**U.S. National Park Service**

# Great Basin National Park Fire Management Plan 2023

**Fire Management Plan (Full FMP Format)** **version 02/2021**

Recommended For Approval By: _____
Tiege Downes, Fire Management Officer Date
Lake Mead National Recreation Area

Approved By: _____
James Woolsey. Superintendent Date
Great Basin National Park

The blue hyperlinks should remain in the document to provide additional information, link to current policy, and reduce redundant text. Text that is *italicized* should be included in that section of the FMP.

**ANNUAL UPDATE** (ii) - The Fire Management Officer (FMO) and Park Superintendent must sign the FMP Annual Update Checklist to maintain currency of the FMP. All approved changes must be incorporated in the FMP and the Annual Update Checklist must be added to the FMP immediately following the cover-page (page ii).

**DOCUMENT REPOSITORY** - FMP Documents should be uploaded to the NPS Wildland Fire, Planning & Budget Share Point Site.

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## Acronym/Abbreviations

| Acronym/ Abbreviation | Definition |
|---|---|
| AAR | After Action Review |
| AIM | Assessment, Inventory, and Monitoring |
| BACI | Before-After-Control-Impact |
| BAR | Burned Area Rehabilitation |
| BIA | Bureau of Indian Affairs |
| BLM | Bureau of Land Management |
| BMPs | Best Management Practices |
| DIMA | Database for Inventory, Monitoring and Assessment |
| EA | Environmental Assessment |
| EICC | Ely Interagency Communications Center |
| ES | Emergency Stabilization |
| ESD | Ecological Site Descriptions |
| FD | GRBA Foundation Document |
| FDOP | Fire Danger Operating Plan |
| FEMO | NWCG Fire Effects Monitor |
| FMO | Fire Management Officer |
| FMOP | Fire Management Operating Plan between Department of Interior/National Park Service/Great Basin National Park and the Department of Interior/Bureau of Land Management/Ely District Office, 2018-2023. |
| FMP | Fire Management Plan |
| FMPC | Fire Management Program Center |
| FMU | Fire Management Unit. A land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, etc. that set it apart from the characteristics of an adjacent FMU. An FMU is similar to an SO. |

| Acronym/ Abbreviation | Definition |
|---|---|
| FOBS | NWCG Fire Observer |
| FTEM | Fuels Treatment Effectiveness Monitoring |
| FWS | U.S. Fish and Wildlife Service |
| GB-GACC | Great Basin Geographic Area Coordination Center |
| GIS | Geographic Information Systems |
| GPS | Global Positioning System |
| GRBA | Great Basin National Park |
| GMP | GRBA General Management Plan |
| HFR | Hazardous Fuels Reduction |
| IC | Incident Commander |
| IFTDSS | Interagency Fuel Treatment Decision Support System |
| IMT | Incident Management Team |
| INFORM | Wildland Fire Reporting System |
| IPM | Integrated Pest Management |
| IQCS | Incident Qualifications and Certification |
| IRMA | Integrated Resource Management Applications |
| IROC | Interagency Resource Ordering Capability |
| IRPG | NWCG Incident Response Pocket Guide |
| JHA | Job Hazard Analysis |
| LAKE | NPS Lake Mead National Recreation Area |
| LAKE FMO | NPS Lake Mean Zone FMO |
| LODD | Line of Duty Death |
| LPG | Liquid Propane Gas |
| MIST | Minimum Impact Strategies and Tactics |
| MR | Management Requirements |
| NEPA | National Environmental Protection Act |
| NFDRS | National Fire Danger Rating System |
| NFPORS | National Fire Plan Operations and Reporting System |
| NHPA | National Historic Preservation Act |
| NPS | National Park Service |
| NPS-18 | NPS Wildland Fire Reference Manual 18 |
| NRCAs | Natural Resource Condition Assessment Program |
| NWCG | National Wildfire Coordinating Group |
| NWS | National Weather Service |
| PCL | Potential Control Locations |
| PEPC | Planning, Environment and Public Comment |
| PIO | Public Information Officer |
| PSD | Plastic Sphere Dispenser (ignition device) |
| PPOW | Planned Program of Work |
| PWR | NPS Pacific West Region |
| RAWS | Remote Automated Weather Stations |

| Acronym/ Abbreviation | Definition |
|---|---|
| READ | NWCG Resource Advisor |
| RCA | Risk and Complexity Assessment |
| Red Book | Interagency Standards for Fire and Aviation Operations |
| RMP | GRBA Resource Management Plan, 1999 |
| SDI | Suppression Difficulty Index |
| SHPO | State Historic Preservation Officer |
| SO | Strategic Objective |
| USDA | U.S. Department of Agriculture |
| WFDSS | Wildland Fire Decision Support System |
| WFRA | NPS Wildland Fire Risk Assessment |
| WUI | Wildland Urban Interface |

## 1.0 INTRODUCTION, LAND MANAGEMENT PLANNING, and COMMUNICATION

*The mission of the National Park Service [NPS] Wildland Fire Program is to manage wildland fire to protect the public, park communities, and infrastructure, conserve natural and cultural resources, and maintain and restore natural ecosystem processes (NPS Wildland Fire Strategic Plan, NPS 20xx). Each park unit with burnable vegetation must have an approved Fire Management Plan [FMP] that will address the need for adequate funding and staffing to support the fire management program.* (Directors Order *#18, Wildland Fire Management, NPS 2008). To align with the DOI FMP Framework, the NPS developed fire management planning guidance described in NPS Reference Manual (RM) - 18, Fire Planning, Chapter 4 (2019), that considers fire program complexity and efficient and effective planning direction.*

Great Basin National Park (GRBA or Park) is located in eastern Nevada, White Pine County (Figure 1). The Park was established in 1986 and encompasses 77,100 acres of the South Snake Range. Wheeler Peak, at 13,063-feet is the Park's tallest peak and overlooks two expansive basins – Spring Valley to the west and Snake Valley to the east. An 80-acre administrative site is in Baker, Nevada. The Park is surrounded by public lands administered by the Bureau of Land Management (BLM) and private lands.

This GRBA FMP meets the requirements of NPS policies, directives, and guidelines for management of fire to protect human lives, Park resources, and property.

The GRBA FMP is a strategic plan that provides direction on the management of fire and fuels in the Park. The FMP is based on direction contained in Park unit planning documents, including the GRBA Resource Management Plan (NPS 1999), Natural Resources Condition Assessment (NPS 2016) and the Park Foundation Document (NPS 2015b). The GRBA FMP is consistent with Park resource management objectives and complies with environmental laws and regulations such as the National Environmental Policy Act (NEPA), the National and State Historic Preservation Acts, the Clean Air Act, and the Wilderness Act.

This FMP describes the major actions, goals, and objectives for wildland fire, to reduce the threat of wildfires to Park resources, and to protect and enhance natural and cultural resources. The GRBA FMP provides for firefighter and public safety and includes strategies for managing wildland fire and fuels. Protecting human life and safety are the highest priority of all fire management actions. Protecting Park resources and property are secondary priorities. This FMP also provides the operational guidance the NPS will use to manage wildland fire in GRBA. Fire management includes all activities undertaken to prevent, control, suppress, and utilize or manage wildfire or prescribed fire for the protection of human safety, personal property, and irreplaceable natural and cultural resources.

The GRBA Fire Management Officer (FMO) determines program requirements to implement land use decisions through the FMP to meet land management objectives. The FMO is responsible for developing, maintaining, and annually evaluating the FMP to ensure accuracy and validity by completing an annual review. (Interagency Standards for Fire and Fire Aviation Operations (Red Book), Chapter 3, NPS Program Organization and Responsibilities).

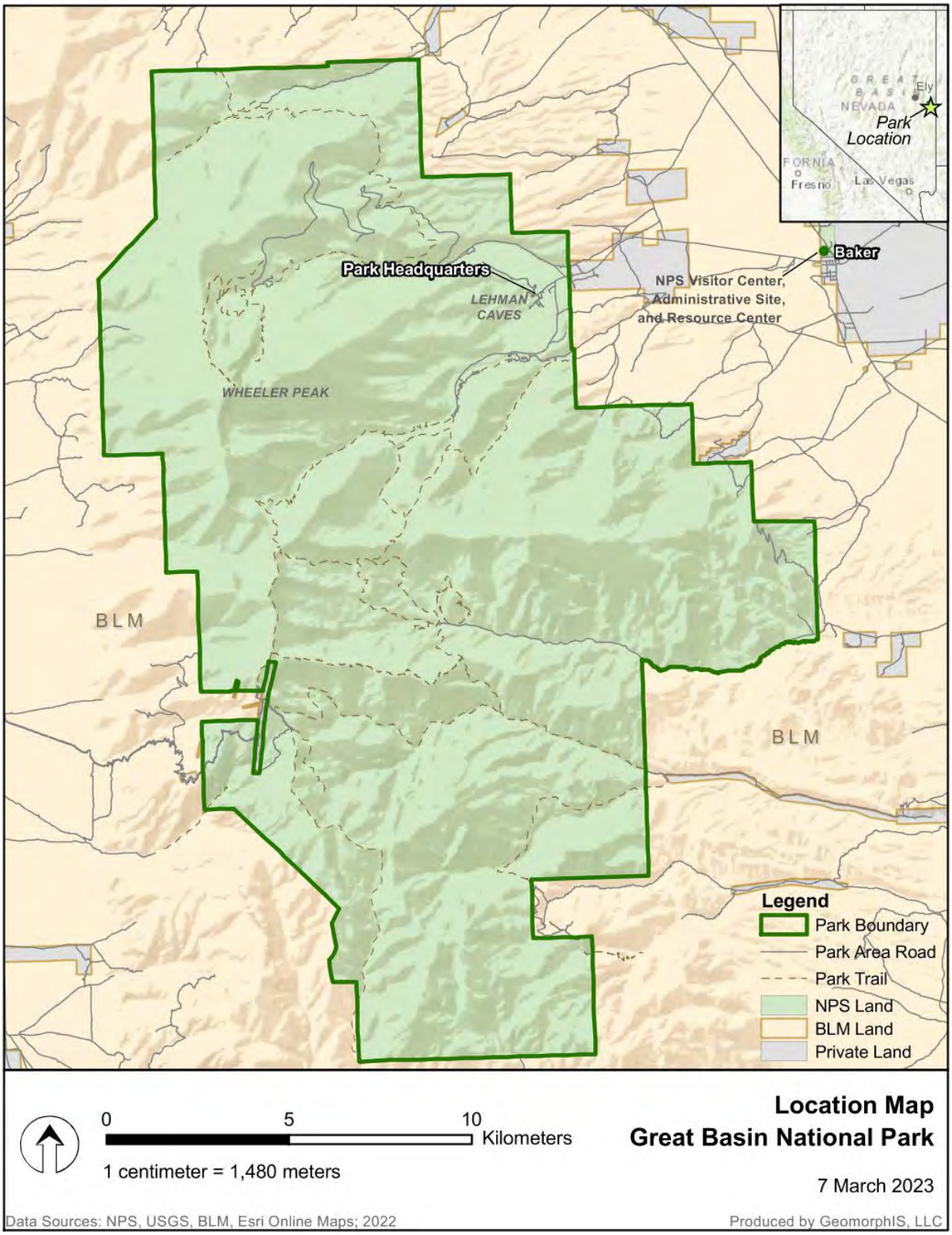


**Figure 1. GRBA Boundaries and Location in Nevada**

For the last three decades GRBA has managed a mechanical fuels treatment program to protect natural and cultural resources, infrastructure, private property, and human safety and well-being. Wildfire for resource benefits and prescribed fires have not been used to restore and maintain landscapes or reduce hazard fuels at GRBA. Effective fire management will require the use of both wildfires and prescribed fires to reduce fuels, protect human health, safety, infrastructure, and natural and cultural resources. Fire management at GRBA will continue to plan and implement fuels treatments and promote wildfire for resource benefits.

## 1.1 Program Organization

Great Basin National Park is a unit within NPS Regions 8, 9, 10 &12 (formerly Pacific West Region). The Park receives no funding for fire management staff and has no dedicated fire management staff duty stationed at Great Basin. In 2009, Park fire staff, funding, and operations were removed from the Park and transferred to Lake Mead National Recreation Area (LAKE). The Lake Mead Fire Management Officer (FMO) has responsibility for Great Basin NP.

The Park has fewer than five employees with red cards or resource advisor qualifications. No employees in the Park have wildland fire as a collateral duty in their position descriptions. No employees are qualified as Incident Commanders (IC) or engine bosses. The Park has a fire cache with an engine (E-862) located in Baker. This engine and fire cache are not maintained and are rapidly deteriorating. Due to the lack of qualified personnel, the Park cannot respond to wildfires and is entirely reliant on the BLM for initial attack and fire suppression response. Response time by the BLM is one hour.

Fire and fuels management are coordinated between GRBA, LAKE, and the BLM through delegations of authority and a Fire Management Operating Plan (FMOP). Fuels management is the responsibility of the Park resource management program, with authority delegated to the LAKE fire program. Fire suppression and incident management are the responsibility of the Park protection program, with authority for fire suppression and incident management delegated to the BLM. The annual delegation of authority and FMOP between the Park and the BLM are the template for how the BLM responds to wildfires in the Park.

**Park Superintendent –** The Superintendent is responsible for fire management at GRBA, with technical duties and accompanying responsibilities delegated to Park staff and other agencies, including:.

- Ensures that Delegations of Authority and FMOP are current.
- Maintains and facilitates public and media relations pertaining to fire and fuels through communication, press releases, and outreach.
- Validates and approves Wildland Fire Decision Support System (WFDSS) output.
- Reviews and approves Delegations of Authority and FMOP.
- Oversees all activities related to fire suppression, wildland fire use, and fuels reduction projects.

**Integrated Resource Program Manager –** The Integrated Resource Program Manager coordinates and implements fuels management, oversees wildfire rehabilitation, and sets the overall fuel and vegetation treatment objectives, including:

- Serves on the Fire Management Team.
- Leads the fuels and vegetation management program.
- Coordinates with LAKE FMO in project planning and implementation.
- Identifies natural and cultural resource issues and concerns.
- Provides critical review of fire documents (e.g., delegations of authority, FMOP, FMP updates, Prescribed Burn Plans).
- Serves as the primary resource advisor in the event of a wildfire or prescribed fire.
- Oversees all rehabilitation actions resulting from wildland fire.
- Provides technical assistance in meeting Historic Preservation Act requirements.
- Completes Section 106 compliance process as requested.

**Chief Ranger –** The Chief Ranger is responsible for wildfire suppression and incident management, including:.

- Serves on the Fire Management Team.
- Coordinates with Ely District BLM on wildfire suppression, Annual Delegation of Authority, and FMOP.
- Responsible for incident management and response.

**Chief of Interpretation –** The Chief of Interpretation primary responsibilities are to communicate and disperse information, including:

- Serves on the Fire Management Team.
- Serves as Public Information Officer (PIO) for wildland fires and fuels projects.
- Prepares news releases on fire and fire danger for publication in media and outreach to local community.
- Develops interpretive media for public dissemination on all aspects of the fire management program.

**LAKE FMO (Zone Fire Management Officer) –** The LAKE FMO coordinates and implement fuels management activities, including:

- Manages fuels funding, funding requests, and wildland fire qualifications.
- Serves as NPS liaison to BLM on large incidents and extended attack fires.
- Coordinates and communicates the needs and requirements related to the Wildland Fire Decision Support System (WFDSS) and approved decision documents.
- Serves as a member of the Park Fire Team.
- Responsible for completion of all fire reports (DI-1202s) and timely entry of reports into the wildland fire reporting system (INFORM).

**Fire Management and Duty Officer (Ely BLM) –** The Fire Management and Duty Officer implements wildland fire management activities in the Park as described in the FMOP and annual delegation of authority. Responsibilities include management of wildfire incidents and initial attack, provides for operational oversight during wildfires and fire activities, setting priorities for suppression, regular communication with the Park, and representing the Park in coordinating groups, including:

- Responsible for initial actions and response to wildland fires.
- Responsible for safe response to all wildfires, demobilization, and rehabilitation of burned areas.
- Assigns fire monitors to wildland fires managed for resource benefits.
- Completes periodic fire assessments based on expected fire activity.

## 1.2 Fire Management Actions

Wildland fire is a general term describing any non-structure fire that occurs in vegetation and/or natural fuels. Wildland fire can be planned (prescribed fire) or unplanned (wildfire). A prescribed fire is any fire intentionally ignited by management under an approved plan to meet specific objectives. A wildfire is an unplanned ignition or a prescribed fire that has been declared a wildfire.

The Guidance for Implementation of Federal Wildland Fire Management Policy,2009 allows that a wildland fire may be concurrently managed for one or more objectives, and objectives can change as the fire spreads across the landscape. Objectives are affected by changes in fuels, weather, topography; varying social understanding and tolerance; and involvement of other governmental jurisdictions having different missions and objectives. Initial action on human-caused wildfire will be to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety. Management response to a wildland fire on federal land is based on objectives established in this Fire Management Plan.

Fire management activities in GRBA include suppression and management of wildfires, prescribed fire, mechanical and manual fuel reduction, fire ecology and fire effects monitoring, and fire operations planning. Wildland fires will be managed to protect infrastructure, high visitor-use areas, and natural and cultural resources and include resource benefit objectives and returning fire to its natural role on the landscape where identified risk is manageable and acceptable. Natural ignitions would be allowed to burn in specified areas, under certain conditions favorable to their management. Only fires of a natural origin would be managed for resource benefits. All human caused fires would be promptly suppressed, as would fires which pose a threat to life or property.

Fuels reduction will be used to simulate the natural effects of fires and to reduce hazardous fuels buildup. Fuels reduction methods would include mechanical, manual, prescribed fire, herbicide, and revegetation. Some areas would be retreated over multiple years, as needed, to meet fuels and restoration objectives.

Major objectives of the fuels reduction program include:

- Fire hazards around developments and boundaries would be systematically reduced.
- A mosaic of burned and unburned areas would be created and maintained to reduce fuel hazards and restore vegetation communities.
- Fuels treatments will be used to restore sagebrush, aspen, ponderosa pine, riparian, and wet meadow plant communities.
- Fuels treatments and managed wildfire for resource benefit would reduce wildland fire risk in the long term and allow more options for firefighting operations to suppress and control unwanted wildfires.

For planning purposes, the Park has been divided into two geographic Strategic Objectives (SO). Strategic Objectives are:

- **Wildland Fire Resource Objective SO**: The primary goal in this area is to protect life , property, and natural and cultural resources by actively returning fire to its natural role on the landscape. Fires in this area, which covers the majority of the Park at 74,012 acres, *should* be managed for resource benefit objectives, when risk is manageable and acceptable.
- **Full Suppression SO**: All wildfires will be fully suppressed in this area because of high visitor use and infrastructure protection priorities (3,115 acres).

These SOs replaced Fire Management Units (FMUs) in WFDSS in 2022. Detailed Information on the SOs are referenced in Section 3.1.2 WFDSS of this FMP. Reference **Appendix I** WFDSS: Strategic Objectives and Management Requirements, for a full description of the SOs

## 1.3 Environmental Compliance

The relevant National Environmental Policy Act (NEPA) document(s) and supporting decision documents that are associated with this FMP are shown in Table 1. The final decision documents are posted on the NPS website, Planning, Environment & Public Comment (PEPC). **(**See https://parkplanning.nps.gov/projectHome.cfm?projectID=105453 for FMP documents).

**Table 1. NPS environmental compliance documents.**

| NEPA Document Name | Document Date Signed (month/day/year) | Project ID Number |
|---|---|---|
| 2004 FMP EA<br>2004 FMP FONSI | 07/03/2004<br>09/02/2004 | NA<br>NA |
| 2022 FMP EA<br>2023 FMP FONSI | 12/16/2022<br>03/30/2023 | #105453 |

**National Historic Preservation Act (NHPA) /Section 106, Endangered Species Act (ESA) /Section 7 consultation documentation should be uploaded in NPS Planning, Environment & Public Comment (PEPC).**

**Documents should be included in the FMP compliance folder on the NPS Wildland Fire, Planning & Budget Share Point Site.**

This FMP is accompanied by an Environmental Assessment (EA, NPS 2022) that addresses the proposed fire management actions and alternative actions. The EA was prepared in accordance with NEPA, NPS Director's Order 12, and 2015 NPS NEPA Handbook (NPS 2015a).

The EA analyzed the potential effects of two alternatives:

- **No Action.** Fire management would continue under the 2004 Fire Management Plan which includes ongoing wildland fire suppression activities and limited mechanical fuels treatments. Wildland fire use and prescribed fire would be limited to small portions of the Park.
- **Updated Fire Management Plan.** Implementation of the updated fire management plan includes wildland fire suppression, manual and mechanical fuels reduction, wildland fire with resource benefit objectives, herbicide application, revegetation, and prescribed fire (Preferred Alternative).

Federal land management agencies are required to consider the effects proposed actions have on properties listed in, or eligible for inclusion in, the National Register of Historic Places (i.e., Historic Properties) and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. Agencies are required to consult with federal, state, local, and tribal governments, or organizations, identify historic properties, assess adverse effects to historic properties, and negate, minimize, or mitigate adverse effects to historic properties while engaged in any federal or federally assisted undertaking (36 CFR Part 800). The FMP EA was reviewed by the Nevada State Historic Preservation Officer (SHPO). All required consultations will be completed prior to implementing actions described in the FMP. Individual fuels treatment projects require Section 106 compliance prior to project implementation.

Fire management actions have been designed to avoid or minimize adverse effects on species of management concern. However, due to the unpredictability of wildfires and associated threats to human safety and significant resources, fire management could require suppression actions that differ from those in the proposed action. Therefore, all wildfire suppression tactics and activities outside this EA FMP will be analyzed through emergency consultation with the appropriate regulatory agencies.

Best Management Practices (BMPs) identified in the EA, will minimize adverse effects to resources. BMPs are methods or techniques found to be the most effective and practical in achieving an objective. BMPs identified in the EA, will minimize impacts to Park resources when implemented (*Appendix B* of the EA).

## 1.4 Park Unit/Resource Management Planning

The statutory directive for GRBA is Public Law 99-565, which is the enabling legislation for GRBA, signed on October 27, 1986. This law established the Park "to preserve for the benefit and inspiration of the people, a representative segment of the Great Basin of the Western United States possessing outstanding resources and significant geological and scenic values." It further states that the NPS is to "protect, manage and administer the Park in such a manner as to conserve and protect scenery, the natural, historic and archeological resources of the Park, including fish and wildlife and to provide for the public use and enjoyment in such a manner as to perpetuate these qualities for future generations."

**Great Basin National Park Foundation Document, 2015**

The Foundation Document (FD; NPS 2015b) provides guidance for planning and management decisions. Concerning wildland fire management, the FD identifies that the lack of a robust prescribed fire program puts the Park at risk for catastrophic fires, especially when coupled with increasing fire frequency and intensity due to climate change.

**GRBA General Management Plan (GMP), 1992**

Fire Management goals addressed in the GMP (NPS 1992) are:

1. Determine the natural role of wildland fire in the South Snake Range ecosystem and manage the Park to restore and maintain this process.
2. Develop an action plan for fire management.
3. Determine the extent of plant diversity, monitor changes that are occurring and identify the sources of change; eliminate or mitigate any identified adverse impacts, recognizing that native populations fluctuate naturally.
4. Monitor and evaluate biological diversity in relation to the influences of major climatic and environmental change, particularly those caused by man.
5. Protect threatened, endangered and endemic species and restore them within their natural ranges.

**Great Basin National Park, Resource Management Plan (RMP), 1999**

Per the GRBA RMP (NPS 1999), the primary resource management objective of GRBA is to maintain or restore the natural resources of the Park, and perpetuate the ecological condition that would prevail were it not for the advent of modern culture. In keeping with this directive, the goals listed below will be followed for fire management:

- Manage the Park to maintain the greatest degree of biological diversity and ecosystem integrity within the provisions of the enabling legislation.
- Determine the natural role of wildland fire in the South Snake Range ecosystem and manage the Park to restore and maintain this process.
- Work with local communities in meeting goals and maximizing economic benefits.

**Natural Resource Condition Assessments, Natural Resource Report, GRBA 2016**

Natural Resource Condition Assessments (NRCAs) provide documentation about current conditions of important Park natural resources through a spatially explicit, multi-disciplinary synthesis of existing scientific data and knowledge. For a given NPS unit, NRCAs evaluate conditions for a representative subset of natural resources and resource indicators, reporting where possible, on trends in resource condition. In the section on wildland fire, the NRCA identifies the impacts of fire exclusion on ecological systems in the Park and notes that vegetation has been degraded compared to pre-settlement or more natural conditions.

**Great Basin National Park Invasive Plant Management Plan, 2014**

The purpose of the Park's Invasive Plant Management Plan (NPS 2013) is to provide guidelines for management actions that reduce or eliminate the impacts of invasive plants to Park resources. The plan implements a full integrated pest management (IPM) strategy that includes inventory, monitoring, manual treatments, herbicide treatments, biological controls,

seed collection, and restoration, including the use of fire. The Invasive Plant Management Plan highlights the cumulative impacts of fire suppression on Park resources and includes prescribed fire and wildland fire in the impacts analysis. The fuels treatments outlined in the updated FMP and EA (e.g., herbicide, seeding) fall within the IPM strategies analyzed in the 2014 Invasive Plant Management Plan and EA (NPS 2013).

**Cave Management Plans, 2019**

The Lehman Caves Management Plan (NPS 2019) and the Wild Caves and Karst Management Plan (NPS 2019) both address wildland fire. Caves in the Park are up to eight million years old and have evolved with fire. Fire itself is generally not a threat to the caves in the Park. The biggest concern is that fire retardant has been shown to add nutrients to cave systems, which can affect cave biota. Some of the cave biota are endemic species that occur nowhere else in the world. For that reason, no fire retardant or foam is allowed uphill of Lehman Caves for 800 m or in the lower Baker Creek-Grey Cliffs area within 100 m of perennial water or 50 m from a cave entrance. This management requirement has been incorporated into WFDSS. In addition, water bucket drops should be avoided in the Lehman Caves natural entrance area as well as the Upper and Lower Pictograph Caves area (in Grey Cliffs) to avoid damaging cultural resources. If needed, wrapping material could be used to protect pictographs at caves where they occur as a short-term measure during a fire incident. Prescribed fire should be undertaken to minimize the amount of smoke that could enter caves to reduce impacts to bats and invertebrates.

## 1.5 Collaborative Planning

**National Cohesive Wildland Fire Management Strategy (Cohesive Strategy)**

To achieve the goals of the Cohesive Strategy (resilient landscapes, fire adapted communities, and safe and effective wildfire response), the Park collaborates and cooperates with Ely BLM, Humboldt-Toiyabe National Forest, and the Nevada Division of Forestry, employing the full spectrum of wildland fire management strategies. Additional information may be found on the web link National Cohesive Wildland Fire Management Strategy (Cohesive Strategy).

**Fire Management Agreements**

- **The Fire Management Operating Plan (**FMOP) provides a framework for coordination of wildland and prescribed fire operations between the Park and Ely District BLM. This plan expires in April 2023 and will be renewed for 5 years ( ). The FMOP is based on this FMP and includes organization, oversight, responsibilities, dispatch, communication, and funding, as well as appendices. As the Park has no capacity to respond to wildland fires, the FMOP is the template for how the BLM manages wildfires on Park lands (**Appendix C** Cooperative and Interagency Agreements).
- **Delegation for Fire Duty Officers from GRBA to BLM** is based on the FMOP and is completed annually. The Ely BLM office implements wildland fire management activities as described in the FMOP through this annual delegation of authority. Responsibilities include management of wildfire incidents and initial attack, operational oversight during wildfires, setting priorities for suppression, regular communication with the Park, and representing the Park in coordinating groups( **Appendix A** Annual Delegation of Authority).

- **Delegation of Authority for Great Basin National Park Fuels Program and Wildland Fire Qualifications** from GRBA to LAKE is completed annually. LAKE is delegated authority to coordinate and implement fuels management, manage fuels funding and wildland fire qualifications, serve as NPS liaison to BLM on large incidents and extended attack fires, and manage park data in WFDSS a(**Appendix A** Annual Delegation of Authority).
- **Master Cooperative Wildland Fire Management and Stafford Act Response Agreement** includes the BLM, NPS, Bureau of Indian Affairs (BIA), U.S. Fish and Wildlife Service (FWS), USFS, and State of Nevada, Department of Conservation & Natural Resources Division of Forestry. The purpose of this Agreement is to improve efficiency by facilitating the coordination and exchange of personnel, equipment, supplies, services, and funds to sustain wildland fire management activities, such as prevention, preparedness, communication and education, fuels treatments, hazard mitigation, fire planning, response strategies, tactics and alternatives, suppression and post-fire rehabilitation and restoration. This agreement is in effect for 5 years.

**Communication and Education**

Fire communication and education activities are coordinated between resource management, protection, LAKE, interpretation, and the Ely BLM, with a general strategy of open, transparent dialogue. Coordination will ensure messaging regarding wildland fire activity, prevention messaging, fire danger levels, and fuels management are consistent and in alignment with interagency partners. Additional information can be found in RM - 18, Chapter 20, Communication and Education.

**Communication and Coordination**

For wildland fire incidents, the Chief Ranger, PIO, and Ely BLM will coordinate communication. The Ely BLM is responsible for communication and consultation with cooperators, regarding wildfire management. The objective is to promote efficient and mutually beneficial operations and consistent information sharing. Additional information can be found in RM - 18, Chapter 20, Communication and Education.

The Park PIO is responsible to the Superintendent for all press releases and will work together with Ely BLM, LAKE FMO, and Chief Ranger to provide local media, Park concession operations, and the local community with fire prevention alerts and fire restrictions during periods of elevated fire danger. Park interpretive staff will disseminate fire related information to Park visitors through social media, bulletin boards, and website updates.

**Public Information Activities and Capabilities**

In support of the fire management program the Interpretation and Protection staffs will coordinate messaging for Park visitors of fire incidents, current fire danger, fire restrictions, fuels projects, and Park closures. It is important that the Park work with local Interagency Cooperator's in producing prevention/education programs that will complement each agency, as well as participate as a member of the Eastern Nevada Fire Prevention Association. The Chief Ranger and PIO will coordinate closely with the BLM Duty Officer to ensure awareness of current fire activity and fire danger levels on the Park and adjacent lands.

During fuels project planning and implementation, the Park will notify the public through press releases, social media, Snake Valley connection and the NPS PEPC website and will schedule annual field trips and site visits to view and discuss projects.

**Step-up Public Information Activities and Capabilities**

During instances where fire danger warrants, and in situations where large fire incidents could impact visitors, residents, adjacent landowners, and Interagency Cooperators, a PIO will be assigned. Their responsibilities will include development of a communication plan and schedule, notification of fire danger, campfire and stove restrictions (campfires and stoves), closures and hazards through the media and website. In all circumstances the Superintendent or PIO will act as the primary spokesperson for media interviews. Media access to the fire line will be permitted only when all safety precautions are met and is at the discretion of the IC and Superintendent.

# 2.0 WILDLAND FIRE PROGRAM MANAGEMENT GOALS AND OBJECTIVES

This section of the FMP describes the overall fire management program direction from the Park unit planning documents listed in Section 1.4. Wildland Fire Decision Support System (WFDSS) Strategic Objectives and Management Requirements are described in Section 3.1.2.

## 2.1 Goals

Goals for the Wildland Fire Program:

- Ensure safety of firefighters and public is the highest priority in all fire management actions.
- Return fire to its ecological role on the landscape.
- Use fire management strategically to reduce fuels that have accumulated because of past fire exclusion, thereby reducing the chances of a catastrophic wildfire.
- Implement a fuels management program to restore fire dependent ecosystems and increase resiliency and resistance of plant communities.
- Actively engage with Park visitors, local communities, and land management agencies in fire management.
- Use fire management as a tool to protect infrastructure, natural, and cultural resources.

## 2.2 Objectives

Objectives for the Wildland Fire Program:

- Maintain preparedness through current FMOP and delegations of authority to BLM and LAKE.
- Cooperate with adjacent landowners and land management agencies in the full range of fire management activities, respecting the jurisdiction, interests, and legal mandates of each participant.
- Conduct annual outreach and regular communication with the public and partners through meetings, social media, and field tours.
- Meet with BLM, LAKE FMO and GRBA staff to review delegation of authority and FMOP before and after fire season.
- Conduct after action reviews with Park, BLM and LAKE for all wildfires.

- Reduce fuels on 21,024 acres in the next 10 years to restore native plant communities, protect values at risk, and increase ecosystem resiliency.
- Manage wildland fires for resource benefits where deemed appropriate and identified risk is both manageable and acceptable. Resource benefit objectives should align with historic fire regime attributes by vegetation type (e.g., return interval, seasonality, and severity).
- Minimize the spread of invasive plants such as cheatgrass that alter fire regimes and negatively impact native vegetation communities.

# 3.0 WILDLAND FIRE OPERATIONAL GUIDANCE

Wildland fire management actions at GRBA will employ a full range of options including fire suppression, management of wildfires for resources benefit, prescribed fire, and mechanical and manual fuels treatments. Wildfire suppression will be used within the Full Suppression Strategic Objective Area, to protect infrastructure and adjacent private lands. Naturally ignited fires should be managed for resource benefits, where risk is acceptable and manageable, where fire conditions will meet natural resource objectives, and when fire has a high probability of being confined within an identified planning area based on spatial fire behavior & spread analysis. Prescribed fire will be used where fuel hazard reduction and fire restoration objectives can be met safely. Mechanical and manual fuels treatments can be applied in areas where fire cannot be safely utilized and will often precede prescribed fire.

If fires exceed initial attack, strategic planning should highlight areas with the highest probability of success and least exposure to firefighters (such as ridges, roads, past wildfires, and other fuels treatment areas). Evacuation planning for Park staff and visitors will be a priority in early stages of all wildland fire suppression actions.

## 3.1 Management of Wildfires

A full range of strategies and tactics will be utilized in the management of unplanned ignitions. These duties will be performed by the Ely BLM as specified in the FMOP and annual delegation of authority (**Appendix A** Annual Delegations of Authority and **Appendix C** Cooperative and Interagency Agreements). Every wildland fire should be managed in order to protect firefighter and public safety, values at risk, and minimize suppression costs. The comprehensive mission of the fire management organization is to respond to all fires in accordance with management objectives, actions, and constraints.

### 3.1.1 Wildfire Response Planning

**Expected Fire Behavior**

Fire behavior is determined by fuels, weather, topography, and climate. Favorable conditions for fires occur under windy conditions, low humidity, high temperatures, and drought. The accumulation of fuels as a result of over 100 years of fire exclusion has greatly increased fuel loadings and canopy cover in many areas of the Park. Insect and diseases have also increased tree and shrub mortality, further adding to dead and down woody fuels. As a result of this accumulation of fuels, fire intensity and severity have increased over the past 100 years.

The elevation at GRBA ranges from 5,200 feet in the valleys to 13,065 feet at Wheeler Peak, with steep slopes and narrow canyons. About 73% of the Park is above 8,500 feet. Slopes are steep and 59% of the Park is above 20 degrees. Sparse vegetation and rocky areas, especially at higher elevations, can limit fire behavior. Steep topography can increase fire spread rates and flame lengths.

Fire behavior in the Park and surrounding area ranges from creeping ground fires in light grass fuels to crown fire events in densely vegetated forest and shrub plant communities. Fuel loadings are abnormally heavy in many areas. Fire regimes have been significantly altered from their historical range.. Fire frequencies have departed from historical benchmarks by multiple return intervals, resulting in dramatic changes to fire size, frequency, intensity, severity, and landscape vegetation patterns.

A wide variety of vegetation types occur in the Park due to the complex topography. Twelve major vegetation types have been mapped; major components include grassland, shrub, conifer, aspen, and alpine types. Fifteen fire behavior fuel models were identified in the parks (Scott and Burgan, 2005). This wide variety of vegetation adds to the complexity of managing wildland fire.

GRBA is dominated by cold desert conditions, characterized by cold, harsh winters, low precipitation scattered fairly evenly throughout the year, and extremes in both daily and seasonal temperatures. Most precipitation comes in the form of snow. Winters are cold with snowstorms mostly originating from the Pacific Ocean. Due to the rain shadow effect created by the Sierra Nevada, only the strongest storms produce precipitation. Approximately 60% of annual precipitation is snow. Summers are hot and dry with intermittent mountain thunderstorms, that often produce dry lightning. The Snake Range is on the edge of the North American monsoon and receives significant precipitation, thunderstorms, and lightning during July, August and September. Higher elevations are cooler and wetter and receive more lighting. In Eskdale, Utah, at 4,980 feet elevation, annual precipitation is 6.3 inches, mean low temperatures range between 14.5o to 58o F, and mean high temperatures from 42 degrees to 93 degrees F. At Lehman Caves, 6,830 feet elevation, annual precipitation is 13 inches, low temperatures range from 19 to 57 degrees F and highs from 41 to 86 degrees F. At the Wheeler Peak campground, 10,060 feet elevation, annual precipitation ranges from 14 to 43 inches, with an average of 28 inches.

Large fires are associated with high wind events and cold frontal passages. Drought conditions and abundant annual grasses can greatly influence fire behavior. While large fires generally spread upslope, modified by general winds, down canyon, extreme fire events have occurred on the Black, Hampton, and Strawberry Fires. With higher wind speeds, crown fires can occur in shrub and conifer fuel types and heavy downed woody fuels add to fire intensity and severity. Steep slopes and narrow canyons increase the potential for large fires and increase the difficulty of control. Based on analysis of fire occurrence and historical weather, for the North Fire Danger Rating Area (**Appendix D.1** Preparedness Planning the BLM Fire Danger Operation Plan or FDOP), a Burning Index (fuel model Y) greater than or equal to BI = 42 may result in rapid fire growth. Sagebrush live fuel moisture less than 100% increases potential for fire growth, while winds above 20 mph, relative humidity less than 15%, and temperature over 90 degrees F define local watchouts for extreme fire behavior.

An analysis was completed in the Interagency Fuel Treatment Decision Support System (IFTDSS), FlamMap fire behavior model, for crown fire potential at the 97th percentile weather conditions in 2022. A significant area of the Park has active crown fire potential under extreme fire weather conditions (Table 2). Figure 2 depicts a map of potential crown fire, during extreme fire weather conditions (97$^{th}$ percentile).

**Table 2. Area of Park with active crown fire potential under extreme weather conditions.**

| Crown Fire Activity | Acres | Percent |
|---|---|---|
| Non-burnable | 6,392 | 8 |
| Surface Fire | 26,387 | 34 |
| Passive Fired (single and group tree torching) | 26,368 | 34 |
| Active Crown Fire | 17,845 | 23 |

Further information including maps and data are included in **Appendices D.6** and **D.7** Preparedness Planning, which includes crown fire potential, historical fire occurrence, fire regime condition class, fire behavior fuel models, fire season, National Fire Danger Rating System (NFDRS) information, and fire regime groups.

### Initial Response Procedures

The Park has no personnel qualified to respond to wildfires. All wildfire response and initial attack will be done by Ely BLM, as detailed through the FMOP and annual delegation of authority. The Park initial response plan is part of **Appendix D.4** Preparedness Documents. Current Initial Response direction is located in RM - 18, Managing Wildfire, Chapter 2 and Red Book, Incident Management and Response, Chapter 11 .

### Reporting

When a report of a fire is made to Park employee, the employee will take the following information:

- Name of reporting party
- Phone number
- Address
- Campground site number
- Size of the fire
- Color of the smoke
- General location
- Global Positioning System (GPS) coordinates

If possible, the reporting party is encouraged to remain on site until law enforcement arrive to take a report, if it is safe to do so.

If this information cannot be obtained, collect as much information as possible and call the Ely Interagency Communications Center (EICC) or alternatively, call 911 to report wildfires.

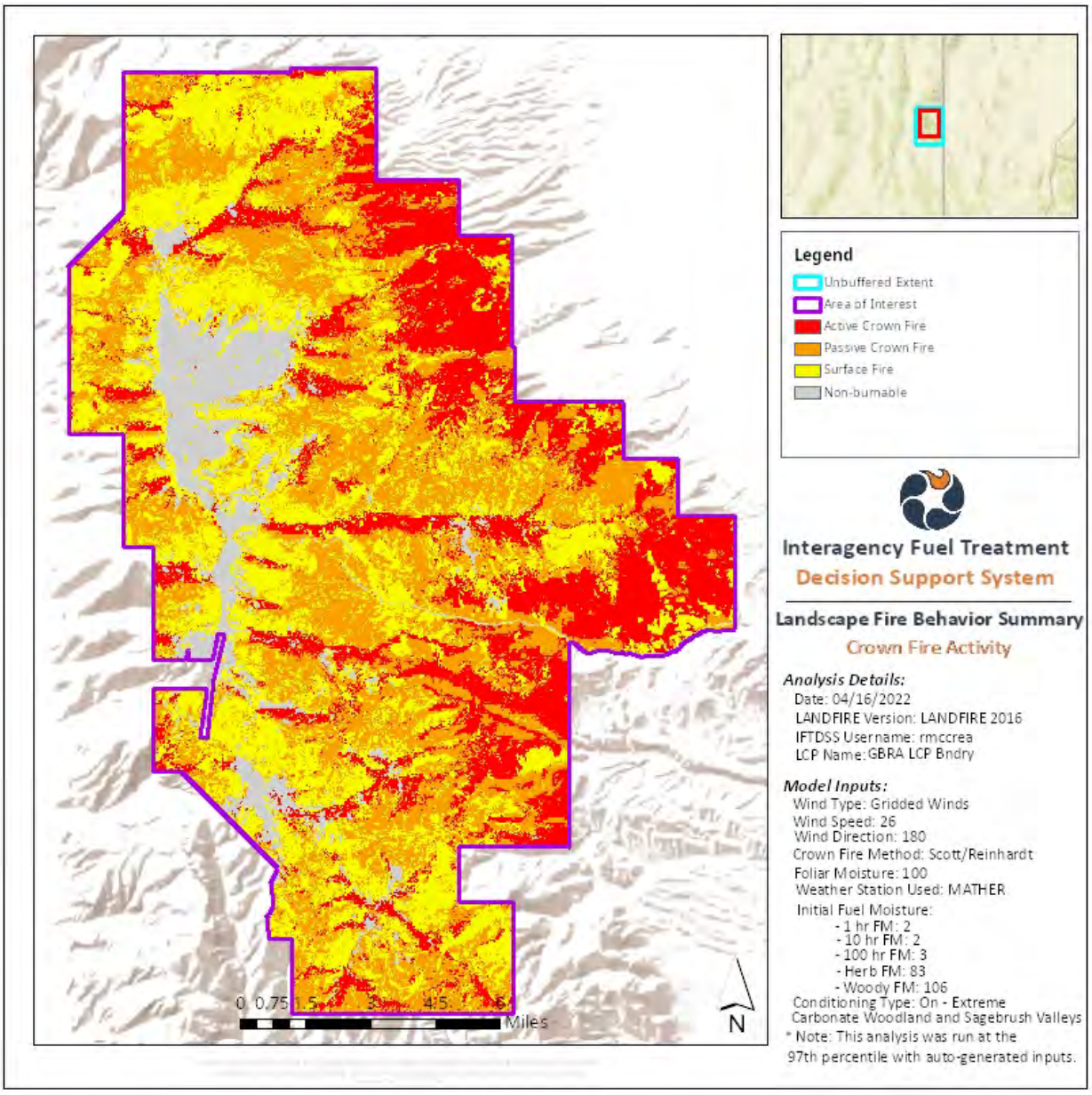


**Figure 2. IFTDSS 97th Percentile Crown Fire Modeling.**

**Initial Response Procedures**

Wildland fire operations are managed under the FMOP agreement with the BLM. The BLM will provide a Duty Officer that is responsible for operational oversight during wildland fire activities. An IC will be assigned by EICC, to every fire. Briefings on wildland fires will be conducted by the IC/Fire Duty Officer.

All wildfires will receive an initial response based on the BLM response plan identified in the Fire Danger Operating Plan (3 Response Levels). Initial response is defined as the assessment of the current fire situation considering ongoing events and additional factors, developing, and implementing an initial plan of action. The protection of human life is the single, overriding priority. Protection of property and infrastructure is of secondary importance. Management actions that are applied to wildland fires are based on the social, political, and environmental considerations and the conditions of the fire, fuels, weather, and topography to accomplish specific objectives for the individual fire. Communications and coordination actions between EICC/BLM Duty Officer and GRBA are outlined in the FMOP.

Once the initial response is determined, the objectives and strategy for managing the fire will then be relayed to the BLM Duty Officer who will then manage and provide oversight for the operational aspects of the fire response. The suppression strategy should be in alignment with the SO and MR objectives identified in WFDSS. Information on SO/MR guidance is outlined in detail in Section 3.1.2. WFDSS.

In the event a fire is threatening life or property, Law Enforcement will be dispatched to close private/public roads, notify, and evacuate Park residents, employees and visitors from the area. Resource management staff may be called upon to provide resource protection information and maintenance staff to identify locations of electrical and gas shut off valves, notify local power and gas companies, and to identify potential hazardous materials concerns.

**If a fire is determined to be a human caused ignition:** Initial action on human caused fires will be to suppress the fire at the lowest cost with the fewest negative consequences with respect to firefighter and public safety. If the initial actions are unsuccessful, then a WFDSS decision will be completed to assess risk and document the selected course of action.

**If the fire is determined to be a natural ignition**: Initial actions for natural ignitions will be determined based upon location, topography, snag hazards, SO and MR guidance, potential complexity, fire weather forecasts, projected fire behavior, projected fire danger, and potential natural and cultural resource effects. The course of action will be documented in a WFDSS decision.

If a fire cannot be contained or suppressed after one operational period, the assigned duty officer will order additional resources and the next level of Incident Command, if necessary. The BLM duty officer will update the Chief Ranger and Superintendent on extended attack incidents. Should a fire become large, the Pacific West Regional Office, Procedures for Large Fires, will be implemented.

EICC will be responsible for all dispatching functions for all wildland fires within the Park boundaries. Interagency aircraft patrols may be used to observe sections of the Park during periods of high fire danger.

The initial assessment to determine if an ignition will be managed for resource benefits will include:

- The fire would provide resource benefits (refer to strategic objectives and management requirements)). This determination should be made by park resource managers within an hour.
- Natural ignition.
- There are no threats to human life or property as a result of the fire or its management that cannot be mitigated.
- Potential impacts to cultural and natural resources.
- Seasonality and potential fire duration.
- Presence of natural barriers and containment features that may be utilized to confine fire to specific areas.

Once an initial decision is made regarding potential for resource benefits, consultation will be required with the BLM Duty Officer, LAKE FMO, Chief Ranger, Superintendent, , and other local cooperators that may be impacted by the fire. These entities should be involved in the WFDSS process as well. Appropriate Park and Regional FMO staff will be informed and involved in the decision regarding strategy.

During National Preparedness Levels 4 and 5, NPS regional and national fire management staff concurrence is required for the use of wildland fire for resource benefits. The following procedures will be utilized to ensure the above criteria are met:

- Convene and solicit input from the Park Fire Management team and NPS Regional Duty Officer.
- Qualified personnel will utilize a level of strategic and tactical action commensurate with values at risk and current and expected fire behavior.
- Adequately inform Park employees and the public regarding fire status and potential impacts.
- Ensure resource protection and monitoring guidelines are followed which can be referenced in **Appendix F** Natural and Cultural Resources and **Appendix G:** Resource Advisors Guide and **Appendix H** Monitoring.

**Resource Advisors**

Resource Advisors (READ) are required on all fires in the Park including resource benefit and extended attack fires. Initial action on any unplanned ignition will include considering the need to assign a READ to the incident. The READ will work directly with the IC and other Park staff as needed. Factors to consider in assigning a READ include: the size of the fire, fire behavior, location, the proximity of the fire to high valued natural and cultural resources, and infrastructure. Guidance for the READ include National Wildfire Coordinating Group (NWCG) NWCG Resource Advisors Guide, 2017. Additional resources and guidance for the READ have been developed by the Park and include **Appendix G** Resources Advisor Guide and Burned Area Emergency Response.

The READs responsibility on initial attack fires are to convey to the fire management team the resource costs and benefits of managing the fire. Within 1 hour the READ should be able to state the location of the fire (SO zone), resource benefits of fire, and the potential impacts to natural and cultural resources.

**Transition to Extended Response**

Extended attack occurs when the fire has not been contained or controlled by initial attack and continues until containment/control is successful or, if unsuccessful, the transition to a higher level of incident management. The WFDSS process will be used to guide decision-making on extended attack and large fire suppression incidents. A WFDSS decision will be published within 24 hours of a fire escaping initial attack, and published decisions will be periodically assessed to confirm the course of action, organizational needs assessment, and incident complexity remain valid. Refer to the Interagency Standards for Fire and Fire Aviation Operations (Red Book, Incident Management and Response, Chapter 11), for current policy and guidance.

Procedures for managing extended attack fires are outlined in FMOP. If a fire cannot be contained or suppressed after one operational period, the assigned BLM duty officer will order additional resources and the next level of Incident Command, if necessary. The BLM duty officer will update the Park Chief Ranger and Superintendent on extended attack incidents. The LAKE FMO will communicate with NPS Pacific Western Region (PWR) staff to inform them of large fire activity within the Park. The briefing checklist located in the NWCG Incident Response Pocket Guide (IRPG) (NWCG 2022) will be followed.

If an Incident Management Team (IMT) is assigned, the Superintendent, LAKE FMO, Resource Program Manager, Chief Ranger, and IC will brief the team. A written delegation of authority will be provided to the IMT. Refer to the Red Book, for current direction on wildfire command and organizational structure and delegation of authority information. When the IMT has accomplished its assigned tasks, the fire will be transferred back to the BLM, as the Park has no capacity to manage wildfires. To assure an orderly transition of command the departing IMT will conduct a debriefing with the Park Superintendent, Ely BLM and LAKE fire and other staff as appropriate.

As an incident escalates and de-escalates, a continuing reassessment of complexity should be completed to validate the current command organization or identify the need for a different level of incident management. The NWCG has adopted the Risk and Complexity Assessment (RCA) form as a replacement for the Incident Complexity Analysis form and the Organizational Needs Assessment form. An IC is expected to establish the appropriate organizational structure for each incident and manage the incident based on his/her qualifications, incident complexity, and span of control. If the incident complexity exceeds the qualifications of the current IC, the IC must continue to manage the incident within his/her capability and span of control until replaced. Planning will include consideration of visitor safety and how to keep visitors out of fire areas. Evacuation planning for Park staff and visitors will be a priority in early stages of all wildland fire suppression actions.

**Incident Management Team Closeout and Fire Reviews**

An After-Action Review (AAR) will occur on all fires, and include the BLM, GRBA, and the LAKE FMO. The goal is to review the response to the fire and improve future responses. In addition, the Park Superintendent will conduct a closeout review with the IMT prior to their departure from the incident. This review ensures a smooth transition of the incident back to the Park and to determine the status of fire business.

**Minimum Impact Strategy and Tactics (MIST)**

Minimum Impact Strategy and Tactics (MIST) are guidelines. In accordance with RM-18, MIST will be applied to all wildland fires. MIST is defined as the aggressive application of those strategies and tactics that effectively meet management objectives with the least cultural and environmental impact. However, at no time should MIST be applied if they compromise firefighter safety or suppression objectives. A complete list of MIST guidelines has been developed for GRBA and is located in **Appendix G** Resources Advisor Guide. Additional MIST guidelines are found in the IRPG and in *Exhibit 1 of RM - 18, Managing Wildland Fire, Chapter 2.*

### 3.1.2 Wildland Fire Decision Support System (WFDSS)

The Wildland Fire Decision Support System(WFDSS)will be used to document the management objectives and strategies if a wildfire escapes initial attack, exceeds initial attack response, or if the management objectives contain elements of protection and resource benefit. Current direction on WFDSS pertaining to the NPS can be found in the Interagency Standards for Fire and Fire Aviation Operations (Red Book) in Chapters 3 and 11.

WFDSS allows the Agency Administrator (Park Superintendent) to describe and assess the fire situation, review completed fire behavior analysis products, develop incident objectives and requirements, develop a course of action, evaluate relative risk, complete an organization assessment, document the rationale, and publish a decision.

GRBA transitioned to Spatial Fire Planning in WFDSS in 2022. With this change, Fire Management Units (FMUs) were replaced with SOs and MRs that tier to direction in the FMP, the 2022 FMP EA, GMP, and FD. The LAKE FMO will ensure SOs, and MRs are updated annually and are consistent with NPS policy, the current Red Book, and Park planning documents, during annual updates.

**Management Requirements (MR) and Strategic Objectives (SO)**

Management Requirements and Strategic Objectives are derived from land and resource management plans, as well as related compliance documents, and provide the framework, limitations, and challenges for wildfire response. MR and SO provide the foundation of the WFDSS decision. In order to publish an Incident Decision in WFDSS, applicable fire related protection and resource management objectives and requirements must be incorporated pre-season into WFDSS. NPS recommends pre-loading MR and SO before the fire season in the Interagency Standards for Fire and Fire Aviation Operations (Red Book) in Chapters 3 and 11.

WFDSS procedures for the Park including more details on SO and MR descriptions are located in **Appendix I** WFDSS: Strategic Objectives and Management Requirements.

For planning and management purposes, the Park has been divided into two SOs. A description of the zones is included below.

**Wildland Fire Resource Objective SO**

(WRO 74,012 acres): Wildfire for resource benefits is emphasized in this zone. The primary goal is to restore fire to its natural role while protecting life and property. Wildfire use is encouraged in this zone to manage fuels. Natural ignitions should be managed to maintain the greatest degree of biological diversity and ecosystem integrity. Human caused ignitions in this zone will be suppressed with the greatest opportunity for success and the fewest negative consequences with respect to firefighter and public safety.

In this area, visitation is relatively low, with limited buildings, structures, and infrastructure present. Some of the values at risk include:

- Developed campgrounds occur in Snake Creek.
- Future campground development in in Strawberry Creek.
- Day-use only areas around Wheeler Peak and Lexington Arch.
- Trails in the Baker Creek, Snake Creek, and Strawberry Creek watersheds
- Overnight backcountry use near Baker and Johnson Lakes.
- Johnson Lake historic district.

Wildfires will be evaluated for appropriate response based on seasonality, fuels conditions, national and regional preparedness level, and sound risk analysis. Fires in this zone should be managed for resource benefit objectives where identified risk is both manageable and acceptable. Fire management strategy, objectives, risk, and rationale will be documented in WFDSS (the exception is for initial attack fires) and approved by the Superintendent or designee. Wildfire suppression decisions will be documented in writing and reviewed during annual fire meetings.

All fuel treatment types, including manual, mechanical, chemical, seeding, wildfire, and prescribed fire, will be used in this zone to restore native plant communities and reduce hazardous fuels.

**Fire Suppression SO**

Fire suppression (SUP; 3,115 acres). The fire suppression SO includes the 80-acre administrative site in Baker, NV and a quarter mile wide area along the Wheeler Peak Scenic Drive and Baker Creek Road. This zone includes most of the Park's infrastructure, visitor centers, housing, campgrounds, and water collection and treatment facilities. The vast majority of Park visitation, camping, and interpretive programs occur within this zone. All wildfires will be fully suppressed in this zone because of high visitor use and the density of infrastructure. A variety of fuels treatments, including manual, mechanical, chemical, seeding, and prescribed fire, will be used in this zone to restore native plant communities, prevent catastrophic wildfire and to protect life and property from wildfire.

Within this zone all wildfires will have the appropriate full suppression action taken with consideration to firefighter and public safety. Confine/contain/control strategies

will be considered if initial actions are unsuccessful and a WFDSS decision will be completed to assess risk and document the selected course of action.

Values at risk and infrastructure within the Park include:

- Structures: two maintenance buildings and yard, a resource management office trailer, a protection office trailer, eight houses, and two cabins.
- GRBA contains minimal WUI. Permanent residences are located in the Parkview Estates, just outside the Park entrance on the east side and includes about twenty homes. Private lands are shown on the location map in Figure 1, above.
- Recreation: Five developed campgrounds, a picnic area, historic orchard.
- Visitor Centers:
    - the Lehman Cave visitor center and at least 50 outbuildings.
    - Within the 80-acre administrative site in Baker there are the Great Basin Visitor Center, Resource Center, a dormitory, one housing unit with 3 subunits, and the historic USFS Ranger Station and fire cache.

Figure 3 depicts the SO areas for GRBA. The SOs are equivalent to an FMU.

## 3.2 Fuels Treatments

**Fuels Management Goals and Objectives**

Fire is an essential ecological process. In the western US, fire exclusion has resulted in accumulation of heavy woody fuels. As a result, the ecological health of forests, woodlands, and rangelands has declined, and intense, severe wildfires threaten communities, and natural and cultural resources.

Fuels treatments reduce fuel loading, density, fuel bed height, and ladder fuels, in turn reducing fire intensity, flame length, spread rates, spotting, torching, and crown fires. Additionally, fuel breaks can serve as control lines, travel routes, and safety zones for wildfire suppression.

Even though most fuels treatments occur at the stand level, it is important to consider each treatment in a landscape context, as wildfires commonly dwarf individual treatment projects in size (Sisk et al. 2004). Historically, variation in forest structure was broad, driven by landscape-level fire effects, and mixed severity fires. While these effects are difficult to replicate, individual stand level treatments should be considered at broad scales.

Fuels management consists of a combination of prescribed and wildland fire; and mechanical, manual, and chemical treatments. The goals and objectives for fuels management tier to this FMP EA (NPS 2022), GMP, RMP, FD, and Natural Resource Condition Assessment (Comer et al. 2016).

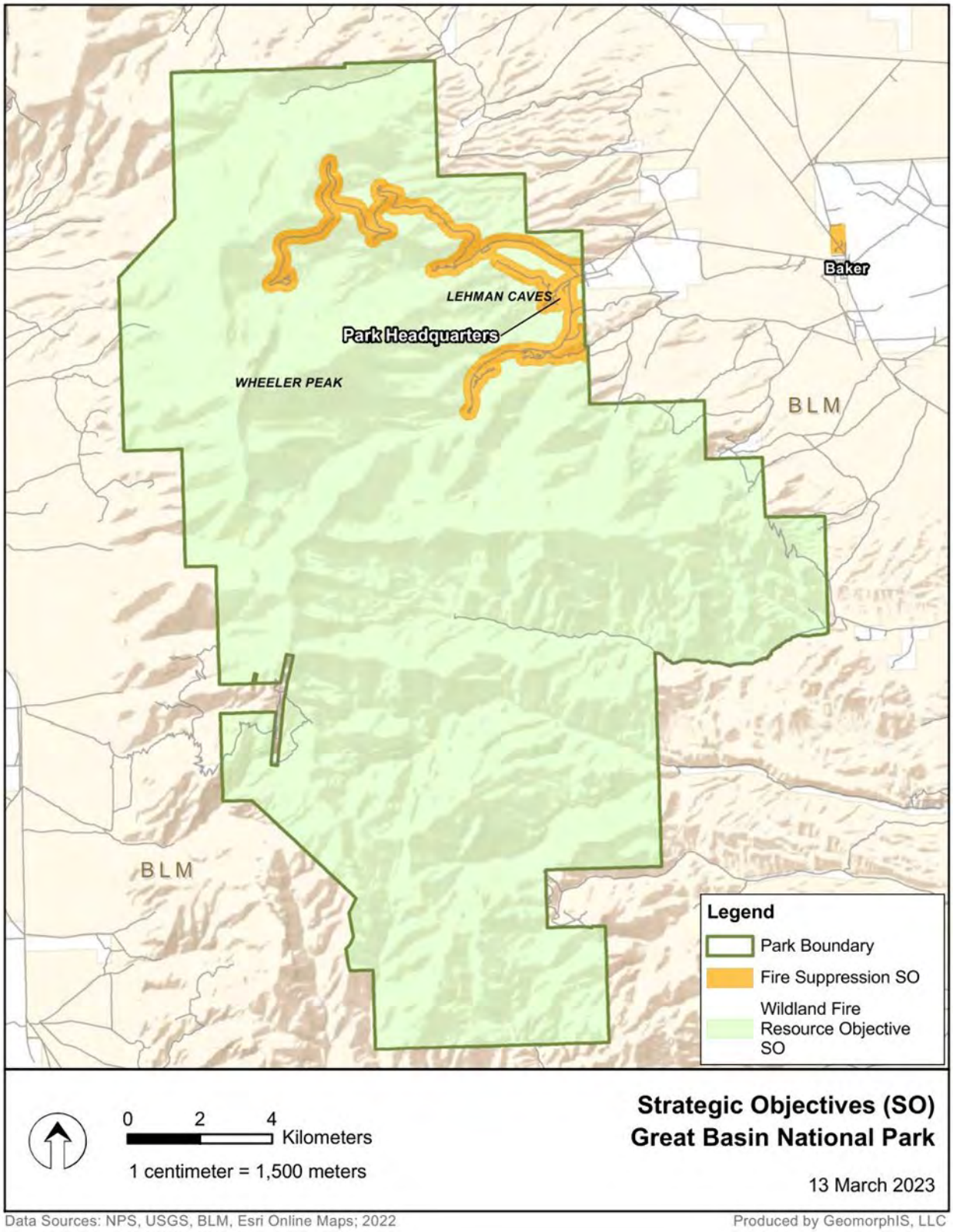


**Figure 3. GRBA Strategic Objectives Areas.**

Fuels Management Goals and Objectives:

- Protect human life and property though active fuels management.
- Reduce fuels that have accumulated because of past fire exclusion.
- Manage fuels through wildland and prescribed fire; and mechanical, manual, and chemical treatments.
- Increase resiliency and resistance of plant communities.

**Fuels Treatments**

**Prescribed Fire**

Prescribed fire is the intentional application of fire to vegetation under specified weather conditions. Fuel moisture, humidity, temperature, windspeed, and other environmental variables would be used to guide prescribed fire treatments. Prescribed fire may follow manual and/or mechanical treatments used to create more favorable burning and holding conditions.

Prescribed fire is used to alter, maintain, or restore plant communities; achieve desired resource conditions; and ultimately to protect life, property, and values that would be degraded or destroyed by high intensity wildfire. Objectives of prescribed fire include reducing hazardous fuel loads, reducing vegetation density, stimulating the regeneration of herbaceous species and other disturbance adapted species such as aspen, and improving seedbeds. Prescribed fire would benefit pinyon-juniper woodlands, sagebrush, ponderosa pine stands, mixed conifer, meadows, riparian areas, and aspen stands.

Prescribed fire includes broadcast burning, jackpot burning, and burning of hand and/or machine-stacked piles. Techniques include hand, land, and/or aerial ignition operations (e.g., drip torch, Very pistol, hand throws, UTV terra torch, Heli torch, plastic sphere dispenser [PSD]). Prescribed fire could be conducted at any time of the year, provided that favorable conditions are present to produce a vegetative response that meets resource objectives. Each prescribed fire is subject to a written, management approved prescribed fire plan that follows the NWCG Standards for Prescribed Fire Planning and Implementation, 2022, and subsequent agency specific requirements.

**Manual Treatments**

Manual treatments are highly selective and can be used in sensitive areas or areas inaccessible to vehicles.

Manual treatments would be used in pinyon-juniper woodlands, sagebrush, ponderosa pine stands, mixed conifer, riparian areas, meadows, and aspen stands.. Native bunchgrass understories indicate more resilient and resistant plant communities and are preferred locations over depleted understories to implement manual and mechanical treatments.

Manual treatments would typically use the “lop and scatter” technique where trees would be cut with chainsaws or other hand-held tools, and the resultant slash would be scattered on the ground to maximize soil-biomass contact to the extent practicable

to aid in water retention, promote herbaceous species growth, and reduce erosion. Cut branches and slash may also be piled along roadways and trails and chipped or burned to reduce visual impacts, reduce fuel loadings, and maintain prescribed fire treatment boundaries.

Manual treatments can be used to prepare sites for future reintroduction of fire where fuels are abnormally heavy and dense, where prescribed fire might cause significant ecological damage. Manual treatments would also aid broadcast or jackpot prescribed fire treatments. Manual treatments would involve construction of fuel breaks by reducing vegetation using hand tools and chainsaws and would aid in prescribed fire treatments by acting as control lines.

**Mechanical Treatments**

Mechanical treatment includes tracked or wheeled chippers, masticator or brush hogs that can cut existing or precut vegetation and scatter the debris (mulch) on site. The selection of a mechanical method would be based on the characteristics of the vegetation, seedbed preparation and revegetation needs, topography, soil characteristics, weather conditions, restrictions on off-road use, and cultural resource considerations. Mechanical treatments would be used in pinyon-juniper woodlands, sagebrush, ponderosa pine stands, mixed conifer, riparian areas, and aspen stands. If prescribed fire is not an option to dispose of cut biomass due to risk of life, property and resources, mechanical treatment could be used. Like manual treatments, mechanical treatments can prepare sites for future reintroduction of fire.

**Chemical Treatments**

Chemical treatments using approved herbicides may be used in conjunction with manual, mechanical, seeding, and prescribed fire treatments to control invasive plants or other undesirable vegetation. Chemical treatments on NPS lands would require approval by the NPS Regional or National IPM Coordinator. Herbicide application would be performed under the supervision of a certified pesticide applicator. All standard operating procedures including following herbicide product label instructions would be adhered to. Herbicide applications would be designed to minimize impacts to non-target plants and animals, while achieving project objectives. Herbicides will be applied using a variety of techniques including but not limited to spot, broadcast, drill and fill, and cut stump treatments following label-specified rates of application. Treatment objectives, site topography, target vegetation, weather conditions, and other factors would be considered prior to any chemical application. The appropriate application method would be determined by the target species, the herbicide being applied, and the application site.

**Seeding Treatments**

Seed would be applied by a variety of methods, including manual (e.g., hand seeders) or mechanical application (e.g., rangeland drills, drag covering implements, and rubber tired cross-country seed applicators), and aerial application. Seeding may be conducted in conjunction with herbicide application for invasive plant species such as cheatgrass. Seeding may be preceded by or follow manual and mechanical fuels treatments. Seeding would be used in areas where the onsite seed source is inadequate to ensure successful revegetation of the site after treatment. On NPS lands, seed mixes would be composed of native species. Locally adapted seed and

plant material would be used whenever possible. Only seed that has undergone and passed recent purity and viability tests would be accepted. Species selection would be based on site potential as indicated by known species composition in the area and potential vegetative community components as indicated in U.S. Department of Agriculture (USDA) Ecological Site Descriptions (ESD) and GMP/RMP objectives.

**Biomass Disposal**

Prescribed fire (pile burning) may be used to eliminate biomass (slash) produced by mechanical fuel reduction projects and maintenance activities. Other methods of biomass disposal include lopping and scattering, chipping, and mastication. Larger woody materials may be removed by the public for firewood or piled and burned on site.

**Fuels Project Prioritization and Targeted Vegetation Types**

Future fuels projects and goals will be determined by Park and LAKE staff with guidelines from resource management plans and research. The availability of fuels funding and qualified personnel are a major factor in determining priorities. The following is a list of factors to consider when establishing priorities:

- WUI and hazard fuels near infrastructure and private property.
- High visitor use.
- Watersheds with downstream water users.
- Proximity to completed fuels treatments or past fires on BLM and GRBA.
- Protection or enhancement of natural and cultural resource values.
- Information such as suppression difficulty index (SDI) and potential control locations (PCL) would help inform and prioritize treatment locations favorable to reducing potential fire behavior and intensity.
- Benefit to target vegetation types, including sagebrush, aspen, ponderosa pine, wet meadows and riparian plant communities (Figure 4).
    - Conifer encroached sagebrush with remaining native understory (Phase I or Phase II).
    - High resistance-high resilience sites (aspen, ponderosa pine, wet meadow, and riparian vegetation).

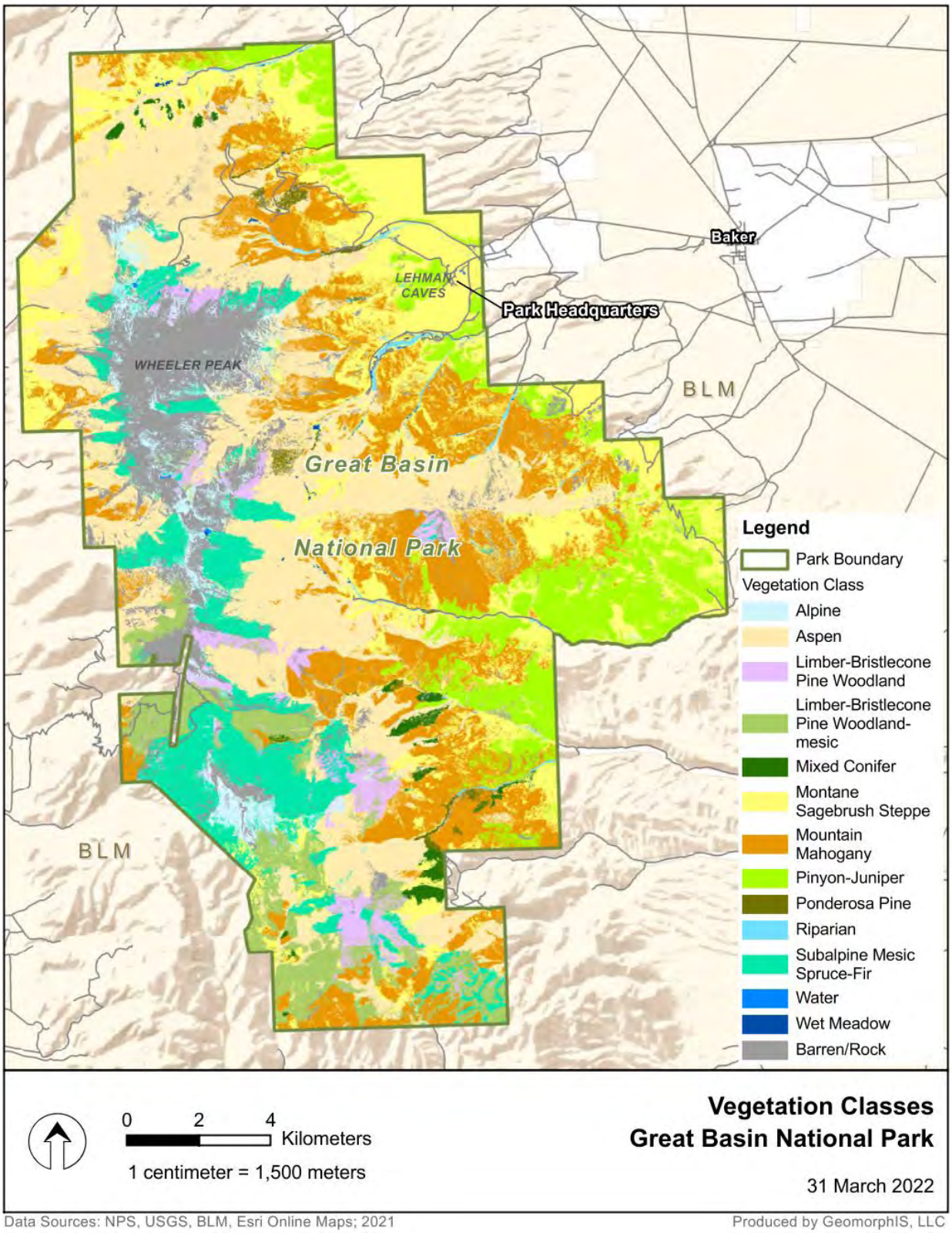


**Figure 4. Vegetation classes within GRBA.**

**General Fuels Management Implementation Procedures**

**Fuels Management Program**

Fuels management activities will be planned and implemented in accordance with RM 18, Fuels Management Chapter 7, the NWCG Standards for Prescribed Fire Planning and Implementation, 2022 (PMS 484), and the Red Book, Fuels Management, Chapter 17. Fuels management includes prescribed fire and non-fire treatments.

At National Preparedness Level 4 or 5, written concurrence is required prior to implementing prescribed fires from both the NPS Regional Fire Management and the NPS Chief, Branch of Wildland Fire. A notification to the regional director is also required in both regional and national preparedness level scenarios and is the responsibility of the NPS regional fire management staff. Email is an acceptable method to satisfy concurrence requirements (Red Book page 360).

The Multi-Year Fuels Treatment Plan (**Appendix E**) sets priorities for funding requests and provides guidance for the fuel treatments on the Park. Staff are encouraged to seek funding outside traditional fire and NPS funding sources. The Hazardous Fuels Reduction (HFR) Module in National Fire Plan Operations and Reporting System (NFPORS) is the national system for submitting proposals, tracking accomplishments, and reporting performance. The NPS Active Management Dashboard displays Fuels Treatments accomplished by the NPS's Wildland Fire Management program. All fuels treatments, regardless of fund source, will be entered and tracked through NFPORS.

Resource management has the overall responsibility for the planning and implementation of fuels projects at GRBA. The LAKE Fire program is delegated authority annually to conduct and coordinate fuels treatments and funding in the Park (**Appendix A**). LAKE Fuels Management Specialists, Resource Management staff, and the Chief Ranger will meet each winter to review and update the Multi-Year Fuels Treatment Plan. The plan will then be reviewed by the Resource Management and Protection Division leads, approved by the Superintendent, and updated in NFPORS and the FMP. As part of this process the LAKE delegation of authority will be finalized and signed.

Project specific compliance is required for fuels projects. NEPA, Wilderness Act, and NHPA under Director's Order #12: Conservation Planning, Environmental Analysis, and Decision Making (RM-12), will be prepared by Resource Management staff as part of the planning for annual fuels treatments. A minimum of two years of lead time is recommended to complete planning and compliance for fuels projects.

Fuels projects will be assessed at the site-specific level by qualified Park staff for the presence of special status species, cultural resources, and other concerns. Site-specific recommendations for protection of sensitive resources (e.g., avoidance areas) will be incorporated into project work plans and implementation. The NPS PEPC website will be utilized to track and complete project-level compliance.

Fuels projects require extensive planning. To complete all required compliance and surveys, a minimum of two years lead time is recommended. Pre-project work includes archeological and invasive plant surveys, wildlife surveys, and eligible wilderness Minimum Requirements Analysis. All fuels projects should include funding for invasive plant treatments, seeding native plants, and effectiveness and validation monitoring.

Annual activities for the fuels program include:

- Review and update the Multi-Year Fuels Treatment Plan.
- Conduct a needs assessment to improve or maintain defensible space for Park infrastructure.
- Complete compliance, baseline data collection, and prescription development.
- Prepare communication materials about the purpose, need, and project goals.
- Conduct press releases and regular social media updates before, during, and after each fuels project.
- Conduct implementation monitoring.
- Conduct AAR's for completed projects and lessons learned to assess the need for follow-up actions. All fuels projects should include funding for invasive plant treatments, seeding or planting of native species, and biomass removal.
- Prepare a final report on the completed project. Information should include a narrative of the project operation, a determination of whether objectives were met, weather data, map of the project area with completed acres saved as shapefile or similar, before and after photographs of the project area, number of person hours, and final cost of the project.

**Special Considerations**

Best Management Practices (BMPs) from the 2022 FMP EA will be followed for fuels projects. BMPs are given in *Appendix B* of the EA.

GRBA works with USFS Forest Health Protection staff to monitor forest health and implement conservation and sanitation treatments to improve forest conditions. Annual aerial surveys and ground-level site visits have documented die-off of pinyon pine, limber pine, Engelmann spruce and Douglas-fir in the Park.

Fuels treatment projects can create a food source for native bark beetles. Bark beetles, disease and other pathogens are having a greater impact on native conifer species, including pinyon pine, ponderosa pine, limber pine, and Engelmann spruce, due to exceptional drought and climate change. Best practices include conducting fuels treatments in the fall and winter and timely removal or disposal (e.g., chipping or burning) of slash and other cut material from the project site. Firewood and other cut material should be moved to a site where target tree species do not occur. For example, firewood from a pinyon-juniper fuels treatment should be moved down in elevation several miles from pinyon-juniper woodlands.

To reduce the spread of insects and pathogens, firewood should not be transported long distances (> 50 miles). The Nevada Department of Agriculture encourages the public to remove the bark from firewood before transporting.

To comply with the Migratory Bird Treaty Act, tree cutting, and burning is prohibited between March 1 through July 31 (raptors) and April 1 July 31 (songbirds). Small numbers of individual trees may be cut during restricted periods around campgrounds and structures, if trees are cleared by a qualified biologist.

**Multi-year Fuels Treatment Plan**

The Hazardous Fuels Reduction (HFR) Module in NFPORS is the national system for submitting proposed projects for approval, tracking, reporting, and measuring accomplishments for NPS. A three year Planned Program of Work (PPOW) can be found in the National Fire Plan Operations and Reporting System (NFPORS). The NPS Active Management Dashboard displays Fuels Treatments accomplished by the NPS's Wildland Fire Management program. A Multi-Year fuels treatment plan is attached as **Appendix E** of this FMP. Additional information can be found in RM 18, Fuels Management Chapter 7, the NWCG Standards for Prescribed Fire Planning and Implementation, and the Red Book, Fuels Management, Chapter 17.

**Defensible Space**

The NPS has adopted the International Code Council's (ICC's) International Urban-Wildland Interface Code (2006; revised 2018) through the parameters described in Executive Order Wildland-Urban Interface Federal Risk Mitigation (May 18, 2016). Contained in the ICC's code (sections 603 and 604) are descriptions of defensible space and maintenance requirements for urban wildland interface areas. Reference RM - 18, Fuels Management, Chapter 7 for additional information.

Current information on NPS Structure Protection needs can be found at NPS Wildland Fire Risk Assessment (WFRA). https://wildfire-risk-assessments-nifc.hub.arcgis.com/.

Fuels management projects have been completed around Park infrastructure and structures including offices, visitor centers, and campgrounds. Evaluation for hazardous fuel reduction activities will be completed annually around GRBA infrastructure to include but not limited to Park housing and offices, the Lehman Caves Visitor Center, and campgrounds.

The intent of defensible space is to enhance the protection of structures and resources during a wildfire by lowering fire intensity and providing an area for firefighters to safely work to defend structures from the fire. Defensible space work may include removing, trimming, mowing, or pruning dead or live fuels that could be ignited and threaten structures, hauling them away from that area, piling for future burns, or masticating slash and leaving on site. Defensible space zones typically vary from 50 to 200 feet but may differ by sensitivity of the infrastructure to fire, type of vegetation, aspect, prevailing wind direction, and slope. Defensible space may be created using wheeled or tracked equipment (e.g., mowers, masticators, tractors), or handheld motorized equipment (e.g., brush cutters, chainsaws, trimmers). Typically, defensible space is heavily cleared adjacent to the structure (0 to 50 feet) and more vegetation retained further (50 to 200 feet) from the structure. Standards should be site specific but may include:

- Ember Resistant Zone: 0 to 5 feet from buildings should be maintained with no combustible materials (e.g., weedy plants, bark, mulch). Remove all live and dead plants, weeds, debris, litter, etc. Remove all branches within 10 feet of any chimney. Limited cover of low-growing, non-woody, green plans may be maintained within this area.
- Green Zone: 30 feet from building: remove all dead plants, grass, and weeds. Remove all pine needles, dry leaves, sticks, including from gutters, decks, and roofs. Trim trees to a minimum of 10 feet separation from other tree crowns or buildings. Prune and isolate flammable plants so they are not contiguous with each other or the structure. Maintain low-growing green vegetation so dead material does not accumulate.
- Reduced Fuel Zone: 30 to 100 feet from buildings, structures, decks. Mow grass to a height of 4 inches, clear horizontal space between shrubs and trees to break up continuity and ladder fuels. Limit buildup of sticks, needles, branches to less than 3-inch depth. Limb lower tree branches to minimum of 6 feet height from ground. Pinon-juniper trees should not be limbed but should be removed entirely.
- All Liquid Propane Gas (LPG) storage tanks need a minimum 10 feet of clearance down to bare mineral soil and no flammable vegetation for an additional 10 feet from bare soil.

## 3.3 Preparedness

*The Annual Delegation of Authority, Inter-Park Agreement (where applicable), Cooperative and Interagency Agreements, Fire Danger Operating Plan, Step-up Plan - Staffing Plan and Initial Response Plan are found in the Appendix section of this FMP. Reference Red Book, Preparedness, Chapter 10 for preparedness planning requirements.*

Since GRBA is without fire staff, preparedness activities and wildfire suppression are entirely implemented by the BLM ELY District Fire Program. See **Appendices D.2, D.3, D.6,** and **D.7** Preparedness Planning for additional information and interagency preparedness plans.

**Preparedness Activities**

Preparedness guidelines are outlined in RM - 18, Preparedness, Chapter 5 and Red Book, Preparedness, Chapter 10. The Park has no fire staff so preparedness reviews are not conducted. If reviews were conducted annually they would follow the approved NPS Interagency Preparedness Review Checklists.

Preparedness is a continuous process that includes developing and maintaining firefighting infrastructure; predicting fire activity; preventing human-caused fires; hiring, training, equipping, and deploying firefighters; evaluating performance; correcting deficiencies; and improving overall operations.

**Interagency and Intra NPS Park Agreements**

Cooperative and interagency agreements are covered in Section 1.5 Collaborative Planning, in this document. The Fire Management Operating Plan (FMOP with BLM Ely District) is the primary agreement guiding fire management relationships and roles between BLM and GRBA **(Appendix C**).

**Great Basin Geographic Area Coordination Center (GB-GACC)**

The Park lies within the GB-GACC planning and dispatch area, and coordinates on a local basis with EICC for wildland fire management programs.

**Weather**

See the BLM Fire Danger Operating plan for additional weather analysis information. GRBA falls within the National Weather Service (NWS) Elko Forecast Office, Fire Weather Zone 425, out of Elko, Nevada. Products provided by the NWS include spot weather forecasts, fire weather forecasts, general planning forecasts, current weather observations, drought information, radar and satellite imagery, red flag warnings and watches and precipitation information. This information can be accessed at National Weather Service, NWS Elko.

The Predictive Services program at GB-GACC also provides various products including live and dead fuel moisture information, National Fire Danger Rating System (NFDRS) indices and forecasts, Seven Day Significant Fire Potential, and monthly/seasonal outlooks. This information can be referenced at the Great Basin Coordination Center, Fire Weather Page.

The designated fire weather station for GRBA is Mather, which is a remote automated station remote automated weather station (RAWS). The basic information on this RAWS is shown in Table 3.

**Table 3. RAWS information.**

| Station Name | NWS ID | Data years | Elevation | Lat/Long |
|---|---|---|---|---|
| Mather | 260809 | 1998 to Present | 9,268 | 39.0225 by -114.27222 |

RAWS stations automatically collect weather observations (wind speed and direction, relative humidity, temperatures, precipitation, solar energy, and fuel moisture). The weather observations are used to calculate NFDRS indices.

Weather observations are also available from the GRBA Lehman Caves Visitor Center. Metadata for this station is below:

- Station Type: NWS Coop
- Station Number: 263340
- Latitude: 39.0056 degrees
- Longitude: - 114.2198

The Wheeler Peak Snotel s records snow depth, snow water accumulation, accumulated precipitation, soil moisture and temperature. Metadata for the site is below:

- Site Number: 1147
- County: White Pine
- Latitude: 39.01 degrees

- Longitude: - 114.31 degrees
- Elevation: 10,060 feet
- Reporting since: 2010-10-01

Maintenance of RAWS is required on an annual basis, which includes switching out calibrated sensors, clearing of vegetation around the station, and inspecting the towers and equipment for damage. However, this maintenance has not occurred since 2009. For further information reference: NWCG Standards for Fire Weather Stations.

**National Fire Danger Rating System (NFDRS)**

NFDRS is a multiple index system which is used to provide information about current and predicted fire danger conditions, which can be used in short- and long-range planning. NFDRS provides several products including readiness class, adjective class, industrial precautions class, energy release component, burning index, spread component, and fire load index.

An Interagency Fire Danger Operating Plan (FDOP) outlines information and guidance for fire agencies to provide an appropriate level of preparedness to meet wildland fire management objectives, based upon an assessment of vegetation, climate, and topography utilizing NFDRS. The FDOP is prepared by the BLM and is included in **Appendix D.1** Preparedness Planning. This plan provides a science-based tool for fire managers to incorporate a measure of risk associated with decisions which have the potential to significantly compromise safety and control of wildland fires. GRBA falls within the Ely North Fire Danger Rating Area, which encompasses the following RAWS stations, as depicted in Table 4.

**Table 4. Ely North fire danger operating area RAWS.**

| Station Name | NWS # | Agency/Owner | Data Years | Elevation |
|---|---|---|---|---|
| Alligator Ridge | 260804 | BLM-NV-ELD | 1989-Present | 6560 |
| Cattle Camp | 260807 | BLM-NV-ELD | 1994-Present | 7300 |
| Cedar Pass | 260805 | BLM-NV-ELD | 1989-Present | 7180 |
| Current Creek | 261406 | BLM-NV-ELD | 1989-Present | 5580 |
| Mather | 260809 | NPS GRBA | 2003-2021 | 9268 |

**Training and Qualifications**

The NWCG Standards for Wildland Fire Position Qualifications, 310-1, 2022, establishes minimum NWCG position qualification standards for training, experience, physical fitness, and currency for national mobilization to wildland fire incidents. Training and qualifications will follow current NWCG and NPS, policies.

LAKE FMO will coordinate fire training and manage fire qualifications for Park employees. The LAKE FMO will prioritize training opportunities, nominate individuals for courses, develop the annual Park training schedule and manage the Incident

Qualifications and Certification (IQCS) program. Training information and opportunities will be made available to all Park employees on an interagency basis. Ely BLM offers regular training to park employees. The Basic Firefighter (S-130/S190) course will be offered to all interested personnel to qualify at the firefighter level.

In addition, all red-carded personnel will receive instruction from the LAKE FMO or delegate in:

- Purpose and objectives of the fire management program.
- Information regarding appropriate considerations and constraints to protect resource values during firefighting operations.
- Identification of and impacts on cultural resources during firefighting operations.
- Dispatch procedures.

**Dispatching and Coordination**

EICC will act as the primary Park fire dispatcher Monday through Friday from 0730-1800 and on weekends 0900-1800 during fire season. In the event of fires, it is very likely the EICC will be staffed 24 hours. In the event of a wildland fire after work hours the Park fire liaison will contact the Ely BLM fire duty cell (775-289-9395) to provide initial attack dispatching support and response to park fires. Lake Mead National Recreation Area Dispatch may be contacted to dispatch if EICC is not available (702-293-8988). The Interagency Resource Ordering Capability (IROC) enables fire managers to request fire personnel and equipment and track where they're located.

EICC provides coordination for dispatch in east central Nevada which includes lands administered by GRBA. The main function of EICC is:

- Provide a reporting point for wildfires occurring on or near GRBA.
- Provide dispatching services for resource orders for personnel and equipment.
- Provide flight following for wildland fire.
- Provides 24 hour per day answering services for incidents.
- Coordinate radio frequencies on wildland fires.
- Provide for communications plans, weather, fire danger, and reports on fire activity.
- Provide initial attack size up reports to GBRA for submission to the INFORM incident reporting system.
- Provide expanded dispatch for large fires or multiple fire situations.

**Duty Officer**

The BLM Ely District provides a duty officer for wildfire suppression response on GRBA. The BLM duty officer coordinates wildland fire activities with the Chief Ranger and LAKE FMO. Duties and responsibilities are laid out in the FMOP. For further information including the role, function and responsibilities of the Duty Officer reference the Red Book, NPS Program Organization and Responsibilities, Chapter 3.

**Prevention**

Only units that experience more than an average of 26 human caused fires per ten-year period are required to develop a fire prevention plan. As GRBA is below this number, the Park is not required to have a prevention plan, however GRBA does cooperate with the BLM in prevention efforts (Red Book, Preparedness, Chapter 10). (see **Appendix D.5**).

**Human Caused Ignition Patterns and Problems**

From 1972 to 2021, 163 wildfires occurred within or adjacent to GRBA (average 3.3 per year). Of these, 31 wildfires were human caused (23%) and 132 (77%) were caused by lightning. About 14,667 acres burned during this period (~300 acres per year).10,753 acres burned between 2000 and 2016. The Black (2013; 4752 acres), Strawberry (2016; 2690 acres), Granite (2001; 614 acres), and Phillips Ranch fires (2000, 2533 acres) were all ignited by lightning. For further information on fire history reference **Appendix D.7** Preparedness Planning.

**Fire Investigation Policies and Procedures**

Prompt and efficient investigation of all suspicious fires will be carried out. Fire personnel will protect the point of origin and record any pertinent information to determine fire cause. The IC will promptly notify the Chief Ranger of all fires of suspicious origin and a qualified fire investigator will be assigned or ordered through EICC.

**Wildfire Prevention Program**

Fire Prevention includes:

- Information disseminated to visitors via bulletin boards and personal contacts.
- Increased patrols during high fire danger.
- Restriction of visitor activities, such as restrictions or banning of front country and backcountry camp and cooking fires during high or extreme fire danger.

Campfire restrictions in the Park will generally follow those of the BLM and USFS in eastern Nevada (https://www.nevadafireinfo.org/restrictions). These restrictions are based on fire danger levels of 4 and 5, and will be implemented in the backcountry, Snake and Strawberry Creek, and developed campgrounds, in that order.

Other prevention activities include:

- Patrols by Park rangers for education and compliance with campfire restrictions.

- Wood fires will be restricted to metal fire grills at developed campsites and day use sites and will be banned in all other front country and backcountry locations.
- Fire grills in campgrounds will be inspected annually and overhanging branches removed.
- Annual fire/safety building inspections will be conducted to identify hazard fuels that may need to be mitigated.
- The posting of signs and notices on Park bulletin boards, and at visitor centers, developed campsites trailheads and day use sites.
- Fire educational messages will be included in Park publications, interpretive talks, on the Park website, and a site bulletin describing wildland fire management program.
- Keeping the fire danger rating sign current at the Baker Ranger Station.

**Safety Program /Plan**

Each operating unit must prepare a basic "Documented Occupational Safety and Health Plan," applicable to the unit. Refer to Reference Manual 50B, National Park Service Occupational Safety and Health Program for requirements

GRBA is committed to the safety of employees, visitors and residents, and the protection of infrastructure and property in and adjacent to the Park.

Actions that may be taken to ensure public and firefighter safety include:

- The Superintendent may close all or a portion of the Park to visitation if or when wildfire or fuels projects or prescribed fire operations pose a threat to public safety
- The Park will inform visitors of all fire activity and fuels projects through press releases, social media, and other communication channels
- A fire activity report may be provided when NFDRS adjective fire danger rating is high to extreme, to inform Park personnel of potential threats
- Areas of fire activity will be clearly signed at trailheads and along roadways. Personnel will inform visitors obtaining permits for backcountry use of the exact location of fire activity.
- If a wildfire incident has been determined to be threat to public safety, Park visitors, employees, Park residents and adjacent landowners, including interagency cooperators, will be notified immediately and given precautions to take to ensure their safety. Law enforcement and the Park's PIO will have the responsibility for this notification process

**Job Hazard Analysis (JHA)**

The LAKE FMO is required to ensure completion of job hazard analysis (JHA) for fire and fire aviation activities, so mitigation measures are taken to reduce risk. Red Book, NPS Program Organization and Responsibilities Chapter 3.

The location of relevant safety and health documents is as follows:

- Wildland Fire JHA's are on the Park's server at: S:\shdata\Fire-Fuels\Wildland Fire\Job Hazard Analyses
- GRBA Occupational Safety and Health Plan (i.e., Safety Plan) is saved in S:\shdata\SAFETY-WELLNESS\GRBA Safety
- "S:\SAFETY-WELLNESS\GRBA Safety and health Mgt. Plan\GRBA-Occupational Safety and Health Plan.pdf"
- The Health Management Plan, Line of Duty Death (LODD) is saved in S:\shdata\Accident Injury Reporting

  "S:\Accident Injury Reporting\LODD_MasterDocument_NLCFinal_08-21-13_optimalsize (1).pdf"
- Pacific West Region Accident, Injury and Fatality Notification Flow Chart is saved in S:\shdata\Accident Injury Reporting
- "S:\Accident Injury Reporting\Accident_Notification_Flow_chart 3_07_2022mm.docx"

## 3.4 Post-Fire Programs and Response

GRBA is responsible for taking prompt action after a wildfire to minimize threats to life or property, and to prevent unacceptable degradation to natural and cultural resources. Damages resulting from wildfires and associated operations are addressed through four activities:

**Suppression Repair**: the intent is to repair suppression damages and is the responsibility of the IC. This activity is paid for from wildfire suppression funding. The intent is to repair suppression damages and is the responsibility of the IC. This activity is paid for from wildfire suppression funding. The Park Superintendent or assigned Representative, the FMO, and the READ will be present at the close out with the IC to discuss the IC's performance and any remaining tasks the Park will need to complete. Suppression Repairs will be one of the items reviewed at the close out.

**Emergency Stabilization**: the intent is to protect life and property and critical resource values and is the responsibility of the Superintendent. This activity is paid for from Emergency Stabilization (ES) funding.

**Rehabilitation**: the intent is to repair wildfire damaged lands that are unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by wildfire. This activity is paid for from Burned Area Rehabilitation (BAR) funds.

**Restoration:** the intent is to continue the rehabilitation efforts started in the BAR process beyond the time period limitation set by the department. This activity is paid for from regular program funds.

RM - 18, Post Wildfire Programs, Chapter 18 and the Red Book, Incident Management and Response, Chapter 11 provide direction on current processes and timeframes.

Post fire programs are necessary for the protection of the public and natural and cultural resources. Reference **Appendix F** Natural and Cultural Resources and **Appendix G** Resources

Advisor Guide and the NIFC Burned Area Emergency Response site for further information Table 5 shows the post-fire response matrix.

**Table 5. Post Fire Response Matrix.**

| | Suppression Repair | Emergency Stabilization | Rehabilitation | Restoration |
|---|---|---|---|---|
| **Objective:** | Repair suppression damages | Protect life and property | Repair damages | Long Term Ecosystem Restoration |
| **Damage due to:** | Suppression activities | Post-fire events and fire | Fire | Fire |
| **Urgency:** | Immediately after containment | 1-12 months | 1-5 years | 5+ years |
| **Responsibility:** | IC/Agency Administrator | Agency Administrator | Agency Administrator | Agency Administrator |
| **Funding Type:** | Suppression (fire) | Suppression (Emergency Stabilization) | Rehabilitation of Regular Program | Regular Program |

## 3.5 Air Quality/Smoke Management

One of the natural resources management goals of GRBA is to "Maintain the pristine quality of the air, water, geologic and scenic resources in the Park." (NPS 1999). Additional Smoke Management guidance can be found in RM 18, Air Quality and Smoke Management, Chapter 9.

### 3.5.1 Air Quality Issues

GRBA is a Class II airshed, as defined by the Clean Air Act. Under the Organic Act, the NPS manages GRBA to protect air quality and related values from air pollution. There are no population centers larger than 10,000 people near GRBA. Given its location, the Park often enjoys some of the cleanest air in the United States. However, GRBA is occasionally affected by air pollution transported inland from California with the prevailing westerly winds. On these days, the Park may experience ozone levels close to or exceeding the primary ozone national ambient air quality standard (NPS 2016).

Smoke sensitive receptors within a 20-mile radius of fuels management locations include the town of Baker, NV, Garrison Utah, and Eskdale Utah. Other sensitive areas inside the Park include the Lehman Caves Visitor Center and five campgrounds. The GRBA Visitor Center and administrative site at Baker could also be impacted by smoke.

GRBA follows smoke management protocols, under direction of the State of Nevada, Division of Environmental Protection, Smoke Management Program. This program coordinates and facilitates the management of open burning in Nevada. The Nevada Smoke Management Program Plan details the program and responsibilities of affected

parties. It provides information on permit requirements for land managers using prescribed fire and wildland fire use as a land management tool. It also includes information on air quality monitoring at prescribed fires, burner qualifications, and emission reduction methods. Burn Permit Applications for GRBA operations can be submitted online(link? NV Rx Fire NDEP).

### 3.5.2 Smoke Management Activities

The Nevada Smoke Management Program Plan provides information on emission reduction and alternatives to burning. Additional smoke management and safety guidelines for prescribed fire operations include:

- NPS RM18 (NPS Reference Manual 18 Wildland Fire Management).
- NWCG Smoke Management Guide for Prescribed Fire
- NWCG Smoke and Roadway Safety Guide
- NWCG Smoke and Roadway Safety Pocket Card
- NWCG Standards for Prescribed Fire Planning and Implementation
- Prescribed fire burn plans provide guidelines and procedures for smoke management, air quality, and safety. Prescribed burn plans require the monitoring of fire behavior and smoke. Each plan includes a pre-ignition notification list of adjacent landowners likely to be impacted by smoke.

## 3.6 Data and Records Management

All fire related data will be managed in accordance with the requirements listed in RM - 18, Information and Technology Management, Chapter 19. The Incident Management Qualification and Certification System (IQCS) is the official system for managing personnel records documenting wildland fire qualifications.

**Documentation and Cost Tracking**

All documentation associated with incidents will be kept in an incident file. The file will include all planning documents (WFDSS and amendments), delegations of authority, monitoring data and summary reports, revalidation and certification documents, fire time reports, maps, photos, and DI-1202s. All expenditures (personnel, aircraft, supplies, and equipment) will be tracked and reported according to the standards established in the Department of the Interior Individual Fire Occurrence Form (DI-1202). All fire projects will have an appropriate fire management accounting code.

**Fire Reports**

Preparation of DI-1202 is the responsibility of the IC. Reports will be submitted within 10 days of the fire being declared out. The reports will be numbered consecutively throughout the calendar year. Each report will include a brief narrative stating cause and action taken. The NPS fire reporting is managed in the INFORM system.

**Fuels Management Activities**

The Resource Management and LAKE Fuels Specialist will work together to ensure all proposed and completed fuels treatments are entered into NFPORS according to Regional requirements and timelines. All fuels treatments that burn in a wildfire are required to have Fuels Treatment Effectiveness Monitoring (FTEM) completed in the Interagency Fuels Treatment Decision Support System (IFTDSS) (see **Appendix J**). Fuel treatment accomplishments were previously entered into NPS Treatment Inspector, but tracking is transitioning to Inform-Fuels in 2023/24.

**Wildfire Polygons**

The final wildfire or prescribed fire perimeter will be stored in a Geographic Information System (GIS) polygon data layer using the NPS GIS Data Standard. Fires perimeters are available on the Park server ("Q:\Fire\GISData\Past Fires"). The final perimeter should be mapped by locally available staff by park staff with GPS and ,documenting the collection method, and other appropriate metadata.

**Incident Qualifications and Certification System (IQCS)**

The Incident Qualifications and Certification System (IQCS) is an interagency information system that tracks responder incident qualifications for the federal partners of the National Wildfire Coordinating Group (NWCG), the Department of Interior, the United States Air Force, and the United States Army.

IQCS will be maintained for all wildland fire personnel and updated as necessary by LAKE fire staff. Reference the Red Book, Chapter 13: Firefighter Training and Qualifications, for further information, and the NWCG Standards for Wildland Fire Position Qualifications, PMS 310-1.

## 4.0 PROGRAM MONITORING AND EVALUATION

This section describes actions the Park will take to review and update this plan by incorporating lessons learned from fire reviews and fire effects monitoring data as well as through findings from scientific research.

### 4.1 Monitoring

Fire monitoring at GRBA provides information for quantifying and predicting fire behavior and its ecological effects on Park resources while building a historical record of fire effects. Monitoring measures should include parameters common to all fires: fuels, topography, weather, burn severity, and fire behavior. In addition, ecological changes such as species composition and structural changes are monitored using long-term plots for many years after a fire. This information is very useful in fine-tuning the prescribed fire and fuels management program. Monitoring plan guidelines can be referenced in RM - 18, Fire Ecology and Monitoring, Chapter 8.

During prescribed burning, monitoring includes mapping, weather, site and fuel measurements and direct observation of fire characteristics such as flame length, rate of spread, and fire intensity. Operational monitoring provides a check to ensure that the fire remains in prescription and serves as a basis for evaluation and comparison of management actions in response to measured, changing fire conditions, and changes such as fuel conditions and species composition. Monitoring activities for wildland fires include mapping and documenting the growth of the fire and measuring on-site weather and fuel loading to provide

the fire management staff with present and expected fire behavior information. All fires should be monitored regardless of size.

The LAKE FMO will establish specific fire information guidelines for each fire to update intelligence about the fire. Highest priority for monitoring will be assigned to large fires or fires which threaten to leave the Park boundary. The LAKE FMO will ensure that assigned qualified personnel are dispatched to monitor fires, typically Fire Effects Monitor (FEMO), Field Observer (FOB), and READs. Personnel will be dispatched for the length of time needed to gather information on the fire's status, to assess suppression objectives, and interpret fire effects on key values at risk. Fire Monitors will utilize the NPS Fire Monitoring Handbook (https://www.nps.gov/orgs/1965/upload/fire-effects-monitoring-handbook.pdf).

Monitoring guidelines specific to GRBA can be found in **Appendix H** Monitoring Handbook.

Long term monitoring of ecological change caused by fire and fuels projects is conducted the GRBA Natural Resource Management program. Monitoring ecological change requires baseline data to compare conditions before and after treatments or disturbances. Ideally data are collected in an experimental framework utilizing controls in a Before-After-Control-Impact (BACI) design to allow strong inference of treatment effects and post disturbance recovery. Alternatively, space for time substitutions can be used to strengthen inferences and improve adaptive management.

In general, GRBA utilizes a modified Assessment, Inventory and Monitoring (AIM, https://jornada.nmsu.edu/aim) protocol to collect monitoring data on vegetation. Attributes monitored include plant cover, density, height, and diversity. These data are stored in a DIMA (Database for Inventory, Monitoring and Assessment) Access database developed by the Jornada Rangeland Research Program and maintained on the GRBA server. Vegetation data is also collected by the NPS Mojave Network Inventory and Monitoring Program. Several long-term monitoring protocols have been implemented at GRBA including integrated uplands (sagebrush steppe), aspen, and five-needle pine systems. Protocols and summary data are available in the Integrated Resource Management Applications (IRMA), the NPS Integrated Resource Management Applications Portal. Limited data following fire monitoring program protocols may be available.

## 4.2 Research

Extensive research in the South Snake Range informs this plan. Taken as whole, all vegetation types in the Snake Range are fire adapted. Colonization and fire exclusion have interrupted fire regimes, causing an accumulation of heavy fuels. This fuel accumulation has shifted fire regimes from frequent, low intensity fires to catastrophic, high intensity fires. Without active management and extensive use of fire and fuels treatments, the ecological condition of the Park will continue to degrade, resulting in impairment of some ecosystems, loss of visitor access, and diminished visitor experience. Refer to RM - 18, Fire Research, Chapter 17 for further information.

The Resource Management branch is responsible for coordinating monitoring and research activities to guide vegetation management and develop tools for sound management decisions. Fire research and monitoring should address scientific information needs, data gaps, management requirements, and public health concerns. Cooperative research with other agencies and academic institutions is necessary and encouraged. Research findings are

used in adaptive management, to provide a sound scientific basis for the integration of wildland fire and resource management.

Research and monitoring activities are summarized in the Fire Ecology Annual Reports referenced above, peer-reviewed publications, IRMA, and the permit reporting system. Reference **Appendix H** Monitoring Handbook for further detail on the fire ecology program, monitoring of fire and ecological objectives, protocols, and data management practices. Significant fire management research findings are summarized below.

The Nature Conservancy conducted Landscape Conservation Forecasting™ to guide fire management in the Park (Provencher et al. 2013). This effort established the ecological role of fire and forms the basis for fire management in the South Snake Range. All vegetation types were mapped, disturbance regimes modeled, and ecological departure from reference conditions calculated. Management scenarios were evaluated for their return on investment in returning plant communities to reference conditions. The primary causes of ecological departure were lack of early succession plant communities, overrepresentation of late succession classes, conifer encroachment into shrublands and aspen, and invasion of annual grasses. Although all vegetation types in the Park are fire adapted, fire exclusion has negatively impacted aspen and sagebrush plant communities most dramatically. Active management is required to restore the ecological integrity of Park vegetation communities. Sagebrush ecosystems require mechanical fuels reduction, invasive plant treatments, and seeding of native plants. Aspen and high elevation conifers require aggressive use of prescribed fire and managed wildfire. Without extensive fire and active management, these systems will suffer impairment (Provencher et al. 2010).

## 4.3 Climate Change

"The primary consideration of climate change for the Park, over the upcoming decades, should be related to effects of elevated growing season temperatures, with numerous potential effects on vegetation growth, susceptibility to wildfire, disease, and drought stress." (Comer et al. 2016).

Climate change is significantly impacting fire management in the Great Basin (Chambers 2008). Warmer temperatures (Tang and Arnone 2013), increased aridity (Abatzoglou and Williams 2016), decreased precipitation, increased variability in precipitation, earlier onset of spring (Monahan et al. 2016), and earlier stream run-off and snow melt (Xiao 2021; Musselman et al. 2021; Westerling et al. 2006) are all consequences of fossil fuel combustion and the resultant increase of atmospheric carbon dioxide (Gonzalez 2017; Gonzalez et al. 2018).

Great Basin NP ranked high among 57 NPS units for vulnerability to effects of climate change (Hansen et al. 2014). Local temperatures increased by 2.1° C between 2006 and 2018, with temperatures increasing faster at higher than at lower elevations (Sambuco et al. 2020). Based on local climate data, Park temperatures have warmed, and precipitation has decreased (Monahan and Fisichelli 2014a; Monahan and Fisichelli 2014b; Comer et al. 2016). Five general predictions about climate change are relevant for fire management in GRBA (Monahan and Fisichelli 2014a):

- Climate has already shifted beyond the range of historic variability.
- Climate change is affecting all aspects of Park management, including natural and cultural resource protection, Park operations, and visitor experience.

- Effective planning and management must be grounded in past dynamics, present conditions, and projected future change.
- Climate change will manifest itself not only as changes in average conditions but also as changes in extreme climate events such as more intense storms, floods, or drought.
- Extreme climate events can cause widespread and fundamental shifts in conditions of Park resources.

Climate change is resulting in longer fire seasons (Westerling et al., 2006), larger fires, and higher fire intensities. Fuels and wildfire activity in the Great Basin are increasing (Westerling et al. 2006). For example, bristlecone pines are growing faster due to longer growing season (Salzer et al. 2009), high elevation pine forests are more vulnerable to insect and pathogens mortality (Bentz et al. 2022), and tree lines are expanding upward at the expense of alpine vegetation (Smithers et al. 2018). Invasive plants such as cheatgrass are favored under climate change scenarios (Blumenthal et al. 2016; Bradley et al. 2016).

Additional information can be found in the NPS Climate Change Response Program (DataStore - Project - (Code: 2221882) (nps.gov)), published studies on NPS climate trends (GIF - Anthropogenic Climate Change (berkeley.edu)).

## 4.4 Evaluations, Reviews and Updates

**Fire Program Reviews**

As the Park has no fire program, no reviews are required. However the Fire Management Plan, fuels treatment priorities, and WFDSS objectives are reviewed and updated annually by FMO and park staff (see Annual Fire Management Plan Update below).

**Wildland Fire Incident Review**

All wildland fires and fire-related incidents will be reviewed in accordance with RM - 18, Evaluations, Reviews and Investigations, Chapter 16 and the Red Book, Reviews and Investigations Chapter 18.

All fires occurring within Park will receive at a minimum a review (i.e., AAR) by those involved to evaluate such topics as: the initial response, control methods used, safety concerns, and the need for new and replacement equipment. This review will be conducted by one of the following: the IC, the FMO, or the official who has been designated fire program responsibilities. The purpose of this review is to recognize and document actions that were successful and identify and rectify actions that were unsafe or ineffective.

The authority to convene a wildland fire review rests with the Park Superintendent, Regional Director, or the Associate Director, Visitor and Resource Protection. It is the clear responsibility of the Park Superintendent to be accountable for a Park wildland fire review. They can call for a wildland fire review, must ensure timely completion, and are ultimately responsible to implement recommended actions. The Regional Director is responsible for following up with the Park Superintendent and ensuring that Park and wildland fire reviews are established and completed in a timely manner and that recommended actions are completed. The Park Superintendent may request technical support from the Branch of Wildland Fire, Fire Management Program Center (FMPC), and regional, Park, or interagency personnel with the appropriate expertise.

A regional level fire review may be conducted if one of the following occurs:

- Crosses a Park's boundary into another jurisdiction without the approval of an interagency agreement.
- Results in adverse media attention.
- Involves serious injury to fewer than three personnel, significant Departmental property damage, or an incident with potential. This review is separate from and in addition to any specific accident investigation.
- Results in controversy involving another agency.

A national level fire review may be conducted if one of the following occurs:

- Significant adverse media or political interest.
- Multi-regional resource response.
- A substantial loss of equipment or property.
- A fatality, or multiple, serious fire-related injuries (three or more personnel). This is in addition to the required serious accident investigation (see Reference Manual 18, Standards for Operations and Safety chapter).
- Any other fires that the Associate Director, Visitor and Resource Protection wants reviewed.

All wildland fire incidents which result in human entrapment, fatalities, or serious injuries, or result in incidents with potential, will be investigated and reviewed as soon as possible after the incident.

**Annual Fire Management Plan Update**

Fire Management Plans do not expire and remain in effect until superseded by a new or revised plan. However, annual updates are required for the plan to be valid for the current year. Once completed, the superintendent must sign the Annual Update Checklist. All approved changes must then be incorporated in the FMP and the Annual Update Checklist must be added to the FMP immediately following the cover-page. The revised FMP, including the signed Annual Update Checklist, must be uploaded to the NPS Wildland Fire, Planning and Budget SharePoint. Fire Management Plans that do not have a current Annual Update Checklist are not considered current RM - 18, Fire Management Plans, Chapter 4. Contact your Regional Fire Planner for region specific deadlines and protocols.

An informal fire management program review will be conducted annually to evaluate current procedures and identify any needed changes to the FMP. A formal fire management review will be conducted every five years. The Superintendent must approve significant changes to the body of this plan. The only exceptions to this procedure will include grammatical corrections, minor procedural changes, deletions, corrections, and additions to the appendices. Changes requiring the approval and concurrence will be submitted with a new cover sheet for signature and dates, which will replace the original cover sheet upon receipt by the Superintendent, and submitted to Region Fire Planner for filing.

**Review of Interagency Agreements**

- FMOP: This agreement is for a five-year time frame, and the current plan is in effective from May 1, 2018, to April 30, 2023. Every five years this agreement will have to be updated and it also should be reviewed each fire season. As part of the annual FMP update, the BLM and NPS will meet biannually, before and after the fire season, to review the FMOP and annual delegation of authority.
- The Delegation of Authority to BLM Duty Officers is updated on an annual basis by memorandum approved by the Park Superintendent. The updated delegation needs to coincide with the terms of the FMOP.

**Review of Inter-NPS Agreements**

A delegation of authority exists between GRBA and LAKE that outlines duties of the Fire Management Staff including the LAKE FMO and LAKE Fuels Management Specialists. This agreement is updated annually by memorandum from the Park Superintendent at GRBA.

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## REQUIRED APPENDICES

**A.** Annual Delegations of Authority - Attached

**B.** Inter-Park Agreement (Not Applicable)

**C.** Cooperative and Interagency Agreements - Attached

**D.** Preparedness Planning Documents

1. Fire Danger Operating Plan (FDOP) - Not Attached
2. Preparedness Level Plan - Attached
3. Step-up Plan/Staffing Plan - Attached
4. Initial Response Plan - Not Attached
5. Prevention Plan - Not Attached
6. BLM FFPlus Data - Not Attached
7. BLM Maps - Not Attached

## ADDITIONAL APPENDICES

**E.** Multi-Year Fuels Treatment Plan - Attached

**F.** Natural and Cultural Resources - Attached

**G.** Resource Advisors Guide and Burned Area Emergency Response – Not Attached

**H.** Monitoring Handbook – Not Attached

**I.** WFDSS: Strategic Objectives and Management Requirements - Attached

**J.** IFTDSS Fire Behavior Modeling – Not Attached

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# GRBA 2023 FIRE MANAGEMENT PLAN

# Appendix A. Annual Delegation of Authority

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# United States Department of the Interior

**NATIONAL PARK SERVICE**

LAKE MEAD NATIONAL RECREATION AREA
601 NEVADA HIGHWAY
BOULDER CITY, NEVADA 89005

IN REPLY REFER TO:

January 31th, 2022

Memorandum

To: John Foley, Fire Management Officer, and Lake Mead National Recreation Area

Through: Natural Resource Program Manager, Great Basin National Park

From: Superintendent, Great Basin National Park

Subject: Delegation of Authority for Great Basin National Park Fuels Program and Wildland Fire Qualifications

In order for John Foley, Tiege Downes, and Jeremie Gamiao, Fire Management Office, Lake Mead National Recreation Area, to administer Fuels Management activities and Wildland Fire Qualifications in Great Basin National Park, they are delegated the following authority on my behalf:

1. Coordinate all prescribed fire, mechanical treatment activities, and projects (Wildland Urban Interface and Hazardous Fuels Reduction) in Great Basin National Park with the Chief of Resource Management
2. Ensure that only fully qualified personnel are used in fuels operations.
3. Request and oversee distribution of fuels funding for Great Basin National Park.
4. Approve fuels program requests of overtime and other premium pay.
5. Ensure all projects/planned ignitions are managed in a safe and cost-effective manner.
6. Coordinate all fuels project accounts to assure National Park Service fuels fiscal guidelines are adhered to and targets are met.
7. Authorized to hire emergency firefighters for fuels related projects in accordance with the Department of Interior Pay Plan for Emergency Workers.
8. Input and update NFPORS for proposed projects and project completion.
9. Follow national policy for burn plan writing, technical review, and implementation.
10. Apply for Open Burn Variances with the State of Nevada Bureau of Air Quality Planning for prescribed fire projects.
11. Approve and sign all Red Cards in accordance with Pacific West Regional Office Guidance.
12. Act as fire training officer for GRBA employees, maintain training folders and ensure adherence to medical standards.

DAVID NICHOLS
Digitally signed by DAVID NICHOLS
Date: 2022.02.01 09:53:55 -08'00'

Reviewed By: Natural Resource Program Management — Date

Anita Hansen — 2-1-2022

Approved By: Superintendent, Great Basin National Park — Date

# United States Department of the Interior

NATIONAL PARK SERVICE
GREAT BASIN NATIONAL PARK
100 Great Basin National Park
BAKER, NEVADA 89311

In reply refer to:

Memorandum

April 13, 2020

To: Ray Maestes, Assistant Fire Management Officer, Bureau of Land Management

From: Superintendent, Great Basin National Park

Subject: Delegation for Fire Duty Officers

You are delegated to authority to act on our behalf for the following duties and actions:

1. Monitor unit incident activities for compliance with BLM/NPS safety policies
2. Coordinate and set priorities for unit suppression actions and resource allocation.
3. Keep Agency Administrators, suppression resources and Information Officers informed of the current and expected situation.
4. Plan for and implement actions required for future needs.
5. Document all decisions and actions.
6. Represent Great Basin National Park in Multi-Agency Coordinating Group in setting priorities and allocating resources for fire emergencies.
7. Ensure that only fully qualified personnel are used in wildland fire operations.
8. Coordinate, pre-position, send and order fire and aviation resources in response to current and anticipated zone fire conditions.
9. Ensure all incidents are managed in a safe and cost-effective manner.
10. Coordinate and provide all fire and prevention information needs to inform internal and external costumers with necessary information.
11. Authorized to hire Emergency Firefighters in accordance with the Department of Interior Pay Plan for Emergency Workers.

The following BLM Ely District personnel will also be delegated authority as Fire Duty Officer: Jon Holmes, Tye Petersen, Robert Washburn and Kip Goff. In the absence of the Assistant Fire

Management Officer, one of the above mentioned names will be designated as the Fire Duty Officer.

JOHN FOLEY Digitally signed by JOHN FOLEY Date: 2021.04.20 12:54:25 -07'00'

Prepared By
Park Fire Management Officer — Date

James Woolsey — 5/6/2021

Reviewed By
Superintendent, Great Basin National Park — Date

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# GRBA 2023 FIRE MANAGEMENT PLAN

# Appendix C. Cooperative and Inter-Agency Agreements

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**2018 Fire Management Operating Plan**
**Between**
**Department of Interior/ National Park Service/ Great Basin National Park**
**And**
**Department of Interior/ Bureau of Land Management/ Ely District Office**

**Introduction**
This Operating Plan is based upon information in Great Basin National Park's (GRBA) current Fire Management Plan, effective May 1, 2018 through April 30, 2023, and the Annual Operating Agreement between the Eastern Nevada Fire Management Agencies, effective May, 2018.

**1. Preamble**
The objective of this document is to provide a framework for wildland and prescribed fire operations between GRBA and the Ely District Office of the Bureau of Land Management (BLM) from May 1, 2018 through April 30, 2023. A 2018 Financial Plan is attached to this Operating Plan. The performance period is five years and may be funded by annual appropriations.

**2. Authorities**
- Service First Public Law 106-291, Section 330, dated October 11, 2000.
- Economy Act, 31 USC 1535 provides any executive department or independent establishment of the government or any other bureau or office thereof, if funds are available therefore and it is determined by the head of such executive department, establishment, bureau or office to be in the interests of the Government to do so, may place orders with any such department, establishment, bureau or office for materials, supplies, equipment, work, or services of any kind that such requisitioned Federal Agency may be in a position to supply or equipped to render.
- 42 USC 1856a (a) Reciprocal Fire Protection Agreements, authorizes each agency head, charged with the duty of providing fire protection for any property of the United States to enter into a reciprocal agreement with any fire organization maintaining fire protection facilities in the vicinity of such property, for mutual aid in furnishing fire protection for such property, and for other property for which such organization normally provides fire protection.
- Master Cooperative Wildland Fire Management and Stafford Act Response Agreement Between the United States Department of the Interior, BLM, National Park Service, Bureau of Indian Affairs, United States Fish and Wildlife Service, United States Department of Agriculture, Forest Service and State of Nevada.

**3. Goals**
1. Through Interagency Agreements the Park Service will continue to provide support to the United States Forest Service, and the Bureau of Land Management on wildland fires that occur on public lands.

**4. Organization/Oversight**
Oversight of the fire management program in the park will be delegated to the park Fire Liaison, with the Park's Superintendent and the Ely BLM District Manager providing agency specific direction to park Fire Liaison and the Ely BLM Fire Management Officer (FMO). The park Fire Liaison will communicate information to the BLM FMO, BLM Assistant FMO (AFMO), or Duty Officer as it relates to wildland fire activities within GBNP.

The Great Basin National Park staffing level will include:

Chief Ranger, Wildland Fire Liaison between GBNP and Ely District BLM Fire Management.

The 2018 BLM staffing to support GRBA objectives will include:

BLM Ely District Duty Officer

**5. Responsibilities**

**Great Basin National Park**

GBNP will provide a delegation of authority to the BLM Duty Officer(s) describing authorities, responsibilities, and expectations. The National Park Service, Pacific West Region may provide funding sufficient for the BLM to support fire awareness and initial attack at Great Basin National Park. This will include specifics listed below in this document.

**Ely District BLM**

The BLM will provide a Duty Officer that is responsible for operational oversight during wildland fire activities. The Ely Interagency Communications Center (EICC) will be responsible for all dispatching functions for all wildland fires that are within the Park boundaries.

**6. Duty Officer**

The Duty Officer(s) for the Park will be from the BLM Ely District Office. A Delegation of Authority will be prepared annually and signed by the potential duty officers and Park Superintendent.

**7. Personnel**

BLM fire staffing will be maintained at the Ely, Pony Springs, or Caliente, NV fire stations. Crews may be requested to be stationed at GBNP upon discussion between the Chief Ranger and the BLM Duty Officer.

All other park employees (militia) interested in participating in wildland fire activities will be required to meet NWCG National Interagency Incident Management System 310-1, and Interagency Standards for Fire and Fire Aviation Operations. All qualified NPS employees will have a signed Supervisory Fire Availability Form on file with the park Fire Liaison.

**8. Dispatch Operations**

The Ely Interagency Communications Center (EICC) will act as the primary park fire dispatcher Monday through Friday from 0700-1700 and on weekends 0700-1700 during fire season. Additional dispatch hours may be warranted during fire activity. In the event of a wildland fire after EICC work hours the park Fire Liaison will contact the Ely BLM Fire Duty Cell (775-289-9395) to provide Initial Attack dispatching support and response for the park. Lake Mead National Recreation Area Dispatch may be contacted to dispatch if EICC is not available.

The park Fire Liaison will be responsible for updating the Interagency Resource Ordering Capability (IROC) to show availability of the park's Red Carded personnel.

**9a. Function of the Ely Interagency Communication Center is:**

A. Provide a Communications Center for information concerning the fire situation for GBNP.
B. Provide a reporting point for wildland fire occurring on or threatening GBNP.
C. Provide wildland fire dispatching services for all shared resources.
D. Provide a central point of contact for placing resource orders for personnel and equipment.
E. Provide flight following services for all agency flights originating within or passing through GBNP and adjoining federal lands.

F. Provide a 24-hour per day telephone answering service for fire incidents occurring within the protection boundaries of participating agencies.
G. Provide mobilization services for local resources that include all Eastern Nevada federal partners.
H. Provide radio frequency management. Coordinate frequencies for individual wildland fires. Control non-critical radio traffic while emergency operations are in progress.
I. Prepare or update communications plan, forms, mobilization plans, daily staffing forms, fire activity forms, daily weather records, revise dispatch maps, radio repeater maps.
J. Provide hard copies of initial attack size-up fire reports to GBNP for submission into the Wildland Fire Management Information System
K. Provide extended attack dispatch services for all wildland fires that escape initial attack. Plan for and establish an expanded dispatch organization for large fire support or multiple fire activity.

**9b. Dispatch Center Staffing Plan**
See attached Step-Up Plan and the EICC Delegation of Authority.

**9c. Expanded Dispatch Plan**
All expanded dispatch needs will be ordered through the Ely Interagency Communication Center as needed by the EICC Floor Supervisor.

**10. Initial Attack Response Plan and Mutual Aid**
All attempts will be made by the BLM to provide initial attack coverage to the park during times of high fire activity.

When a report of a fire is made to park employee, the employee will take the following information: Name of Reporting Party, Phone Number, Address, Campground site number, size of the fire, color of the smoke, location and encourage the reporting party to remain there until LE arrives to take a report. This information will be passed along to the duty officer and EICC for response.

In the event a fire is threatening life or property, Law Enforcement Rangers will be dispatched to close private/public roads, notify and evacuate park residents, employees and visitors from the area. Resources staff may be called upon to provide resource protection information and Maintenance staff to identify locations of electrical and gas shut off valves, notify local power and gas companies and to identify potential hazardous materials concerns.

If a fire cannot be contained or suppressed after one operational period, the assigned duty officer will order additional resources and the next level of Incident Command, if necessary. The BLM duty officer will update the park Fire Liaison and Superintendent on extended attack incidents. Should a fire become large, the Pacific West Regional Office Procedures for Large Fires will be implemented.

**11. Search and Rescue**
The BLM fire crew may participate as necessary and qualified with any Search and Rescue operation in GBNP with the approval of the BLM Duty Officer.

**12. Structural/Vehicle fires – Park Fire Brigade**
The BLM fire crew is untrained to respond to structural or vehicle fires. The crew may assist trained structural firefighters in providing water or traffic control. The crew is not allowed to enter a burning building.

**13. EMT/Medical Responses**
The fire crew may not assist in responding to EMT-Medical responses within the park, unless they meet NPS EMT standards.

**14. Communication**
This Operating Plan between GBNP and BLM, along with the Annual Operating Agreement between, Eastern Nevada Federal Fire Management Agencies will be followed for dispatch, initial attack, support, resource ordering and billing. A copy of the Radio Frequency List Agreement between the Ely BLM and GBNP has been provided to EICC. This agreement allows the BLM to use the park frequencies for dispatching resources to fires.

During fire incidents the EICC will obtain, manage and assign radio frequencies and will be responsible for set-up of Temporary Flight Restrictions (TFR's) and flight following.

**15. Fire Weather**
Each morning the fire weather forecast for Zone 455 (White Pine County) will be downloaded and shared with the fire crews who are stationed at the park. Notification of a Red Flag Warning, Fire Weather Watches, Spot Weather Forecasts or other weather notices will be broadcast to fire personnel during preparedness and fire suppression activities, by EICC. The EICC will follow standard operating procedures for weather notification and documentation. This information will be faxed to (775) 234-7268 at the park.

Requests for Spot Weather Forecasts during wildland fires or prescribed fires will be handled through the EICC.

**16. Fire Danger**
The Weather Information Management System will be used to determine fire danger each day. The EICC will provide a fire danger rating. The fire danger rating will be posted daily on the sign that is located at the entrance to the GBNP Fire Station.

**17. Information to be provided by Dispatch for Suppression Support**
Information on resource availability will be updated frequently in ROSS and retrieved by EICC personnel for local, state and National dispatch of Park employees. The park Fire Liaison will provide incoming personnel with briefing packages containing radio frequencies, fuel types, agency policy, maps and a pocket card.

**18. Briefings**
Briefings will be conducted daily and documented by the engine boss at the GBNP fire station, if staffed. Briefings on wildland fires will be conducted by the Incident Commander. The briefing checklist located in the IRPG will be followed.

**19. Preparedness Levels**
National Preparedness levels are dictated by burning conditions, fire activity, and resource availability.

*Preparedness Level 1* – Minimal large fire activity nationally. Most Geographic areas have low to moderate fire danger. There is little to no commitment of National Resources.

*Preparedness Level 2* – Several Geographic areas are experiencing high to extreme fire danger. Wildland fire activity is increasing and large fires are occurring in one or more geographic areas. Minimal mobilization of resources from other geographic areas is occurring. The potential exists for mobilizing additional resources from other Geographic Areas.

*Preparedness Level 3* – Two or more geographic areas are experiencing wildland or prescribed fire activities requiring a major commitment of National Resources. Additional resources are being ordered

and mobilized through NICC. Incident Management Teams are committed in two or more geographic areas or 275 crews are committed nationally.

*Preparedness Level 4* – Two or more geographic areas are requiring Type 1 Teams. Competition exists for resources between Geographic areas. When 425 crews or five Type 1 Teams are committed nationally.

*Preparedness Level 5* – Geographic areas are experiencing major incidents which have the potential to exhaust all agency fire resources. When 550 crews are committed nationally.

**20. Trigger Points**
The next level Incident Commander will be ordered when Yes is marked on 3 or more in the Incident Complexity Analysis, page 9 of the Incident Response Pocket Guide, April 2018.

**21. Aviation**
All aviation ordering and scheduling will be requested through a resource order faxed to the EICC. Temporary Flight Restrictions will be requested through EICC. Aviation flight following will be handled by EICC. In the event that EICC cannot flight follow, a request to Lake Mead Dispatch will be made to flight follow. All flights will be coordinated with the Chief Ranger at Great Basin.

**22. Administrative Items**
Each agencies administrative staff will be responsible for completing travel, payroll information and purchases for small fire incidents including setting up local fire accounts. The Duty Officer will determine whether extended staffing is needed for holidays, extreme weather events such as red flag warnings and lightning and for days when the fire danger rating is very high and extreme. The Duty Officer will convey this information to the Engine Boss who will then inform the park fire liaison.

**23. Accident Incident**
All accidents (personal, property damage or vehicle) will be reported as soon as possible to the park Fire Liaison and Law Enforcement Officer for investigation. The individual involved in the accident will be responsible for turning in completed paperwork to the park Fire Liaison, who will then contact the BLM Duty Officer. Established call out procedures will be followed if medical assistance is necessary. In the event of a fatality the Fire Liaison will be contacted who will notify the Superintendent and Duty Officer. Procedures in the Administrator's Guide to Critical Incident Management will be followed. Normal resource ordering procedures will be used to mobilize a Critical Incident Stress Debriefing Team.

**24. Medical Plan**
The Medical Evacuation Plan for serious injuries which occur in Station, during Wildland Fire Suppression or Prescribed Fire will be as follows:

1. Call EICC on King Top Repeater, with mechanism of injury, approximate age and gender, location of injury, location of incident, time of injury and has CPR been initiated, if needed.
2. EICC will contact the Sheriff's Department and the Great Basin Rangers to initiate EMS response.
3. EMT's will assess patient and determine if the patient should be transported either by ambulance or by air.
4. If the patient is to be transported by ambulance, the ambulance will take the patient to the nearest medical facility, most likely the William Bee Ririe Hospital, 6 Steptoe Circle, Ely, NV.
5. If the patient is to be transported by air, the park dispatcher will contact the Ely Interagency Communications Center who will initiate air transport to the nearest medical facility.

Any injury to staff assigned to Great Basin National Park will be relayed to the Chief Ranger, so accurate SMIS information can be maintained. Supervisors of the injured person will complete the SMIS report.

**25. Media Plan**

The Superintendent or designee will act as the park's media contact during fire incidents. Procedures for communicating with the public and the media as stated in the Superintendents Guide to Public Affairs will be followed.

**26a. Fire Regime Condition Class 1 (FRCC1) FMU**

Fire regimes are within or near a historical range. The risk of losing key ecosystem components is low. Fire frequencies have departed from historical frequencies by no more than one return interval. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as use of wildland fire. Fire Regime Condition Class 1 FMU = 26,120 acres.

**Fire Management Tools for this FMU**

**Use of Wildland Fire** – When a natural ignition occurs within this FMU, a SFDSS Response Level 1 analysis will be performed within two hours of detection and size. SFDSS Response Level 1 analysis will be performed as necessary as the incident evolves.

**Prescribed Fire** - Prescribed Fire will be used in those areas and under conditions that will not result in the loss of key ecosystem components to approximate the natural vegetative disturbance of periodic fire occurrence. One hundred years of fire suppression has resulted in heavy fuel loading in most ecosystems within the park. Low intensity prescribed fire will be applied in order to prevent the loss of key ecosystem components. This low-intensity fire is vital to the life cycles of fire-dependent range and forest lands.

**Mechanical Fuels Reduction** – Mechanical treatments to achieve fuel reduction and ecological restoration will be employed within shrub-steppe and pinyon-juniper plant communities below 8,000 feet elevation.

Fire management policy in this Fire Management Unit will be to:

1. Protect all structures on the List of Classified Structures are identified as values at risk with the appropriate actions. The protected area will extend 1/8 mile around each historic structure, unless the fire situation or resource value dictates an exclusion zone.
2. If a use of wildland fire incident or prescribed fire exceeds prescription parameters, it will be suppressed using strategies appropriate to the situation.
3. Suppress all human ignitions.
4. Treat with any given use of wildland fire incident or incidents and prescribed fire no more than 10% of the acreage within sensitive watersheds and those watersheds with reintroduced BCT, until herbaceous vegetation has recovered to reduce sediment from the past treatment. If the 10% threshold is reached during a use of wildland fire incident.
5. All naturally unplanned ignitions below 8,000 feet in elevation will be suppressed as a means to prevent complete ecosystem conversion from cheat grass invasion.
6. As a means of preventing the spread of cheat grass, only mechanical treatments will be utilized and all natural unplanned ignitions will be suppressed in areas below 8,000 feet in elevation. Only 10% of the acreage within sensitive watersheds, those watersheds with re-introduced BCT,

will be treated until herbaceous vegetation has recovered to reduce sediment inputs from past treatment.

**26b. Fire Regime Condition Class 2 (FRCC2) FMU**

**Fire Regime Condition Class 2 FMU** – Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as use of wildland fire and mechanical treatments, to restore ecosystem health. Fire Regime Condition Class 2 FMU + 44,437 acres.

**Fire Management Tools for Use in this FMU**

**Use of Wildland Fire** – Natural ignitions within this FMU will be subject to the same evaluative process described under Fire Regime Condition Class 1 FMU.

**Prescribed Fire** – Prescribed fire will be used in those areas and under conditions that will not result in the loss of key ecosystem components and to approximate the natural vegetative disturbance of periodic fire occurrence. A low intensity prescribed fire will be applied.

**Mechanical Treatments** – In areas where it is determined that prescribed fire and use of wildland fire will result in the loss of key ecosystem components, mechanical restoration treatments will be applied. Treatments that return the landscape to a semblance of a natural fire regime will include thinning the canopy, removing ladder fuels, and reducing the overall fuel loading. Silvicultural prescriptions will be developed to achieve the desired future conditions for the site. Mechanical treatments will involve construction of fuel breaks for reduction of the vegetation through the use of hand tools and chainsaws. A small Bobcat will be used to assist in removing fuels and the chipping of slash. Larger materials will be sold as firewood or pile and burned on site. All mechanical treatments will be based upon restoring the site to the potential natural vegetative community type under a natural disturbance regime.

**26c. Fire Regime Condition Class 3 (FRCC3) FMU**

Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments. Fire Regime Condition Class 3 FMU + 143 acres. Each site will be analyzed by an interdisciplinary team to determine the best restoration treatment based upon current conditions.

**Fire Management Tools for use in this FMU**

**Full Suppression** – All unplanned ignitions will be subject to full suppression within this FMU due to very heavy fuel accumulations. The risk of losing key ecosystem components is high from the resulting stand replacing event.

**Mechanical Treatments** – This will be the preferred fuel reduction/fire regime restoration tool of choice. Treatments that return the landscape to a semblance of a natural fire regime will involve thinning the canopy, removing ladder fuels, and reducing the fuel loading. Ladder fuels will be largely removed by

cutting understory trees and high fire-risk trees (such as brush, dog hair thickets, and trees heavily infected with dwarf mistletoe and fir-engraver beetles). Cleanup will be covered in the biomass disposal section.

**Prescribed Fire** – After restoration treatments have been completed and monitoring shows that vegetation attributes have been restored, low intensity prescribed fires will be used to maintain the natural disturbance of periodic fire occurrence.

Fire management policy in this Fire Management Unit will be to:

1. Suppress all human and natural unplanned ignitions.
2. As a means of preventing the spread of cheatgrass, only mechanical treatments will be utilized in areas below 8,000 feet in elevation.

**26d. Infrastructure FMU** – This unit is a $1/8^{th}$ mile radius circle around Park infrastructure, including campgrounds, housing, picnic areas, water systems and the visitor center. The intent of this unit is to reduce fuels where necessary to reduce the loss of structures. Infrastructure FMU + 1,047 acres.

**Fire Management Tools for use in this FMU**:

**Mechanical Treatments** – This will involve treatments that thin the canopy, removes ladder fuels, and reduces fuel loads. An uneven-aged silvicultural prescription utilizing a group-selection cutting method will be implemented. The uneven-aged silvicultural system involves the manipulation of the stand to simultaneously maintain high forest canopy of a diversity of desirable species, remove interlocking crowns, and stimulate regeneration of a diversity of both over-story and under-story species and the orderly growth and development of trees through a range of age classes. Ladder fuels will be largely removed by cutting understory trees and high fire-risk trees. Cleanup will involve removal of 100 percent of the large biomass and the chipping and/or pile burning of smaller materials.

**Prescribed Fire** – After mechanical treatments have been completed, low intensity prescribed fires will be used to maintain the natural disturbance of periodic fire occurrence.

Fire management policy in this Fire Management Unit will be to:

1. Suppress all human and natural ignitions.
2. As a means of preventing the spread of cheatgrass, only mechanical treatments will be utilized in areas below 8,000 feet in elevation.

**26e. Wildland/Urban Interface FMU** – The only effort that will protect communities from the threat of wildfire are those that seek to treat houses and the surrounding properties, and the forest directly adjacent to houses. The WUI Unit refers to areas ½ mile from the houses on the edge of the Park boundary. WUI FMU = 4,444 acres.

**Fire Management Tools for use in this FMU**:

**Mechanical Treatments** – The fuels reduction efforts will be implemented as two distinct treatments. All treatments prescriptions will be based upon potential natural vegetative community restoration as well as protecting structures. The intensive zone will involve a heavy thinning for the first 1/8 mile from houses or private lands on the Park boundary. The extensive zone will involve a more conservative treatment for up to 3/8 mile from the intensive zone. The goal of the intensive zone treatment is to reduce the intensity of an approaching wildfire, preferably reducing it to a surface fire. Thinning the canopy,

removing ladder fuels, and reducing the fuel load accomplish this. This area can serve as a "defensible space", a fuel break, and a potential fire line. The prescriptions will include cleanup of 100% of the slash through chipping and/or pile burning. The goal of the extensive zone treatment is to reduce the ability of the forest to sustain or initiate a crown fire. Groups of trees will be left intact in the extensive zone, with interlocking crowns within the groups, but continuous canopy is thinned to separate tree groups. Ladder fuels will be largely removed by cutting understory trees and high fire-risk trees. Larger biomass will be removed from the site. Smaller biomass will be chipped and scattered to slow existing infestations of cheat grass. A small portion of slash will be lopped and scattered to create an environment conducive to recovery of herbaceous vegetation.

**Prescribed Fire** – After mechanical treatments have been completed, low intensity prescribed fires will be used to maintain the natural vegetative disturbance of periodic fire occurrence.

Fire management policy in this Fire Management Unit will be to:

1. Suppress all human and natural ignitions.
2. As a means of preventing the spread of cheatgrass, only mechanical treatments will be utilized in areas below 8,000 feet in elevation.

**27. Structural Fires/Vehicle Fires**
The fire crew will not fight Structural Fires or Vehicle Fires within the park, unless qualified to do so. The fire crew may provide assistance with shuttling water, traffic control or communication.

**28. Training**
The two Annual Firefighting Refreshers may be conducted for park employees in late May or June by the BLM. All fire training may be conducted by the Ely District. Park employee nominations for fire training must be coordinated through the Chief Ranger. Ely BLM fire crewmembers may take part in park training (Search and Rescue, Cave Rescue, Orientation, Safety Training) if spaces are available. Training will include pack tests for participants. The Chief Ranger will ensure that persons participating in the pack test have completed the correct medical clearances prior to starting.

**29. Administratively Determined Hires**
The NPS Lake Mead Fire Management Office is permitted to "hire" casuals and complete paperwork.

**30. Snake Valley Volunteer Fire Department**
Great Basin National Park has no formal agreement with White Pine County for using the Snake Valley Volunteer Fire Department for fire incidents inside the park at the present time.

**31. Fire Station, Great Basin Resource Building**
A computer, fax machine, copier and telephones will be made available to the fire crew in order to conduct business with their home unit and gather information needed to conduct morning briefings with the crew. The shower facilities will also be made available for the fire crew to use after daily physical training.

Items in the fire station computer, equipment and tools will be made available to the fire crew to maintain their fire engine, hand tools and fire gear in a state of readiness. The Park's fire engine (E-862) will be made available to the BLM fire crew should it be necessary.

All problems encountered within Great Basin National Park will be reported to the Chief Ranger, who will then convey the information to the Duty Officer and Park Law Enforcement.

No firearms, alcohol or drugs are allowed on or in property belonging to the federal government.

**Availability of Funds:**
Funds in the amount of at least $5,000 will be obligated annually by execution of the IA (See item 16 of IA). These funds are obligated to the BLM, Ely District for wildland fire support in the areas of dispatch, training, fire preparedness, and/or fire prevention.

**Advance Funding:**
Advanced funding is not authorized. Reimbursement for allowable costs shall be submitted in accordance with Agency procedures.

**Claims Dispute Resolution:**
Should any Party not be able to resolve a claim regarding compensation, reimbursement, damage or equipment repair through negotiation with the protecting agency, it should be elevated to the next higher level of management for resolution.

**Financial Arrangements:**
This IA is not to exceed the amount as shown in block 16c. All costs shall be charged to the information in Section 11, Buyer Information.

The BLM will submit invoices via the Intra-Governmental Payment & Collection System (IPAC) or the Intra-Governmental Transaction Portal, whichever is applicable. The invoice will reference the BLM DUNS number, the BLM Agency Locator Code (ALC), the Treasury Account Symbol (TAS), the Accounting Classification Reference Code(s), the Document Number, a brief description of the services performed, and the Accounts Payable Point of Contact (POC) name and phone number.

**Termination by Mutual Agreement:**
This Agreement may be terminated, in whole or part, as follow:

a. When the District/Department agree upon the termination conditions, including the effective date and, in the case of partial termination, the portion to be terminated.
b. By 30 days written notification District/Department to the BLM setting forth the reasons for termination, effective date, and in the case of partial termination, the portion to be terminated.
c. If, in the case of a partial termination, the NPS determines that the remaining portion of the agreement will not accomplish the purposes for which the agreement was made, the agreement may terminate in its entirety and excess funds shall be refunded within 60 days after the effective date of termination.

**Modifications to the Agreement:**
Either party may propose changes to the IA by written notification. All modifications to this agreement will be issued in writing and agreed to by both parties.

**Payments:**
Accounts and related records shall be available for inspection and review by each Federal Agency upon written request.

**Publication Rights:**
The results of this work will be available to the BLM and NPS for publication and use in connection with any related work.

National Park Service Representative (Superintendent)

Fire Coordinator/Liaison, Great Basin National Park

District Manager, Ely District BLM

Fire Management Officer, Ely District BLM

Should any Party not be able to resolve a claim regarding compensation, reimbursement, damage or equipment repair through negotiation with the protecting agency, it should be elevated to the next higher level of management for resolution.

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This IA is not to exceed the amount as shown in block 16c. All costs shall be charged to the information in Section 11, Buyer Information.

The BLM will submit invoices via the Intra-Governmental Payment & Collection System (IPAC) or the Intra-Governmental Transaction Portal, whichever is applicable. The invoice will reference the BLM DUNS number, the BLM Agency Locator Code (ALC), the Treasury Account Symbol (TAS), the Accounting Classification Reference Code(s), the Document Number, a brief description of the services performed, and the Accounts Payable Point of Contact (POC) name and phone number.

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**Publication Rights:**
The results of this work will be available to the BLM and NPS for publication and use in connection with any related work.

James Woolsey 4/2/2020
National Park Service Representative (Superintendent)

4/6/2020
Fire Coordinator/Liaison, Great Basin National Park

District Manager, Ely District BLM

Fire Management Officer, Ely District BLM

**2018 Fire Management Operating Plan**
**Between**
**Department of Interior/ National Park Service/ Great Basin National Park**
**And**
**Department of Interior/ Bureau of Land Management/ Ely District Office**

**Introduction**

This Operating Plan is based upon information in Great Basin National Park's (GRBA) current Fire Management Plan, effective May 1, 2018 through April 30, 2023, and the Annual Operating Agreement between the Eastern Nevada Fire Management Agencies, effective May, 2018.

**1. Preamble**
The objective of this document is to provide a framework for wildland and prescribed fire operations between GRBA and the Ely District Office of the Bureau of Land Management (BLM) from May 1, 2018 through April 30, 2023. A 2018 Financial Plan is attached to this Operating Plan. The performance period is five years and may be funded by annual appropriations.

**2. Authorities**
- Service First Public Law 106-291, Section 330, dated October 11, 2000.
- Economy Act, 31 USC 1535 provides any executive department or independent establishment of the government or any other bureau or office thereof, if funds are available therefore and it is determined by the head of such executive department, establishment, bureau or office to be in the interests of the Government to do so, may place orders with any such department, establishment, bureau or office for materials, supplies, equipment, work, or services of any kind that such requisitioned Federal Agency may be in a position to supply or equipped to render.
- 42 USC 1856a (a) Reciprocal Fire Protection Agreements, authorizes each agency head, charged with the duty of providing fire protection for any property of the United States to enter into a reciprocal agreement with any fire organization maintaining fire protection facilities in the vicinity of such property, for mutual aid in furnishing fire protection for such property, and for other property for which such organization normally provides fire protection.
- Master Cooperative Wildland Fire Management and Stafford Act Response Agreement Between the United States Department of the Interior, BLM, National Park Service, Bureau of Indian Affairs, United States Fish and Wildlife Service, United States Department of Agriculture, Forest Service and State of Nevada.

**3. Goals**
1. Through Interagency Agreements the Park Service will continue to provide support to the United States Forest Service, and the Bureau of Land Management on wildland fires that occur on public lands.

**4. Organization for 2018**
Oversight of the fire management program in the park will be delegated to the park Fire Liaison, with the Park's Superintendent and the Ely BLM District Manager providing agency specific direction to park Fire Liaison and the Ely BLM Fire Management Officer (FMO). The park Fire Liaison will communicate information to the BLM FMO, BLM Assistant FMO (AFMO), or Duty Officer as it relates to wildland fire activities within GBNP. .

The 2018 Great Basin National Park staffing level will include:

Chief Ranger, Wildland Fire Liaison between GBNP and Ely District BLM Fire Management.

The 2018 BLM staffing to support GRBA objectives will include:

BLM Ely District Duty Officer

**5. Responsibilities**
**Great Basin National Park**

GBNP will provide a delegation of authority to the BLM Duty Officer(s) describing authorities, responsibilities, and expectations. The National Park Service, Pacific West Region may provide funding sufficient for the BLM to support fire awareness and initial attack at Great Basin National Park. This will include specifics listed below in this document.

**Ely District BLM**
The BLM will provide a Duty Officer that is responsible for operational oversight during wildland fire activities. The Ely Interagency Communications Center (EICC) will be responsible for all dispatching functions for all wildland fires that are within the Park boundaries.

**6. Duty Officer**
The Duty Officer(s) for the Park will be from the BLM Ely District Office. A Delegation of Authority will be prepared annually and signed by the potential duty officers and Park Superintendent.

**7. Personnel**
BLM fire staffing will be maintained at the Ely, Pony Springs, or Caliente, NV fire stations. Crews may be requested to be stationed at GBNP upon discussion between the Chief Ranger and the BLM Duty Officer.

All other park employees (militia) interested in participating in wildland fire activities will be required to meet NWCG National Interagency Incident Management System 310-1, and Interagency Standards for Fire and Fire Aviation Operations. All qualified NPS employees will have a signed Supervisory Fire Availability Form on file with the park Fire Liaison.

**8. Dispatch Operations**
The Ely Interagency Communications Center (EICC) will act as the primary park fire dispatcher Monday through Friday from 0730-1800 and on weekends 0900-1800 during fire season. In the event of fires it is very likely the EICC will be staffed 24 hours. In the event of a wildland fire after EICC work hours the park Fire Liaison will contact the Ely BLM Fire Duty Cell (775-289-9395) to provide Initial Attack dispatching support and response for the park. Lake Mead National Recreation Area Dispatch may be contacted to dispatch if EICC is not available.

The park Fire Liaison will be responsible for updating the Resource Ordering Status System (ROSS) to show availability of the park's Red Carded personnel.

**9a. Function of the Ely Interagency Communication Center is:**

A. Provide a Communications Center for information concerning the fire situation for GBNP.
B. Provide a reporting point for wildland fire occurring on or threatening GBNP.
C. Provide wildland fire dispatching services for all shared resources.
D. Provide a central point of contact for placing resource orders for personnel and equipment.
E. Provide flight following services for all agency flights originating within or passing through GBNP and adjoining federal lands.
F. Provide a 24-hour per day telephone answering service for fire incidents occurring within the protection boundaries of participating agencies.
G. Provide mobilization services for local resources that include all Eastern Nevada federal partners.
H. Provide radio frequency management. Coordinate frequencies for individual wildland fires. Control non-critical radio traffic while emergency operations are in progress.
I. Prepare or update communications plan, forms, mobilization plans, daily staffing forms, fire activity forms, daily weather records, revise dispatch maps, radio repeater maps.
J. Provide hard copies of initial attack size-up fire reports to GBNP for submission into the Wildland Fire Management Information System
K. Provide extended attack dispatch services for all wildland fires that escape initial attack. Plan for and establish an expanded dispatch organization for large fire support or multiple fire activity.

**9b. Dispatch Center Staffing Plan**
See attached Step-Up Plan and the EICC Delegation of Authority.

**9c. Expanded Dispatch Plan**
All expanded dispatch needs will be ordered through the Ely Interagency Communication Center as needed by the EICC Floor Supervisor.

**10. Initial Attack Response Plan and Mutual Aid**
All attempts will be made by the BLM to provide initial attack coverage to the park during times of high fire activity.

When a report of a fire is made to park employee, the employee will take the following information: Name of Reporting Party, Phone Number, Address, Campground site number, size of the fire, color of the smoke, location and encourage the reporting party to remain there until LE arrives to take a report. This information will be passed along to the duty officer and EICC for response.

In the event a fire is threatening life or property, Law Enforcement Rangers will be dispatched to close private/public roads, notify and evacuate park residents, employees and visitors from the area. Resources staff may be called upon to provide resource protection information and Maintenance staff to identify locations of electrical and gas shut off valves, notify local power and gas companies and to identify potential hazardous materials concerns.

If a fire cannot be contained or suppressed after one operational period, the assigned duty officer will order additional resources and the next level of Incident Command, if necessary. The BLM duty officer will update the park Fire Liaison and Superintendent on extended attack incidents. Should a fire become large, the Pacific West Regional Office Procedures for Large Fires will be implemented.

**11. Search and Rescue**
The BLM fire crew may participate as necessary and qualified with any Search and Rescue operation in GBNP with the approval of the BLM Duty Officer.

**12. Structural/Vehicle fires – Park Fire Brigade**
The BLM fire crew is untrained to respond to structural or vehicle fires. The crew may assist trained structural firefighters in providing water or traffic control. The crew is not allowed to enter a burning building.

**14. EMT/Medical Responses**
The fire crew may not assist in responding to EMT-Medical responses within the park, unless they meet NPS EMT standards.

**15. Communication**
This Operating Plan between GBNP and BLM, along with the Annual Operating Agreement between, Eastern Nevada Federal Fire Management Agencies will be followed for dispatch, initial attack, support, resource ordering and billing. A copy of the Radio Frequency List Agreement between the Ely BLM and GBNP has been provided to EICC. This agreement allows the BLM to use the park frequencies for dispatching resources to fires.

During fire incidents the EICC will obtain, manage and assign radio frequencies and will be responsible for set-up of Temporary Flight Restrictions (TFR's) and flight following.

**16. Fire Weather**
Each morning the fire weather forecast for Zone 455 (White Pine County) will be downloaded and shared with the fire crews who are stationed at the park. Notification of a Red Flag Warning, Fire Weather Watches, Spot Weather Forecasts or other weather notices will be broadcast to fire personnel during preparedness and fire suppression activities, by EICC. The EICC will follow standard operating procedures for weather notification and documentation. This information will be faxed to (775) 234-7268 at the park.

Requests for Spot Weather Forecasts during wildland fires or prescribed fires will be handled through the EICC.

**17. Fire Danger**
The Weather Information Management System will be used to determine fire danger each day. The EICC will provide a fire danger rating. The fire danger rating will be posted daily on the sign that is located at the entrance to the GBNP Fire Station.

**18. Information to be provided by Dispatch for Suppression Support**
Information on resource availability will be updated frequently in ROSS and retrieved by EICC personnel for local, state and National dispatch of Park employees. The park Fire Liaison will provide incoming personnel with briefing packages containing radio frequencies, fuel types, agency policy, maps and a pocket card.

**19. Briefings**
Briefings will be conducted daily and documented by the engine boss at the GBNP fire station, if staffed. Briefings on wildland fires will be conducted by the Incident Commander. The briefing checklist located in the IRPG will be followed.

**20. Preparedness Levels**
National Preparedness levels are dictated by burning conditions, fire activity, and resource availability.

*Preparedness Level 1* – Minimal large fire activity nationally. Most Geographic areas have low to moderate fire danger. There is little to no commitment of National Resources.

*Preparedness Level 2* – Several Geographic areas are experiencing high to extreme fire danger. Wildland fire activity is increasing and large fires are occurring in one or more geographic areas. Minimal mobilization of resources from other geographic areas is occurring. The potential exists for mobilizing additional resources from other Geographic Areas.

*Preparedness Level 3* – Two or more geographic areas are experiencing wildland or prescribed fire activities requiring a major commitment of National Resources. Additional resources are being ordered and mobilized through NICC. Incident Management Teams are committed in two or more geographic areas or 275 crews are committed nationally.

*Preparedness Level 4* -- Two or more geographic areas are requiring Type 1 Teams. Competition exists for resources between Geographic areas. When 425 crews or five Type 1 Teams are committed nationally.

*Preparedness Level 5* – Geographic areas are experiencing major incidents which have the potential to exhaust all agency fire resources. When 550 crews are committed nationally.

**21. Trigger Points**
The next level Incident Commander will be ordered when Yes is marked on 3 or more in the Incident Complexity Analysis, page 9 of the Incident Response Pocket Guide, January 2010.

**22. Aviation**
All aviation ordering and scheduling will be requested through a resource order faxed to the EICC. Temporary Flight Restrictions will be requested through EICC. Aviation flight following will be handled by EICC. In the event that EICC cannot flight follow, a request to Lake Mead Dispatch will be made to flight follow. All flights will be coordinated with the Chief Ranger at Great Basin.

**23. Administrative Items**
Each agencies administrative staff will be responsible for completing travel, payroll information and purchases for small fire incidents including setting up local fire accounts. The Duty Officer will determine whether extended staffing is needed for holidays, extreme weather events such as red flag warnings and lightning and for days when the fire danger rating is very high and extreme. The Duty Officer will convey this information to the Engine Boss who will then inform the park fire liaison.

**24. Accident Incident**

All accidents (personal, property damage or vehicle) will be reported as soon as possible to the park Fire Liaison and Law Enforcement Officer for investigation. The individual involved in the accident will be responsible for turning in completed paperwork to the park Fire Liaison, who will then contact the BLM Duty Officer. Established call out procedures will be followed if medical assistance is necessary. In the event of a fatality the Fire Liaison will be contacted who will notify the Superintendent and Duty Officer. Procedures in the Administrator's Guide to Critical Incident Management will be followed. Normal resource ordering procedures will be used to mobilize a Critical Incident Stress Debriefing Team.

**25. Medical Plan**

The Medical Evacuation Plan for serious injuries which occur in Station, during Wildland Fire Suppression or Prescribed Fire will be as follows:

1. Call EICC on King Top Repeater, with mechanism of injury, approximate age and gender, location of injury, location of incident, time of injury and has CPR been initiated, if needed.
2. EICC will contact the Sheriff's Department and the Great Basin Rangers to initiate EMS response.
3. EMT's will assess patient and determine if the patient should be transported either by ambulance or by air.
4. If the patient is to be transported by ambulance, the ambulance will take the patient to the nearest medical facility, most likely the William Bee Ririe Hospital, 6 Steptoe Circle, Ely, NV.
5. If the patient is to be transported by air, the park dispatcher will contact the Ely Interagency Communications Center who will initiate air transport to the nearest medical facility.

Any injury to staff assigned to Great Basin National Park will be relayed to the Chief Ranger, so accurate SMIS information can be maintained. Supervisors of the injured person will complete the SMIS report.

**26. Media Plan**

The Superintendent or designee will act as the park's media contact during fire incidents. Procedures for communicating with the public and the media as stated in the Superintendents Guide to Public Affairs will be followed.

**27a. Fire Regime Condition Class 1 (FRCC1) FMU**

Fire regimes are within or near a historical range. The risk of losing key ecosystem components is low. Fire frequencies have departed from historical frequencies by no more than one return interval. Vegetation attributes (species composition and structure) are intact and functioning within a historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as use of wildland fire. Fire Regime Condition Class 1 FMU = 26,120 acres.

**Fire Management Tools for this FMU**

**Use of Wildland Fire** – When a natural ignition occurs within this FMU, a SFDSS Response Level 1 analysis will be performed within two hours of detection and size. SFDSS Response Level 1 analysis will be performed as necessary as the incident evolves.

**Prescribed Fire** - Prescribed Fire will be used in those areas and under conditions that will not result in the loss of key ecosystem components to approximate the natural vegetative disturbance of periodic fire occurrence. One hundred years of fire suppression has resulted in heavy fuel loading in most ecosystems within the park. Low intensity prescribed fire will be applied in order to prevent the loss of key ecosystem components. This low-intensity fire is vital to the life cycles of fire-dependent range and forest lands.

**Mechanical Fuels Reduction** – Mechanical treatments to achieve fuel reduction and ecological restoration will be employed within shrub-steppe and pinyon-juniper plant communities below 8,000 feet elevation.

Fire management policy in this Fire Management Unit will be to:

1. Protect all structures on the List of Classified Structures are identified as values at risk with the appropriate actions. The protected area will extend 1/8 mile around each historic structure, unless the fire situation or resource value dictates an exclusion zone.

2. If a use of wildland fire incident or prescribed fire exceeds prescription parameters, it will be suppressed using strategies appropriate to the situation.
3. Suppress all human ignitions.
4. Treat with any given use of wildland fire incident or incidents and prescribed fire no more than 10% of the acreage within sensitive watersheds and those watersheds with reintroduced BCT, until herbaceous vegetation has recovered to reduce sediment from the past treatment. If the 10% threshold is reached during a use of wildland fire incident.
5. All naturally unplanned ignitions below 8,000 feet in elevation will be suppressed as a means to prevent complete ecosystem conversion from cheat grass invasion.

**27b. Fire Regime Condition Class 2 (FRCC2) FMU**

**Fire Regime Condition Class 2 FMU** – Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as use of wildland fire and mechanical treatments, to restore ecosystem health. Fire Regime Condition Class 2 FMU + 44,437 acres.

**Fire Management Tools for Use in this FMU**

**Use of Wildland Fire** – Natural ignitions within this FMU will be subject to the same evaluative process described under Fire Regime Condition Class 1 FMU.

**Prescribed Fire** – Prescribed fire will be used in those areas and under conditions that will not result in the loss of key ecosystem components and to approximate the natural vegetative disturbance of periodic fire occurrence. A low intensity prescribed fire will be applied.

**Mechanical Treatments** – In areas where it is determined that prescribed fire and use of wildland fire will result in the loss of key ecosystem components, mechanical restoration treatments will be applied. Treatments that return the landscape to a semblance of a natural fire regime will include thinning the canopy, removing ladder fuels, and reducing the overall fuel loading. Silvicultural prescriptions will be developed to achieve the desired future conditions for the site. Mechanical treatments will involve construction of fuel breaks for reduction of the vegetation through the use of hand tools and chainsaws. A small Bobcat will be used to assist in removing fuels and the chipping of slash. Larger materials will be sold as firewood or pile and burned on site. All mechanical treatments will be based upon restoring the site to the potential natural vegetative community type under a natural disturbance regime.

Fire management policy in this Fire Management Unit will be to:

1. Protect all structures on the List of Classified Structures are identified as values at risk with the appropriate actions. The protected area will extend 1/8 mile around each historic structure, unless the fire situation or resource value dictates a larger exclusion zone.
2. If a use of wildland fire incident or prescribed fire exceeds prescription parameters it will be suppressed using the strategies appropriate to the situation.
3. Suppress all human ignitions.
4. As a means of preventing the spread of cheat grass, only mechanical treatments will be utilized and all natural unplanned ignitions will be suppressed in areas below 8,500 feet in elevation. Only 10% of the acreage within sensitive watersheds, those watersheds with re-introduced BCT, will be treated until herbaceous vegetation has recovered to reduce sediment inputs from past treatment.

**27c. Fire Regime Condition Class 3 (FRCC3) FMU** – Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need high levels of restoration treatments, such as

hand or mechanical treatments. Fire Regime Condition Class 3 FMU + 143 acres. Each site will be analyzed by an interdisciplinary team to determine the best restoration treatment based upon current conditions.

**Fire Management Tools for use in this FMU**

**Full Suppression** – All unplanned ignitions will be subject to full suppression within this FMU due to very heavy fuel accumulations. The risk of losing key ecosystem components is high from the resulting stand replacing event.

**Mechanical Treatments** – This will be the preferred fuel reduction/fire regime restoration tool of choice. Treatments that return the landscape to a semblance of a natural fire regime will involve thinning the canopy, removing ladder fuels, and reducing the fuel loading. Ladder fuels will be largely removed by cutting understory trees and high fire-risk trees (such as brush, dog hair thickets, and trees heavily infected with dwarf mistletoe and fir-engraver beetles). Cleanup will be covered in the biomass disposal section.

**Prescribed Fire** – After restoration treatments have been completed and monitoring shows that vegetation attributes have been restored, low intensity prescribed fires will be used to maintain the natural disturbance of periodic fire occurrence.

Fire management policy in this Fire Management Unit will be to:

1. Suppress all human and natural unplanned ignitions.
2. As a means of preventing the spread of cheatgrass, only mechanical treatments will be utilized in areas below 8,000 feet in elevation.

**27d. Infrastructure FMU** – This unit is a 1/8$^{th}$ mile radius circle around Park infrastructure, including campgrounds, housing, picnic areas, water systems and the visitor center. The intent of this unit is to reduce fuels where necessary to reduce the loss of structures. Infrastructure FMU + 1,047 acres.

**Fire Management Tools for use in this FMU:**

**Mechanical Treatments** – This will involve treatments that thin the canopy, removes ladder fuels, and reduces fuel loads. An uneven-aged silvicultural prescription utilizing a group-selection cutting method will be implemented. The uneven-aged silvicultural system involves the manipulation of the stand to simultaneously maintain high forest canopy of a diversity of desirable species, remove interlocking crowns, and stimulate regeneration of a diversity of both over-story and under-story species and the orderly growth and development of trees through a range of age classes. Ladder fuels will be largely removed by cutting understory trees and high fire-risk trees. Cleanup will involve removal of 100 percent of the large biomass and the chipping and/or pile burning of smaller materials.

**Prescribed Fire** – After mechanical treatments have been completed, low intensity prescribed fires will be used to maintain the natural disturbance of periodic fire occurrence.

Fire management policy in this Fire Management Unit will be to:

1. Suppress all human and natural ignitions.
2. As a means of preventing the spread of cheatgrass, only mechanical treatments will be utilized in areas below 8,000 feet in elevation.

**27e. Wildland/Urban Interface FMU** – The only effort that will protect communities from the threat of wildfire are those that seek to treat houses and the surrounding properties, and the forest directly adjacent to houses. The WUI Unit refers to areas ½ mile from the houses on the edge of the Park boundary. WUI FMU = 4,444 acres.

**Fire Management Tools for use in this FMU:**

**Mechanical Treatments** – The fuels reduction efforts will be implemented as two distinct treatments. All treatments prescriptions will be based upon potential natural vegetative community restoration as well as protecting structures. The intensive zone will involve a heavy thinning for the first 1/8 mile from houses or private lands on

the Park boundary. The extensive zone will involve a more conservative treatment for up to 3/8 mile from the intensive zone. The goal of the intensive zone treatment is to reduce the intensity of an approaching wildfire, preferably reducing it to a surface fire. Thinning the canopy, removing ladder fuels, and reducing the fuel load accomplish this. This area can serve as a "defensible space", a fuel break, and a potential fire line. The prescriptions will include cleanup of 100% of the slash through chipping and/or pile burning. The goal of the extensive zone treatment is to reduce the ability of the forest to sustain or initiate a crown fire. Groups of trees will be left intact in the extensive zone, with interlocking crowns within the groups, but continuous canopy is thinned to separate tree groups. Ladder fuels will be largely removed by cutting understory trees and high fire-risk trees. Larger biomass will be removed from the site. Smaller biomass will be chipped and scattered to slow existing infestations of cheat grass. A small portion of slash will be lopped and scattered to create an environment conducive to recovery of herbaceous vegetation.

**Prescribed Fire** – After mechanical treatments have been completed, low intensity prescribed fires will be used to maintain the natural vegetative disturbance of periodic fire occurrence.

Fire management policy in this Fire Management Unit will be to:

1. Suppress all human and natural ignitions.
2. As a means of preventing the spread of cheatgrass, only mechanical treatments will be utilized in areas below 8,500 feet in elevation.

**28. Structural Fires/Vehicle Fires**
The fire crew will not fight Structural Fires or Vehicle Fires within the park, unless qualified to do so. The fire crew may provide assistance with shuttling water, traffic control or communication.

**29. Training**
The two Annual Firefighting Refreshers may be conducted for park employees in late May or June by the BLM. All fire training may be conducted by the Ely District. Park employee nominations for fire training must be coordinated through the Chief Ranger. Ely BLM fire crewmembers may take part in park training (Search and Rescue, Cave Rescue, Orientation, Safety Training) if spaces are available. Training will include pack tests for participants. The Chief Ranger will ensure that persons participating in the pack test have completed the correct medical clearances prior to starting.

**30. Administratively Determined Hires**
The NPS Lake Mead Fire Management Office is permitted to "hire" casuals and complete paperwork.

**31. Snake Valley Volunteer Fire Department**
Great Basin National Park has no formal agreement with White Pine County for using the Snake Valley Volunteer Fire Department for fire incidents inside the park at the present time.

**32. Fire Station, Great Basin Resource Building**
A computer, fax machine, copier and telephones will be made available to the fire crew in order to conduct business with their home unit and gather information needed to conduct morning briefings with the crew. The shower facilities will also be made available for the fire crew to use after daily physical training.

Items in the fire station computer, equipment and tools will be made available to the fire crew to maintain their fire engine, hand tools and fire gear in a state of readiness. The Park's fire engine (E-862) will be made available to the BLM fire crew should it be necessary.

All problems encountered within Great Basin National Park will be reported to the Chief Ranger, who will then convey the information to the Duty Officer and Park Law Enforcement.

No firearms, alcohol or drugs are allowed on or in property belonging to the federal government.

**Availability of Funds:**

Funds in the amount of at least $3,000 will be obligated annually by execution of the IA (See item 16 of IA). The performance period is five years and may be funded by annual appropriations. These funds are obligated to the BLM, Ely District for wildland fire support in the areas of dispatch, training, fire preparedness, and/or fire prevention.

**Advance Funding:**
Advanced funding is not authorized. Reimbursement for allowable costs shall be submitted in accordance with Agency procedures.

**Settlement of Disputes:**
The parties under this IA are responsible for resolving any disputes that may arise within 30 business days of the invoice date.

**Financial Arrangements:**
This IA is not to exceed the amount as shown in block 16c. All costs shall be charged to the information in Section 11, Buyer Information.

The BLM will submit invoices via the Intra-Governmental Payment & Collection System (IPAC) or the Intra-Governmental Transaction Portal, whichever is applicable. The invoice will reference the BLM DUNS number, the BLM Agency Locator Code (ALC), the Treasury Account Symbol (TAS), the Accounting Classification Reference Code(s), the Document Number, a brief description of the services performed, and the Accounts Payable Point of Contact (POC) name and phone number.

**Termination:**
Either party may terminate this agreement by providing 30 calendar days written notice to the other party. BLM is authorized to invoice for costs incurred prior to the cancellation of the IA plus reasonable termination costs.

**Modifications to the Agreement:**
Either party may propose changes to the IA by written notification. All modifications to this agreement will be issued in writing and agreed to by both parties.

**Payments:**
Accounts and related records shall be available for inspection and review by each Federal Agency upon written request.

**Publication Rights:**
The results of this work will be available to the BLM and NPS for publication and use in connection with any related work.

_____
National Park Service Representative (Superintendent)

_____
Fire Coordinator/Liaison, Great Basin National Park

_____
District Manager, Ely District BLM

_____
Fire Management Officer, Ely District BLM

James Woodley 5/24/2019

National Park Service Representative (Superintendent)

5/20/19

Fire Coordinator/Liaison, Great Basin National Park

05/17/2019

Network Fire Management Officer, Lake Mead Recreational Area/Great Basin National Park

District Manager, Ely District BLM

3/29/21

Fire Management Officer, Ely District BLM

# GRBA 2023 FIRE MANAGEMENT PLAN

# Appendix D. Preparedness Planning Documents

# D.2. Preparedness Level Plan

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# Great Basin National Park Preparedness Planning

**April 2023**

## Contents

## List of Tables



## List of Figures

## List of Acronyms/Abbreviations

| Acronym/ Abbreviation | Definition |
|---|---|
| BLM | Bureau of Land Management |
| EICC | Ely BLM Dispatch |
| ERC | Energy Release Component: The computed total heat release per unit area within the flaming front at the head of a moving fire. |
| ERCy | Energy Release Component for NFDRS Fuel Model Y (timber) |
| FDOP | Fire Danger Operating Plan |
| FRG | Fire Regime Groups |
| FRCC | Fire Regime Condition Class |
| FMP | Fire Management Plan |
| FMOP | Fire Management Operating Plan between Department of Interior/National Park Service/Great Basin National Park and the Department of Interior/Bureau of Land Management/Ely District Office, 2018-2023 |
| GRBA | Great Basin National Park |
| IFTDSS | The Interagency Fuel Treatment Decision Support System |
| IC | Incident Commander |
| MFI | Mean Fire Interval |
| NFDRS | National Fire Danger Rating System |
| NPS | National Park Service |
| OAS | Office of Aviation Services |
| RAWS | Remote Automated Weather Station |
| Red Book | Interagency Standards for Fire and Fire Aviation Operations |
| RH | Relative Humidity |
| RM-18 | NPS Wildland Fire Reference Manual 18 |
| RM-60 | NPS Aviation Management Reference Manual 60 |
| WFIP | Wildland Fire Implementation Plan |

# 1 INTRODUCTION

This preparedness planning document is an appendix to the National Park Service (NPS), Great Basin National Park (GRBA or Park) 2023 Fire Management Plan (FMP). Although not a required appendix to the FMP, it is provided as a supplement to other planning documents. This appendix provides maps and data on fire history, fire behavior, fuel models, fire danger, fire season, fire regimes, and crown fire potential. The information in this appendix was developed using fire behavior models such as The Interagency Fuel Treatment Decision Support System (IFTDSS), FireFamily Plus and FlamMap.

The main guiding document for wildland fire programs in the NPS is the NPS Wildland Fire Reference Manual 18 (RM-18) and the Interagency Standards for Fire and Fire Aviation Operations (Red Book). Fuel model information was obtained from Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Mode.

Specific guidance for fire preparedness in the Park is outlined in several documents that are prepared by ELY BLM and the Park which can be referenced in **Appendix D** Preparedness Planning Documents and in **Appendix C** Cooperative and Interagency Agreements. Appendix D contains several subsections including the following:

- 1_Fire Danger Operating Plan (prepared by ELY BLM)
- 2_Preparedness Level Plan (Not Applicable)
- 3_Step-Up Staffing Plan (prepared by ELY BLM)
- 4_Initial Response Plan (prepared by ELY BLM)
- 5_GRBA Preparedness Planning (prepared by GRBA)
- 6_Prevention Plan (prepared by ELY BLM)

Appendix C Cooperative and Interagency Agreements provides additional information on preparedness in the following document, which is updated every five years by the Park and ELY BLM:

- Fire Management Operating Plan between Department of Interior/National Park Service/Great Basin National Park and the Department of Interior/Bureau of Land Management/Ely District Office, 2018-2023 (FMOP).

# 2 PLANNING FOR INCREASED FIRE DANGER AND STAFFING LEVELS

Staffing and step-up plans will follow the Bureau of Land Management (BLM) Ely Fire Danger Operating Plan (FDOP). Coordination with the BLM Duty Office is necessary to track fire danger and staffing levels so that GRBA can respond as needed. Fire restrictions, such as bans on outdoor fires should be coordinated with the BLM.

# 3 AVIATION

All aircraft operations at GRBA will be consistent with the Office of Aviation Services (OAS) policies, NPS Wildland Fire Reference Manual 18 (RM-18), Interagency Standards for Fire and Aviation Operations (Red Book), and NPS Aviation Management Reference Manual 60, 2022 (RM-60). Other references include the Interagency Aviation User Guide, 2015. Pilots and aircraft used in fire management

operations must be OAS approved. Aircraft orders will be placed at the request of the BLM Duty Officer or Incident Commander (IC) through the Ely BLM Dispatch (EICC).

# 4 NATIONAL FIRE DANGER RATING

## 4.1 Fire Season

The fire season at GRBA begins at the lower elevations in June and continues through the end of September. Cooler temperatures, shorter day length and higher humidity in the fall significantly reduce the fire danger.

An analysis of the historical fire season at GRBA was completed in the software program FireFamilyPlus. The National Fire Danger Rating System (NFDRS) energy release component (ERC) for fuel model Y (ERCy) was selected because all fuel classes are represented. Fuel model Y represents the timber fuel type. A climatological graph was completed for the Mather Remote Automated Weather Station (RAWS), ERCy, for the period of 2014 to 2021, for weather observations at average, maximum and minimum, for 3-day periods (Figure 1).

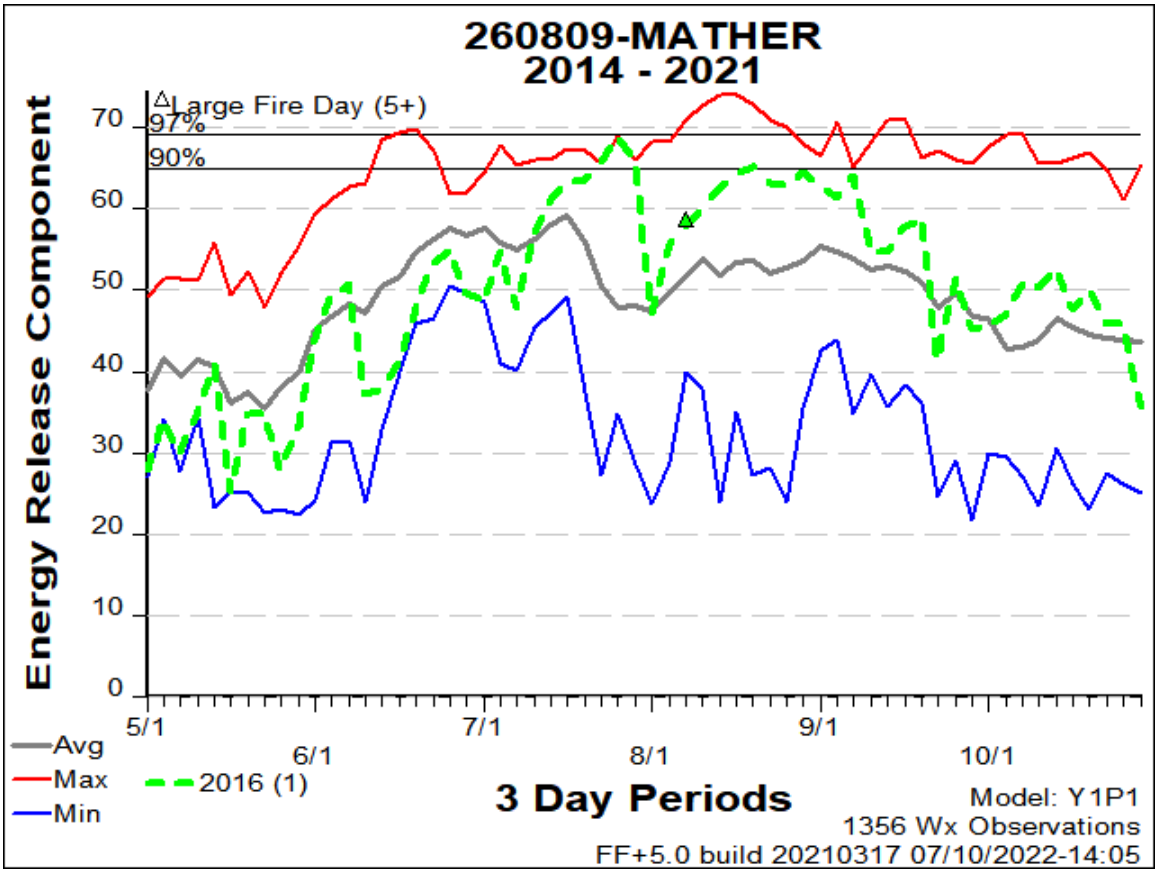


**Figure 1. Mather RAWS ERCy.**

Maximum ERCy values for this time span are represented in red, average values in gray, and the lowest values in blue. The year 2016 was also overlaid on this graph (dashed green line) and the fires over 5 acres indicated with a "triangle" which marks the historic Strawberry Fire of 2016. This graph depicts a representation of the fire season, when viewing the ERCy average values, which shows the fire season starting about in May and ending in October, as ERCy values rapidly drop.

### 4.2 Fire Danger Operating Plan

The BLM Ely FDOP is included in Appendix D.1 in the 2023 GRBA FMP.

# 5 FIRE BEHAVIOR FUEL MODELS

Fire Behavior fuel models are necessary fire behavior modeling. The most current system of fuel models is the Standard Fire Behavior Fuel Models: A Comprehensive Set For Use With Rothermel's Surface Fire Spread Model, RMRS-GTR-153, 2005, which is often referred to as the 40 Fire Behavior Fuel Models.

Table 1 lists the fuel models for GRBA based on the 40-fuel model system. The data was downloaded from the LANDFIRE 2016 Remap, which should reflect fuel changes throughout that period, including disturbances such as large fires. Figure 2 illustrates a map of fuel models for GRBA with a three-mile buffer.

**Table 1. Fuel models for GRBA based on the 40-Fuel Model System.**

| FBFM40 | Acres | % Area | Description |
|---|---|---|---|
| GR1 | 3,080 | 4.0 | The primary carrier of fire in GR1 is sparse grass, though small amounts of fine dead fuel may be present. The grass in GR1 is generally short, either naturally or by grazing, and may be sparse or discontinuous. |
| GR2 | 318 | 0.4 | The primary carrier of fire in GR2 is grass, though small amounts of fine dead fuel may be present. Load is greater than GR1, and fuelbed may be more continuous. Shrubs, if present, do not affect fire behavior. |
| GS1 | 1,137 | 1.5 | The primary carrier of fire in GS1 is grass and shrubs combined. Shrubs are about 1 foot high; grass load is low. Spread rate is moderate, flame length low. |
| GS2 | 5,964 | 8.0 | The primary carrier of fire in GS2 is grass and shrubs combined. Shrubs are 1 to 3 feet high; grass load is moderate. Spread rate is high, flame length moderate. |
| SH1 | 616 | 1.0 | The primary carrier of fire in SH1 is woody shrubs and shrub litter. Low shrub fuel load, fuelbed depth about 1 foot; some grass may be present. Spread rate is very low; flame length very low. |
| SH2 | 428 | 0.6 | The primary carrier of fire in SH2 is woody shrubs and shrub litter. Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuel present. Spread rate is low; flame length low. |
| SH5 | 15,983 | 20.0 | The primary carrier of fire in SH5 is woody shrubs and shrub litter. Heavy shrub load, depth 4-6 feet. Spread rate very high; flame length very high. |
| SH7 | 7,419 | 10.0 | The primary carrier of fire in SH7 is woody shrubs and shrub litter. Very heavy shrub load, depth 4 to 6 feet. Spread rate lower than SH7, but flame length similar. Spread rate is high; flame length very high. |
| TL3 | 20,013 | 25.0 | The primary carrier of fire in TL3 is moderate load conifer litter, light load of coarse fuels. Spread rate is very low; flame length low. |
| TU1 | 3,011 | 4.0 | The primary carrier of fire in TU1 is low load of grass and/or shrub with litter. Spread rate is low; flame length low. |

| FBFM40 | Acres | % Area | Description |
|---|---|---|---|
| TU5 | 12,662 | 17.0 | The primary carrier of fire in TU5 is heavy forest litter with a shrub or small tree understory. Spread rate is moderate; flame length moderate. |
| NB1 | 145 | 0.2 | Fuel model NB1 consists of land covered by urban and suburban development. |
| NB8 | 9 | 0.1 | Land covered by open bodies of water such as lakes, rivers and oceans. |
| NB9 | 6,262 | 8.0 | Land devoid of enough fuel to support wildland fire spread is covered by fuel model NB9. Such areas may include gravel pits, arid deserts with little vegetation, sand dunes, rock outcroppings, beaches. |
| Totals | 77,047 | 100 | |

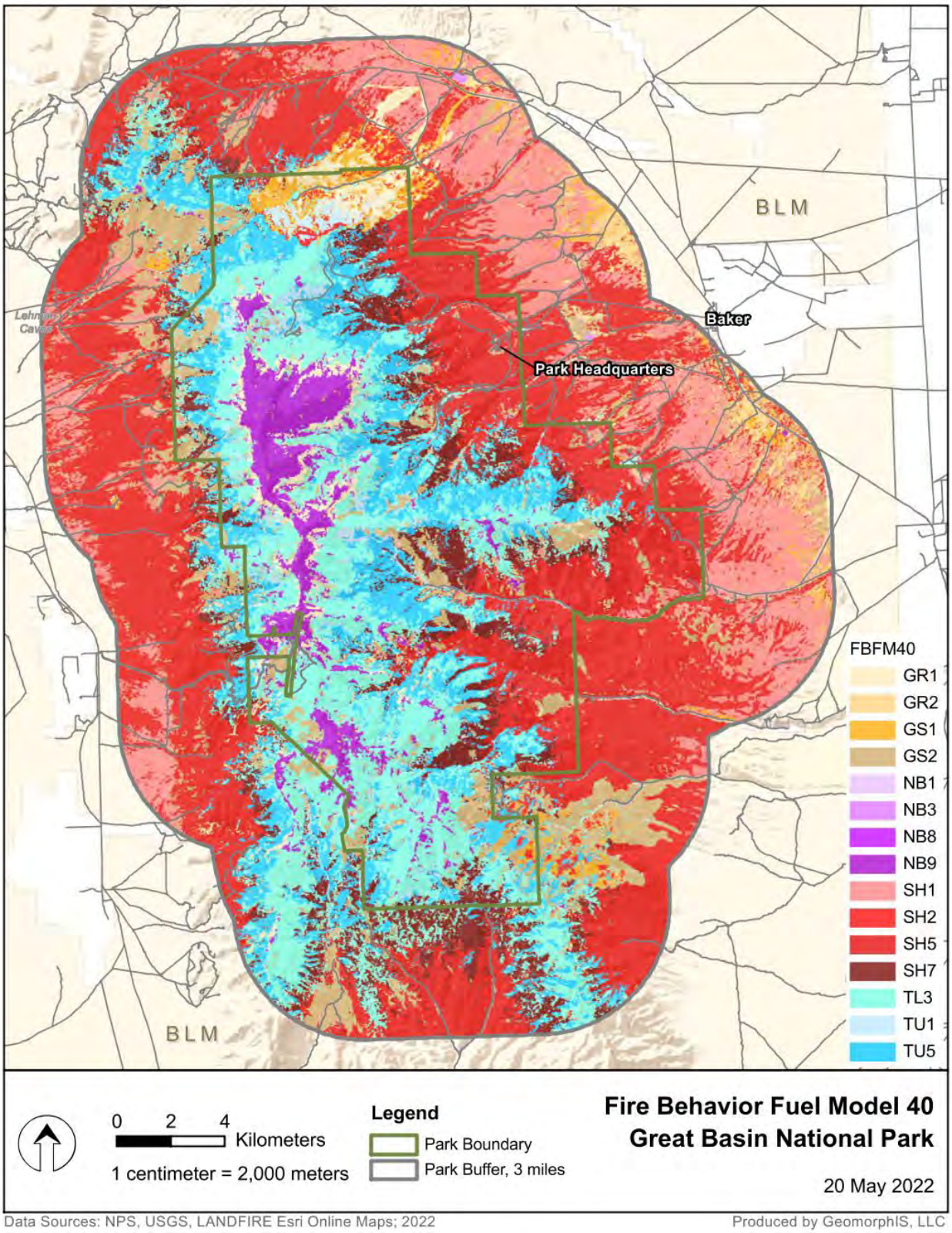


**Figure 2. Fuel models for GRBA and surrounding area.**

# 6 Fire Behavior Modeling

Fire behavior modeling was completed using The Interagency Fuel Treatment Decision Support System (IFTDSS). A landscape fire behavior analysis was completed, with worst case fire weather conditions (97th percentile fuel moisture and wind). This model yields several outputs including crown fire potential, flame length and spread rates. The IFTDSS modeling outputs can be used for wildland fire planning.

Crown fire activity describes fire activity in the forest or shrub vegetation types. Crown fires are often associated with extreme fire weather events, with high-intensity burning and moderate to long range spotting. From a fire control standpoint crown fires are nearly impossible to suppress until weather conditions moderate. There are two types of crown fire as described below.

- Active Crown Fire: A fire in which a solid flame develops in the crowns of trees, but the surface and crown phases advance as a linked unit dependent on each other.
- Passive Crown Fire: A fire in the crowns of trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface fires. Areas of closed canopy conifers and brush are more susceptible to crown fire activity, especially where low canopy base height exists. The canopy base height (also known as crown base height) for an individual tree is the height at which sufficient fuel density exists for sustained canopy ignition. For a stand of trees, canopy base height considers both the height of the main canopy layer as well as the height of ladder fuels in the understory. Average height from the ground to a forest stand's canopy bottom.

Under natural fire regimes, forested and brush areas within GRBA would have been much more open; however, fire exclusion over the decades has allowed major increases in the number of trees and shrubs. Fir and juniper trees have invaded more seral stands of trees, such as aspen and ponderosa pine, which has greatly increased ladder fuels and crown canopy coverage. Brush species, such as pinyon-juniper, have invaded sagebrush and grassland, which greatly increases the potential for crown fires. Sagebrush and grassland have been invaded by brush species and pinyon-juniper woodland, which greatly increases the potential for crown fires.

High-intensity crown fire activity is not desired in the Park; it is not the natural fire regime and therefore could have undesirable effects to soils, revegetation, watersheds and high valued resources and assets. Crown fire activity potential is a good benchmark for fuels management planning; with a planning focus on reducing fuel loadings and ladder fuels.

The IFTDSS 97th percentile fire behavior modeling showed a significant area of GRBA (23% of total acreage) has potential for active crown fire. The crown fire potential map shown in Figure 3, reflects major vegetation disturbances that have occurred up through 2016. The footprint of the Strawberry Fire in 2016, that burned 4,656 acres, is readily visible on the map and generally shows only surface fire potential, due to the fact that the fire greatly reduced shrub and tree coverage in this area.

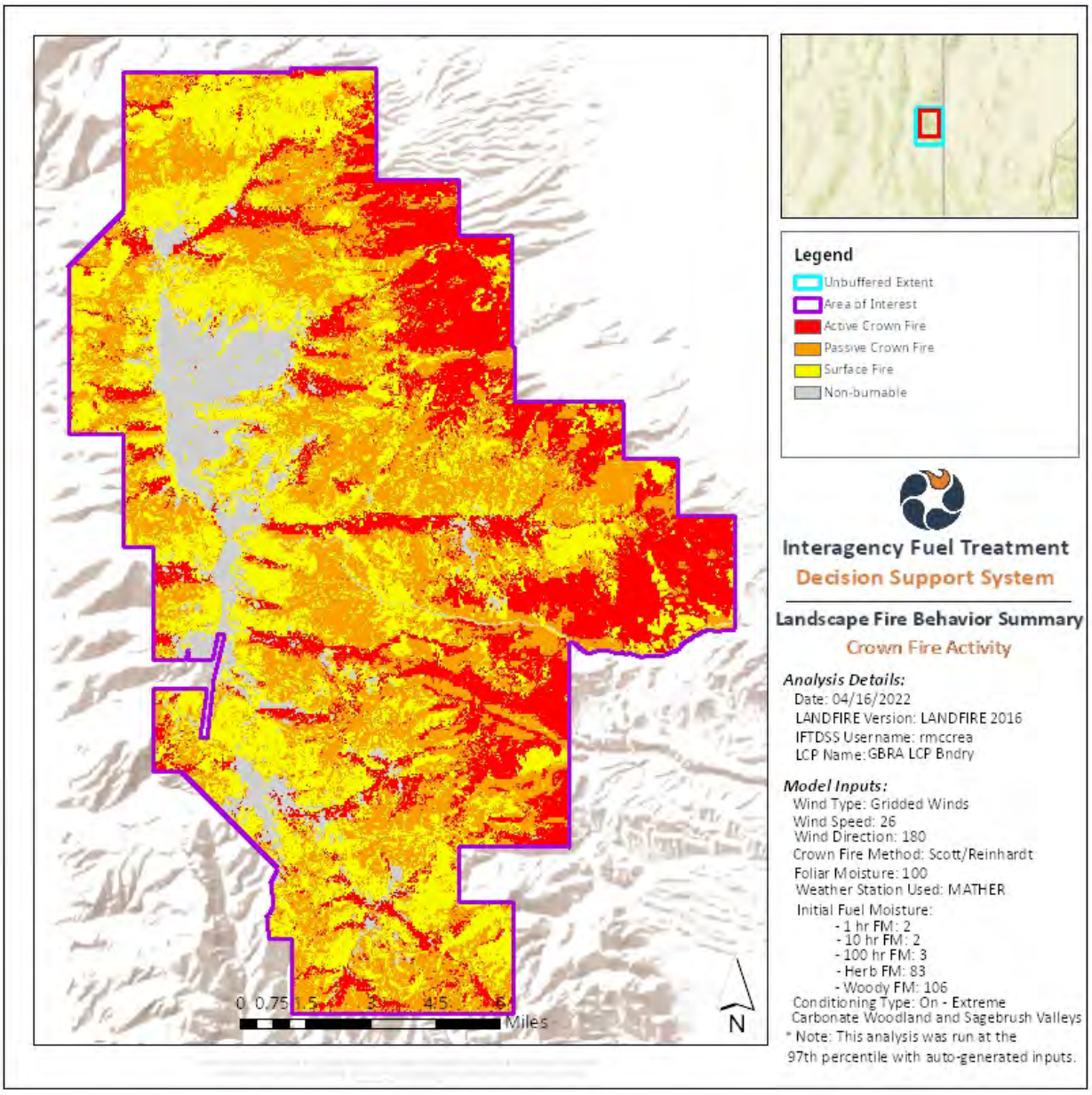


**Figure 3. Crown fire potential at GRBA, 97th Percentile.**

The crown fire potential for GRBA is indicated in Table 2 (listed by acres and by the percent of the Park that represents).

**Table 2. Crown fire potential at GRBA, 97th percentile.**

| Acres of Potential Crown Fire Activity | Acres | Percent of Park |
|---|---|---|
| Non-burnable | 6,392 | 8 |
| Surface Fire | 26,387 | 34 |
| Passive Fire (single and/or group tree torching) | 26,368 | 34 |
| Active Crown Fire | 17,845 | 23 |

# 7 Fire Regime Condition Class

Fire Regime Condition Class (FRCC) is an interagency tool used to determine the degree of ecological departure from historical, or reference condition, vegetation, fuels, and disturbance regimes. FRCC assessments help guide management objectives and prioritize treatments. Developed in 2002, FRCC provided an assessment tool to understand historical reference landscapes, current conditions, and ecological departure. Relationships between natural disturbances and resulting vegetation patterns were used to inform current conditions and management opportunities. Reference conditions describe historical seral stages, vegetation patterns, and fire regimes. FRCC used reference conditions to define pre-settlement landscapes. These became the baseline against which current conditions were compared.

The FRCC standard landscape assessment system provides tools for fire regime and vegetation assessment at the both the landscape and stand scales. These methods can be used to describe general fire regime and vegetation traits for the historical (reference condition) versus current periods to produce departure estimates. (In this document, the terms “historical,” “reference,” and “natural” all refer to native ecosystems as they existed prior to EuroAmerican settlement.)

FRCC is defined as follows: FRCC 1 represents ecosystems with low (<33 percent) departure from a defined reference period – that is, landscapes still within the natural or historical range of variation; FRCC 2 indicates ecosystems with moderate (33 to 66 percent) departure; and FRCC 3 indicates ecosystems with high (>66 percent) departure from reference conditions.

FRCC data was downloaded for the Park, from LANDFIRE, version refresh 2016. Table 3 depicts the acres for GRBA for each FRCC class. Figure 4 is a map of FRCC classes for GRBA, with a three-mile buffer.

**Table 3. Number of acres in each Fire Regime Condition Class (FRCC) for GRBA.**

| FRCC Class | Acres | Percent of Park |
|---|---|---|
| FRCC Class I | 19,757 | 26 |
| FRCC Class II | 42,334 | 55 |
| FRCC Class III | 6,359 | 8 |
| Agriculture | 3 | < 1 |
| Barren or Sparse | 8,114 | 11 |
| Snow/Ice | 249 | < 1 |
| Urban | 222 | < 1 |
| Water | 9 | < 1 |

## 7.1 FRCC Summary

A large area of the Park (63%) has a moderate to very high departure of historical conditions. Natural fire regimes have vastly changed due to fire suppression activities over the last 100 years. This has allowed significant vegetation changes including the invasion of pinyon-juniper into areas previously dominated by sagebrush and grass and the invasion of fir into aspen and ponderosa pine stands. FRCC maps can assist with planning for fuels treatments and during large wildfire events.

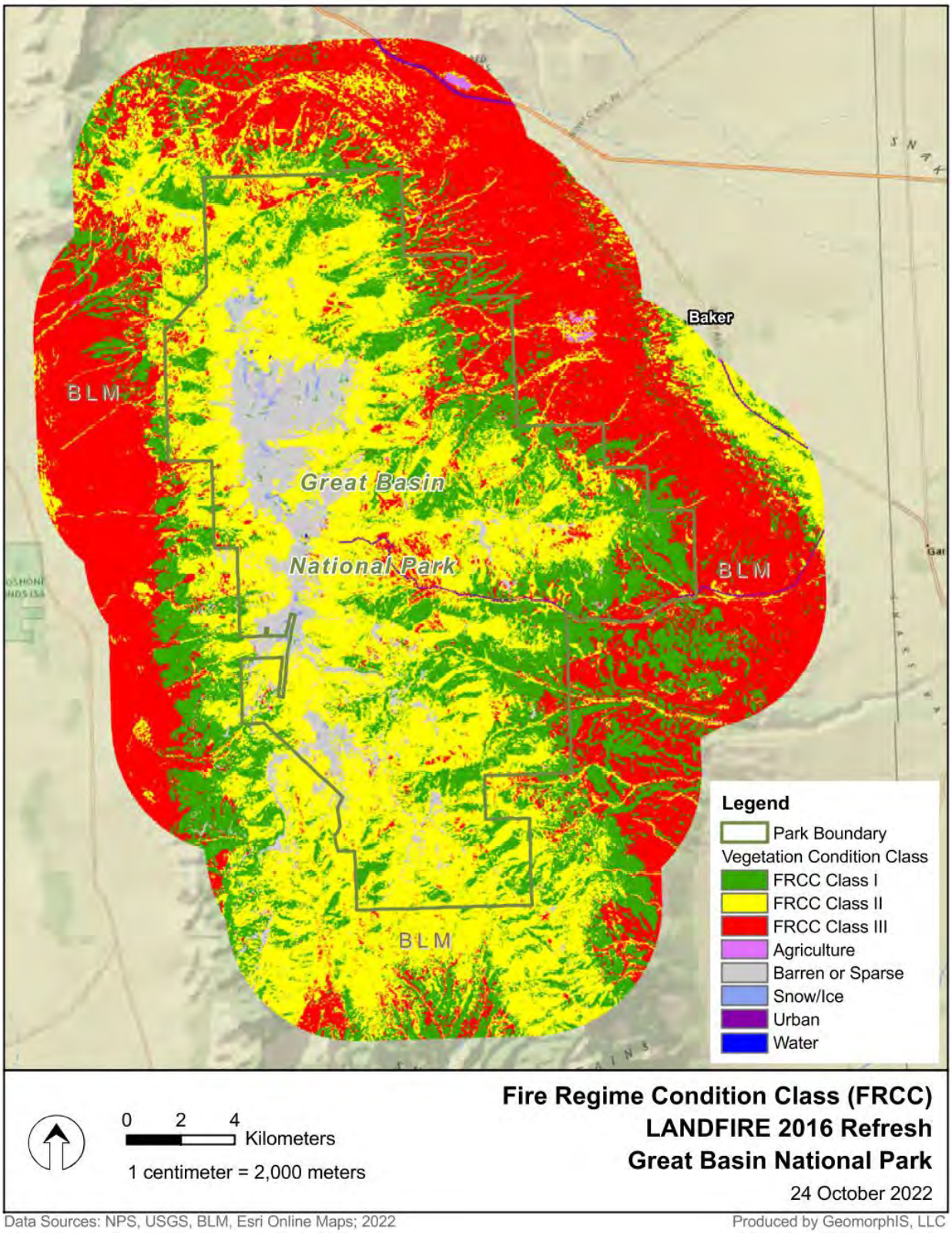


**Figure 4. Fire Regime Condition Class for GRBA.**

# 8 Fire Regime Groups

The LANDFIRE Project has produced a number of data layers related to various aspects of natural (or reference) fire regimes. For instance, the Fire Regime Groups (FRG) layer documents the spatial occurrence of the five reference fire regime groups defined by the FRCC Guidebook (USDA-USDOI 2022).

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention but including the possible influence of aboriginal fire use. The five natural fire regime groups are classified based on the average number of years between fires i.e., the fire frequency or mean fire interval (MFI), combined with characteristic fire severity reflecting percent replacement of dominant overstory vegetation. The five natural fire regimes from LANDFIRE with descriptions are defined in Table 4 below:

**Table 4. Fire Regime Groups and descriptions for GRBA.**

| Group | Frequency | Severity | Severity Description |
|---|---|---|---|
| I | 0-35 Years | Low/Mixed | Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory |
| II | 0-35 Years | Replacement | High-severity fires replacing greater than 75% of the dominant overstory vegetation |
| III | 35-200 Years | Mixed/Low | Generally mixed-severity; can also include low-severity fires |
| IV | 35-200 Years | Replacement | High-severity fires |
| V | 200+ Years | Replacement/any severity | Generally replacement- severity; can include any severity type in this frequency range |

FRG data was downloaded for the Park, from LANDFIRE, version 2012. Table 5 depicts the five FRG by acres and % of the Park. Figure 5 represents a map of FRG for GRBA.

**Table 5. Number of acres in each Fire Regime Group for GRBA.**

| Fire Regime Group | Acres | % of Park |
|---|---|---|
| Fire Regime Group I | 26,371 | 34 |
| Fire Regime Group III | 30,247 | 39 |
| Fire Regime Group IV | 12,671 | 17 |
| Fire Regime Group V | 1,276 | 2 |
| Barren | 5,971 | 8 |
| Snow / Ice | 391 | < 1 |
| Sparsely Vegetated | 66 | < 1 |
| Water | 8 | < 1 |

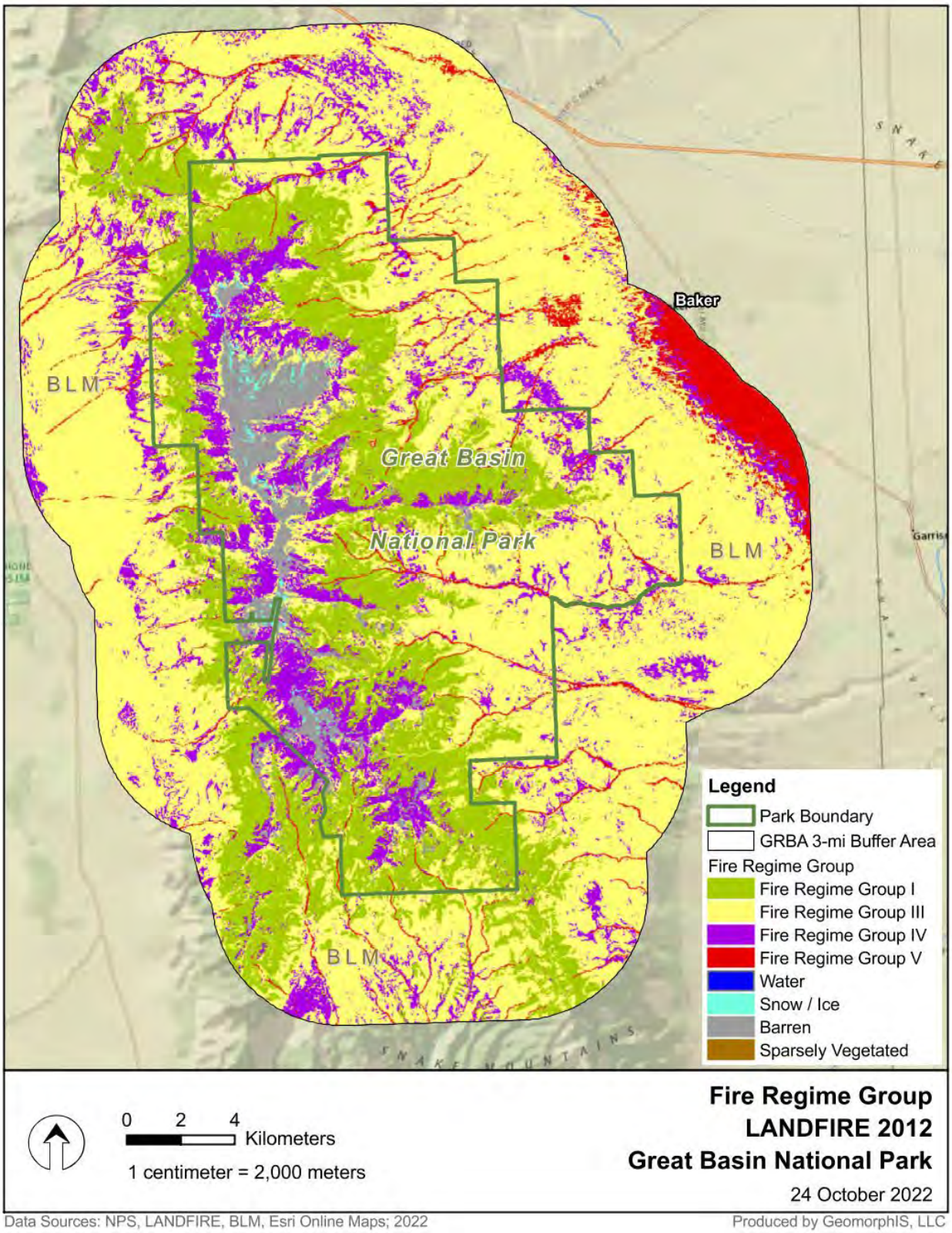


**Figure 5. GRBA Fire Regime Groups.**

# 9 Wildland Fire History

## 9.1 Introduction

Fire has not been a significant factor in the Snake Range since settlement by Euro- Americans until the late 1990's when larger fires started to occur. As recalled by Wayne Gonder, a local rancher, the largest fire in modern times took place in 1908-10 in the Baker Creek Basin (200-300 acres). Winkler (1916) describes a series of what was believed to be arson fires that burned 150-200 acres in the Sagehen Creek - Strawberry Creek locality. Mention was made previously of two small fires on Shingle Creek in 1941 and 1947. A fire of limited size occurred near the head of Baker Creek in the early 1950's (A. Murchie, pers. comm., 1990).

Records of fire occurrence on lands which now comprise GRBA are reasonably accurate for the past 44 years. It is likely that many small fires occurred in inaccessible areas, but went unnoticed and, thus, were not recorded. The majority of the natural fires in the Park have occurred primarily at higher elevations, or at lower elevations in pinyon-juniper or mountain shrub vegetation types, with very few fires occurring at middle elevations.

In 1999, the Big Wash fire started in the early fall. The Park allowed this fire to burn for resource benefit and it eventually burned a little over 40 acres. In July 2000, the Phillips Ranch Fire burned 2,667 acres of mixed conifer, spruce, and bristlecone pine on the west side of the Park. Approximately 1,704 acres of NPS lands and 963 acres of National Forest Service land were affected. High-intensity burned areas included more than half of the total burned acreage. The Horse Heaven fire burned approximately 50 acres of mixed conifer in 2000. The Granite Fire started on August 18, 2001 and burned approximately 614 acres of mixed conifer and ponderosa pine at a high-intensity (burned area included 539 acres in GRBA and 75 acres in the Humboldt National Forest). In 2006 the Border Fire, on the NPS/BLM wilderness boundary at the south of the Park, burned 164 acres. In 2014 the Black Fire burned 4,752 acres, primarily in the Lexington drainage in BLM wilderness. In 2016 the Strawberry Fire burned a total of 4,656 acres in the Park and adjacent BLM.

## 9.2 Wildfire Statistics for GRBA, 1972 to 2021

An analysis was completed of wildfire statistical data for GRBA for the period of 1972 to 2021. Data was obtained from the Wildland Fire Management Information (WFMI) system. Fire types/protection types included were 11, 12, 13, 14, 16, 21, 25, 26 and 49. Fire type 48 (prescribed fires) was excluded. Fire types and protection types are as follows:

Fire Type/Protection Type 11: Suppressed fire, point of origin of fire located on NPS land under NPS fire suppression responsibility.

Fire Type/Protection Type 12: Suppressed fire, point of origin of fire located on NPS land protected by a different federal agency under a local agreement.

Fire Type/Protection Type 13: Suppressed fire, point of origin of fire located on NPS land protected by a non-federal agency under a local agreement or contract.

Fire Type/Protection Type 14: Suppressed fire, point of origin of fire located on NPS land when the management goal is other than full suppression, or when conditions dictate a limited suppression response.

Fire Type/Protection Type 16: Suppressed fire, point of origin of fire located on non-NPS land where NPS response was initiated under a local agreement. For wildfires originating on non-NPS land that are under a local agreement that burn onto NPS land.

Fire Type/Protection Type 21: Natural out, point of origin of fire located on NPS land under NPS fire suppression responsibility.

Fire Type/Protection Type 25: Natural out, point of origin of fire located on non-NPS land where NPS response was not under a local agreement but was initiated to prevent fire spread onto NPS land. For wildfires originating on non-NPS land that are not under a local agreement that burn onto NPS land.

Fire Type/Protection Type 26: Natural Out, point of origin of fire located on non-NPS land where NPS response was initiated under a local agreement. For wildfires originating on non-NPS land that are under a local agreement that burn onto NPS land.

Fire Type/Protection Type 49: Prescribed fire and wildland fire use, naturally ignited wildland fires managed with a Wildland Fire Implementation Plan (WFIP) to accomplish resource objectives.

Table 6 lists wildfires by size classes and acres. Table 7 lists wildfires by time span. Table 8 lists fires greater than five acres.

**Table 6. Wildfire statistics for GRBA between 1972 and 2021.**

| **GRBA Wildfire Statistics** | | |
|---|---|---|
| **Years** | **1972-2021** | |
| **Span of Years** | **50** | |
| **Class of Fire** | **# Fires** | **# Acres** |
| Class A Fires: < ¼ Acre | 93.0 | 10.3 |
| Class B Fires: ¼- 9.9 Acres | 58.0 | 98.7 |
| Class C Fires: 10-99 Acres | 5.0 | 152.3 |
| Class D Fires: 100-299 Acres | 2.0 | 375.0 |
| Class E Fires:300-999 Acres | 1.0 | 614.0 |
| Class F Fires:1,000-4,999 Acres | 4.0 | 13,417.0 |
| Class G Fires: 5,000 + Acres | 0.0 | 0.0 |
| **Total** | **163.0** | **14,667.3** |
| Average # Fires Per Year | 3.3 | |
| Average # Acres Per Year | 293.3 | |
| | | |
| **Fire Cause** | **# Fires** | **% Fires** |
| Lightning-caused fires | 132 | 77 |
| Human-caused fires | 31 | 23 |

**Table 7. Size of wildfires by timespan for GRBA.**

| Start Year | End Year | Total Years | # Fires | Acres |
|---|---|---|---|---|
| 1972 | 1985 | 14 | 33 | 266.2 |
| 1986 | 1997 | 12 | 52 | 111.3 |
| 1998 | 2009 | 12 | 63 | 4,726.6 |
| 2010 | 2021 | 12 | 15 | 9,563.2 |
| | Total | 50 | 163 | 14,667.3 |

**Table 8. GRBA fires of >5 acres that occurred between 1972 and 2016.**

| Fire Name | Cause | Acres | Year |
|---|---|---|---|
| Baker Cr | Natural | 7 | 1972 |
| Baker Cr | Human | 210 | 1977 |
| Shingle Cr | Human | 65 | 1988 |
| Bighorn | Natural | 6.5 | 1993 |
| Narrows | Natural | 15 | 1996 |
| Eldridge | Natural | 1360 | 1998 |
| Big Wash | Natural | 30 | 1999 |
| Horsehvn2 | Natural | 12.3 | 2000 |
| Lincoln Ci | Natural | 30 | 2000 |
| Phillips R | Natural | 2500 | 2000 |
| Granite | Natural | 614 | 2001 |
| Border | Natural | 165 | 2006 |
| Granite 2010 | Natural | 5 | 2010 |
| Black | Natural | 4901 | 2013 |
| Strawberry | Natural | 4656 | 2016 |

## 9.3 Large Fire Occurrence and Fire Suppression

As shown in the above tables, wildfire acres burned in the Park have greatly increased since 1998.

Since 1998, 14,290 acres burned, an average of 595 acres per year, which represents about 19% of the total size of the Park.

## 9.4 Challenges With Large Fire

The steep terrain and heavy unnatural fuel loading in many areas of the Park pose significant challenges for fire suppression actions and fuels management projects. There is also a significant occurrence of

snags in some areas of the Park which greatly adds to the complexity of operations and safety of personnel.

The Strawberry Fire of 2016 was a good example of a large fire that posed many challenges. The Strawberry Fire was ignited by lightning on August 8, 2016, in the upper headwaters of Strawberry Creek at about 8,600 feet elevation. Initial reports put the fire at about 15 acres. Weather conditions that day from the Mather RAWS, taken from around noon to midnight, were as follows:

- Maximum Temperature: 74 degrees F.
- Minimum Relative Humidity values: 15 to 18%.
- Wind Direction: Southerly
- Wind Speed, 20 foot: 9 to 20 MPH
- Wind Gusts: 35 to 43 MPH

August 9 brought increased wind speeds and lower relative humidity (RH) values from the previous day. The weather conditions that day, from the Mather RAWS, taken from noon until midnight were as follows:

- Maximum Temperature: 74 degrees F.
- Min Relative Humidity values: 12 to 17%.
- Wind Direction: Southerly
- Wind Speed, 20 foot: 15 to 28 MPH
- Wind Gusts: 33 to 45 MPH

On August 9, due to high winds and low RH, the fire grew to approximately 4,600 acres. The Strawberry fire made a major fire run to the east/northeast about 3 ½ miles, funneling down the Strawberry Creek canyon and spread onto the main valley floor, with the lowest elevation spread to 6,300 feet.

By late afternoon on August 13, the fire had burned approximately 4,603 acres with 59 percent containment involving 434 personnel. The fire was largely contained on ridge tops, until the flames reached into less steep areas, where direct fireline and roads could be used as control lines. On August 13, a fatality occurred on this fire, when the top of a snag broke out and struck a fire crew member.

### 9.5 Summary

Suppressing rapidly spreading wildfires in the steeper areas of the Park is very challenging, and operations are likely to only be successful on ridgetops or when the fire reaches lower elevations. Steep slopes, rocky areas and snags pose significant safety issues to personnel even on small fires. Safety routes are difficult to identify because of all these factors. Rescue and evacuation of injured personnel can be quite challenging, with steep slopes, poor footing, and few roads and trails. Suppression of wildfires in some areas of the Park are best to be avoided unless safety concerns can be mitigated, or the fire can be contained on ridges or natural fire breaks.

# 10 REFERENCES

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Winkler, E. 1916. Memorandum for the District Forester. Ernest Winkler, Inspector of Grazing, October 25, 1916, 1440-inspection, Year 1916, RG 96, National Archives and Records Administration, San Bruno Accession No. 61-333/Location No. 88830.

# GRBA 2023 FIRE MANAGEMENT PLAN

## Appendix D. Preparedness Planning Documents

## D.3. Step-up Plan/Staffing Plan

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# Ely District

# Emergency Preparedness Step-Up Plan

Step-up plans provide management direction given in identified levels of burning conditions, fire activity, and resource commitment, and are required at national, state/regional, and local levels. Preparedness levels (1-5) are determined by incremental measures of burning conditions, fire activity, and resource commitment. Step-up plans are designed to direct incremental preparedness actions in response to increasing fire danger. Those actions are delineated by "staffing levels". Each Step-up plan should address the five preparedness levels (1, 2, 3, 4 and 5) and the corresponding planned actions that are intended to mitigate those fire danger conditions. The Step-up Plan describes escalating responses that are pre-approved in the fire management plan. Mitigating actions are designed to enhance the unit's fire management capability during short periods (one burning period, Fourth of July or other pre-identified events) where normal staffing cannot meet initial attack, prevention, or detection needs. The difference between preparedness level/step-up and severity is that preparedness level/step-up actions are established in the unit fire management plan, and implemented by the unit when those pre-identified conditions are experienced. Severity is a longer duration condition that cannot be adequately dealt with under normal staffing, such as a wide spread killing frost converting live fuel to dead fuel and/or long term drought conditions. See Interagency Standards for Fire and Fire Aviation Operations, Chapter 10 for more information regarding appropriate mitigating actions for step-up planning and long term severity.

The emergency preparedness step-up plan for the Ely District is included below.

There are certain conditions where emergency preparedness can be implemented. Conditions that apply to Planning Levels 2 thru 5 are as listed below:

A. The Ely Operational Duty Officer (Ely DO) may activate extended staffing for mitigating actions designed to enhance the Unit's fire management capabilities during busy holiday weekends or other pre-identified events within the identified fire season where normal staffing cannot meet initial attack, prevention, or detection needs. Extended staffing for the Ely DO, necessary logistic and IA staff for the affected Zone. (Ely North or Ely South)

B. Predicted or observed Red Flag criteria (LAL, Winds and\or RH) in Planning Levels 3 and 4 will allow the Ely DO to increase the Planning Level to the next highest level for that current burn period.

C. ERC-G and 1000hr fuel moisture will be monitored and may allow the Ely DO to increase to the next highest planning level if in the 90$^{th}$ percentile or above.

D. Drought – The standard measure for drought will be the U.S. Drought Monitor (www.drought.unl.edu/dm/monitor.html)

- If drought monitor shows to be primarily rated as DO – Abnormally Dry or D1 – Moderate Drought then Ely DO may increase one planning level with consideration to time of season.
- If drought monitor shows Unit to be primarily rated as D2 – Severe, then Ely DO may bump up one Planning level. If D2 continues for 30 days then consider national severity request.
- If drought monitor shows Unit to be primarily rated as D3/D4 – Extreme/Exceptional Drought, then Unit DO may bump up two Planning Levels. Request national severity funding if within designated fire season.

E. Use of State Directors short term account to extend staffing and/or mobilize locally assigned resources if conditions meet those outlined in Instructional Memorandums.

F. Fuel loading that has met critical status as deemed by the Ely District Fire/Fuels staff will allow the Ely DO to increase the planning level by one.

G. Conditions listed above are not additive – in other words if you are in Planning Level (PL) 3 when LAL 6 is predicted on July 4$^{th}$ Holiday, you can only bump up 1 planning level not 2. You would be in Planning Level 4 not Planning Level 5.

The Ely North and South SIG NFDRS BI value will be used to identify the appropriate actions identified in the Step-Up Plan. Fuel Model G and is used for analysis as it is analyzed daily by the EICC. The inclusion of the ERC and 1000 Hour dead fuel moisture is for reference but can allow for longer range planning. Typically the BI values will drive the Planning Level for this Step-up Plan.

| Planning Level | Adjective Rating | BI Range | 1000 Hour | Fire Activity | Emergency Preparedness Actions Authorized | Fund Source | Minimum Suggested IA resources |
|---|---|---|---|---|---|---|---|
| 1 | Low | North<br>0 – 51<br>South<br>0 – 47 | >20% | Little or no fire activity. Little or no potential. | • No emergency preparedness actions should be needed.<br>• Normal staffing during identified fire season. | LF100<br>LF561<br>LF571 | 2 Engines |
| 2 | Moderate | North<br>52 – 65<br>South<br>48 – 61 | 16-20% | Some potential for the occurrence of multiple fires in class A/B size classes or some fires actually occurring, but weather and fuels conditions and/or season will minimize fire potential. | • Apply all applicable conditions listed above (A through G)<br>• No emergency preparedness actions and funding are expected<br>• Normal staffing during identified fire season. | LF100<br>LF561<br>LF571 | 4 Engines |
| 3 | High | North<br>66 – 85<br><br>South<br>62 – 80 | 11-15% | Potential exists for multiple fires in A/B/C size classes to occur or multiple fires in these size classes are occurring. Some potential for extended attack fires exists. Weather and fuels conditions and/or season will minimize fire potential in short term. | • Apply all applicable conditions listed above (A through G)<br>• Consider extended staffing for support personnel deemed necessary by Ely DO.<br>• Resources from within the unit may be extended to "move up and cover" stations where pre-positioning is occurring away from primary stations. Also consider extended staffing for Helitack.<br>• Aircraft should only be extended when DO assumes a strong likelihood that fire activity will occur. | LF100<br>LF200 – Support<br>LF210 – State<br>LF210 National<br>LF561<br>LF571 | 6 Engines |
| 4 | Very High | North<br>86 – 109<br><br>South<br>81 – 99 | 6-10% | Potential exists for multiple A/B/C and larger fires to occur. Extended attack potential is high. Weather, fuels, and/or season will create conditions where fire spread potential and resistance to control is high. | • Apply all applicable conditions listed above (A through G) as appropriate<br>• Consider extended staffing for support personnel deemed necessary by Ely DO.<br>• Consider extended staffing for Ella Mt Lookout and all IA resources at each station. Also consider extended staffing for Helitack, smokejumpers and SEATs.<br>• Aircraft should only be extended when DO assumes a strong likelihood that fire activity will occur. | LF100<br>LF200 – Support<br>LF210 – State<br>LF210 National<br>LF561<br>LF571 | 8 Engines<br>1 Helicopter<br>1 SEAT |
| 5 | Extreme | North<br>>110<br><br>South<br>>100 | <5% | Potential exists for multiple A/B/C and larger fires to occur. Potential for multiple IMT managed incidents is high. Weather, fuels, and/or season will create conditions where fire spread potential and resistance to control may be beyond capabilities of IA resources available. | • Apply all applicable conditions (A thru G) listed above as appropriate<br>• Consider Extended staffing for support personnel deemed necessary by Ely DO.<br>• Consider Extended staffing for Ella Mt. Look Out; all IA resources at each station. Also consider extended staffing for Helitack, Smokejumpers and SEATs.<br>• Aircraft should only be extended when DO assumes a strong likelihood that fire activity will occur. | LF100<br>LF200 – Support<br>LF210 – State<br>LF210 National<br>LF561<br>LF571 | 10 Engines<br>1 Helicopter<br>1 SEAT |

# GRBA 2023 FIRE MANAGEMENT PLAN

# Appendix E. Multi-year Fuels Treatment Plan

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# Great Basin National Park Multi-Year Fuels Treatment Plan

**April 2023**

# Contents



# Figures



# Tables

# 1.0 Introduction

The National Park Service (NPS) Great Basin National Park (GRBA or Park) Multi-Year Fuels Treatment Plan (MYFT) provides a yearly plan for fuels management operations. The main goal is to reduce fuels on approximately 21,024 acres in the next ten years, with re-treatments and additional projects identified after five years. Fuels reduction methods would include mechanical, manual, prescribed fire, herbicide, and revegetation. Some areas would be retreated over multiple years, as needed, to meet fuels and re-vegetation objectives. Fuels reduction would focus on sagebrush, aspen, ponderosa pine, riparian, and wet meadow vegetation types.

The MYFT, which is updated yearly, serves as an appendix to the GRBA Fire Management Plan (FMP) providing more detailed information on fuels management. The GRBA FMP provides guidance for fuels treatment projects including in *Section 3.0 Wildland Fire Operational Guidance*, *3.2 Fuels Treatments,* which includes the guidance on the following:

- Wildland Fire and Fuels Management Goals and Objectives.
- General Fuels Management Implementation Procedures .
    - Manual Treatments.
    - Prescribed Fire.
    - Chemical Treatments.
    - Mechanical Treatments.
    - Revegetation Requirements.
    - Biomass Treatments.
- Infrastructure and Defensible Space.

This plan is designed to realign the vegetation and the natural fire regime with historical norms while protecting Park visitors and resources. By utilizing adaptive management and systemically organizing treatments with the help of the Resource Management Division, the objective is to achieve a state where the natural fire regime could maintain the desired plant communities. However, it should be noted that multiple treatment entries are usually required to return the vegetation to a point where natural disturbance will maintain the historical plant communities and biodiversity.

Treatments may be adjusted between years to accommodate such variables as: prescription, fuel loading, fire severity, resource availability, funding, compliance, and biological concerns such as nesting birds.

Every prescribed fire project is subject to a written, management approved prescribed fire plan that follows the National Wildfire Coordinating Group (NWCG) Standards for Prescribed Fire Planning and Implementation, PMS 484, 2022 (NWCG 2022) and subsequent agency specific requirements.

Using existing barriers to fire spread, where appropriate, is preferable to constructing fire line to mineral soil. Constructing fire line is expensive and may cause the spread of invasive plant species (NPS 2013). Firelines will be constructed where needed but existing features such as roads, streams, trails and areas with sparse vegetation will be used as firebreaks or fire lines, where appropriate.

## 2.0 Location of the Treatments

Treatment locations will be chosen based on values at risk, topography, access, infrastructure, fuels, and ecological departure. The following factors will be considered when selecting and prioritizing fuels projects:

- Wildland Urban Interface (WUI) and hazard fuels near infrastructure and private property.
- Proximity to completed fuels treatments or past fires on Bureau of Land Management (BLM) and NPS lands.
- Cultural resource protection and concerns.
- Protection or enhancement of natural and cultural resource values.
- Information such as suppression difficulty index (SDI) and potential control locations (PCL) (reference maps) can help inform and prioritize treatment locations favorable to reducing potential fire behavior and intensity.
- Benefit to target vegetation types, including sagebrush, aspen, ponderosa pine, wet meadows, and riparian vegetation.
    - Conifer encroached sagebrush with remaining understory (Phase I or Phase II).
    - High resistance-resilient sites (aspen, ponderosa pine, wet meadow and riparian vegetation).

All plant communities in the Park evolved with fire and will benefit from landscape-scale fuel reductions and restoration actions. Fuels treatments would be designed for the long-term revegetation of sites and would include multiple years of post-fuel reduction interventions such as herbicide application for invasive plants, seeding, and/or planting. Simply removing fuels may not result in ecological recovery, particularly in sites with lower resilience and resistance. In lower elevation, drier, hotter sites, recovery of native vegetation may take years or decades. At higher elevations with more precipitation, vegetation response will be faster and more evident, even without seeding and herbicide treatments. The need for post fuel removal interventions such as seeding, planting, and herbicide application will be determined for each project and adjusted through the adaptive management process. Figure 1 shows treatment locations in GRBA.

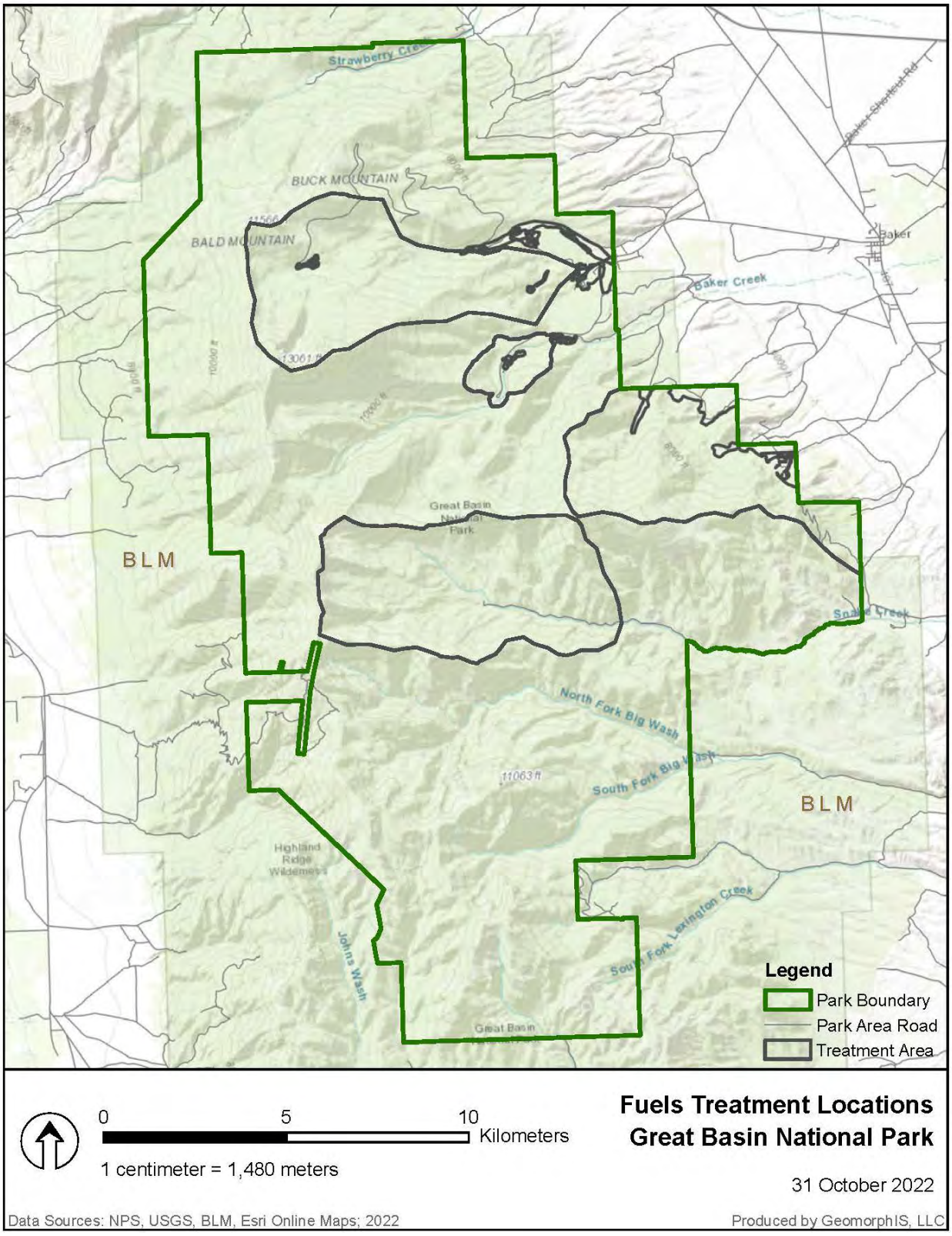


**Figure 1. Location of fuels treatments at GRBA.**

# 3.0 Treatment Implementation

## 3.1 Sagebrush

Sagebrush in GRBA encompasses about 17,000 acres including black and low sagebrush, montane grassland, bitterbrush, and wildrye. Under a natural fire regime, tree cover in sagebrush habitat is less than 3%. Sagebrush ecosystems currently lack early successional classes typical of a natural fire regime with tree cover exceeding 50% in many sites. Fire exclusion and resultant conifer encroachment has virtually eliminated this early successional stage, reducing the resistance and resilience of Park sagebrush and leaving sagebrush vulnerable to high-intensity fires and subsequent annual grass invasion.

Fuels treatments in sagebrush would return sites to their natural range of variation and reduce ecological departure through removal of pinyon pine, juniper, mountain mahogany, and other conifers. Conifer reduction reduces competition for soil moisture and sunlight, allowing understory vegetation, shrubs, perennial grasses, and forbs to recover and persist. Sagebrush restoration would use mechanical and manual methods to remove trees. Returning sagebrush sites to their natural range of variation, requires removal of 90% of trees of all size classes. Old growth pinyon and juniper with distinct morphological features will not be removed. Tree removal will not be conducted during the breeding bird season, unless pre-treatment surveys are conducted (1 May to 15 July).

Heavy equipment, such as chippers, and masticators may be utilized as specified above for sagebrush restoration. Slash generated from conifer removal may be pile burned, chipped, or cut and left on site (lop and scatter). Prescribed fire in the form of broadcast burning may be used at higher elevations (>8,000 feet) and on north facing slopes. These sites are higher in resilience and resistance and support a more diverse and abundant understory of native vegetation. Treatments would focus on areas with lower tree cover to increase the probability of restoration success as these areas have more understory vegetation and a more robust seed bank. Multiple years of follow up treatments of herbicide, seeding, and planting would be considered for all sagebrush treatments to minimize the impacts of invasive plants and maximize native species recovery. Sagebrush restoration may require maintenance treatments on 10-year intervals. Maintenance projects would remove all newly established conifers within project areas.

**Lehman Flat, Kious Basin, and Infrastructure Sagebrush Restoration (1,667 acres)**

These projects will reduce fuels and restore sagebrush, riparian, and wet meadow habitat. Project areas are surrounded by private, and BLM administered lands. Fuels reductions have occurred in the project area several times since 2004. Project goals are to reduce fuel loads, protect Park infrastructure, and private property from catastrophic wildlife and restore sagebrush, riparian, and wet meadow plant communities. Project objectives are to reduce conifer cover to <5%. Figure 2 depicts potential treatment areas for sagebrush restoration.

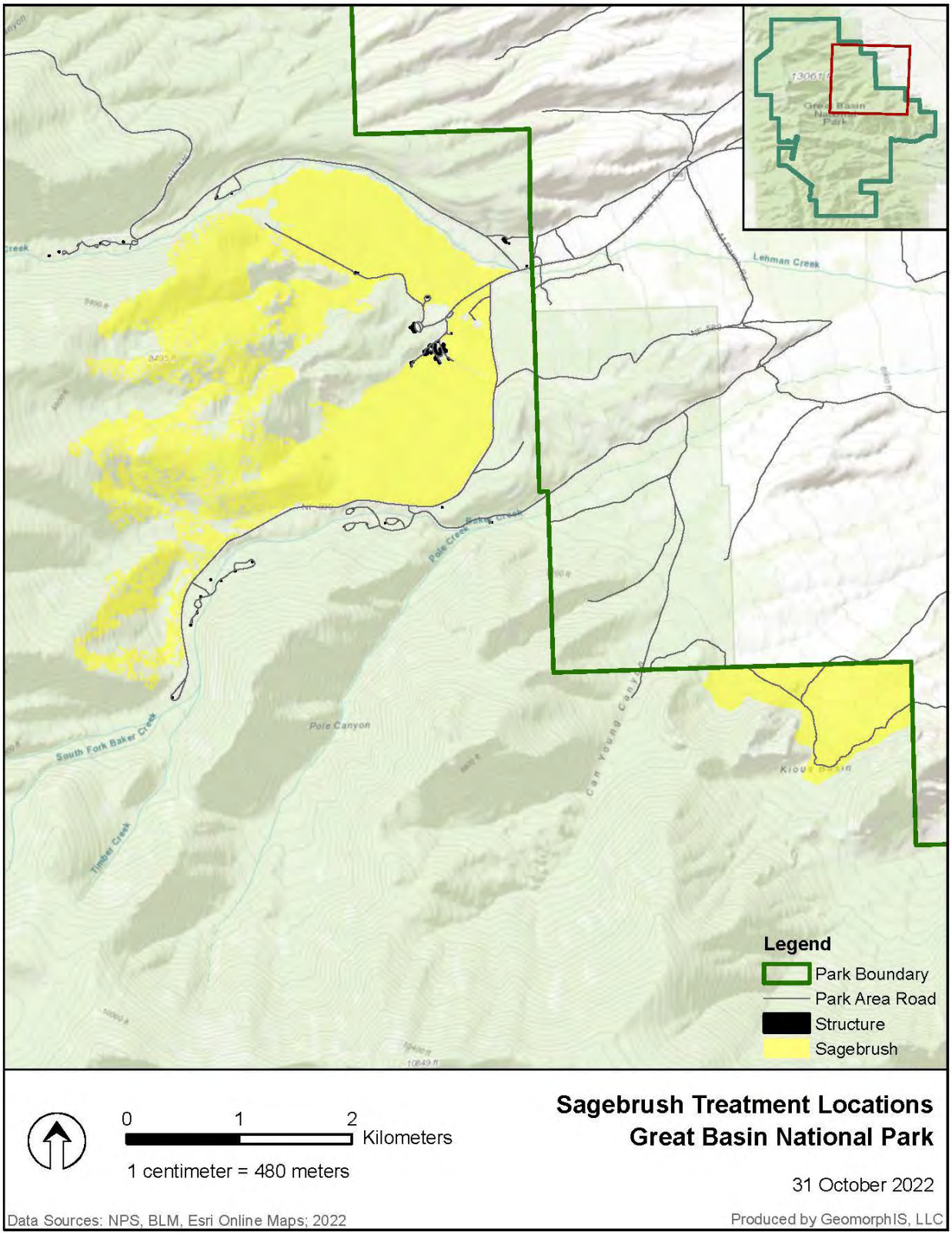


**Figure 2. Location of Lehman Flat, Kious Basin, and Infrastructure treatments.**

Target tree species for removal include pinyon pine, juniper, mountain mahogany, and white fir. Slash would be piled for future burning, lopped and scattered or chipped. Treatments would include mechanical, manual, and prescribed fire. Seeding of native forbs, grasses and shrubs and herbicide treatments for annual grasses and invasive forbs would be conducted.

## 3.2 Aspen

Quaking aspen is a fire dependent, keystone species, highly valued by the public and culturally significant. Aspen systems are the largest vegetation type in GRBA (19,997 acres). Fire exclusion and conifer encroachment have resulted in aspen being replaced by white fir. Approximately 11,000 acres of aspen in GRBA are conifer dominated, late successional classes with little remaining aspen. Restoration of fire is critical to maintain and restore aspen stands in the Great Basin and prevent the permanent loss of aspen clones.

Some aspen stands contain historically significant dendroglyph components, primarily associated with sheep herding and contribute to the visual and atmospheric setting of historic campgrounds.

The proposed action would treat aspen on approximately 17,939 acres of the Park. Annual goals are to treat 1,000 to 2,000 acres of aspen per year, with all aspen in the Park treated by 2045. Aspen treatments will be conducted with prescribed fire to reduce fuels and conifers and stimulate root sprouting of aspen clones. Fire stimulates root sprouting and is necessary in addition to mechanical treatments. Pre-treatments using mechanical methods, chainsaws, and pile burning may be used to reduce fuels and prepare sites prior to broadcast burns. Aspen treatments would occur at higher elevation sites, with higher annual precipitation and resistance and resilience. While seeding and herbicide treatments are not expected to be needed, they may be used when monitoring shows slow recovery of native plants or increasing invasive plant species.

**Snake Creek, Lehman Creek, Can Young and Young Canyon Aspen Restoration (17,939 acres)**

The Lehman Creek drainage receives the majority of Park visitation with the Wheeler Peak Scenic Drive providing the only access to Wheeler Peak Campground and popular hiking trails to bristlecone pines, sub-alpine lakes, and Wheeler Peak. Snake Creek is a popular hiking area with a single route in and out of the canyon. Snake Creek supports a population of native Bonneville cutthroat trout, two sub-alpine lakes, the Johnson Lake Historic Mining District, and is a popular backpacking area in the Park. Young Canyon and Can Young Canyon encompass a remote area of the Park that supports a diversity of vegetation and wildlife.

Heavy fuels in these watersheds create a high risk of catastrophic, stand replacing fire and would threaten lives, critical Park resources, water quality and quantity. Proactively reducing fuels and fire risk is a Park priority. These projects would use mechanical, manual, prescribed fire, herbicide, seeding, and planting, to protect life and property, reduce fuels, and proactively restore native plant communities. The goals of these treatments are to restore plant communities to their natural range of variation, increase ecological resistance and resilience, reduce fuel loading, and prevent catastrophic wildfire. Figure 3 depicts potential aspen treatment areas.

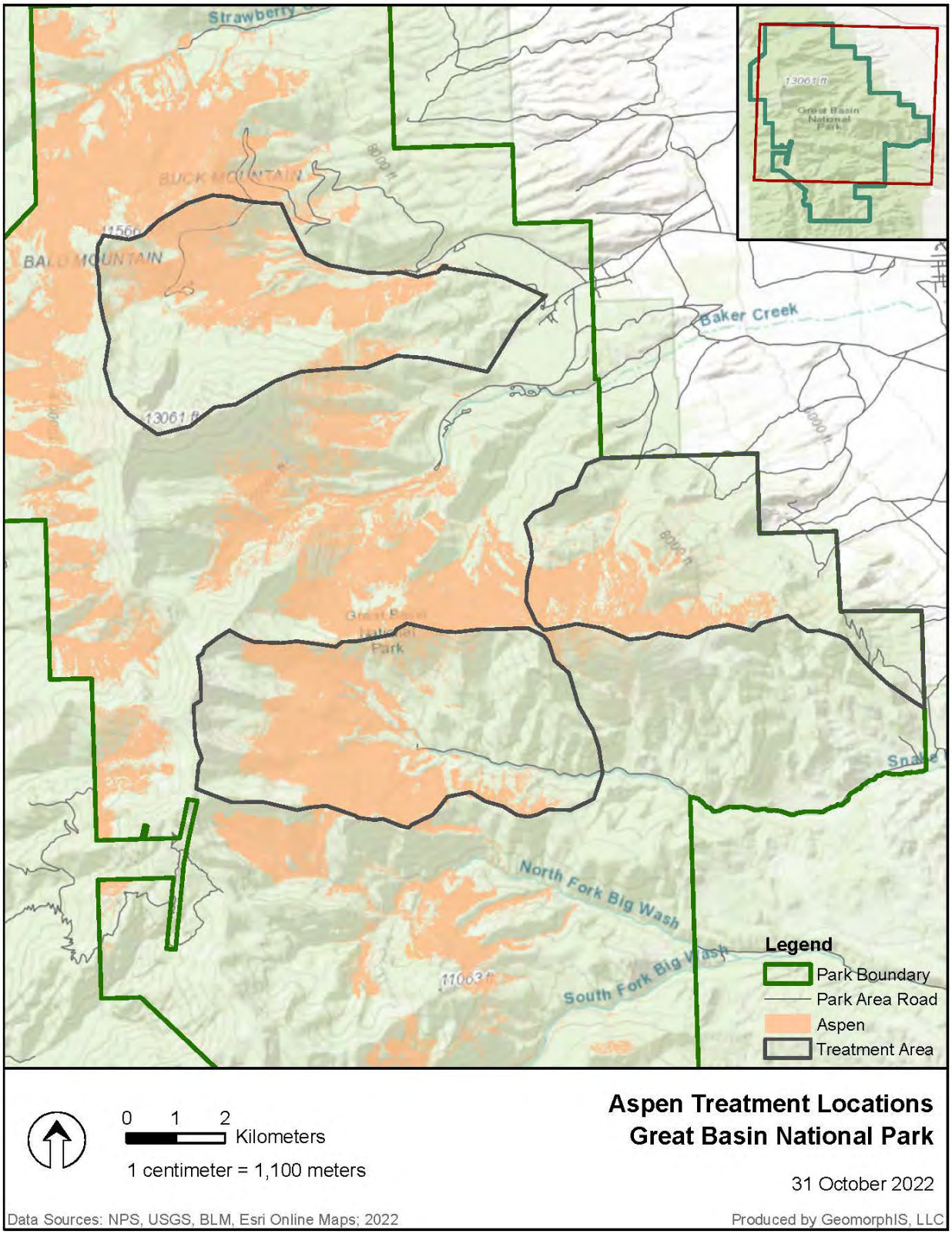


**Figure 3. Locations of Snake Creek, Lehman Creek, and Can Young Canyon treatments.**

Aspen plant communities are the focus of prescribed fire in these treatment areas. Aspen treatments would be conducted with prescribed fire to reduce fuels, kill conifers and stimulate root sprouting of the aspen clone. Fire stimulates root sprouting and is necessary in addition to mechanical treatments. Pre-treatments using mechanical methods, chainsaws, and pile burning may be used to reduce fuels and prepare sites prior to broadcast burns.

Aspen treatments would be done at higher elevation sites, with higher annual precipitation and resistance and resilience. While seeding and herbicide treatments are not expected to be needed, they should be considered as restoration tools if site recovery requires it. Other plant communities within the treatment areas, including ponderosa pine, sagebrush, wet meadow, and riparian, may be treated as well.

## 3.3 Ponderosa Pine

Ponderosa pine is an iconic species in the southwest and one of the rarest plant species in the Great Basin. These stands require frequent, low-intensity fires to maintain the open park like structure characteristic of healthy populations. Commercial logging in the 1800s decimated ponderosa pine stands in the Great Basin. Ponderosa pine was the most valuable timber and most mountain ranges, including the Snake Range, had sawmills focused primarily on logging this species. Additionally, ponderosa pine requires bare mineral soil for seed germination. Fire exclusion has virtually eliminated tree seedling recruitment and has allowed the accumulation of heavy ladder fuels. Ponderosa pine is a shade intolerant species and full sunlight is needed for seedling establishment and growth. As a result, ponderosa stands and ancient trees are vulnerable to stand replacing wildfires, with little potential for post-fire regeneration. Introducing regular, beneficial fire is critical to maintain and protect these stands. Ponderosa stands are historically significant and contribute to the visual and atmospheric setting of historic campgrounds.

Due to extensive logging, the historic extent of ponderosa pine is difficult to estimate. Ponderosa pine, and related fire dependent communities such as mixed conifer and mountain shrub, occur on 1,100 acres in GRBA. Historic fire frequencies in GRBA stands were about 5 years, but the last fire scars were from the 1880s (Heyerdahl et al. 2011). Fire exclusion has resulted in an overrepresentation of late successional classes, with substantial fuel loads. We propose broadcast burning ponderosa pine stands, which would require pretreatments such as mechanical thinning to prepare the sites. Fire return intervals of 5 to 10 years should be reestablished through regular maintenance burns.

**Lehman and Burnt Mill Ponderosa Pine Treatments (668 acres)**

Ponderosa pines in Burnt Mill and Lehman Creek are ancient, some dated to over 800 years old. Fuels treatments would be designed to avoid mortality of individual ponderosa pines. Fire exclusion impacts on ponderosa pine is evident by an overrepresentation of late successional classes, with substantial fuel loads. Heavy fuels threaten these stands as well as increase the risk of catastrophic, stand replacing fire in the Park's most visited drainage, Lehman Creek. Additional resources in Burnt Mill Canyon include Osceola ditch and Wheeler Peak Scenic Drive. Figure 4 depicts potential ponderosa pine treatment areas which is the target species.

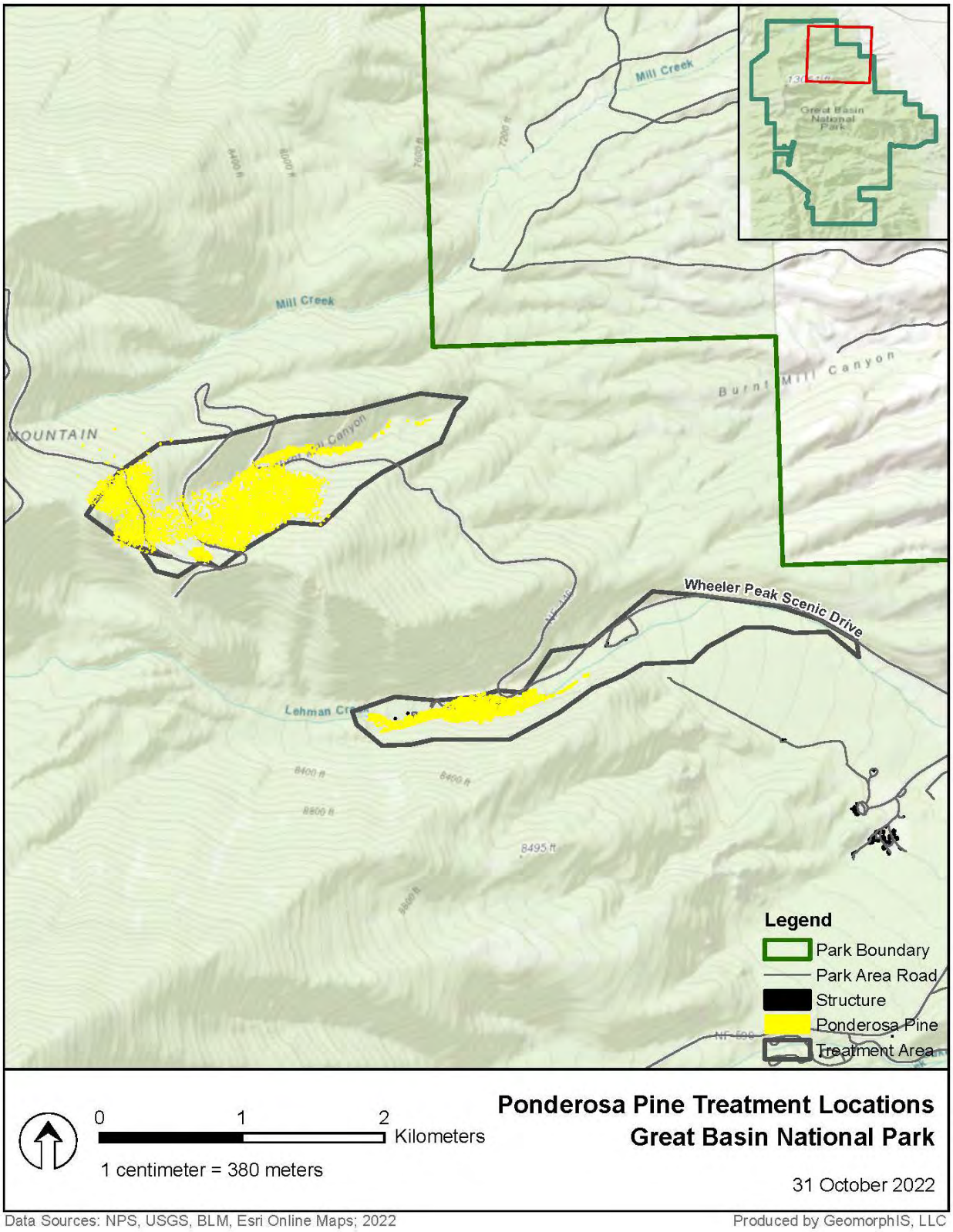


**Figure 4. Location of Lehman and Burnt Mill Ponderosa Pine treatments.**

This project would use mechanical and manual treatments, prescribed fire, herbicide, seeding, and planting to protect life and property, reduce fuels, and proactively restore native plant communities. The goals of these treatments are to restore ponderosa pine communities to their natural range of variation, increase ecological resistance and resilience, reduce fuel loading, and prevent catastrophic wildfire. Reducing canopy cover will decrease the chance of crown fire and increase the resistance and resilience of ponderosa pine stands to insects and drought.

Ponderosa pine communities are the focus of prescribed fire in these areas. We propose broadcast burning ponderosa pine stands with pre-treatment of mechanical thinning to prepare the sites. Fire return intervals of 5 to 10 years should be reestablished through regular maintenance burns. Pre-treatment would include mechanical thinning to decrease ladder fuels, and to reduce canopy cover, which will help reduce scorching in the crowns of ponderosa pines and allow more sunlight to reach the ground. Shade tolerant conifers such as juniper and white fir germinate and establish under ponderosa pine. As they grow, these species become ladders fuels that ignite and burn intensely. These ladder fuels would be cut and removed. Thick duff and litter could burn hot enough to kill trees by damaging roots and cambium. To mitigate this, burns would be completed in the spring before duff and litter dry out or duff and litter would be removed (e.g., raking) to prevent lethal soil temperatures. Several burns may be required to reduce the duff and litter layer and reduce canopy cover. Prescribed fire is necessary to expose bare mineral soils and increase sunlight which are required to stimulate germination and ponderosa pine seedling establishment. Seeding and herbicide treatments may be required at lower elevation sites until a native understory is reestablished.

## 3.4 Riparian and Wetland Areas

Riparian areas and wet meadows are supported by groundwater. As a result, they are highly productive and high in both resistance and resilience. These areas contribute disproportionately to biodiversity and are highly valued for recreation. These mesic systems are extremely limited in the Great Basin and in the Park (540 acres or <1% of Park lands) and have been dramatically altered by grazing, roads, recreation infrastructure, water diversions, invasive plants, and fire exclusion.

Mechanical conifer removal followed by broadcast burning is the recommended treatment strategy. Removing conifers and resetting succession in mesic systems can increase water availability to plants, fish, wildlife, and downstream water users. Revegetation and herbicide treatments would be implemented as needed following fuels treatments. Figure 5 depicts the location of riparian areas in GRBA.

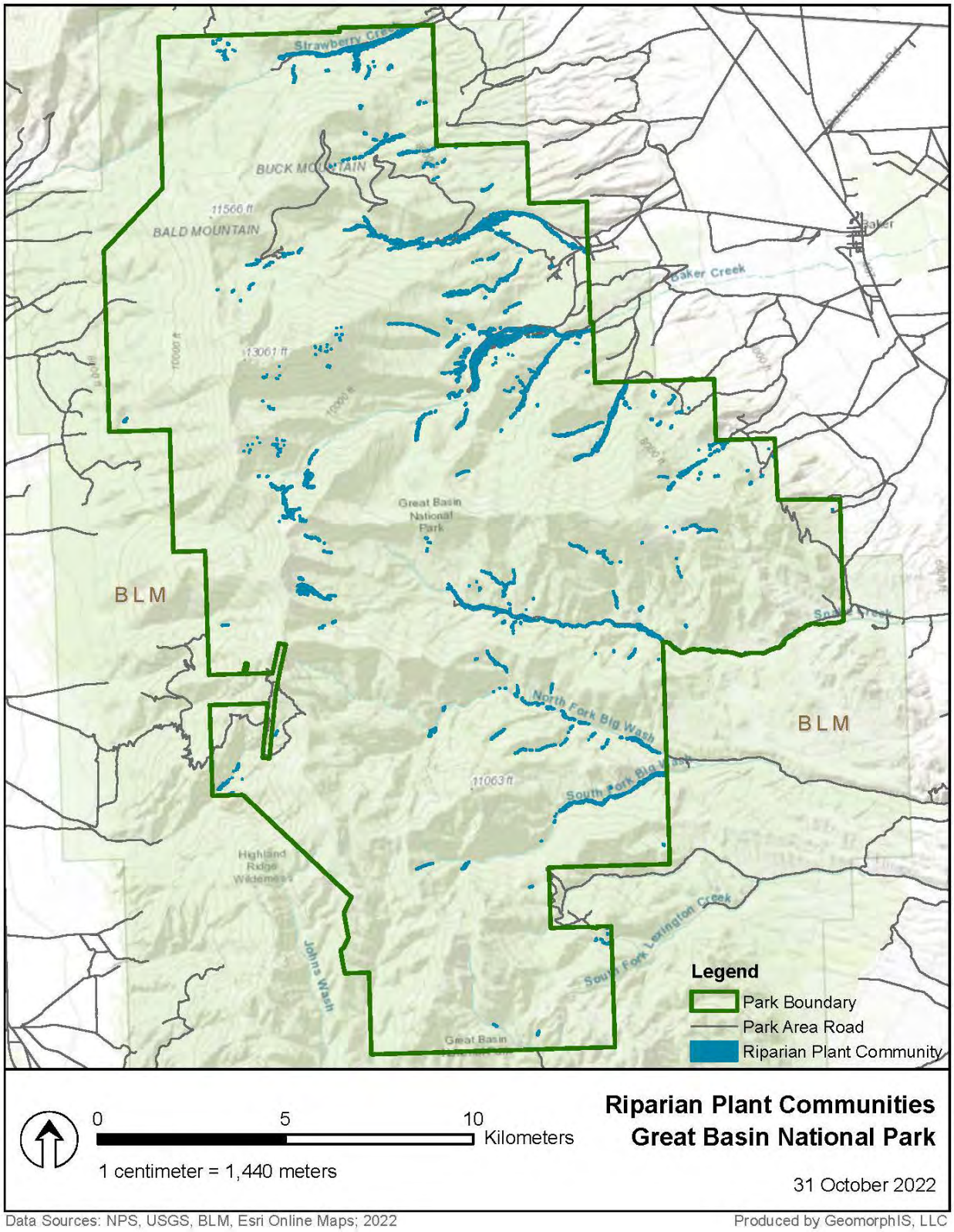


**Figure 5. Location of riparian plant communities at GRBA.**

**Baker Creek Prescribed Fire (750 acres)**

This project would restore habitat in the Baker Creek Watershed, including sagebrush, riparian areas, wet meadows, and aspen ecosystems using prescribed fire, conifer removal, seeding of native species, and herbicide treatments to establish and maintain naturally functioning, sustainable landscapes and to reduce fire risk.

Fire exclusion impacts in the project area are evidenced by an overrepresentation of late successional classes, with substantial fuel accumulation documented by historic photos. Heavy fuels increase the likelihood of catastrophic, stand replacing fires, threatening human safety (Baker Creek is the only access in and out of the watershed), campgrounds, and recreational use. The Baker Creek trailhead provides access to most of the Park's backcountry and the stream supports the largest recreational fishery in the Park.

This project would use mechanical and manual treatments, prescribed fire, herbicide, seeding, and planting to protect life and property, reduce fuels, and proactively restore native plant communities. The goals of these treatments are to restore sagebrush, riparian areas, meadows, and aspen stands to their natural range of variation, increase ecological resistance and resilience, reduce fuel loading, and prevent catastrophic wildfire.

We propose broadcast burning, preceded by mechanical thinning to prepare the sites. Maintaining heterogeneity in plant successional states through variable fire intensity is project goal. Fire return intervals of 5 to 10 years should be reestablished through regular maintenance burns in meadows. Seeding and herbicide treatments may be required in some areas until a native understory is reestablished. Figure 6 depicts the location of the Baker Creek proposed treatment area.

# 4.0 Historical Treatments

Figure 7 depicts GRBA historic fuels projects and Figure 8 depicts historic and planned BLM projects.

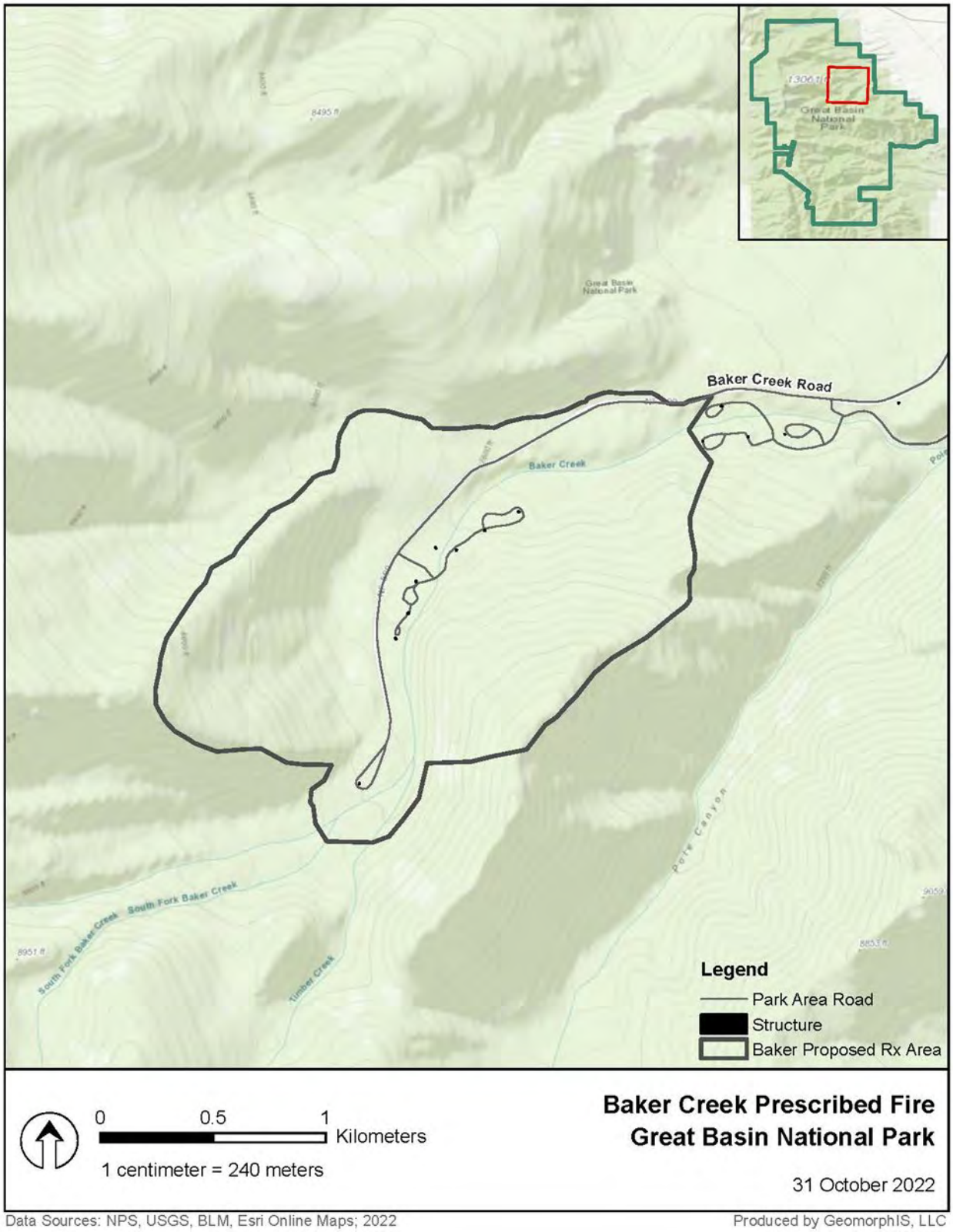


**Figure 6. Location of Baker Creek proposed prescribed fire.**

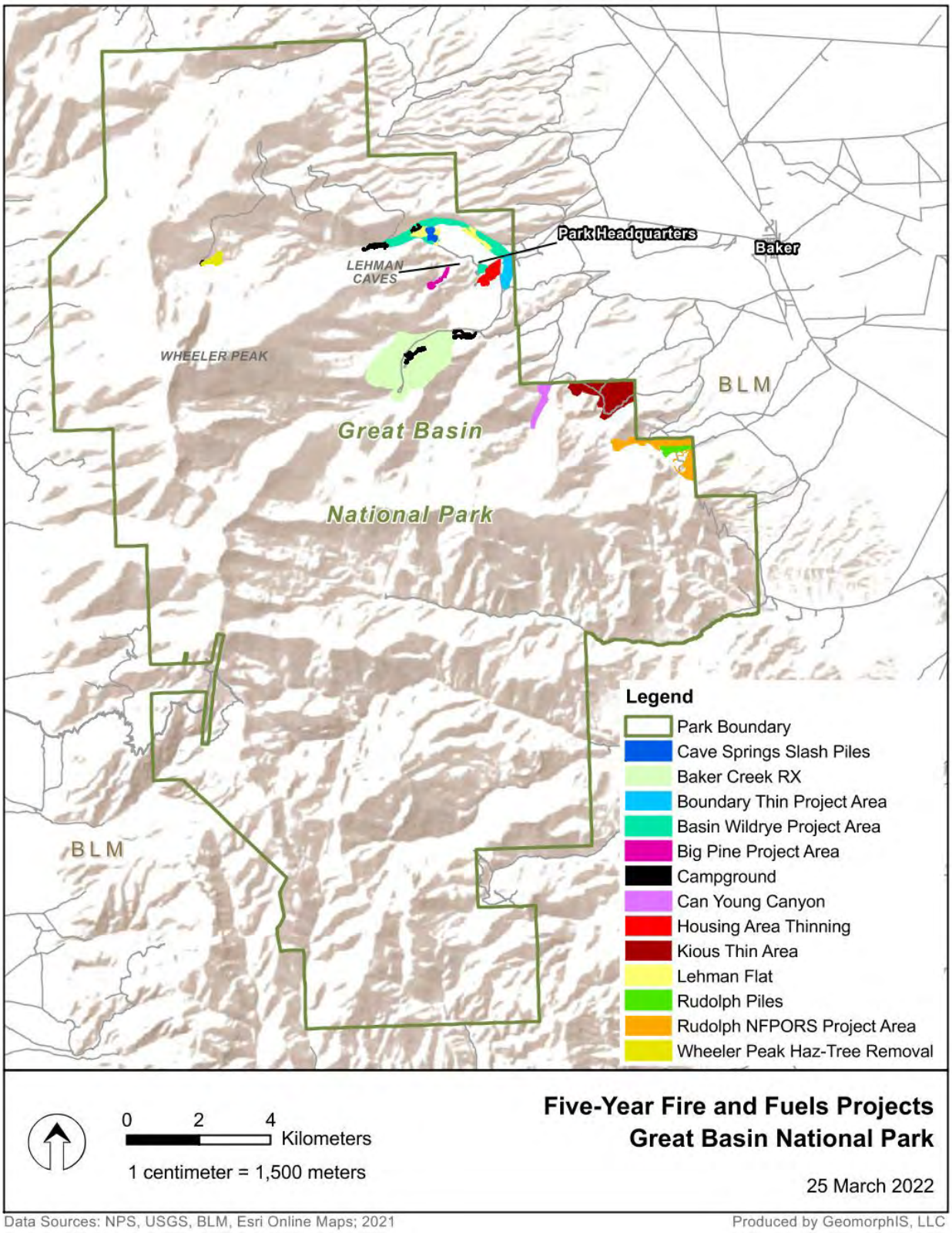


**Figure 7. GRBA historic fuels treatment projects.**

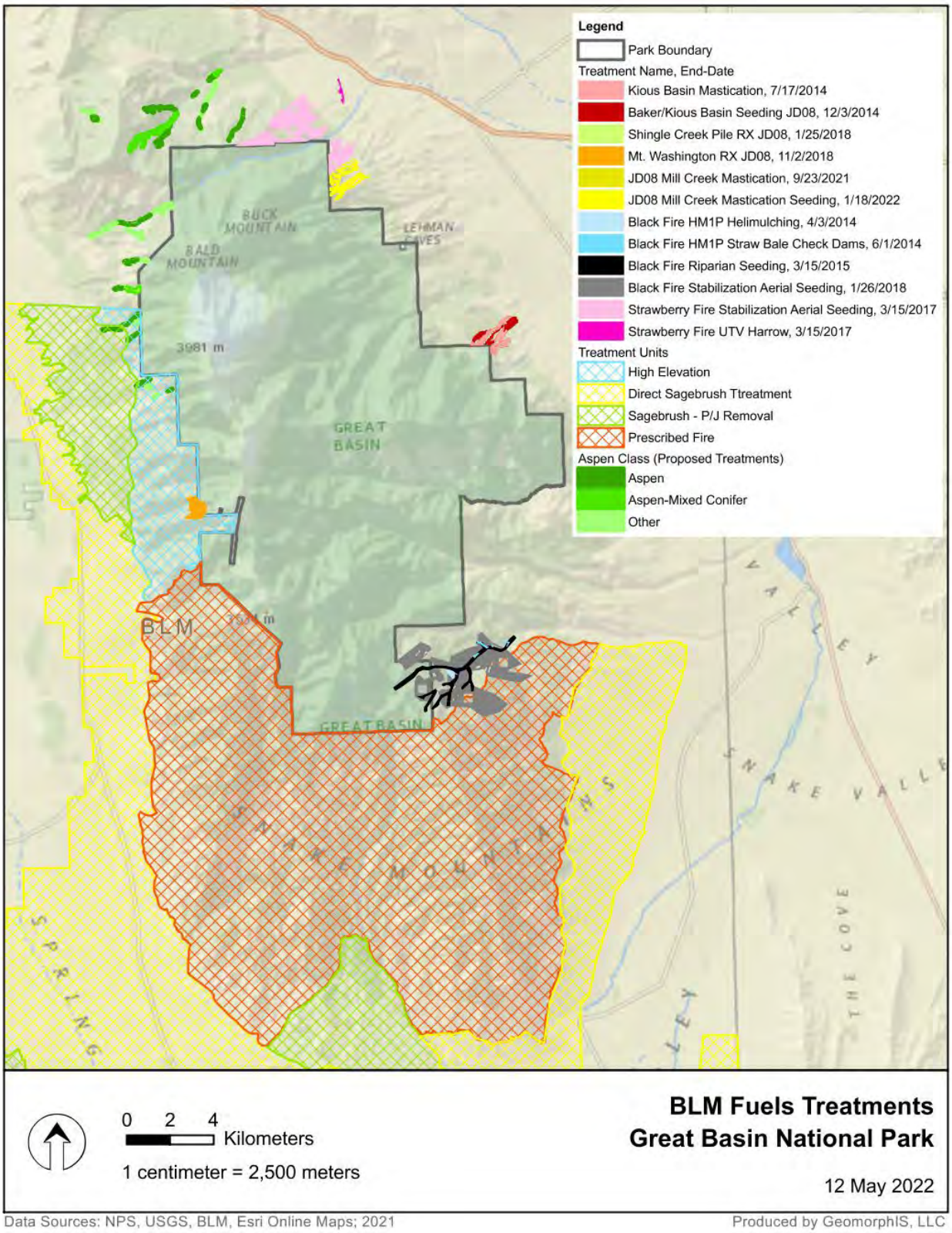


**Figure 8. BLM historic fuels treatment projects.**

# 5.0 Proposed Treatment Schedule

Over the duration of the multi-year fuels plan, we propose to treat 21,024 acres (treating an average of 2,102 acres/year over 10 years) using prescribed fire, mechanical and manual treatments, revegetation, and herbicide application. Project locations and prescriptions are outlined above. The MYFT is re-assessed annually through the annual FMP update process and changes to specific projects and years may occur. All projects will be submitted to NPS's Planning, Environment and Public Comment (PEPC) online system prior to implementation to ensure project-level National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) Section 106 compliance are complete.

Tables 1 through 9, below, provide detailed information on proposed projects including size, location, and scheduling by fiscal year (FY).

**Table 1. FY 2023 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Lehman Flats | 45 | Chemical | Pinyon-Juniper | 39.105 x -114.2141 | 9/30/2023 | 6338755 |
| Lehman Flats | 42 | Pile | Pinyon-Juniper | 39.105 x -114.2141 | 9/30/2023 | 6332878 |
| Lehman Flats | 45 | Seed | Pinyon-Juniper | 39.105 x -114.2141 | 9/30/2023 | 6338750 |
| Lehman Flats | 45 | Mechanical | Pinyon-Juniper | 39.105 x -114.2141 | 9/30/2023 | 6332876 |
| Baker Creek Prescribed Fire | 750 | Fire | Wet Meadow, riparian, sagebrush | 38.985 x -114.241 | | |

**Table 2. FY 2024 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Kious | 134 | Chemical | Pinyon-Juniper | 38.9748 x -114.1755 | 9/30/2024 | 6338815 |
| Kious | 134 | Seed | Pinyon-Juniper | 38.9748 x -114.1755 | 9/30/2024 | 6338818 |
| Kious | 134 | Mechanical | Pinyon-Juniper | 38.9748 x -114.1755 | 9/30/2024 | 6332879 |
| Lehman Flats | 45 | Chemical | Pinyon-Juniper | 39.105 x -114.2141 | 9/30/2024 | 6327889 |
| Lehman Flats | 42 | Fire | Pinyon-Juniper piles | 39.105 x -114.2141 | 9/30/2024 | 6336599 |
| Lehman Flats | 45 | Seed | Pinyon-Juniper | 39.105 x -114.2141 | 9/30/2024 | 6338813 |
| Baker Creek Rx | 750 | Fire | Wet Meadow, riparian, sagebrush | 38.985 x -114.241 | | |

**Table 3. FY 2025 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Kious | 134 | Chemical | Pinyon-Juniper | 38.9748 x -114.1755 | 9/30/2024 | 6338815 |
| Kious | 134 | Seed | Pinyon-Juniper | 38.9748 x -114.1755 | 9/30/2024 | 6338818 |
| Kious | 134 | Mechanical | Pinyon-Juniper | 38.9748 x -114.1755 | 9/30/2024 | 6332879 |
| Baker Creek Rx | 750 | Fire | Wet Meadow, riparian, sagebrush | 38.985 x -114.241 | | |

**Table 4. FY 2026 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Snake Creek Rx | 967 | Fire | Aspen/Mixed Conifer | 38.935 x -114.248 | | |
| Infrastructure | 289 | Chemical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Seed | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Mechanical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Chemical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Baker Creek Rx | 750 | Fire | Wet Meadow, riparian, sagebrush | 38.985 x -114.241 | | |

**Table 5. FY 2027 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Snake Creek Rx | 967 | Fire | Aspen/Mixed Conifer | 38.935 x -114.248 | | |
| Infrastructure | 289 | Chemical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Seed | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Mechanical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Chemical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Lehman Creek Ponderosa | 130 | Mechanical | Ponderosa Pine | 39.016 x -114.239 | | |
| Lehman Creek Ponderosa | 260 | Fire | Ponderosa Pine | 39.016 x -114.239 | | |

**Table 6. FY 2028 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Snake Creek Rx | 967 | Fire | Aspen/Mixed Conifer | 38.935 x -114.248 | | |
| Infrastructure | 289 | Chemical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Seed | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Mechanical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Infrastructure | 289 | Chemical | Pinyon-Juniper | 39.000 x -114.216 | | |
| Lehman Creek Ponderosa | 130 | Mechanical | Ponderosa Pine | 39.016 x -114.239 | | |
| Lehman Creek Ponderosa | 260 | Fire | Ponderosa Pine | 39.016 x -114.239 | | |

**Table 7. FY 2029 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Snake Creek Rx | 967 | Fire | Aspen/Mixed Conifer | 38.935 x -114.248 | | |

**Table 8. FY 2030 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Snake Creek Rx | 967 | Fire | Aspen/Mixed Conifer | 38.935 x -114.248 | | |

**Table 9. FY 2031 Projects.**

| Unit | Size | Treatment Type | Fuel Type | Lat and Long | Completed/Est Completion | NFPORS Treatment ID# |
|---|---|---|---|---|---|---|
| Snake Creek Rx | 967 | Fire | Aspen/Mixed Conifer | 38.935 x -114.248 | | |

# References

Heyerdahl, E. K., P. M. Brown, S. G. Kitchen and M. H. Weber. 2011. Multicentury fire and forest histories at 19 sites in Utah and eastern Nevada. Gen. Tech. Rep. RMRS-GTR-261WWW. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station:1-192.

[NPS] National Park Service. 2013. Environmental Assessment for Invasive Plant Management Plan, Great Basin National Park, Baker, Nevada. September 2013. Accessed at: https://parkplanning.nps.gov/document.cfm?parkID=304&projectID=38924&documentID=55634.

NWCG Standards for Prescribed Fire Planning and Implementation, 2022. Accessed at: https://www.nwcg.gov/sites/default/files/publications/pms484.pdf

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# GRBA 2023 FIRE MANAGEMENT PLAN

# Appendix F. Natural and Cultural Resources

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# Great Basin National Park

## Natural and Cultural Resources
## References for Fire Management Plan

Contents

# 1.0 Cave Management Planning

**ELEMENTS FOR GRBA FIRE MANAGEMENT PLAN FROM CAVE MANAGEMENT PLANS**

**From Lehman Caves Management Plan (2019), Section 5.0:**

GRBA contains 40 known caves and 41,000 acres of karst landscape, a landscape that is capable of supporting caves. Caves and karst are significant natural resources and many contain significant cultural resources. For the purposes of this document, a cave is defined as a natural opening in rock, accessible by a human, which is at least 30 feet long and has a dark zone. Federal cave resources are protected by the Federal Cave Resource Protection Act of 1988 (FCRPA). All caves in the national park system are deemed to be significant. As further established by this act, specific locations of significant cave entrances may be kept confidential and exempted from FOIA requests.

Fire retardant has been shown to add nutrients to cave systems, which can affect cave biota. No fire retardant or foam will be allowed uphill of Lehman Caves for 800 m, which is 450 m past the Prospect Mountain Quartzite-Pole Canyon Limestone contact. No retardant will be released between 114° 14’ 00’’ and 114° 13’10” W and 39°0’0” N and 39°0’30” N. The GRBA Fire Management Plan will be revised to reflect this new no-retardant area.

No water bucket drops will be allowed over the natural entrance or 30 m uphill to protect cultural resources in the natural entrance area.

This area is within the Wildland-Urban Interface and restricting fire retardant and bucket drops may have an impact on protecting the Lehman Caves Visitor Center. However, it should be remembered that the cave is millions of years old and can’t be replaced, while the visitor center is a non-historic building with a limited lifespan. It is recommended that some thinning uphill of the cave be completed to help create a fire break. Figure 2 depicts a retardant avoidance zone (in red) for the Lehman Caves area.

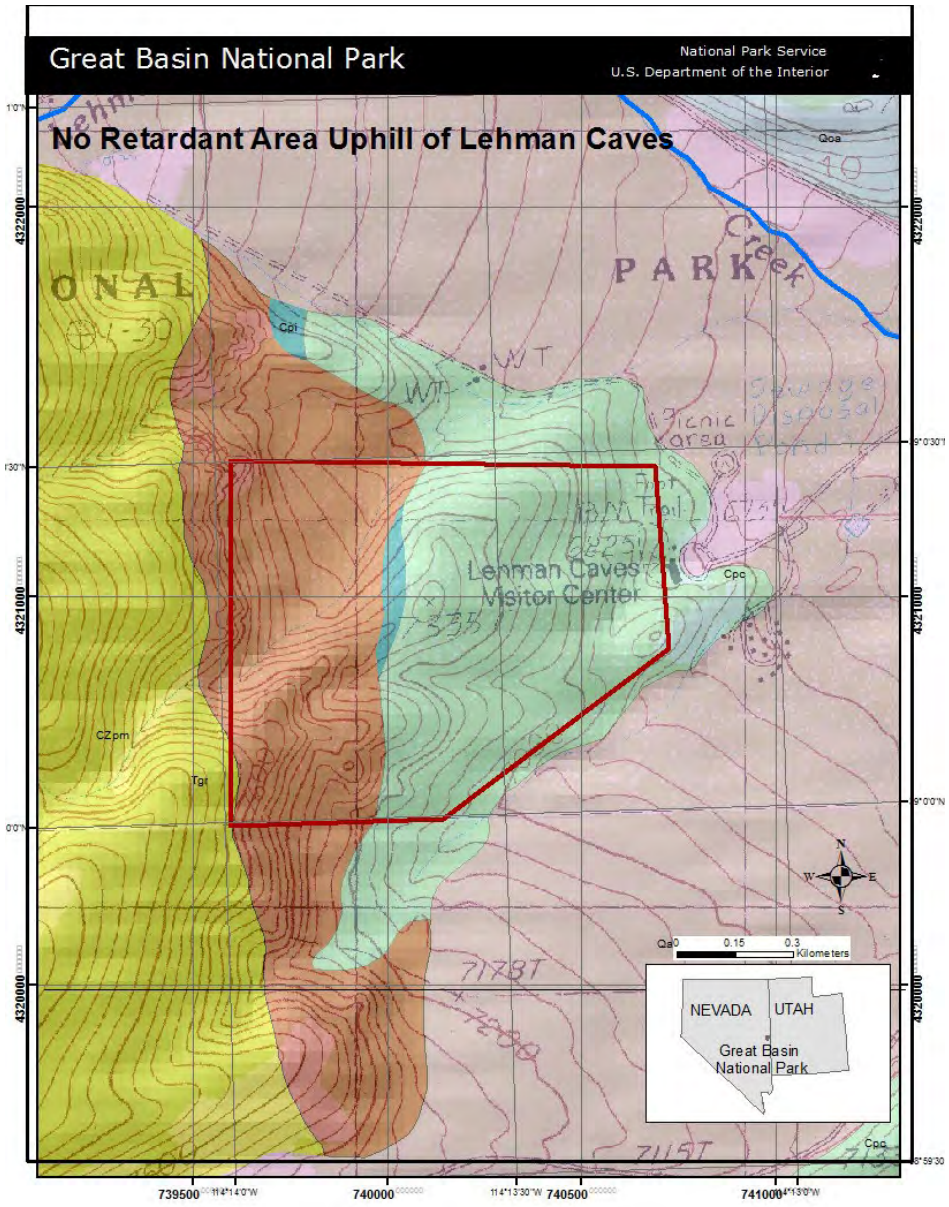


**Figure 1. Lehman Caves, No Retardant Area in Red Color**

From GRBA Wild Caves and Karst Management Plan (2019):

### 1.1 Surface Management

The surface above and near caves should be managed with cave resources in mind, as the surface and subsurface are interconnected.

### 1.2 Development

Limited development is present above wild caves. One cave goes underneath Baker Creek and the adjacent road (Systems Key). Two cave entrances are adjacent to a gravel road (Upper Pictograph, Lower Pictograph). No other development (e.g., buildings, utility corridors, roads) will be allowed above wild caves. Development at or near a cave entrances or upstream of cave entrances should only occur if no impairment will take place, and park staff determine that the benefits of the development outweigh the risks to the cave.

### 1.3 Prescribed Fires:

Prescribed fire actions will avoid known cave entrances in a manner that minimizes potential direct, indirect, and cumulative effects to cave systems. Ignition methods which involve chemicals such as diesel fuel, gasoline, propane, and flammable gels, will be utilized in a manner which avoids the introduction of chemicals or foreign materials into caves. Management practices will be developed to minimize the amount of smoke that could enter caves. Prescribed fire should not be implemented within areas that could directly, indirectly, or cumulatively affect caves which contain bat roosts, as bats may abandon roosts in response to disturbance.

### 1.4 Use of Chemicals

Best management practices for Integrated Pest Management will be followed as possible.

Fire retardant has been shown to add nutrients to cave systems, which can affect cave biota (Tobin et al. 2015). The Baker Creek-Grey Cliff area caves are especially susceptible due to the presence of perennial water in those caves and a high number of endemic cave organisms. No fire retardant or foam will be allowed within 300 ft (100 m) of perennial water or 50 m from a cave entrance (Figure 7). The GRBA Fire Management Plan will be revised to reflect this new no-retardant area.

No water bucket drops will be allowed over the entrances of Upper and Lower Pictograph Caves or on the adjacent road within 30 m of the cave entrances to avoid impacts to cultural resources at those caves.

If needed, wrapping material (fire shelter wrap) could be used to protect pictographs at caves where they occur as a short-term measure during a fire incident.

Herbicides are not currently used above most wild caves. If non-native plants that can be treated with herbicides are detected above the caves, Resource Management staff will review the herbicide information and decide if it can be delivered in a targeted manner to avoid impacts to cave resources.

Figure 2 represents a retardant avoidance area in the Baker Creek, Pole Canyon and Grey Cliffs area.

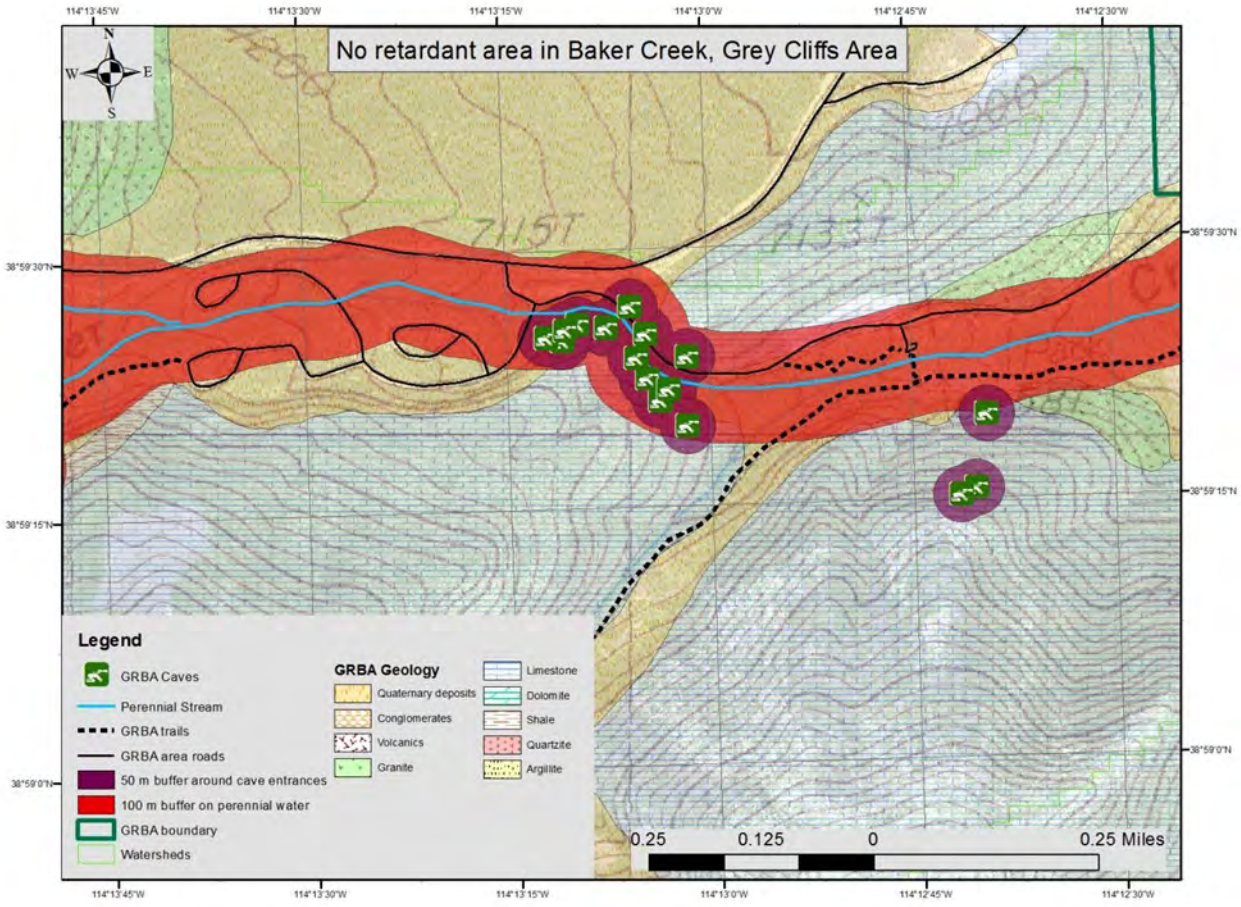


**Figure 2. Baker Creek, Grey Cliffs and Pole Canyon, No Retardant Area**

## 2.0 NPS Sensitive Species

Fire has influenced composition, structure, and landscape patterns of animal habitat for millennia, so it is reasonable to assume that animals have coexisted and adapted to periodic perturbations from fire (Smith 2000).

Natural Resources Management Guidelines NPS 77, states: "The NPS will identify and promote the conservation of all Federally listed threatened, endangered, or candidate species within Park boundaries and their critical habitats. The NPS also will identify all state and locally listed threatened, endangered, rare, declining, sensitive, or candidate species that are native to and present in the Parks, and their critical habitats. All management actions for protection and perpetuation of special status species will be determined through the Park's resource management plan."

Based upon these guidelines and objectives, the Park is required to identify all sensitive species and their habitats within the Park and to manage for their continuity. Based upon literature reviews, fieldwork, and historical citations, species are considered sensitive if they meet one or more factors listed below:

- Local rarity of native species.
- Whether the species is endemic to the Park or local vicinity.
- The importance of the species to the Park (as identified in Park management
- objectives).
- Whether the species is the subject of political concern or unusual public
- interest.
- The usefulness of the species as an indicator species.
- The vulnerability of the species to local population declines.
- Whether the species or its habitat is subject to human disturbance during critical portions of its life cycle.

As a result of re-establishing more natural fire regimes, species that had previously benefited from fire suppression may, in the future, see their habitat reduced in size. In general, it is better to re-establish a more natural fire regime rather than attempt to maintain unnatural fire regimes that negatively impact ecosystems. Fire is an essential process in promoting biodiversity and habitat types that support an array of animals and plants. While the long-term goal may be to re-establish natural fire regimes, there may be short-term goals that retain key habitat for native species until other habitat has become suitable or until we are comfortable that the species is adequately managed.

Many wildlife and plant species are declining due to climate change, habitat loss, and habitat degradation, including the loss and degradation of habitat from fire exclusion. The following species are classified as NPS sensitive species for GRBA:

### 2.1 Mammals

- Spotted Bat
- Mexican Free-Tailed Bat
- Fringed Myotis
- Long-Eared Myotis
- Long-Legged Myotis
- Silver-Haired Bat
- Townsend's Big-Eared Bat
- Western Big-Eared Bat
- Pygmy Rabbit
- Merriam's shrew

- Ring-Tailed Cat
- Rocky Mountain Bighorn Sheep
- Beaver
- Yellow-bellied Marmot

## 2.2 Fish – Bonneville Cutthroat Trout

**Background**

Bonneville cutthroat trout (BCT) are the only game fish native to Great Basin National Park. They were historically used as a food source by Native Americans and early European settlers. Stocking of nonnative fishes, specifically brook, brown, and rainbow trout, led to the hybridization and extirpation of BCT throughout much of its range. Over the last several decades state departments, federal agencies, and non-profit groups have worked together to restore populations of genetically pure BCT throughout their native range and precluded their listing under the Endangered Species Act (ESA). Due to these restoration efforts anglers, conservationist, and the general public can enjoy this iconic western species for generations to come, both here at Great Basin National Park and throughout the rest of their home range.
(Optional)

**Local Case Studies**

The 2012 Hampton Fire just north of the Park and the 2016 Strawberry Fire showed how devastating large high intensity fires can be on BCT and their habitat. It is believed that BCT were completely eliminated from the Hampton Creek watershed and 85% of the BCT in Strawberry Creek were killed as direct results of these two fires. BCT were killed by both the Strawberry Fire (presumably due to high water temperatures) and during the flash floods that followed. Another lesson learned from the Strawberry Fire was the areas with well-established native riparian vegetation (willow, water birch, and aspen) revegetated quicker and more successfully post-fire than areas dominated by conifers. There are still areas where the habitat is greatly degraded in both streams. It may be decades if not longer before Hampton and Strawberry Creeks recover enough to support BCT populations at pre-fire levels.

**Current Conditions**

There are currently ten populations of BCT that exists within or immediately downstream of the Park (Table 1). These populations play an important role in BCT conservation within the State of Nevada and warrant protection. Most populations exist in canyons that contain high fuel loads due to decades of aggressive fire suppression. Excess fuel combined with steep canyon topography promote high intensity fires and post-fire flash flooding; both of which have the potential to eliminate an entire BCT population. Another issue that has arose due to the absence of a natural fire regime is the encroachment of conifers into riparian areas. If conifers become the dominant species and displace the riparian vegetation, it will reduce the riparian's ability to revegetate when a fire (or some other disturbance) occurs. If the stream banks are not revegetated with native riparian species after a fire or disturbance, it will allow the establishment of invasive plant species that do little to stabilize streambanks, produce large woody debris, or provide shade/overhead cover – all of which are important parameters of BCT habitat. Proper fire management with objectives of reducing conifer encroachment, reducing overall fuel loads, and promoting more frequent but less intense fires would greatly aid the conservation of BCT by reducing the frequency of large, intense fires and increasing riparian vigor and resilience within the park.

**Table 1. Bonneville Cutthroat Trout Populations in and Adjacent to GRBA.**

| Population | BCT Habitat in Park (miles) | BCT Habitat Outside Park (miles) | Estimated BCT Population (Individuals) |
|---|---|---|---|
| Strawberry | 4.0 | 1.5 | 338 |
| Mill | 1.0 | 0.25 | 459 |
| Lehman | 0.5 (no barrier in place) | 0 | <100 |
| South Fork Baker | 1.2 | 0 | 425 |
| Snake | 6.25 | 0 | 169 |
| South Fork Big Wash | 1.25 | 0 | 690 |
| Big Wash | 0 | 1.5? | Established |
| Willard | 0 | 1.0? | ??? |
| Pine/Ridge | 0 | 1.8? | ??? |
| Johnson Lake | 2.3 acres | NA | 55 |

## 2.3 Birds Northern Goshawk

- Ferruginous Hawk
- Swainson's Hawk
- Golden eagle
- Bald Eagle
- Peregrine Falcon
- Sage Grouse
- Flammulated Owl
- Three-Toed Woodpecker

## 2.4 Plants

Scalloped moonwort (*Botrychium crenulatum*)
Holmgren buckwheat (*Eriogonum holmgrenii*)
Nevada catchfly (*Silene nachlingerae*)
Snake Range whitlowgrass (*Draba serpentina*)
Mt. Moriah beardtongue (*Penstemon moriahensis*)
Nevada primrose (*Primula cusickiana var. nevadensis*)
Bristlecone pine (*Pinus longaeva*)

## 2.5 Invertebrates

## 3.0 Invasive Plants

Lands that are now managed by Great Basin National Park have a history of grazing, logging, mining, recreation and other land uses that disturbed soils, altered native vegetation, and served as potential vectors for the introduction of invasive plants. Natural disturbances, like fire, and management actions such as fuels treatments and fire management activities also contribute to the introduction and spread of invasive plants.

The NPS Management Policies (2006) define invasive or exotic species as "those species that occupy or could occupy park lands directly or indirectly as the result of deliberate or accidental human activities…Because an exotic species did not evolve in concert with the species native to the place, the exotic species is not a natural component of the natural ecosystem..." If left untreated, invasive plants can impact native vegetation and soils leading to altered plant communities. The park actively manages invasive plant populations and coordinates with state and federal agencies to control state listed noxious weeds. The Great Basin National Park Invasive Plant Management Plan and EA (2014) guides management of invasive plants in the park using Integrated Pest Management (IPM) techniques. IPM is an approach that combines manual, chemical, biological, and cultural control methods, as well as selected combinations of these methods, to manage pests that minimizes risk to human health and the environment.

There are 44 species of nonnative plants growing within or adjacent to the Park's boundaries. Seven are listed as noxious weeds by the state of Nevada*. Thirteen invasive plant species are managed by the Park through inventory and treatment due to their negative impacts on native plant communities and soils, status as Nevada noxious weeds and their ability to spread. These are:

- Spotted knapweed*
- Canada thistle*
- Musk thistle*
- Bull thistle
- Houndstongue*
- Hoary cress*
- Tamarisk or Saltcedar*
- Russian Olive
- Common mullein
- Field bindweed (listed as noxious in Utah)
- Horehound
- Puncturevine*
- Cheatgrass

Several other state listed noxious weeds occur or have been detected outside park boundaries and have the potential to establish in the Park. These are:

- Medusahead
- Perennial sowthistle
- Purple loosestrife
- Russian knapweed

- Scotch thistle
- Yellow starthistle

Invasive plant survey and treatment data is maintained by park staff and available on the park's GIS server (Biological\Flora\Nonnatives).

Most invasive plant species recover quickly after disturbances like fire and can outcompete recovering native vegetation. Cheatgrass is of particular concern post-fire, especially at lower elevations and on warmer sites like south facing slopes (i.e., low resistance/low resilience sites, Chambers et al. 2014). As a winter annual with an abundant and long-lasting seedbank, cheatgrass establishes quickly after disturbance and can eventually dominate a site. Cheatgrass can also increase the likelihood and frequency of fire (Peters and Bunting 1994). Repeat fires on the same site prevent native shrubs and perennial grass from recovering or reestablishing and can lead to the conversion of native shrub systems to annual grasslands. Actions that minimize disturbance, utilize IPM techniques, and include revegetation treatments using native species can help restore sites while minimizing the establishment or spread of nonnative species.

# 4.0 Hydrologic Resources

**Existing Conditions**

Ten permanent streams originate in the Park, are fed by numerous springs along their courses, and found at elevations ranging from 6,200 to 10,300 feet (Table X). Six of the streams flow eastward into Snake Valley, and four westward into Spring Valley. Most of the streams are diverted into irrigation ditches or pipelines, gradually percolate into the alluvium, and/ or evaporate before reaching the adjacent valleys. The length of the streams within the Park Boundary range from 0.25-12.5 miles. Streams within Great Basin National Park generally have excellent water quality with minimal inputs of human caused pollutants. Typical water quality parameters are as follows: temperatures generally stay below 68 degrees F (20 C), dissolved oxygen is high and ranges from 6-10 mg/L, specific conductivity ranges from 20 to 400 microSiemens, and pH ranges between 7.5 and 8.5. Water quality is monitored in four of the ten streams using a YSI SONDE that records these parameters every hour. The SONDES are typically deployed from the end of May until mid-September. Water chemistry samples and benthic macroinvertebrates are also collected once a year from nine streams. These collections are used as an index of water quality and track changes in the aquatic invertebrate community over time.

Except for Strawberry Creek, the geomorphology of all the streams are in a healthy state of flux. Channel complexity is high, large woody debris exists, there are similar amounts of erosion and of deposition, pools, riffles, and glides are all present, channels are generally not incised or disassociating with their flood plains, and large flows do not drastically change the channels. Strawberry Creek is limiting in large woody debris, channel complexity, flood plain connectivity, and areas of deposition. There are also areas where large amounts of downcutting and incision has occurred and is continuing to occur. These issues are a direct result of the 2016 Strawberry Fire.

Six subalpine lakes also exist within the Park, one which supports an introduced population of Bonneville cutthroat trout (Table X). With the exception of Johnson Lake, all the alpine lakes' water levels fluctuate drastically throughout the year. They are the fullest during peak snowmelt and decrease in size throughout the rest of the year. Johnson Lake fluctuates less due to a historic dam near the outflow and the input of springs and seeps. The smallest of the alpine lakes, Dead Lake, went dry in 2015. Water quality measurements and water chemistry samples are taken once a year in mid to late September using a float tube and a handheld multiparameter water quality probe.

**How Fire Management Can Help**

The most likely event that could drastically change our hydrological resources is a large, high intensity fire. Such a fire would negatively affect water quality for a short period of time, but it could drastically affect the geomorphology of a stream for decades or longer. As seen in the Strawberry Fire, a large, high intensity fire can remove all large woody debris from the channel, decrease channel complexity, decrease areas of deposition, increase narrow channel incisions, and disconnect flood plains from the stream channel. Couple this with an increased frequency of flash flooding due to the lack of vegetation on steep canyon walls and you get a positive feedback loop of impairment. Using proper fire management to reduce the risk and/or frequency of large scale and intensely burning fires will help protect healthy stream geomorphology, water quality, and habitat for aquatic organisms.

Another issue that can negatively affect hydrological resources is conifer encroachment into riparian areas. If conifers become the dominant species and displace the riparian vegetation, it takes away the riparian's resilience and ability to revegetate when a fire (or some other disturbance) occurs. If the stream banks are not revegetated with native riparian species after a fire or disturbance, it will allow the establishment of invasive plant species. Most of these invasive species do little to stabilize streambanks or produce large woody debris, which in turn can lead to mass erosion, incision, and lack

of channel complexity. Proper fire management can create healthier hydrological resources by promoting healthy riparian areas. The mechanical removal of conifers, use of prescribed fires, and use of natural low intensity fire can be used to decrease conifer encroachment and reinvigorate riparian vegetation.

Most of the lakes would not be as affected by fire as the streams. This is because they are located higher in the watersheds, have less of a catchment above them, and are less densely vegetation with lower fuel loads to burn.

**Retardant Drops**

Retardant drops near streams could cause nutrient loading, increased production of algae and other aquatic plants, change the composition of benthic macroinvertebrates, and potentially kill fish and other aquatic organisms. Retardant drops near lakes would have similar effects as in streams, but with more drastic and longer lasting implications. This is because all six lakes have very limited freshwater inputs so any chemical that enters them would potentially remain there for a very long time.

**Table 2. Streams and Lakes in GRBA Area**

| Name | Length / Area (w/in Park) | BCT Present | SONDEs | Water Chemistry | BMI |
|---|---|---|---|---|---|
| Strawberry Creek | 5 miles (inc. Blue Canyon) | Yes | Yes | Yes | Yes |
| Mill Creek | 2 miles | Yes | No | Yes | Yes |
| Lehman Creek | 7.25 miles | Yes – WPCG | Yes | Yes | Yes |
| Baker Creek | 9 miles? | Yes – SFBC | Yes | Yes | Yes |
| Snake Creek | 12.5 miles | Yes | Yes | Yes | Yes |
| South Fork Big Wash | 3 miles | Yes | No | Yes | Yes |
| Shingle Creek | 1 mile? | No | No | Yes | Yes |
| Pine Creek | 0.75 miles? | Yes – Below Park | No | Yes | Yes |
| Ridge Creek | 0.25 miles | Yes – Below Park | No | Yes | Yes |
| Williams Creek | 1 mile? | No | No | No | No |
| Stella Lake | 2 – 4.75 acres | No | No | Yes | No |
| Teresa Lake | 0.75 - 2 acres | No | No | Yes | No |
| Brown Lake | 0.5 - 2 acres | No | No | Yes | No |
| Baker Lake | 2 – 5.5 acres | No | No | Yes | No |
| Johnson Lake | 2.3 - 2.5 acres | Yes | No | Yes | No |
| Dead Lake | 0 – 0.9 acres | No | No | Yes | No |

## 5.0 Air Quality

Congress, as amended in 1977, enacted the Clean Air Act, after determination that the nation's air quality was rapidly deteriorating, and that Federal leadership and financial assistance were needed to cope with the problem. The primary Federal responsibility is to provide technical and financial assistance to state and local governments who have the responsibility to develop and execute air pollution prevention and control programs. This includes the State of Nevada's Smoke Management Program administered by the Nevada Division of Environmental Protection.

The Clean Air Act created three classifications of varying degrees of restriction of allowable air quality deterioration. Under the terms of this classification, the former Lehman Caves National Monument was designated a Class II area. This classification did not change with the establishment of GRBA In 1986. Air quality conditions in the park meet regulatory

and NPS standards. Based on 2019 data from the NPS, ground-level ozone concentrations were labelled as fair for human health. Visibility was good with a measured visual range of 109 to 199 miles. Average concentrations of particulate matter (PM; 2017-2019) were satisfactory with concentrations well within the EPA's index for good air quality. Particulate matter concentrations and visibility are affected by wildfire smoke from local and regional fires sometimes hundreds of miles from the park.

Visibility and fine particulate monitoring and baseline data collection were initiated at Lehman Caves National Monument in 1982 and continue today. The NPS Air Quality Division selected GRBA as a long term "Trends" monitoring site in 1991. The Park is currently monitoring air quality with four nationwide programs. The Interagency Monitoring of Protected Visual Environments (IMPROVE) program monitors visibility through aerosol sampling and transmissometer readings. The Clean Air Status and Trends Network (CASTNet)provides atmospheric data on acid rain, tropospheric (ground-level) ozone and other forms of atmospheric pollution. The National Atmospheric Deposition Program (NADP) currently monitors pollutants in wet deposition (rain and snow). Finally, a PurpleAir sensor was installed in 2020 to monitor airborne particulate matter (PM). Monitoring equipment is housed in the Park's air quality building located near Park headquarters. Most data are available online through the NPS Air Quality website.

## 6.0 Vegetation and Fire Effects

Vegetation in Great Basin National Park is characteristic of the major vegetation types found in the Central Basin and Range ecoregion of the Great Basin: desert scrub, riparian, shrub steppe, pinyon-juniper woodland, subalpine forest and alpine. Vegetation types in GRBA include aspen, sagebrush steppe, mountain mahogany, pinyon-juniper, limber-bristlecone pine, spruce, alpine, mixed conifer, Ponderosa pine and wet meadow (Provencher et al. 2010). Each has its own dominant overstory and understory vegetation, soil profiles, fire adaptations, wildlife assemblages and fire histories.

Over a century of fire suppression, decades of drought and the introduction and spread invasive species have caused landscape level changes in vegetation across the Great Basin. The elimination of fire as a natural ecosystem process has caused major changes in the composition, condition, and resilience of plant communities (Provencher et al. 2013, Chambers et al. 2014). Vegetation has shifted away from a diversity of seral stages to a preponderance of late successional classes with more woody species and increased fuel loads. Vegetation types that have been impacted by a lack of fire include dense mountain mahogany stands; sagebrush steppe lost to pinyon-juniper expansion; aspen and Ponderosa pine stands impacted by conifer encroachment; and degraded riparian and grassland communities affected by expanding upland vegetation and dwindling snowpack. Invasive annual grasses such as cheatgrass have increased fire frequency, especially in shrublands, and impacted the ability of native vegetation to recover post-fire.

An increase in the density and distribution of pinyon pine, Utah juniper and white fir has led to the degradation and loss of sagebrush steppe, aspen, and riparian plant communities. Before European settlement, stand-replacing fires in sagebrush steppe and herbaceous vegetation types occurred at intervals averaging less than 80 years. Aspen stands typically burned at intervals of less than 200 years (Provencher et al. 2010). More frequent fires were a result of lightning-caused ignitions and regular burning by Native Americans (McAdoo et al. 2013). These fires maintained more diverse and more resilient plant communities and prevented the accumulation of heavy fuels. Varied patterns of vegetation and seasonal differences in burning conditions lessened fire severity and negative fire effects.

Conditions have changed dramatically since pre-European settlement. New challenges such as human-caused climate change, population centers and homes in fire prone areas, invasive species, worsening air quality, more extreme fire

behavior and heavier fuel loads force land managers to use different strategies, including fire, to protect human life and property and natural and cultural resources. Without fire or other treatments that reduce fuels and change vegetation structure and composition, negative impacts on vegetation, wildlife habitat and cultural resources will continue, fuel loads and fire risk will continue to increase, and fire behavior will worsen.

## 6.1 Vegetation Types and Fire Regimes

Vegetative types have been grouped by dominant overstory species to develop potential natural plant community (PNC) types. See map 3. These include: sage-grasslands; pinyon-juniper woodlands; pinyon woodlands; mountain mahogany; aspen; ponderosa pine; mixed conifer dominated by white-fir, Douglas-fir and limber pine; spruce-fir dominated by Engelmann spruce, and white fir; Subalpine pine dominated by limber pine and bristlecone pine; and, alpine. The rapid expansion of pinyon-juniper forests, the encroachment of white-fir into coniferous forests and the expansion of dense, closed- canopy plant community conditions resulting in the loss of under story plant species has greatly altered an accurate representation which would be found under a natural fire regime. Ecosystems at any temporal or spatial scale are in properly functioning condition when they are dynamic and resilient to perturbations to structure, composition, and processes of their biological or physical components. Properly functioning condition is not a single state in time or space but includes a range of conditions and situations that allow for a full variation of composition (number of species) and structure (size and age classes) within the processes of functioning ecosystems.

In order to restore fire to the landscape it is important to understand the history of fire within the various vegetation communities found in the Parks. It helps to answer critical questions including “where, how frequently, how intense, and when it should be applied as a tool.” Historical fire regimes are a depiction of fire regimes prior to Euro-American settlement. The fire-regime condition class is an expression of the departure of the current condition from the historical fire regime. Consequently, it is derived from the historical fire regime and the current fire severity. It is used as a proxy for the probability of severe fire effects (e.g., the loss of key ecosystem components - soil, vegetation structure, species; or alteration of key ecosystem processes - nutrient cycles, hydrologic regimes).
Consequently, the Fire Regime Condition Class is an index of ecosystem risks attributable to wildland fire.

Fire Regime Condition Class One - Fire regimes are within or near their historical range. Fire frequencies have departed from historical frequencies by no more than one return interval.

Fire Regime Condition Class Two - Fire regimes have been moderately altered from their historical range. Fire frequencies have departed from historical frequencies by more than one return interval.

Fire Regime Condition Class Three - Fire regimes have been significantly altered from their historical range. Fire frequencies have departed from historical frequencies by multiple return intervals.

To determine the Fire Regime Condition Classes, soils data compiled by the U. S. Department of Agriculture Natural Resource Conservation Service (Blake 1992) was synthesized into a relational database and then further incorporated into a Geographical Information System (GIS). Soils information provides the best available data about potential natural vegetation communities across the landscape. Soil scientist determined the potential natural vegetation community, also called Range Site Descriptions, through determination of the climax vegetation that best reflects the influences of natural disturbances. Natural disturbances include drought, fire, and grazing by native fauna and insects. These natural disturbances along with soils provide an approximation for the development and maintenance of a plant community.

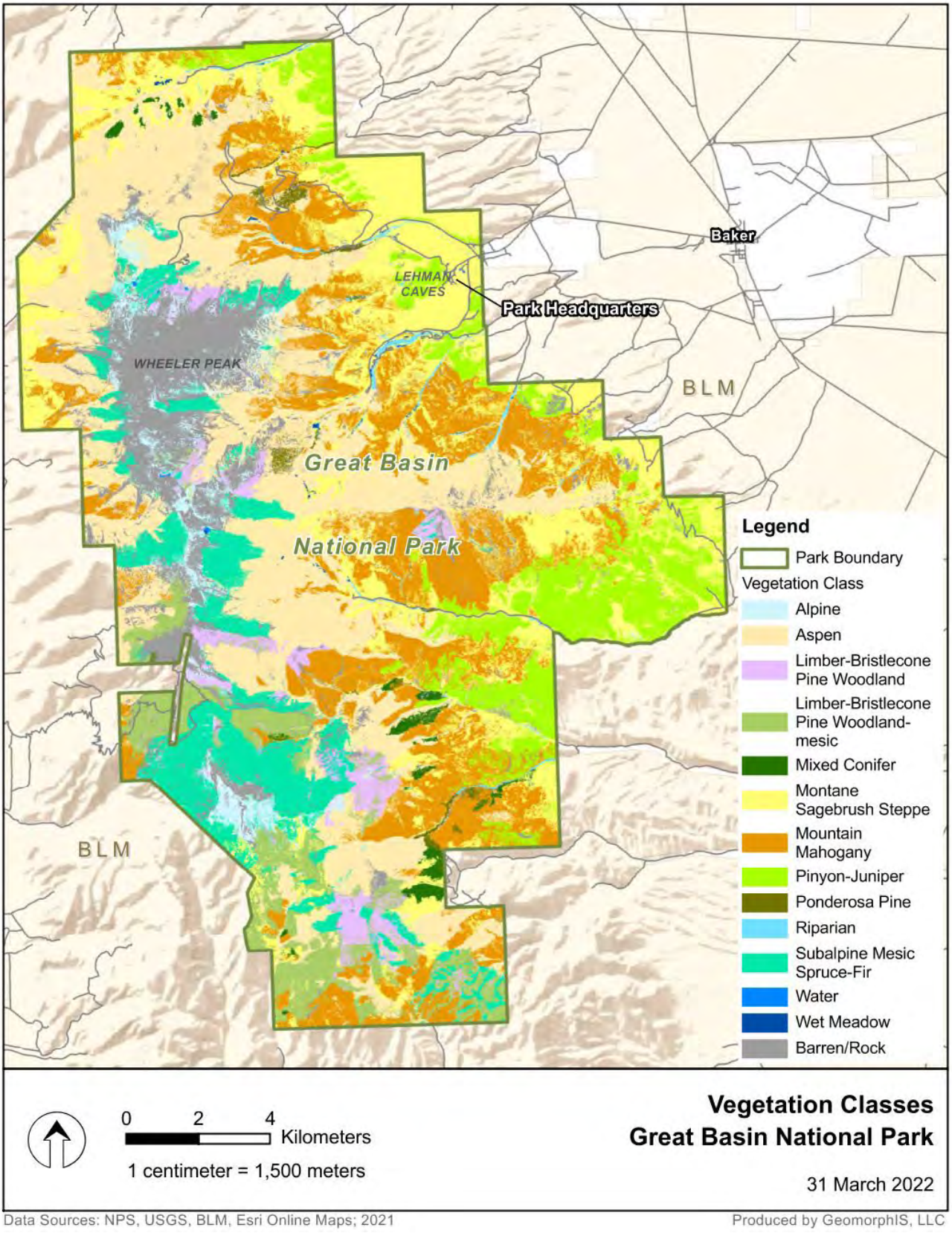


**Figure 3. GRBA Vegetation Classes**

**Table 3. Vegetation Classifications (4/3/2022 Version)**

| Vegetation Class | Acres | Estimated Fire Return Interval | |
|---|---|---|---|
| Alpine | 1,940 | | |
| Aspen | 19,631 | 20-200 years | |
| Barren/Rock | 7,105 | N/A | |
| Developed/Roads * | 119 | N/A | |
| Limber-Bristlecone Pine Woodland | 1,959 | | |
| Limber-Bristlecone Pine Woodland-mesic | 4,099 | | |
| Mixed Conifer | 565 | 50 years (mixed severity/surface fire)<br>125-400 years (stand replacing fire) | |
| Montane Sagebrush Steppe | 14,761 | 40-80 years<br>Up to 250 for black and low sagebrush | |
| Mountain Mahogany | 13,685 | 150-500 years | |
| NoData * | 139 | N/A | |
| Pinyon-Juniper | 6,492 | 200-500 years | |
| Ponderosa Pine | 384 | 20-40 years (surface/mixed severity fire)<br>100-400 years (stand replacing fire) | |
| Riparian | 412 | 50 years | |
| Spruce | 5,655 | 125-400 years | |
| Water | 13 | N/A | |
| Wet Meadow | 86 | 40 years | |
| **Total Acres** | **77,047** | | |
| * Not Reflected on the Map | | | |

Current citation: Provencher, L., G. Low, T. Anderson. 2010. Landscape Conservation Forecasting: Report to Great Basin National Park. The Nature Conservancy, Reno, NV. 242p.

**Table 4. Potential Natural Vegetation**

| Potential NaturalCommunities | Acres | Estimated FireReturn | Fire Regime ConditionClass |
|---|---|---|---|
| Alpine | | >500 years | |
| Aspen | | 50 – 75 years | |
| Aspen/Ponderosa Pine | | 10 – 25 years | |
| Barren | | N/A | |
| Mt. Sagebrush/Mtn. Mahogany | | 50 – 75 years | |
| Mixed Conifer/PonderosaPine | | 30 – 50 years | |
| Montane Grasslands | | 50 – 75 years | |
| Pinyon-Juniper Woodlands | | 30 – 50 years | |
| Subalpine Pine | | >500 years | |
| Spruce-Fir | | >100 years | |
| Sagebrush Steppe | | 10 –25 years | |

Soils attribute information is used to determine the potential natural vegetation community that is typically presented within soil series. A soil series is the basic unit used in the classification of soils. For each soil series a potential natural vegetation community or range site has been described. Unfortunately, soils information compiledfor natural resource management is not mapped by soil series, but rather by soils association. An association typically consists of several soil series. Therefore, when a soils map is displayed the polygon for the soils association can consist of two to many soil series and their respective potential natural vegetation communities.

This provides a unique situation in regards to mapping potential Fire Regime Condition Classes across the Park. To do this, the total area of each soils association was determined using GIS. Soil survey information provides an estimate of the percentage ofthe association comprised by each soil series. Hence, if greater than 65 percent of the association consisted of particular soil series with potential natural vegetation communities of mountain big sagebrush steppe and less than 15 percent of the associationwas pinyon, then the association was categorized as mountain big sagebrush steppe. If mountain big sagebrush steppe was less than 65 percent and/or pinyon was greater than 15 percent of the association it would be categorized as a sage and pinyon mix. This assessment yielded 39 potential natural vegetative communities. For this assessment, these have been grouped by dominant over story species. Table 2 provides the list of soils associations and the resulting potential natural vegetation community category created using the above described proportions.

With dominant potential natural vegetation communities categorized for each soils association the area and distribution of these communities in the Park is layer on to existing vegetation maps to determine the departure from the potential natural vegetation community. This departure combine with the fire history for the park and the fire historyfor each community type were used to determine Fire regime condition classes. The NPS in conjunction with USGS Biological Resource Division is currently conducting a fuels mapping project for the entire Park; however, this information will not be available until 2005. Table 5 depicts the acreage of Fire Regime Condition Class. Note that this is not equal to the park acreage because WUI and IP are located inside FRCC zones, and that the FRCC does notcount non-vegetated acres.

**Table 5. Fire Regime Condition Class for GRBA**

| Fire Regime Condition Class | Acres |
|---|---|
| 1 | 25,008 |
| 2 | 44,177 |
| 3 | 442 |
| Wildland Urban Interface | 4,444 |
| Infrastructure Protection | 1,047 |

**Vegetation Types**

a. **Sagebrush – Grasslands**: Within sagebrush – grass communities, low to moderate intensity fires recurring at approximately 10 to 25 years maintained species diversity anda mosaic of various age classes by eliminating woody species and regenerating older decadent vegetation. Based upon this return interval, sagebrush-grass communities have missed between 4 to 10 burn intervals in the last 100-years. This PNC community is in Fire-Regime Condition Class 3. Fire regimes and vegetative attributes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments. These treatments may be necessary before fire is used to restore the historical fire regime. Decreased fire return intervals have resulted in: shrub and tree encroachment; increased down and standing fuels; loss of a mosaic of seral stages withinthe plant community and a loss of herbaceous species diversity. This altered fire regime results in burns of higher intensity and size, which could disrupt natural recovery post burn. Singleleaf pinyon and Utah juniper, readily invade this site where it occurs adjacent to these woodlands. When pinyon-juniper canopies are allowed to close, they eliminate the understory vegetation. Over 10,000 acres of this community type at GRBA have been lost to pinyon-juniper encroachment.

Based upon the Natural Resource Conservation Service (NRCS) range site descriptionsfor GRBA, the community under a natural fire regime is characterized as:

This site occurs on summits, side slops, valley bottoms and hills on all aspects. Elevations are from 6,200 to 7,500 feet. Slopes range from 4 to 75 percent. The plantcommunity is shrub dominated by big sagebrush, antelope bitterbrush, little leaf mountain mahogany, winterfat and snakeweed. Indian ricegrass, needle-and-thread grass, bluebunch wheatgrass and basin wild rye are the dominant grasses. Singleleaf pinyon and Utah juniper, readily invade this site

where it occurs adjacent to these woodlands. Potential natural vegetative composition is about 50 percent grasses, 35 percent shrubs, 10 percent forbs and 5 percent trees in a pristine environment.

NRCS Range Site limitations and considerations include:

Adequately protect from uncontrolled burning.
High potential for cheatgrass infestation following prescribed fire.
Potential for sheet and rill erosion is moderate to severe depending on slope.
Pinyon-juniper encroachment can completely alter the site to woodlands.

1. **Mountain Mahogany Woodlands:** Mountain Mahogany communities experienced moderate to high intensity burns at infrequent intervals of 50 to 75 years. Based upon this return interval, mountain mahogany communities have missed between 1 to 2 burn intervals in the last 100-years. This PNC community is in Fire-Regime Condition Class 1. Fire regimes and vegetative attributes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historicalfrequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.Fire plays a significant role in regenerating decadent stands, creating a mosaic of seral states within stands, preparing the seedbed and maintaining a diversity of herbaceous species mixed within the community.

   Current mahogany stands at GRBA are in a mid to late seral condition and are dense. Historic photos show this increase on a landscape scale. Loss of open habitats within these stands could be a major limiting factor for recovery and restoration of Bighorn Sheep. Based upon the NRCS range site descriptions for GRBA, the community under anatural fire regime is characterized as:

This site occurs in concave positions on mountain slopes, outcroppings on mountain summits and side slopes on all exposures. Elevations are 7,000 to 9,500 feet. The plant community is dominated by curlleaf mountain mahogany. Singleleaf pinyon, white fir, aspen and limber pine may occur sporadically in the tree canopy. Mountain bigsage and mountain snowberry are the principle Understory shrubs. Columbia needlegrass, bluebunch wheatgrass, letterman needlegrass and muttongrass are the most prevalent Understory grasses. Potential vegetative composition is about 15 to 25 percent grasses, 5 percent forbs, 10 to 20 percent shrubs and 50 to 70% percent trees. Fire is recognized as anatural disturbance that strongly influences the structure and composition of the climax vegetation of this woodland.

NRCS Range Site limitations and considerations include:

As ecological conditions deteriorate, understory grasses and forbs are reduced.High potential for cheatgrass infestation following prescribed fire.

Potential for sheet and rill erosion is moderate to severe depending on slope.

Heavy utilization by livestock or wildlife results in a hedge line, out of reach of browsing animals and decreases site productivity.

**b. Pinyon-Juniper Woodlands:** Fire within pinyon-juniper plant communities played an important role in limiting tree density, moderating pinyon-juniper encroachment into adjacent plant communities, creating a mosaic of burned and unburned woodlands on a landscape scale and promoting a diverse herbaceous understory component. Fires typically burned at 20-year intervals on north aspects and canyon bottoms at low to moderate intensity carried through the woodland under story by shrubs and grasses. On dryer south and west aspects a lack of herbaceous vegetation and less tree density increased the fire return rate to 50 or more years. Based upon this return interval, pinyon-juniper communities have missed between 2 to 5 burn intervals in the last 100-years. This PNC is in Fire-Regime Condition Class 3. Fire regimes and vegetative attributes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments. These treatments may be necessary before fire is used to restore the historical fire regime. Current Pinyon-Juniper woodlands within GRBA are dense, over mature, and in some areas lack any herbaceous vegetation. The skeletal remains of sagebrush, rabbit brush and bitterbrush is present throughout. Laminated root rot is now naturally thinning the stands leaving an abundance of down fuels. Wind driven fires of high intensity over a large area can be expected.

The majority of Pinyon- Juniper woodlands within GRBA fit the NRCS over-mature woodland successional state description of: extremely dense singleleaf pinyons and Utahjunipers that have reached maximum height for the site dominate this stage. Upper crowns are typically irregularly flat-topped or rounded. Understory vegetation is lackingdue to tree competition, overstory shading, duff accumulation, etc. Tree canopy is commonly greater than 30 percent. Laminated root rot is now naturally thinning the stands leaving an abundance of large down fuels. Wind driven fires of high intensity over a large area can be expected.

Based upon the NRCS range site descriptions for GRBA, the community under a naturalfire regime is characterized as:

This site is dominated by singleleaf pinyon and Utah juniper. Black and Big sagebrush, antelope bitterbrush and rabbitbrush are the principle Understory shrubs. This woodland community occurs on side slopes, canyons and summits at elevations between 5,700 to 8,200 feet. Overstory tree canopy composition is about 50 to 70 percent singleleaf pinyonand 30 to 40 percent Utah juniper. Understory vegetation composition is about 35 percent grasses, 5 percent forbs and 60 percent shrubs in a pristine state. Bluebunch wheatgrass, Indian ricegrass, muttongrass and Great Basin wild rye are the most prevalent understory grasses. Understory vegetation is strongly influences by tree competition, overstory shading, duff accumulation, etc. Fire is recognized as a natural disturbance that strongly influences the structure and composition of the climax vegetation of this woodland. Understory vegetation composition is about 35 percent grasses, 5 percent forbs and 60 percent shrubs in a pristine state.

NRCS Range Site limitations and considerations include:

Adequately protect from uncontrolled burning.
High potential for cheatgrass infestation following prescribed fire. Proper tree spacing is the key to a healthy pinyon-juniper woodland.
Potential for sheet and rill erosion is moderate to severe depending on slope. To restore understory vegetation within stands, harvest selectively and in smallgroups to achieve proper spacing that improves overall health of the stand.
Broadcasting slash improves reestablishment of native understory species and establishment of seeded grasses and forbs.

**c. Ponderosa Pine Communities:** The loss of ponderosa pine communities is of most concern at GRBA. Within Nevada, these communities are limited to the extreme eastern side of the state and occur mainly in the Snake Range, which encompasses the Park. ThePark contains both upland ponderosa communities and riparian ponderosa communities. Current conditions within this community show little to no regeneration of ponderosa pine with a thick dense under story of White-fir. Lack of disturbance and shading from this dense White-fir understory has eliminated, shrubs, herbaceous vegetation and ponderosa pine regeneration. Fuel loading is heavy. Historically, fires burned with low intensity in a creeping mosaic pattern consuming grass shrubs and small trees and did notaffect the larger ponderosa pines. Return intervals are estimated at 10 to 25 years. Fire played an important role in maintaining community structure within what were once openstands. Based upon this return interval, ponderosa pine communities have missed between 4 to 10 burn intervals in the last 100-years. This PNC is in Fire-Regime Condition Class 3. Fire regimes and vegetative attributes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments. These treatments may be necessary before fire is used to restore the historical fire regime. Current conditions will result in high intensity stand replacing fire events.

Based upon the NRCS range site descriptions for GRBA, the community under a naturalfire regime is characterized as:

This woodland site occurs on northerly aspects on flats and side slopes of 15 to 50 percent slope. Elevations are 8,000 to 9,500 feet. The plant community is dominated byPonderosa pine and Douglas-fir with lesser amounts of white fir, aspen and limber pine occurring sporadically in the tree canopy. Common juniper, green leaf manzanita, creeping barberry, currents, and Utah serviceberry and mountain snowberry are the principle Understory shrubs. Columbia needlegrass, bluebunch wheatgrass, slender wheatgrass, spike trisetum and muttongrass are the most prevalent Understory grasses.

An overstory canopy of 40 to 50 percent is assumed to be representative under a naturalfire regime. Potential vegetative composition is about 15 percent grasses, 15 percent forbs, 10 to 70 percent shrubs and young trees. Overstory tree canopy composition is about 60 percent ponderosa pine, 20 percent Douglas-fir, 10 percent white-fir and a 10 percent mix of limber pine, aspen and Engelman spruce. Fire is recognized as a naturaldisturbance that strongly influences the structure and composition of the climax vegetation of this woodland.

NRCS Range Site limitations and considerations include: Adequately
protect from uncontrolled high intensity burning.Proper tree
spacing is the key to a healthy woodland.
Potential for sheet and rill erosion is moderate to severe depending on slope.
To restore understory vegetation within stands, harvest selectively and in small groups to achieve proper spacing that improves overall health of the stand.
Broadcasting slash improves reestablishment of native understory species and establishment of seeded grasses and forbs.

d. **Aspen:** Aspen stands are considered one of the most biologically diverse ecosystemsin the Intermountain West. As aspen dominated landscapes convert to other cover types, tremendous biodiversity is lost. These losses include not only vascular plants and vertebrate animals but also nonvascular plants and invertebrate organisms. Measures taken to sustain aspen ecosystems across the landscape will greatly promote sustaining biodiversity. GRBA contains large stands of aspen interspersed within almost all plant communities across the elevation gradient. Aspen trees sprout from roots following fire.Thus, fire plays an important role in regenerating decadent aspen stands and maintainingbiodiversity across the landscape. A large percentage of the aspen stand within the Park could be classified as decadent consisting of very large even aged trees and a under storydominated by White-fir. Fire return intervals have been estimated at every 50 to 75 years. This PNC is in Fire-Regime Condition Class 2. Fire regimes and vegetative attributes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Where appropriate, these areas mayneed moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime. Shading, lack of disturbance andWhite-fir encroachment has resulted in little regeneration of aspens within most stands.

Based upon the NRCS range site descriptions for GRBA, the community under a naturalfire regime is characterized as:

This woodland site occurs on cool, moist mountain slopes of all aspects. Slopes range from 8 to 50 percent. Elevations range from 8,000 to over 10,000 feet. This woodland community is composed of one to several quaking aspen clones, each with a common genetic makeup and individual phonological and physiological characteristics. Wildfire is recognized as a natural disturbance that strongly influenced the structure and composition of climax vegetation. Periodic wildfires prevent over-mature aspen stands and maintain a naturally stratified mosaic of even-aged aspen communities in various stages of successional development. In the absence of fire, aspen stands become uneven-aged. Aspen and Engelman spruce dominate this site. An overstory canopy of 40 percent is assumed to be the representative of tree dominance under a natural fire regime.Sufficient light is able to penetrate the tree canopy to support abundant undergrowth.

Understory vegetation composition is about 40 percent grasses, 35 percent forbs and 25 percent shrubs and trees. Species present include nodding brome, mountain brome, slender wheatgrass, skyline bluegrass, mutton grass, clover, sweetanise, meadow rue, creeping barberry and mountain snowberry. Understory vegetative composition is about25 shrubs, 40 grasses and 35 forbs when the overstory averages 40% tree dominance in apristine environment; however, no specific compositions were given.

NRCS Range Site limitations and considerations include: Adequately
protect from uncontrolled high intensity burning.Proper tree
spacing is the key to a healthy woodland.
Potential for sheet and rill erosion is moderate to severe depending on slope.

e. **Mixed Conifer:** Within the mixed conifer, fire plays an important role in regulating tree density, maintaining structural diversity within stands and moderating encroachment of white-fir into adjacent plant communities. Current conditions within this community show a thick dense under story of White-fir. Fir engraver beetles have impacted many stands. This has led to an abundance of heavy down fuels. Competition and shading from this dense White-fir understory has eliminated, shrubs, herbaceous vegetation and pine regeneration. Historically, fires burned with moderate intensity in a mosaic pattern consuming grass shrubs, smaller trees and in particular white fir. A deep accumulation ofresinous litter combined with a thin bark and shallow root system made the older white firs particularly susceptible to impacts from fire. Fire played an important role in maintaining community structure within what were once open stands. Return intervals are estimated at 50 to 75 years. Based upon this return interval 1 to 2 intervals have beenmissed in the last 100-years. This PNC is in Fire-Regime Condition Class 2. Fire regimes and vegetative attributes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Where appropriate, these areas may need moderate levels of restoration treatments, such as fireuse and hand or mechanical treatments, to be restored to the historical fire regime.
Current conditions will result in high intensity stand replacing fire events.

Based upon the NRCS range site descriptions for GRBA, the community under a naturalfire regime is characterized as:

This woodland site occurs on northerly aspects on flats and side slopes of 15 to 75 percent slope. Elevations are 8,000 to 9,500 feet. A mix of white-fir, limber pine, Engelman spruce, ponderosa pine, aspen and Douglas-fir dominates the plant community.Common juniper, creeping barberry, currents, and Utah serviceberry and mountain snowberry are the principal Understory shrubs. Columbia needlegrass, bluebunch wheatgrass, slender wheatgrass, spike trisetum and muttongrass are the most prevalent Understory grasses. An overstory canopy of 40 to 50 percent is assumed to be representative under a natural fire regime. Potential vegetative composition is about 15 percent grasses, 15 percent forbs, 70 percent shrubs and young trees. Overstory tree canopy composition is about 50 to 80 percent white-fir, 20 to 50 percent Douglas-fir, 2 to10 percent Aspen and a 10 percent mix of limber pine, bristlecone pine, ponderosa pine, aspen and Engelman spruce.

**f. Spruce-Fir:** The spruce-fir sagebrush type extends from approximately 9,000 to over11,000 feet in elevation. Thin bark, persistence of dead lower limbs and high flammability of trees within this community makes it highly susceptible to severe damage. This is the only community type within GRBA that has evolved with high intensity stand replacing fire events. This community type often recovers quickly using aspen and white-fir cover trees. This PNC is in Fire-Regime Condition Class 1. Fire regimes and vegetative attributes have not been significantly altered on a large scale but stand throughout the park are reaching the point that within the next 10 to 20 years will have missed at least one return interval. Fire frequencies have not departed (either increased or decreased) from historical frequencies by more than one return interval.

This woodland site occurs on northerly aspects on side slopes of all aspects. Slope rangefrom 30 to 75 percent slope. A mix of Engelman spruce, white-fir, limber pine, aspen and Douglas-fir, dominates the plant community. Common juniper, currents, and mountain snowberry are the principal understory shrubs. Letterman needlegrass, slenderwheatgrass, spike trisetum and alpine fescue are the most prevalent Understory grasses. An overstory canopy of 25 to 35 percent is assumed to be representative under a natural fire regime. Potential vegetative composition is about 35 percent grasses, 15 percent forbs, 50 percent shrubs and young trees. Overstory tree canopy composition is about 80to 90 percent Engelmann spruce, 5 to 10 percent white fir, and 2 to 10 percent quaking aspen.

NRCS Range Site limitations and considerations include: Adequately
protect from uncontrolled high intensity burning.
Potential for sheet and rill erosion is moderate to severe depending on slope.

To restore understory vegetation within stands, harvest selectively and in smallgroups to achieve proper spacing that improves overall health of the stand.

**g. Subalpine Pine:** The Subalpine pine type extends from approximately 9,000 to over 10,500 feet in elevation. In the absence of wildfire these trees, especially bristlecone pine can become quite old. Estimated Fire return intervals are greater than 500 years. This PNC is in Fire-Regime Condition Class 1. Fire regimes and vegetative attributes have not been significantly altered on a large scale but stand throughout the Park are reaching the point that within the next 10 to 20 years will have missed at least one return interval. Fire frequencies have not departed (either increased or decreased) from historical frequencies by more than one return interval.

This woodland site occurs on northerly aspects on high mountain peaks and side slopes associated with cliffs and talus. Slope range from 15 to 50 percent slope. Bristlecone pine and limber pine dominant the plant community. White-fir, Douglas fir and quaking aspen can be found in low densities along the lower elevation limits. Common juniper and currents are the principal understory shrubs. Skyline bluegrass, wheeler bluegrass, mutton grass, letterman needlegrass and spike fescue are the most prevalent understory grasses. An overstory canopy of 10 to 20 percent is assumed to be representative under anatural fire regime. Potential vegetative composition is about 10 percent grasses, 10 percent forbs, 80 percent shrubs and young trees. Overstory tree canopy composition is about 80 to 90 percent bristlecone pine, 5 to 20 percent limber pine and 5 percent or less of white fir, Douglas-fir Engelmann spruce and quaking aspen.

NRCS Range Site limitations and considerations include: Adequately protect from uncontrolled high intensity burning.
Potential for sheet and rill erosion is moderate to severe depending on slope.Protect soils from accelerated erosion.

h. **Mountain Sagebrush** Within GRBA, the mountain big sagebrush type extends from approximately 7,400 to over 10,000 feet in elevation. In general, plant species richness, herbaceous productivity and sagebrush canopy cover increase with elevation. This type has undergone the greatest change due to fire suppression and domestic livestock grazing. Pinyon invasion has reduced the extant of mountain big sagebrush communities and contributed to the degree of separation between individual communities. Loss and fragmentation of this type has greatly reduced ungulate winter range quality in and adjacent to the Park. In the absence of fire, there is little reason to expect the mountain big sagebrush type to survive until the end of this century (Eddleman 2004). Fire return intervals have been estimated at every 50 to 75 years. This PNC is in Fire-Regime Condition Class 2. Fire regimes and vegetative

attributes have been moderately altered from their historical range. The risk of losing key ecosystem components has increased to moderate. Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to thehistorical fire regime.

Based upon the Natural Resource Conservation Service (NRCS) range site descriptionsfor GRBA, the community under a natural fire regime is characterized as:

This site occurs on summits, side slopes, valley bottoms and hills on all aspects. Elevations are from 7500 to 10,000 feet. Slopes range from 4 to 75 percent. The plant community is shrub dominated by mountain big sagebrush, antelope bitterbrush, hairy mountain mahogany, serviceberry and snowberry. Indian ricegrass, pine needlegrass, blue grama, bluebunch wheatgrass and mountain brome are the dominant grasses. Limberpine, Singleleaf pinyon and Utah juniper; readily invade this site where it occurs adjacentto these woodlands. Potential natural vegetative composition is about 70 percent grasses,20 percent shrubs, 5 percent forbs and 5 percent trees in a pristine environment.

NRCS Range Site limitations and considerations include:Adequately protect from uncontrolled burning.
High potential for cheatgrass infestation following prescribed fire.
Potential for sheet and rill erosion is moderate to severe depending on slope.Pinyon-juniper encroachment can completely alter the site to a woodland.

## 7.0 Cultural Resources

Archeological surveys within the 77,180 acres comprising GRBA in the past has concentrated mainly within the developed areas of the original Lehman Caves National Monument (640 acres) with known site documentation occurring in other parts of the Park. As of yet, there has been no complete baseline archeological survey conducted within the Park to determine where other prehistoric and historic sites may occur or the types of sites found within the Park's boundary. It is estimated that only about 1000 acres (1.3 percent) of the Park has been adequately surveyed for archeological sites.

At least 67 prehistoric archeological sites and 36 historic-period archeological sites have been identified within GRBA (Blalack in draft; Teague 1990; Wells 1990 and 1993). Sites range from buried habitation sites; surface artifact scatters, rock art sites, prehistoric and historic cultural landscapes, ethnographic resources, historic structures such as mining, sheep herding/cattle grazing sites such as dendroglyph sites. The dates of these sites range form the Paleo-Indian period of about 12,000 – 9000 B.C. to the Euro- American historic period beginning in the 1850s and continuing to the present. The NPS and GRBA will give consideration to these site types in their development plans under Section 106 of the NHPA of 1966, as amended.

An Archeological Survey and Site Assessment at GRBA has been completed (Wells 1990, 1993). The survey and site assessment looked at potently developed areas as well as areas proposed for development. Rock art sites and certain cave sites were also reviewed. A total of 45 sites were recorded, including 29 prehistoric sites and 16 historic sites. The historic sites are made up of mining, homesteads, recreational, administration, and ranching. The prehistoric sites are either artifact scatters comprised of lithic scatters (obsidian, chert, and/or quartzite), ground stone, and/or ceramics, rock art sites (both pictographs and petroglyphs), or cave deposits. All these sites were determined to meet Criterion D of the National Register Criterion for Evaluation. Specifically, these are resources "that have yielded, or may be likely to yield, information important in prehistory or history" (36 CFR 60.4).

Prehistoric – The earliest well-dated sites in the Great Basin fall within the Paleo-Indian period (12,000 B.C. – 9,000 B.C.). These early inhabitants are generally thought of as highly mobile groups of big game hunters. While most of the nearby reported Paleo-Indian sites are located in the northern Snake Range, a 1989 find of a Paleo-Indian point on the Baker Ranger Station grounds suggests use of the southern Snake Range as well.

The Great Basin Desert Archaic period (9,000 B.C. – A.D. 500) is characterized by the introduction of ground stone artifacts (manos and milling stones). The hunting subsistence base has been supplemented during this period by a broader food-gathering pattern. Archaic sites have been found in and around the Park, typically in caves or rock shelters, or in open-air settings near springs.

Sedentary agriculturalists typified the Fremont period (A.D. 500 – A.D.1300). The Fremont lived in villages or farmsteads and were primarily small-scale farmers, rather than hunters and gatherers, although hunting and gathering greatly supplemented their diet. In the Park vicinity,

The Garrison Fremont site was excavated and documented in the 1950's. Excavation of the Baker Archeological Site began in the summer of 1991, and continued through 1994. It is located approximately two miles northeast of the present-day Baker. The site appears to be a rather large village with dense archeological features. Three contemporary pit houses have been excavated, with two earlier pit houses evident at a lower level. There is some evidence that occupants of the site used a horizon calendar to track the seasons. Within the Park itself, Fremont-style rock art and cultural materials have been frequently noted.

The Western Shoshone period (A.D.1300 – Present) found peoples living in small villages adjacent to springs and permanent streams near the present-day towns of Baker, Nevada and Garrison, Utah. These peoples lived in the area at the time of the first Euro-American contact in the mid-1800s and are considered to have been hunter-gathers.

Historic – The first written record of Euro American exploration into what is now GRBA occurred in June, 1855, when the Mormon, White Mountain Mission expedition entered the area. Expedition members made an ascent of Wheeler Peak.

Mining operations began in White Pine County in 1859 and by 1869, there were six mining districts organized in the Snake Range. A number of the Park's most significant historic resources relate to these mining activities. The Osceola Ditch, an 18 mile long aqueduct which was built to transport water from Lehman Creek (and other intervening watercourses) to the hydraulic mining operation at Osceola, on the west side of the southern Snake Range, has been recommended for inclusion on the National Register of Historic Places. Remains of wooden flumes, a 600-foot long tunnel and a construction camp associated with the ditch are all located within the Park.

Perhaps the most complete mining complex located within the Park is the Johnson Lake Mine, with associated cabins, mill and 300-yard long cableway. This tungsten mine was operated by Alfred Johnson from 1910 to 1930 and presently consists of an open slope and a collapsed adit above 11,000 feet elevation, upslope from Johnson Lake. The buildings associated with this operation are in various states of disrepair and collapse.

The remains of a number of other less extensive, mining operations are also found scattered throughout the Park.

Evidence of early ranching and farming activity within the Park is found primarily near Lehman Caves, where Absalom Lehman founded his "Cave Ranch" shortly after his discovery of the caves in 1885. The orchard and grazing operation that he established required water, so Lehman constructed a series of ditches to collect and transport water from Cave Spring, Lehman Creek and South Spring. The remaining orchard and aqueduct are included on the National Register of Historic Places.

Another historic resource located within the Park is the Wheeler Peak Triangulation Station, which was part of a system of mapping stations along the 39th parallel. The U.S. Coast and Geodetic Survey conducted these measurements during the late 1870s and early 1880s. The foundation of a large rectangular structure can still be seen at the summit of Wheeler Peak.

Evidence of an historic logging/sawmill operation can be found along the upper portion of the South Fork of Big Wash, within the Park. The remains of a log cabin and part of a fire-tube or firebox boiler are located in a meadow near the 8,000-foot elevation.

Finally, historically significant resources represent the early history of the Lehman Caves operation, both before and after its establishment as a National Monument in 1922. The Rhodes Cabin, near the present visitor center, is listed on the National Register of Historic Places. It was built in the 1920s to provide accommodations for visitors to Lehman Caves, and is named for Clarence and Beatrice Rhodes, who were Forest Service custodians at Lehman Caves during the 1920s. The cabin presently contains interpretive exhibits relating to the area's history.

An Historic Resource Study was completed in 1990, and provides a comprehensive review of all historic sites in the area. Recommendations concerning the extent to which sites are preserved, and determinations concerning eligibility for the National Register of Historic Places have been made for all sites identified.

Sixteen historic period sites were recorded during the 1989 archeological survey at GRBA. Of these, five sites were determined to possess archeological significance that is defined under Criterion D of 36 CFR 60.4. The Osceola Ditch, which has been nominated to the National Register, possesses both historic significance, as well as archeological significance. The remaining four historic sites, the Tilford Spring Cabin, the Pole Canyon Dugout, the South Fork of Big Wash Sawmill, and the Johnson Lake Mine, Cabins and Mill, are all considered significant archaeologically, although not significant from an historical perspective. Four of the five sites are related either directly or indirectly to mining activities. The Pole Canyon Dugout may relate to Lehman Caves tourism, but the actual function of the site is unknown.

A List of Classified Structures (LCS) Survey was conducted within the Park during the 1993 summer season. As a result of this survey, it is anticipated that 18 additional entries will be recommended for inclusion on the LCS.

To summarize, there are currently two properties within the Park that are listed on the National Register of Historic Places: The Lehman Aqueduct and the Lehman Orchard (as a single listing), and the Rhodes Cabin. The Baker Ranger Station has been nominated for inclusion on the National Register. A nomination has been prepared for the Osceola (East) Ditch, along with the Stella Lake Rock Dam, as a single listing, and a nomination is being prepared for the Johnson Lake Mine and Mill. See Appendix 4 for the LCS's within GRBA.

## 7.1 Fire Effects Upon Cultural Resources

Cultural resources (prehistoric and historic) may be impacted to varying degrees by fire and fire management actions. Since these resources are located in a highly flammable environment, unwanted fire effects may not be completely preventable under all circumstances. However, impacts may be managed with appropriate pre-planning, avoidance, and mitigation. Mitigation effects are designed to

prevent the impairment of the Parks' known cultural resources, and minimize the chance of adverse impacts to unknown sites.

Prehistoric Sites
The effects of fire on prehistoric sites are variable; with particular concerns associated with rock art sites and those sites with dense, surface-visible scatters of obsidian and chert. In general, such sites with shallowly buried deposits or features tend not to be impacted adversely by low intensity fires, while high intensity fire events associated with heavy fuel loads may cause serious impacts such as spalling of rock surfaces, crazing of obsidian and chert artifacts, fracturing ceramics or potsherds, and the disruption of hydration bands on obsidian surfaces.

Of significant concern is the ground disturbance associated with the placement of staging areas and the construction of firelines necessary to fight or manage fires. These actions have the potential to impact prehistoric resources directly through ground disturbance.

Historic Sites
The effects of fire on historic era sites are variable. There is particular concern associated with wooden building and structures, logging debris (i.e. stumps, logging decks), and mining features (i.e. framed portals, head-frames). Many other sites are effectively sub- surface (buried trash dumps) in their current appearance and thus relatively protected from adverse impact from fires, especially low intensity burns. Of greatest concern is the placement of staging areas and firelines needed to fight or manage fires. Associated ground disturbance has the potential for direct and adverse impacts on historic sites.

## 7.2 Impact Sources

There are three fire-related factors that can affect the level of impact to cultural resources: disturbance of the ground; ability to pre-plan and avoid impacts; and the risk posed by high intensity fire events.

Surface disturbance occurs as a result of the need to construct firelines, fire camps, staging areas, and related facilities. Fire management actions that minimize the need for surface disturbance will have less potential to affect cultural resources.

Pre-planning minimizes potential impacts from fire management actions by allowing consultation and oversight by cultural resource specialists. Tools that rely more heavily on pre-planned fire management actions (prescribed fire) allow advance identification and avoidance of significant cultural resources. Alternatives that entail more unplanned or emergency fire events, with little opportunity for advanced planning and clearance for cultural resources, have more potential to impact cultural resources.

High intensity fires have potential to drive heat pulses deep into the ground and to spall- off rock surfaces that may contain rock art. These mechanisms can also negatively affect subsurface and lithic cultural resources. There are opportunities for high intensity fire events in many areas of the Park. Actions that proactively reduce heavy fuel loads through low intensity fire or though mechanical removal of fuel reduce the risk of damage to cultural resources from high intensity fire.

## 7.3 Mitigation Process for Fire and Cultural Resources

All prescribed burn plans will be treated as an undertaking as defined in Section 106 of the National Historic Preservation Act, 1966, as amended. This will include the Park archeologist reviewing all prescribed burn and mechanical fuel project plans for the presence of known surface resources and shallow subsurface resources in the project area. Combining information on the location and sensitivity of known sites with information on the expected fire operations impacts, fuel loads, and anticipated fire intensity, the archeologist will specify requirements necessary for the protection of significant resources within the project area. These requirements will be documented in each individual burn or mechanical fuel treatment plan.

Fireline construction or any other ground disturbing activity planned for prescribed and mechanical fuel projects will be flagged in advance of any work on the ground, and must receive clearance and approval from the Park archeologist prior to the work.

For wildland fires, the archeologist will be consulted as soon as possible to identify known sensitive cultural resources that have the potential to be affected by the fire or by fire management actions. To the extent possible, and considering short timeframes, unpredictable fire behavior, and firefighter and public safety mitigation measures specified by the Parks' cultural resource specialist will be implemented as part of the suppression response.

Resource base maps showing cultural resource site locations will be ~~given~~ (provided to?) ~~to~~ archeologist(s) and incident commanders ~~on the firelines~~ during wildfire operations ~~project or wildland fires~~ or when fires are near known cultural resources.

When a fire threatens cultural resources, the Parks' cultural resource specialist will be present to help mitigate fire suppression or rehabilitation impacts on those resources.

If during any fire, cultural resources are discovered during initial attack, these sites will be protected from damage if at all possible and the cultural resource specialist will be notified immediately. After a fire, the cultural resource specialist of the Park may deem it necessary to complete a site survey to determine if there were any sites present and/or if any site damage occurred.

A photographic record will be kept of all fire suppression in cultural resource areas and of all archeological activities.

Required mitigation in all cases may include but not limited to: relocation of firelines away from sensitive cultural resources, line construction to exclude sites, removal of fuels from sensitive sites to reduce fire intensity, installation of hose lays, sprinklers or other water handling devices for direct protection of features, and/or wrapping sites or features with fire protective shelter material. As new cultural resource requirements and standards for protection are developed, they will be adopted and included as an appendix in this document.

Assessing the condition of known resources before project ( RM note: does project mean prescribed fire and fuels management?) implementation and after the project is complete will provide better information on effects on cultural resources, and feedback on the effectiveness of mitigation practices. These pre/post project inspections are considered part of the project and may be funded from project dollars. Detailed cultural resource monitoring information can be found in Appendix 5.

The Western Archeological and Conservation Center completed an Archeological Survey and Site Assessment at GRBA (Wells 1990, 1993). The survey and site assessment looked at developed areas as well as areas proposed for development. Rock art sites and certain cave sites were also reviewed. A total of 45 sites were recorded, including 29 prehistoric sites and 16 historic sites. The historic sites are made up of mining, homesteads, recreational, administration, and ranching. The prehistoric sites are either artifact scatters comprised of lithic scatters (obsidian, chert, and/or quartzite), ground stone, and/or ceramics, rock art sites (both pictographs and petroglyphs), or cave deposits. All these sites were determined to meet Criterion D of the National Register Criterion for Evaluation. Specifically, these are resources “that have yielded, or may be likely to yield, information important in prehistory or history” (36 CFR 60.4).

A Historical Resource Study was completed in 1990 (Unrau 1990), and provides a comprehensive review of all known historic sites within the Park. Recommendations concerning the extent to which sites are preserved, and determinations concerning eligibility for the National Register of Historic Places (NRHP) have been made for all the sites identified in the 1990 Historical Resource Study report.

During the 1989 archeological survey (Wells 1990), sixteen historic period sites were recorded. Of these, seven sites were determined to possess archeological significance, which is defined under Criterion D of 36 CFR 60.4, with thirteen of the sixteen sites also being listed on the List of Classified Structures (LCS). The other three structures were/are too deteriorated to be listed on the LCS. See appendix 4.

Artifacts (prehistoric and historic) collected during fieldwork are stored either in the Park museum or at the Western Archeological and Conservation Center in Tucson, Arizona.

Acronyms

| Acronym/ Abbreviation | Definition |
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| | |
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| FMP | Fire Management Plan |
| FCRPA | Federal Cave Resource Protection Act of 1988 |
| FRCC | Fire Regime Condition Class |
| GIS | Geographic Information System |
| GRBA | Great Basin National Park |
| NHPA | National Historic Preservation Act |
| NPS | National Park Service |
| NRCS | Natural Resource Conservation Service |
| PNC | Potential Natural Plant Community |
| NPS | National Park Service |
| PEPC | NPS's Planning, Environment and Public Comment |
| USGS | US Geologic Survey |

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# GRBA 2023 FIRE MANAGEMENT PLAN

# Appendix I. WFDSS Strategic Objective and Management Requirements

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**WFDSS Strategic Objectives and Management Requirements Updated April 2023**

| Type | Strategic Objective/Management Requirement | GIS Shape |
|---|---|---|
| **Strategic Objective** | **SUP** - Full Suppression Objective: A full suppression strategy will be implemented within this Zone.<br>• Ensure firefighter and public safety is the highest priority in every fire management action.<br>• Protect the public, infrastructure, and the natural and cultural resources of the parks utilizing strategies and tactics commensurate with the values at risk.<br>• Cooperate with adjacent landowners and land management agencies in the full range of fire management activities, respecting the jurisdiction, interests and legal mandates of each participant. | SO shape. Currently in WFDSS |
| **Strategic Objective** | **WRO** - Wildand Fire Resource Objective: Fires within this area should be managed for resource benefit objectives in addition to suppression objectives where deemed appropriate and identified risk is both manageable and acceptable.<br>• Restore fire as an ecosystem process in the Park's biotic communities to the fullest extent practical.<br>• Resource benefit objectives should align with historic fire regime attributes by vegetation type (e.g., return interval, seasonality, and severity).<br>• Ensure firefighter and public safety is the highest priority in every fire management action.<br>• Protect the public, infrastructure, private property, and the natural and cultural resources of the Park utilizing strategies and tactics commensurate with the values at risk.<br>• Where feasible, utilize natural topographic features and fuelbreaks to confine fires within the WRO zone.<br>• Cooperate with adjacent landowners and land management agencies respecting jurisdictional priorities and fire management strategies. | SO shape. Currently in WFDSS |
| **Mgmt Req** | Resource Benefit Requirements in Aspen Forests: Aspen systems are the largest vegetation type in Great Basin National Park (21,000acres), with 11,00 acres identified as impaired due to lack of fire and conifer encroachment.<br>• Fire is necessary to initiate aspen regeneration and reduce competition from encroaching conifers | Aspen Shape |

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| | • Mixed and high-severity fire in conifer-encroached aspen stands will help restore aspen dominance<br>• Restore fire as an ecosystem process in aspen to the fullest extent practical<br>• Where feasible, utilize natural topographic features and fuelbreaks to allow fires to spread through aspen stands | |
| **Mgmt Req** | Fire Retardant Avoidance. Fire Retardant may not be utilized within 300 feet of any water source (e.g. wetlands, streams, lakes, springs). Fire retardant adds nutrients to cave systems, which can affect cave biota. No fire retardant or foam will be utilized on Lehman Caves or within 300 feet of the caves. | Retardant avoidance shape |
| **Mgmt Req** | Bristlecone Pine Protection:<br>• Minimize fire spread in bristlecone pine stands<br>• Do not cut bristlecone pine trees or remove dead and down wood<br>• Avoid dozer lines, grading, road construction or ignition of backfires in bristlecone pine stands<br>• Avoid staging areas or base camps except on already established roads and parking areas<br>• Avoid using retardant in the Mt Washington Bristlecone Groves or Bristlecone Pine Trail area. Use of water is acceptable and preferable. | Bristlecone Pine Shape |
| **Mgmt Req** | Ponderosa Pine Preservation:<br>• Minimize high severity fire in ponderosa pine stands.<br>• Avoid damage or felling of large diameter (>12 inch) Ponderosa Pine when possible and take actions to protect them from high severity fire.<br>• Measures to limit impacts include but are not restricted to:<br>o Reduce heavy duff accumulation (75% removal, not all), especially around wounds/cat-faces<br>o Limb up and remove ladder fuels in the drip line of trees. | PIPO Shape |
| **Mgmt Req** | Alpine Plants: Several rare, endemic species of alpine plants occur in the park, mostly above 9,000 ft. elevation near or above tree line.<br>• Avoid ground disturbance in these areas<br>• Avoid fire spread, minimize firing operations within plant populations<br>• No dozer lines, grading, or road construction and avoid putting hand line in these areas, if possible. If handline is necessary, consult with a READ to avoid plants | Alpine Plant shape |

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| | • Do not locate staging areas or base camps in these areas except on already established roads and parking areas.<br>• Avoid designating landing zones in these areas whenever possible. | |
| **Mgmt Req** | Cheatgrass Avoidance: Cheatgrass-dominated areas are prone to further annual grass infestation following fire or disturbance. Work with the Lead READ to implement the following:<br>• Avoid operations in cheatgrass infested areas, minimize fire spread and avoid ground disturbance.<br>• Implement Noxious Weeds mitigation measures to limit further spread.<br>• Establish Weed Wash stations if crews are working in cheatgrass infested areas | Cheatgrass shape |
| **Mgmt Req** | Noxious Weed Avoidance: houndstongue, spotted knapweed, whitetop (hoary cress), puncturevine, Canada thistle and musk thistle.<br>To prevent further spread of noxious weeds, coordinate with Lead READ to:<br>1. Avoid dozer line construction, staging areas, spike camps, and ground disturbance in known infestations.<br>2. Clean equipment and vehicles prior to use and after operations in infested areas using weed wash stations.<br>3. Establish boot brushing stations at spike camps and ICP when operations occur in infested sites. | Other Noxious Weeds Shape |
| **Mgmt Req** | Structures: Protect park infrastructure (building, campgrounds, potable water sources, historic district, utility lines), where possible. Consult with the lead READ on protection measures. | Infrastructure Shape |
| **Mgmt Req** | Cultural resources:<br>• Protect all structures on the list of classified Structures with the appropriate action<br>• Bucket drops and retardant are not allowed on rock art areas.<br>• Avoid ground disturbing activities<br>• Consult the lead READ on locations and appropriate actions. | Sensitive CR Shape |

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| **Mgmt Req** | For all fires:<br>• Superintendent approval required for heavy equipment use<br>• READ/REAF required for use of vehicles (including ATVs/OHVs) or mechanized equipment off road.<br>• A Resource Advisor (READ/REAF) and/or ARCH is required on all fires.<br>• Utilize Minimum Impact Suppression Strategies and Tactics (MIST) on all fires.<br>• Work with the Lead READ to implement suppression repair activities according to the suppression repair plan as quickly and efficiently as possible. | Unit Wide |