

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE



**BIGHORN CANYON NATIONAL RECREATION
AREA**

Wildland Fire Management Plan

Prepared By: Mark W. Farwell 12/22/04
Prescribed Fire and Fuels Specialist, GTNP Date

Submitted By: Janice Schenker 12/22/04
Chief Ranger Date

Reviewed By: J. Astor 12-22-04
Chief of Resource Management Date

Concurred By: Scott Dineen 12/22/04
Fire Management Officer, Grand Teton NP Date

Concurred By: _____
Assistant Superintendent Date

Approved By: Daniel J. Cook 12/29/04
Superintendent Date

TABLE OF CONTENTS

1	INTRODUCTION	3
1.1	Fire Management Plan Requirement	3
1.2	Collaborative Planning Process	3
1.3	Federal Policy Implementation.....	3
1.4	NEPA/NHPA Planning Requirements	3
1.5	Fire Management Plan Authorities.....	3
2	RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY	5
2.1	NPS Management Policies	5
2.2	Enabling Legislation and Purpose of NPS Unit	5
2.3	General Management Plan	5
2.4	Resource Management Plan	5
2.5	Support to the General and Resource Management Plans	5
3	FIRE MANAGEMENT STRATEGIES	7
3.1	General Management Considerations.....	7
3.2	Fire Management Goals	7
3.3	Fire Management Options	8
3.4	Wildland Fire Management Strategies by Fire Management Unit	9
3.4.1	Fire Management Unit Descriptions	10
3.4.2	Fire Management Unit Characteristics.....	14
3.4.3	Fire Management Objectives	18
3.4.4	Historic Role of Fire	19
3.4.5	Wildland Fire Situation.....	20
4	FIRE MANAGEMENT OPERATIONAL GUIDANCE	22
4.1	Management of Unplanned Ignitions	22
4.1.1	Preparedness	22
4.1.2	Incident Management.....	30
4.2	Emergency Rehabilitation and Restoration	33
4.3	Prescribed Fire.....	34
4.3.1	Planning and Documentation	34
4.3.2	Exceeding Existing Prescribed Fire Burn Plan	37
4.4	Non-Fire Fuel Treatment Applications.....	37
4.4.1	Mechanical Treatment and Other Applications	37
5	ORGANIZATIONAL AND BUDGETARY PARAMETERS	39
5.1	Organizational Structure.....	39
5.2	FIREPRO Funding	42
5.3	Fire Management Committee	42
5.4	Interagency Coordination	43
5.5	Intra and Interagency Contacts.....	43
5.6	Fire Related Agreements	43
6	MONITORING AND EVALUATION	44
7	FIRE RESEARCH.....	45
8	FIREFIGHTER AND PUBLIC SAFETY	46
8.1	Firefighter Safety.....	46
8.1.1	Aviation Program.....	46
8.2	Public and Employee Safety.....	46
9	PUBLIC INFORMATION AND EDUCATION.....	48
10	PROTECTION OF SENSITIVE RESOURCES	49
11	FIRE CRITIQUES AND ANNUAL PLAN REVIEW	51
12	CONSULTATION AND COORDINATION.....	53

APPENDIX A -	References
APPENDIX B -	Maps
	Unit Map
	BICA Fire Management Units (FMU)
	Vegetation Types by FMU
APPENDIX C -	Fire Size-Up (excerpted from Cody Dispatch Zone Incident Organizer)
APPENDIX D -	Minimum Impact Suppression Tactics
APPENDIX E -	Wyoming Interagency Fire Restriction Plan
APPENDIX F -	Preparedness Plan
APPENDIX G -	Pre-Attack Plan
APPENDIX H -	Multi Year Fuels Treatment Plan
APPENDIX I -	Inter-Park Agreement (GRTE/BICA)
APPENDIX J -	Interagency Agreements
	WY Interagency Cooperative Fire Management and Stafford Act Response Agreement
	Fire Management Annual Operating Plan, Bighorn County, WY
	Bighorn Canyon NRA/Bighorn National Forest Interagency Agreement
	WY-BHF/MT-BIP Annual Operating Plan
	MT Cooperative Fire Management and Stafford Act Response Agreement
	Cody Interagency Dispatch Center Annual Operating Plan
APPENDIX K -	Interagency Contacts
APPENDIX L -	Environmental Assessment and Finding of No Significant Impact
APPENDIX M -	Definitions

1 INTRODUCTION

1.1 Fire Management Plan Requirement

The Bighorn Canyon Wildland Fire Management Plan has been developed in accordance with Director's Order 18 (DO-18), which details National Park Service fire policy. DO-18 requires that all parks with vegetation capable of sustaining fire develop a Wildland Fire Management Plan to meet the specific resource management goals for that area. Specific standards or guidelines for developing and implementing the plan are contained in the Reference Manual 18 (RM-18). RM-18 also cites from the U.S. Department of the Interior Manual (910 DM), the authorities for the prevention, preparedness, control, and suppression of fire on or threatening lands under the jurisdiction of the Department of the Interior. It further cites the authorities for the funding of wildland and prescribed fire, and for rendering assistance outside of the park.

1.2 Collaborative Planning Process

The purpose of the Wildland Fire Management Plan is to provide direction and establish specific procedures to guide all wildland fire program activities within Bighorn Canyon National Recreation Area (hereinafter "recreation area"). It implements objectives for wildland and prescribed fire recommended in the Bighorn Canyon's Resource Management Plan and the selected Proposed Action contained in the Environmental Assessment which accompanies this plan.

Consultation with Bureau of Indian Affairs - Crow Indian Agency, Bureau of Reclamation, Bureau of Land Management (BLM), U.S. Forest Service, Wyoming Game and Fish Department Commission, Montana Division of Fish, Wildlife and Parks, Bighorn County, WY, Bighorn County, MT, Carbon County, MT, and private inholders will be conducted concurrent with public review of the Wildland Fire Management Plan and Environmental Assessment. The EA and any public review has already occurred during the development of the previous plan (1999). Additionally, the state Division of Environmental Quality-Air Quality Division, and state Historic Preservation Offices for the states of Montana and Wyoming will be consulted

The Fire Management Plan presents the actions that will integrate fire management with the recreation area's management goals in a safe and professional manner.

1.3 Federal Policy Implementation

The *Federal Wildland Fire Management Policy (1995, review 2001)* provides the overall framework for agencies to build a program consistent with stated land and resource management goals and objectives while providing for public and firefighter safety. Further guidance can be found in the 2009 Guidance for Implementation of Federal Wildland Fire Management Policy. The fuels management component of this plan follows recommendations of the *Cohesive Strategy (USFS 2000)* which established a framework to restore and maintain ecosystem health in the fire-adapted ecosystems of the west, and to protect identified communities at risk. Both it and the *Collaborative Approach 10 year Imp Plan (2002)* established a collaborative interagency community based approach to address wildland fire and fuels management issues which this plan follows.

1.4 NEPA/NHPA Planning Requirements

This plan meets the requirements of the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Air Act, as amended, and the Clean Water Act. A full and thorough scoping process was undertaken and an associated Environmental Assessment (EA) was completed to discuss alternatives and assess the effects of the proposed action. Projects implemented under this plan will be evaluated to ensure all NEPA/NHPA requirements have been addressed. If they have not, additional NEPA/NHPA documentation will be completed.

1.5 Fire Management Plan Authorities

The authority for implementing wildland fire management plans is found in the National Park Service (NPS) Organic Act (16 USC1, August 25, 1916), the 1976 Authorities Act (16 USC 1a), and is further clarified in the National Parks and Recreation Act of 1978. Related statutory authorities are the Clean Air Act, the Clean Water Act, the Endangered Species Act, the National Environmental Policy Act, the Antiquities Act and others.

Service-wide fire management policy is expressed in the current revisions of the Directors Orders and attendant Reference Manual for the National Park Service, and "Guidance for Implementation of Federal Wildland Fire Policy 2009", and is incorporated herein by reference. The sites fire management objectives conform to the referenced documents.

The environmental assessment that accompanies this plan describes and analyzes the potential environmental effects of the proposed action and two additional alternatives. It was prepared in compliance with the requirements of the National Environmental Policy Act, the National Historical Preservation Act, and Section 7 of the Endangered Species Act. Consultation with Bureau of Reclamation, Bureau of Land Management (BLM), U.S. Fish and Wildlife Service, Wyoming Game and Fish Department Commission, Historic Preservation Office for the State of Wyoming, and the general public was conducted concurrent with public review of the Wildland Fire Management Plan and Environmental Assessment.

2 RELATIONSHIP TO LAND MANAGEMENT PLANNING AND FIRE POLICY

2.1 NPS Management Policies

Agency policy on resource and fire management issues is summarized in the National Park Service Management Policies (2001). The policies state that park fire management programs will be designed around resource management objectives, clearly stated in a fire management plan. The implementation of this plan will allow fire to play its ecological role in the park while protecting human life, developments, and cultural or natural resources, and providing for firefighter safety. Specific guidance on wildland fire is contained in Directors Orders (DO-18) and attendant Reference Manual (RM-18) for the National Park Service, and “Guidance for Implementation of Federal Wildland Fire Management Policy 2009”.

In a memo from the Federal Fire and Aviation Directors signed January 6, 2003 the National Park Service adopted the “Interagency Standards for Fire and Fire Aviation Operations 2003”. The current Interagency Standards for Fire and Aviation Operations will be used for the fire season. The purpose of the document (also known as the Red Book) is to, “state, reference, or supplement” agency fire and fire aviation management policy. It meets specific direction in the Federal Wildland Fire Management Policy reviews of 1995 and 2001 particularly related to improvement of the safety, effectiveness and efficiency of interagency fire and fire aviation operations. Specifically for the National Park Service, the Red Book supplements RM-18 Wildland Fire Management and RM-60 Aviation, and is to be used as agency policy guidance.

2.2 Enabling Legislation and Purpose of NPS Unit

Bighorn Canyon National Recreation Area was established by Public Law 89-664 on October 15, 1966. It provides that "the secretary shall coordinate administration of the recreation area with other purposes of the Yellowtail Reservoir Project so that it will in his judgment best provide 1) for public outdoor recreation benefits, 2) for conservation of scenic, scientific, historic, and other values contributing to public enjoyment, and 3) for management, utilization, and disposal of renewable natural resources in a manner that promotes, or is compatible with, and does not significantly impair public recreation and conservation of scenic, scientific, historic, or other values contributing to public enjoyment."

2.3 General Management Plan

Bighorn Canyon National Recreation Area is currently operating under an approved General Management Plan (GMP) dated 1981. This document cites enabling legislation and includes references to wildland fire management. The direction given in the GMP is to follow national policy and guidance provided in Reference Manuals. Additionally the GMP calls for extinguishment of “all natural and human-caused fires that threaten to damage recreational developments, historic sites, or adjacent property” (page 121). In accomplishing this task, additional information about training is provided in that “Park personnel will be trained to suppress fires and will be fully equipped with the necessary equipment. Special emphasis will be placed on preventing fires in riparian habitats such as Hough Creek and North Fork Trail Creek.” (page 136)

2.4 Resource Management Plan

The Resource Management Plan for Bighorn Canyon NRA (1995, updated 1999) states “that the park’s primary management goal is . . . to preserve, protect, and manage the park’s cultural and natural resources within naturally functioning ecosystems, consistent with cultural resource preservation (NPS 1995).” Prescribed fire is recommended as projects or activities to improve wildlife habitat, restore Bighorn Sheep populations, and increase wild horse habitat. It recommends that the effects of prescribed fire on exotic plants be examined and for natural fires to function in fire-dependent ecosystems within the constraints of policy. Prescribed fires will be used to reduce fuel loads and restore plant community structure to historical ranges.

2.5 Support to the General and Resource Management Plans

The Fire Management Plan describes fire management units (FMU) and further defines fire management objectives tiered to the parks goals and objectives as outlined in the previously cited documents. Many of the area’s goals and objectives can be affected both positively and negatively by fire on recreation area lands. The FMP will outline 1) acceptable fire management strategies for wildland fire within recreation area boundaries; and 2) those areas where resource protection/enhancement objectives may be met utilizing appropriate fuels reduction/vegetation management techniques (prescribed fire and mechanical fuels manipulation). Further, it describes a cooperative approach to wildland fire management realizing that fire does not recognize administrative

boundaries and significant program efficiencies will be realized when a cooperative interagency program of fire management is developed with the adjacent federal, state, county, and local resources.

3 FIRE MANAGEMENT STRATEGIES

3.1 General Management Considerations

Wildland fire in the recreation area will be managed to enhance resource protection, diminish risk and consequences of severe wildland fires and, to the extent possible, increase the health of naturally occurring vegetative communities and watersheds.

To these ends Bighorn Canyon NRA will employ the following goals:

1. Improve fire prevention and fire management capabilities through interagency agreements and community assistance
2. Reduce hazardous fuels accumulations at recreation area sites and across agency boundaries
3. Meet resource objectives through the careful application of prescribed fire

A community-based approach to wildland fire issues will involve close collaboration and cooperation with neighboring agencies that have a vested interest.

3.2 Fire Management Goals

The following wildland fire management program goals support the recreation areas General and Resource Management Plans and objectives as well as national and NPS policy and direction.

1. Protect park resources, including park developments and infrastructure, while giving primary consideration to firefighter and public safety.
 - Fire management operations will be carried out only by qualified individuals that promote the safe and skillful application of fire management strategies and techniques.
 - Develop and maintain a fully qualified fire management staff to implement the wildland fire management plan.
 - Utilize only certified structural firefighters to enter burning structures.
 - All personnel involved in fire management operations will receive a safety briefing before operations are initiated.
 - Recreation area neighbors, visitors, and local residents will be advised of any fire management activities that may affect them through postings, newspaper articles, and personal contacts.
 - Employ minimum impact suppression tactics (MIST) while conducting fire management activities.
 - Prevent further damage to resources by keeping vehicles on roads, unless approval is obtained from the Chief Ranger. Dozer use requires prior written authorization of the Assistant Superintendent.
 - Aerial and ground delivery of retardant and foam may be used within the recreation area, but may be restricted near and around historic sites, archeological sites, and watercourses.
 - Utilize fire opportunities to survey for archeological and historic features to increase inventory information.
 - For fires escaping initial attack, use a resource advisor to advise on potential resource threats and to assist in planning to reduce or eliminate impacts.
2. Use prescribed fire and other treatments where and when appropriate as a tool to manage vegetation.
 - Promote a diversity of plant communities to allow for restoring and perpetuation of wildlife and native plant species.
 - Restore and maintain cultural landscapes.
 - Improve disturbed land, which contributes to the capability and maintenance of stable plant and animal populations.
 - Reduce noxious/exotic plants.
 - Consult with Montana and Wyoming state wildlife biologists on any treatments used to enhance wildlife habitat.
 - Restore fire as an ecological process.
3. Manage smoke generated by wildland or prescribed fires to minimize degradation of air quality and visibility.
 - Prescribed fire activities will be coordinated with Wyoming and Montana Department of Environmental Quality to assure that air quality standards are being met.
 - The appropriate management response will be taken during suppression activities to promote favorable smoke dispersal and minimal impact on communities.
 - Prescribed fires would only be undertaken considering atmospheric stability and associated smoke dispersion characteristics.
4. Monitor all prescribed fires to increase knowledge of fire effects to better achieve resource goals.

- Increase fire management data obtained through appropriate investigation, monitoring and research.
 - Fire effects will be monitored during all prescribed fires to determine if objectives are being met. Objectives may be adjusted in future prescribed fires based on data collected from previous monitoring efforts.
5. Manage hazardous fuels through mechanical/chemical treatment or through the use of prescribed fire.
- Employ hazard fuel reduction treatments to reduce hazardous fuels that threaten important wildlife habitat, cultural resources, historic structures, or key park developments.
 - Where possible, employ hazard fuel reduction treatments in areas where there exists a high risk of fire escape beyond the area's boundaries that may threaten lives and/or property of our neighbors.
 - Reestablish native plant populations in areas disturbed by fuel treatments through seeding or planting.

3.3 Fire Management Options

The following options (and their definitions) describe the full range of management tools available to Bighorn Canyon National Recreational Area. Each tool is a valuable option in the management of a sound fire program.

The fire management program at Bighorn Canyon NRA will focus on selecting the appropriate management response for all wildland fire ignitions and the careful application of prescribed fire and mechanical fuels reduction to restore habitat and reduce risk to park resources. Inherent in this program is the recognition of the size and capabilities of park staff, response times from cooperating agencies, and the nature and scale of likely wildland fire scenarios. At this time wildland fire use actions will not be considered due to differing agency goals and objectives, resources at risk, land ownership, and lack of dedicated staff and planning resources to manage incidents at the initial stages.

Wildland Fire: *a general term describing any non-structure fire that occurs in the wildland.*

- ◆ **Unplanned Ignition:** *the initiation of a wildland fire by lightning, volcanoes, unauthorized and accidental human-caused fires.*
- ◆ **Wildfire:** (See Section 4.1 – Management of Unplanned Ignitions) *unplanned ignition of a wildland fire (such as caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires.*

All wildfire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources. Equally as critical as the loss of resource values to fire are the potentially damaging effects of fire suppression activities. Consideration will be given to resources at risk and effects of management actions and may result in suppression actions that lead to larger fire size, (i.e. controlling a fire along a nearby roadway v. direct line construction through wildland fuels) while still meeting overall goals of fire containment. This strategy mirrors that of adjacent federal land management agencies (DOI-BLM and USFS) and allows for consistent application of existing federal policies regardless of responding resources.

The goal of suppression actions is to safely suppress wildfires at minimum cost consistent with land and resource management objectives and fire management direction.

All unplanned wildland fires will be suppressed using an appropriate management response. The correct response to specific fires will be determined through evaluation of public and firefighter safety, fire behavior, values at risk, potential suppression damage, and the availability of fire management resources. Close coordination with local, county, and federal cooperating agencies (Lovell Volunteer Fire Department, Bighorn National Forest- Medicine Wheel District, BLM-Cody/Worland Resource Area, Wyoming State Forestry Division, Bureau of Indian Affairs-Rocky Mountain Region, Fish and Wildlife Service-Mountain Prairie) will be essential in the safe and efficient response to any wildland fires on or in the vicinity of Bighorn Canyon NRA.

Management responses may vary from fire to fire and sometimes along the perimeter of a fire. Response options range from monitoring without on-the-ground disturbance to aggressive suppression actions on all perimeters of the fire.

- ◆ **Planned Ignition:** *the intentional initiation of a wildland fire by hand-held, mechanical or aerial device where the distance and timing between ignition lines or points and the sequence of igniting them is*

determined by environmental conditions (weather, fuel, topography), firing technique, and other factors which influence fire behavior and fire effects.

- ◆ **Prescribed Fire:** (See Section 4.3 – Prescribed Fire) *is a wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved prescribed fire plan for which NEPA requirements (where applicable) have been met prior to ignition.*

Prescribed fire is used as a management tool to achieve specific resource objectives or manage hazardous fuels. NPS units are required in DO-18 to “reduce, to the extent possible, hazardous fuels in the wildland urban interface.” In many cases similar resource management objectives will be in place on large tracts of lands inside and outside recreation area lands. This plan will emphasize cooperation with adjacent land managers, when management objectives coincide, on the implementation of landscape scale fuels and vegetation management projects. The use of prescribed fire as a management tool is integral to meeting the objectives of the Resource Management Plan.

Prescribed fire will be used to return the natural disturbance process of fire to the ecosystem and to maintain and/or restore plant communities, cycle nutrients, reduce or remove exotic plants, maintain or improve wildlife habitat, reduce hazardous fuel accumulations, reduce future fire suppression costs, and for other resource management objectives.

Joint opportunities to conduct prescribed fire along administrative boundaries will be sought with the BLM, BIA, USFS, and WYG&F where similar resource objectives are shared and unit planning and operational considerations are favorable. Planning will be coordinated between agency’s to ensure policy requirements are followed and appropriate NEPA compliance is met prior to project initiation. At a minimum a prescribed fire plan will be developed outlining the critical elements described in each agency’s manual system. Prescribed fire is used to contribute to cost-efficient fire protection and sustainability of ecosystem values, which are shared across agency boundaries. For the foreseeable future, the prescribed fire program under this plan will be aimed at restoring fire as a natural ecological process in lieu of wildland fire use, reducing hazardous fuels concentrations, and meeting other specific resource objectives.

Non-Fire Applications: (See Section 4.4 – Non-Fire Fuels Treatment) *Treatment of fuels using means other than fire. Manipulation or removal of fuels to reduce the fire behavior and risk of loss to life/property or resources that may include cutting, thinning, mowing, chipping, lopping, limbing, or like applications. These treatments may be multi-season, stand alone, or multi-treatment.*

- ◆ **Non-Fire Applications:** A management tool to manipulate conditions or to manage hazardous fuels and vegetation. Park areas are required in DO-18 to “reduce, to the extent possible, hazardous fuels in the wildland urban interface.”
- ◆ **Mechanical fuel reduction** – *treatment of wildland fuels to reduce fire behavior and risk, and may include cutting, thinning, mowing, chipping, lopping, limbing or like applications.*

These treatments may occur over several years, or be used as a pre-treatment for or in conjunction with the application of prescribed fire. An interdisciplinary approach will be utilized to identify resources at risk and design treatment objectives and application methods that meet risk reduction needs and are consistent with overall management objectives.

3.4 Wildland Fire Management Strategies by Fire Management Unit

A fire management unit (FMU) can be any land management area definable by objectives, topographic features, access, values to be affected, political boundaries, fuel types, or major fire regimes, etc. that sets it apart from management characteristics of an adjacent unit (RM-18, Chap 4, p.5). A map illustrating the units is in Appendix B.

There are three FMUs at Bighorn Canyon that have differing management characteristics:

1. Yellowtail Wildlife Management (Yellowtail) Unit
2. East Pryor Mountain Unit
3. Canyon Unit

3.4.1 Fire Management Unit Descriptions

Yellowtail Wildlife Management Unit

The Yellowtail Wildlife Management Unit is flanked on the east by the foothills of the Bighorn Mountains, on the north by Sykes Mountain, and on the west by State Highway 37. There are multiple vehicle access points from Highway 37 and State Highway 14A. The Yellowtail Unit is composed of multiple land management agencies or owners including: Bureau of Reclamation, National Park Service, Bureau of Land Management, Wyoming Game and Fish, and private inholdings. The National Park Service administers the majority of the land. Wyoming Game and Fish is the lead agency for the management of wildlife. The Yellowtail Habitat Unit was established for the benefit of wildlife by manipulating resources including water, farmland crops, and vegetation. The Shoshone and Bighorn rivers run through the unit. The impounded Bighorn River creates Bighorn Reservoir, covering the eastern one-third of the unit during full floodpool. During the winter months and drought years, when water levels are low, a large mudflat exists which allows for the growth of noxious plants and the buildup of driftwood.

Vegetation type	Fuel Model	Fire Regime	Condition Class	% of FMU	Acres of FMU
Desert Shrubland				38%	5749
Sagebrush Desert shrubland	2, 5, 6	1	2	6%	873
Saltbrush desert shrubland	5	1	2	32%	4876
Riparian Vegetation				36%	5671
Floodplain shrubland	2, 5, 6	2	3	14%	2214
Floodplain meadow	2	1	3	12%	1780
Creek woodland	8, 9	4	3	3%	546
Floodplain woodland	8,9	4	3	7%	1131
Other				26%	4010
Agricultural land	2	NA	NA	8%	1216
Marsh	2	1	3	10%	1529
River	N/A			8%	1265
			TOTAL	100%	15,430

Access

- This Unit generally has the best land vehicle access within the recreation area, with roads and 2-tracks running throughout it.
- Water availability is good with the Bighorn River flowing through, ponds interspersed, and many irrigation canals.

Fire Management Issues

- Fire control problems exist due to heavy understory fuels in some of the woodland areas within the riparian corridor. Accumulated driftwood also adds to fire intensity and overall resistance to control.
- The Yellowtail FMU has multiple land ownerships within and adjacent to the boundary including private lands, and Wyoming State lands administered by the Game and Fish Department.
- Preservation of the old growth cottonwood forest is a concern due to high recreational and ascetic values.
- Lack of disturbance by flooding contributes to high fuel loading and thick undergrowth.
- Bald eagles utilize the old growth cottonwood stands as nesting areas. Other Threatened or Endangered species may migrate through the area.
- The control of exotic plants, Russian olive and tamarisk, must be considered when conducting a prescribed fire or in rehabilitating an area after a suppression action.
- Smoke production must be monitored to minimize its impacts the local community.
- Hunting seasons are regulated by the WY Game and Fish and may be impacted by Fire Management Operations.
- Response time for the Lovell Fire Department to most areas within the Yellowtail Unit would be 15-20 minutes. Response from NPS, USFS, or BLM, could vary from 20 minutes to an hour or more depending on location and availability of resources.

Management Considerations

The Yellowtail FMU was established to provide wildlife habitat and agricultural lands, and provide public access for hunting and fishing. As such, the resources in the area are managed and manipulated specifically for wildlife enhancement. Prescribed fire will be used to reduce noxious/exotic plants and hazardous fuels for the benefit of game and non-game animals. It will also be used to enhance wildlife habitat and reduce the understory to improve recreational opportunities such as hunting, wildlife viewing, and hiking. Cooperative efforts in suppression and prescription activities are a priority in this unit due to multiple jurisdictions. All wildland fires will be suppressed using the appropriate response to meet protection objectives, while providing for firefighter safety, minimum costs, and resource objectives.

Priority Protection Areas

- Special consideration/protection will need to be given to historic sites such as the Gams Place, Kane Cemetery, ML Ranch, and other non-National Register sites.
- Private agricultural areas must be protected from fire during farming season.
- NPS-leased housing and Administrative sites

East Pryor Mountain Unit

This unit encompasses an area starting 2.5 miles south of Layout Creek, east to the recreation area's paved road, north to the North fork of the Trail Creek drainage, and then west to two-thirds up slope on East Pryor Mountain where the National Park Service boundary ends and BLM land begins. U.S. Forest Service lands lie adjacent to the BLM land approximately 1.3 miles west of the NPS border. The unit is six miles long and from one to three and a half miles wide with escarpment slopes averaging 80 percent in much of the area. The East Pryor Mountain Unit is in the primary viewshed for the southern end of Bighorn Canyon NRA. Layout Creek is the primary incising canyon, and provides water to wild horse watering tanks and to trailing livestock. The unit also holds the Ewing-Snell historic ranch site and numerous archeological sites. Valuable wild horse and bighorn sheep habitats can also be found within the unit. The steepness of slopes and close proximity to other agency lands, along with cultural resources, habitat, and watershed/viewshed values, requires Bighorn Canyon to utilize an aggressive suppression response on a case-by-case basis, considering firefighter safety, minimum costs, values to be protected, and resource objectives.

Vegetation type	Fuel Model	Fire Regime	Condition Class	% of FMU	Acres of FMU
Coniferous Woodland				49%	2,940
Douglas fir woodland	8, 9	3	2	27%	1,638
Spruce fir woodland	8, 9	3	2	6%	352
Limber pine woodland	8, 9	3	2	16%	950
Juniper and Mountain Mahogany Woodlands				48%	2,835
Mountain mahogany shrubland	2, 5, 6	1	2	9%	530
Juniper woodland			2	39%	2,305
Sagebrush Steppe					
Sagebrush steppe	2, 5, 6	1	2	.5%	32
Riparian Vegetation					
Creek woodland	8, 9	4	2	2%	97
Other					
Agricultural land	2			.5%	36
			TOTAL	100%	5,940

Access

- Much of East Pryor Mountain Unit is nearly inaccessible by vehicle due to steep terrain and lack of roads.
- The closest water source is Layout Creek or Trail Creek, both of which flow east through the unit. Water from Bighorn Lake is available for helicopter drops.

Fire Management Issues

- Steep terrain, poor access, and dense fuels in some of the drainages and canyons could present control problems.

- Until an agreement is signed with Lovell FD, they are unable to respond into Montana.
- Response times for NPS, USFS, and BLM would be 20 minutes to several hours depending on location and accessibility of the fire.
- Prescribed fire may be used to reduce fuels and to enhance wildlife habitat for mule deer, wild horses, bighorn sheep and other wildlife
- Cooperation and coordination with both Montana Bureau of Land Management and Custer National Forest is imperative for maximizing efforts in suppressing wildland fire and conducting prescribed fire.
- There can be no unacceptable impacts to the cultural or natural resources found within this unit as a result of fire management projects or suppression efforts.
- This FMU is located along the primary road and is in the main viewshed for visitors.
- Proposed Wilderness Area on the east slope of Sykes Ridge may impose management restrictions.

Management Considerations

Prescribed fire will be used to reduce fuels and to enhance wildlife habitat for mule deer, wild horses, Bighorn Sheep and other wildlife. The safety of firefighting personnel will be the primary management objective and concern both in conducting prescribed fire or suppressing a wildland fire. The use of prescribed fire will assist in moderating fire behavior from a catastrophic fire that may threaten the historic ranch site and neighboring lands. Cooperation and coordination with both Montana Bureau of Land Management and Custer National Forest is imperative for maximizing efforts in suppressing wildland fire and conducting prescribed fire.

Priority Protection Areas

- The Ewing-Snell Historic Site.

Canyon Fire Management Unit

The Canyon FMU includes all lands within Bighorn Canyon NRA, excluding the Yellowtail Wildlife Management Unit and the East Pryor Mountain Unit. The FMU begins near Sykes Mountain just north of the Yellowtail Wildlife Management Unit and extends to Fort Smith, Montana. The reservoir and canyon are the predominant features with a narrow corridor of tablelands and hills extending from the canyon west two to three miles. Values to be protected include the developed/infrastructure sites and two historic ranches that are scattered throughout. Government camp located at Fort Smith, Montana, consists of NPS and Bureau of Reclamation headquarters buildings, the Yellowtail Dam site, employee housing, a primary school, agencies' maintenance yards, and accompanying infrastructure. Crow tribal land borders the east side of the Canyon from the Montana State line north. Sykes Ridge, part of the Lower East Pryor BLM Management Area flanks the west side.

Vegetation type	Fuel Model	Fire Regime	Condition Class	% of FMU	Acres of FMU
Juniper-mountain mahogany woodland				34%	17,970
Juniper-mountain mahogany	2, 5, 6	3	2	8%	4,328
Juniper woodland	2, 5, 6	3	2	24%	12,657
Mountain mahogany shrubland	2, 5, 6	3	2	2%	985
Riparian Vegetation				8%	4,121
Flood plain meadow	2	1	2	4%	1,867
Flood plain shrublands	2, 5, 6	1	2	2%	1,197
Creek woodland	8, 9	3	2	1%	609
Flood plain woodland	8, 9	3	2	1%	448
Desert Shrubland				7%	3,915
Sagebrush desert shrubland	2, 5, 6	1	2	3%	1,759
Saltbrush desert shrubland	5	1	2	2%	890
Mixed desert shrubland	5, 6	1	2	2%	1,266
Sagebrush Steppe					
Sagebrush steppe	2, 5, 6	1	2	9%	4,633
Grasslands					
Basin grasslands	2	1	2	19%	9,935

Coniferous Woodlands				4%	1,898
Limber pine woodland	8	3	2	3%	1,449
Douglas fir woodland	8, 9	4	2	.5%	233
Spuce/fir woodland	8, 9	4	2	.5%	216
Other				19%	9,528
Marsh	2	1	2	2%	1,022
Agricultural lands	2	na		1%	468
River				15%	7,959
Human development				1 %	79
			TOTAL	100%	52,000

Access

- The main park road runs the length of the FMU and numerous 2 tracks offer access to more remote areas. There are however, many areas where terrain is rough and accessibility limited or impossible by vehicle.
- Access by boat should be considered in some areas.
- Water is available from the lake or several creeks that feed the lake, but overall is poor due to the desert nature of the unit.

Fire Management Issues

- Steep terrain and long response times to some areas could present control problems.
- Response time from for the Lovell Fire Department would be 15-30 minutes for most of the road accessible areas within the Wyoming portion of the unit.
- Response from NPS, USFS, and BLM would be 20 minutes to several hours depending on resources and accessibility of the fire.
- Prescribed fire may be used to reduce hazardous fuels and to improve wildlife habitat for game and non-game species
- Prescribed fire may be used to restore cultural/historic landscapes at Hillsboro and Lockhart Ranch.
- Grazing and trailing of livestock occurs in this FMU and is regulated by grazing and trailing plans. Prescribed fire projects and fire suppression actions need to address these plans and agreements.
- Pryor Mountain Horse Range occurs within this unit and may impose management restrictions.
- Proposed wilderness area on the east slope of Sykes Ridge may impose management restrictions.
- Park management will want to ensure no unacceptable impacts to cultural resources through the use of prescribed fire or fire suppression tactics.

Management Considerations

This unit shares some management issues with the Yellowtail Unit in that it is closely flanked by non-NPS owned or managed property. Wildland fire will be suppressed in this unit, using the appropriate management response according to the large number of developed/infrastructure sites, private and state inholdings, historic ranch sites, steep terrain, high visitor use areas, and other special concerns/values within the Unit. High visitor/special uses will be another factor to consider, with public safety being a primary objective.

Prescribed fire will be used to reduce hazardous fuels and to improve wildlife habitat for game and non-game species as in the other units. It will be used less as a tool for reducing noxious plants or promoting recreational opportunities. Prescribed fire may also be used to restore cultural/historic landscapes at Hillsboro and Lockhart Ranch.

Primary Protection Areas

- Private land exists in the northwest portion of the FMU in the Dryhead drainage area.
- Private and state inholdings including Bassett state lease, Tillett Inholdings
- Montana State inholdings near the south fork of Trail Creek.
- Numerous historic ranches/sites, campgrounds and marinas, and some high visitor use areas.
- Black Canyon is of special interest due to its steep slopes, scenic viewshed, and an improved boat-in campground (Black Canyon)
- Ft. Smith government housing and administration area (total of 45 NPS buildings and 37 BLR buildings)
- Crooked Creek Ranger Station
- Two Marinas

- Horseshoe Bend Marina
- Ok-A-Bey Marina
- Two historic ranches
 - Hillsborough Ranch
 - Lockhart Ranch
- Five campgrounds lie along drainages that flow into Bighorn Reservoir
 - Trail Creek Campground
 - Medicine Creek Campground
 - Black Canyon Campground
 - Horseshoe Bend Campground
 - Afterbay Campground
- High visitor use areas including:
 - Barry's Landing boat launch
 - Devil Canyon Overlook

3.4.2 Fire Management Unit Characteristics

VEGETATION

The six most common vegetation types in Bighorn Canyon were classified by Knight et al. (1987). They include: Juniper and mountain mahogany woodlands (40%); riparian vegetation (16%); desert shrubland (15%); sagebrush steppe (12%); grasslands (8%) and coniferous woodlands (6%). Generally, desert shrubland and riparian vegetation are found in the southern one-third of the recreation area, with juniper/mountain mahogany woodland and sagebrush steppe found in the center one-third, and mixed-grass prairie and Douglas fir/ponderosa pine woodlands commonly found in the northern third. While there are no known plants on the T&E list in Bighorn Canyon NRA, there are six plant species of concern in the states of Montana and Wyoming that are located near possible or known areas of weed infestation. They include: *Sullivantia hapmanii*, *Rorippa calycina*, *Erigeron allocotus*, *Stanleya tomentosa*, *Astragalus oreganos* and *Eriogonum brevicaulis* var. *canum*.

SIX MOST COMMON VEGETATION TYPES From Knight (1987)

Vegetation Types	Percent of Land Area	Dominating and Associated Plant Species
Juniper – Mountain Mahogany woodlands	40%	Utah Juniper (<i>Juniperus osteosperma</i>), curlleaf mountain mahogany (<i>Cercocarpus ledifolius</i>), black sagebrush (<i>Artemisia nova</i>), broom snakeweed (<i>Gutierrezia sarothrae</i>), bluebunch wheatgrass (<i>Agropyron spicatum</i>), Fendler threeawn (<i>Aristida fendleriana</i>), limber pine (<i>Pinus flexilis</i>), and Rocky Mountain Juniper (<i>J.scopulorum</i>).
Riparian Vegetation (3 Categories)	16%	<ol style="list-style-type: none"> 1. Creek woodlands – Plains cottonwood (<i>Populus deltoides</i>), Narrowleaf cottonwood (<i>P. angustifolium</i>), Boxelder (<i>Acer negundo</i>), water birch (<i>Betula occidentalis</i>), peach-leaf willow (<i>Salix amygdaloides</i>), Russian olive (<i>Elaeagnus angustifolia</i>), Douglas fir (<i>Psuedotsuga menziesii</i>), hackberry (<i>Celtis occidentalis</i>), rose (<i>Rosa woodsii</i> and <i>R. sayi</i>), skunkbush (<i>Rhus trilobata</i>), Rocky Mountain maple (<i>Acer glabrum</i>), snowberry (<i>Symphoricarpos spp.</i>), silver sage (<i>A.cana</i>), Basin big sagebrush (<i>A. tridentata spp.</i>), rabbitbrush (<i>Cyrysothamnus nauseosus</i>), chokecherry (<i>Prunus virginiana</i>), poison ivy (<i>Toxicodendron rydbergii</i>), rock clematis (<i>clematis columbiana</i>), horsetail (<i>Equisetum sp.</i>), dogbane (<i>Apocynum adnrosaemifolium</i>), smooth brome (<i>Bromus inermis</i>), tall wheatgrass (<i>Agropyron elongatum</i>), poison hemlock (<i>Conium maculatum</i>), common yarrow (<i>Achillea millefolium</i>), harebell (<i>Campunula rotundifolia</i>), and phacelia (<i>Phacelia spp.</i>). 2. Floodplain meadows and mudflats – <i>Artemisia biennis</i>, <i>Chenopodium berlandieri</i>, halogeton (<i>Halogeton glomeratus</i>), fireweed summercypress (<i>Kochia scoparia</i>), <i>Rumex maritimus</i>, and saltcedar (<i>Tamarix chinensis</i>).

		3. <u>Floodplain woodland</u> – Plains cottonwood, peach-leaf willow, silver buffaloberry (<i>Shepherdia argentea</i>), Russian olive, Russian knapweed (<i>Centaurea repens</i>), and saltcedar.
Desert Shrubland (4 Categories)	15%	<ol style="list-style-type: none"> 1. <u>Saltbush desert shrubland</u> – Gardner saltbush (<i>Atriplex gardneri</i>) bud sagewort (<i>A. spinescens</i>), big sagebrush, Indian ricegrass (<i>Oryzopsis hymenoides</i>), bottlebrush squirreltail (<i>Sitanion hystrix</i>), plains pricklypear (<i>Opuntia polyacantha</i>), birdfoot sagewort (<i>A. pedatifida</i>), western wheatgrass (<i>A. smithii</i>), Sandberg bluegrass (<i>Poa sandbergii</i>), halogeton, fireweed summercypress, and seepweed (<i>Suaeda depressa</i>). 2. <u>Greasewood desert shrubland</u> – greasewood (<i>Sarcobatus vermiculatus</i>), big sagebrush, shadscale (<i>Atriplex confertifolia</i>), rubber rabbitbrush, Douglas rabbitbrush (<i>C. viscidiflorus</i>), scarlet globemallow (<i>Sphaeralcea coccinea</i>), halogeton, Gardner saltbush, plains pricklypear, fireweed summercypress, Nuttail monolepis (<i>Monolepis nuttalliana</i>), cheatgrass (<i>Bromus tectorum</i>), foxtail barley (<i>Hordeum jubatum</i>), bottlebrush squirreltail, western wheatgrass, Nevada bluegrass (<i>Poa nevadensis</i>), and alkali sacaton (<i>Sporobolus airoides</i>). 3. <u>Sagebrush desert shrubland</u> – Wyoming big sagebrush (<i>A. t. ssp. Wyomingensis</i>), bud sagewort (<i>A. spinescens</i>), shadscale, Indian ricegrass, needleandthread (<i>Stipa comata</i>), greasewood, and Gardner saltbush. 4. <u>Mixed desert shrubland</u> – Rubber rabbitbrush, shadscale, big sagebrush, broom snakeweed, bluebunch wheatgrass, Fendler threeawn, and needleandthread grass.
Sagebrush Steppe	12%	Wyoming big sagebrush, black sagebrush, broom snakeweed, bluebunch wheatgrass, blue grama (<i>Bouteloua gracilis</i>), threadleaf sedge (<i>Carex filifolia</i>), june grass (<i>Koeleria macrantha</i>), Sandberg bluegrass, needleandthread, Hooker sandwort (<i>Arenaria hookeri</i>), fringed sage (<i>A. frigida</i>), plain pricklypear, and Hoods phlox (<i>Phlox hoodii</i>).
Grasslands (3 Categories)	8%	<ol style="list-style-type: none"> 1. <u>Mixed-grass prairie</u> – little bluestem (<i>Angropogon scoparius</i>), sideoats grama (<i>Boutelous curtipendula</i>), Kentucky bluegrass (<i>Poa pratensis</i>), western wheatgrass, bluebunch wheatgrass, bluegrama, junegrass, Idaho fescue (<i>Festuca idahoensis</i>), needleandthread, green needlegrass, (<i>S. viridula</i>), Japanese brome (<i>Bromus japonicus</i>), soapweed (<i>Yucca glauca</i>), hairy golden aster (<i>Heterotheca villosa</i>), arrowleaf balsam root (<i>Balsamorhiza sagittata</i>), lupine (<i>Lupinus sp.</i>), spikemoss selaginella (<i>Selaginella densa</i>), and Lewis flax (<i>Linum lewisii</i>). 2. <u>Basin grasslands</u> – bluebunch wheatgrass, blue grama, needleandthread, broom snakeweed, Hooker sandwort, fringed sagewort, and Hoods phlox. 3. <u>Windswept plateau</u> – bluebunch wheatgrass, Fendler threeawn, needleandthread, Hooker sandwort, broom snakeweed, fineleaf hymenopappus (<i>Hymenopappus filifolius</i>), squarestem phlox (<i>Phlox bryoides</i>), and Hoods phlox.
Coniferous woodlands (3 Categories)	6%	<ol style="list-style-type: none"> 1. <u>Limber pine Woodlands</u> – Limber pine, Douglas fir, spiraea (<i>Spiraea betulifolia</i>), buffaloberry, ground juniper (<i>J. communis</i>), snowberry, ninebark (<i>Physocarpus monogynus</i>), kings fescue (<i>Leucopa kingii</i>), and Rocky mountain maple. 2. <u>Ponderosa pine Woodland</u> – Douglas fir, little Bluestem, bluebunch wheatgrass, needleandthread grass, Idaho fescue, lupine, arrowleaf balsam, golden aster, soapweed, prickly pear cactus, Lewis flax, yarrow, harebell, bastard toadflax, (<i>Comandra umbellata</i>), fringed

sagewort, owl clover (*Orthocarpus sp.*), and Indian paintbrush (*Castilleja spp.*).

3. **Spruce-fir Woodland** – huckleberry, clematis, heart-leaf arnica (*Arnica cordifolia*), and gooseberry (*Ribes spp.*).
-

GEOLOGY AND SOILS

The canyon of the river, which contains the lake and lies between the Bighorn and Pryor Mountains, is formed in flat-lying sedimentary rocks and was created by the cutting action of the Bighorn River in response to geologic uplifting 10-12 million years ago.

The soils of Bighorn Canyon National Recreation Area are diverse, reflecting the complex geology of the area. The skeletal, poorly developed soils located on the rocky plateaus are quite resistant to damage from compression from heavy machinery, especially when dry. The pink clay soils and soils derived from the Chugwater Formation (a Triassic siltstone) compact easily if damp. When dry, they are friable and use of heavy machinery may leave visible marks that take years to erase naturally.

Wildland fire has various effects on soil properties. Variables that influence these effects include: fire severity (related to the downward heat pulse), residence time of the flaming front, soil moisture, and the amount of organic matter. The direct effects of fire on soil properties may include changes in soil chemistry (e.g., loss of nitrogen), reduction in porosity, and consumption of organic matter. Indirect effects may include an increase in soil temperature and erosion after vegetation layers are removed. Because fuel loading is light with shrub fuel types in the recreation area, fires in these fuel types have a short residence time and generate only a small downward heat pulse. Fires in the coniferous community should also have a small downward heat pulse since the primary carrier of fire would be grasses and shrubs. Fires within the riparian community would heat the soil somewhat more in localized areas since there is more dead and down woody material and generally deeper duff.

AIR QUALITY

Section 118 of the Clean Air Act (42 USC 7401 *et seq.*) requires a park to meet all federal, state and local pollution standards. Bighorn Canyon National Recreation Area is designated as a Class II air quality area under the Clean Air Act as amended. A Class II area designation indicates the maximal allowable increases in concentrations of pollutants over baseline concentrations of sulfur dioxide and particulate matter as specified in Section 163 of the Clean Air Act. Further, the clean Air Act requires that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, soils, water quality, cultural resources and visitor health) from adverse pollution impacts.

Bighorn Canyon lies on a northeast-southwest axis with the lower end part of the upper Bighorn Basin, and the northern end on the edge of the tall grass prairie. Two dominant ranges, the Bighorn and the Pryor Mountains, flank the area. Elevations range from 3200 to 7000 feet. The elevation of the lake ranges generally from 3610 to 3640 feet, depending upon the year or season. The main canyon and the various side canyons experience both upslope and downslope winds due to differential heating in the canyons, allowing for a mixing of air. The general wind direction is northwest with occasional winter winds from the southeast. The air is generally free flowing except in the summer when a high-pressure ridge may build up over the area, or in the winter with inversions causing stagnant air due to extreme cold temperatures. Winds tend to be stronger in winter due to Arctic fronts passing through. There are few local large air emission sources.

Prescribed fire will be undertaken only after consideration of atmospheric stability and associated smoke dispersion characteristics. When conditions are unfavorable for smoke dispersion (and air quality standards threatened), ignitions would be postponed and suppression activities planned to consider smoke management issues.

WATER RESOURCES

The Bighorn Basin watershed above Yellowtail Dam is part of the Missouri River basin watershed. Several minor tributaries originate from the Pryor Mountains to the west and the Bighorn Mountains to the east. The two major rivers that flow into Bighorn Lake, Shoshone and Bighorn, are both controlled upstream by dams.

Bighorn Canyon National Recreation Area is located mostly in a desert. On the rocky plateaus north of Crooked Creek, ground water has not been accessible except for areas of calcarious springs where the water seeps out of

the bottom of limestone cliffs. Most of the water used by settlers in this “Dryhead” area came from small streams off the nearby Pryor Mountains and a few springs and cisterns. The historic ranches and grazing areas are located near the few areas of wetlands and creeks in the park.

In the Southern part of the recreation area, the groundwater is closer to the surface, especially in the greasewood flats and the floodplain of the Bighorn River near the ML Ranch. Wells can be drilled in this area though the groundwater is usually alkaline. In times of high agricultural irrigation, water tables may be as high as 40 feet below the surface.

Following severe wildland fires, the potential for water quality degradation from runoff exists. These fires could remove vegetation from large areas, resulting in overland flow of water during high intensity precipitation events. This flow could cause widespread erosion and deposit sediments in streams degrading water quality. Reduced runoff would occur due to a decrease in high intensity fires. With prescribed fire, impacts to whole watersheds and sensitive areas would be undesirable and would be mitigated through planning to avoid impacting whole watersheds. With planning, erosion control actions would be taken to minimize runoff. There also may be some residual chemicals in the runoff from certain forms of chemical treatments.

WILDLIFE

A great diversity of ecological zones exists in and adjacent to the recreation area, resulting in a corresponding diversity of wildlife utilizing the recreation area environs.

Large mammals such as bighorn sheep, mule deer, white tail deer, an occasional black bear or moose, mountain lion, bobcat, and coyote utilize the habitats within the recreation area at least seasonally, if not on a permanent basis. A herd of wild horses is managed by the Bureau of Land Management on the 31,000-acre Pryor Mountain Wildhorse Range, 9,100 acres of which are within the recreation area boundaries. Twelve species of bats inhabit the recreation area with about 47 mammal species total. There are 212 species of birds and 13 species of reptiles.

The bald eagle is listed on the Threatened and Endangered Species list, and utilizes habitat within the recreation area. The bald eagle winters in significant numbers within the Yellowtail Wildlife Habitat Area and along the Bighorn River below Afterbay Dam.

Management of the Yellowtail Habitat Area is supported partly by hunting fees for managing habitat of game and non-game species such as the wild turkey, deer, dove, and pheasant. It also hosts, song birds, raptors, and waterfowl including, the common loon, Canada Geese, numerous ducks, herons, egrets, osprey, white pelicans, and sandhill crane.

Large flocks of Canada geese and ducks winter on Afterbay Lake and along the Bighorn River.

Wyoming Fish and Game Department has continued an intensive fish-stocking/research program to maintain a walleye/sauger population in Bighorn Lake. The Bighorn River in Montana boasts a world class trout fishery due to the relatively constant water temperature, clarity of water, and managed water flows. Bighorn Lake has one of the few viable populations of sauger left in Wyoming, and boasts excellent fishing for channel catfish near the south end of the lake.

Potential Federal and State listed Threatened and Endangered Species in the Bighorn Canyon area include: the bald eagle, Canada lynx, and black footed ferret. Of these, only the bald eagle is found within Bighorn Canyon National Recreation Area. The habitat is unsuitable for the other listed species and they have not been seen in the recreation area.

Listed species of special concern and candidate species may also exist in the recreation area. These include the leopard frog, milk snake, sturgeon chub, mountain plover, sharptail grouse, northern goshawk, black-tailed prairie dog, Townsend’s big-eared bat, swift fox, Merriman’s shrew, long-eared myotis, hoary bat and spotted bat. The recently delisted peregrine falcon may also inhabit the recreation area.

CULTURAL RESOURCES

Bighorn Canyon National Recreation Area is rich in cultural landscapes reflecting over 120 years of ranching, tourism and irrigated agriculture. The traditions of ranching continue today with cattle trailing and grazing in the park as well and the presence of part of the Pryor Mountain Wild Horse Range in the southern unit of the park.

The historical practice of impounding rivers for irrigation and flood control in the arid lands associated with the Bighorn Canyon region led to the creation of the Yellowtail Dam and the National Recreation Area.

Five historic ranches have many of their features such as outbuildings, irrigation ditches, historic fences and cultivated plants still present.

All prescribed fires and treatment activities will be conducted with consultation from the Wyoming or Montana State Historic Preservation Offices, and with appropriate tribal officials. In addition, previously unknown cultural resources or sites may be discovered through prescribed burning efforts.

ARCHEOLOGICAL RESOURCES

Native Americans have used the area of Bighorn Canyon for over 10,000 years as a trail between the Great Plains and the Bighorn Basin and as a hunting ground. The most visible evidence of this use is the Bad Pass Trail where a series of large rock cairns mark the passage of people migrating between the Great Plains and the Bighorn Basin. Other archeological features include buffalo jumps, vision quest sites, flaking sites, teepee rings, wood storage structures and siege sites. The Bad Pass Trail and the Pretty Creek Archeological Site are on the National Register of Historic sites. Before the Yellowtail Dam was built (1965) and in the 1970's, extensive surveys of the archeological sites were conducted and the results digitized for GIS. There are a total of 186 archeological sites in Bighorn Canyon National Recreation Area listed in the National Park Service Archeological Sites Information Management System (ASMIS). Of these 141 are in the South District above the canyon rim (not counting the cairns of the Bad Pass Trail). The sites are clustered along riparian areas, rock cliffs and flat meadows.

HISTORICAL STRUCTURES

Bighorn Canyon National Recreation Area has five historic ranches within its boundaries and four (the Mason-Lovell Ranch, Hillsboro, the Lockhart Ranch and the Ewing-Snell Ranch) are listed on the National Register of Historic Places.

REAL PROPERTY

Real property includes highways, backcountry cabins, trailheads, and developments both private and government owned. Each fire management unit summary includes a list of values to be protected.

3.4.3 Fire Management Objectives

Measurable objectives have been developed which support the program goals listed in Section 3.2.

- Ensure all wildland fire and prescribed fire operations sustain no injuries to members of the public and limit injuries to firefighters to no more than the past five year agency (NPS) average. (Supports Goal #1, #5)
- Contain 95% of unwanted wildland fires during the initial action or within the first operational period. (Supports Goal #1)
- Complete and update annually cooperative fire management agreements with the following agencies/units: (Supports Goal #1)
 - Bureau of Land Management – Wyoming, Cody District; Montana, Miles City District*
 - Bighorn National Forest – Medicine Wheel Ranger District*
 - Bighorn County, MT – Sheriff Office*
 - Lovell Fire Department*
 - Wyoming State Forestry Department*
 - Grand Teton National Park – Fire Management Office*
 - Bureau of Indian Affairs – Rocky Mountain Region*
 - Fish and Wildlife Service-Mountain Prairie Region*
- Utilize minimum impact suppression techniques and rehabilitate disturbed areas to protect natural, cultural, and scenic resources from adverse impacts attributable to fire management activities. (Supports Goal #1, #5)
- Engender understanding among the public, interagency cooperators, park staff and firefighters about the role of fire in the ecosystem, fuels management program needs, and the impacts of fire suppression on sensitive park resources. (Supports Goal #1, #2, #4, #5)
- Ensure that a resource advisor is present on all major suppression actions (any fires that remain uncontrolled after the first operational period) (Supports Goal #1)
- Evaluate park resources at risk from fuels buildup and reduce fuels at high value/high risk sites within 5 years. (Supports Goal #2, #4, #5)
- Integrate recreation area fire education and prevention efforts with those of the adjacent agencies, coordinating educational messages and use restrictions and/or public closures. (Supports Goal #1)

- Monitor, evaluate, and report on the effects of fire (and non-fire) treatments on biotic systems, air and water quality, and cultural resources and quantify the overall effectiveness of these activities to improve the program, with particular emphasis to the following resources (Supports Goal #1 - #5)
 - *Invasive, non-native plant species (spotted knapweed, henbane, houndstongue, various thistles etc.)*
 - *Rare or sensitive plant species (25 species of rare plants Appendix B)*
 - *Critical habitat health for large ungulates (bighorn sheep, wild horses, deer).*

3.4.4 Historic Role of Fire

Wildland fire history and potential fire behavior in the Bighorn Canyon area are not well documented. The only comprehensive study, Fire History and Potential Fire Behavior in a Rocky Mountain Foothill Landscape, A study conducted in the Bighorn Canyon National Recreation Area was done by Yegang Wu in 1991 on Limber pine Woodlands associated with the Pryor Mountains. Based on observed fire scars in the study area of 4-hectare (ha) cells (1ha = 2.47 acres), there were 15 surface fires during the last 109 years (1880-1989) and 10 canopy fires during the last 360 years (1629-1989) within this forest. Most surface fires burned an area less than 49 acres with the average area burned of 44 acres. In 1905, a 632 acre surface fire occurred, causing a 89 acre canopy fire. The 1905 canopy/surface fire also burned across the Jake's Teeth, spires along the east edge of East Pryor Mountain, and continued as a surface fire into the ravines to the west. Most canopy fires observed in the area burned more than 124 acres, and 4 fires burned more than 247 acres. The average number of acres burned in a canopy fire was 247, with the largest fire of 632 acres occurring in 1769. The only area that remained unburned for 360 years was on the steep slopes on both sides of Jake's Teeth. All fires burned uphill and stopped at the ridges.

Wu calculated the mean fire interval (time between fire events) in his study area as seven years at 39 acres. Surface fire intervals ranged from 1-25 years. The mean interval for canopy fires in the study area was 31 years, on the average of 100 acres, with a range from 5-110 years. Comparing surface fires to canopy fires, there were 15 surface fires to 3 canopy fires in the last 109 years. The mean fire intervals for surface and canopy fires in the study area were similar to those in Douglas fir forest in the northern Rocky Mountains. Bighorn Canyon has not had a crown fire, at least in the area studied, since 1905. However, the probability of a canopy fire in the near future is increasing, as it's been 94 years since the last occurred.

Two other studies, Vegetation Ecology in the Bighorn Canyon National Recreation Area, by Dennis H. Knight, George P. Jones, Yoskiko Akashi, and Richard W. Myers (1987); and Riparian Vegetation Dynamics along the Bighorn River, Wyoming, by Yoskiko Akashi (1988), address more general plant ecology issues with some discussion of fire history in the studied plant communities. In the study performed by Knight and associates, Knight did not analyze fire scars to determine frequency or intervals of fires in his study area. He did, however, observe mosaics created by fire with younger trees interspersed with older stands.

Akashi (1988) produced maps of the Yellowtail Habitat Management Area based on field observation and aerial photos of several large and small burns during the period 1938-1986. She also cored several cottonwoods with fire scars. Akashi was especially interested in fire history as an indicator of changing vegetation. She found that fire was the most significant disturbance to creek woodlands among beaver damage, grazing/browsing, recent flooding, or bank erosion. She also found that the area burned by major fires and those converted to agricultural lands were largest between 1954 and 1961. The major fires occurred from 1955 to 1960, burning over 250 acres in total. They tended to be intense, destroying considerable portions of the woodlands in the study area. No major fires occurred between from 1938 to 1954. Cultivation of lands began in that area around 1954 and continued until 1967 when it became a part of the Yellowtail Habitat. Although fires were still observed occurring after 1967, they tended to be smaller and lower in intensity. In some areas on National Park Service land within the Yellowtail Habitat, agricultural lands and associated activities such as ditch and field burning are still allowed through a permit process managed by Wyoming Game and Fish.

Additional information has been derived from Ecological Role of Fire in Western Woodland and Range Ecosystems, by Walter F. Mueggler (1972), regarding fire behavior in vegetation types similar to Bighorn Canyon. The sagebrush-grass steppe found in over 12% of the recreation area has been generally accepted as a climax shrub accompanied by an understory of grasses and forbs over much of its range. Fire occasionally swept across the sagebrush-grass steppes during their development. Sagebrush is highly flammable when dry. During the dry summer months, an understory of cured grasses and forbs would readily carry a fire, even if the shrubs were scattered.

Most fires at Bighorn Canyon occur in the Juniper and mountain mahogany woodlands, a vegetation type covering 40% of the recreation area. Juniper woodlands have greatly extended in range and dominance since

settlement throughout the West. This extended range has been attributed to overgrazing, fire exclusion, dispersion of seed by livestock, or a combination of these factors. Grazing of livestock and wild horses has been occurring in this area since the late 1800's. Grazing also affects the distribution of fine fuels, and therefore tends to curtail fire spread. Fire, directly or indirectly, contributed to regulating the distribution of juniper. Young junipers are susceptible to fire until they reach heights of three or four feet. If the grass understory has been eliminated or reduced through grazing, fire will not occur to the same extent or intensity across the landscape. With more of the area covered by juniper, there is less ability for grasses and forbs to compete. The fire return interval in Juniper woodlands is considered to be 30 to 50 years.

The lack of adequate fire history and knowledge about fire behavior inhibits the park's ability to understand the natural role of fire in a healthy landscape and habitat. The research of Wu's, Akashi's, Knight's allows some general conclusions to be made. First, an East Pryor Mountain crown fire, at least along the eastern flank, is very probable. Suppression of fires near that area in recent years has allowed for a continued buildup in fuels as noted in Wu's study. Second, grazing activity has reduced grasses and forbs leading to an increase in Juniper Woodlands. This expansion can only be inhibited by fire or mechanical removal. Third, the ongoing agricultural use and associated burning activities, enhanced with the continuous supply of driftwood, makes the Yellowtail area particularly vulnerable to a wildland fire that would kill older cottonwood stands. Akashi's study clearly correlated agricultural use to large fires during the 1955–1960 period. Also, the recreation area in recent times has recorded and responded to an increase in incidents of wildland fire occurring due to escaped ditch and field burning. Akashi also addressed the endless accumulation of fuels in the floodplain that no longer are flushed by seasonal river flows. Finally, in reviewing the three studies, the need for one comprehensive study on fire history and behavior is apparent and paramount to returning fire to its natural role. This study may occur as funding allows.

3.4.5 Wildland Fire Situation

3.4.5.1 Historic Weather Analysis

All three FMU's share the same annual weather patterns, taken from Knight, et al (1987). Daily temperatures are lowest in January, averaging 16.8 degrees Fahrenheit, and are the highest in July, averaging 71.8 degrees Fahrenheit. The frost-free period begins about May 16 and lasts an average of 125 days at the lower elevations. Average annual precipitation at the lower elevations ranges from six to seven inches near Lovell to 18 to 20 inches near Fort Smith. Spring rainfall accounts for two-thirds of the precipitation with the balance coming from snow. Snow cover is short with mild weather occurring frequently during the winter months.

Fuel moistures are at their maximums for live woody and herbaceous plants during the spring when plants are actively growing. Dead fuel moistures in large size classes reach minimum values during the late summer and fall months. Indicators of fire danger as computed through the National Fire Danger Rating System (NFDRS) show that fire danger is highest when fuel moistures are lowest and when plants are not actively growing. The Hillsboro RAWS was installed for NFDRS predictions in March of 2003 with a WIMS description established mid summer 2003. A historical records log is not available since this is a new station and current records are not of a significant period of record to provide a basis for meaningful analysis. A network of NFDRS weather stations in the Bighorn Basin is currently used to determine staffing class for the recreation area. The following weather stations may provide useful data for historic weather analysis for the recreation area (also see Section 4.2.2.4 – Fire Weather and Fire Danger)

Station Name	Station ID #	Observing Agency	Elevation	Latitude	Longitude
South Bridger	245604	Montana BLM	4725	45° 12' 28"	108° 47' 31"
Bighorn Mountain	245107	Montana BLM	7280	45° 05' 45"	107° 53' 52"
Pryor Mountain	245106	Montana BLM	6160	45° 20' 43"	108° 30' 03"
Hyatt High	408307	Worland BLM	5720	44° 18' 00"	107° 30' 58"
Hillsboro	245609	BICA NPS	3986	45° 06' 14"	108° 13' 08"

3.4.5.2 Fire Season

Fire activity within Bighorn Canyon and surrounding lands, was not reported until the establishment of the recreation area in 1966 when suppression activities became formalized and recorded. Of the 47 fires recorded from 1966 through 1998, Bighorn Canyon averaged 2 fires per year burning less than 5 acres per fire. Fifty

percent of the fires were 1 acre or less, with 34% of the fires burning 10 or more acres. The fire season began in March and continued through September when our largest recorded fire of 155 acres occurred.

3.4.5.3 Fuel Characteristics

Fuels within Bighorn Canyon NRA can be described by 5 fire behavior fuel models (FBFM 2, 5, 6, 8, 9). Fire suppression, lack of wetland flood events, conversion to agriculture, and grazing have combined to greatly affect fuel characteristics. In many areas, fuels will not sustain prolonged fire spread due to their arrangement. In those areas where fire will carry, topographic influences such as bare ridges or canyons may limit fire size.

Ground Fuels: Duff and buried logs are relatively rare within the recreation area due to the arid nature of the environment. These fuels exist in the Yellowtail Unit and the Pryor Mountain Unit in areas where timber canopy is closed or nearly closed providing shading and conditions where duff layers can accumulate. Within the Canyon Unit, ground fuels exist but are not considered to be a major component of the fuel characteristics due to their scattered distribution and arrangement.

Surface Fuels: Grasses, small dead wood, downed logs, and low shrubs, are the most widespread fuel type within the recreation area, occurring with relative abundance in all three fire management units. The horizontal and vertical arrangement of these fuels will determine fire behavior with areas of high concentrations of these fuels creating control problems including high flame lengths, rapid rates of spread, and spotting.

Aerial Fuels: Upper forest canopy branches, tree crowns, snags, and high shrubs are arranged in the riparian corridor and higher elevations within the recreation area. The Yellowtail Unit contains abundant aerial fuels primarily deciduous trees and shrubs which will sustain crown fires only under extreme conditions or when abundant surface fuels create high flame lengths. In the Pryor Mountain Unit, coniferous trees, juniper and mountain mahogany woodlands, exist with patchy continuity especially within drainages and on shaded aspects. In the Canyon Unit, aerial fuels are primarily juniper and mountain mahogany and fire spread from tree to tree requires extreme burning conditions and abundant surface fuels. Groups of trees and brush are common, often separated by light grasses, bare ground, or rock. Fire behavior needs to be extreme to involve aerial fuels throughout much of the recreation area.

3.4.5.4 Fire Regime Alteration

Suppression of fire, grazing, and lack of flooding disturbance in the riparian zones have all contributed to alteration of historic fire regimes in Bighorn Canyon NRA. These effects are most widespread in the mid to low elevation areas of the recreation area in the Juniper-Mountain Mahogany vegetation type. This relatively short fire frequency regime may have missed several fire cycles. In the forested areas, fire regimes are only slightly altered due to the longer fire return interval in the high elevation timber, and the occurrence of some small fires in the lower elevation ponderosa pine stands.

4 FIRE MANAGEMENT OPERATIONAL GUIDANCE

4.1 Management of Unplanned Ignitions

Wildland fire in the recreation area will be managed to enhance resource protection, diminish risk and consequences of severe wildland fires and, to the extent possible, increase the health of naturally occurring vegetative communities and watersheds.

The Area will employ a strategy of appropriate management response to all wildland fire starts. Selected management strategies will consider public and firefighter safety as the first consideration, with the ultimate goal of suppressing the fire. Tactics will consider resources at risk as well as the effects on park resources of selected suppression tactics.

The initial assessment of any wildland fire will include a thorough fire size-up (Appendix C) describing the fire situation and providing information to support the initial response. This initial size up information will be input in to the Wildland Fire Decision Support System (WFDSS) for use in developing further management plans as needed. Initial action on human-caused wildfires will be to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety.

Prior to prescribed fire implementation, a specific operational plan, Prescribed Fire Burn Plan, will be completed. This plan will implement objectives identified in resource management plans and guidelines or this fire management plan. Prescribed fires exceeding prescription parameters beyond the capacity of on-site resources to control will be converted to a wildland fire with appropriate guidance documentation developed.

4.1.1 Preparedness

4.1.1.1 Coordination

During periods of extended attack and continued fire activity communication will occur frequently with local, county, and state government representatives and local media personnel in order to inform the public. A roster of available local resources will be maintained by the Cody Dispatch Center. These local resources will be utilized to the greatest extent possible in the implementation of the activities outlined in this plan.

Local resources will also be utilized and coordinated through local and county officials when needed for rest and recuperation of firefighting resources brought in to the area for fire operations. See the Pre-Attack Plan for logistical assistance with food, lodging, etc.

If the following conditions exist the indicated coordination will be completed.

- Bighorn Canyon NRA Staffing Class IV (Very High) or V (Extreme).
- Any uncontained fire or if threatening adjacent private or public lands.
- Depletion or exhaustion of local, or the Recreation Area's firefighting resources

Fire Start Notification Check List

1. The Fire Coordinator notifies the Chief Ranger who notifies the Superintendent.
 - Kevin Tillman – Chief Ranger: (406) 666-3304 (432) 533-8793 cell
 - Jerry Case – Superintendent:
2. The Fire Coordinator will notify and coordinate with the West Zone Fire Management Officer (FMO) of Bighorn National Forest (Medicine Wheel Ranger District). For fires originating in the northern portion of the park the Crow Agency FMO will also be contacted to coordinate adequate staffing for the fire.
 - Dale Kissner – Fire Coordinator: (307)548-5401 (cell) (928) 606-1160
 - Todd Legler – West Zone FMO: (307)548-5312 (cell) (307) 272-5804
 - Marvin Matthiesen – W Zone AFMO: (307) 548-5313 (cell) (307) 272-8552
 - Bryce Rogers- Crow Agency FMO: (406)638-2247 (cell) (406) 665-5072
3. The Fire Coordinator will notify Cody Dispatch Center with current fire size-up and resources on scene. Cody Dispatch Center is the primary dispatch office for all fires occurring within Bighorn Canyon NRA.
 - Cody Dispatch Center: (800) 295-9954
4. The Incident Commander will order additional Resources needed through Cody Dispatch Center.

5. Within 24 hours, the fire coordinator or designee will notify Grand Teton National Park FMO, DFMO or Fire Program Management Assistant regarding current and projected fire status.
 - Grand Teton Fire Management Officer: (307) 739-3310
 - Grand Teton Deputy FMO: (307) 739-3313
 - Grand Teton National Park Fire Prg Mgmt Assistant (307) 739-3311
 - Teton Interagency Fire Dispatch: (307) 739-3630

6. The Grand Teton Park FMO or designee will notify the Intermountain Region to assure appropriate accounts are established. Authorization to expend beyond the pre-identified expenditures of the step-up plan will be obtained with assistance from the Grand Teton National Park FMO. Severity requests will be submitted through the Intermountain Region through the Grand Teton NP FMO by submitting a funding request with a severity assessment.
 - Intermountain Region Fire Duty Officer (720) 381-2481

4.1.1.2 Annual Training Activities

All personnel taking part in the fire program will meet current agency and NWCG standards (National Interagency Incident Management System, Wildland and Prescribed Fire Qualification System Guide, PMS 310-1) for training and job qualification. All line-going personnel will have a current “Red Card” (Interagency Incident Qualification and Certification Card) rated at the appropriate physical fitness level and job skills for the position they are fulfilling on the incident. The qualification system sets required prerequisite training and job experience for each identified ICS position, along with an associated physical fitness requirement.

Local level training is coordinated and hosted at various federal and state land management agencies. Some examples of local level training are Basic Fire School (S-130 Intro to Wildland Firefighting, S-190 Intro to Wildland Fire Behavior), Portable Pumps and Water Supply (S-211), Power Saws (S-212). These classes teach basic fire skills or knowledge about local incident management. Also included in local training is the required Annual Fire Safety Refresher. All NPS personnel participating in fire suppression or prescribed fire activities who may be subject to assignments on the fireline are required to attend 8 hours of annual refresher training prior to being considered current for the season (Interagency Standards for Fire and Fire Aviation Operations, Red Book).

Training beyond this level is offered through interagency training centers coordinated at geographic areas. Personnel desiring to develop additional skills in fire command, operations, or other incident management areas typically require additional higher-level training. A training needs analysis will be completed in the fall of the year to ensure adequate local training is provided and nomination deadlines are met for out-of-area training offerings. These nominations will be initiated by the interested student, approved by their supervisor and forwarded to the course coordinator through the park fire coordinator, to ensure prerequisite skill and training requirements are met.

Incident experience, training attendance, and other incident qualifications data is entered and archived in the Interagency Incident Qualifications and Certifications System (IQCS) database. This database is utilized to create Red Cards for the fire season. A pre-season review of personnel records will ensure up-to-date and accurate records prior to issuance of Red Cards. Upon attendance of the annual fire safety refresher and completion of the requisite Work Capacity Test (Walk/Field/Pack) a Red Card will be issued and approved by the Grand Teton NP FMO. This card will document all qualified positions and trainee positions for which an employee is current for the season. This information will also be made available to the servicing dispatch center for potential out-of-area mobilizations.

4.1.1.3 Annual Fire Readiness

To prepare for each upcoming fire season, BICA will complete a training analysis, equipment inspections, inventory readiness, and other tasks. In addition, coordination with agency cooperators is imperative.

Training: In January, the Fire Coordinator or Chief Ranger will review all red carded employee records and certifications. Appropriate training will be sought out for employee development and to ensure the proper number and appropriate skills are available.

Annual Preparedness Review: An annual preparedness review using the interagency standards will be completed during the spring, prior to the fire season using interagency cooperators where available. Comments

and a review summary will be given to the Park Superintendent with a copy forwarded to the GRTE Fire Management Officer and the Intermountain Regional Office.

Annual Tasks:

January:

- Perform fire physical exams and fitness tests as per standards in *Reference Manual 18*.
- Review and update cooperative agreements with neighboring fire management agencies.
- Review red cards and training.
- Complete review of Fire Management Plan and approve annual update as needed.

February:

- Inventory fire equipment and update equipment lists. Include the fire cache and personal equipment.
- Order supplies.
- Review step-up plan.
- Schedule annual preparedness review.
- Inspect all fire equipment. Check operation of engine pump and backpack pumps.
- Check established procedures for using suppression and emergency preparedness accounts, verify accounting structures approved for the current fiscal year.
- Complete and update all prescribed fire plans for spring season and have them signed by the superintendent.

March:

- Obtain or prepare signs regarding prescribed fire interpretation.
- Schedule Fire Safety Refreshers and Pack Tests for Red Cards

March to Mid October (Fire Season):

- Inspect all fire equipment for readiness; operate engine monthly.
- Complete all prescribed fire plans for the fall season and have them signed by the superintendent.
- Coordinate local training needs with adjacent cooperators.
- Complete annual safety refresher training and issue pocket cards.
- May 1: Red Cards signed and issued to employees
- Complete after action reviews following each incident.
- Complete a Wildland Fire Report within 10 days of each incident and submit to Grand Teton National Park for review and entry.
- Ensure fire replacement of equipment and supplies is completed in a timely manner and prior to the fiscal year end.
- Evaluate individual performance of staffs, correct deficiencies and recommend personnel for training.

November:

- Critique fire season, including all fire management activities (i.e. wildland fire suppression, prescribed fires and mechanical fuel treatments, prevention, etc.)

December:

- Update and submit fire experience and training to Grand Teton National Park for entry in to the interagency qualifications system.

4.1.1.4 Step-Up Staffing Plan

Emergency preparedness includes all activities that are conducted in advance of a fire occurrence in order to maintain and improve the agency's ability to properly manage the fire program and individual ignitions. It describes actions taken to provide enhanced initial attack capability during very high or unusual fire danger periods caused by significant wind events, dry thunderstorms, or prolonged drought. Weather stations, fire danger/drought monitoring, situation reporting, initial attack readiness, and extended attack readiness will be maintained.

Appropriate activities for emergency preparedness funds include hiring of emergency temporary firefighters, placing existing staff on extended tours of duty, increasing or initiating special detection operations, and pre-positioning personnel or equipment. These actions are aimed at ensuring prompt response to wildland fire incidents.

In accordance with direction in Reference Manual 18, all step-up actions described in a Preparedness Plan under an approved Fire Management Plan are authorized to be charged to an appropriate preparedness funded account. The Fire Coordinator will request from the AO that an emergency preparedness account be established under the appropriate PWE to charge costs for approved actions (extended shifts, additional staff on duty, etc.). The FMO, Grand Teton NP will be notified in the event such actions are undertaken. The Fire Coordinator and the FMO will work together to determine when fire danger and seasonal conditions warrant the request of funds under a severity situation.

The recreation area's authority to expend emergency preparedness funds is tied to the National Fire Danger Rating System (NFDRS) Burning Index (BI), 90th percentile, as outlined in the Step-Up Plan at the Staffing Class IV and V level. The GRTE Fire Management Officer will be notified if an emergency preparedness account has been opened. Authorization to expend beyond the pre-identified actions of the step-up plan will be obtained from the Regional Fire Management Officer and will typically be identified in a severity request to cover extended periods of severe drought. Extensive severity requests may require approval at the National Fire Management Officer level. The GRTE Fire Management Officer will assist BICA in formulating a severity request.

As fire danger increases, organizational preparedness will increase with additional patrols, increased public education, and the readiness of equipment and other resources. Preparedness actions are defined in the Staffing Plan found in Appendix F. Specific staffing thresholds are identified in the Cody Dispatch Zone Fire Danger Rating Operation Plan. Bighorn Canyon NRA is included in the Bighorn Basin fire danger rating area (FDRA).

Hillsboro Weather Station (2004-6/2006)				
Staffing Class	Burning Index	Energy Release Comp.	1,000 Hr FM	Adjective Class
I	0 – 22	0 – 6		LOW
II	23 – 44	7 – 11		MODERATE
III	45 – 87	12 – 21		HIGH
IV	88 – 98	22 – 23	10th % - 7.57%	VERY HIGH
V	99+	24+	3rd % - 6.74%	EXTREME

Bighorn Basin FDRA (1993- 2009)				
Staffing Class	Burning Index	Energy Release Comp.	1,000 Hr FM	Adjective Class
I		0 – 36		LOW
II		37 - 51		MODERATE
III		52 - 63		HIGH
IV		64 - 73		VERY HIGH
V		74+		EXTREME

4.1.1.5 Pre-Attack Plans

The goal of the Pre Attack Plan, Appendix G, is to pre identify those command, planning, and logistical needs and concerns that would arise in most extended attack and large fire support scenarios at the recreation area. Close coordination will need to exist between an extended attack IC or Incident Management Team and the assigned local agency representative. Reliance on the servicing dispatch center, Cody is also key in these instances. Many logistical needs can be met through utilization of the dispatch center Service and Supply Plan and the appropriate logistics coordinator familiar with Emergency Equipment Rental Agreements in place and available to the interagency community. Many issues though will need to be decided upon locally (camp/staging area location, aerial operations hazards and considerations, telephone and utility accessibility, etc.). A carefully thought out Pre Attack Plan can assist in this.

Prior to fire season the pre-attack plan must be updated and incorporated in this plan. Some information found in the pre-attack plan is mentioned in the Annual Preparedness Activities section, other pre-attack plans are informally discussed among the red-carded fire fighters.

4.1.1.6 Records and Reports

The basic report for documenting a wildland fire and prescribed fire activity is the Wildland Fire Report. The report is valuable as it provides a historical record of the fires for the recreation area. It is important that all fires that occur within the boundaries be documented using this form including fires that go out on their own when the location can be documented. Incidents known as Support Actions, where recreation area personnel respond to fires outside their boundary are also reported on this form. A fire report also provides documentation of fire personnel responding.

The latest version of the Wildland Fire Report will be used to document fire starts and responses within 10 days of the fire being declared out. The report will be sequentially assigned a fire number by calendar year; i.e. fires in 2005 are numbered 5001, 5002, 5003, etc. These reports will be sent electronically to Grand Teton National Park for review. The Fire Coordinator is responsible for completion, tracking, and archiving records and reports. Grand Teton NP will ensure reports are entered in to the Wildland Fire Management Information System. Note that all responses within and outside of BICA will have a report completed.

A complete fire report file will include the following attachments:

- Situation Map
- Personnel lists
- Accident reports
- All weather data reports and records
- Additional items documented to file:
 - Any written policies, guidelines & authority statements signed by the Superintendent
 - Initial Fire Report (Fire Size-Up)
 - Wildland Fire Decision Support System (WFDSS). An analysis is required when a fire has escaped initial attack or the situation requires a change in strategy. The Chief Ranger in consultation with appropriate staff, including designated personnel by the Chief of Resources, will prepare the Analysis. The Superintendent will approve it.
 - Copies of equipment/supplies purchased
 - Press clippings
 - Documentation of financial charges made against the fire account
 - Rehabilitation plan
 - Monitoring data

In addition to Wildland Fire reporting, fire activity and staffing levels are reported daily to the Rocky Mountain Geographic Area Coordination Center through Cody Dispatch. Fire information is processed and shared with all fire agencies so that commitments of firefighters and equipment within the region and the nation are coordinated.

Incident Status Summary (ICS 209) forms will be completed by the IC no later than 1800 each day for fires that meet large fire reporting thresholds (see the current Rocky Mt Area Mobilization Guide for further information). These will be faxed or emailed immediately to Cody Dispatch Center.

Fire Experience, Fitness Test Results, and Qualifications

Individual Employee Master File Record and Update Form will be completed by the Fire Management Coordinator on fire personnel and submitted to Grand Teton NPs Fire Program Management Assistant for qualifications updated on an annual basis. Health screening and pack test documentation will be sent annually as well.

4.1.1.7 Potential Range of Fire Behavior

Fuel models describe living or dead fuel matter and how they react to fire (Anderson, 1982). Fuel models, in conjunction with moisture and wind factor, are used primarily in determining fire danger ratings for a specific area. They are also useful in describing fire behavior in certain vegetation types or cover. The six major vegetation types described in Section 3.4.1 can be described by the following fuel models (also described in Sec. 3.4.1).

Fuel Model 2: This fuel model will be used in estimating fire behavior in the sage/grasslands community. Fire spread is primarily through the fine herbaceous fuels, either curing or dead. Surface fires can spread easily. Some juniper may be in this model. Sagebrush is highly flammable when dry. During the dry summer months, an understory of cured grasses and forbs would readily carry a fire, even if the shrubs were scattered. Fire spread and intensity is increased significantly with an increase in winds.

Fuel Model 5: Fire is generally carried in the surface fuels that are made up of litter cast by the shrubs and the grasses or forbs in the understory. The fires are generally not very intense because surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area. Young, green stands with no dead wood would qualify such as chamise. Young green stands may be up to 6 feet (2 m) high but have poor burning properties because of live vegetation.

Fuel Model 6: Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but requires moderate winds greater than 8 mph at midflame height. Fire will drop to the ground at low wind speeds or at openings in the stand. This model covers a broad range of shrub conditions. Juniper shrublands may be represented, but the rate of spread may be overpredicted at wind speeds less than 20 mph. Fire behavior varies widely, depending on the fuel type being modeled. Continuous fuel beds would readily carry fire and could work as a ladder fuel to carry fire to the canopy.

Fuel Model 8: Closed canopy stands of healthy, short-needled conifer support fire in the compact litter layer. This layer is mainly needles, leaves, and some twigs since little undergrowth is present. Representative

conifer types are lodgepole pine, spruce, and fir. Slow-burning surface fires with low flame heights are typical, although heavy fuel concentrations can cause flare-ups. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Low intensity fire behavior is normal for spruce/fir stands. Intense fire behavior occurs when fire spreads into other fuel types. This may occur in late fall when cured vegetation dries out sufficiently to carry a fire. Ladder fuels in dry conditions may carry fire into the canopy, torching the trees, and produce short-range spot fires. Extreme fire is possible only under extended drought conditions.

Fuel Model 9: Fires run through the surface litter faster than model 8 and have higher flame lengths. Closed stands of long-needled pine such as ponderosa are grouped in this model. Concentrations of dead/down woody material will contribute to possible torching out of trees, spotting, and crowning. Fire spread is primarily in surface litter such as concentrations of dead, dry needles in fall or spring. Fires run through the surface litter and possibly torch out trees, spot, and crown where concentrations of dead-down woody materials are encountered.

Fire Behavior Characteristics by Fuel Model

Fine Fuel Moisture %	Eyelevel Windspeed MPH	Rate of Spread* Ch/hr					Flame Length* Feet				
		Fuel Model					Fuel Model				
		2	5	6	8	9	2	5	6	8	9
10	0	2.9	2.0	1.8	0.2	0.8	1.9	1.9	1.5	0.4	0.9
6	5	12	12	12	0.6	2.0	3.8	5.1	3.7	0.6	1.5
4	7	20	19	20	0.9	3.3	5.0	5.8	4.9	0.8	2.0
2	10	43	33	37	1.6	6.5	7.6	7.7	7.0	1.1	2.9

*Fine fuel moistures and windspeeds derived from Britton Springs historic weather data from 1999-2003. Fine fuel moistures 2-10% and eyelevel windspeed of 0-10 mph. Rate of spread is measured in chains/hour and flame lengths are measured in feet. Results from Behave Plus 2.0.2.

4.1.1.8 Fire Weather and Fire Danger

Fire weather is currently forecast for the recreation area by the National Weather Service, Billings, Montana, Forecast Zone 129. Additional forecast information for adjacent lands in Wyoming can be obtained from the National Weather Service, Riverton, WY Forecast Office, Forecast Zone 275. Fire weather forecasts are produced twice daily during fire season, approximately April 1 – October 31, and spot weather forecasts are available for federal land managers 24 hours a day, 365 days a year from the Forecast Office.

Forecast products are available on the NWS website -

Billings website for Zone 129:

http://www.wrh.noaa.gov/byz/get_fwzones.php?wfo=byz&sid=byz&pil=fwf&zone=129

Riverton website for Zone 275: <http://www.crh.noaa.gov/riw/firewx/fwz.php?zone=WYZ275&wfo=riw>

Fire weather forecasts are broadcast daily during fire season by the Cody Dispatch Center on both BLM and USFS radio frequencies. Additionally information can be found at the Cody Dispatch Center web page http://gacc.nifc.gov/rmcc/dispatch_centers/r2cdc/. The Lovell Visitor Center will broadcast fire weather information daily during the fire season over the BICA radio network.

Due to inadequate fire weather data specific to Bighorn Canyon NRA, fire danger ratings are not issued specifically for the recreation area. The step-up plan is based on indices developed for an interagency Fire Danger Rating Area as outlined in the Cody Dispatch Zone Fire Danger Rating Operating Plan. Bighorn Canyon NRA is included in the Bighorn Basin FDRA. The FDRA includes the following weather stations; Hyatt High 480307, Split Rock 480904, Grass Creek 480804, Rattlesnake 480212.

The Hillsboro RAWS (#245609) was established in the spring of 2003 and is currently activated in WIMS to begin to predict fire danger ratings for conditions in the 4000-foot elevation open juniper woodland vegetation type. This site is adjacent to the Pryor Mountain FMU in the Canyon FMU, above the Barry’s Landing campground, boat ramp, and picnic area. The values obtained at this station will be monitored during the fire season, however it will not be incorporated into the Step-Up Plan until a valid historical weather set is archived (typically 10 years). Indices and staffing levels from the Hillsboro station are included below for comparison purposes only.

4.1.1.9 NFDRS

National Fire Danger Rating System (NFDRS), which provides daily fire danger indices relating to the potential and expected fire behavior for fires that start on a particular day, will be used for predicting fire danger. The

NFDRS indices used within the recreation area are primarily the energy release Component (ERC) and Burning Index (BI).

The NFDRS indicates the potential for, and severity of, wildland fire occurrence. The Energy Release Component for NFDRS fuel model T2P2 (sagebrush/grass) will be used to indicate fire danger for the recreation area. As fire danger increases, the organization level of preparedness will increase. Preparedness actions are defined in the Step-Up Staffing Plan found in Appendix F.

After careful analysis of fire history and fire weather conditions, the Energy Release Component has been selected as the fire danger component for preparedness planning and staffing. While Burning Index has previously been used, ERC provides managers with a smoother index that normally does not change drastically on a day-to-day basis. Fire managers need to understand that ERC does not consider the short-term effects of wind on daily fire danger. Staffing levels and park restrictions/closures will be considered, using all of the above factors, and in consultation with other neighboring agencies, not just the energy release component. The use of preparedness funds will be directly tied to the Burning Index and Energy Release Component, as described in the Step-Up Plan (Appendix F)

4.1.1.10 Fire Prevention Activities

A critical part of any fire management plan is a wildland fire prevention program. Bighorn Canyon will conduct a fire prevention program implementing an educational outreach program, providing educational programs for park staff and the visitor, signing and posting fire information, publishing press releases, and involving the community.

A variety of strategies are used to address the risks of human-caused fires. Park staff and visitors should be educated to where fires are appropriate and where they are not. This is a matter of education, signing and posting the relevant regulations. Where fires are allowed in specific places such as campgrounds and picnic areas, fire rings must be cleared of ladder and extension fuels. In areas where fires are allowed in unspecified places, such as in the Habitat and along the lakeshore below the high water line, emphasis must be placed on fire care. For those interested in backcountry camping away from the lake, they are advised to contact a ranger or the visitor center for current restrictions and information. Campground bulletin boards will be posted with fire restrictions and other regulations.

When fire danger becomes very high or extreme, the park imposes restrictions that limit visitor activities. Restrictions begin with limiting fires to campgrounds only, progressing to no fires anywhere within the recreation area. Smoking may also be restricted during periods of extreme fire danger. Closures may occur in backcountry campgrounds. Fire personnel rate the fire danger every day during fire season. The fire danger level will be posted at the entrance of the park each day for park staff and visitors to see. Restrictions and closures based on elevated fire danger are implemented in coordination with local interagency cooperators in accordance with the Wyoming Fire Restrictions Plan (Appendix E)

Articles on fire will be completed by park personnel for publication in local news outlets. Various themes will be addressed, covering fire and resource management, fire suppression tactics, and fire prescription. Outreach/education programs will be utilized for reaching a younger audience.

Park and concession employees are another audience that will be approached due to the considerable amount of time they spend in the park and with park visitors. As with other park employees and park visitors, concession employees will receive training in: 1) fire prevention as a good example for others to follow; and 2) becoming familiar with fire regulations and policies to better able to inform others.

If notification/education is the first step to fire prevention, then enforcement is the second. Park users' activities will be monitored to ensure safe activity and compliance with restrictions or closures. Patrols and level of action will increase as the amount of fire risk and the level of human activity increases in the park.

As part of the Annual Emergency Operations Plan, a Prevention Analysis and Plan will be developed and then updated each year.

It is the responsibility of all park employees to promptly report any wildland fires within or adjacent to the recreation area. All initial reports of fire within the park will be relayed to the Chief Ranger or Fire Program Coordinator who will dispatch resources and notify Cody Dispatch Center.

During or after lightning activity or during high fire severity, fire detection patrols over and above regular ground patrols by park rangers on roadways, lakes and trails will be made. Patrols will also increase in areas where non-traditional park uses occur such as around the landing strip near Fort Smith, Montana, and along the Burlington Northern Railroad line at the south end.

Assistance from other agencies such as Crow Tribe/BIA may allow aerial detection flights on occasion

4.1.1.11 Air Quality and Smoke Management

National Park Service fire management activities, i.e., all fires which result in the discharge of air pollutants (e.g., smoke, carbon monoxide, and other pollutants from fires) are subject to, and must comply with, all applicable federal, state, interstate, and local air pollution control requirements as specified by Section 118 of the Clean Air Act, as amended (42 USC 7418). It is not the primary intent of the Clean Air Act to manage the impacts from natural sources of impairment. Smoke from these fires is an inevitable by-product. Fires are not considered point sources of emissions, but tend to be spatially-distributed, singular events during the progress of management approved, ecologically essential fires. These fires are termed ecologically essential because fire plays a principle, and in some cases, a dominant role in maintaining the integrity of park resources. Impacts are still a concern, however, and agencies are held accountable for air quality standards. Smoke must be managed prior to exceeding standards not when standards are exceeded. Although there may be several sources of emission, each source is accountable to contributing or causing to exceed standards.

Prescribed fire activities will only be undertaken considering atmospheric stability and associated smoke dispersion characteristics. When conditions are unfavorable for smoke dispersion (and air quality standards threatened), ignitions would be postponed or the fire extinguished. During suppression activities, an appropriate management response will be taken to promote favorable smoke dispersal and minimal impact on communities. This may mean the appropriate management response will be to immediately suppress all fires. During both suppression and prescribed fire activities an individual will be identified to track air quality conditions such as the ventilation and concentrations of smoke.

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

1. All burn plans will have clear goals and objectives.
2. Prescribed burns ignited in proximity to structures or significant visitor use areas will be ignited during periods of low visitation. They will also be ignited only if the prevailing winds will carry the smoke away from the facilities or areas of visitor concentration.
3. Current and predicted weather forecasts for smoke dispersal will be utilized along with test fires. Smoke dispersal will be visually monitored at set intervals during the course of all prescribed burns. If air quality standards are exceeded or smoke creates a hazard or annoyance, especially in or near smoke sensitive areas, the prescribed burn will be managed to reduce impacts or be put out.
4. When prescribed fires are conducted, notification must include the states of Wyoming and/or Montana Air Quality Divisions, Cody Dispatch Center, the U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs and Crow Tribe, state agencies, local communities, park staff, park concessionaires, and park visitors.

All prescribed fires will comply with current smoke management regulations as required by the Wyoming Department of Environmental Quality, Air Quality Division (WDEQ/AQD). Section 12 of Wyoming's air quality regulations prohibits activities that would violate the Wyoming Ambient Air Quality Standards for total suspended particulates. Current regulations require notification of DEQ regarding planned burn events, documentation of emission reduction techniques utilized, alternatives to burning considered, public notification, visual smoke monitoring, and post-burn reporting.

The State of Montana differentiates prescribed fires into two categories, "Major Open Burning" and "Minor Open Burning", based on the amount of carbon monoxide, particulate matter (PM10), or other pollutants emitted into the air under State of Montana, Air Quality Rules, Administrative Rules of Montana, Chapter 17.8, Subchapter 6. With Major Open Burning, a permit is required and must adhere to "Best Available Control Technology" (BACT), a set of standards established by the Department of Environmental Quality based on techniques and methods of controlling emissions. Minor open burning must also adhere to BACT, and during certain months of the year will require notification to the Department. Depending upon the size of the burn, Montana will be contacted and will issue a permit, if needed.

Management actions applied to a fire can consist of a range of suppression oriented responses, ranging from aggressive initial attack to a combination of strategies to achieve confinement. There may be periodic fire occurrences that warrant a combination of strategies that result in aggressively suppressing a portion of an unwanted wildland fire as well as confining the fire within the remaining fire perimeter in order to meet other objectives (firefighter safety, minimize cost, maximize utilization of scarce suppression resources, or avoiding

detrimental effects of aggressive direct suppression actions). These situations will be closely scrutinized and appropriate decision documents articulating selected strategies will be developed.

Any prescribed fire that exceeds the unit boundary or prescription as defined in the prescribed burn plan will also receive a prompt suppression action. This process is further outlined in Section 4.3.2 Exceeding Existing Prescribed Fire Burn Plan.

4.1.2 Incident Management

The initial attack response will be consistent with management objectives described in the General Management Plan and Resource Management Plan and elaborated on in this FMP. The primary goal of any suppression action is to control the fire. Firefighter and public safety will always be the primary objective, while the effects of fire suppression actions will be weighed against fire control objectives. Minimizing fire size is not always paramount to a safe, effective fire suppression action on NPS lands. Consideration must be taken in regards to historic and pre-historic sites, sensitive plant communities, etc. In many cases it would be preferable to take an indirect action from an existing fuel break (roadway, bare ridge, fuel type change) versus an aggressive direct action requiring line construction and significant off-road activity.

Coordination among the various local landowners (NPS, private) will facilitate safe, effective suppression actions allowing for access to and knowledge of road systems and resources at risk.

4.1.2.1 Typical Fire Response Times

Because initial attack resources vary from season to season within the Recreational Area, quick notification of the Cody Dispatch Center is essential in determining response times of resources from adjacent management units (USFS, BLM, BIA). Additional information is available in Section 3.4.1 Fire Management Unit Characteristics.

4.1.2.2 Response to Fires

Initial Attack:

Wildland fire suppression includes all actions to extinguish or limit the growth of fires, regardless of the strategies and tactics chosen. All wildland fires will receive prompt, safe, and cost effective suppression actions. The selected strategy in any suppression action will reflect firefighter and public safety, resources at risk, and the effects of fire management activities.

Resource Driven Responses:

Managing wildland fires to meet resource objectives is a specific strategy taken in response to a fire. Bighorn Canyon's Resource Management Plan allows for managing fires if it can be justified scientifically. However, due to the relative size of the recreation area, the potential scale of wildland fires in the predominant fuel type, and until further analysis of the recreation area's fire history, effects, and behavior can be performed, this will not be an accepted management response.

4.1.2.3 Initial Fire Report & Mobilization

Initial Fire Report:

Reports of wildland fire are received in a variety of ways. Recreation area employees receiving or making initial reports should obtain basic fire information. This information should be immediately relayed to the Fire Coordinator, the Lovell Visitor Center, or any protection ranger available to initiate a response. If a complete wildland fire size-up (Appendix C) cannot be completed then the following minimum information should be gathered.

- Location of fire (as accurate as possible).
- Estimation of the fire size in acres.
- Wind direction, wind speed, current weather conditions.
- Discovery date and time.
- Any relevant information to assist initial attack personnel.
- If a visitor report, get their name and telephone number.
- Fire behavior (ex. smoldering, flame heights, moving rapidly).
- Type of fuels (grasses, brush, juniper, cottonwoods, dead, live, mixed).

Fire Location Outside Recreation Area Boundaries

- The landowner, manager, and Cody Interagency Dispatch Center will be notified immediately of the fire, with a follow-up call as size up information is gathered.

- Notify the Bighorn National Forest West Zone Fire Management Officer (West Zone FMO) with the initial report information.
- If initial attack support is requested by the land manager or owner, Cody Dispatch Center, or if the fire is threatening the recreation area boundary, see **Initiating a Response** below.

Fire Location Within Recreation Area Boundaries - Initiating a Response

Responding resources, whether NPS or a cooperating agency will meet NWGC standards for training, physical fitness, and currency. Fire dispatching must be maintained while resources are engaged with the fire either at the local level (Lovell Visitor Center) or through Cody Dispatch Center. See **Section 4.1.1.1 Coordination for a notification checklist.**

- The Fire Coordinator or the Bighorn NF FMO typically initiates the response of resources and manages the fire at the scene, as qualified.
- The Fire Coordinator will designate one person to staff the Lovell Visitor Center radio to serve as the liaison between the fire, Cody Interagency Dispatch Center, and park management to allow for consistency in information being provided.
- The Chief Ranger will establish minimum resource (law enforcement and lifeguard duties) draw down based on park visitation and potential fire complexity.
- Every fire will have an assigned incident commander (IC). The IC will be made known to all resources assigned to the fire and to the dispatch center and operate under the Incident Command System.
- A complete fire size-up (Appendix C) will be broadcast on the recreation area's radio system to the Lovell Visitor Center when a qualified IC arrives on scene.
- If the fire is located near recreation area boundaries and there is potential for the fire to encroach onto adjacent lands, the appropriate land owner/management agency will be notified through the Lovell Visitor Center as directed by the IC (Appendix K – Interagency Contacts).
- Additional resources will be requested by the IC through the recreation area's radio system and relayed to Cody Dispatch by the visitor center radio operator.
- If the fire exceeds or is likely to exceed the qualifications of the IC, the Fire Coordinator will request command resources from the West Zone FMO by as agreed to through the annual operating plan.
- The West Zone FMO will have access to local initial attack resources and a direct communication line to the Cody Dispatch Center for any additional resources.
- A spot weather forecast will be requested for all fires which exceed initial attack capabilities or have the potential to extend attack past the first operational period.
- Review Section 8.2 – Public and Employee Safety
- The IC is responsible for the fire until relieved by a more qualified IC or until the fire is declared out.
- Declared out status shall be designated at least 24 hours after the last smoke has been identified.

4.1.2.4 Initial Attack Priorities

In cases of multiple fire starts competing for limited suppression resources, priorities will be set by the Chief Ranger. Considerations will be made as to:

- Imminent life/safety concerns (threats to firefighter or public safety)
- Threats to private structures or physical improvements
- Natural and cultural resources at risk
- Archaeological sites
- Probability of success with initial action

4.1.2.5 Restrictions and Special Concerns

See Section 10 for guidelines for Protection of Sensitive Resources.

The following information should guide initial attack resources in selecting suppression tactics or making tactical decisions. At no time will firefighter or public safety be compromised in response to these guidelines.

- Direct and indirect tactical methods may be used in all suppression strategies.
- Chainsaws and portable pumps may be used for suppression operations.
- Vehicles may be used inside the Recreation Area where roads exist; approval must be obtained from the Chief Ranger for off-road driving.
- Aerial and ground delivery of retardant and foam may be used within the Recreation Area, but may be limited at some historic and archeological sites and near water resources.
- Minimum impact tactics will be utilized when possible (Appendix D)

- Dozer use requires authorization by the Assistant Superintendent.
- Use of motorized equipment within the Recreation Areas proposed Wilderness Area requires authorization of the Assistant Superintendent.

<u>Fire Management Unit</u>	<u>Restrictions</u>	<u>Special Concerns</u>
Yellowtail Habitat Unit	Utilize existing roads whenever possible.	High visitor use area with poor visibility and multiple access/egress routes makes tracking visitor evacuation difficult.
East Pryor Mountain Unit	Protect critical winter habitat Proposed Wilderness Area within this FMU Utilize existing roads whenever possible.	Wild horse, bighorn sheep, and mule deer critical range exist. Access is difficult and may be limited to foot travel. Air support may be required during initial attack.
Canyon Unit	Proposed Wilderness Area within this FMU Utilize existing roads whenever possible.	High public use areas including campgrounds, historic sites, picnic areas, and historic trails.

4.1.2.6 Potential Impacts

Fire activities may affect visitor use opportunities during discrete timeframes of high fire activity. Just as controls on human activity may be enacted during periods of high to extreme fire danger, controls may be implemented in the vicinity of fire activity to ensure public safety.

4.1.2.7 Minimum Impact Suppression Tactics

Minimum Impact Suppression Techniques, Appendix D, will be used on all fires. Fire management activities will be carried out in a manner that minimizes impacts to natural and cultural resources. Fire camp facilities, when practical, will be located outside of the park's natural and historic zones. Of primary importance is the need to impart upon suppression forces a minimum impact suppression philosophy. Suppression forces will choose methods and equipment commensurate with suppression needs and chosen strategy. This policy is an attempt to take the national park ethic into account in firefighting practices; it is not a reason to relax normal safe firefighting practices.

4.1.2.8 Extended Attack and Large Fire Suppression

A wildland fire that has not been contained by the initial attack forces and controlled within two burn periods and requires additional resources is considered an extended attack. If this occurs, the Incident Commander will request additional appropriate resources through the Cody Dispatch Center as outlined above in **Initiating a Response**. If the fire involves land from multiple agencies, a determination will be made on which agency will manage the fire, whether it is the agency on which the fire began or the agency most affected by the resulting fire.

For large fires, the Superintendent will approve requests to mobilize a local or national incident management team to the Recreation Area. The Superintendent will represent the Recreation Area at the initial meeting, issue the Delegation of Authority (outline located in current Red Book), approve the WFDSS decision, and appoint the Agency Advisor to the team. The Superintendent will also perform the closeout and evaluation of the team.

4.1.2.9 Decision Support and Planning Requirements

All fires will be documented in the Wildland Fire Decision Support System (WFDSS). Upon size up, Cody Dispatch will input the initial information in to the system. A fire that exceeds initial action requires an extended analysis of strategic alternatives, along with the selection of a new strategy by the agency administrator. WFDSS will be used to describe the situation, evaluate the expected affects, establish objectives and constraints for management of the incident, and describe a course of action. Preparation of a WFDSS decision should be

initiated by the Chief Ranger and/or someone with training and experience in completing these strategic plans. The decision is approved by the agency administrator, with fiscal authorities described below.

Selected alternative expected costs	Approval authority
Less than \$5,000,000	Park Superintendent
\$5,000,000 – 10,000,000	Regional Director
Above \$10 million	Director

In the selection of a suppression strategy, either on a fire started on the recreation area or on adjacent BLM lands, “confinement” is one strategy alternative available to managers and will be outlined in the Wildland Fire Decision Support document. Confinement may be selected in order to maximize firefighter safety, minimize suppression costs, and not commit limited suppression resources in periods of high competition. *Confinement will not be utilized to meet resource benefit goals and objectives.*

4.1.2.10 Incident Complexity and Management Transition

Planning and preparation for suppression actions within Bighorn Canyon NRA has been done with the goal of establishing a fire management organization and procedures that can control approximately 90 percent of the historical fire occurrence by the staff. Control of the remaining 10 percent of fire occurrences, however, will require assistance from adjacent cooperating agencies, or regional and national fire organizations.

Rotation of firefighting staff will normally occur only outside of the active burn period to allow for continuity in the firefighting effort and to minimize risks associated with transition of resources. New personnel will receive an incident briefing, safety briefing, and any other pertinent information regarding the incident before being assigned to the fireline.

If a fire threatens to exceed the initial attack capabilities of BICA and local cooperating agencies, an Interagency Incident Management Team will be requested by the Agency Administrator through Cody Dispatch. The amount and type of assistance needed and requested will depend on the present and expected complexity of the fire situation. These needs will be identified by completing an Incident Complexity Analysis when the fire escapes initial attack. During the transition from initial attack until a fully qualified overhead team arrives and takes over the fire, the incident will be managed by BICA’s or surrounding agencies most qualified IC.

Some large fires may be managed with local resources and minimal command and general staffing needs and still be considered extended attack fires. Other incidents require full staffing of command and general staff positions and elevate the extended attack resource requirements. The complexity analysis is used to differentiate between the need for the small-extended attack and large fire suppression organizations.

The incident commander will continually analyze the complexity of an incident. An extended attack complexity analysis will be completed using the Incident Response Pocket Guide or the Interagency Standards for Fire and Fire Aviation Operations (Red Book) standards as a guide. Specific threshold indicators are identified in these analyses to assist incident commanders and fire program coordinators to realize when an incident’s complexity exceeds current management capability. Beyond the first burn period, consultation may include the Chief Ranger to determine extended incident complexity. Imperative in any incident complexity analysis is the realization that the most potentially dangerous periods of incident management are when the complexity of a wildland fire is escalating.

Any transition of complexity must be recognized and communicated in order to ensure the safety of the public and engaged fire personnel.

4.1.2.11 Unit example of “Delegation of Authority for Incident Commander.

The procedure and a briefing document for managing the transition between BICA and an Incident Management Team can be found in Chapter 11 – Incident Management & Response in the “Red Book”. The transfer of responsibility for suppression actions on the fire will be done officially ONLY through the execution of a Delegation of Authority by the Superintendent or designated acting alternate.

4.2 Emergency Rehabilitation and Restoration

Planning and implementation of post-fire emergency rehabilitation and restoration will follow guidelines set forth in the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook as well as RM-18 Chapter 12 Burned Area Emergency Rehabilitation. “No-year” funding is available to allow parks to take immediate or

short-term actions to prevent unacceptable resource damage and to minimize threats to life and property resulting from a wildland fire.

The recreation area will use the least intrusive BAER actions to mitigate actual or potential damage caused by wildland fire. The preferred action will be natural recovery of native plant species, except in rare circumstances. BAER actions for prescribed fire are inappropriate and will not be utilized.

Every effort will be made to prevent human-caused impacts during a suppression effort through careful planning and supervision, individual education and commitment and the use of minimum impact suppression techniques.

When rehabilitation is necessary, efforts will be initiated by the Incident Commander while the fire is being suppressed and through mop-up. If performed after the incident, the recreation area will designate an employee to organize and direct rehab efforts following Burned Area Emergency Rehabilitation (BAER) standards directed toward minimizing or eliminating the adverse effects of the suppression effort with a special emphasis at preventing unacceptable soil erosion. If re-vegetation or seeding is required, only native plant species will be utilized.

Rehabilitation planning for each fire will be the responsibility of the Incident Commander in consultation with the resource advisor. Rehabilitation should be performed prior to complete demobilization. Only under unusual situation should rehabilitation be put off until the following spring.

4.3 Prescribed Fire

Prescribed fire is defined as the deliberate ignition of a fire to accomplish specific objectives, under predetermined conditions, and identified in an approved plan. Per National Park Service policy (RM-18 chapter 10), the legitimate use of this tool includes simulating the effects of natural fire, maintaining historic scenes, reducing hazardous fuels, eliminating exotic/alien species, and preserving endangered species habitat. The Education and Visitor Protection division has primary responsibility for the implementation of prescribed fire activities. Resources Management plays a key role in providing guidance, expertise, staff, and in formulating priorities and objectives for the prescribed fire program.

4.3.1 Planning and Documentation

4.3.1.1 Annual Activities

Planning for prescribed fire projects is a collaborative process involving all park disciplines for project prioritization, education, design, goal and objective development, implementation, and monitoring. Once a project is proposed an interdisciplinary group will devise an implementation strategy to meet the project objectives including fire management and/or fuels treatment objectives, project boundaries, weather and fuel prescription, timing, areas of special concern, and monitoring and evaluation.

To meet Section 106 requirements of the National Historic Preservation Act, consultation will occur with Montana or Wyoming State Historic Preservation Offices (SHPO), and tribal officials when appropriate. Consultation will occur early and will include conducting a File Search through SHPO and a reconnaissance survey. This will also occur when mechanical/chemical treatment may be used in addition to prescribed fire. If historic properties are found within the burn area, mitigating actions may be included in the plan along with consultation documentation. An intensive cultural resources inventory may be conducted after a burn to verify sites or to discover any additional sites.

Montana Fish, Wildlife, and Parks and Wyoming Game and Fish Department will be involved in establishing initial goals or objectives for burns that may be benefiting wildlife and habitat.

Implementation of prescribed fire projects is completed with assistance from all local cooperators. Advanced scheduling is important because limited resources may be available for completion of multiple burns within short windows of opportunity, typically but not limited to spring and fall. Project requests should include estimated costs of bringing resources in from out of the area to meet resource needs over the short implementation phase. As with all fire operations conducted at BICA, resources implementing prescribed fire will meet all NWCG qualification for prerequisite experience and training and be qualified for those positions they are filling within the project organization. Specific requirements are identified in various agency and interagency policy and operation guidelines.

The following list outlines annual activities that must be accomplished in order to successfully complete prescribed and fuels management projects. Additional, site-specific activities are included in the project implementation plan and further explained in the daily Incident Action Plan developed at the time of implementation.

- Complete annual updates of plans and agreements including the Fire Management Plan, interagency agreements and burn plans.
- Update five-year fuels management plan for mechanical and prescribed fire treatments.
- Review current/predicted weather information, fire behavior indices, and national, regional, and local situation reporting.
- Coordinate wildland urban interface projects, priorities, and standards for current and future community protection initiatives with all cooperating agencies.
- Coordinate with interagency cooperators and schedule work crews for project preparation, implementation, evaluation and monitoring.
- Program annual budget to authorized amounts and management priorities.
- Provide resource specialists with the updated prioritized project compliance list and maps for proposed contract work.
- Prepare prescribed burn plans and project proposals for review and signature.
- Ensure all information required by Wyoming and or Montana Dept of Environmental Quality is submitted according to current timelines for project permitting.
- Submit budget requests and updates.
- Conduct field orientation trips with resource managers to further define project areas, goals and objectives.

4.3.1.2 Long-Term Prescribed Fire Strategy

Over the long-term, Bighorn Canyon's prescribed fire program will strive to protect cultural resources, adjoining property, and developed areas by reducing hazard fuels, thereby minimizing the effects of catastrophic or severe fires. This may also prevent the loss of human life in areas where severe fires could endanger firefighters. By controlling noxious/exotic plants that compete with native vegetation, wildlife habitat will be improved and disturbed lands restored. Prescribed fire will reflect and support resource management recommended activities or projects as stated in the Resource Management Plan. Those activities are to improve wildlife habitat, restore bighorn sheep populations, increase wild horse habitat, and examine the effects of prescribed fire on exotic plants. Prescribed fire may be used to restore and maintain cultural landscapes. Mechanical/chemical methods may be used in conjunction with prescribed fire.

To meet recreation area goals of reducing hazard fuels and restoring native vegetation, prescribed fires may be ignited within any of the three fire management units. Specific locations will be addressed in the Multi-Year Fuels Treatment Plan found in Appendix H

4.3.1.3 Personnel Requirements

The proposed prescribed fire workload for the recreation area will require staff assistance in the identification and design of project objectives and implementation. Operational personnel for project implementation will be sought from the interagency fire community in the local area. Grand Teton National Park, Bighorn NF, Miles City, MT & Worland BLM, BIA Crow Agency, and Wyoming Game and Fish, all have personnel qualified in the planning, implementation, and monitoring of prescribed fire projects. Part of the interagency agreement between Grand Teton NP and Bighorn Canyon NRA includes commitments from GRTE to ensure qualified individuals are available to assist in all aspects of project planning, implementation, and evaluation. This arrangement will be utilized to the greatest extent possible, integrating all fire qualified personnel.

In an effort to continue to develop recreation area staff fire experience and qualifications, coordination will continue with the above units to utilize monument personnel on agency burn projects in trainee positions and as part of assigned fire modules (hand crews, engine modules, etc.).

Funds will be sought through the annual fire management program budget submission to complete identified fuels treatment projects in the recreation area. Currently this is requested by the Chief Ranger and Fire Coordinator, completed by the Fire Management Officer, GTNP, and approved by the Superintendent BICA. Agency resources, such as the Teton Interagency Fuels Management Crew or other local initial attack fire resources may be scheduled to complete approved fuels projects. Contract resources will be considered for implementation of funded fuels management projects in those cases where appropriate. Qualified staff will be required to administer any fuels management contract, including an agency contracting officer and local technical representatives.

4.3.1.4 Monitoring

All projects will have identified project objectives tiered from park resource or management plan goals and objectives. In accordance with current policy, assigned resources will monitor fuels, weather, fire behavior, and smoke concerns during project implementation. This data will be documented and included in the project file. Included in the implementation plan will be the strategies for monitoring and evaluation of project success. This program of monitoring is discussed further in Section 6, Monitoring and Evaluation.

4.3.1.5 Critiques of Prescribed Fire Projects

The Fire Management Committee, headed by the Chief Ranger, will critique each prescribed fire. A report detailing the actual fire will accompany any recommendations or changes deemed necessary in the program. This report will be submitted to the Superintendent and Area Fire Management Officer for review.

Documentation of prescribed fire implementation will include a narrative summary report compiled by the Burn Boss with input from various project resources (holding, ignition, monitoring, etc.). This will be included in the project file. Section 11 specifies program and project level critiques required under NPS policy. All units conducting prescribed fire and fuels treatment will conduct at a minimum a local level critique of project accomplishments each year that projects are implemented.

4.3.1.6 Reporting and Documentation Requirements

Project reporting and documentation is specified in the project implementation plan, including responsible parties and required timeframes. A complete project file will include the following

- A completed and signed burn plan, including any amendments and signed copies of both the Agency Administrator GO/NO GO Checklist and the Operations GO/NO GO checklist.
- Completed and signed Wildland Fire Report, including project map (completed within 10 days of the prescribed fire being declared out), signed and input into Wildland Fire Management Information System.
- Digitized project map.
- WY-DEQ/MT-DEQ burn registration and reporting documents.
- Fire monitoring narrative report.
- Detailed cost accounting spreadsheet, showing actual project costs as well as base costs absorbed through other accounts.
- Burn Boss narrative report, and any unit logs.
- Update to NFPORS database showing costs and accomplishments.

As described below, when a prescribed fire exceeds the prescription or project boundaries and cannot be controlled it is declared a wildfire. Documentation and reporting requirements for wildfires are described previously in this plan and would apply in this case. The prescribed fire critique and review should seek to determine what caused the project to exceed the project boundaries and/or prescription and apply lessons learned from this incident to improve future project design and implementation.

4.3.1.7 Historic Fuel Treatment

Prescribed burning at Bighorn Canyon began in 2000 with several projects in the Yellowtail Wildlife Habitat management Area. The Farmer (250 acres) and Farmer 2 (100 acres) burns were conducted to remove stubble and clear ditches in former agricultural areas. The 65 acre Three Canals burn targeted fuels reduction.

The 60 acre Yellowtail Habitat 1 burn also was completed in 2000. The objectives of this project were to reduce exotic plants including Russian olive and saltcedar, rejuvenate native shrubs and grasses, and preserve plains cottonwood trees. Follow up treatments used herbicide to control weeds. The Yellowtail Habitat 1 project also involved formal fire effects monitoring with assistance from the Grand Teton National Park Fire Effects program.

The 175 acre Sorenson prescribed burn was completed in the fall of 2001. This project was located in the Pryor Mountain FMU, in juniper woodland vegetation south of Layout Creek. This area is important habitat for bighorn sheep, however juniper had encroached into former open areas, which reduced sheep habitat value. Fire effects monitoring data show that this project successfully killed juniper in a mosaic pattern and promoted a slight increase in grass and forb cover (despite drought conditions in 2002-2003). Additional juniper woodland prescribed burn projects targeted for bighorn sheep habitat improvement have been discussed for future implementation at Barry's Island and Hillsboro.

Some mechanical fuel reduction has been completed around historic structures in the park, however this work has not been formally documented and little information on acres completed and project specifications is available.

4.3.1.8 Prescribed Fire Burn Plan

Prescribed fire burn plans are required for every prescribed fire application. The currently approved template for a prescribed fire is included in RM-18, Chapter 10, Fuels Management. Prescribed fires conducted on the recreation area will be implemented under a burn plan conforming to the current template and policy guidance. In the case of an interagency project an approved plan will include all required elements described in NPS policy and require review and approval by the agency administrator.

4.3.2 Exceeding Existing Prescribed Fire Burn Plan

Every prescribed fire plan will include a section describing actions required if the fire should exceed project boundaries or prescriptive criteria. In many cases these instances will be temporary and short in nature and will not cause the fire to be declared a wildfire.

RM-18 Chapter 10, Fuels Management states that in the case of a prescribed fire exceeding project boundaries that cannot be controlled within one burn period utilizing project resources, the prescribed fire will be converted to wildfire status. Upon conversion, suppression actions should be initiated, an incident commander assigned and selection of a new management strategy will be described in the Wildland Fire Decision Support System. To the extent possible, pre-identification of resource needs, incident commander, and fire transition, including responsible parties for WFDSS planning should be made in the prescribed fire burn plan.

4.4 Non-Fire Fuel Treatment Applications.

A buildup of natural fuels within the recreation area has occurred over the last 30 years in areas due to the area's policy of suppressing all fire starts, the prevention of visitors collecting wood for campfires in developed areas, and from the damming of the Bighorn River causing an unnatural accumulation of driftwood along the lakeshore.

The accumulation of driftwood poses great risk to riparian stands of cottonwood found within the Yellowtail Habitat where sustained fire could damage the older cottonwood stands. Fuel accumulations near campgrounds, around historic sites, and along the eastern flank of the East Pryor Mountain threaten park historic structures and surrounding neighbors' property.

Through a combination of mechanical/chemical treatment and the use of prescribed fire, the recreation area may minimize hazardous fuels. Mechanical treatment would be the thinning or cutting of vegetation or the removal of underlying dead fuels. Approved chemical treatment would be used in conjunction with mechanical treatment. Biological treatment would be the allowing of livestock to graze in areas of concentrated grasses, shrubs, or forbs where it is allowed in previously specified units.

4.4.1 Mechanical Treatment and Other Applications

4.4.1.1 Annual Activities

Planning for fuels projects is a collaborative process involving all park disciplines for project prioritization, education, design, goal and objective development, implementation, and monitoring. Once a project is proposed an interdisciplinary group will devise an implementation strategy to meet the project objectives including fire management and/or fuels treatment objectives, project boundaries, weather and fuel prescription, timing, areas of special concern, and monitoring and evaluation.

Since legislation was passed implementing the National Fire Plan, reducing fire risk to identified wildland urban interface communities is a special emphasis area within prescribed fire and fuels management. A collaborative process has been underway between state, tribal, and local government officials with adjacent federal land managers to identify communities at risk and prioritize those areas for fire and fuels treatment. In Wyoming the State Forestry Division has published a list of communities at risk developed by federal land managers and their respective county representatives. This collaborative process is intended to be an ongoing effort with periodic reviews of completed projects and re-assessments of residential and infrastructure developments in and around federal lands. At this time no communities have been identified as "at risk" that are immediately adjacent to the recreation area.

The following list outlines annual activities that must be accomplished in order to successfully complete fuels management projects. This list is in addition to the prescribed fire annual list above.

- Update five-year fuels management plan to include mechanical fire treatments.

- Coordinate wildland urban interface projects, priorities, and standards for current and future community protection initiatives with all cooperating agencies.
- Coordinate with interagency cooperators and schedule work crews for project preparation, implementation, evaluation, and monitoring.
- Program annual budget to authorized amounts and management priorities.
- Provide resource specialists with the updated prioritized project compliance list and maps for proposed contract work.
- Prepare project proposals and implementation plans for review and signature.
- Ensure all information required by Wyoming and Montana Depts. of Environmental Quality is submitted according to current timelines for project permitting (as necessary for pile and debris burning).
- Submit budget requests and updates.
- Conduct field orientation trips with resource managers to further define project areas, goals and objectives.

4.4.1.2 Equipment and Seasonal Use Restrictions

Applicable equipment and season use restrictions previously described also apply to fuels reduction projects. See section specific restrictions found in Section 4.2.1.7 - Minimum Impact Suppression Techniques, and Section 10 - Protection of Sensitive Resources

4.4.1.3 Monitoring

All projects will have identified project objectives tiered from park Resource or Management Plan goals and objectives. Minimum monitoring standards include a map of the project area, pre-burn vegetation composition map, and an immediate post-burn severity map. Additional information collected specific to the project objectives will be included with the project file. Coordination with the Resource Management Office is critical to sound monitoring plan design and implementation. Each project plan will include a strategy for monitoring and evaluating the project. See Section 6 for more programmatic monitoring information.

4.4.1.4 Critiques of Non-Fire Treatments

Project implementation documentation will include a narrative summary report compiled by the project lead which will be included in the file. Section 11 of this plan specifies program and project level critiques required under NPS policy. All units conducting fuels treatment will conduct at a minimum a local level critique of project accomplishments each year that projects are implemented.

4.4.1.5 Reporting and Documentation Requirements

Project reporting and documentation is specified in the project implementation plan, including responsible parties and required timeframes. A complete project file will include the following

- A completed implementation plan.
- Digitized project map
- WY/MT-DEQ burn registration and reporting documents (if applicable)
- Monitoring narrative report
- Detailed cost accounting spreadsheet, showing actual project costs as well as base costs absorbed through other accounts
- Any unit logs
- Update to NFPORS database showing costs and accomplishments

5 ORGANIZATIONAL AND BUDGETARY PARAMETERS

5.1 Organizational Structure

This section discusses areas of responsibility for implementation of the fire management program by specific park position. There may be instances that the same person functions in two areas of responsibility, e.g., the Chief Ranger, and the Park Fire Coordinator may be the same person. The purpose of this section is to clearly define areas of responsibility, provide clear direction and accountability, and further the development of a responsive fire management program.

The implementation of the recreation area's wildland fire management program rests primarily in the Division of Education and Visitor Protection with the Chief Ranger acting as the Fire Program Manager. The recreation area's program is provided technical oversight by the Area Fire Management Officer located at Grand Teton National Park. Bighorn Canyon's Superintendent is the approving official for the overall fire program with subsequent operational authority delegated to the Assistant Superintendent. The Resource Management Division supports the fire program, providing expertise on cultural and natural resources, assisting in developing fire plans and, on occasion, providing firefighters or overhead/support personnel during an on-going action. The Division of Maintenance and Administration also supports the wildland fire program with firefighting/overhead personnel (i.e., time keeping, qualified firefighters, transportation services).

Superintendent

Fire management at Bighorn Canyon National Recreation Area is the responsibility of the Superintendent, with technical duties and accompanying responsibilities delegated to staff members. The Superintendent will be responsible for management of the program within Department of Interior and National Park Service policy, Director's Order 18 Wildland Fire Management (DO-18), and all relevant laws and regulations.

- Reviews and meets all the required elements outlined in the management performance requirements for fire operations as identified in the Interagency Standards for Fire and Fire Aviation Operations.
- Ensures that a comprehensive fire management program is adequately planned, staffed, implemented, and that the Fire Management Plan is reviewed annually and revised as necessary.
- Ensures all park divisions support the team effort to maintain a fire management program.
- Approves the park Fire Management Plan
- Delegates limited authority to Incident Commanders and Prescribed Fire Burn Bosses for implementation of approved plans and emergency actions associated with fire activities as allowed by NPS policy.

Acting Superintendent

Is delegated all decision making responsibility when the Superintendent is absent from the Park.

Assistant Superintendent

Is delegated all decision making responsibility for the fire management program. They are responsible for the following wildland fire management tasks.

- Secure funds and personnel needed to meet the objectives of the fire management program.
- Approves prescribed fire burn plans.
- Maintains and facilitates public and media relations pertaining to both suppression and prescribed fire.
- Approves the use of firefighting vehicles off road. This may include engines, dozers, and the like.
- Approves requests to mobilize a local or national incident management team to the area.
- Represents the Recreation Area at the initial meeting, issues the Delegation of Authority, approves the WFDSS, and acts as the Agency Advisor to the team
- Performs the closeout and evaluation of the team.

Chief Ranger

Has overall responsibility for integration of fire management activities with other regular park operations and emergency incident operations. This position may or may not concurrently fill the role of Park Fire Coordinator.

- Is delegated operational wildland fire management authority.
- Ensures implementation and execution of all aspects of the Fire Management Program.
- Is responsible for reviewing the FMP annually, revising as needed, recommends approval and obtains the Superintendent's signature.
- Responsible for overall coordination, direction, and supervision of wildland fire prevention, preparedness, and suppression. Has line authority over the Fire Coordinator, and coordinates all wildfire emergencies.

- Assures adequate fire-training opportunities are available to personnel to maintain predetermined fire qualification skills in critical positions. Reviews, and updates fire training and fire experience records.
- Ensures records for all personnel involved in suppression and prescribed fire activities are maintained through local Administrative support, detailing individual qualifications and certifications for such activities. Ensure fire qualifications are updated in appropriate current database and incident command system qualification cards (Red Cards) are issued for all incident qualified personnel.
- Ensures completion of the annual preparedness review and forward the report to the Area FMO and Intermountain Regional Office.
- In consultation with the Bighorn National Forest Zone FMO and the Area FMO, establishes fire training priorities for park staff and approves all fire training nominations
- Coordinates the implementation of this plan with other governmental agencies administering adjacent lands and with local landowners. Develops and implements cooperative fire management agreements with other federal, state, and local agencies and with the local landowners.
- Maintains liaison with interagency cooperators through annual meetings to review agreements.
- Briefs the Superintendent on current and predicted fire management activity.
- Ensures that both a briefing statement and delegation of authority are prepared for incoming incident management teams.
- Implements the annual prescribed fire program, including developing and conducting approved prescribed fires, with technical assistance provided by the Grand Teton NP fire staff or appropriate staff from the Bighorn National Forest fire personnel.
- With assistance from Grand Teton NP staff, ensures the preparation of individual prescribed fire burn plans in accordance with RM-18, and submits each prescribed fire plan to the Superintendent for approval.
- Chairs the Fire Management Committee, and as such, ensures interdisciplinary participation in planning and implementation of the recreation area's fire program. This includes developing and reviewing prescribed fire and mechanical fuels reduction project proposals and annual FMP updates, contributing staff time to training and preparedness to meet incident staffing needs, participation on drafting WFDSS, incident management team briefings, etc.

Chief of Resource Management

- Coordinates fire research efforts, and assures the assignment of a resource advisor for project fires or prescribed fires.
- Provides technical expertise on cultural/natural resources.
- Assists in determining fire program goals, objectives and plans for suppression strategies and prescription fires.
- Assists in formulating Wildland Fire Decision Support System.
- Responsible for major rehabilitation efforts.
- When appropriate, provides support staff for suppression or prescription activities
- Serves as a member of the park's Fire Management Committee.
- Serves as an ID team member reviewing planned projects.

Park Fire Coordinator

The recreation area's Fire Coordinator is the identified position within the Bighorn Canyon organization that is responsible for completing the following tasks to NPS policy standards. There is no permanent position within the park organization devoted to this task. These collateral duties are assigned by the Chief Ranger, based on organizational workload and personnel skills, abilities, and incident experience.

- Responsible for ensuring employee fire qualifications are documents and red cards are issued in a timely manner.
- Responsible for day-to-day fire management program activities. Implements operational aspects of the Fire Management Plan and the annual budget.
- Responsible for completing the prevention analysis to determine the level and type of prevention effort required.
- Ensures adequate inventory of equipment and supplies to efficiently implement the fire management program.
- Responsible for initial attack and implementation of appropriate suppression response.
- Responsible for the oversight of safe suppression of all wildfires, demobilization, and rehabilitation of the burned area.
- Advises and informs the Chief Ranger of all fire activity information.

- Coordinates dispatch of personnel for fire assignments and other incident mobilizations. Requisitions fire crews, or fire resources and supplies for use within the Park through established ordering procedures.
- Responsible for submission of fire situation reports to Cody Interagency Dispatch.
- Advises Area FMO (GRTE) of park fire situation.
- Responsible for completion and approval of all Wildland Fire Reports within 10 days of a fire being declared out or mobilized resources returning to home unit. Submits completed reports to Area FMO for review and entry into the Wildland Fire Management Information System.
- Maintains technical references, maps, and aerial photos for the fire program.
- Prepares necessary evaluation information for each fire, provides timely update of current and predicted fire behavior, and provides technical advice and recommendations to the Chief Ranger and Assistant Superintendent.
- Serves as a member of the Fire Management Committee

Bighorn National Forest –Fire Management Office

Coordination with the Bighorn National Forest Fire Staff is critical to meet staffing needs and qualified initial attack personnel. The West Zone Fire Management Officer is the key contact and will assist BICA’s Chief Ranger and Fire Management Coordinator with daily fire management activities, planning and implementing projects. They:

- Assist with annual training coordination including fire safety updates and basic fire school as well as additional 200 level classes.
- Assist with the completion of a training needs analysis for the recreation area.
- Provide initial attack resources and support as requested through the Fire Coordinator or as needed based on fire behavior or initial attack draw down.
- Provide technical expertise in project planning and implementation.
- Provide technical review and assistance as necessary for prescribed burn projects or mechanical fuels projects.
- Provide communication links for initial attack resources to Cody Dispatch Center.

Fire Management Officer (FMO), Wyoming Area Parks

The Fire Management Officer, Grand Teton NP, provides technical assistance and advice as needed to those assigned area park units within Wyoming, including Bighorn Canyon NRA. The responsibilities of this assistance are outlined in the Inter-Park Agreement, which is reviewed and signed every five years, Appendix I. Close coordination needs to occur between the Area FMO and the recreation area’s staff. The Area FMO will:

- Review and advise the Superintendent on requests for emergency assistance, operational activities required for implementation of the Plan, and completeness and correctness of all required reports (Wildland Fire Report), plans (Prescribed Fire Plans), and agreements relating to fire management activities.
- Coordinate, prioritize, and submit budget requests for Bighorn Canyon NRA fire program activities.
- Issue and approve all Incident Qualification Cards (Red Cards) for BICA staff.
- Issue incident management position taskbooks for personnel as appropriate, and completes agency certification upon completion of said taskbooks.

Cody Dispatch Center

This interagency dispatch center is responsible for providing dispatch support for initial and extended attack fires, and processing resource orders for out-of-area assignments for recreation area staff. The dispatch center will:

- Provides dispatch services for fires within the NRA.
- Inputs fire information in to WFDSS, FireCode, etc.
- Record daily fire danger and NFDRS indices for the recreation area based on weather observation (See Appendix F – Preparedness Plan).

Park Ranger, Interpreter

Park interpretive rangers play an important role in informing visitors of fire management issues in the recreation area. Interpretive rangers also staff the park’s radio system and serve as the first link in communications with initial attack resources.

- Incorporates fire management information into interpretive programs, when appropriate.
- Provides fire information to staff and visitors including broadcasting fire weather forecasts and fire danger ratings during the fire season (Appendix F – Preparedness Plan).

- Notifies the Chief Ranger, Assistant Chief Ranger, Fire Coordinator and Assistant Superintendent if the Fire Weather report indicates a Red Flag Warning, a Fire Weather Watch, Lightning Activity Level (LAL) of ≥ 3 , or indices indicate a change into Very High fire danger or above.
- Ensures accurate information is incorporated into recreation area books, brochures, and exhibits.
- Provides for on-site interpretation of fires, when appropriate and deemed safe by the assigned Incident Commander (IC).
- May serve as Fire Information Officer, as appropriate.

Administration

- Provides overall administrative support for the fire management program to include budget support, contracting, and purchasing.

Maintenance

- Responsible for the maintenance of mechanized fire equipment and vehicles, including the park's wildland fire engine.

5.2 FIREPRO Funding

Identification of a "typical" fire season, in addition to the type and complexity of recorded fire management activities is utilized to determine and justify necessary base funding for a fire management program. Historical fire activity, complexity of wildland fire events, and management-initiated projects at Bighorn Canyon NRA may justify base funding a position within Bighorn Canyon NRA and has been submitted through the IMRO.

Funds are currently based on a FIREPRO analysis; there are no fire-funded positions. Funding is approved for fire and hazard fuel reduction projects through the NFPORS process. Funding is also authorized for approved fire training, preparedness activities, equipment, supplies, and personal protective equipment. Funds also cover all suppression and emergency pre-suppression activities as well as wildland fire emergency stabilization and rehabilitation projects.

FIREPRO funds are managed through the Grand Teton NP Fire Management Office. Submission of a budget request for these discretionary funds is made in coordination with the Fire Management Officer, Grand Teton NP, according to the established budget call schedule. Requests for FIREPRO funding are made from the recreation area through the FMO, Grand Teton NP to the Intermountain Region Fire Management Office.

The FIREPRO budget process will soon be replaced by the Fire Program Analysis (FPA) system which is an interagency planning process, which will lead to the most efficient organizations. Through the FPA program the recreation area will seek logical joint fire planning associations with other units to provide the most effective and efficient interagency fire management organization for the recreation area. The Superintendent will seek out opportunities and engage adjoining agencies in such planning efforts.

Fire management funding for the NPS is derived from 2 sources, one fixed and the other a shared national fund for emergency wildland fires.

5.3 Fire Management Committee

The Fire Management Committee will be responsible for determining appropriate management response to wildland fires contributing to Wildland Fire Decision Support System development, for Prescribed Burn planning, for non-fire treatment planning, and for conducting Fire Critiques.

The Fire Management Committee will be comprised of the Chief Ranger, the Chief of Resource Management, and the Fire Management Coordinator. The committee may request technical expertise from other individuals at any time, (such as cultural or natural resource specialists). Each committee member will designate an alternate to serve in the event that the normal representative is unavailable. The primary purpose of the committee is to coordinate preparedness, suppression, mechanical and prescribed fire activities between the division's, and between the Park and cooperating agencies. In those instances where a decision is forthcoming the Fire Management Committee will make a recommendation to the Superintendent who has final authority over the program.

The Fire Management Committee shall meet at a minimum prior to and following each year's fire season. The committee will determine objectives and needs of the fire management program for the coming year and to review the season and the Fire Management Plan, recommending revision as necessary. The team may be convened

whenever fire danger indices indicate that fire presents a potentially serious risk to park resources. The committee may review the situation and determine an appropriate course of action, using the FMP, Resource Management Plan, and General Management Plan as guidance, as well as any prepared project implementation plans (Wildland Fire Decision Support System, Prescribed Fire Plans, etc.) for going incidents. The committee will meet to review and recommend any Delegations of Authority prepared for extended attack fire operations. The Fire Management Committee may also convene at the request of the Park Fire Coordinator, Chief Ranger, Chief of Resource Management, or Superintendent.

5.4 Interagency Coordination

Interagency coordination is necessary at the federal, state, and local levels for fire management. Bighorn Canyon NRA works closely with Cody Dispatch Center, U.S. Forest Service, Wyoming Game and Fish, and Lovell Fire Department. Assistance has been given at times to Crow Indian Agency for fire suppression, detection, and logistical support. Continued coordination with the above agencies as well as other organizations will ensure the implementation of the park's Fire Management Plan.

A Memoranda of Understanding have been developed and implemented with Bighorn County and the Lovell Volunteer Fire Department, for the purposes of fire management, fire suppression, and fire training. See Appendix J.

The authority to enter into agreements with federal agencies is found in "Interagency Agreement Between the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service of the United States Department of the Interior and the Forest Service of the United States Department of Agriculture" (1982).

5.5 Intra and Interagency Contacts

A list of interagency contacts can be found in Appendix K and will be updated annually.

5.6 Fire Related Agreements

- Interagency Agreement between Bighorn Canyon NRA and the Bureau of Indian Affairs, Crow Indian Agency for forest and range fire suppression.
- Cooperative Fire Agreement between Bighorn Canyon NRA, Bighorn National Forest (USDA) and Wyoming Game and Fish Commission.
- Wyoming Interagency Fire Protection Agreement between Bureau of Land Management, Wyoming State Forestry Division, Bighorn National Forest, Bighorn County Commissioners, Bighorn County Fire Warden, Bighorn County Fire District #1 - 4; and Bighorn Canyon National Recreation Area.
- Interpark Agreement between Grand Teton National Park and Bighorn Canyon National Recreation Area.
- Wyoming Interagency Fire Restriction Plan

Interagency agreements will be updated as needed. A future agreement with Bureau of Land Management, Montana State Office, is planned once its fire management planning process is completed. See agreements in Appendix J.

6 MONITORING AND EVALUATION

Monitoring protocols must be reviewed and approved at the regional office level before receiving funding. Monitoring should, whenever possible, result in digital data including GIS-compatible data. The National Park Service has a formal program for monitoring the effects of prescribed burns, which supports and guides these activities. This guidance can be found in the NPS Fire Monitoring Handbook. As fire effects monitoring at Bighorn Canyon NRA is formalized a Fire Effects Monitoring Plan will be developed which will outline the areas requirements and provides additional information.

Project monitoring is broken into four levels; Level 1 Fire Reconnaissance and Size-Up, Level 2 Environmental Conditions, Level 3 Immediate Post Fire Effects, and Level 4 Long Term Trends. These levels are sequential and build upon the information gathered in the previous steps. Not all monitoring efforts will continue through identifying long-term trends, however all fire management actions will involve at least the basics of information gathering.

Project or Operation	Level 1	Level 2	Level 3	Level 4
Wildland Fire - Initial Attack	Fire Size Up			
Wildland Fire – Extended Attack	Fire Size Up	Fire Situation Information, Weather/Fire Behavior reports	<i>Fire Severity mapping*</i>	
Prescribed Fire	Project description	Fire Monitor reports	Fire effects plot installation and post-burn re-reads	Plot data collection and analysis, multi year post burn visits
Mechanical Treatments	Project description	Fuel loading determined through ocular estimates and use of photo series, Brown’s transects, and pre and post photo documentation	<i>Pre and post treatment documentation*</i>	
<i>*monitoring technique may potentially be used in addition to previously identified minimum levels</i>				

Formal monitoring data as well as other information are used in program evaluation. Data is analyzed, interpreted, and compared to objectives, costs, expectations, and experiences. These findings are shared with inter- and intra-agency partners. Monitoring and evaluation will be built into project identification, planning, and implementation schedules and approved by the Fire Management Committee.

Monitoring and evaluation are not only conducted at the project level. Overall program effectiveness is also considered as part of an “adaptive management” system. Annual work planning, interagency coordination, and program reviews are used to regularly assess, verify and improve the fire management program.

7 FIRE RESEARCH

All fires in the park will be managed; therefore, there is a need for refined management programs based upon scientific information. The fire research performed in the park will support the fire management program by providing information to be used for making management decisions. The information needed to plan, reintroduce, monitor, and refine the use of fire in the park will be obtained by several means. These may be from participation of park staff with fire management experience, or requesting assistance from other NPS units or agencies. Information may also be obtained by searching the scientific literature, contracting studies with universities, and involving independently-funded scientists in studies.

The Division of Resources Management will assess the need for research on fires. A select number of fires may be intensively studied for several decades to provide detailed information on fire effects in the major vegetation/fuel types.

(See Section 3.4.4, Historic Role of Fire, for an overview of previous fire research and the recreation area's need for additional research in fire history, effects, and behavior.) Bighorn Canyon's Resource Management Plan recommends pre-burn and post-burn studies being conducted on vegetative growth, nutrient values, cover, and biomass as well as examining the effects of prescribed fire on exotic plants.

8 FIREFIGHTER AND PUBLIC SAFETY

Firefighters and the public will be protected from injury or undue threat from wildland fire management, prescribed fire or fuels management activities.

8.1 Firefighter Safety

Firefighting is inherently dangerous and requires all personnel involved to exercise caution and judgment. Prevention of injury is the overriding consideration during all operations. It is the responsibility of each and every person involved in an operation to ensure safety. If any action cannot be carried out safely, another action must be utilized. At no time will the protection of resources be placed before the safety of fire management personnel or the public.

All operations shall be carried out in accordance with established safety practices as set by *Reference Manuals 18, 58, and 60*, the Fireline Handbook (NWCG 410-1), the Interagency Standards for Fire and Fire Aviation Operations, OSHA, agency policy, and the recreation area's safety plan. The Fire Coordinator is responsible for the establishment of Job Hazard Analyses (JHA's) which are written descriptions of hazards and corresponding mitigations for common fire operations. The JHA's will be regularly reviewed, modified, and updated. The established JHA's will be readily accessible for firefighters for integration into fire operations.

Firefighters will only be allowed on an active wildland fire after receiving proper equipment and training as specified in Reference Manual-18. This includes an annual eight-hour wildland fire safety refresher. Instructors for the safety refresher class will be qualified as a single resource boss. Employees failing to attend will not be allowed on the fireline until class completion.

Wildland firefighters must meet minimum physical standards for their assigned incident position, as defined in NWCG 310-1 "Wildland Qualifications Subsystem Guide." Physical fitness/work capacity tests for wildland firefighters and other fire-qualified employees will consist of the "pack test." Arduous duty medical exams must be taken according to current policy standards in the Federal Interagency Wildland Firefighter Medical Qualifications Standards guidance. The exams include various tests and components prescribed according to the employee's age and required fitness level.

On all fire management actions, terrain, fuel conditions, and fire danger will be considered when determining the appropriate response.

8.1.1 Aviation Program

A qualified aviation manager will manage air operations and assure that they are performed in accordance with Federal Aviation Administration rules and regulations, the Department of Interior departmental manual, and NPS Aviation Management Policy as outlined in Reference Manual #60.

8.2 Public and Employee Safety

Public and employee safety must be given the highest priority. Employees responsible for any wildland fire management action will never subordinate human lives to other values. Assuring visitor safety will take priority over fire suppression and monitoring activities. All key fire management personnel are issued the National Wildfire Coordinating Group Fireline Handbook 410-1. Consistent, accurate monitoring and evaluation of fire behavior will provide the basis for developing contingency plans, contacts, and briefings that ensures public safety.

Bighorn Canyon's fire management program is dedicated to ensuring the safety of each visitor, all residents, and private property adjacent to the boundary. The Superintendent, upon recommendation from the Incident Commander, may close the entire park or a portion of it (including roads and trails) when either a wildland fire or prescribed fire poses an imminent threat to public safety as provided in 36 Code of Federal Regulations 1.5 (b).

The Chief Ranger will inform other divisions of all hazardous fires in the recreation area. The Public Information Officer/Assigned Interpreter and Fire Management Coordinator/Chief Ranger will then coordinate public notification efforts within and outside the park. The extent of public notice will depend on the specific fire situations. The information actions to be considered include:

1. Initial attack and monitoring team members will determine the proximity of visitors and neighbors to the fire, inform them of potential hazards, and aid in the evacuation if necessary.

2. When a major fire is in progress, information listing location, behavior, expected dangers, areas to avoid, and precautions to be taken will be posted on appropriate park bulletin boards and at visitor centers and distributed to park concession operations. Interpreters may be utilized to inform the public of dangers as well as interpret the role of fire in natural areas.
3. When the hazards of a wildland fire are high, signs on roads or boat launch areas leading into the fire activity area will be posted. Campsites and day use sites will be closed if deemed necessary by the Chief Ranger and as approved by the Assistant Superintendent. The Prescribed Burn Boss will ensure that closure and/or informational signs on prescribed fires are properly posted.
4. Visitor use will be limited or prevented near fires and potentially affected areas. NPS personnel will patrol to inform visitors and neighbors about the role of fire in a natural area, explain the risks associated with approaching too close to a fire, and enforce visitor compliance with area closure orders.
5. News articles will be written by designated information specialists, reviewed by the Superintendent or designee, and released to local newspapers, and radio and television stations as necessary and appropriate.
6. Burned areas will be posted at the trailheads/launch ramps if potential hazards exist. Campsites, day use sites and trails will remain closed until all hazards are mitigated. The public will be informed of hazards and appropriate safety precautions associated with traveling through or camping in burned areas.

Bighorn Canyon NRA has identified areas that present high risk to the public during a wildland fire event. These areas are either developed areas, have concentrated visitor use or are major roadways. These areas have been identified in Section 3.4.1 – Fire Management Unit Descriptions under the sub-heading “Primary Protection Areas”.

Mitigations to these areas of risk are as follows.

- Develop a prioritized mechanical or prescribed fire treatment plan to moderate fire behavior for high-risk areas.
- Impose temporary closures during very high and extreme conditions.
- Distribute informational fliers to park staff and visitors, including information on temporary closures, fire danger, and areas of concern.

9 PUBLIC INFORMATION AND EDUCATION

The success of the fire management program depends to a large degree on a successful public relations program. Public education was started when the Environmental Assessment for Fire Management was released. It will be necessary to maintain public interest and support as the program continues. This is vital to change the traditional values concerning fire and the tremendous success of the Smokey Bear Program that has been largely accepted by the general public. It is also essential that all park employees be aware of the thrust of the program and enthusiastically support the fire management policies of the park.

The wildland fire management information program will be factual, straightforward, and targeted for many different audiences. The following guidelines will be followed:

1. The news media will be informed when prescribed fires are scheduled, with information being released well before the day of ignition. As necessary, a Public Information Officer/Interpreter will be assigned and act as the liaison with local newspaper, radio, and television representatives to assure that media coverage is accurate and timely. All incoming correspondence or telephone calls from the news media will be forwarded to the assigned liaison.
2. All personnel will be informed of fire management activity and will be able to respond intelligently to questions by visitors. The main source of visitor information will be with the Interpretive Division. Interpreters should inform visitors at all interpretive presentations and other points of contact.
3. Ecological concepts upon which the wildland fire management program is based will be incorporated into information handouts, selected books written about the park, and wayside and visitor center exhibits.
4. Informational handouts explaining the fire management program will be prepared and periodically updated. During periods of high fire danger or when there are ongoing fires within the area these handouts will be distributed to visitors at park information boxes and visitor centers, and by NPS field personnel during informal contacts within the recreation area.
5. The fire management program will be incorporated into applicable interpretive talks, walks, and the park newspaper.
6. Public information outlets for neighboring land management agencies will be provided with fire management information, particularly when ongoing fires are burning in the area.
7. To effectively answer visitor questions, every NPS and concession employee in the park will be made aware of the wildland fire management program and the status of ongoing fires.

Signs notifying the public about ongoing prescribed or wildland fires, area closures, dense smoke, or other special situations will be placed along roadways and at visitor centers, boat launching ramps, trailheads, campsites, day use sites, and concession operations.

Step Up Activities:

Public Information Step-Activities may include the following, and are tied to increased fire danger or fire activity:

- Public Service Announcements (PSAs) - Both radio and television PSAs may be utilized to convey a variety of key messages during fire season.
- Newspaper Advertisements - Newspaper ads may be utilized to convey a variety of key messages during fire season. The Grand Teton National Park Fire Management Office will seek funding to provide assistance.
- Interagency Coordination of Fire Danger Levels - Interagency fire managers will coordinate the implementation of partial or full fire restrictions. A checklist should be developed to note locations where signs may be posted when fire danger levels escalate, asking users for extra caution to reduce human-caused ignitions.
- "Trapline" for Fire Information - A list should be developed of park and neighboring facilities and locations where fire information updates, posters, maps, etc. should be distributed when appropriate.
- Staff Email - Regular staff updates on fire activities keep internal audiences informed and give them updated, accurate information to share with park visitors and local residents.
- Utilization of Park Interpretive Staff - The interpretive staff will be utilized when possible to assist with roving contacts during fire activities to provide fire information updates at programs and visitor centers. The interpretive staff receives early season training on the park's fire management program and fire information resources online.

10 PROTECTION OF SENSITIVE RESOURCES

An underlying principle of the fire management program within the NPS is to manage fire operations commensurate with values at risk. In many cases the effects of fire management actions can be more destructive on park resources than the effects of the fire itself. The adoption of Minimum Impact Suppression Tactics is aimed at minimizing this possibility. These tactics are described in Section 4 and elaborated on in Appendix D.

The recreation area's historical properties, as defined in recent regulations of the National Historic Preservation Act, include prehistoric and historic structures, sites, or objects, and traditional cultural properties that meet National Register criteria. They are a limited, fragile, and nonrenewable part of the environment that must be protected. When disturbed, the scientific/cultural importance they hold is often lost forever. Great care will be taken during fire suppression and prescribed fire activities not to destroy important properties.

Twelve basic types of archeological sites have been located: tipi ring sites, wooden structures, caves and rock-shelters, buffalo jumps, burials, fortified caves, quarries, rock art sites, vision quest sites, a medicine wheel site, and cairns/rock alignments. On the National Register of Historic Places are Bad Pass Trail, Pretty Creek Archeological site, Lockhart, Hillsboro, Sorenson, Mason-Lovell ranches and the Bighorn Canal Headgate. Nearby sites just outside the park boundary include Sykes Cabin, Sykes Graves, Dry Head Siege Site, Hayfield Battle Site, Ft. Smith, the Bozeman Trail, and Stuart Fight Site.

Although a complete ground survey and inventory with detailed maps of sites, features, and environmental data are the best sources of cultural resources; these surveys are incomplete at Bighorn Canyon. Traditional cultural properties are not well known or documented. During fire suppression, prescribed fire and rehabilitation activities resource base maps, showing known archeological, historical, or traditional cultural site locations, will be given to the Incident Commander/Prescribed Fire Burn Boss on the fireline. A resource advisor will be used in preparation of the Wildland Fire Decision Support System analysis and for all Prescribed Fire plans to ensure protection of park values at risk. During initial planning for prescribed fires, traditional cultural properties will be identified to the greatest extent possible, either through consultation with the appropriate State Historic Preservation Office or tribal officials.

The protection of sensitive natural resources is a high priority. The Peregrine falcon and bald eagle are both residents of Bighorn Canyon and both subjects of ongoing research in the recreation area. Known nesting areas are known in some areas and will be included in the planning process for any fire event. Currently, a rare plant survey is occurring in the park, and when the study is complete, the information will be used in planning and enhancing the habitat for these resources. The survey will also assist the recreation area in determining Plants of Special Concern, if they exist, their location, and numbers. Any paleontological remains will be protected and preserved during all fire activities and all newly discovered sites will be reported to the Division of Resources Management.

Management must address the following items during implementation of this plan as well as the specific sensitive resource mitigations. Also see Section 4.2.4.5 – Restrictions and Special Concerns

- No unacceptable impact to cultural, natural resources or T&E species will occur.
- Consultation pursuant to §7 of the Endangered Species Act and §106 of the National Historic Preservation Act is initiated to ensure that proposed actions would not adversely affect endangered species and cultural resources.
- Vegetation communities in Bighorn Canyon NRA are restored and would maintain long-term ecological diversity and stability, with fire-dependent communities sustained by fire and fire intolerant communities protected from unwanted fire.
- Federal and state-listed threatened and endangered species and their habitats are sustained. No fire management actions jeopardize the continued existence of listed or candidate species or adversely impact critical habitats.
- Soil stability and fertility are perpetuated. Soil stability and fertility in the long-term are not decreased as a result of fire management programs and practices.
- Air quality related values are protected from pollution sources emanating from within and outside park boundaries. Park management activities do not violate federal and state air quality standards.
- Water resources are protected from pollution sources or flow disruption from causes originating within or outside park boundaries. Park management activities do not violate federal and state water quality standards.
- Wetlands retain their natural function. Changes within floodplain and wetlands remain within the range of natural variation.

- Visitor activities are not substantially disrupted by fire management activities. The quality of visitor experiences, particularly with respect to scenic vistas, is not adversely impacted by smoke or other fire management activities.
- Ungulate species are considered when planning mechanical and prescribed fire implementation actions.

Management constraints which would further mitigate potential adverse impacts to sensitive resources include:

- The use of foam or chemical retardant in the recreation area should be limited to those areas away (greater than 300') from permanent streams, springs or wetlands in order to minimize the chance of these agents negatively affecting aquatic resources.
- Fire retardant, if used, must be on the approved list of retardants used by the U.S. Forest Service and USDI Bureau of Land Management.
- Motorized equipment would not normally be used off established roadways in the monument. However, due to rapid rates of spread and the emergency nature of fires near the boundary, off-road use of motorized equipment, such as all-terrain vehicles and wildland fire engines, may be authorized by the Superintendent.
- All extended attack and prescribed fire operations would have a park employee designated and available to assist suppression operations as a Resource Advisor. If qualified employees are not available, a Resource Advisor would be ordered through the interagency dispatch system.
- Helicopters may be used to transport personnel, supplies and equipment. Improvement of landing sites would be kept to a minimum and would include consultation with the assigned Resource Advisor. Helibases and landing sites within the recreation area would be rehabilitated to pre-fire conditions to the extent reasonably possible.
- Except for spot maintenance to remove obstructions, no modifications would be made to roadways, trails, water sources, or clearings. All sites where modifications are made or obstructions removed would be rehabilitated to pre-fire conditions to the extent reasonably possible.
- Earth moving equipment such as tractors, graders, bulldozers, or other tracked vehicles would not be used for fire suppression or prescribed fire. If special circumstances warrant extreme measures to ensure protection, the Superintendent may authorize the use of heavy equipment.
- Fireline location would avoid sensitive areas wherever possible.
- Following fire suppression activities, firelines would be re-contoured and water-barred. (Appendix D)
- As a matter of practice, burned areas would not be reseeded unless there were overriding concerns about establishment of invasive nonnative species. Any reseeding would be with native species and occur only with the Superintendent's prior approval.

The environmental assessment prepared in conjunction with this plan detailed expected effects of the proposed action. Effects to key topic areas were described as well as specific effects to T & E species, and cultural and historic properties as required under the Endangered Species Act and the National Historic Preservation Act, respectively.

11 FIRE CRITIQUES AND ANNUAL PLAN REVIEW

Fire reviews will be conducted in accordance with procedures found in RM-18, documented, and included with the final fire file. An informal review of each fire will take place after the incident, evaluating such topics as the response, control methods, safety concerns, equipment performance, etc. The Chief Ranger will be responsible for completing an annual fire summary report. The report will contain the number of fires by type, acres burned by fuel type, cost summary, personnel utilized, hours of aircraft used, and fire effects. The Fire Management Plan will be reviewed annually by the Chief Ranger in consultation with the Area Fire Management Officer (Grand Teton NP) to determine necessary updates or changes prior to the next fire season. Such changes will be reviewed by the Fire Management Committee, and approved by the Superintendent. The Fire Management Plan is subject to formal review every five years to ensure program compliance and NEPA currency.

Operational “preparedness” reviews are to be conducted annually. An interagency accepted series of program checklists is available to cover all aspects of a unit’s fire management program. Only those checklists appropriate to the recreation area’s fire program need to be addressed. Reviews will ensure operational readiness of equipment and personnel, currency and adequacy of local MOU’s and interagency agreements, and understanding of agency policy and park staff responsibilities as outlined in this plan. These reviews can be conducted “in-house”; however general guidelines are to include the local interagency community at a minimum. Any unit conducting or planning to conduct fuels management activities in the upcoming year will undertake a fuels program review annually. This review should be conducted by the Chief Ranger, and include relevant resource management staff and local cooperators, as applicable.

The Fire Management Officer, NPS-Intermountain Region and/or NPS-Fire Management Program Center periodically initiate full program and fiscal reviews of park fire management programs reaching pre-identified complexity levels. Current policy does not call for fire program reviews of programs with the complexity level of the fire program at Bighorn Canyon NRA. The level of assistance and technical advice provided to Bighorn Canyon under the Wyoming Area Parks FMO agreement should be covered whenever a program review is completed at Grand Teton NP.

Incident Reviews

Wildland and prescribed fires will initially be critiqued by the Incident Commander or the Burn Boss and engage as many operational personnel as logistically feasible. This review should take place in a timely manner to address issues as they remain fresh in the mind. The “After Action/After Incident Review” format (see the Incident Response Pocket Guide) is suggested as a well structured template for bringing out issues and identifying lessons learned.

A more in-depth review will take place on those incidents (wildland or prescribed fires) of significant size, cost, or where minor safety issues or minimal levels of public concern occur. This review will be initiated by the Superintendent and will be conducted by appointed fire management personnel with knowledge and experience commensurate with the complexity of the incident under review. These findings should be forwarded to the Regional Fire Management Office.

Prescribed or wildland fires involving an Incident Management Team or significant political, safety, or public issues should be reviewed by the Regional Fire Management Office. If a fire generates a major political or public concern, involves multiple serious injuries or a fatality, the Fire Management Program Center should conduct or participate in the review.

Reference Manual -18 and the Interagency Standards for Fire and Fire Aviation Operations define additional situations warranting reviews, identifies responsibilities and provides sample review formats and checklists for formal reviews.

Timeframes and Responsibilities for various program and incident reviews

Review Type	Timeframe	Intent/Objectives	Responsible Party
Fire Management Plan	Annually	Assure effectiveness of the Plan in meeting goals and objectives of this and the Park's General and Resource Management Plans, assure currency and compliance of FMP with NEPA requirements	Fire Management Committee
Readiness	Annually (pre-season)	Ensure operational readiness of firefighting resources	Fire Coordinator
Program	As needed	Assure compliance with established NPS standards	Fire Management Officer, Intermountain Region
After Action Review (AAR)	Post-incident, after each operational period	Review operational effectiveness, learn lessons	Incident Commander, or Burn Boss
Incident Review	Post-incident, as needed	Constructive critique to determine facts of incident	Superintendent

12 CONSULTATION AND COORDINATION

In March, 1998, a letter of intent indicating that Bighorn Canyon National Recreation Area was in the process of updating its Fire Management Plan and Program was sent out to 19 private individuals, 21 Government Agencies, two non-profit organizations, and two community businesses in March, 1998. The letter requested comments or concerns that should be considered when updating the Fire Management Plan. In addition, a press release announcing the update was sent to local and regional newspapers. Seven comments were received.

The expressed concerns were:

1. A suggestion that grazing be used in reducing fire hazards, and to perform prescribed burns when the fire danger is low.
2. To consider using prescribed fire as a tool for improving wildlife habitat and to especially consider the use of fire to control tamarisk.
3. To consider recommendations for the protection of historic properties from prescribed burning activities.
4. The potential for suppression activities and prescribed fire to have an adverse effect on historic properties, and the need to consult with the State of Montana prior to planning.
5. The continuation of multi-agency involvement (two agencies suggestion).
6. The need for review by Montana Fish, Wildlife, and Parks to ensure that the prescribed burn benefits the wildlife of Montana.

All expressed concerns were considered and applied in the development of this plan. Specifically, there is, and will continue to be, multi-agency involvement in both planning and the implementing of this plan. Interagency agreements exist with most government entities. Consultation will continue with the State Historic Preservation Offices, wildlife management agencies, and departments of environmental quality.

On August 20, 1999 the final draft of the Bighorn Canyon National Recreation Area Fire Management Plan and accompanying Environmental Analysis was sent out to forty individuals or government agencies. Changes were made in the Fire Management Plan based on returned comments. Those comments may be found in the Environmental Analysis (Appendix L). This plan continues the fire management program as outlined in the 1999 Fire Management Plan and brings the document up to current NPS policy format.