Center. (BLM only - funding approval for non incident aircraft needs must first be obtained, following appropriate unit procedures).

The Communications Center will dispatch the necessary aircraft to control the incident in its early stages, as has been determined by the agency initial attack Area Dispatch Plan.

It must be understood that a new incident of any potential has priority over an ongoing incident and either South Zone or the Communications Center has the authority to divert aircraft as needed to control the new incident. If a divert will take place the Dispatchers must notify the I.C. Prior to the divert, so that the I.C. can make contingency plans to accommodate the overall objectives of the incident.

If a request is received for an overhead assignment off administrative Unit, Dispatcher will refer to Red Card qualifications list for qualified personnel. When USFS employees are involved the Dispatcher will contact the employees immediate supervisor. The supervisor will ascertain the employees availability for assignment at which time the employee will the contact the Communications Center for further information regarding the assignment.

If Bureau of Land Management personnel are to be dispatched, approval by the District Manager or Fire Management Officer is required.

The Communications Center will pay close attention to fire training assignments, sending trainees for on-the-job training as designated by the I.C. and conforms with the approved Red Card Qualification system.

When dispatching personnel off Administrative Unit, the Dispatcher will designate a Chief of Party who will be in charge of the group. The Chief of Party will be given the transportation manifest. This form covers names, titles, position to be filled at the incident, and highest fire qualification Red Card rating, also the name of the incident, transport action, route of travel, who to report to and when. If trainees are sent, what the trainees assignment consists of and who they are to be assigned to.

During large or multiple incidents, Communication Center Dispatchers will commit resources down to an acceptable level within the respective agencies zone of influence, then will go direct to local mutual aid agreements for additional resources i.e., CDF San Bernardino, CDF Perris, San Bernardino City Fire, County Communications, and Desert Communications. The closest resource concept will be adhered to at all times. South Zone will interface to fill additional resource orders only after resources from the zone of influence have been reduced down to an acceptable level.

When an incident goes beyond initial attack, the Center Manager or acting will initiate the Communications Center Expanded Dispatch Plan. The Expanded Dispatch Plan will be activated as soon as the Supv Dispatcher determines the incident will extend beyond the capabilities of initial attack.

FEDERAL INTERAGENCY COMMUNICATIONS CENTER
SAN BERNARDINO

ORGANIZATIONAL CHART

1990

BOARD OF DIRECTORS

National Park Service	US Forest Service	Bureau of Land Management
Joshua Tree N.M. Dave Moore	San Bernardino N.F. Gene Zimmerman	Calif. Desert District Gerald Hillier
Death Valley N.M. Ed Rothfuss		

OPERATION GROUP

Joshua Tree Natl Monument	US Forest Service	Bureau of Land Management
Chief Ranger	Forest FMO	Asst. Dist. Mgr. Ops.
Paul Henry	John Hatcher	Dick Crowe
Death Valley Natl Monument		
Chief Ranger		
Chris Ward		

Center Manager

U.S. Forest Service

Tom Sensintaffar (acting)

Communications Center Organizational Chart on Following Page

FICC Extended Large Incident
Management Plan

OBJECTIVE

1. Coordination between the Incident Command Post, Communications Center and South Zone, with regards to ordering manpower, equipment, and supplies during an extended large complex incident.

2. To demobilize all manpower, equipment, and supplies when the incident is controlled.

3. Receive orders from the Incident Command Post, fill out Resource order forms, coordinate orders with South Zone and follow up with confirmation back to the Command Post.

4. Maintain ongoing resource status of amounts, type, and the various agencies involved in the incident.

5. Coordinate the communications flow between , Communications Center, Incident Command Post, and South Zone.

EXTENDED INCIDENT MANAGEMENT PLAN

2 teams of 4 to 5 people who will be trained as a unit and perform the duties involved with Expanded Dispatch in the Interagency Communications Center.

Each team will consist of 1 team leader and 3 to 5 subordinate positions which will facilitate the ordering of manpower, equipment, and supplies during a large incident situation.

Each team will have 2 to 3 people assigned to the procurement section with procurement authority and experience.

The 2 team leaders will work directly under the Communication Center Manager or Acting and will be responsible for maintaining a 24 hour operation, each team working 12 hour shifts.

When this plan is implemented and extended operation is in effect, the integrity of the normal day to day operation of the Communication Center will not be compromised.

Extended Large Incident
Organizational Chart

Communication Center Manager

Operations Director

A Shift

Supv. Dispatcher

Manpower and Overhead Recorder

Equipment Recorder

Crew Recorder

Computer Terminal Operator

Alternate

B Shift

Supv. Dispatcher

Manpower and Overhead Recorder

Equipment Recorder

Crew Recorder

Computer Terminal Operator

Alternate

Procurement Buying Team

Supv. Purchasing Agent

Procurement Recorder

Alternate

Alternate

Supv. Purchasing Agent

Procurement Recorder

Alternate

Alternate

Note: Each team will work a 13 hour maximum shift.

MULTIAGENCY INCIDENT COORDINATION

Definitions and Organization Rules

Coordination Center

The Coordination Center is composed of representatives from federal agencies (U.S. Forest Service, Bureau of land Management, and National Park Service) which control Incident Management Resources for their agency. The Chairman of the Operating Group will be the Agency Representative on which the major workload is occurring. The Coordinating Center will establish priorities for the use of total resources, maintaining coordination and information flow to appropriate agency unit heads and coordinate public information releases. If the situation warrants Regional coordination, the center will expand as the incident dictates.

Duties and Responsibilities

The Coordination Center Group functions in both a management and staff role. In the management role, the group formulates direction for FICC and prepares "action" plans. In the staff role, the Operations Group assists the Communication Center Manager in the conduct of activities which will lead to an orderly integration and implementation of FICC.

Coordinating Center Agency Representatives

Bureau of Land Management

Primary - Dick Franklin, District Fire Management Officer

Alternate - Felicia Probert, District Ranger / Law Enforcement

Alternate - Dick Crowe, Asst. District Mgr. Operations

Forest Service

Primary - Russ Johnson, Deputy Forest Fire Management Officer

Alternate - John Hatcher, Forest Fire Management Officer

National Park Service (Joshua Tree)

Primary - Paul Henry, Chief Ranger, Joshua Tree National Monument

Alternate - Kathy Billings, Management Assistant

Alternate - Tom Patterson, Fire Management Officer

National Park Service (Death Valley)

Primary - Chris Ward, Chief Ranger, Death Valley National Monument

Alternate - Mike Rondas, Staff Ranger, Death Valley National Mounment

Installation and maintenance of radio and computer equipment

The five dispatch consoles will be maintained by the BDF with support from the CDD.

The CDD will be responsible for the maintenance of the California Law Enforcement Telecommunications System (CLETS), and the Automatic Lightning Detection System (ALDS).

Each agency will be responsible for its own remote communications and telephone lines.

The Communications Center Micro Computer system will be maintained by the BDF.

Radio Frequencies and (CLETS) computer will be used only in conformity with with the license, policies and regulations of the agency which controls its use. Refer to attachment (A) for the approved list of operators and users.

JTP CHANNEL	DESIGNATOR	FREQUENCY	STATION CALL SIGN
CHANNEL #1	CAR TO CAR	171.675	KMC 775
CHANNEL #2	BELL MT.	171.675 TONE 146.2	KMC 775
CHANNEL #3	TRAMWAY	171.675 TONE 167.9	KMC 775
CHANNEL #4	PAXTON	171.675 TONE 103.5	KMC 775

DVM CHANNEL	DESIGNATOR	FREQUENCY	STATION CALL SIGN
CHANNEL #2	ROGERS	170.100	KMC 785

****

CITY INTERCOM AGENCIES

1. CDF - BDU
2. COMM CENTER
3. CHP - S.B.
4. DESERT COMM
5. LAKE ARROWHEAD F.D. (COMM CENTER)
6. ONTARIO F.D.
7. REDLANDS F.D.
8. SAN BERNARDINO F.D.

STATE INTERCOM AGENCIES

1. CDF - RO 3
2. CDF - RRU
3. CDF - MVU
4. ORANGE COUNTY
5. USFS - CNF
6. USFS - ANF

BLM FREQUENCIES

TONE	DESIGNATOR	REPEATER LOCATION	FREQUENCY	CALL SIGN
1	MAIN NET	TORO PEAK	166.375	KMC 457
1	MAIN NET	GOVERNMENT PEAK	166.375	KMC 457
2	MAIN NET	OLD WOMANS MTN	166.375	KMC 457
3	MAIN NET	ROGERS PEAK	166.375	KMC 457
3	MAIN NET	BLACK MTN	166.375	KMC 457
4	MAIN NET	CERRO GORDO	166.375	KMC 457
4	MAIN NET	TURQUOISE	166.375	KMC 457
5	MAIN NET	FROST PEAK	166.375	KMC 457
5	MAIN NET	TECATE PEAK	166.375	KMC 457
6	MAIN NET	CHRISTMAS TREE	166.375	KMC 457
7	MAIN NET	BOX SPRINGS	166.375	KMC 457
8	MAIN NET	ONYX PEAK	166.375	KMC 457

* REPEATER ACCESS FREQ. ON MAIN NET IS 166.975 MHZ

7	FIRE NET	BOX SPRINGS	166.4875	KMC 457
-	FIRE NET	LOCAL	166.4875	KMC 457

* REPEATER ACCESS FREQ. ON FIRE NET IS 167.075 MHZ

TONE	DESIGNATOR	REPEATER LOCATION	FREQUENCY	CALL SIGN
	RANGER NET	STRAWBERRY PEAK	172.575	KMC 460
	RANGER NET	TORO PEAK	172.575	KMC 460

TONE	DESIGNATOR	REPEATER LOCATION	FREQUENCY	CALL SIGN
7	BAKERSFIELD	F-4U ALL REPEATERS	167.075	KMC 455
8	BAKERSFIELD	F-3 CAR TO CAR	166.4875	KMC 455
10	BAKERSFIELD	4-C BEAR PEAK	167.075	KMC 455

TONE	DESIGNATOR	REPEATER LOCATION	FREQUENCY	CALL SIGN
11	AIR/GROUND	PRIVATE LINE"OFF" CAR TO CAR	168.550	KMC 457
12	AIR/GROUND	PRIVATE LINE "ON" CAR TO CAR	168.550	KMC 457

FOREST SERVICE

DESIGNATOR	FREQUENCY	TONE	FIRE REPEATER	ADMIN REPEATER	FREQUENCY	CALL SIGN
KELLER	171.475					KME 20
PINE COVE .	171.475					KME 20
LOCAL FIRE	171.475					KME 20
LOCAL ADMIN	172.225					KME 20
		TONE	169.875	169.925	FREQUENCY	
LOCAL NET		1	QUARTZITE	LUNA	110.9	KME 20
LOCAL NET		2	CAJON	CAJON	123.0	KME 20
LOCAL NET		3	STAWBERRY	STRAWBERRY	131.8	KME 20
LOCAL NET		4	KELLER	KELLER	136.5	KME 20
LOCAL NET		5	BUTLER	BUTLER	146.2	KME 20
LOCAL NET		6	ONYX	ONYX	156.7	KME 20
LOCAL NET		7	TORO	TAHQUITZ	167.9	KME 20
LOCAL NET		8	BLACK MT.	BLACK MT.	103.5	KME 20
DISPATCH	166.562					KME 20
AIR NET	168.625					KME 20
SERVICE	164.125					KME 20
R-5 CALLING	169.125					KME 20

FEDERAL INTERAGENCY COMMUNICATION CENTER
FINANCIAL SUMMARY '92

POSITION		UNIT COST	AGENCY
Center Manager	GS-11	45,524	USFS
Operations Mgr.	GS-9	37,622	USFS
Operations Mgr.	GS-9	37,622	BLM
Shift Supervisor	GS-7	31,396	USFS
Shift Supervisor	GS-7	27,016	USFS/NPS
Shift Supervisor	GS-7	28,476	USFS/NPS
Shift Supervisor	GS-7	27,746	BLM
Shift Supervisor	GS-7	27,016	BLM
Asst Dispatcher	GS-5	24,766	USFS
Asst Dispatcher	GS-5	24,766	USFS
Asst Dispatcher	GS-5	22,996	USFS
Asst Dispatcher	GS-5	22,406	BLM
Asst Dispatcher	GS-5	22,406	BLM
Asst Dispatcher	GS-5	25,946	BLM
Asst Dispatcher	GS-5	21,816	BLM
Disp. Clerk	GS-4	17,073	USFS

U.S. Forest Service 204,000.00

Bureau of Land Management 185,000.00

National Park Service 55,000.00

Note: Sunday and night differential costs approximately 5,000.00
Agency cost above is an estimated cost to the Government.

San Bernardino Interagency Communication Center

Operation Financial Summary

Fiscal Year 92

OCTOBER 1,1991 THROUGH SEPTEMBER 30,1992

ITEM	AMOUNTS ALLOCATED BY AGENCY		
	USFS	BLM	NPS
BUILDING SPACE	$17,000.00	.....	.....
SUPPLIES/EQUIPUIPMENT	$1,000.00	.....	.....
TRAINING/ORIENTATION	$3,000.00	3,000.00	3,000.00
CLETS (MAINTANCE & CIRCUIT'S)....	.....	$6,000.00	.....
CAD COMPUTER	$3,000.00	.....	.....
AFFIRMS	$6,000.00	.....	.....
CENTRACOMM UPGADE	.....	$5,000.00	.....
COMPUTER MEMORY EXPANSION	$2,000.00	.....	.....
PROCURMENT	.....	$5,000.00	.....
TOTAL	$32,000.00	$19,000.00	$3,000.00

Combined Agency Cost $54,000.00

Responsibility By Agency:

U.S.Forest Service ..... $ 32,000.00

Bureau of Land Management..... $ 19,000.00

National Park Service:

JTP..... $ 1,500.00
DVP..... $ 1,500.00

FY-92 OPERATING PLAN

BLM REIMBURSABLE TO FS

OPERATING PLAN	*REIMBURSABLE COSTS	15% SURCHARGE	TOTAL
$23,000.00	20,000.00	$3,000.00	$23,000.00

* FS SALARY/OT. - $23,000.00

BLM DIRECT COSTS

CLETS ..... $ 6,000.00

PROCUREMENT ..... $ 5,000.00
(SUPPLIES, HEADPHONES, ADDITIONAL COMPUTER SOFTWARE, PAGERS, MISC. EQUIPMENT)

TRAINING/ORIENTATION ... $ 3,000.00

NPS REIMBURSABLE TO FS

	OPERATING PLAN	REIMBURSABLE COSTS	15% SURCHARGE	TOTAL
DVP	$31,395.00	$27,300.00	$4,095.00	$31,395.00
JTP	$31,395.00	$27,300.00	$4,095.00	$31,395.00

$1,500.00 EACH PARK WILL BE USED FOR TRAVEL AND ORIENTATION, WHICH IS INCLUDED IN THE AGENCY TOTAL ABOVE.

REIMBURSABLE COLLECTIONS SHALL INCLUDE SALARIES, MATERIALS, SUPPLIES, TRAVEL, TRAINING, AND OTHER IDENTIFIABLE DIRECT AND INDIRECT COSTS.

ANY ADDITIONAL HARDWRE NEEDS WILL BE PRESENTED TO THE OPERATIONS GROUP FOR APPROVAL AND COST SHARING.

Appendix L

FIVE YEAR BURNING PROGRAM
JOSHUA TREE NATIONAL MONUMENT, 1992-1997

FIVE YEAR BURNING PROGRAM, 1992 - 1997

YEAR	SIZE	PROJECT #	NAME	LOCATION
1992	100 ACRES	9301	NOLINA III	NOLINA COVE
1993	100 ACRES	9302	BOUNDARY BUFFER	NW BOUNDARY

U.C. Santa Barbara is currently conducting a vegetation mapping project in the Monument. Upon completion of the project our 5 year burning plan will be revised.

Appendix M

INTERAGENCY PRESCRIBED FIRE AGREEMENT FOR CALIFORNIA, 1983

INTERAGENCY AGREEMENT
FOR
COOPERATIVE USE
OF
PRESCRIBED FIRE
IN
CALIFORNIA

I. Purpose

THIS AGREEMENT is made by and among the agencies signatory for the purpose of establishing guidelines under which two or more agencies may cooperate in projects where such cooperation best serves the public interest and where prescribed burning is mutually beneficial. Each agency agrees to cooperate with each other agency signatory to this agreement under the provisions provided herein.

II. Authority

A. THE FOREST SERVICE, U.S.D.A., is authorized to enter into this agreement under provisions of the Act of April 24, 1950 (16 U.S.C. 572) and of the Economy Act (31 U.S.C. 686).

B. THE CALIFORNIA DEPARTMENT OF FORESTRY is authorized to enter into this agreement under provisions of Section 4141 of the Public Resources Code.

C. THE BUREAU OF LAND MANAGEMENT, U.S.D.I., is authorized to enter into this agreement under provisions of the Act of October 21, 1976 (43 U.S.C. 1737).

D. THE CALIFORNIA DEPARTMENT OF FISH AND GAME is authorized to enter into this agreement under provisions of _____.
_____

E. THE NATIONAL PARK SERVICE, U.S.D.I., is authorized to enter into this agreement under provisions of 16 U.S.C. 1 and 31 U.S.C. 686.

F. THE CALIFORNIA DEPARTMENT OF PARKS AND RECREATION is authorized to enter into this agreement under provisions of
_____.
_____

G. THE BUREAU OF INDIAN AFFAIRS, U.S.D.I., is authorized to enter into this agreement under provisions of _____.
_____

H. THE CALIFORNIA STATE LAND COMMISSION is authorized to enter into this agreement under provisions of _____.
_____

I. _____

_____

_____.

J. _____

_____

_____.

K. _____

_____

_____.

III. Recitals

WHEREAS: Each agency signatory to this agreement has a management program involving the use of prescribed fire, and

WHEREAS: Agencies managing lands adjacent to lands managed by other agencies often find it beneficial to use prescribed fire which benefits both the agencies and the public, and

WHEREAS: Ridgetops, roads, canyon bottoms and other topographical features often make more logical project boundaries than property lines, and

WHEREAS: Agencies may accrue benefits through cooperation in excess of what they could accomplish if only one agency is involved, and

WHEREAS: Projects can often be accomplished with the most efficient use of public funds if done cooperatively, and

WHEREAS: Qualification standards, planning requirements and training needs can best be determined on an interagency basis, and

WHEREAS: A mechanism for determining costs, benefits, responsibilities and payments is required by all signatory agencies, and

WHEREAS: Each agency signatory needs to retain jurisdictional autonomy while cooperating with others.

THE AGENCIES HEREBY AGREE THAT:

1. Each project undertaken under the terms of this agreement will require an individual Project Agreement which contains the Prescribed Burn Plan. (Format attached hereto as Appendix A.) The Project Agreement, signed by authorized representatives of each agency cooperating on the project, shall briefly summarize the nature of and the reasons for the cooperative project, and shall display the project costs (including administrative costs), project benefits and suppression cost responsibility should an escape be declared a wildfire, and the amounts of each to be assumed by the cooperators.

consistent with the terms and conditions of existing fire protection agreements, except for suppression cost responsibility, which shall be determined as follows:

a. Any agency may, upon its own initiative, attack escaped prescribed fires which have been declared wildfires, regardless of protection responsibility when wildfire threatens lands or improvements under its ownership, control or administration.

b. Wildfire resulting from prescribed fire escapes which were ignited by, or at the direction of, or under the supervision of one of the parties to this agreement, shall be the responsibility of that party, and all suppression costs shall be borne by that party.

c. Wildfire resulting from prescribed fire escapes which were ignited by, or at the direction of, or under the supervision of two or more parties to this agreement shall be the responsibility of those parties, and all suppression costs will be borne by those parties in accordance with an agreed-upon acceptance or apportionment of those costs in the Project Agreement, except as otherwise provided in Section III, §7 of this agreement.

d. The responsible party or parties shall reimburse other parties for suppression costs incurred through direct billing, as provided in the particular Project Agreement. All services rendered to one party by another shall be considered to be assistance by hire, regardless of the location of the escape or the location of the final control perimeter.

e. Entities which incur costs, losses or damages and are not party to this agreement or whose requests for cost recovery or reimbursement fall outside the scope of this agreement may file claims through established claims procedures with the agency identified in Section 4b.

5. Methods for apportionment of suppression costs may be based upon percent of cost shared, percent of benefits received, percent of project acres, lead agency vs. supporting agency, or amount of potential damage should a wildfire result. Whichever formula is selected, it should be displayed in the Project Agreement in addition to the amounts apportioned.

6. Where it is determined that the cause of an escape and subsequent wildfire resulting from a cooperative prescribed burn project should be reviewed, cooperating agencies agree to conduct the review jointly. The review team shall consist of representatives from the "lead agency," which will determine the team make-up, and at least one representative from each cooperating agency. (The "lead agency" will normally be the agency which initiated the project, prepared the Burn Plan or provided the supervisory burn personnel.) The selection of the "lead agency" will be documented in the Project Agreement.

a. Agency representatives may withdraw from a joint review at any time.

b. Agencies are not obligated to accept the conclusions of a joint review.

c. Individual agencies may conduct independent reviews, with full support and data access provided by cooperating agencies.

7. The parties hereby waive all claims against each other for compensation for any loss, damage, personal injury, or death resulting from the performance of this agreement, and any Project Agreement entered into pursuant hereto unless the result of (1) a tortious act of the other party or its employee(s), or (2) the failure of the other party or its employee(s) to comply with the Prescribed Burn Plan.

8. Insofar as possible, agencies will jointly develop standards and qualifications, and will provide training on an interagency basis where cost-efficient to do so or where such training will further cooperation among the parties.

IV. Standard Provisions

A. This agreement will be binding on any party from the date of its signature hereto until the agreement is dissolved by mutual agreement of all the parties, or until any party provides a written notice of termination to the other parties, thereby removing itself from the agreement.

B. This agreement may be changed at any time by mutual written agreement of all the parties.

C. No member of, or Delegate to, Congress or resident Commissioner shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom, unless it is made with a corporation for its general benefit.

D. Nothing herein contained shall be construed to obligate any of the parties beyond the extent of available funds allocated or programmed for this work, or contrary to applicable laws, rules, regulations or policy.

IN WITNESS WHEREOF, the parties have executed this agreement in multiple counterparts by their duly authorized officials on the respective dates written below.

AUG 16 1983

(Date)

U.S.D.A., FOREST SERVICE
By: [signature]
Title for Regional Forester

8/18/83
(Date)

CALIFORNIA DEPARTMENT OF FORESTRY
By: [signature]
Title Director

9/20/83
(Date)

U.S.D.I., BUREAU OF LAND MANAGAEMENT
By: [signature]
Title State Director

(Date)

CALIFORNIA DEPARTMENT OF FISH AND GAME
By:
Title

9/26/83
(Date)

U.S.D.I., NATIONAL PARK SERVICE
By: Lawrence H. Chapman
Title Regional Director, Western Region

(Date)

CALIFORNIA DEPARTMENT OF PARKS & RECREATION
By:
Title

(Date)

U.S.D.I., BUREAU OF INDIAN AFFAIRS
By:
Title

(Date)

CALIFORNIA STATE LANDS COMMISSION
By:
Title

(Date)

By:
Title

(Date)

By:
Title

(Date)

By:
Title

(Date)

By:
Title

Appendix N

FIRE MONITORING TYPES
JOSHUA TREE NATIONAL MONUMENT 1992

Monitoring Type Code *	G
Date Described:	04/29/92
Preparer:	Thomas M. Gavin
Monitoring Type Name:	Mojave mixed steppe
Burn Prescription:	To be developed
Prescription Goals:	Required type within PNF FMU #2

Biological Description:
Mojave mixed steppe (Fire Group 1; see FMP). Joshua trees (Yucca brevifolia) provide the overstory at a sparse 15% crown closure. Dominate understory grasses are galleta grass (Hilaria Rigida) and needle grass (Shipa Speciosa) occurring in densities of 300-600 lbs/acre.

Rejection Criteria:
Exclude riparian corridors large rock outcroppings and area within 20 meters (166 ft.) of paved or dirt roads.

* Assign unique 9 character code as described below:

- Fuel/Vegetation Type
  F=forest, B=brush, G=grass

- Dominant Species Alpha Code (see Supplement 4C)

- Burn Period Phenology (phenological stage of key plants affected by and/or carrying the fire):

  G=green-up (period of active plant growth)
  T=transition (plants setting and dispersing seed)
  D=dormant (plants cured, dormant; deciduous trees lost leaves)

- Fuel Model (#1-13 or custom model 10)

Example: FSEGI1T08 (forest, giant sequoia, transition, model 8)

Monitoring Type Code *

Date Described: 04/29/92

Preparer: Thomas M. Gavin

Monitoring Type Name: Mojavean Pinyon Juniper Woodland

Burn Prescription: See Appendix of this text (FMP)

Prescription Objective:
Hazard Fuel Reduction - type conversion to grassland.

Biological Description:
Mixtures of the primary dominant Pinyon Pine (Pinus monophylla), Scrub Oak (Quercus turbinella) and California Juniper form moderately dense stands up to 60% crown closure; mixed annual grass comprise densities of 2-600 lbs/acre in understory.

Rejection Criteria:
Exclude riparian corridors large rock outcroppings and areas within 200 meters of physical obstructions such as roads.

* Assign unique 9 character code as described below:

- Fuel/Vegetation Type
  F=forest, B=brush, G=grass

- Dominant Species Alpha Code (see Supplement 4C)

- Burn Period Phenology (phenological stage of key plants affected by and/or carrying the fire):

  G=green-up (period of active plant growth)
  T=transition (plants setting and dispersing seed)
  D=dormant (plants cured, dormant; deciduous trees lost leaves)

- Fuel Model (#1-13 or custom model 10)

Example: FSEGI1T08 (forest, giant sequoia, transition, model 8)

Monitoring Type Code *

Date Described: 4/29/92

Preparer: Thomas M. Gavin

Monitoring Type Name: Blackbrush Scrub

Burn Prescription: To be developed.

Prescription Goal:
Hazard Fuel Reduction; type convert brush fields to grass.

Biological Description:
Blackbrush Scrub (Fire Group 2; See FMP). The Joshua Tree (Yucca brevifolia) or California Juniper (Juniperus californica) may form the sparse overstory. The understory is dominated by almost pure, homogeneous stands of Blackbrush (Coleogyne ramosissima) especially on areas excluded from past fire activity.

Rejection Criteria:
Exclude riparian corridors large rock outcroppings and areas within 20 meters of physical barriers such as roads.

* Assign unique 9 character code as described below:

- Fuel/Vegetation Type
  F=forest, B=brush, G=grass
- Dominant Species Alpha Code (see Supplement 4C)
- Burn Period Phenology (phenological stage of key plants affected by and/or carrying the fire):

  G=grass-up (period of active plant growth)
  T=transition (plants setting and dispersing seed)
  D=dormant (plants cured, dormant; deciduous trees lost leaves)
- Fuel Model (#1-13 or custom model 10)

Example: FSEGI1T08 (forest, giant sequoia, transition, model 8)

Appendix O

FIRE EFFECTS IN JOSHUA TREE NATIONAL MONUMENT STUDY PLAN, 1992

Study Plan

FIRE EFFECTS
IN
JOSHUA TREE NATIONAL MONUMENT

Principal Investigators:

David R. Faires, Forester
Andrea L. Koonce, Project Leader
Prescribed Fire Research, PSW 4403
Pacific Southwest Research Station
4955 Canyon Crest Drive
Riverside, CA 92507
714-276-6145, FTS 799-6145; DG S27L05A

Cooperators:

Robert L. Moon, Natural Resource Manager
Jerry Frielich, Ecologist
Joshua Tree National Monument
74485 National Monument Drive
Twentynine Palms, Ca 92277
619-367-4528

Title: Fire Effects in Joshua Tree National Monument

Objectives and Scope:

The objectives of this study are to (1) examine seasonal prescribed fire effects on Joshua Tree (Yucca brevifoilia), and (2) To examine effects of wildlife browsing after prescribed fire. This study is designed to better understand the seasonal effects of prescribed fire and to determine the effects, if any, of wildlife brows on the reestablishment of some common plant species in the Joshua tree community.

Justification:

The Joshua Tree National Monument is desert ecosystem in the southern California Mojave desert. Increasing numbers of people have moved into this desert area increasing their demands for scenic, recreation and housing needs. The Monuments plant communities are protected from development but are impacted by population associated with the nearby housing developments. With the increasing population the threat of wildland fire on the natural resources and personal property has increased. This is especially true in urban wildland interface areas where residential housing has grown up to Joshua Tree National Monument boundaries. The potential for devastating fires is high and the need to protect both personal property from natural fires and man caused fires from the natural resources is great.

The use of prescribed fire for vegetative type conversion and fuel reduction is a one way to reduce the fire danger potential by initiating large clearings of low growing vegetation and grass. Conversion from contiguous blackbrush (Coleogyne ramosissima) an associated species to Joshua tree, to fuel breaks of grass/Joshua tree will reduce the efforts of fire suppression crews in the event of wildfire. Blackbrush is a long-lived fast burning shrub that grows 1-6 feet tall (USDA-FS, 1937). Its growth is slow and it can survive 46-64 years (Webb, Steiger, and Turner, 1987). Blackbrush is very susceptible to fire and does not resprout after a disturbance. Callison and Brotherson (1985) found that blackbrush did not recover on burned sites for up to 37 years after a fire. The seeds are large, immobile, and a slow to germination (Webb, et.al., 1987), this reduces the rate of site reestablishment after fire (Wright and Beatley, 1982). The use of prescribed fire for the eradication of blackbrush from the fuel break areas may be useful, if the effects of the burning is better understood.

It is not clear what the long term effects of prescribed fires is on the structure and the health of Joshua tree. It has been found that Joshua tree has developed adaptations to survive wildland fires (Vogl, 1967). These trees may become more fire resistant with increased age. The thick mat of dried leaves that remains for years around the trunk of the tree fall off leaving a thick fire resistant bark that provides a barrier to heat from fire. As the tree matures the terminal bud is increasingly protected by a sheath of green leaves. The height of upwards of 30 feet in a mature tree helps reduce the chances of crown fires by towering over associated fuel types. Fire can kill the above

ground portion of the tree but after fire, the Joshua tree is capable producing root and stump sprouts(Conrad, 1987). These sprouts provide browse for woodrat, rabbits, and other small mammals (Maxwell, 1971; McKelvey, 1938). This browsing may have the greatest effect on the postfire recovery rate of the tree. The population of rodents may increase after a large wildfire or prescribed burn do to increased food supply causing mortality to the trees. Individual trees that have not been over browsed become more dense and shrublike after fire (Conrad, 1987). Vogl (1967) found Joshua trees in previously burned stand with clumps of sprouts over 10m in diameter when rodent brows is not excessive. Webster (1953) found that the seed of Joshua tree can remain viable in the soil for years. Rodents have been found to cache the seeds (Keith, 1985) and the germination of these seeds after fire is possible. Reestablishment through on or off site seed source is possible after a fire.

If fire is to be used as a management tool for fuel reduction and vegetation type conversion then the knowledge of seasonal variation effects on plant regeneration should be understood to better meet management objectives. Once seasonal prescribed fire effects are better understood, natural resource managers can use this information to assist them in fire management plans. This should help reduce the need for costly repeat burning and maximize the protection from unwanted wildfires to both the desert resources and human development. This study will assess fire effects on ecosystem structure and composition by examining short term and long term vegetation affects of various seasonal prescribed fire treatments.

Location:

This study will be conducted in the Joshua Tree National Monument CA.

Methods:

Plot establishment: The study plots will be located in the Covington Flats area near Yucca Valley CA. Plots will include various plant species including joshua tree, Juniper (*Juniperus californica*), blackbrush, and a variety of grasses.

One plot for each seasonal application will be located for a total of five plots. Seasons studied will be Spring, Summer, Fall, Winter, and Control. The plots will be one half acre in size. Each plot will have adequate fire control line constructed around it as indicated by the local fire management officer. Prescribed fires will be conducted in one year.

Plot locations will be selected within the study area to best represent typical vegetation composition of the study area including some Joshua trees in each plot. The treatment plots will be randomly selected Individual Joshua trees will be fences with fencing enclosures and paired with an unburned Joshua tree within a treatment plot to determine effects of wildlife brows after burning.

Measurements:

Prefire data will be collected before each burn using fixed plot vegetation sampling within each plot using line intersect method. Line intersects will be placed 20 m apart through the each half acre plot. Information on every Joshua tree will be collected including height, diameter and location within plot. Each tree will be located on a map and numbered with a tag at the base of each tree.

Fire behavior information will be collected at the time of burn including: Season of burn, time of day, wind speed, air temperature, relative humidity, slope, and aspect of plot, fuel moisture, soil moisture, burning time, rate of spread, flame length, residence time, flame angle, and per cent fuel consumption.

Post prescribe fire data will be collected within each site one year after burn, three years after burn, and five years after burn. Vegetation sampling will be made at original sites within each plot, using line intersect for species composition and per cent coverage, sprouting height, seedling species establishment and height.

Post prescribed fire effects data on Joshua trees will be collected by (1) present or absents of tree. (2) General health of surviving trees will be classified by:

1) poor - Tree dead or dieing from fire damage.
2) moderate - Tree damaged by fire .
3) Good - Tree has some fire damage.
4) Very Good - No apparent effects from fire.

Application of Research:

The information collected in this study will be used to improve the understanding of the short and long term seasonal prescribed fire effects on Joshua trees and associated vegetation. Fire managers throughout the Mojave desert should benefit from this information.

Publication of Research Results:

Results will be published in a applicable journal such as Journal of Range Management, International Journal of Wildland Fire, or Journal of Arid Land Research.

Safety and Health:

The safety and health hazards relating to the field work are on file at RFL. Pre-work safety meeting will be conducted in the form of tailgate meetings for all field personnel. Rattle snakes, sharp Joshua tree leaves and extreme heat are of particular concern.

Environmental Considerations:

The main environmental concern will be for the research burns that will be conducted under Joshua tree National Monument prescribed fire plans. Final permission for burning will be from the Monument Superintendent or his appointee.

Time Table:

All plots will be located and installed in the first year 1992. Fire lines will be constructed prior to each scheduled burn. All preburn data will be collected at one time before any burning takes place. Approximate dates of season will be spring-March, summer-June, fall-September, winter-December. First year post burn data will be collected on all plots in fall 1993. Third year post burn data will be collected Fall 1995. Fifth year post burn data will be collected fall 1997.

Personnel Assignments:

David Faires and Andi Koonce RWU-PSW-4403 will be responsible for the overall performance administration of the study. Bob Moon, Jerry Freilick, Mark Holden, and Tom Patterson from Joshua tree National Monument will provide technical assistant, fire protection and general advice.

Literature Cited:

Callison and Brotherson, 1985. The effects of fire on the blackbrush (Coleogyne ramosissima) community of southwestern Utah. J. Range Mang. 38 (6) p. 535-538.

Conrad 1987.

Keith 1985

Maxwell, C.G. 1971. The tree that is not a tree. American Forests 77 (3) 4-5.

McKelvey, S.D. 1938. Yuccas of the southwestern U.S. The Arnold Arboretum of Harvard University. 147p.

USDA-Forest Service 1937

Vogl 1967

Webb, Steiger, and Turner 1987. Dynamics of Mojave Desert shrub assemblages in the Panamint Mountains of California. Ecology 68 (3) p. 478-490.

Webber 1953

Wright and Bailey 1982

Budget:

	First year	Following Years
Salaries:		
Technical field assistance	$2,000	$1,000
Professional field assistance	$2,000	$1,000
Travel and Per Diem:		
2 weeks spring	$800	$400
1 week summer	$400	
1 week fall	$400	$400
1 week winter	$400	
2 cooperator meeting	$100	$100
Field supplies:		
Fencing material	$1,500	
Field supplies general	$500	$100
TOTAL	$8,100	$3,000

Appendix P

NOTIFICATION OF PRESCRIBED BURNING INFORMATION, FICC FORM, 1992

NOTIFICATION OF
PRESCRIBED BURNING INFORMATION
SAN BERNARDINO NATIONAL FOREST

Date:_____

DISPATCH INFORMATION

District_____

Incident Commander_____

Project Name_____

Legal - Section_____ T_____ R_____

Complexity Class_____

Broadcast Burn_____ Piles_____

Acres_____

Resources Committed_____

_____

Time Stopped_____

Manned_____ Unmanned_____

NOTIFICATION

Cooperating Agencies_____

Public_____

Districts/Forests_____

SMOKE MGT. INFORMATION

Acres Burned_____

Vegetation Type_____

Tons Consumed_____

REMARKS

_____

_____

_____

NOTIFICATION OF PRESCRIBED BURN INFORMATION

Appendix Q

MEMORANDUM OF UNDERSTANDING BETWEEN JOSHUA TREE NATIONAL MONUMENT AND AIR QUALITY DISTRICTS

United States Department of the Interior

NATIONAL PARK SERVICE
Western Region
600 Harrison Street, Suite 600
San Francisco, California 94107-1372

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

Y18(WR-RN)

September 21, 1992

Memorandum

To: Regional Director, Western Regional Office

From: Regional Forest/Range Conservationist

Subject: Smoke Management Memorandum of Understanding (MOU) for JOTR Fire Management Plan

On 617/92, I met with members of the JOTR staff and representatives of both San Bernadino and South Coast Air Quality Districts at the monument to discuss the proposed implementation of the draft Joshua Tree National Monument Fire Management Plan (FMP). Our concerns related to the implementation of this plan involved the proper coordination and review of prescribed burning plans and fire situation analysis (FSA) by both air quality districts. We also discussed a possible exemption of our prescribed natural fires (PNF's) at JOTR from "burn-no burn day" restrictions. This meeting was very productive and beneficial to every one involved and the participants identified several issues which we thought should be formally addressed in a Memorandum of Understanding (MOU) between the National Park Service and both air quality districts.

Enclosed find a copy of the draft MOU specifically requested by the district representatives. On 7/8/92, this draft was sent to both districts for review. On 7/28/92, I discussed the pending review and revision of the draft with Mr. Alex Guilin, Air Pollution Control Officer for San Bernadino Air Quality District, who has agreed to coordinate the legal review and comment by both districts. Mr. Guilin has informed me that due to an anticipated lengthy delay associated with the review by his agency, that we should proceed with the immediate implementation of our plan this year. Mr. Guilin has stated that our PNF's at JOTR will not be subjected to "burn-no burn" day restrictions in relation to their occurrence dates however, these PNF's must comply with all state agricultural burning regulations once they are declared and managed by NPS. Furthermore, the SBAQD is willing to provide a timely review of our FSA's but the logistics of placing a representative on the FSA Team (FSAT) will be worked out following their final review of the MOU. Prescribed burn plans to be implemented this year should be submitted to the appropriate district as soon as they are completed.

In conclusion, the JOTR can be approved and implemented despite the pending approval of the draft MOU. According to Mr. Guilin, the delay associated with the legal review of the MOU by SBAQD is related to a general backlog of pending legal matters and not specifically due to the context of the draft MOU. Mr. Guilin has suggested only minor revision to the draft and once his review is completed, he will forward his comment to South Coast AQD for final review and concurrence. The MOU should take effect next fiscal year. In the interim, I am requesting a concurrent legal review by the Regional Solicitor. In addition, a copy of this memorandum will be included in the final JOTR FMP currently being sent forth for your approval.

Tom Gaier

cc: Bruce Kilgore, WRO
Mietec Kolipinski, WRO
Chris Cameron, WRO
Tom Nichols, WRO
Dave Moore, JOTR
Kathy Billings, JOTR
Tom Patterson, JOTR
Doug Erskin, BIFC
Alex Guilin, SBAQD
SCAQD

DRAFT

MEMORANDUM OF UNDERSTANDING
BETWEEN
NATIONAL PARK SERVICE
JOSHUA TREE NATIONAL MONUMENT
AND
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
AND
SAN BERNARDINO AIR POLLUTION CONTROL DISTRICT

This agreement sets forth the criteria and conditions under which Joshua Tree National Monument (JTNM), National Park Service (NPS), and both the South Coast Air Quality Management District (SCAQMD), and San Bernardino Air Pollution Control District (SBAPCD) will cooperate in regards to the implementation of the Monument's fire management program.

Article I

WHEREAS, NPS, SCAQMD and SBAPCD recognize that natural fire starts from lightning strikes comprise a significant agent of ecological change in plant communities such as blackbrush, Joshua Tree, galleta grass and pinyon-juniper woodlands in JTNM, and . . .

WHEREAS, NPS, SCAQMD and SBAPCD recognize that the effects of such fires are beneficial and desirable, in as much as they are natural, and . . .

WHEREAS, NPS, SCAQMD and SBAPCD recognize that such fires, hereafter referred to as prescribed natural fires (PNF), may burn for several days until extinguished naturally or by man, and that the majority of such fires will occur in isolated portions of JTNM, significantly removed from communities that could be affected by smoke transport, and . . .

WHEREAS, NPS, SCAQMD and SBAPCD recognize that much of the fuels consumed by PNF at JTNM are grasses and fine brush materials that burn quickly and completely and omit very little smoke that remains present for only periods of short duration, and . . .

WHEREAS, JTNM has developed a comprehensive fire management plan to efficiently manage all prescribed and prescribed natural fires within predetermined fire behavior and smoke management conditions, and . . .

WHEREAS, JTNM exists as a Class I airshed and recognizes the need to comply with federal, state and local regulations regarding air quality concerns caused by smoke generated from management fires, and . . .

WHEREAS, JTNM is directed by NPS policy to develop cooperative agreements with state air quality regulatory agencies in support of its fire management program.

Article II

NOW, therefore, it is mutually agreed that:

1. JTNM will formally designate an official from either or both affected air quality districts, SCAQMD and SBAPCD, to serve as a member of the Monument's Fire Situation Analysis Team (FSAT). The purpose of this team will be to properly advise the JTNM Superintendent on the day to day management of all proposed and previously designated PNF via the preparation of the NPS Fire Situation Analysis Report, including recommendations to TERMINATE/or to CONTINUE the management of all PNF. The routine operating procedures for FSAT will be agreed upon annually in a pre-season FSAT meeting convened by the Monument FMO and formally documented and concurred in memorandum form between all agencies contributing to the FSAT function. FSAT will normally be expected to be fully functional within two hours of any lightning strikes in the Monument.

2. Since PNF can administratively qualify as "naturally occurring events" specifically exempted from state air quality regulation as determined by each air quality control district, both SCAQMD and SBAQCD will exempt the JTNM PNF from "burn - no burn day" designations under the following conditions:

a. A PNF is burning within the predetermined prescription parameters as set forth in the JTNM Fire Management Plan, reviewed by both districts.

b. That visibilities are not significantly reduced in affected communities and are stringently monitored in accordance with the Western Region Fire Monitoring Handbook (1992), Section 2.11 on Smoke Management, which has been reviewed by both affected air districts (AD's).

c. That anticipated smoke impacts and visibilities are adequately analyzed and documented by FSAT in the NPS Fire Situation Analysis Report, prior to the declaration of a lightning strike as a PNF and are described according to projected growth of the fire, fire duration, estimated smoke production in tons/acre of emissions and the estimated transport of smoke plume (dispersal and trajectory modeling).

d. That no more than five legitimate and properly documented safety or human health related public complaints have been received by either affected AD due to the effects of smoke from the fire (excluding complaints based primarily on visual concerns or aesthetics).

3. Once any of the above criteria (a-d) are violated, NPS will redesignate the PNF a wildfire and will select and immediately implement an appropriate suppression response (ASR), which takes into consideration the most cost effective strategies of suppression while protecting natural/cultural resources found in JTNM.

4. JTNM will annually submit to both affected AD's all prescribed burn plans for proposed prescribed burns (human ignited) at least 3 months in advance of proposed ignition dates. These plans will provide the basis for burning permits to be issued by either AD to the Monument; each plan will contain plume modeling data (trajectory), the identification of smoke sensitive targets and a calculation of smoke emissions in tons/acre of emissions emitted.

5. That a representative from both affected AD's will be invited to all post burn fire management critiques of any PNF occurring within the Monument, to be conducted within 30 working days of declaring the PNF as out.

Article III

This agreement is effective upon the signature of the Superintendent, JTNM and the appropriate Air Pollution Control Officers from both SCAQMD and SBAPCD, and shall be in affect from that time for a period of five years. At the end of the five year period, the agreement will be reviewed by both parties and revalidated by a reaffirmation memorandum.

This agreement may be renegotiated and/or amended at the option of either party during its duration, subject to the concurrence of both parties.

Article IV

Key officials:

A. David E. Moore, Superintendent, Joshua Tree National Monument, NPS

B. Gail Georg, Air Pollution Control Officer, South Coast Air Quality Management District

C. Alex Guilin, Air Pollution Control Officer, San Bernardino Air Pollution Control District

Article V

Approved by:

David E. Moore Superintendent, Joshua Tree National Monument	Date
Alex Guilin APCO, San Bernardino County	Date
Gail Georg APCO, South Coast Counties	Date

Appendix R

ESCAPED FIRE SITUATION ANALYSIS

III. EVALUATION CRITERIA

For each category develop the Agency Administrator decisions on specific objectives, expressed as measurable criteria, to be used in the selection of the preferred alternatives

CRITERIA (Check those criteria which MUST be met)	MUST
ECONOMIC:	
ENVIRONMENTAL:	
SOCIAL:	
OTHER:	
APPROVED BY: (Agency Administrator)	Date & Time

USDI NATIONAL PARK SERVICE

ESCAPED FIRE SITUATION ANALYSIS

REGION		PARK
DATE	TIME	EFSA NUMBER OF

I. FIRE SITUATION

FIRE NAME	CURRENT SIZE
FUEL	FIRE BEHAVIOR

NARRATIVE (attach description of the existing fire situation)

ALTERNATIVE APPROVED FOR IMPLEMENTATION

SIGNATURE	TITLE	DATE	TIME

II. FOLLOW UP

The selected alternative shall be reviewed prior to each operational period to determine if still valid. If not, new EFSA will be developed.

OPERATIONAL PERIOD REVIEW

BY	DATE	TIME
BY	DATE	TIME
BY	DATE	TIME
BY	DATE	TIME
BY	DATE	TIME

V. EFFECTS

	A	B	C	D
SIZE (Predicted final size in acres)	300	1000	5000	10,000
MARKET ELEMENTS				
Timber	N/A	N/A	N/A	N/A
Improvements	-	-	- - -	- - -
Recreation	N/C	N/C	N/C	-
Wilderness	N/C	N/C	- -	- -
Wildlife	+	+	+ + +	+ + + +
Fish	N/A	N/A	N/A	N/A
Water	N/C	N/C	N/C	N/C
Forage	+	+	+ +	+ + +
SUM OF NET VALUE CHANGE	+ 2	+ 1	+ 2	+ 1
NON-MARKET ELEMENTS				
Air	-	-	-	- -
Visual	N/C	N/C	-	- -
Fuels	N/C	+	+ +	+ + +
Threatened & Endangered Species	N/C	-	-	-
SUM OF NET VALUE CHANGE	-1	-1	-1	-2
SOCIAL ELEMENTS				
Firefighter Safety	-	- -	- -	- -
Employment	N/C	N/C	N/C	+
Public Concern	+	+	-	- - -
Public Safety	-	-	-	- -
Cultural	N/C	N/C	-	- -
Other	+	+	+ +	+ +
SUM OF NET VALUE CHANGE	0	-1	-3	-6
SUPPRESSION COSTS	$500/acre	$500/acre	$400/acre	$300/acre
COST PLUS NET VALUE CHANGE	N/A	N/A	N/A	N/A

IV. ALTERNATIVES

	A	B	C	D
GENERAL PLAN OF CONTROL (STRATEGIC)	Full Fire Control 10 a.m. Control of all fires (1st burning period)	Confine or contain within first topographical break within 2nd burning period.	Confine or contain within major topographical break within 3rd burning period.	Confine or contain to land within Joshua Tree National Monument
SPECIFIC PLAN OF CONTROL (TACTICAL)	Direct Attack of Perimeter	Direct/Indirect Attack of Perimeter	Indirect Attack of Perimeter	Indirect Attack of Perimeter
PROBABILITY OF SUCCESS	97%	90%	75%	50%
ESTIMATED CONTROL TIME	< 12 hours	24 hours	48 hours	> 48 hours

Confine suppression modes at Joshua Tree National Monument are less likely to be used on a regular basis since the park has an approved prescribed natural fire policy. Confine mode may be used in multiple fire situations or when regional or local resources are exhausted. Usually suppression actions will warrant some employment of a control/contain strategy.