

**United States Department of the Interior
U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021
Telephone: (602) 242-0210 FAX: (602) 242-2513**

AESO/SE
02-21-02-F-0118

June 11, 2003

Memorandum

To: Superintendent, Grand Canyon National Park, Grand Canyon, Arizona

From: Field Supervisor

Subject: Biological Opinion for the Grand Canyon National Park Fire Use Program

This biological opinion responds to your request for consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation was dated August 13, 2002, and received by us on August 14, 2002. At issue are impacts that may result from the proposed Grand Canyon National Park Fire Use Program (herein referred to as "managed fire" or "wildland fire," as opposed to "wildfire,") located in Coconino County, Arizona, on the Mexican spotted owl (*Strix occidentalis lucida*) (MSO), designated MSO critical habitat, and the California condor (*Gymnogyps californianus*).

In your memorandum, you requested our concurrence that the proposed action is not likely to adversely affect sentry milk vetch (*Astragalus cremnophylax* var. *cremnophylax*), Kanab ambersnail (*Oxyloma haydeni kanabensis*), humpback chub (*Gila cypha*), bald eagle (*Haliaeetus leucocephalus*), humpback chub critical habitat, or southwestern willow flycatcher (*Empidonax traillii extimus*). We concur that the proposed project is not likely to adversely affect those species and critical habitat for the reasons stated in the appendix to this biological opinion.

This biological opinion is based on information provided in the August 2002 biological evaluation, telephone conversations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, fire use and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

Table 1 is a summary of the consultation history for the proposed project.

Table 1. Consultation history for the Grand Canyon National Park Fire Use Program.

<i>Date</i>	<i>Event</i>
March 5, 2002	Informal consultation began with a meeting with Grand Canyon National Park staff.
April 2, 2002	We received and commented on a species list for fire use projects.
August 14, 2002	We received an August 13, 2002, request for formal consultation on, and a biological assessment of, the proposed project
September 20, 2002	We responded with a thirty-day letter initiating formal consultation and requesting additional information necessary for the consultation.
November 12, 2002	We recommended that the Park request an extension of 30-45 days because the earlier requested information had not yet been received.
December 13, 2002	We received the additional information we had requested in September. The information also included a request for a consultation extension to January 27, 2003.
December 20, 2002	We received a request for an additional consultation extension to February 27, 2003.
December 19, 2002 January 19, 2003 January 26, 2003 April 2, 2003	We received additional information by email in response to our earlier requests.
March 7, 2003	We requested a consultation extension to March 29, 2003.
April 11, 2003	We requested a consultation extension to May 28, 2003.
April 17, 2003	We provided you a draft of this biological opinion.
May 9-19, 2003	The Park provided comments on the draft opinion and requested that the opinion be finalized.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Most of the information in this section is derived from the project Biological Evaluation (BE; Leonard 2002) and correspondence from Grand Canyon National Park (Park) dated December 13, 2002. As part of a comprehensive fire management program, the Park intends to allow certain naturally-ignited fires to burn in order to achieve resource benefits. The life of the program covered by this consultation is five years. The Wildland Fire Use for Resource Benefits program is described under the 1998 Grand Canyon National Park Fire Management Plan Amendment to the 1995 Fire Management Plan.

Wildland fire use, which previously was known as prescribed natural fire, is the practice of determining whether to allow naturally ignited fires to continue to burn in order to meet resource management goals. Wildland fires can be managed in a variety of ways, ranging from simple monitoring of a fire's progress to full suppression. A combination of management techniques can be applied on various portions of a single fire.

Until 1978, when a prescribed fire program was introduced, fire suppression was the only fire management option for the Park. Since that time, the fire management program has grown, and today involves not only wildfire suppression and prescribed fire, but also wildland fire use and mechanical treatments in urban interface areas.

A new fire management plan is currently being developed for the Park. Until the new plan is completed, the fire management program continues to be guided by the 1992 Wildland Fire Management Plan, which was revised in 1993, 1994, and 1995, and amended in 1998 to address new fire policies and park plans. The Park has stated that a new consultation will be conducted with us for the new fire management plan. This biological opinion covers only the wildland fire use program portion of the fire management plan.

Among the changes made in the 1998 amendment to the Park's fire management plan was the division of the Park into three Fire Management Zones by grouping similar fuel types: Grass-Brush-Pinyon-Juniper, Ponderosa Pine, and Mixed Conifer.

The Grass-Brush-Pinyon-Juniper Fire Management Zone includes the inner canyon from Grand Wash Cliffs to Lees Ferry, up to the Coconino geologic formation. It also includes plateau areas of the South Rim from Hermit's Rest west to the Great Thumb, and from the Coconino Rim east to Desert View and Powell Plateau. This zone contains approximately 1,015,000 acres.

The Ponderosa Pine Fire Management Zone includes areas of the South Rim from Hermit's Rest east to the Coconino Rim, as well as that area in and around Mt. Emma bounded on the north and west by the park boundary and on the east and south by the Tuweep Valley. This zone contains approximately 35,000 acres.

The Mixed Conifer Fire Management Zone includes the entire North Rim from Cape Royal west to Fire Point, and contains approximately 150,000 acres.

The fire management plan allows for suppression, prescribed fire, and wildland fire use in each of the zones. However, the current extent of the wildland fire use program is limited to forested areas, and the evaluation of this proposed action is limited to wildland fire use in forested areas.

The Mixed Conifer Fire Management Zone on the North Rim will present the greatest number of opportunities for wildland fire use. The more developed nature of the South Rim allows fewer opportunities for wildland fire use in the Ponderosa Pine Fire Management Zone, but such fires are a possibility, especially in the portion of the Zone in and around Mt. Emma. The greatest number of potential wildland fire use ignitions will be due to lightning strikes during the monsoon season of July and August. Likely ignition locations are well-distributed, but starts may be more common at the southern tips of the North Rim plateaus.

The Park contains over 120,000 acres of forested habitat. To date, the largest acreage treated within a single year in the park, wildfires excluded, was just over 11,000 acres, which occurred in 1998 and 2001. The Park believes that, to simulate a mid-range historical fire return interval of 6 years, an average of 20,000 acres would need to be treated each year. Achieving a longer fire return interval of 20 years would require that an average of 6000 acres be treated annually.

In order to achieve the desired resource benefits, wildland fires must remain primarily of low intensity, with only scattered high-intensity patches within the perimeter of the fire. Low intensity, in a general sense, means that each fire will remain a surface fire, moving into the crowns of mature trees only occasionally. These fires would not be stand-replacing. The fires will thin smaller trees, reduce available fuels, release nutrients, and cause relatively little damage to the largest trees. Most wildland fire use in the Park will be second- or third-entry burns which will favor low-intensity fire.

The decision to let a natural ignition burn as a wildland fire is made by the Park Superintendent, using information and analyses provided by fire and resource managers. An interdisciplinary team is formed to make decisions on whether the fire will provide resource benefits, to define risks to resources, to establish boundaries for the fire (called Maximum Manageable Areas, or MMAs), and to reevaluate the progress of the fire on a continuing basis.

Prescription development for wildland fires is essentially contained within the analysis process discussed in the Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide. Many factors are incorporated into the analysis and planning process. Because of the large number and variability of the factors involved, and because some factors may offset

others, a narrow range of values for many of the factors cannot be readily identified. The decision-making process includes a review of :

- historical weather pattern data
- current weather trends
- current fire danger rating
- seasonal trends in fire danger ratings
- time of season (early, middle, late)
- thousand-hour fuel moisture
- live fuel moisture in ponderosa pine
- fuel loading of the area
- fire history of the area
- location of the ignition and potential fire behavior and spread
- risks and benefits that are likely to occur
- availability of resources to manage the fire

During the ongoing management of a wildland fire use project, fire managers receive and review daily monitoring reports on fire behavior and growth. Daily fire activity is considered both in the context of recent trends and in the context of expected trends in conditions. Decisions on appropriate management actions are based on an overall analysis of these trends, and are not necessarily tied to any specific values of any of the many factors involved. Wildland fire use at the Park is subject to numerous constraints of various types, including air quality standards, tolerance for area closures within the park, resource availability, and administrative capacity.

According to the BE, the Park's best estimate, incorporating all other limiting factors, is that 10,000 acres or less of wildland fire use activity annually is likely and reasonable, under favorable conditions. It is possible, but unlikely, that up to 20,000 acres of wildland fire use could occur annually, and more than 20,000 acres occurring in any season is very unlikely. However, the Park confirmed (Kara Leonard, personal communication 2003) that they are willing to commit only to "limiting the combined percentage of high and moderate/high severity to no more than 15% of the total acreage of wildland fire use, measured annually. We can also commit to limiting total wildfire use acreage to no more than 20,000 acres annually." The Park contains over 120,000 acres of forested habitat, with over 100,000 of that being ponderosa pine or mixed conifer. Burning 10,000 to 20,000 acres of that annually would approximate, in acreage, a 5 to 10 year fire return interval.

Management of wildland fires allowed to burn will involve personnel visiting the fire on a regular basis to monitor its behavior and progress. However, if monitoring indicates that the fire is not achieving the desired resource benefits, the decision may be made to suppress the fire in whole or in part. If suppression actions become necessary, greater levels of activity and habitat disturbance will also be necessary. Suppression activities could include fireline construction, helicopter water drops, aerial application of retardant, or other suppression activities.

Past experience indicates that active suppression occurs on perhaps ten to twenty percent of the total period of a wildland fire use project. The suppression activities are usually limited in scope and are often focused on the protection of individual resources, such as nest trees or combustible archaeological sites. The most common activity would be the construction of line immediately around the resource to be protected, including digging hand line down to mineral soil, and using chainsaws to remove some trees and brush.

Suppression activities may also be used to generally direct the progress of a fire under the wildland fire use program. In almost all cases, existing roads, trails, and natural fire breaks will be used as fireline. Some clearing of brush, trees, or snags in these areas may be necessary to secure them as fireline and, in some cases, it may be necessary to construct new hand line as well.

Occasionally, an area will be burned out to help direct or hold a wildland fire, and additional suppression techniques may be employed. The additional actions could include the use of chainsaws, portable pumps, engines, and helicopters dropping buckets of water.

The aerial application of fire retardant has been, and will continue to be, used only rarely in the management of wildland fires. This activity poses an increased safety risk to personnel, causes greater disturbance to wildlife, is expensive, and is employed only when terrain prevents the use of other methods.

The fire management program includes a monitoring program. All National Park Service units using prescribed fire must implement a standardized vegetation monitoring program to track fire effects and to ensure that fire management resource objectives are met. The fire effects monitoring program at Grand Canyon began in 1989 and has a current network of over 100 permanent plots stratified by seven vegetation types. Plots are visited pre-burn, post-burn, and one, two, and five years after prescribed fires, and when possible after wildland fires. Overstory and pole-sized trees, seedlings, shrubs, herbaceous vegetation, and fuel loading are measured.

Fire monitoring efforts in the Park have recently expanded to include burn severity mapping using satellite imagery, which helps in obtaining a broader view of fire effects across each project area. The burn severity classes are defined by the Park as:

Unburned: No evidence of fire.

Low: Fire was nonlethal to the dominant vegetation. Fire did not alter the structure of the dominant vegetation. Scattered small, unburned patches intermixed within burn area. Scorching of vegetation limited to 1 meter high or less. Small organic material on ground scorched, but not entirely consumed. Most foliage and twigs intact. Mineral soil intact.

Low-to-Moderate: Partial scorching of foliage and fine materials on vegetation. Minimal consumption of foliage and fine materials on vegetation. Most overstory green vegetation

remains. Limited overstory tree mortality. Few, if any, unburned patches within the burn area. Most fine organic materials partially consumed, with minimal consumption of large logs. Rotten wood scorched to partially burned. Mineral soil generally intact.

Moderate-to-High: Fire scorched most of the foliage and fine materials on vegetation. Partial consumption of foliage and fine materials on vegetation. Limited green vegetation remains in overstory. Partial overstory tree survival expected. Intermittent patches within burn area have large logs as well as all organic materials consumed to bare mineral soil. Most woody debris consumed. Mineral soil partially altered.

High: Fire killed above ground parts of all vegetation, changing the forest structure substantially. All foliage and fine materials on vegetation consumed. Most large logs as well as all organic material on the ground consumed. All forest litter and duff consumed, exposing and altering bare mineral soil.

Most wildland fire use projects are expected to occur on the North Rim. Eleven of the Park's 38 MSO Protected Activity Centers (PACs) are located below the North Rim. The wildland fire use program has the potential to affect many of those PACs in any given season. Because there are many variables involved in evaluating the potential risks and benefits of allowing fire to enter any PAC (e.g., occupancy of the PAC, fuel conditions, weather conditions), the Park will consider limiting the movement of fire over the rim and into PACs on a case-by-case basis, through consultation with resource managers and fire managers.

Conservation Measures

The Park has indicated that the following conservation measures regarding the Mexican spotted owl and California condor are part of the proposed project and will be implemented for each wildland fire-use project that occurs (Leonard 2002). The last California condor measure was confirmed January 26, 2003 (Leonard, personal communication).

Mexican spotted owl

Use only low-intensity fires for wildland fire use.

Wildland fires must remain at primarily low intensity, with only scattered high-intensity patches, to be allowed to continue burning.

Monitor fire effects for adaptive management.

Wildland fires will be monitored in order to provide the information necessary to allow 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 be used to monitor burn severity.

Report results of fire use projects to the Fish and Wildlife Service.

Reporting will include notification that a wildland fire use project is occurring, brief progress reports if desired, and a report at the conclusion of each fire event. Resource advisors will collect information including: fire size; numbers of personnel present; fireline length; estimated number of total trees and snags cut; estimated number of large (>18 inches diameter at breast height [dbh]) trees and snags cut; location of new fire support sites such as camps, helispots, and drop points; amount and type of disturbance involved in construction of fire support sites; types of aircraft used; number of flights over and around the incident; and number, size, and location of water drops. The Park will also provide any available information on fire behavior and fire effects as needed, including fire effects monitoring data, fire effects plot data, and burn severity data. An analysis of the effects of the fire on threatened and endangered species and their habitats will also be provided.

Plan in order to minimize negative impacts.

Minimizing the need for suppression activities, both planned and unplanned, is critical to maximizing positive effects and minimizing negative effects of wildland fire use projects. The boundaries of Maximum Manageable Areas of wildland fire use projects will be placed where they can most successfully be defended. It may not be possible to fine-tune the boundaries to avoid sensitive resource areas. In some cases, the boundary will be placed to avoid a large sensitive area. More commonly, plans will be made to protect areas that fall within the MMA. When such an area is identified by an interdisciplinary team, protection activities will be planned for that area, and trigger points will indicate when those protection activities should take place. Trigger points can be defined in various ways; they may relate to a point on the ground, or a point in time, or a level of disturbance.

To minimize negative effects on habitat, wildland fires will be managed as low-intensity fires. The Park's objective will be to limit mortality of trees greater than 18 inches dbh to less than 5 percent across the project area.

While natural fire starts will not be allowed to burn if fire managers anticipate mortality greater than 5 percent in large trees (\geq 18 inches dbh), occasionally up to 10 percent mortality may occur in large trees.

The Park will adhere to the air quality standards set by the Arizona Department of Environmental Quality.

If fireline construction is necessary, the Park will minimize the 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.

If new fire-related activity centers, such as dip sites or drop points, are necessary, they will be located at least 400 meters from the boundary of any designated Protected Activity Center.

To the maximum extent possible, aircraft will remain at least 400 meters from the boundary of any designated Protected Activity Center.

If Mexican spotted owls are discovered during project activities, a Park wildlife biologist will be notified immediately.

Firefighters will not approach or haze Mexican spotted owls, if found.

The Park will survey known PACs that can be surveyed from the rim, and that are adjacent to potential wildland fire use areas as described in the BE.

The Park will consider limiting the movement of fire over the rim and into PACs on a case-by-case basis, through consultation between resource managers and fire managers.

The Park will adhere to the recommendations set out in the September 2, 1997, Fish and Wildlife Service memorandum, "*Clarification of Recommendations in the Recovery Plan for the Mexican Spotted Owl in Regards to Prescribed Natural Fire.*"

The Park will limit the number of PACs adversely affected by wildland fire use in each season to no more than 10 percent of the current number of PACs existing in the park. The determination of whether or not adverse effects have occurred will be made by park wildlife biologists, through evaluation of the following factors:

- percent of PAC area burned
- severity of burn within the PAC
- occupation of PAC by Mexican spotted owls
- location of burn in relation to the nest area/activity center
- degree of damage to primary constituent elements of Mexican spotted owl habitat
- presence of heavy smoke (determined through observation of conditions in PACs and by using air quality measurements made at park critical receptor sites and evaluated using human health standards).

The Park will compile a summary of effects to PACs at the end of each fire season. The Park will submit this summary to USFWS and review it to determine whether any additional consultation or any changes to the Park's management strategy are needed.

Mexican spotted owl critical habitat

To minimize negative effects on the primary constituent elements of critical habitat, wildland fires will be managed as low-intensity fires.

If fireline construction is necessary, the Park will minimize the 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.

Mexican spotted owl and Mexican spotted owl critical habitat

Park wildlife biologists will be consulted early in the decision-making process for wildland fires.

If fireline construction is necessary, the line will be rehabilitated. Rehabilitation will be done by pulling soil, duff, litter, woody debris, and rocks back onto the line to bring it up to grade and to make it blend in with the surrounding area.

California condor

All helicopter dip tanks will be covered when not in use.

All fire personnel will be provided literature or instructed regarding condor concerns.

Any presence of condors in the project area will be recorded and reported immediately to the Resource Advisor.

If condors arrive at any area of human activity associated with wildland fire use activities, the birds will be avoided. The assigned Resource Advisor or a park wildlife biologist will be notified, and permitted personnel will haze the birds from the area.

No non-permitted personnel will haze condors.

All camp areas will be kept free from trash.

Aircraft use along the rim of the Grand Canyon will be minimized to the greatest extent possible.

Aviation personnel will contact the Peregrine Fund daily (at 520-606-5155 or 520-380-4667) during wildland fire use operations involving aviation to check on locations of condors.

If any fire retardant chemicals must be used, the application area will be surveyed and any contaminated carcasses will be removed before they become condor food sources.

Aircraft will remain 437 yards (400 meters) from condors in the air or on the ground unless safety concerns override this restriction.

If airborne condors approach aircraft, aircraft will give up airspace to the extent possible, as long as this action does not jeopardize safety.

The park will adhere to the air quality standards set by the Arizona Department of Environmental Quality.

Smoke from wildland fire use projects will be prevented from negatively affecting condor breeding. A given potential wildland fire use event will not be initiated, or an existing fire use event will be modified or terminated, in order to prevent or stop significant amounts of smoke, or smoke that will remain in place for an extended period of time, or chronic smoke events, from occurring in area(s) where condors are attempting to breed.

Finally, whenever fire suppression activities are necessary, the Park will employ Minimum Impact Suppression Tactics (MIST) in order to minimize negative effects. Additional Park-specific resource protection guidelines which were listed in the BE, and are incorporated here by reference, will be provided to fire personnel. Specific direction to fire personnel will be provided by a resource advisor familiar with the Park's resource issues.

STATUS OF THE SPECIES

Mexican spotted owl

The MSO was listed as a threatened species in 1993 (USDI 1993). The primary threats to the species were cited as even-aged timber harvest and the threat of catastrophic wildfire, although grazing, recreation, and other land uses were also mentioned as possible factors influencing the MSO population. The Fish and Wildlife Service appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican Spotted Owl in 1995. The Recovery Plan divides the U.S. range of the MSO into six recovery units (RU).

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the MSO as a threatened species (USDI 1993) and in the Recovery Plan (USDI 1995). The information provided in those documents is included herein by reference. Although the MSO's entire range covers a broad area of the southwestern United States and Mexico, the MSO does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Surveys have revealed that the species has an affinity for older, well-structured forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico.

A reliable estimate of the numbers of owls throughout its entire range is not currently available (USDI 1995) and the quality and quantity of information regarding numbers of MSO vary by source. USDI (1991) reported a total of 2,160 owls throughout the United States. Fletcher (1990) calculated that 2,074 owls existed in Arizona and New Mexico. However, Ganey *et al.* (2000) estimates approximately $2,950 \pm 1,067$ (SE) MSOs in the Upper Gila Mountains RU alone.

The primary administrator of lands supporting the MSO in the United States is the Forest Service. Most owls have been found within Forest Service Region 3 (including eleven National Forests in Arizona and New Mexico). Forest Service Regions 2 and 4 (including two National Forests in Colorado and 3 in Utah) support fewer owls. According to the Recovery Plan, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service.

The Recovery Plan reports an estimate of owl sites for 1990-1993. At that time, the greatest concentration of known owl sites in the United States occurred in the Upper Gila Mountains RU (55.9 percent). Similarly, the Forest Service reported a total of approximately 935 protected activity centers (PACs) established on National Forest lands in the Southwestern Region, with 542 PACs (58 percent) in the Upper Gila Mountain RU (USDA Forest Service, Southwestern Region, February 28, 2001).

The proposed project will occur in the Colorado Plateau Recovery Unit, which, according to the Recovery Plan, contained 62 (8 percent) of the known owl sites from 1990-1993. The Colorado Plateau RU includes most of southern and south-central Utah, plus portions of northern Arizona, northwestern New Mexico, and southwestern Colorado.

MSO habitat appears to be naturally fragmented in this RU, with most owls found in disjunct canyon systems or isolated mountain ranges. In northern Arizona, MSO have been reported in both canyon and montane situations. Recent records of MSO exist for the Grand Canyon and Kaibab Plateau, as well as for the Chuska Mountains, Black Mesa, Fort Defiance Plateau, and the Rainbow/Skeleton Plateau on the Navajo Nation. Federal lands account for 44 percent of this RU. Tribal lands collectively total 30 percent, with the largest single entity being the Navajo Nation. Threats in this RU, according to the MSO Recovery Plan, include timber harvest; overgrazing; catastrophic fire; oil, gas, and mining development; and recreation.

The Recovery Plan states that “historical records of Mexican spotted owls are available from forested habitats on the Kaibab Plateau of northern Arizona.” All of these historical records, several of which qualify as owl sites per the definitions in the Recovery Plan, are on the Kaibab National Forest. The Recovery Plan recommends designation of PACs at historical locations that qualify as owl sites. However, in a June 5, 2000, memorandum, we recognized the Recovery

Team's conclusion that not all historical locations warrant establishment of PACs. That memorandum also stated:

“Action agencies currently conduct surveys in proposed action areas to determine whether a PAC should be designated. I believe that the same survey protocol would be sufficient in determining whether to delineate a PAC around a historical location. That is, any surveys conducted since 1990, and any conducted in the future, that meet the currently used survey protocol and fail to detect spotted owls, will be sufficient to justify elimination or non-designation of a PAC at a historical site.”

Portions of the Kaibab National Forest have been surveyed several times over recent years for Mexican spotted owls without detecting the species, and breeding has never been confirmed on the Kaibab Plateau; no PACs are established there. However, there are several areas that have been surveyed only once or twice, and those surveys are relatively old. In addition, some of those areas include what little habitat remains that has not been recently altered.

Approximately 200 MSO PACs have been designated in the Colorado Plateau Recovery Unit (Shaula Hedwall, personal communication 2003). Eleven (approximately 5.5 percent) of those PACS have been involved in actions where incidental take has been anticipated.

Since the owl was listed, we have completed a total of 99 formal consultations for the MSO. These formal consultations have identified incidences of anticipated incidental take of MSO in 281 PACs. The form of this incidental take is almost entirely harm or harassment. These consultations have primarily dealt with actions proposed by the Forest Service, Region 3. However, in addition to actions proposed by the Forest Service, Region 3, we have also reviewed the impacts of actions proposed by the Bureau of Indian Affairs, Department of Defense (including Air Force, Army, and Navy), Department of Energy, National Park Service, and Federal Highway Administration. These proposals have included timber sales, road construction, fire/ecosystem management projects (including prescribed natural and management ignited fires), livestock grazing, recreation activities, utility corridors, military and sightseeing overflights, and other activities. Only one of these projects (release of site-specific owl location information) has resulted in a biological opinion that the proposed action would likely jeopardize the continued existence of the MSO.

In 1996, we issued a biological opinion on Forest Service Region 3's adoption of the Recovery Plan recommendations through an amendment of their Forest Plans. In this non-jeopardy biological opinion, we anticipated that approximately 151 PACs would be affected by activities that would result in incidental take of MSOs, with 2 of those PACs located in the Colorado Plateau RU. To date, consultation on individual actions under the amended Forest Plans have resulted in 199 PACs adversely affected, with 1 of those in the Colorado Plateau RU.

Mexican spotted owl critical habitat

The final rule designating critical habitat for the Mexican spotted owl became effective on March 5, 2001 (66 FR 8530). Critical habitat units were designated in New Mexico, Arizona, Utah, and Colorado. Within the designated boundaries, all protected or restricted habitat as described in the Recovery Plan is considered critical habitat.

The Colorado Plateau Recovery Unit contains ten critical habitat units. Those units contain a total of 4,279,139 acres of designated critical habitat. However, not all of the habitat within that acreage has the primary constituent elements of critical habitat. By definition, MSO critical habitat includes only those cover types as identified as MSO habitat in the MSO Recovery Plan which have one or more of the primary constituent elements outlined below. The amount of habitat that has the primary constituent elements within the boundaries of the designated units is unknown (but see Effects of the Action).

All critical habitat designations must consider the physical and biological features of habitat that are essential to the conservation of the species. Such features are the primary constituent elements, and for the MSO, include those features that support nesting, roosting, and foraging. Because the owls are found in both canyon and forest habitat, primary constituent elements were defined for each type of habitat. The primary constituent elements are:

Forest habitat

- high basal area of large diameter trees
- moderate to high canopy closure
- wide range of tree sizes suggestive of uneven-age stands
- multi-layered canopy with large overstory trees of various species
- high snag basal area
- high volumes of fallen trees and other woody debris
- high plant species richness, including hardwoods
- adequate levels of residual plant cover to maintain fruits, seeds, and regeneration to provide for the needs of Mexican spotted owl prey species

Canyon habitat

- cooler and often more humid conditions than the surrounding area
- clumps or stringers of trees and/or canyon wall containing crevices, ledges, or caves
- high percent of ground litter and woody debris
- riparian or woody vegetation (although not at all sites)

California condor

The California condor (*Gymnogyps californianus*) is a member of the family Cathartidae or New World vultures, a family of seven species, including the closely related Andean condor (*Vultur gryphus*) and the turkey vulture (*Cathartes aura*) (Leonard 2002). California condors are among

the largest flying birds in the world. Adults weigh approximately 10 kilograms (22 pounds) and have a wing span up to 2.9 meters (9.5 feet). Adults are black except for prominent white underwing linings and edges of the upper secondary coverts. The head and neck are mostly naked, and the bare skin is gray, grading into various shades of yellow, red, and orange. Males and females cannot be distinguished by size or plumage characteristics.

The California Condor was listed as endangered on March 11, 1967. We established critical habitat for the California condor nine years later on September 24, 1976. Long recognized as a vanishing species, the California condor remains one of the world's rarest and most imperiled vertebrate species. Despite intensive conservation efforts, the wild California condor population declined steadily until 1987, when the last free-flying individual was captured. During the 1980s, captive condor flocks were established at the San Diego Wild Animal Park and the Los Angeles Zoo, and the first successful captive breeding was accomplished at the former facility in 1988. Following several years of increasingly successful captive breeding, captive-produced condors were first released back to the wild in early 1992, and in Arizona starting in 1996.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

A. Status of the species within the action area

Mexican spotted owl

Grand Canyon National Park encompasses 1.2 million acres in northern Arizona (Leonard 2002). The Grand Canyon region is one of the most ecologically diverse in North America, with five of the seven life zones (Lower Sonoran, Upper Sonoran, Transition, Canadian, and Hudsonian) occurring in the park. Within the inner canyon, at the lowest elevations (below 5,000 feet), are several riparian woodland and scrub communities, as well as a variety of warm desert scrub associations with species characteristic of both Sonoran and Mohave deserts. At higher elevations within the canyon, and on the plateaus surrounding the canyon, are several cold desert scrub associations, with species characteristic of Great Basin desert. Interspersed with these communities, and at higher elevations, are pinyon-juniper woodlands (4,000–7,500 feet). Above these are the forest associations, including pure ponderosa pine (7,500 – 8,000 feet), ponderosa mixed with white fir and other conifers (8,000 – 8,800 feet), and spruce-fir at the highest elevations (above 8,800 feet). Some grassland communities, including mountain meadows and semi-desert shrub-grasslands, also occur within the Park. Protected and restricted MSO habitat in the project area is the mixed conifer cover type. There are approximately 75,432 acres of forested MSO habitat within the project area.

Canyon habitat has also been recognized for the MSO. In 1997 and 2000, Dave Willey of the MSO Recovery Team developed models to identify canyon habitat within the range of the MSO, including the project area. Canyon habitat is scattered throughout the Grand Canyon below the rims. Modeling of MSO canyon habitat has resulted in an estimate of 3,127 acres within the Park (Leonard, personal communication, 2003). The results of the habitat modeling have directed recent MSO survey efforts.

MSO have been reported in numerous visitor accounts for the Park since the 1920s (Leonard 2002). In 1992, MSO were detected within the Park through field surveys conducted on the North and South rims. Those initial surveys covered approximately 6,000 acres of suitable habitat. MSO responses were obtained from below the canyon rim.

In 1994 and 1995, a large-scale survey was conducted on the North Rim. That survey covered all suitable habitat on the North Rim plateau, including the Walhalla Plateau. MSO were not detected in those surveys.

Surveys were conducted in 1999 in side canyons with access from the Colorado River corridor. Those surveys detected two MSO pairs and four single males. In 2001, a large-scale river-based inventory was conducted. Approximately 30 additional MSO in side canyons were detected.

As a result of the surveys, the Park has designated 38 MSO PACs. The average size of the PACs is 775 acres. All of these PACs have been designated below the rims of the Grand Canyon. Several are adjacent to the rims of the Canyon. Because the PACs are located in very rugged topography, almost nothing is known about the occupancy or reproductive success within these MSO territories.

Mexican spotted owl critical habitat

The proposed project is in MSO critical habitat unit CP-10. That unit's boundaries essentially include Grand Canyon National Park in its entirety, although much of the Park does not contain the primary constituent elements of critical habitat. The unit contains 698,046 acres. According to Leonard (2002), there are approximately 75,432 acres of forested critical habitat within the designated critical habitat unit boundary. Because acreage within PACs is protected habitat and thus, by definition, critical habitat, another 29,437 acres of critical habitat occurs in the 38 designated PACs (Leonard 2002). According to Leonard (2002), an additional 3,127 acres of canyon critical habitat occurs within the unit.

California condor

In 1996, condors were released into the Vermilion Cliffs area in Coconino County, Arizona, approximately 60 miles north of Grand Canyon National Park. The released birds in Arizona were designated as a nonessential experimental population (Leonard 2002). Under the

regulations of the Act regarding nonessential experimental populations, the condor has the full protection of a threatened species within Grand Canyon National Park.

Following the release of condors in Arizona in 1996, the birds have matured and become skilled flyers, moving farther and farther from the release site. Each bird has been fitted with a radio transmitter that allows accurate tracking of their movements and behavior. The monitoring plan in the final environmental assessment dealing with the condor release calls for continued tracking of the birds. Although ground triangulation is the primary means of radiotracking, aerial and satellite tracking methods are also used to locate birds. Since the time of the initial release in Arizona of immature birds in 1996, data on bird activity away from the release site have been collected by Peregrine Fund and Grand Canyon National Park personnel.

In addition to the Grand Canyon area, reintroduced condors have been observed west to the Virgin Mountains near Mesquite, Nevada, south to the San Francisco Peaks near Flagstaff, Arizona, north to Zion and Bryce Canyon National Parks and beyond Minersville, Utah, and east to Mesa Verde, Colorado, and the Four Corners region.

Monitoring data indicate that the condors are using habitat throughout the Park, with concentration areas in Marble Canyon, Desert View to the Village on the South Rim, and from the Village to Hermit's Rest on the western portion of the South Rim. The majority of summer activity occurs on the South Rim, but includes both North and South Rim visitation areas. However, in 2002, condors spent an increasing amount of time on the Kaibab Plateau.

In 2001, one pair attempted to reproduce in an area below the rim of the Canyon. In 2002, two pairs attempted reproduction within the Canyon near the South Rim. All of the attempts failed for unknown reasons.

B. Factors affecting species' environment within the action area

Mexican spotted owl and Mexican spotted owl critical habitat

Fire history records indicate that approximately 19,800 acres of mixed conifer have burned in the Park since 1910, with some of those acres having burned multiple times during that period. Of those mixed conifer acres, 19,580 acres have burned since 1970, and 17,210 have burned since 1993, when the MSO was listed as threatened. The acreages include acres burned in wildfires, prescribed fires, and managed wildland fires. Recent fires are described below.

The Outlet Fire occurred April-June 2000. This wildfire resulted in approximately 837 acres of protected and 5,370 acres of restricted MSO habitat burned in Grand Canyon National Park. Over half of that acreage burned at high or moderate-to-high intensity. In addition, suppression activities associated with the emergency action resulted in the loss of some key components of MSO habitat. A formal consultation (2-21-01-F-267) was conducted on this emergency action and a non-jeopardy biological opinion was issued on April 19, 2002.

The Vista and Tower fires in 2001 burned slightly more than 6,300 acres of critical habitat; the percentage of high or moderate-to-high burn severity in those fires ranged from four to eighteen percent. The Vista Fire occurred July-September 2001. An analysis of the event and its impacts on the MSO and its habitat and critical habitat has not yet been completed. However, 3,658 acres of mixed conifer (MSO habitat and critical habitat) were burned by the fire. Formal consultation has not been completed on this emergency action/fire use project.

The Swamp Ridge Fire began on August 31, 2000. An analysis of the event and its impacts on MSO and their habitat and critical habitat has not yet been completed, nor has section 7 consultation.

Remotely-sensed or aerially-mapped burn-severity data are limited to all large fires occurring from 1999 through 2002, including Mt. Emma (wildland fire use, 1999), Walhalla Prescribed (Atoko subunit, 1999), Outlet (wildfire, 2000), Vista (wildland fire use, 2001), Tower (wildland fire use, 2001), and Swamp Ridge (wildland fire use, 2001). Those 1999-2002 fires burned a total of 27,876 acres, 43 percent of which burned in mixed conifer. Of the 11,926 mixed conifer acres, burn severity was unburned or low on 9,083 acres (76 percent), moderate-to-high on 1,906 acres (16 percent), and high on 937 acres (8 percent). Significant to complete loss of MSO key habitat components and primary constituent elements occurred in the moderate-to-high-and high-severity areas. However, since 1999, approximately 3,493 acres of the 75,432 acres of MSO habitat and critical habitat (4.6 percent) in the project area have recently been lost to high and moderate-to-high severity fire.

The Park collected data on seven fire-effects plots within the Vista wildland fire, all of which fell in mixed conifer habitat and in areas of low burn severity. The Park also has data from five additional mixed conifer fire-effects plots for which it has remotely-sensed burn severity data. All of those plots burned in the 2000 Outlet wildfire, and are in all burn-severity classes (one in low, one in moderate/low, two in moderate/high, and one in high).

The Park's fire effects monitoring program was designed to monitor only the effects of prescribed fires and not wildland fires. Thus, any data available from a wildland fire was due only to chance location of fire effects monitoring plots. The Park plans to improve its monitoring of the effects of wildland fire use. The Park plans to do that through the expanded use of remote sensing to quantify burn severity, as well as the possible addition of new monitoring methods to the fire-effects monitoring program.

Mexican spotted owl and California condor

Commercial overflights occur over MSO PACs in Grand Canyon National Park. A formal consultation (02-21-97-F-085) was conducted for this activity and a biological opinion was

issued to the Park on January 26, 2000. Reasonable and prudent measures provided in that biological opinion have not yet been implemented to our knowledge.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Mexican spotted owl

In order to analyze the effects of the proposed action, we consider the recommendations in the species' recovery plan and subsequent memoranda. The pertinent recommendations are as follows:

In a July 12, 1999, memorandum, we stated:

“The Recovery Team recommends that surveys for spotted owls not be required above 8,000 feet in elevation in ‘other forest and woodland types’ as defined in the Recovery Plan...we concur that no further effort should be expended in surveying those areas. We also agree that surveys should continue in mixed conifer habitat throughout the Colorado Plateau Recovery Unit.”

On September 2, 1997, we, issued a memorandum that concurs with the following recommendations made by the recovery team regarding prescribed natural fire (PNF):

1. While surveys are encouraged, they are not required for PNF areas.
2. Within areas containing owl habitat that have not been completely surveyed, protection of the 100-acre PAC centers is not required with the following stipulations:
 - a. Fire management plans must be coordinated with local biologists.
 - b. Known PAC locations and the associated 100-acre buffer zones must be incorporated into fire management plans so that fire personnel can protect those areas where feasible.
 - c. Fire management plans must identify areas that should be managed conservatively (i.e., setting a higher trigger on suppression efforts) because of high fire-risk conditions, especially when there is potential for stand-replacing fires within PACs or other owl habitat.

- d. Fire management plans must contain sufficient detail so that they can be evaluated for potential effects to owls in section 7 consultation.
3. There are no breeding season restrictions for PNF.
 4. Do not count PACs affected by PNF toward the ten percent of PAC's to be treated for fuels reduction.

The memorandum also states that in order for PNF to be successful and to simultaneously provide adequate safeguards for the owl, the above clarifications are based on the following assumptions:

1. Application of PNF in areas that have not been surveyed or are known to contain PAC's will undergo formal section 7 consultation. Incidental take statements would be based on the number of known PAC's, plus the estimated number of owl territories that may be present in unsurveyed nest/roost habitat. The Recovery Team encourages that consultation be done in a programmatic fashion to minimize workloads and prevent delays.
2. The PNF plans will contain enough detail to allow the Fish and Wildlife Service (Service) to adequately evaluate the effects of PNF on Mexican spotted owls.
3. The effects of PNF will be assessed after each fire event to allow evaluation of these guidelines and to allow the Service to track the species' environmental baseline.

With the proposed action, death or injury, disturbance, and loss of habitat could occur to Mexican spotted owls from fire, smoke, increased levels of noise and human activity, and aerial application of water or retardant.

Death and injury

Although the Park will be surveying for MSO on many acres of habitat annually, it does not have the resources to survey all potential habitat or all potential wildland fire use areas. Thus, wildland fires and/or suppression actions will occur in unsurveyed habitat. Up to 20,000 acres per year of unsurveyed habitat will be subjected to wildland fire use under the proposed project. Most of this habitat lies above the rim, outside of areas known to be occupied by MSO. Given that areas above the rim as well as National Forest lands on the Kaibab Plateau have been extensively surveyed without detecting MSO, it is not reasonably certain that mortality or injury will occur above the rim (see discussion below under "Loss of Habitat"). However, despite the Park's efforts to try to minimize fire encroachment into the canyon, it is possible that some areas of occupied habitat may be burned resulting in potential injury or mortality.

Loss of Habitat

Wildland fire will be managed primarily for low-intensity ground fires, with occasional patches of moderate and high-intensity fire.

The Park currently contains thirty-eight PACs or provisional PACs which total 29,437 acres. All of the designated PACs are below the rim of the canyon and most have some combination of canyon and forested canyon habitat. Although all PACS are below the rim, several of them extend up to the rim. According to the Park's fire history records, fire has overlapped the areas currently designated as PACs six times and has affected a total of 53 acres.

While wildland fire use projects are not targeted at areas below the rim, the Park will designate project boundaries (Maximum Manageable Areas or MMAs) to include areas below the rim and down to approximately the base of the Redwall limestone layer, where a natural firebreak commonly exists. Although the Park believes it is undesirable to set the MMA at the rim for an entire wildland fire use project, it is possible to limit a fire's movement over the rim in key areas, such as PACs. The Park has determined that the decision to keep fire from moving into specific areas will be made on a case-by-case basis through consultation between resource and fire managers.

The Park contains approximately 10,430 acres of mixed-conifer steep slope protected habitat outside of PACs. Most of these other protected areas occur in canyon habitat below the canyon rim, with a limited amount occurring above the rim.

On steep slopes, fuel arrangement and topography often combine to produce higher fire severity than on level ground if the fire begins below vegetation and burns upward. The threat of total habitat loss from high-intensity wildfire is greater in this steep-slope habitat. However, the vast majority of fire starts are expected to be above the rim, with inner-canyon burning likely to result largely from fires "backing" down hill. Such fires generally result in low-intensity burning and can be beneficial to forest health by removing smaller trees and recycling nutrients. Consultation between resource and fire managers will be used to identify whether to take action to protect these areas.

The Park contains approximately 64,922 acres of restricted MSO habitat. All restricted habitat in the Park is either mixed-conifer or riparian habitat. No areas meeting the definition of restricted riparian (broad-leaved forest) habitat will be included in wildland fire use projects, and there is no potential for damage to this habitat type from wildland fire use activities. The mixed-conifer cover type is the largest part of the restricted habitat in the Park and it will be subjected to wildland fire use. The key habitat components of MSO habitat (mixed-conifer) include hardwoods, a multi-storied canopy, high tree basal area, high canopy cover, large down logs, large trees, and snags.

The MSO Recovery Plan (Table III.B.1) provides target/threshold conditions as guidelines for maintenance and development of the key habitat components in appropriate amounts across the

landscape. The target/threshold conditions for mixed-conifer in the Colorado Plateau recovery unit are as follows:

In 25 percent of the planning area, 10 percent of the stand density of trees should occur in each of the 12-18 inch, 18-24 inch, and 24+ inch dbh size classes.

In 25 percent of the planning area, total tree basal area should be 32 m²/hectare (150 ft²/acre), and density of trees greater than 18 inches dbh should be 49 trees/hectare (20 trees/acre).

In a subset of the 25 percent portion of the planning area, 10 percent of the planning area should have the same stand density distribution as described above, should have a total tree basal area of 39 m²/hectare (170 ft²/acre), and should also have a density of trees greater than 18 inches dbh of 49 trees/hectare (20 trees/acre).

Although not designed to provide data to address the target/threshold conditions, the Park believes that its fire effects monitoring program can provide information on the nature of mixed-conifer habitat in the park. The program has also recently collected data on stand conditions before and after wildland fire in mixed-conifer habitat. The fire-effects data were also supplemented with remotely-sensed and ground-truthed burn severity data. Although the sample size is relatively small, the Park believes the data provide some idea of effects that can be expected from managed wildland fires relative to target/threshold conditions.

There are currently 24 plots installed in mixed conifer and randomized across several North Rim prescribed fire units. Seven of the plots burned in low-intensity portions of the Vista Fire in 2001, which began as a managed wildland fire but was later considered a wildfire.

The pre-treatment measurements from the 24 mixed-conifer plots provide initial pre-burn conditions that exist in general across the vegetation type. However, the Park cannot directly address what conditions might be present within subsets of the total area (e.g., the 25 percent and 10 percent areas of Table III.B.1. of the MSO Recovery Plan).

In the pre-burn measurements on the plots, the 12-18, 18-24, and 24+ inch dbh size classes contained 16, 14, and 25 percent of the total stand density index, respectively. Those results exceeded the desired goal of 10 percent for each class. Total tree basal area, including all trees greater than one inch dbh, was 219.2 ft²/acre, while density of trees greater than 18 inches dbh was 30.5 trees/acre. Those measurements also exceeded the target/threshold values given in the Recovery Plan, indicating that pre-treatment conditions across the mixed-conifer vegetation type adequately meet the guidelines.

The pre- and post-burn measurements from the seven plots burned in the Vista fire can provide an indication of the effects of a low-intensity wildland fire in mixed-conifer. The post-burn

measurements were collected immediately post-burn, in the summer of 2001. The Park notes that seven plots is not a large sample size relative to the type of data collected, and the results from this set of plots are not definitive.

In the seven plots, the stand density index represented by the 12-18 inch dbh size class changed from 19 percent pre-burn to 20 percent post-burn. The 18-24 inch dbh size class changed from 9 percent of the total stand density index pre-burn to 10 percent of the total stand density index post-burn. The 24+ inch dbh size class changed similarly, from 22 percent pre-burn, to 23 percent post-burn. All of the post-burn figures meet or exceed the desired value of 10 percent for each size class on 25 percent of the total planning area.

The total tree basal area on the seven plots, including all trees greater than one inch dbh, decreased from 255.0 ft²/acre pre-burn to 245.1 ft²/acre post-burn. That result still exceeds the 150 ft²/acre desired on 25 percent of the planning area, as well as the 170 ft²/acre desired on 10 percent of the planning area. The density of trees greater than 18 inches dbh remained unchanged at 27.7 trees/acre, exceeding the desired goal of 20 trees/acre. The density of trees in the 1-6 inch dbh size class decreased from 878.8 trees/acre and a stand density index of 120 pre-burn, to 691.4 trees/acre and a stand density index of 101 post-burn. This result suggests that the fire successfully removed a portion of the small understory trees.

In addition to recognizing that low-intensity fire achieved target/threshold conditions where it occurred, it is also important to consider what proportion of a fire burned at a low intensity. The Park addressed this issue through an analysis of burn severity using satellite imagery.

That analysis indicated that 64 percent of the area within the perimeter of the Vista fire burned at a low intensity, or remained unburned. An additional 18 percent burned at moderate-to-low intensity and the remaining 18 percent burned at moderate-to-high or high intensity. It is also important to note that the Vista Fire was reclassified as a wildfire when it had reached less than half of its final size. In two additional managed wildland fires, the Swamp Ridge and Tower fires, the low severity and unburned areas made up 80.9 percent and 84.2 percent of the total areas, respectively.

The Park conducted additional post-burn fire severity analysis for the recent Vista, Tower, and Swamp Ridge fires using remote sensing (Leonard, personal communication, 2002). Because the Vista fire originated as a fire use event that was eventually declared a wildfire, the fire-use portion of that event was separated from the wildfire portion. The fire use portion of the Vista fire resulted in 4.1 percent of the area burned at high, and 9.7 percent at moderate-to-high (for a total of 13.8 percent) severity. The Tower fire resulted in 0.2 percent burned at high, and 1.5 percent burned at moderate-to-high (total of 1.7 percent) severity. The Swamp Ridge fire resulted in 0.5 percent burned at high, and 4.9 percent at moderate-to-high (total of 5.4 percent) severity. The mean portion of these three fires sustaining moderate-to-high and high severity fire is approximately 7 percent.

In summary, up to 20,000 acres of the unsurveyed 75,432 acres (Leonard 2002) of MSO habitat will be subjected to wildland fire use per year. Where the fire is of low intensity, the key habitat components of MSO habitat are not expected to be significantly affected. However, up to 15 percent (3,000 acres) of that area may result in moderate-to-high or high intensity fire that results in significant or total loss of key habitat components for each of the five years of the life of the plan. Thus, over the life of the plan, 15,000 acres of unsurveyed MSO habitat could be significantly damaged. In addition, up to ten percent (four) of the thirty-eight known PACs in the project area may be affected by wildland fire use per year, which over the five-year life of the program could total 20 PACs. They will be treated with fire of an unknown intensity and to an unknown extent and therefore the key habitat components could be significantly affected.

As indicated elsewhere in this biological opinion, it may be possible that low-intensity wildland fires may benefit Mexican spotted owls although we are unaware of any definitive scientific evidence that that is the case. Bond *et al.* (2002) examined the short-term effects of wildfires on spotted owls. They determined that spotted owls of all three subspecies exhibited high estimates of post-fire survival, site fidelity, and average number of fledglings per pair, one year after both low and high severity fires. Unfortunately, their study describes only very short-term results, and was not designed to address the long-term effects of wildfires on spotted owls. Furthermore, although they indicated that only four of the eight territories that were examined for fire severity were subjected to high-severity fire, the results from low-severity fires and high-severity fires were not distinguished in the study. Thus, it is not possible to determine from the reported results whether the examined life history components were differentially affected by low and high severity fires. However, they were able to “hypothesize that spotted owls may have the ability to withstand the immediate, short-term (1-year) effects of fire occurring at primarily low to moderate severities within their territory.” Although a similar hypothesis was not expressed for high severity fires, the researchers stated that “the spotted owl may be able to survive wildfires of various sizes and severities.”

The researchers also stated that while they do not yet advocate wholesale prescribed burning in spotted owl territories, they do believe that their observations justify large-scale experiments to corroborate their observations and to establish cause-and-effect relationships. While the proposed action does not include an experimental approach (such an approach would be difficult if not impossible due to the unpredictable nature of wildland fire starts), the proposed action can potentially contribute to the body of knowledge on the effects of fire on spotted owls.

It may be possible that low intensity fire aids in protecting owl habitat from catastrophic fire. However, the particular fire regimes of owl habitat, and the loss of habitat characteristics that may occur due to wildland fires may obviate the protection. In any case, if low intensity fires can retain the characteristics recommended by the Recovery Plan, then anticipated adverse effects to owl habitat are likely to be few, and may in fact be beneficial. However, severe fire is likely to mimic the results and effects of catastrophic fire.

The Mexican Spotted Owl Recovery Team advocates fuels-reduction treatments both inside and outside of PACs (USDI 1995), and has in fact paid particular attention to use of wildland fire to aid in MSO recovery (September 2, 1997, memorandum from Region 2 Regional Director). For

managed natural fires (referred to as “prescribed natural fire” in Recovery Team documents) the Recovery Team eliminated survey requirements, relaxed the requirement to protect 100-acre cores within PACs, and recommended other measures to encourage wildland fire use. The Recovery Team also recommended monitoring the effects of wildland fire. While acknowledging that MSO may be incidentally taken, they believe that such trade-offs are necessary to return fire to the fire-adapted ecosystem in which the MSO evolved.

Noise and visual disturbance

The activities associated with managing a wildland fire are usually minimal, involving only monitoring of the fire’s progress. Fire monitors may walk and drive in and around the fire perimeter on a regular basis.

In some cases, management requires active suppression. These activities can range from construction of fireline around a cultural resource site to suppressing a flank of a fire while allowing another to increase. It is also possible that the fire could exceed the prescription and cease to be a low-intensity ground fire, or could threaten the pre-established MMA boundaries. Resulting fire-management and suppression activities could result in increased levels of disturbance to MSO from personnel on the ground and from aircraft.

Animal responses reported in the literature have been either physiological or behavioral in nature (Leonard 2002). Physiological effects may include temporary or permanent hearing threshold shifts, masking of auditory signals, increased respiration and heart rate, and increased corticosteroid levels. Behavioral responses may include animals becoming alert and turning toward the sound source, fleeing from the sound source, changes in activity patterns (e.g., interrupted feeding), nest abandonment, or changes in habitat use. If the changes are sufficiently severe, the health and survival of an individual animal may be reduced. If a large number of animals are affected, then local population declines could result. Additional studies regarding noise disturbance impacts on raptors were addressed in Leonard (2002), and are incorporated here by reference.

All known breeding MSO in the action area are below the canyon rim, and no MSO have been recorded above the rim in the Park. It is expected that the vast majority of suppression activity will occur above the rim and, given the rugged nature of inner-canyon topography, both air and on-foot suppression will likely be rare (if they occur at all). Thus, breeding owls will not likely be affected significantly by disturbance from suppression activities.

Smoke

There is a lack of scientific literature detailing what effects smoke may have on the MSO or other raptor species. Given that MSO have co-evolved with fire-adapted ecosystems in the Southwest, they are no doubt tolerant of a certain amount of smoke, but no data are available to determine

what this level of tolerance might be. As with other fire effects, young, less mobile owls would be more likely to be negatively affected than adults which could more easily move away from smoke.

Mexican spotted owl critical habitat

The Park used the pre- and post-burn data from the seven fire-effects plots of the Vista Fire to estimate the general effects on the primary constituent elements of MSO critical habitat (Leonard 2002). The data from these plots represent only the effects from low-intensity fire.

High basal area of large diameter trees

Basal area of trees larger than 18 inches dbh remained unchanged at 110 ft²/acre pre-burn to post-burn.

Moderate to high canopy closure

The Park's fire effects data does not address canopy closure directly. Results from the Vista plots suggest that canopy closure may be reduced through removal of small trees, but that the larger trees will remain. The Park expects that the remaining trees will provide at least moderate canopy closure.

Wide range of tree sizes suggestive of uneven-age stands

In the post-burn measurements of the Vista plots, the percent of the total stand density index in the 0-6, 6-12, 12-18, 18-24, and 24+ inch dbh size classes were 24, 23, 20, 10, and 23 percent, respectively. This distribution suggests an uneven-age stand.

Multi-layered canopy with large overstory trees of various species

The wide range of tree sizes present on the Vista plots suggests that the canopy will also be multi-layered; this is confirmed by field observation. Various species are also present, with the trees larger than 18 inches dbh remaining post-burn including ponderosa pine (17.9 trees/acre), white fir (8.7 trees/acre), and Douglas-fir (1.2 trees/acre).

High snag basal area

Basal area of snags 18 inches dbh and larger changed from 20 ft²/acre pre-burn to 17.6 ft²/acre post-burn.

High volumes of fallen trees and other woody debris

The total woody fuel load was 19.1 tons/acre pre-burn, including 14.6 tons/acre of fuels greater than three inches dbh. Post-burn, the total fuel load was 11.5 tons/acre, with 8.9 tons/acre of fuels greater than three inches dbh.

High plant species richness, including hardwoods

The Park has not collected enough data from the Vista plots to evaluate this element. In general, however, the Park expects that thinning of the canopy as well as reduction of fuel loads on the forest floor should allow increased diversity. The Vista plots contained 12.1 aspen trees/acre in the 6-18 inch dbh size class. The plots contained 10.9 aspen trees/acre in the 6-12 and 12-18 inch dbh size classes, post-burn.

Adequate levels of residual plant cover to maintain fruits, seeds, and regeneration to provide for the needs of Mexican spotted owl prey species

The Park has not yet collected sufficient data from the Vista plots to evaluate residual plant cover. The Park believes their monitoring experience from prescribed fires suggests that low intensity fire leaves a mosaic of residual plant cover, and also allows plant cover to return rapidly.

Overall, little overlap of wildland fires and canyon critical habitat is expected. If fires do occur in canyon habitat, they are likely to be in areas where canyon habitat also displays many of the characteristics of forest habitat (Leonard 2002). The Park evaluated the effects of wildland fire use on the primary constituent elements of canyon critical habitat.

Cooler and often more humid conditions than the surrounding area

This element would only be affected by wildland fire use where it was dependent on vegetation rather than topography.

Clumps or stringers of trees and/or canyon wall containing crevices, ledges, or caves

Clumps or stringers of trees could be affected as described above in the discussion of forest habitat.

High percent of ground litter and woody debris

Woody debris could be removed by a wildland fire, as discussed above.

Riparian or woody vegetation (although not at all sites)

Woody vegetation could be affected as described above.

In summary, up to 20,000 acres of the unsurveyed 75,432 acres of MSO critical habitat could be subjected to wildland fire use per year. Where the fire is of low intensity, the primary constituent elements of MSO critical habitat are not expected to be significantly affected. However, up to 15 percent (3,000 acres) of the area that may burn may result in moderate-to-high or high-intensity fire that results in significant or total loss of the primary constituent elements. Up to ten percent (four) of the thirty-eight known PACs in the project area could be treated with wildland fire use per year. They will be treated with fire of an unknown intensity and to an unknown extent and therefore the primary constituent elements could be significantly affected. All of the above may occur for each of the five years of the life of the wildland fire use plan. While up to twenty PACs could theoretically be so affected, in the entire recorded history of the Park only six instances of fire backing into the canyon (affecting a total of 56 acres) have been recorded. Thus, it seems reasonable to expect that no more than one currently known MSO PAC will suffer significant adverse effects over the time period of the proposed action.

Although critical habitat unit CP-10 (Grand Canyon National Park) contains 698,046 acres, according to the BE only 75,432 (10.8 percent) acres are actual forest MSO critical habitat. A model predicting the occurrence of both forest and canyon habitat in Arizona and Utah was developed by Dan Spotskey and Dave Willey (Spotskey and Willey 2000 a and b). That model indicates that the amount of forest critical habitat in CP-10 is 88,012 acres (Dan Spotskey, personal communication 2003). The annual worst-case or maximum degradation of forest critical habitat (3,000 acres) over the life of the plan (five years) could result in a possible degradation of a total of 15,000 acres of forest critical habitat over the life of the plan. Using the larger figure above (i.e., 88,012 acres instead of 75,432), such a loss would be approximately 17 percent of the existing MSO forest critical habitat in the project area.

The amount of actual forest MSO critical habitat in the other nine critical habitat units in the Colorado Plateau Recovery Unit (CPRU) is unknown. However, some rough estimates are possible. MSO critical habitat unit CP-2 is relatively very small and the amount of forest critical habitat is unknown but is probably none to negligible. To obtain estimates for units CP-6, 6a, and 7 (collectively Canyon de Chelly) the predictive habitat model (Spotskey and Willey 2000a; Dan Spotskey, personal communication 2003) was used. Unit CP-6 contains 1,031 acres of forest critical habitat, and CP-6a and 7 contain none. To obtain estimates for the remaining units, the predictive habitat model (Spotskey and Willey 2000b; Dan Spotskey, personal communication 2003) was used. Unit CP-11 (Zion) contains approximately 905 acres of forest critical habitat. Unit CP-12 (Escalante) contains approximately 18,329 acres of forest critical habitat. Unit CP-13 (Capitol Reef) contains no forest critical habitat, and CP-14 (Canyonlands) contains approximately 7,308 acres of forest critical habitat. Unit CP-15 (Book Cliffs) contains approximately 42,888 acres of forest critical habitat. The total amount of MSO forest critical

habitat in the CPRU is approximately 158,473 acres (which is 3.7 percent of the total 4,279,139 acres in the designated units). Thus, the worst-case scenario degradation of 15,000 acres of forest critical habitat over the five-year life of the proposed action will be an approximate 9.5 percent degradation of the designated forest MSO critical habitat in the CPRU.

The canyon and PAC critical habitat in the Colorado Plateau Recovery unit include the following figures partially from the same sources cited above. For CP-10, an additional 29,437 acres is in (38) MSO PACs (Leonard 2002), and there is an estimated additional 65,922 acres of canyon critical habitat in the unit (Dan Spotskey, personal communication, 2003). The remaining critical habitat units contain a total of approximately 92,199 acres of canyon habitat (Dan Spotskey, personal communication 2003) and 60,000 acres in PACs (Laura Romin and Frank Howe, personal communication 2003). Using those figures, the total area of canyon/PAC critical habitat in the CPRU is approximately 247,558 acres. Theoretically, up to 3,100 acres (four PACs) of that amount will be affected to an unknown degree by the proposed action each year of the five-year life of the plan, for a total of up to 15,500 acres. The actual proportion of each PAC that would be directly affected by severe fire is unknown, but we believe it is reasonable to expect only small areas of PACs would be affected. Even using the worst-case scenario, only 6.3 percent of the canyon and PAC critical habitat in the Colorado Plateau Recovery Unit would be affected, but much less effect is anticipated.

Thus, using the figures above, forest and canyon/PAC MSO critical habitat totals approximately 402,538 acres in the CPRU. Even using the worst-case scenario, only 7.6 percent (30,500 acres) of that amount will be affected to an unknown degree by the proposed action.

California condor

Wildland fire use activities may increase the potential for condor habituation to humans, and result in collisions of condors and aircraft, damage of condor habitat, and disturbance of condors by personnel, aircraft, and smoke.

Fire

The mobility of condors, and the fact that they rarely nest in forested habitat, make the possibility of direct mortality from fire relatively low.

Noise and Visual Disturbance

If suppression actions are necessary, the noise and activity associated with fireline construction, helicopter water drops, and crew staging areas could potentially disturb condors in the area. Studies of the physiological and behavioral responses of condors to noise and visual stimuli have not been undertaken. However, disturbance from wildland fire use activities could range from none at all to flushing birds from perching, roosting, scavenging, or nesting sites.

It is likely that condors will be attracted to areas with high levels of human activity associated with wildland fire use operations. Condors are naturally curious and it is not uncommon to observe them in busy areas, such as Grand Canyon Village on the South Rim. During the Vista wildland fire of 2001, fifteen condors were hazed from the North Rim helibase water tank several times. The attraction to human activity may increase the potential for interaction between condors and humans, which would be of concern if non-permitted personnel haze the birds, or if the birds become habituated to humans. It will not be possible for firefighters to cease activity if condors are attracted to fire management or suppression areas.

Smoke

Condors are highly mobile birds, able to travel over 100 miles in a single day, and use home ranges of well over a million acres (Leonard 2002). Because of their mobility, and the fact that they are not closely tied to one small habitat area, effects from smoke may be relatively minor. However, smoke will present a major disturbance or hazard if large amounts are generated near, or flow towards, nesting condors. Large amounts of smoke or chronic occurrence of smoke during the breeding season may cause condors to alter their behavior resulting in failure of the nest.

Collisions with Aircraft

Based upon observations made during the wildland fires of 2001, the Park helicopter and condors are sharing the same airspace (Leonard 2002). Although there have been no collisions or near-collisions, the potential does exist. There are no data available documenting the number of collisions between aircraft and birds within the Park. Increased aviation activity associated with wildland fire use, and the possible attraction of condors to other wildland fire use activity, will increase the overall risk of a collision.

Damage to habitat

Wildland fire use projects have the potential to damage condor roosting habitat within project areas. Some roost sites, such as large trees or snags, could be damaged or lost. Because many roosting sites are available throughout the Park, and condors demonstrate flexibility in use of roosts, damage to roost sites may be relatively minimal.

Wildland fire use projects also have some potential to contaminate condor food sources. Because suppression actions are a part of the proposed project, it is possible that aerially-applied fire retardant might be used in suppression activities.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The action area occurs entirely on Federal land, and therefore non-Federal actions are likely to be minimal. Private actions that are likely to occur within the action area include various forms of recreation in MSO habitat. Such recreation can result in a variety of effects to MSO, primarily through disturbance of owls. However, recreation effects are likely minimal to nonexistent given the remote and inaccessible nature of MSO habitat. A State action that is likely to occur in the future is allowing bison to wander from a State-owned buffalo ranch in House Rock Valley onto the Kaibab Plateau and into the Park. Roaming bison may affect MSO critical habitat as other domestic livestock are known to do. The impacts of these actions are entirely unknown, but because of the inaccessibility of MSO habitat, the effects are likely to be minimal. In summary, we do not consider cumulative effects to be a significant factor in the overall effects analysis.

CONCLUSION

After reviewing the current status of the Mexican spotted owl and the California condor, the environmental baseline for the action area, the effects of the proposed Grand Canyon National Park Fire Use Program and the cumulative effects, it is our biological opinion that the Grand Canyon National Park Fire Use Program, as proposed, is not likely to jeopardize the continued existence of the Mexican spotted owl and California condor, and is not likely to destroy or adversely modify Mexican spotted owl critical habitat.

We present these conclusions for the following reasons:

1. We anticipate that no more than one MSO PAC may be affected to a significant extent (see incidental take statement below).
2. Only 17 and 9.5 percent of forested critical habitat in the CHU-10 and the CPRU, respectively, will be affected to a significant degree.
3. Only 8 and 3.7 percent of total critical habitat in CHU-10 and the CPRU, respectively, will be affected to a significant degree.
4. Canyon habitat, which will be largely unaffected by the proposed action, is clearly the most important to MSO in both the Park (all 38 PACs are within the canyon) and the CPRU.
5. There has never been confirmed nesting on the Kaibab Plateau, and no detections of any spotted owls on the Plateau within the Park, where the majority of the fires will occur.
6. Fires are a natural part of the fire-adapted ecosystem in which MSO have evolved. The Mexican Spotted Owl Recovery Team and numerous others have recognized the importance of allowing fire to return to southwestern forests, and the policy of widespread fire suppression is well documented as a source of declining forest health.

7. The proposed action is largely consistent with the recommendations of the Recovery Team.
8. Implementation of the conservation measures that are part of the proposed action should reduce the impacts of the proposed project on the California condor.
9. No taking of condors is anticipated from fire; one condor is anticipated to be taken from suppression activities.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). "Harass" is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR 17.3). "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The National Park Service has a continuing duty to regulate the activity covered by this incidental take statement. If the National Park Service (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the agency or applicant must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Mexican spotted owl

For the purposes of consideration of incidental take of MSO from the proposed action under consultation, incidental take can be anticipated as either the direct mortality of individual birds, or the alteration of habitat that affects the behavior (i.e. breeding or foraging) of birds to such a degree that the birds are considered lost as viable members of the population and thus "taken." They may fail to breed, fail to successfully rear young, raise less fit young, or desert the area because of disturbance or because habitat no longer meets the owl's needs.

In past biological opinions, the management territory was used to quantify incidental take thresholds for the MSO (see biological opinions provided by the FWS to the Forest Service from August 23, 1993 through 1995). The current section 7 consultation policy provides for incidental take if an activity compromises the integrity of a PAC. Actions outside PACs will generally not be considered incidental take.

This biological opinion anticipates that one MSO PAC will be affected to the extent that taking of MSO will occur. This taking could be in the form of death, injury, harm, or harassment of up to two adults and associated eggs/juveniles.

Authorized taking will be considered to have been exceeded if fire or suppression actions affect more than one PAC in any of the following manners:

1. Over 10% of the PAC experiences burning of moderately high to high severity as defined in the BE, or suppression actions result in over 10% of a PAC being affected in a manner consistent with such burn severities.
2. Fire and/or smoke adversely affect a known 100-acre core area during the MSO breeding season (March 1-August 31).
3. Suppression actions occur in or over a known 100-acre core area during the breeding season.

We recommend that if, during the five-year duration of the proposed action, any PAC is affected in a manner described above, the Park reinitiate consultation so as to avoid exceeding the amount of authorized taking.

California condor

Even with the implementation of the conservation measures of the proposed project, the nature of the project (which includes uncontrolled fire and smoke, likely interaction with humans, and

condors and aircraft in the same airspace), and the behavior of condors make it reasonably certain that condors will be killed, injured, and/or have their behavior altered to significantly affect breeding, feeding, and sheltering. Thus, incidental take of California condors is anticipated.

Because all the condors that occur in the project area are known and are monitored on a daily basis, determining take (particularly death, injury, harm, or harassment through disturbance of behavior) of individuals will be relatively more straightforward to determine than for almost any other species. Therefore, we expect that the death or injury of one condor as a result of the project will be detectable. In addition, the take of even one individual would represent a significant loss to recovery of California condors. Any project that is likely to result in incidental take of condors should be immediately reevaluated if and when such take occurs. If such death or injury of one individual, or disturbance of one nest site, occurs, reinitiation of consultation on the proposed action will be required.

We anticipate that take of condors could include death, injury, harm, and/or harassment of up to one California condor resulting from: interaction with humans during wildland fire use activities on the ground OR collision with aircraft activity associated with wildland fire use actions, OR inundation of a nest site by smoke.

We will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In the accompanying biological opinion, we have determined that this level of anticipated take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES WITH TERMS AND CONDITIONS

Mexican spotted owl

The following reasonable and prudent measures are necessary and appropriate to minimize the effects on take of the Mexican spotted owl. In order to be exempt from the prohibitions of section 9 of the Act, the National Park Service must comply with the terms and conditions, implement the reasonable and prudent measures and outlining reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Grand Canyon National Park will implement the proposed actions in a manner that minimizes adverse effects to MSO and occupied MSO nest/roost habitat.

The following terms and conditions implement reasonable and prudent measure number 1:

- 1.1 The National Park Service shall ensure that no more than one PAC is affected to the extent described above (in the Amount and Extent of Take section) for the five-year life of the program.
 - 1.2 If it becomes apparent that a fire might enter the canyon and affect a PAC, to the extent practicable, attempt to determine the location and breeding status of MSO in that PAC.
 - 1.3 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 the 100-acre core areas for any PAC affected by wildland fire or suppression activities.
2. Personnel education/information programs and well-defined operational procedures shall be implemented.

The following terms and conditions implement reasonable and prudent measure number 2:

- 2.1 All field personnel who implement any portion of the proposed action shall be informed of regulations and protective measures as described herein for the MSO. All field personnel shall be informed that intentional killing, disturbance, or harassment of threatened species is a violation of the Act and could result in prosecution. A wildlife biologist will present a program regarding the management of fire in threatened and endangered species habitat to all personnel involved in the fire use program.
 - 2.2 Grand Canyon National Park shall review actions after each year of activity and prior to the next MSO breeding season. Such review will take into account the prior effects of all fire activities in the project area.
 - 2.3 Grand Canyon National Park shall ensure that all pertinent information from the reasonable and prudent measures of this biological opinion are included in the final burn plans for all wildland fire use actions.
 - 2.4 Grand Canyon National Park shall notify our Flagstaff Suboffice within two working days of any declared wildland fire actions in protected MSO habitat.
3. Fire suppression activities shall be carried out in a manner to reduce potential adverse effects to the MSO and its habitat, unless such actions would threaten life or property.

The following terms and conditions implement reasonable and prudent measure number 3:

- 3.1 A Resource Advisor will be available for all suppression activities associated with wildland fire in MSO PACs. Resource Advisors shall be provided adequate

information from qualified Park biologists with knowledge of the MSO and its habitat. The Resource Advisor shall possess maps of all PACs in the project area. The Resource Advisor shall coordinate MSO concerns and serve as an advisor to the Incident Commander/Incident Management Team. He/she shall also serve as field contact representative responsible for coordination with our Flagstaff Suboffice and shall monitor fire suppression activities to ensure that protective measures endorsed by the Incident Commander/Incident Management Team are implemented.

- 3.2 All fire suppression actions in PACs will occur, to the maximum extent possible, using minimum methods. This will include not removing trees over 9 inches dbh unless it is deemed necessary for safety reasons or to prevent the fire from affecting additional PAC acres.
 - 3.3 If a MSO is encountered during the fire, the Resource Advisor shall be advised immediately. The Resource Advisor shall assess potential harm to the owl and advise the Incident Commander/Incident Management Team of methods to prevent harm. The Resource Advisor shall maintain a record of any MSO encountered during suppression activities. The information shall include for each owl the location, date, and time of observation and the general condition of the owl.
 - 3.4 Restricted and protected MSO habitat disturbed during fire suppression activities associated with wildland fire use events, such as fire lines, crew camps, and staging areas, shall be rehabilitated, including the obliteration of fire lines to prevent their use by vehicles or hikers. Such rehabilitation/obliteration shall be inspected one year after the event to ensure effectiveness.
 - 3.5 Fire camps, staging areas, and any other areas of disturbance created for fire suppression actions shall be located outside of MSO PACs, whenever possible.
4. Grand Canyon National Park shall document all actions, report incidental take, and monitor the effects of the proposed action on habitat. Those findings shall be reported to us.

The following terms and conditions implement reasonable and prudent measure number 4:

- 4.1 By December 31 of each year, Grand Canyon National Park shall submit a report to us detailing that calendar year's actions. The report shall document the areas and acreage burned, the type of fire (prescribed fire, wildland fire use, wildfire), the name(s) of any PAC(s) subjected to wildland fire use, the amount of unoccupied MSO habitat subjected to wildland fire use, the extent of any suppression actions, the implementation and effectiveness of the terms and conditions of this biological opinion, information about MSO monitored or encountered, any rehabilitation

completed, quantification of any incidental take as defined in this biological opinion, and any recommendations for actions in the upcoming year(s). A map shall be provided which will include each wildland fire use event that occurred. Grand Canyon National Park shall keep and maintain a map depicting cumulative fire information for the project area. By March 1 of each year, prior to any wildland fire use implementation that year, Grand Canyon National Park will meet with our Flagstaff Suboffice to review the report and discuss the upcoming year's plans relative to the previous year's actions and cumulative actions.

- 4.2 Grand Canyon National Park will ensure that sufficient monitoring of the effects of fire on key habitat components of MSO habitat will be conducted after each wildland fire use event. Such monitoring may require additional plots beyond those previously established for the existing fire effects program. The intent of this required monitoring is to completely and adequately determine the effects of the event on the key components. A summary narrative and photographs fully and completely explaining the effects of the event on the key habitat components of MSO habitat will be produced. Each report will include a description of the prescription under which the wildland fire use event occurred.
- 4.3 Grand Canyon National Park will conduct fire severity monitoring within MSO protected and restricted habitat as soon as possible after each wildland fire use event. If the observed proportion of the event in high to moderate-to-high severity categories is greater than that expected in the Effects of the Action section of this biological opinion, then prescriptions will be adjusted to ensure that fire severity of future events is reduced.

California condor

Due to the relevant conservation measures that are described in the Description of the Proposed Action section, and are part of the proposed action, no reasonable and prudent measures are necessary.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. Grand Canyon National Park must immediately provide an explanation of the causes of the taking and review with us the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species, initial notification must be made to our Law Enforcement Office, 2450 West Broadway Road, Suite 113, Mesa, Arizona 85202 (telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Park continue monitoring existing PACs.
2. We recommend that the Park design and implement experimental fire treatments as recommended in Bond *et al.* (2003).

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate Grand Canyon National Park's efforts to identify and minimize effects to listed species from this project, and commend the decision to allow naturally ignited wildfire to resume its role in Park ecosystems. We also acknowledge the complexity involved in decisions on what actions (e.g., suppression vs. no-suppression) are most appropriate in a given situation in terms of effects to listed species, other natural and cultural resources, and the Park Service mission. For

further information, please contact Bill Austin (928) 226-0614 (x102) or Brenda Smith (x101). Please refer to the consultation number, 02-21-02-F-0118, in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque NM (ARD-ES)
Field Supervisor, Fish and Wildlife Service, Albuquerque NM
Director, Science Center, Grand Canyon National Park, Grand Canyon AZ

John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix AZ

W:\Bill Austin\MAYFIREUSEBO.118.wpd:cgg

LITERATURE CITED

- Bond, M.L., R.J. Gutierrez, A.B. Franklin, W.S. LaHaye, C.A. May, and M.E. Seamans. 2003. Short-term effects of wildfires on spotted owl survival, site fidelity, mate fidelity, and reproductive success. *Wildlife Society Bulletin* 30(4):1022-1028.
- Fletcher, K. 1990. Habitat used, abundance, and distribution of the Mexican spotted owl, *Strix occidentalis lucida*, on National Forest System Lands. U.S. Forest Service, Southwestern Region, Albuquerque, New Mexico. 78 pp.
- Ganey, J.L., G.C. White, A.B. Franklin, J.P. Ward, Jr., and D.C. Bowden. 2000. A pilot study on monitoring populations of Mexican spotted owls in Arizona and New Mexico: second interim report. 41 pp.
- Grand Canyon National Park. Undated. Biological evaluation for suppression actions taken on the Outlet Fire, Grand Canyon National Park. Grand Canyon National Park. 15 pp.
- Leonard, K. 2002. Biological evaluation for wildland fire use in Grand Canyon National Park, Coconino County, Arizona. Grand Canyon National Park, Grand Canyon. 83 pp.
- Spotskey, D.B. and D.A. Willey. 2000a. Arizona predicted Mexican spotted owl habitat. Draft map dated July 2000.
- Spotskey, D.B. and D.A. Willey. 2000b. Utah Mexican spotted owl habitat model. Draft Geographic Information System predictive model map dated January 11, 2000.
- U.S. Department of Agriculture, Forest Service, Southwestern Region. 2001. Biological Assessment and Evaluation, Urban Interface Fuel Treatment, February 28, 2001. 271 pp.
- U.S. Department of the Interior, Fish and Wildlife Service. 1991. Mexican spotted owl status review. Endangered species report 20. Albuquerque, New Mexico.
- U.S. Department of the Interior, Fish and Wildlife Service. 1993. Endangered and Threatened Wildlife and Plants; final rule to list the Mexican spotted owl as threatened. *Federal Register*. 58:14248-14271.
- U.S. Department of the Interior, Fish and Wildlife Service. 1995. Recovery Plan for the Mexican Spotted Owl: Vol. I. Albuquerque, New Mexico. 172 pp.

APPENDIX A - CONCURRENCE

This appendix contains our concurrences with your “may affect, not likely to adversely affect” determinations for sentry milk vetch, Kanab ambersnail, humpback chub, humpback chub critical habitat, southwestern willow flycatcher, and bald eagle.

Sentry milk vetch (*Astragalus cremnophylax* var. *cremnophylax*)

We concur with your determination that the proposed project may affect, but is not likely to adversely affect, sentry milk vetch. We base this concurrence on the following conservation measures which are part of the proposed action:

- 1) No wildland fires, and no firefighting (or firefighting-related) activities, will be allowed to encroach upon any known sentry milk vetch population.
- 2) If unsurveyed areas of potential habitat are included within the project boundary for wildland fire use, the Park will evaluate the potential for fire to enter the habitat. If it appears that fire could move through the potential habitat, the Park will attempt, to the extent practicable and without risking personnel safety, survey the habitat before fire reaches it. Fire will not be allowed to enter any habitat found to be occupied.

Kanab ambersnail (*Oxyloma haydeni kanabensis*)

We concur with your determination that the proposed project may affect, but is not likely to adversely affect, the Kanab ambersnail. We base this concurrence on the following:

- 1) The snail’s habitat is not near any potential wildland fire use project areas.

Humpback chub (*Gila cypha*)

We concur with your determination that the proposed project may affect, but is not likely to adversely affect, the humpback chub. We base this concurrence on the following:

- 1) The chub’s habitat is not near any potential wildland fire use project areas.

Humpback chub critical habitat

We concur with your determination that the proposed project may affect, but is not likely to adversely affect, humpback chub critical habitat. We base this concurrence on the following:

- 1) The chub’s critical habitat is not near any potential wildland fire use project areas.

Southwestern willow flycatcher (*Empidonax traillii extimus*)

We concur with your determination that the proposed project may affect, but is not likely to adversely affect, the southwestern willow flycatcher. We base this concurrence on the following:

- 1) No wildland fire use activities are currently planned in or near flycatcher habitat.

Bald eagle (*Haliaeetus leucocephalus*)

We concur with your determination that the proposed project may affect, but is not likely to adversely affect, the bald eagle. We base this concurrence on the following:

- 1) Eagles are not present in the Park when wildland fire use fires would be producing enough smoke to cause disturbance.