National Park Service
U.S. Department of the Interior

Grand Canyon National Park Arizona

Fire Management Plan

Record of Decision

Approved

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UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

RECORD OF DECISION

FIRE MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT and ASSESSMENT OF EFFECT

Grand Canyon National Park
Arizona

INTRODUCTION

The Department of the Interior, National Park Service (NPS), prepared this Record of Decision on the Final Environmental Impact Statement and Assessment of Effect (FEIS/AEF) for the Grand Canyon National Park (GRCA) Fire Management Plan (FMP). This Record of Decision (ROD) includes descriptions of the project background and Environmentally Preferred Alternative, a decision statement, synopses of other alternatives considered, the decision's basis, findings on impairment of park resources and values, a listing of measures to minimize environmental harm, and an overview of public and agency involvement in the decision-making process.

Changes to Federal Wildland Fire Management Since GRCA FEIS/AEF Issuance

New guidance for Federal wildland fire management activities implementation (Department of the Interior and U.S. Department of Agriculture) was approved (NPS Memo dated April 9, 2009; Guidance for Implementation of Federal Wildland Fire Management Policy, 2009). Changes include 1) fire terminology clarification, 2) guidance on managing unplanned fires for multiple objectives, 3) emphasis on the need for fire management planning, intergovernmental in scope and at a landscape scale, and 4) assessment of every wildland fire using a decision-support process that examines the full range of potential responses.

Changes include new terminology. Terms used in past policy guidance and the DEIS are now aggregated as follows.

Wildland Fire
The term wildland fire previously described any wildland non-structural fire; this term is now split into two fire types
1) Unplanned ignitions or planned ignitions declared wildfires, and
2) Prescribed fires or planned ignitions

The term *prescribed fire* has and will continue to refer to a wildland fire and a planned event. Although unplanned human-caused wildfires occur in the park, lightning ignites most park wildfires. Fire managers are responsible for implementing a management response to each wildland fire. Responses to unplanned events include, but are not limited to: extinguishing, confining and/or containing the fire; monitoring the fire; or a mix of these responses.

In the Environmental Impact Statement a number of terms described wildfires including suppression, wildland fire-use, wildland fire use for resource benefit, Appropriate Management Response to a fire (AMR), and arson. The terms wildland fire and wildfire are often used interchangeably throughout the FEIS. All these terms are types of, or responses to, wildfire. Wildfires are managed with multiple objectives that may change during the life of a given fire as environmental, political, and resource-availability needs change.

PROJECT BACKGROUND

Fire Management Plan revision was initiated in 2001 due to changes in NPS and Federal fire management policy. Revisions provide a plan consistent with NPS fire management policies and associated regulations and laws (including but not limited to Director's Order (DO) 12, Conservation Planning, Environmental Impact Analysis and Decision-making; DO-18, Wildland Fire Management; DO-28, Cultural Resource Management; DO-41, Wilderness Preservation and Management; DO-60, Aviation Management; DO-77, Natural Resource Protection; NPS Management Policies 2006; the Endangered Species Act; National Historic Preservation Act; Clean Air Act; and Wilderness Act).

Grand Canyon National Park's Fire Management Program began in the mid-1970s when NPS fire management policy was changed to allow natural processes to occur when possible. In 1978 a Fire Management Plan was developed and approved allowing, for the first time, fire to burn under an established set of conditions. The existing GRCA FMP was approved in 1992 and revised annually through 2008. Annual revisions shifted from suppressing fires to a more proactive program where prescribed natural fire (Wildland Fire Use for Resources Benefits, [WFURB]) and management-ignited prescribed fire strategies were used to meet resource objectives.

Because the 1992 FMP has been revised and amended annually, the park's Fire Management Program has been refined as knowledge of fire behavior and effects have grown. The program undergoes annual review, and has adjusted to reflect experience gained from management actions that achieved desired objectives—and from those that did not. Most notably, fire managers increased the amount of wildland fire use for resource benefits, introduced aerial ignition for prescribed fires, and implemented prescribed fires under a wider range of environmental conditions to more fully meet fuel reduction objectives.

Many of the park's vegetation communities evolved under influence of periodic fires, and many plants developed adaptations to and/or dependence on a regime of frequently occurring fires. Decades of fire suppression have altered vegetation structure and composition and wildlife habitat characteristics. Restoration of fire to its natural role in park ecosystems is a priority for Grand Canyon National Park.

The FEIS presents an analysis of alternatives for implementing GRCA's Fire Management Program. The FMP's purpose is to provide a comprehensive direction for fire management, and a foundation for park decision-making for the life of the plan. The plan describes goals, objectives, and operational guidelines for management of all aspects of fire. Clarification of what must be achieved according to law and policy is based on park purpose, significance, and special mandates.

FMP goals are

- Protect human health and safety and private and public property
- Restore and maintain park ecosystems in a natural, resilient condition
- Protect the park's natural, cultural, and social values
- Promote a science-based program that relies on current and best-available information
- Educate, inform, consult, and collaborate with tribes, stakeholders, and the public

The No Action Alternative represents GRCA's current Fire Management Program. Four FEIS Action Alternatives are based on a thorough consideration of the best-available information on fire and its effects on park resources, park visitors, and other values at risk, such as air quality, surrounding communities, vegetation, and forested habitat.

DECISION

Description of Selected Action

The park has selected Alternative 2, Mixed Fire Treatment Program as the Preferred Alternative.

As described in the FEIS, features of the Selected Action (Mixed Fire Treatment Program Alternative) include

- Continue Fire Management Program's existing direction with limited changes including
  - eight new Fire Management Units (FMU) (compare FEIS Maps 2-1 and 2-2)
  - a Wildland-Urban Interface (WUI) treatment program involving manual and mechanical fuel-reduction methods
    - WUI treatment areas and priorities do not change, but implementation pace varies
    - WUI mechanical and manual fuel-reduction treatments will occur under a Long-Term Treatment Schedule (FEIS Appendix D, Figure 2-4, and Map 2-5), resulting in an average 225 acres treated annually. Increase in treated WUI acres will decrease wildland fire risks and increase safety in these areas
- Continue suppression, wildland fire use, prescribed fire, and manual fuel-reduction treatments
  - assumes a similar or slightly higher suppression level will occur through the life of the plan as occurred 1993–2005
  - annual acreage managed as wildland fire use is expected to increase as natural fire regimes are restored, though it is difficult to predict by how much. It is feasible acres treated under a wildland fire use strategy could rise to an annual average 5,000 from the current 13-year average (1993-2005) 3,568 acres
  - prescribed fire will continue under a Long-Term Treatment Schedule (FEIS Appendix D, Figure 2-4, and Map 2-5), resulting in an average 5,840 acres treated annually. As the Fire Management Program's prescribed fire portion moves into more complex burn units (like mixed-conifer areas with high fuel loads and ladder fuels), risks associated with these projects increase. Acres treated with future prescribed fires may actually decrease as acres treated under other wildland fire strategies increase and treat future prescribed fire acres. These long-term treatment schedules are subject to change as unplanned fires burn in proposed prescribed fire project areas, or weather, funding, personnel, and finding applicable prescription windows change time frames of project completion. These schedules will be reviewed and updated annually
- Thinning standards (manual or mechanical) for WUI are found in National Fire Protection Association (NFPA) Codes, Chapter 4, Assessing Wildland Fire Hazards in the Structure Ignition Zone (www.nfpa.org). Additional guidelines can be found in the 2006 International Wildland-Urban Interface Code at www.nwcg.gov/pms/docs/PMS310-1-january-2006.pdf, and include
  - thin up to a 12-foot canopy clearance, removing trees up to ten inches diameter breast height (dbh)
  - limb trees four-to-six feet above the ground to reduce ladder fuels
  - remove up to 60% of dead-and-down woody debris 3–12 inches dbh
  - remove up to 50% of dead-and-down woody debris larger than 12 inches dbh
  - flush-cut all stumps as low to the ground as possible
  - slash from thinning operations may be removed, lopped, and scattered for a future broadcast burn; piled and burned in place; or chipped on or offsite
  - modifications to degree of thinning may occur in the Historic Landmark District or adjacent to individually listed National Register of Historic Places Buildings
- Standards for manual fuel thinning in the immediate vicinity of structures (to establish and maintain defensible space) are found in NFPA Codes, Chapter 4, Assessing Wildland Fire Hazards in the Structure Ignition Zone. Additional guidelines can be found in the 2006 International WUI Code
  - Prune all trees within 50 feet of structures and increase the height to live crown to prevent surface fire from transitioning to crown fire

    - Cut all tree limbs overhanging and in contact with any roof by a maximum of ten feet. If conditions warrant the entire tree may be removed
    - Cut all tree limbs in structural contact back to three-to-six feet from the structure
    - Remove 80% of dead material on the ground greater than three inches diameter within 30 feet of structures
    - Create ten feet of space between tree crowns within 30 feet of each structure
- Additional treatment units not identified in the treatment schedule may also be accomplished, including residential areas that have or have not been treated in the past. For example, some thinning has occurred in the historic district, but only in areas within 30 feet of structures. Additional thinning may occur in or outside that 30-foot space to expand defensible space and meet desired conditions throughout the WUI
- Total cost and cost/acre is approximately $167.00/acre
    - Increased cost is due to increased manual thinning and use of mechanical thinning. The cost of the No Action Alternative, which does not use mechanical thinning, is $159.00/acre
- This is a balanced approach to managing hazardous fuels, protecting the WUI and other values at risk, restoring natural fire regimes, and suppressing unwanted fires
- Maintains a balance of fire management strategies, incorporating all strategies available
- Other items specific to the selected action are
    - Wildland fire-use fire will not be used as a management tool in the two WUI FMUs
    - Hwy 64 and Hwy 67 are not classified in either WUI FMU, but these roads and their corridors are primary public escape routes and will be included as areas where mechanical and manual thinning is proposed. For planning and funding purposes, work associated with these road corridors (300 feet from road centerline) will be designated WUI projects
    - It is anticipated that up to 80% of proposed thinning projects will be completed under contracted services (using local or regional resources)
    - Increased allowance of moderate/high and high burn severity in the mixed-conifer vegetation type compared to the No Action Alternative. A mitigation addressing increased high and moderate/high severity states: "Assess the amount of moderate/high and high severity fire through composite burn index monitoring after each managed fire in the mixed-conifer vegetation type above the rim. Use the adaptive management process to adjust burn prescription, ignition pattern, burn seasonality, and/or pre-treatment to ensure no more than 30% of the mixed-conifer vegetation type and Mexican Spotted Owl (MSO) mixed-conifer restricted habitat burns with moderate/high and high severity. This includes high and moderate/high fire severity from past fires (2000 to present) (FEIS Table 4-15a), and all fires that will occur within the scope of this planning document." Allowance of 30% high and moderate/high severity is not meant as a target, but as a maximum. The park has described tools for planned and unplanned fires to help keep the level of high and moderate/high severity to a minimum
    - The adaptive management process will be used during planning, implementation, and review processes for each fire event with the intent that more tools can be developed to continue to minimize high and moderate/high fire severity effects
    - The adaptive management process and evaluation shown in FEIS Figure 2-1 will be used

Mitigating Measures/Monitoring

Vegetation **Invasive Species** **Mitigating Measures/Monitoring**

The Exotic Plant Management Plan (Finding of No Significant Impact, July 2009) provides a framework for implementing prevention, early detection and rapid response, control, education, research and restoration activities for invasive species on park lands.

The Fire Management Program can contribute to prevention and control invasive species in the following ways

- Locate control lines, helispots, fire camps, and other soil-disturbing fire management activities to minimize damage to biological resources
- Inspect helispots, staging areas, incident command posts/base camps, etc., periodically, and minimize exotic species introduction
- Use Minimum Impact Suppression Techniques to reduce disturbances to soil and vegetation
- Clean fire vehicles, equipment, and clothing in compliance with parkwide policy as determined by the Exotic Plant Management Plan
- Procure certified weed-seed-free mulching materials and native plant seed used in fire rehabilitation operations

Vegetation Special Status Plant Species Mitigating Measures/Monitoring

- Locate control lines, helispots, fire camps, and other soil-disturbing fire management activities to minimize damage to biological resources
- Protect aquatic habitat, riparian and wetland areas, meadows, and other sensitive resource areas by defining and avoiding these areas
- Establish trigger points (geographic locations that, when reached by fire, trigger an action to mitigate) if sensitive biological areas are located in Maximum Manageable Areas (MMA) that require some mitigation during wildland fire use fires. Implement mitigation plans when fire reaches the trigger point
- Rehabilitate affected sites (control lines, staging areas, and helispots) as soon as possible after disturbance. Develop Burned Area Emergency Response (BAER) plans as appropriate
- Assist with implementing the Exotic Plant Management Plan (Finding of No Significant Impact, July 2009). This plan provides a framework for implementing prevention, early detection and rapid response, control, education, research, and restoration activities for invasive species found on park lands
- Inspect helispots, staging areas, incident command posts/base camps, etc., periodically and minimize exotic species introduction
- Use Minimum Impact Suppression Techniques to reduce disturbances to soil and vegetation
- Clean fire vehicles, equipment, and clothing in compliance with parkwide policy
- Procure certified weed-seed-free mulching materials and native plant seed used in fire rehabilitation operations
- Prohibit prescribed fires and fire-related activities from encroaching on any known sentry milk-vetch (*Astragalus cremnophylax* var. *cremnophylax)* population
- Evaluate potential for fire to enter sentry milk-vetch habitat in unsurveyed areas of potential habitat, defined in U.S. Fish Wildlife Service (USFWS) 2006 Sentry Milk-vetch Recovery Plan

Vegetation Exotic Plant Species Mitigating Measures/Monitoring

- Locate control lines, helispots, fire camps, and other soil-disturbing fire management activities to minimize damage to biological resources
- Rehabilitate affected sites (e.g., control lines, staging areas, and helispots) as soon as possible following disturbance. Develop BAER plans as appropriate
- Inspect helispots, staging areas, incident command posts/base camps, etc., periodically and minimize exotic species introduction
- Use Minimum Impact Suppression Techniques to reduce disturbances to soil and vegetation
- Clean fire vehicles, equipment, and clothing in compliance with parkwide policy
- Procure certified weed-seed-free mulching materials and native plant seed used in fire rehabilitation
- Ensure the GRCA Exotic Plant Management Program and Fire Management Program work together to prevent and/or manage invasive exotic plant populations efficiently and effectively. Where implementation of these programs overlap, track dates and dual treatment prescriptions (e.g. hand pull and prescribed burn), and map locations

In addition to these specific mitigation measures, Fire and Vegetation Program staff will develop a phased approach to address species known to have large ecological effects (such as cheatgrass [*Bromus tectorum*] and other brome species), but are difficult to manage due to widespread park distribution. Park managers are directed to focus management actions on those species that could pose substantial impacts to park resources, that can reasonably be expected to be successfully controlled, and for which undertaking the action is prudent and feasible. Cheatgrass is currently listed as low priority for direct management action because treatment feasibility of this and other brome species across the entire park is low. However, due to concerns about potential effects of this species on ecosystem integrity, fire and Vegetation Programs are initiating proactive steps to minimize factors that would contribute to future expansion of this species.

During 2010, staff will develop a map layer using Geographic Information System (GIS) (datum NAD83) that displays current cheatgrass distribution based on recent vegetation work, and which will be considered baseline distribution. The most up-to-date cheatgrass distribution information will be obtained using 1,502 vegetation plots and 696 observation points installed as part of the 2007 vegetation mapping project, and data from the park's 148 fire monitoring plots, and research collaborations. In addition, fire ecology program staff will analyze existing data from fire effects monitoring plots to determine whether cheatgrass distribution or abundance changed pre- and post-fire measurement. This strategy will provide an overall landscape assessment.

After preliminary data are compiled, Fire and Vegetation Program staff will work to compare each vegetation type's current conditions to desired future conditions. Staff will set a threshold for invasive species composition pre-burn represented as percent cover of individual species, with focus on the highest priority species that pose a significant threat to ecosystems, such as cheatgrass. If preliminary data suggest threshold value has been reached, management actions may be taken to reduce highest-priority species cover prior to burning, and to continue treating the species after the burn.

Fire Monitoring Program staff will continue to provide information on invasive species, including cheatgrass, to Vegetation Management Program staff through landscape-scale fire monitoring plots; however, monitoring specific burn units to quantify invasive species is not currently planned. Fire and Vegetation Program staff will seek research funds to answer specific questions relating to invasive species management (e.g. does burn severity determine how and to what extent invasive plants enter and persist?). An adaptive management process will determine whether invasive plant control strategies, burn strategies (such as burn season), monitoring protocols, and/or threshold values should be adjusted to achieve desired results. To fully implement this program beyond the evaluation phase, additional resources and compliance will be necessary because extensive cheatgrass control actions are not included in the Vegetation Program's current budget, and Fire Program monitoring funds are limited.

- Collect exotic plant data. Data will be user-friendly and available to managers to track growth or reduction of exotic plant populations before and after fuel or fire treatment and/or incident
- Consider mechanical treatment work during winter plant dormant season and/or times when snow pack will minimize impacts to soil and vegetation
- Use qualified personnel to periodically inspect, map or document, and remove exotic plants from treatment areas, slash loading sites, and/or skid trails created and/or disturbed by mechanical equipment during treatment. If removal is not feasible, at a minimum work with GRCA Vegetation Program staff to document and map extent of exotic species encroachment

Wildlife **Mitigating Measures/Monitoring**

- Manage fire incidents using natural barriers to fire spread when safe and feasible
- Employ Minimum Impact Suppression Techniques in fire management techniques
- Protect aquatic habitat, riparian and wetland areas, meadows, and other sensitive resource areas during suppression fires by defining and avoiding these areas

- Restrict fire retardant use during fire management operations where possible
- Retain snags, particularly large snags (over 24 inches dbh), to provide wildlife habitat. Generally, snags will not be cut during fire management activities unless they present a threat to human life, safety, property, or a valued resource
- Lop and scatter debris from cut vegetation (slash) to a depth of no more than 12 inches and burn during subsequent prescribed fire, or pile and burn
- During prescribed burning, drip torch fuel will not be applied directly to large, down, woody debris greater than ten inches diameter
- Establish trigger points (geographic locations that, if reached by fire, trigger action to mitigate) if sensitive biological areas are located in MMA that require some mitigation during wildland fire-use fires. Implement mitigation plans when fire reaches trigger points
- Rehabilitate disturbed sites (control lines, staging areas, and helispots) where and when safe to do so, by pulling soil, duff, litter, woody debris, and rocks back onto the line to bring it up to grade and blend with the surrounding area
- Practice best management practices for smoke mitigation and emission reduction techniques to reduce health risks and visibility impacts to Class I airshed
- Implement best management practices for exotic species spread reduction and control during fire management operations
- Use resource advisors on fire management projects and incidents
- Use resource specialists in preparation of contract fire management activities (scope of work, mitigation measures) as well as contract work implementation on the ground
- Implement management response strategies to affect least disturbance possible in known occupied territories during breeding season
- Assess the amount of moderate/high and high severity fire through composite burn index monitoring after each managed fire in the mixed-conifer vegetation type above the rim. Use the adaptive management process to adjust burn prescription, ignition pattern, burn seasonality, and/or pre-treatment to ensure no more than 30% of the mixed-conifer vegetation type and Mexican spotted owl mixed-conifer restricted habitat burns with moderate/high and high severity. This includes high and moderate/high fire severity from past fires (2000 to present) (FEIS Table 4-15a), and all fires that will occur within the scope of this planning document
- When burning in the mixed-conifer vegetation type, fire prescriptions or objectives should create a mosaic of openings spread through this vegetation type

Wildlife **Special Status Wildlife Species Mitigating Measures/Monitoring**

- Manage fire incidents using natural barriers to fire spread when safe and feasible
- Employ Minimum Impact Suppression Techniques in fire management techniques
- Protect aquatic habitat, riparian, and wetland areas, meadows, and other sensitive resource areas during suppression fires by defining and avoiding these areas
- Restrict fire retardant use during fire management operations where possible
- Retain snags, particularly large snags (over 24 inches dbh), to provide wildlife habitat. Generally, snags will not be cut during fire management activities unless they present a threat to human life, safety, property, or a valued resource
- Lop and scatter debris from cut vegetation (slash) to a depth of no more than 12 inches and burn during a subsequent prescribed fire, or pile and burn
- During prescribed burning, drip torch fuel will not be applied directly to large, down, woody debris greater than ten inches diameter
- Establish trigger points (geographic locations that, if reached by fire, trigger action to mitigate) if sensitive biological areas are located in MMA that require some mitigation during wildland fire-use fires. Implement mitigation plans when fire reaches trigger points
- Rehabilitate disturbed sites (control lines, staging areas, and helispots) where and when safe to do so by pulling soil, duff, litter, woody debris, and rocks back onto the line to bring it up to grade and blend with the surrounding area

- Implement best management practices for smoke mitigation and emission reduction techniques to reduce health risks and visibility impacts to Class I airshed
- Implement best management practices for exotic species spread reduction and control during fire management operations
- Use resource advisors on fire management projects and incidents
- Use resource advisors in preparation of contract fire management activities (scope of work, mitigation measures) as well as implementation of contract work on the ground
- Implement management response strategies to affect the least disturbance possible in known occupied territories during breeding season

Wildlife Special Status Wildlife Species Mitigating Measures/Monitoring
MSO and MSO Critical Habitat Mitigation Measures

GRCA will be seeking relief from the U.S. Fish and Wildlife Service on MSO survey requirements. If relief is granted, survey requirements listed in the following mitigation measures would not occur.

- To the maximum extent possible, aircraft will remain at least 1,200 feet (400 meters) from the boundary of any designated Protected Area Center (PAC)
- Locate areas associated with fire related activities, such as dip sites or drop points, at least 437 yards (400 meters) from the boundary of any designated PAC
- Notify a GRCA Wildlife Biologist or Resource Advisor if MSO are discovered during any projects
- Survey known PACs that can be surveyed from the rim, and adjacent to prescribed fire or active fire-use areas
- Survey all MSO habitats within 0.5 miles of project perimeters prior to project implementation in accordance with formal MSO Survey Protocol
- Inform all field personnel who implement any portion of the proposed action about MSO regulations and protective measures. A wildlife biologist will present a program regarding fire management in Threatened and Endangered Species habitat to all personnel involved in the fire use program
- Advise the Resource Advisor immediately if a MSO is encountered during any project. The Resource Advisor will maintain a record of MSO encountered during suppression activity and will include location, date, time of observation, and general condition of each owl
- Consult GRCA Wildlife Biologists early in the decision-making process for prescribed, wildland fire-use and suppression fires
- Adhere to recommendations in September 2, 1997, USFWS memorandum, Clarification of Recommendations in the Recovery Plan for Mexican Spotted Owl in Regard to Prescribed Natural Fire
- Ensure all pertinent information from the reasonable and prudent measures from the Biological Opinion issued by the USFWS for the proposed FMP is included in Wildland Fire Implementation Plan for all wildland fire-use actions
- Document all actions, report incidental take, and monitor effects of proposed action on habitat. Report findings to USFWS
- Ensure, to the extent funding allows, sufficient monitoring of fire effects on key MSO-habitat components is conducted after each wildland fire-use event. Monitoring may require additional plots beyond those previously established for the existing fire effects program. Intent is to adequately determine event effects on key habitat components
- Integrate data from reports to USFWS on fire activity, into adaptive management processes
- Minimize cutting of trees and snags larger than 18 inches dbh, and no trees or snags larger than 24 inches dbh will be cut unless absolutely necessary for safety reasons

The following mitigations measures are a result of the Final Biological Opinion (received November 10, 2009) with the U.S. Fish and Wildlife Service

- Minimize effects to MSO PACs

- Ensure no more than one PAC is affected to the extent described in the Final Biological Opinion (in the Amount and Extent of Take section) for the life of the program
- Where physically practicable, and in a manner that does not compromise human safety in any way, delineate and keep wildland fire and suppression activities out of 100-acre core areas for any PAC affected by wildland fire or suppression activities
- All fire actions in and near (within 0.5 mile) PACs will occur, to the maximum extent possible, using minimum impact suppression methods
- Areas of disturbance created for fire actions will be located outside MSO PACs, whenever possible
- Personnel education/information programs and well-defined operational procedures will be implemented
- All field personnel will be informed that intentional killing, disturbance, or harassment of threatened species is a violation of the Endangered Species Act and could result in prosecution. A wildlife biologist will present a program regarding fire management in threatened and endangered species habitat to all Fire Program personnel
- Review, with fire and natural resources staff, actions after each year of activity and prior to the next MSO breeding season. Review will take into account prior effects of fire activities in the project area
- Ensure all pertinent information from reasonable and prudent measures of the Final Biological Opinion are included in burn or treatment plans for all fire management actions and in wildfire suppression decision documents
- Coordinate with USFWS's Flagstaff Suboffice during decision process for wildland fire management and suppression actions in MSO habitat
- Fire activities will be carried out in a manner to reduce potential for MSO take through habitat loss outside of PACs
- A Resource Advisor will be available for all fire activities associated with MSO habitat. Resource Advisors will be provided adequate information from qualified park biologists with knowledge of MSO and its habitat. The Resource Advisor will possess maps of all MSO habitat and PACs in the project area. GRCA Section 7 Coordinator will coordinate MSO concerns and serve as advisor to the Incident Commander/Incident Management Team. The Resource Advisor will be on the ground and report to the Section 7 Coordinator and park biologist, who will report to the USFWS. The Section 7 Coordinator and/or park biologist will be responsible for coordination with the USFWS Flagstaff Suboffice and will monitor fire management and suppression activities to ensure protective measures endorsed by the Incident Commander/Incident Management Team are implemented
- MSO habitat disturbed during fire suppression activities associated with fire actions such as fire lines, crew camps, and staging areas, will be rehabilitated, including obliteration of fire lines to reduce erosion, protect disturbed areas from invasive species, and to prevent their use by vehicles or hikers. Such rehabilitation/obliteration will be inspected as necessary following the event to ensure effectiveness
- To ensure all MSO habitats have been correctly identified in the project area, the park will work with the USFWS Flagstaff Suboffice to closely re-examine all available data regarding MSO habitat extent in the project area. Any MSO habitat not previously identified will be added to MSO habitat databases and maps so it can be managed appropriately. This re-examination (and any necessary re-adjustment) will be led by knowledgeable and qualified personnel
- Document all actions, report incidental take and owl occurrences, and monitor effects of proposed action on MSO habitat. Findings will be reported to USFWS by January 31 each year and will, with USFWS involvement, be incorporated into the adaptive management program
- If a MSO is encountered during the fire, the Resource Advisor will be advised immediately. The Resource Advisor will assess potential harm to the owl and advise the Incident Commander /Incident Management Team of methods to prevent harm. The Resource Advisor will maintain a record of any MSO encountered during suppression activities. Information will include (for each owl) the location, date, and time of observation and general condition of the owl

- By January 31 of each year, the park will submit a report to USFWS detailing that calendar year's actions. Report will document areas and acreage burned, fire type (prescribed fire, wildland fire-use, wildfire), name(s) of any PAC(s) subjected to fire activity, MSO habitat amount subjected to fire activity, extent of fire actions, prescriptions applied to the action, extent of effects to MSO key habitat components and Primary Constituent Elements of critical habitat, photographs depicting effects, implementation and effectiveness of terms and conditions of the biological opinion, information about MSO monitored or encountered, any rehabilitation completed, quantification of any incidental take as defined in the biological opinion, and any recommendations for actions in upcoming year(s). A map will include each fire event that occurred. GRCA will keep and maintain a map depicting cumulative fire information for the project area
- By March 1 of each year, prior to any implementation of prescribed or wildland fire use that year, GRCA will meet with the USFWS Flagstaff Suboffice to review the annual report and discuss the upcoming year's plans relative to the previous year's actions and cumulative actions. If the observed proportion of fire events in high to moderate-to-high severity categories are greater than that expected in the Effects of the Action section of the biological opinion, prescriptions will be adjusted to ensure fire severity of future events is reduced
- Continue monitoring existing MSO PACs
- Ensure sufficient monitoring of effects of fire on key habitat components of MSO habitat and primary constituent elements of MSO critical habitat is conducted after each fire event. Such monitoring may require additional plots beyond those previously established for the existing fire effects program. Intent of monitoring is to determine effects of the fire event on the key habitat components of MSO habitat and primary constituent elements of critical habitat
- Conduct fire severity monitoring in MSO restricted habitat as soon as possible after each fire event to ensure the most accurate classification of burn severity is applied to the fire
- Work with USFWS to develop and fund a research project to study foraging, dispersal, and other habitat use of MSO on the Kaibab Plateau

Wildlife Special Status Wildlife Species Mitigating Measures/Monitoring

California Condor and Habitat Mitigation Measures

- Cover all water dip tanks when not in use
- Keep camp areas free of trash
- Provide all fire personnel literature or instruction regarding condor concerns
- Record and report immediately any condor presence in the project area to the Resource Advisor or a GRCA wildlife biologist
- Avoid any condors that arrive at any area of human activity associated with fire management activities. Notify assigned Resource Advisor or a GRCA wildlife biologist; only permitted personnel will haze birds from the area
- Survey any fire-retardant chemical application areas to the extent possible and remove contaminated carcasses before they become condor food sources
- Minimize aircraft use along the rim to the greatest extent possible
- Keep aircraft at least 437 yards (400 meters) from condors in the air or on the ground unless safety concerns override this restriction. This restriction does not apply to North Rim Helispot
- Aircraft will give up airspace to the extent possible if airborne condors approach aircraft, as long as this action does not jeopardize safety
- Prescribed fire projects will not occur within 0.5 miles of active condor nesting sites
- Crews will stop activity on thinning projects if condors arrive onsite

The following mitigations measures are a result of the Final Biological Opinion with U.S. Fish and Wildlife Service GRCA will avoid impacting nesting condors.

- Wildland fire-use projects will not occur within 0.5 mile of active condor nesting sites (February 1 to September 30). These dates may be modified based on the most current information regarding condor nesting and coordination with the GRCA wildlife biologist and USFWS

- Manage fires so smoke will not inundate condor nests. This may include delaying prescribed fire ignition and suppressing all or portions of managed fires if weather and wind conditions may result in heavy and/or persistent smoke at active condor nests
- Aircraft associated with fire activities will stay at least one mile from active (February 1 to September 30) condor nest locations and vicinities except when human safety would be compromised. Dates may be modified based on the most current information regarding condor nesting and coordination with the GRCA wildlife biologist and USFWS

Wildlife Special Status Wildlife Species Mitigating Measures/Monitoring
Bald Eagle Habitat Mitigation Measures

- A 1,200-foot (400 meter) no-flight perimeter will be established around all active roost locations November 1 to April 1

Wildlife Special Status Wildlife Species Mitigating Measures/Monitoring
Northern Goshawk Species and Habitat Mitigation Measures

Northern goshawk is not listed under the Endangered Species Act, but is a state species of concern. Mitigation measures for this species include

- Unless previously agreed by Fire and Wildlife Program staffs, no more than 60% of the entire home range of a northern goshawk pair may be burned by prescribed fire during a single year
- Surveys must be completed in potential goshawk habitat one season prior to burning
- In general, burn unit preparations, such as thinning and removal of dead-and-down fuels, using chainsaws and vehicles within 0.25 miles of northern goshawk nest trees will be prohibited in active nesting areas. These activities will be allowed in known goshawk territories and potential goshawk habitat after surveys have determined the areas are inactive or unoccupied. Such operations may be allowed in active territories if agreed to by Fire and Wildlife Program staffs
- Measures to mitigate disturbance to nesting goshawks will be undertaken at the direction of the GRCA Wildlife Biologist and Fire Management staff. Allowing fire within active 40-acre nesting areas may be considered if fire can be implemented at low intensity

Wildlife Special Status Wildlife Species Mitigating Measures/Monitoring
MSO Habitat Mitigation Measures

- Assess amount of moderate/high and high severity fire through composite burn index monitoring after each managed fire in the mixed-conifer vegetation type above the rim. Use adaptive management process to adjust burn prescription, ignition pattern, burn seasonality, and/or pre-treatment to ensure no more than 30% of the mixed-conifer vegetation type and MSO mixed-conifer restricted habitat burns with moderate/high and high severity. This includes high and moderate/high fire severity from past fires (2000 to present) (FEIS Table 4-15a), and all fires that will occur within the scope of this planning document

Cultural Resources Mitigating Measures/Monitoring

- During any planned fire management activity, project area cultural resource locations will be determined and adverse impacts avoided. Cultural resources will be identified through database and paper-record searches and field inventories or verifications. As needed, project and site-specific mitigation measures will be developed, implemented, and designed to minimize adverse impacts
- Prior to project work, fire staff will be trained (yearly or as needed) in cultural resource identification and laws and policy regarding management and protection
- Control lines, helispots, fire camps, staging areas, and other ground-disturbing activities will not occur in identified cultural resources
- Fire will be excluded from National Register eligible fire-sensitive archeological sites or features. Exclusion measures may include line construction, site or feature fuel reduction, and application of fire shelter material, foam, or water

- During aerial ignition operations, National Register eligible fire-sensitive sites will be marked to be seen from the air and avoided. Marking will be removed after implementation
- Post-fire assessments will be completed for all National Register eligible fire-sensitive sites. Post-fire assessments at additional sites will be completed as needed to assess effects of high intensity fire or specific management actions
- As needed, emergency stabilization and restoration will be implemented following BAER standards
- During prescribed fire projects and wildland fire-use and suppression incidents, a cultural resource specialist may be assigned as a resource advisor to prevent adverse cultural resources impacts
- During manual/mechanical thinning projects, no slash will be dragged through or piled in an archeological site, and to the greatest degree possible, no trees will be felled on archeological features or sensitive cultural sites
- Manual/mechanical thinning in view of National Historic Landmark and Individually Listed Historic Buildings will be consistent with the Secretary of the Interior's 1996 Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. Work in these areas will be coordinated with the Historical Architect or appropriate Cultural Resource Specialist
- Manual/mechanical thinning in identified cultural landscapes will be consistent with treatment recommendations in relevant cultural landscape reports and the Secretary of the Interior's 1996 Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. Work in these areas will be coordinated with a Historical Landscape Architect or appropriate cultural resource specialist
- Any road and helispot maintenance activities will avoid adverse cultural resources impacts
- A Programmatic Agreement was developed with the State Historic Preservation Officer (SHPO) in consultation with affiliated tribes and interested parties to address potential cultural resources impacts and how they can be mitigated. All planned fire management activities will comply with National Historic Preservation Act (NHPA) Section 106 and implementing regulations as defined in the terms of the signed Programmatic Agreement
- A fuel assessment and reduction program will be developed and implemented for National Register eligible cultural resources
- Fire modeling data will be included with prescribed fire plans to allow cultural resource specialists to better assess proposed project affects
- Tribal consultation will be conducted yearly with affiliated tribes to determine potential effects from fire management activities on resources of concern to the tribes. Efforts will be made to ensure tribal concerns are incorporated into prescribed burn plans, and tribes are afforded ample opportunities to comment. The Branch of Fire and Aviation will initiate and coordinate consultation through the park's Tribal Liaison
- To the greatest degree possible, collaborate with interested tribes in fire projects. An example could include allowing designated tribal representatives to monitor resource effects, and pre-project access to ethnobotanical resources

Air Quality **Mitigating Measures/Monitoring**

Fire and smoke are natural components of GRCA ecosystems. However, determining how much wildland fire smoke is natural and how much anthropogenic (the result of human actions, including past management decisions) is not straightforward. The Western Regional Air Partnership developed guidance on making this determination (Policy for Categorizing Fire Emissions, Western Regional Air Partnership, Nov. 15, 2001, at http://wrapair.org/forums/fejf/documents/nbtt/FirePolicy.pdf) which can be summarized as

- Suppression fire smoke is natural (as part of fire suppression, all practicable measures are being taken
- to reduce smoke production)

- Wildland fire use fire smoke is natural (because of the natural ignition of these fires)
- Prescribed fire smoke from fires used to maintain a naturally functioning ecosystem is natural
- Prescribed fire smoke from fires used to restore an ecosystem is anthropogenic

While the guidelines provide a framework for differentiating natural and anthropogenic smoke, they also call for smoke management to reduce emissions from all wildland fires.
A variety of measures can be taken to reduce or manage smoke produced by wildland fires. Some measures apply during the planning phase, for example, when defining the prescription window for a prescribed fire. Other measures apply during the fire itself. No single measure is applicable to all fires, but all fires can be managed using some of these measures.

In preparing prescribed fire burn plans and wildland fire implementation plans, appropriate computer smoke-dispersion models will be run to predict smoke impacts at critical receptor locations. These critical receptors include population centers and developments nearby and in GRCA including Grand Canyon Village, Tusayan, Desert View, the Cross-Canyon Corridor (Kaibab and Bright Angel Trails), North Rim developed area, Kaibab Lodge, Supai, and Tuweep.

- Plans for any fire that result in predicted exceedences of National Ambient Air Quality Standards or unhealthy conditions under the Air Quality Index will be refined until such impacts are not expected at critical receptor locations. Since current models do not model nocturnal smoke drainage well, computer model outputs will be treated with caution and results interpreted in light of previous experience
- Grand Canyon staff will coordinate closely with the Interagency Smoke Coordinator regarding any burning upslope of any critical receptor site to mitigate impacts of nocturnal smoke drainage

Timing can affect smoke dispersal and transport. To take advantage of windows when smoke impacts can be reduced, the following actions will be taken when appropriate

- Burning ahead of cold fronts and/or precipitation, or anticipating effects of predicted precipitation to reduce smoke production and improve dispersion when consistent with other program goals (especially safety and risk management)
- Burning between March 15 and September 15 for optimal smoke dispersion, unless other project goals necessitate burns earlier or later, especially to mitigate wildlife impacts early in the year or manage wildland fire-use fires that burn into fall
- Ignite prescribed fires under good-to-excellent ventilation conditions
- Suspend ignitions for projects that do not use mass ignition techniques under poor smoke dispersion conditions unless continued ignition is necessary to protect human health and safety or for effective management of an ongoing fire
- Complete, whenever possible, daily ignitions by 3:00 p.m. to maximize burning during optimum mid-day dispersion hours, and avoid trapping smoke in inversions or diurnal wind flow patterns

Reducing fuel burned reduces smoke produced. Fuel reduction is often a primary goal of wildland fire. When consistent with program goals, these fuel reduction mitigation measures will be used when possible

- Dispose of slash by methods other than burning, if feasible, including transfer of thinning slash to the Bureau of Indian Affairs for distribution to neighboring tribes, or mulch slash for use in vegetation management and other projects
- Since large logs and snags are important wildlife habitat, they will not be specifically targeted for burning. Critical snags may also be lined to prevent their burning
- Burn before deciduous litter fall when possible
- Although fuels are often too moist to meet ecosystem goals, some prescribed fires may be conducted before green-up to reduce available fuels, but only when consistent with project goals including minimal impact to wildlife and ethnobotanical resources

The same fuel burned differently will produce different amounts of smoke. Generally, piles produce the least and smoldering the most for a given fuel amount. Consistent with program and project goals, the following mitigation measures will be taken to encourage cleaner fuel burning.

- When consistent with other program goals, mass ignition techniques such as aerial ignition by helicopter will be used to produce shorter fire duration. Aerial ignition is commonly employed for prescribed fire ignition and wildland fire-use management, and GRCA has this equipment onsite
- Pile burning produces fewer emissions than broadcast burning and will be considered on thinning projects such as WUI and boundary fuel reduction where non-burning alternatives are not feasible. Piles will be constructed by hand to reduce soil content, and burning will be conducted when other smoke impacts are not present
- Burning fuels with an air curtain destructor will be considered when non-burning options are not available and slash transport to the burner is practicable (such as thinning projects in developed areas and along existing roads)
- Extinguishing or mopping-up of smoldering fuels can be used when a decision is made to not fully suppress a fire. However, fuel consumption is generally a goal of wildland fire in Grand Canyon, and mop-up may damage cultural resources and/or wildlife habitat
- Chunking of piles and other consolidations of burning material will be used to enhance flaming and fuel consumption and minimize smoke production when consistent with other resource goals

Effective communications do not reduce smoke, but help increase public acceptance of smoke impacts. In case of unhealthy conditions, prompt notification is essential to protect public health.

- To aid public understanding of fire management plans and actions, park staff will ensure fire management information is available for the public (visitors, residents, contractors, etc.)
- Provide neighboring jurisdictions (land managers, communities, and tribal governments) with information on planned fire activities on an annual basis and with updates as needed before particular projects or incidents relevant to them
- Make information available to interpretive staff, guides, and others whose jobs include frequent public contact to explain the need for fire in park ecosystems and the nature of fire and smoke management
- During fire operations, disseminate public information on fire and its impacts (beneficial and adverse)
- If unhealthy conditions are present, promptly notify all people in the affected area (visitors, employees, contractors, etc.). The NPS will follow the most current Environmental Protection Agency guidelines for public notification at http://airnow.gov/index.cfm?action=aqibroch.aqi#2

Smoke from any kind of wildland fire can adversely impact air quality. The following mitigation measures will be taken when monitoring shows such adverse impacts have reached potentially unacceptable levels

- When visibility is Very Poor (daily average in the worst 10th percentile for the month) for three or more consecutive days, fire managers should either a) take fire management actions to reduce smoke impacts or b) obtain written concurrence from park management that fire benefits to other park resources outweigh visibility impacts. Documentation for either action will be forwarded to the Interagency Smoke Coordinator and the park Air Quality Specialist
- When monitoring in sensitive receptor sites indicates the Air Quality Index is 100 or more (Unhealthy to Sensitive Individuals), begin immediate notification of people in the affected area (FEIS Table 4-38). Fire managers should also begin assessing options to reduce smoke production and implementing actions as soon as practicable
- When monitoring in sensitive receptor sites indicates the Air Quality Index is 150 or more (Unhealthy), protection of public health will become park management's highest priority (FEIS Table 4.54). Public notification in the affected area will be immediate and aggressive. Area closures may be made by the Superintendent, and smoke production from contributing fires should be reduced as quickly as possible

Soils and Watersheds **Mitigating Measures/Monitoring**

- Locate control lines, helispots, fire camps, and other soil-disturbing fire management activities to minimize damage to biological resources
- Protect aquatic habitat, riparian and wetland areas, meadows, and other sensitive resource areas by defining and avoiding these areas, especially with wheeled vehicles and fire retardant application. Water drops are preferred over fire retardant under all circumstances except for protection of life and safety. Avoidance zones will be identified in fire planning documents and maps, and may be flagged on the ground if deemed necessary by resource advisors or management staff
- Rehabilitate affected sites (e.g., control lines, staging areas, helispots) as soon as possible following disturbance. Develop BAER plans as appropriate
- Monitor wildland fires to provide information necessary for adaptive management. Efforts will include monitoring fire behavior while fires are ongoing and providing feedback to fire managers. Long-term monitoring will be conducted through the existing fire effects program. Remote-sensing will monitor burn severity
- Rehabilitate fire line construction according to the GRCA 2006 Resource Advisor Handbook Examples include pulling soil, duff, litter, woody debris, and rocks back onto the line to bring it up to grade and blend with the surrounding area
- Instruct crews to avoid biological soil crust during fire management activities
- Prohibit non-emergency wheeled or tracked equipment off-road when moisture causes easily compacted and rutted soils
- Conduct fueling and servicing only in designated areas with appropriate spill-control measures to prevent pollutants, such as fuels and lubricants, from impacting soil and drainages
- Restrict foot and wheeled traffic to a minimum in burned areas
- Install stabilizing structures such as water bars, check dams, straw bales, wattles, or other measures such as seed-free mulch or fine woody debris to reduce sediment transport, if sensitive areas require additional protection

Soundscape **Mitigating Measures/Monitoring**

- Incorporate best available noise abatement technology in fire-related equipment acquisition
- Implement best management practices to reduce noise from fire management activities and equipment

Wilderness Character **Mitigating Measures/Monitoring**

- According to DO-18, Wildland Fire Management, all fire management activities in wilderness, including categories of designated, recommended, potential, proposed, and study area will be conducted in keeping with minimum requirement analysis protocols. The Branch of Fire and Aviation will submit for review and approval minimum requirement analysis documents regarding fire management activities including, but not limited to fuels sampling; fire effects monitoring; fire weather observation; air quality monitoring; cultural and natural resource surveys and monitoring; prescribed fire planning, preparation, and implementation; fire use; and resource rehabilitation. Use of vehicles, chainsaws, motorized pumps, aerial ignitions, and helicopter landings will be assessed on a programmatic basis under the minimum requirement decision process to reduce use to the extent possible. Programmatic documents will be reviewed annually and updated as needed
- Locate control lines, helispots, fire camps, and other soil-disturbing fire management activities to minimize damage to resources
- Protect aquatic habitat, riparian and wetland areas, meadows, and other sensitive resource areas by defining and avoiding these areas, especially with wheeled vehicles
- Rehabilitate affected sites (e.g., control lines, staging areas, and helispots) as soon as possible following disturbance. Develop BAER plans as appropriate.
- Inspect helispots, staging areas, incident command posts/base camps, etc., periodically to minimize exotic species introduction

- Use Minimum Impact Suppression Techniques to minimize disturbances to soil, vegetation, and wilderness character
- Clean, prior to returning from an out-of-park incident, fire vehicles, equipment, clothing in compliance with park policy
- Procure certified weed-seed-free mulching materials and native plant seed for use in fire rehabilitation adhere to regulations of the Arizona Department of Environmental Quality (ADEQ) Final Forest and Range Management Burn Rule and any other provisions (if any) of permits issued for specific burns to minimize undesirable impacts to public health, public welfare, and visibility-related values
- Implement as many Emission Reduction Techniques as feasible, subject to the economic, technical, legal, and safety implications of the techniques, and burn management objectives to reduce smoke produced by prescribed fires
- Implement as many smoke management techniques (as prescribed by the state in FEIS Appendix A, Attachment C) as practicable to manage smoke produced during any desired fire
- Explore new technologies and methods to reduce use of mechanized/motorized tools and transport for monitoring and other onsite fire management activities. These technologies will be included in the minimum requirement process

Visitor Experience **Mitigating Measures/Monitoring**

- Close trails and roads providing access to fuel reduction projects, and wildland or prescribed fires if projects and/or fires present unacceptably hazardous conditions to visitors, as determined by the Incident Commander or Superintendent
- Close portions or entire park by Superintendent's order if any threat exists to public or firefighter safety from wildland fire or fire management activities. When and if such action occurs, adjacent agencies, neighboring communities, and authorities will be notified as soon as possible
- Institute smoke warning signs or roadway traffic control during fire operations as warranted at direction of the Burn Boss, Incident Commander, Safety Officer, or visitor protection representative
- Adhere to regulations of the Arizona Department of Environmental Quality Final Forest and Range Management Burn Rule and any other provisions of permits issued by the Department for specific burns to minimize undesirable impacts to public health, public welfare, and visibility-related values
- Implement as many Emission Reduction Techniques (as prescribed in FEIS Appendix A, Attachment C) as feasible to reduce smoke produced by prescribed fires, subject to economic, technical, legal, and safety implications of the techniques, and burn management objectives
- Implement as many Smoke-Management Techniques (as prescribed in FEIS Appendix A, Attachment C) as practicable to manage smoke produced during any prescribed or wildland fire-use fire
- Rehabilitate affected sites (e.g., control lines, staging areas, and helispots) as soon as possible following disturbance. Develop BAER plans as appropriate
- Avoid, to the extent possible, prescribed burns on or immediately before major holidays
- Provide information to visitors about closures and optimal view locations during fires
- Develop fire interpretation and educational programs designed to address the fire management program (including smoke, aircraft noise, temporary closures, manual/mechanical treatments, prevention of invasive exotic plant species, and other resource topics)
- Develop and implement treatment prescriptions that create defensible space around structures and within cultural landscapes
- Update evacuation plan by addressing communications with people of various cultures (and languages) and directing them to safe places. Evacuation plans exist and have been practiced, but additional attention may be needed to communicate with people during disasters. Provide preparedness provisions and encourage communication and cooperation with adjacent public agencies and communities
- Schedule, to the extent possible, WUI treatment to minimize impacts on visitors and residents

Socioeconomics **Mitigating Measures/Monitoring**

- Close trails and roads providing access to fuel reduction projects, and wildland or prescribed fires if fires and/or projects present unacceptably hazardous conditions to visitors Close portions or entire park by Superintendent's order when a threat to public or firefighter safety exists from wildland fire or fire management activities. Notify adjacent agencies, neighboring communities, and authorities as soon as possible
- Institute smoke warning signs or traffic control on roads during fire operations as conditions warrant at the direction of the Burn Boss, Incident Commander, Safety Officer, or visitor protection representative
- Adhere to ADEQ Final Forest and Range Management Burn Rule regulations and any other provisions (if any) of permits issued by ADEQ for specific burns to minimize undesirable impacts to public health, public welfare, and visibility-related values
- Implement as many Emission Reduction Techniques (as prescribed in FEIS Appendix A, Attachment C) as feasible to reduce smoke produced by prescribed fires, subject to economic, technical, legal, and safety implications of the techniques and burn management objectives
- Implement, to manage smoke produced during any desired fire, as many Smoke Management Techniques (as prescribed in FEIS Appendix A, Attachment C) as practicable
- Provide information to visitors about closures and optimal view locations during fires
- Develop and implement treatment prescriptions that create defensible space around structures and in cultural landscapes
- Update evacuation plans by addressing communications with people of various cultures (and languages) and how to direct them to safe places. Evacuation plans exist and have been practiced, but communicating with people during disasters may need additional attention. Provide preparedness provisions and encourage communication and cooperation with adjacent public agencies and communities

OTHER ALTERNATIVES CONSIDERED

Alternative 1 No Action, Existing Program

Continues existing program including fire suppression, wildland fire use, prescribed fire, and limited manual fuel reduction treatments, in three existing Fire Management Units.

The No Action Alternative assumes a similar or slightly higher level of suppression would occur as occurred 1993–2005. Successful suppression of small fires (in areas treated with past fires) should improve. However, large areas with poor access have not burned in the last 100 years, and risk of large-scale wildfire in these areas is very high. Wildland fires managed as suppression actions averaged 1,705 acres annually from 1993-2005.

Prescribed fire would continue under a Long-Term Treatment Schedule (FEIS Appendix D, Figure 2-3, and Map 2-4), resulting in an average 5,840 acres treated annually. As the Fire Management Program's prescribed fire portion moves into more complex burn units (like mixed-conifer areas with high fuel loads and ladder fuels), risks associated with these projects increase.

Annual acreage managed under a wildland fire use strategy is expected to increase as natural fire regimes are restored, though it is difficult to predict by how much. It is feasible to assume that acres treated under a WUI strategy could rise to an annual average 5,000 acres from the current 13-year (1993-2005) average 3,568 acres. Acres treated with future prescribed fires may actually decrease under this alternative as acres treated under wildland fire use strategy increase and treat those future prescribed fire acres.

Under the No Action Alternative, existing manual fuel-reduction treatments would continue in piñon-juniper habitat of FMUs 1 and 3 in areas not proposed as wilderness including Grand Canyon

Village, Hermits Rest, Desert View, and along main routes between these developments (Highway 64 and West Rim Drive). Manual treatments in spruce-fir habitat (FMU 2) would continue, primarily aimed at prescribed fire unit preparation, WUI protection, and the main route in and out of North Rim (Highway 67). Level of activity would continue at 10-60 acres per year with an average 40 acres per year.

Alternative 3 Non-Fire Treatment Emphasis

Alternative 3 would change the existing direction of GRCA's Fire Management Program through inclusion of a large mechanical/manual thinning component along with the wildland fire use and suppression program. The mechanical and manual thinning program would comprise the majority of the fire management staff's planning and implementation efforts. Thus, the wildland fire use and prescribed Fire Programs would be reduced due to time and/or resource constraints.

Alternative 3 Non-Fire Treatment Emphasis assumes an increase in suppression level through the life of the plan compared to 1993-2005. Acres burned under a suppression strategy would increase by an estimated 30% due to lack of effort in restoring fire regimes and fuel conditions (primarily in North Rim forests) through wildland fire-use or prescribed fire. Large areas with poor access have not burned in the last 100 years, and risk of large-scale wildfire in these areas is very high. As fuel loads increase, fires will grow more quickly with greater intensity, reducing effectiveness of firefighters and fire-suppression equipment. Wildland fires managed as suppression actions are assumed to average 2,370 acres annually through the life of the plan.

Prescribed fire would continue under a Long-term Treatment Schedule (FEIS Appendix D, Figure 2-5, and Map 2-6), resulting in an average 2,300 acres treated annually. Emphasis for most prescribed fire treatments will be in WUI to maintain light fuel loads.

Annual acreage managed as wildland fire use is expected to fall due to fire staff commitments to accomplishing non-fire treatment. Fire-use fires would still be part of the Fire Management Program when staff is available to manage the fire. It is feasible that fire-use acres would burn an annual average of 800 acres from the current 13-year (1993-2005) average 3,568 acres.

WUI mechanical and manual fuel-reduction treatments would occur under a Long-term Treatment Schedule (FEIS Appendix D, Figure 2-5, and Map 2-6), resulting in an average 360 acres treated annually.

Alternative 4 Prescribed Fire Emphasis

Alternative 4 would change the existing direction of GRCA's Fire Management Program by increasing amount of prescribed fire. The prescribed Fire Program would be solely responsible for achieving desired vegetative structural conditions. Any area not identified as being at desired conditions would not be eligible for management with fire use, creating a suppression response. Therefore, the wildland fire use program would initially be reduced to a few small areas.

Alternative 4 assumes an increased suppression level through the life of the plan compared to 1993–2005. Acres burned could increase by an estimated 20% due to decrease of fire-use fires and multiple prescribed fire entries needed to move an area to desired conditions. Successful suppression of small fires (in areas previously treated with fire) should improve. However large areas with poor access have not burned in the last 100 years, and risk of large wildfire in these areas is very high. As the prescribed fire portion of the Fire Management Program moves into more complex burn units (like mixed-conifer areas with high fuel loads and ladder fuels), risks associated with these projects increase, thus increasing the chance of escaped prescribed fire. Wildland fires could rise to an average 2,190 acres annually.

Prescribed fire would continue under a Long-term Treatment Schedule (FEIS Appendix D, Figure 2-6, and Map 2-7), resulting in an average 9,930 acres treated annually. The prescribed Fire Program would emphasize treating WUI areas to maintain light fuel loads and protect park communities. The prescribed Fire Program would also emphasize moving current vegetative structural conditions toward desired conditions outside the WUI. Time and effort needed for planning and implementing this level of prescribed fire would mean less effort toward planning and implementing non-fire treatments.

Annual acreage managed as wildland fire use is expected to fall due to lack of suitable areas that meet desired conditions. It is feasible that fire-use acres would burn an annual average 500 acres from the current 3,568 acre 13-year (1993-2005) average.

Mechanical/manual fuel-reduction treatments in WUI would occur under a Long-term Treatment Schedule (FEIS Appendix D, Figure 2-6, and Map 2-7), resulting in an average 75 acres treated annually.

Alternative 5 Fire Use Emphasis

Alternative 5 would change the existing direction of GRCA's Fire Management Program by expanding amount (acres and number of incidents) of fire use. Alternative 5 would emphasize managing fire for maintenance and restoration of fire-dependant ecosystems. Managing wildfire under a fire-use strategy would be applied in all park areas except the WUI. The prescribed Fire Program focus would be limited to protecting values at risk, developing defendable management action points or maximum manageable areas, and reducing wildfire risk in the WUI. Prescribed fire treatments would be phased out of the proposed wilderness area, but would occur in and around park boundaries and the WUI. Non-fire treatments would only occur in the WUI.

Alternative 5 assumes a decrease in suppression fires through the life of the plan compared to 1993–2005 because more fires will be managed under a fire-use strategy. Acres burned under a suppression strategy would decrease by an estimated 10% due to increased number of fires approved and managed under a fire-use strategy. Wildland fires managed with suppression actions would be assumed to average 1,640 acres annually. These suppression acres account for fires that would not be considered for management under a fire-use strategy for reasons including but not limited to political pressures, air quality issues, staffing concerns, and national preparedness concerns.

Prescribed fire would continue under a Long-term Treatment Schedule (FEIS Appendix D, Figure 2-7, and Map 2-8), resulting in an average 2,720 acres treated annually. Prescribed fire would also be used as a restoration and maintenance tool, but implementation would be focused on the WUI.

Annual acreage managed as wildland fire-use is expected to increase due to acceptance of fire use as a restoration and maintenance tool. It is feasible that fire-use acres would burn an annual average 8,000 acres from the current 13-year (1993-2005) average 3,568 acres.

Mechanical and manual fuel-reduction in the WUI would be carried out under a Long-term Treatment Schedule (FEIS Appendix D, Figure 2-7, and Map 2-8), resulting in an average 245 acres treated annually.

BASIS FOR DECISION

The GRCA Fire Management Interdisciplinary Team used descriptions of the existing fire management program (Alternative 1, No Action) with proposed program goals and objectives, policies and planning guidance, and public issues and concerns to consider individual actions and

develop four new alternatives (FEIS Action Alternatives 2, 3, 4, and 5). Once the alternative concepts had been developed, they were more fully evaluated in the framework of meeting or, as appropriate, balancing criteria outlined below. Each alternative was based on assumptions including: no significant increase or decrease in Fire Program personnel, each alternative was viable and could be successfully implemented, Fire Program budgets would be similar to recent past budgets, advances to future fire and forestry equipment may occur but would not significantly reduce impacts to the affected environment, and all five alternatives could be supported logistically with resources currently available to GRCA.

Environmental consequences of implementation were identified by the planning team, park staff, and consultants. Following internal administrative review, proposed alternatives were refined and finalized.

The Preferred Alternative was chosen after evaluating each alternative based on how well the alternative, 1) achieved the purpose of and need for a Grand Canyon Fire Management Plan, 2) achieved the goals of GRCA's General and Resource Management Plans, 3) addressed public issues and concerns, 4) met FEIS Fire Management Program goals and objectives, and 5) met National Environmental Policy Act (NEPA) section 101(B) criteria.

FINDINGS ON APPROPRIATE USE, UNACCEPTABLE IMPACTS, AND IMPAIRMENT OF PARK RESOURCES AND VALUES

Sections 1.5 and 8.12 of NPS Management Policies 2006 underscore not all uses are allowable or appropriate in national park system units. The proposed use was screened to determine consistency with applicable laws, executive orders, regulations, and policies; consistency with existing plans for public use and resource management, actual and potential effects to park resources, total NPS costs, and whether the public interest would be served.

The proposed project is considered an appropriate use as defined in NPS Management Policies because it is suited to the park's exceptional natural and cultural resources and fosters understanding of, and appreciation for, park resources and values. If unanticipated and unacceptable impacts transpire, the Superintendent will reevaluate purpose and need to further manage, limit, or discontinue the use.

Therefore, Grand Canyon National Park finds that the Preferred Alternative is an appropriate use. Because application of mitigating measures is expected to reduce major adverse impacts and satisfactory reclamation of the disturbed area is expected to be achievable, implementation of the Preferred Alternative would not result in any unacceptable impacts.

In analyzing impairments in the NEPA analysis for this project the NPS takes into account that if an impairment were likely to occur, such impacts would be considered major or significant under Council on Environmental Quality (CEQ) regulations. This is because impact context and intensity would be sufficient to render what would normally be minor or moderate impact, major or significant. Taking this into consideration, NPS guidance documents note, "Not all major or significant impacts under a NEPA analysis are impairments. However, all impairments to NPS resources and values would constitute a major or significant impact under NEPA. If an impact results in impairment, the action should be modified to lessen the impact level. If the impairment cannot be avoided by modifying the proposed action, that action cannot be selected for implementation."

Alternative 2 actions will achieve FMP goals in a comprehensive, integrated manner that reduces fire-related risks while also suppressing fire and/or allowing fire to assume its role in park ecosystems. Actions implemented under Alternative 2 that will cause negligible to major short- to long-term adverse impacts will not constitute impairment; these impacts have limited severity

and/or duration and will not result in appreciable irreversible results on resources. Minor to major beneficial effects were also identified in the FEIS which include effects related to restoring and protecting park resources and values.

Major adverse impacts have been identified in the following impact topics: vegetation, cultural resources, and soundscape. Major adverse impacts identified for in the vegetation section include impacts from suppression fires that include large crown fires at 97th weather percentiles, and cumulative impacts to areas not treated in the past and that will not experience any future fire or thinning treatments. Major adverse impacts to cultural resources include impacts from unplanned fire management activities where it could be difficult to avoid or pretreat cultural resources. Impacts to soundscape considered major include noise impacts from aviation, powertools, and/or mechanical equipment during all fire and thinning activities when that equipment is used. Major beneficial impacts occur in several impact topics including vegetation, cultural resources, soundscape, wilderness character, visitor experience, and the socio-economic environment.

In determining whether impairment may occur, park managers consider impact duration, severity, and magnitude; affected resources and values; and direct, indirect, and cumulative effects of the action. According to NPS policy, “An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is: necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or identified as a goal in the park’s general management plan or other relevant National Park Service planning documents” (NPS Management Policies, Part 1.4.5).

The NPS has determined Alternative 2 implementation, upon review of the impacts, will not constitute impairment to park resources and values nor will it violate the NPS Organic Act. This conclusion is based on a thorough analysis of environmental impacts described in the FEIS, relevant scientific studies, GRCA interdisciplinary team and the Superintendent’s professional judgment, as guided and directed by NPS management and fire policies. While the plan does contain some major adverse impacts, they do not rise to the level of impairment. Mitigation measures are listed to reduce adverse impacts.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The Environmentally Preferred Alternative is determined by applying criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which is guided by the Council on Environmental Quality. CEQ provides direction that "the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's §101: (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradations, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety, of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

The following section is based on FEIS impact analysis for each alternative summarized in FEIS Table 2-7 (included below). The Environmentally Preferred Alternative for the proposed Fire Management Plan is the alternative that best meets or exceeds requirements set forth in NEPA section 101(b) as defined above.

Criterion 1 *Fulfill the responsibility of each generation as trustee of the environment for succeeding generations*

A primary threat to environmental resources is landscape-scale high-severity fire. As environmental trustees for future generations, our goal is to manage fire in fire-adapted ecosystems to maintain and restore desired forest conditions. Such management would allow ecosystems to be resilient to any threat such as insect infestation, climate change, and other environmental factors.

Criterion 2 *Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings*

When desired conditions are met, hazard-fuel loads are lower which moderates higher-severity fires, and forests become safer for visitors (backcountry and developed areas). Fewer widespread high-severity fires also protect landscape aesthetics, natural and cultural resources, and the WUI.

Criterion 3 *Attain the widest range of beneficial uses of the environment without degradations, risk to health or safety, or other undesirable and unintended consequences*

To attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences, the proposed fire management program must allow for wide array of visitor uses.

Criterion 4 *Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety, of individual choice*

To preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety, fire management alternatives should incorporate a variety of tools

Criterion 5 *Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities*

Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities

Criterion 6 *Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources*

To enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Based on the analysis in FEIS Table 2-7 (included below), Alternative 2, Mixed Fire Treatment Program, best achieves NEPA section 101(b) criteria, and is the Preferred Alternative. This alternative exceeds or meets each criterion.

Table 2-7 How Each Alternative Meets NEPA Section 101(B) Criteria

Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
1 Fulfill the responsibility of each generation as trustee of the environment for succeeding generations	**Meets** Mitigation requirements for low-severity fire in mixed-conifer limits the trend toward desired conditions	**Exceeds** Ability for a wider array of fire severities and application of fire use results in a greater trend toward historic pattern of fire severity and spatial complexity, especially in mixed- conifer	**Does Not Meet** Due to limited fire treatments allows vegetation outside the WUI to trend further away from desired conditions	**Does Not Meet** Emphasis on prescribed fire cannot restore and maintain desired conditions	**Meets** Potential for greatest ecosystem benefits and trend toward desired conditions, but greatest risk due to fire timing, unknown environmental conditions and uncertainty due to dependence on natural starts
2 Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings	**Does Not Meet** Least reduction in risk for high-intensity wildfire that could destroy infrastructure and cause evacuations and/or park closures	**Meets** Expanded WUI treatments provide safety to infra-structure and people. Moves toward a healthier and more aesthetically pleasing forest	**Does Not Meet** Hazard fuel treatments emphasize safety in the WUI, but rest of park receives minimal treatment and is in greatest risk of high-severity fire	**Meets** Includes less WUI than other action alternatives. Emphasis on prescribed fire cannot restore and maintain desired conditions	**Meets** Includes second highest WUI amount. Potential for greatest benefits to ecosystem and trend toward desired conditions. Greatest risk due to fire timing, unknown environmental conditions, and uncertainty due to dependence on natural starts
3 Attain widest range of beneficial uses of environment without degradations, risk to health or safety, or other undesirable and unintended consequences	**Meets** Overall, a variety of uses even though some impacts to visitors	**Meets** With incorporation of WUI and range of severity for prescribed fire in mixed-conifer, wider range of severity would improve for a wider range of uses	**Does Not Meet** For the park as a whole does not provide for widest range of beneficial uses to Fire Program. This would limit use of fire in a fire-dependent ecosystem	**Meets** Emphasis on prescribed fire may reduce risk but limits amount of restoration	Meets Primary focus on natural starts which gives more uncertainty and limits variety of uses

Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
4 Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety, of individual choice	**Meets** Opportunities for surveys and pretreatment of cultural sites prior to prescribed burns and non-fire treatments in WUI. Decreased potential for high-severity fire. Wildland fire use has less opportunity for survey and pretreatment		**Does Not Meet** Has highest levels of suppression; therefore, the highest potential for high-severity wildfire effects and damaging suppression impacts	**Meets** With emphasis on prescribed fire, there are more opportunities for pretreatment surveys and protection of archeological sites prior to prescribed burns	**Does Not Meet** Limited opportunities to protect and survey before fire-use fires and is safety dependent. Since the majority of acres are wildland fire use and suppression, ability to pretreat is reduced
5 Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities	**Meets** Provides balance between visitor use and resources benefits		**Does Not Meet** Only the human factor is considered and not resources	**Meets** Provides balance between visitor use and resources benefits	**Meets** Provides balance between visitor use and resources benefits
6 Enhance quality of renewable resources and approach maximum attainable recycling of depletable resources	**Meets** Provides balance in all park forest ecosystems, but does not provide any significant treatment activities in the piñon-juniper and WUI	**Exceeds** Provides the most opportunities for restoration and maintenance of forest ecosystems	**Does Not Meet** Limited number of acres treated. Not moving park as a whole toward desired conditions	**Meets** Returning fire into dependent ecosystems enhances resources quality. May not enhance as much as both prescribed fire and fire use but moves toward desired conditions	**Meets** Getting fire back into a fire-dependent ecosystem enhances resources quality. May create best restoration opportunities. Greatest risk due to fire timing and unknown environmental conditions. Greater uncertainty due to dependence on natural starts

PUBLIC AND AGENCY INVOLVEMENT

Scoping

In January 2001, an updated Federal Wildland Fire Management Policy was released. The policy was a revision and update of the December 1995 Final Report of the Federal Wildland Fire Management Policy and Program Review, and was accepted by the Secretaries of Interior and Agriculture. A National Fire Plan was also introduced and approved. This National Plan directed the NPS to expedite removal of hazardous fuels from Wildland-Urban Interface areas to provide immediate protection of natural and cultural resources, physical property, and facilities both Federal and private.

In May 2001, the NPS sent a general scoping letter to interested public, affected agencies, and known interested groups about the GRCA Fire Management Program and projects to be undertaken for the purpose of preparing a NEPA document. The letter informed recipients about the proposed updated Fire Management Plan and related projects including prescribed and wildland fire-use fires and manual/mechanical fuel reduction. The letter also described several existing park conditions that have led to increased fire potential such as decadent forests and activities undertaken before Grand Canyon became a national park. GRCA received 11 written responses to this letter by email, U.S. mail, and hand delivery. Based on comments and issues raised during internal scoping, the NPS elevated the level of environmental analysis from an Environmental Assessment to an Environmental Impact Statement (EIS).

On September 16, 2003, the NPS issued a Notice of Intent (NOI) in the Federal Register for preparation of an EIS for the proposed GRCA Fire Management Plan. The NOI stated, "This effort will result in a new wildland fire management plan that meets current policies, provides a framework for making fire-related decisions, and serves as an operational manual." Wildland Fire Associates (WFA) and SWCA Environmental Consultants (SWCA) were retained by GRCA to help develop the EIS and organize and manage a second round of public scoping which included a scoping letter and comment form sent to interested public and affected agencies; press releases; and a series of open house meetings.

The 2003 scoping letter informed the public that the NPS intended to prepare an EIS to analyze proposed GRCA fire management activities. The more in-depth 2003 scoping letter informed recipients of the purpose and need for intended actions, intent of the management plan to be used for long- and short-term planning, and the proposed plan's goals and objectives. The 2003 letter also explained public scoping involvement and planning process participation.

A newsletter was released to the public, tribes and agencies in June 2007 with the purpose of informing the public of EIS planning since public scoping in 2003.

On October 23, 2008, the National Park Service published a Notice of Availability (NOA) in the Federal Register to announce the Grand Canyon National Park Fire Management Plan Draft Environmental Impact Statement and Assessment of Effect for public review and comment. The DEIS provided a comprehensive look at impacts to the human environment from GRCA fire activities, and evaluated various alternatives. DEIS release initiated a formal 90-day public comment period, ending January 21, 2009.

On August 7, 2009, the National Park Service published a Notice of Availability in the Federal Register to announce the Grand Canyon National Park Fire Management Plan Final Environmental Impact Statement and Assessment of Effect for public review and comment. The FEIS provided a comprehensive look at impacts to the human environment from GRCA fire activities, and evaluated various alternatives. FEIS release initiated a 30 day no-action period, ending September 6, 2009.

Public Meetings and Outreach

When the 2003 Notice of Intent and associated public scooping letter were released, the NPS conducted public meetings during the 90-day comment period.

WFA and SWCA organized and managed five public meetings held on the dates and in the communities listed below

October 15, 2003	Kanab, Utah	October 22, 2003	Phoenix, Arizona
October 20, 2003	Page, Arizona	October 23, 2003	Flagstaff, Arizona
October 21, 2003	Grand Canyon, Arizona		

Meetings were structured as open houses. Information about the FMP EIS process was presented through posters and handouts NPS personnel were present to answer questions. Attendees were invited to submit written comments on a comment form provided and an audio recorder was available to collect verbal comments. GRCA received a total of 20 written responses in 2003 via email, U.S. mail, and hand delivery, including those collected during open house meetings.

A total of 96 comments were identified in 31 submissions received in response to the 2001 and 2003 scopings. Primary issues identified through public comment evaluation were concerns related to GRCA ecological restoration through natural fire, local impacts related to air and visual resource quality, cultural resource protection, Wildland-Urban Interface/community protection, appropriate conditions for prescribed fire use, and overall management and coordination procedures. These are similar issues and impact topics brought forward by the NPS internal scoping process.

Many of the topics were directly related to management plan goals and objectives, and have been incorporated including reducing risk of wildland fire in the WUI; using natural fire as a natural process to maintain park ecosystems; coordination with other Federal, state, county, local, and American Indian tribal governments through fire management collaboration; and maintaining wilderness areas as wilderness during fire management.

A Notice of Availability to prepare a Draft Environmental Impact Statement was published in the Federal Register on October 23, 2008 for a 90-day public review and comment period ending January 21, 2009. During the public comment period there were four scheduled public meetings held in and on

December 2, 2008	Kanab, Utah	December 4, 2008	Tusayan, Arizona
December 3, 2008	Flagstaff, Arizona		

The meetings were structured as open houses, and were attended by approximately 28 people. A press release, website updates (on the NPS Planning Environment and Public Comment database, PEPC), and public meetings were used to request public input and disseminate information about the alternatives (including the Preferred Alternative) and their impacts to the human environment. The FMP DEIS process, alternatives, and analysis were presented through posters and handouts. Attendees were invited to submit written comments during public meetings. NPS personnel were present to answer questions and take verbal comments.

Public Comment

The National Park Service received a total of ten written submissions on the DEIS via public meetings, PEPC, hand delivery, and U.S. mail. From those ten submissions, 115 were substantive comments. Major issues raised were

- Cumulative impacts on resources combined with effects from U.S. Forest Service (USFS) lands
- Adaptive management too vague
- Fire severity changes in the Action Alternatives
- Impacts to MSO critical habitat

The National Park Service values this input and, where applicable, it will be taken into account in future plans. Substantive comments were addressed in FEIS Appendix K.

Agency and American Indian Consultation and Coordination

A number of meetings were held with staff from the U.S. Forest Service and U.S. Fish and Wildlife Service. Meetings with USFS discussed fire organizations, project schedules, and cumulative impacts. Meetings with USFWS discussed impacts alternatives might have on wildlife and their movement corridors, and to ensure NPS planning would be in support/harmony with other agency planning efforts. Several conversations explored possibility of joint or co- resource management.

Informal consultations have been ongoing with USFWS since August 2008 when affected species of concern were identified for analysis (FEIS Chapter 4, 4.2.5 and 4.2.2).

Since DEIS distribution, GRCA has continued informal USFWS consultation. Several meetings have occurred to ensure the two agencies are collaborating and issues are addressed. GRCA and USFWS engaged in meetings on January 14, 2009; March 11, 2009; March 23, 2009; and April 22, 2009. In compliance with Section 7 of the Endangered Species Act of 1973, as amended, a Biological Assessment was submitted to USFWS for formal consultation on May 27, 2009.

A Biological Opinion (BO) was received from USFWS November 10, 2009. The BO stated the reasonable and prudent measures, terms and conditions, and recommended mitigation measures for Mexican Spotted Owl/Critical Habitat and California Condor. The NPS incorporated mitigations recommended by the USFWS for MSO, MSO critical habitat, and California Condor.

Consultation with the Arizona State Historic Preservation Office was initiated September 2003. A Draft Programmatic Agreement (PA) was sent to the SHPO in December 2008; SHPO comments on the Draft PA were received in a letter dated January 23, 2009. SHPO comments were very minor, and changes are reflected in the final PA. The Programmatic Agreement was signed July 20, 2009 by the State Historic Preservation Office. The Advisory Council on Historic Preservation submitted a letter on September 30, 2008 that they did not need to be a signatory to the PA. Affiliated American Indian tribes also had an opportunity to review the draft Programmatic Agreement. The final Programmatic Agreement including tribes as "invited signatories" was sent in November 2009. Tribes were asked to return the document by January 6, 2010 with their signatory. The following American Indian Tribes have signed the PA as an invited signatory: Moapa Band of Paiute Indians, Navajo Nation, and the Yavapai-Apache Nation.

In keeping with its mandates for tribal consultation, NPS consulted with tribes throughout the planning process. Based on ethnographic research efforts and previous consultations conducted for GRCA during the last several years, 12 tribes were identified as having potential traditional associations with park lands and resources. They are the Havasupai Tribe, Hopi Tribe, Hualapai Tribe, Kaibab Band of Paiute Indians, Navajo Nation, Paiute Indian Tribe of Utah, White Mountain Apache Tribe, Yavapai-Apache Nation, San Juan Southern Paiute Tribe, The Pueblo of Zuni, Moapa Band of Paiute Indians, and the Las Vegas Tribe of Paiute Indians.

All 12 tribes were contacted by letter, inviting them to attend a Pan-Tribal meeting in January 2007 to talk about the status of the Fire Management planning process. Additional formal correspondence and Pan-Tribal meetings during EIS development include

Formal Correspondence

January	2007	Invitation to Pan-Tribal Meeting
February	2007	Notes and copies of handouts from Pan-Tribal Meeting sent with invitation to April field trip
Mar	2007	Prescribed Fire Plans for 2007 sent to all tribes

Winter	2008	Distribution of DEIS to all tribes
January	2008	NPS requests meetings with individual tribes
August	2009	Initial letter inviting tribes to sign the Programmatic Agreement
November	2009	Final formal invitation to sign the Programmatic Agreement

Pan-Tribal Meetings

February	2007	Flagstaff Meeting Agenda: FMP Overview, planning process, range of alternatives Tribal Representatives: Moapa Band of Paiutes, Havasupai Tribe, Hualapai Tribe
April	2007	Field Trip to South Rim burn areas Agenda: Visit recent burns and discuss tribal concerns and interest Tribal Representatives: Yavapai-Apache Nation, Cameron Chapter of Navajo Nation, Moapa Band of Paiute Indians, Kaibab Band of Paiute Indians
March	2009	Flagstaff Meeting Agenda: Status of FMP, review of Preferred Alternative and tribal comments. Tribal Representatives: Havasupai Tribe, Navajo Nation

Requested Meetings With and Correspondence from Individual Tribes

Havasupai

February	2007	Presented overview at Tribal Council meeting, prior to Pan-Tribal meeting
April	2007	Discussed preservation options for Havasupai homesites at consultation meeting on South Rim, along with other projects
October	2007	Update on planning status at Tribal Council meeting

Navajo

June	2006	Field visit with Cameron chapter members to visit Navajo structural sites, discussed their concerns and recommendations for protection during fire, received follow-up letter expressing their concerns
September	2006	Correspondence from Navajo Nation Historic Preservation Department (NNHPD) regarding preservation of sweatlodges and other Navajo structures during fire incidents
October	2006	Tribal meeting at South Rim, additional discussion regarding preservation of sweatlodges
March	2008	Meeting at NNHPD, concern about Traditional Cultural Properties on South Rim Field trip with Cameron Seniors to visit Navajo structural sites
April	2008	Map of burn project area emailed to NNHPD
February	2009	Informational meeting at Bodaway/Gap, primary concerns are smoke Impacts, access to wood, impacts to tribal resource such as piñon nuts
April	2009	Field trip with Bodaway/Gap chapter members to South Rim burn Areas
October	2009	Updates and discussion of FMP and PA status during multi-topic government-to-government consultation

Hualapai

October	2006	Tribal meeting in Flagstaff, updated on planning process, asked for tribal concerns

Hopi

November 2009 — Updates and discussion of FMP and PA status during multi-topic government-to-government consultation

Kaibab Paiute

September 2009 — Updates and discussion of FMP and PA status during multi-topic government-to-government consultation

Zuni

October 2009 — Updates and discussion of FMP and PA status during multi-topic government-to-government consultation

Issues identified during tribal consultation include

- Smoke impacts to neighboring Navajo Nation chapters (Bodaway/Gap)
- Impacts to fire-sensitive (combustible) traditional structures such as wickiups and sweatlodges
- Vandalism to archeological sites from government and contract crews
- Conduct cultural sensitivity training for fire staff
- Incorporate indigenous fire management techniques
- Use tribal resource advisor to assess needs and impacts
- Opportunities to engage tribal youth in pre- and post-fire assessments and resource monitoring
- Have tribal representatives monitor fire management activities
- Access and impacts to traditional plant resources
- Ecosystem vulnerability to invasive plants and bug kills, pre- and post-treatment
- Prescribed fires are conducted within the natural range of variability, not operating outside natural ecosystem processes
- Prescribed fires to reduce threat of unwanted, high-severity fire and stimulate growth of certain ethnographically important plants
- Contracts with tribal entities and tribal fire crews for hazard fuel removal and other fire management activities
- Transfer of wood cut during hazard fuel removal to Bureau of Indian Affairs for use as fuel

All twelve originally identified tribes continued to receive newsletters and invitations to consultation meetings throughout the planning process. Tribal interests and concerns were fully considered in the planning process and alternative development.

CONCLUSION

As described in Mitigation, all practical means to avoid or minimize environmental harm from the selected alternative have been adopted. Because there would be no major adverse impacts to resources whose conservation is 1) necessary to fulfill specific purposes in GRCA's establishing legislation or proclamation; 2) key to the park's natural or cultural integrity or to opportunities for park enjoyment; or 3) identified as a goal in relevant NPS planning documents, there would be no impairment of park's resources or values. After a review of these effects, the alternative selected for implementation will not impair park resources or values, and will not violate the NPS Organic Act.