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In Reply Refer to:

AESO/SE
02-21-03-F-0065

July 3, 2003

Memorandum

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

From: Field Supervisor

Subject: Biological Opinion for the Walhalla Plateau Prescribed Fires

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 on Mexican spotted owl (*Strix occidentalis lucida*) (MSO) critical habitat was dated November 15, 2002, and received by us on November 19, 2002. In a February 21, 2003, memorandum, you requested formal consultation on the Mexican spotted owl. In an April 2, 2003, email message, you requested formal consultation on the California condor (*Gymnogyps californianus*). At issue are impacts that may result from the proposed Walhalla Plateau Prescribed Fires located in Coconino County, Arizona, on the Mexican spotted owl, its critical habitat, and the California condor.

In your memorandum, you requested our concurrence that the proposed action is not likely to adversely affect sentry milk vetch (*Astragalus cremnophylax* var. *cremnophylax*), humpback chub (*Gila cypha*) and its critical habitat, southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat, or bald eagle (*Haliaeetus leucocephalus*). In a December 20, 2002, memorandum, we concurred with your determination that the proposed project is not likely to adversely affect southwestern willow flycatcher critical habitat due to the fact that such designated critical habitat was rescinded on May 11, 2001. We concur that the proposed project is not likely to adversely affect the remainder of 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 November 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 Walhalla Plateau Prescribed Fires.

Date	*Event*
November 19, 2002	We received a November 15, 2002, request for formal consultation on, and a biological assessment of, the proposed project.
December 20, 2002	We responded with a thirty-day letter initiating formal consultation and requesting additional information necessary for the consultation.
February 24, 2003 March 25, 2003	We received the additional information we had requested in December. That information included a request for formal consultation on the Mexican spotted owl, as well as Mexican spotted owl critical habitat. The information also included a request for a consultation extension to May 1, 2003.
April 2, 2003	We received a request by email for formal consultation on the California condor.
April 18, 2003	We issued a draft biological opinion.
June 4, 2003	We received comments on the draft biological opinion via email.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Most of the information in this section is derived from the project Biological Evaluation (BE; Bowden 2002, Kleindienst 2002), and correspondence from Grand Canyon National Park (Park) dated February 21, and March 31, 2003. The Grand Canyon Fire and Aviation division proposes to conduct first- and second-entry prescribed burns on the Walhalla Plateau on the North Rim of the Grand Canyon National Park. The purpose of the project is to further reduce hazardous fuel accumulations. The Park believes this action will help to restore the forested area to pre-fire suppression conditions thus allowing for the area to be returned to a natural fire regime.

Implementation of the project will occur in several separate burns over a period of three-to-five years. Previous burns on the plateau include the 1995 Mathes and 2001 Vista Fire Use Fires and prescribed fires in 1998 and 1999. The primary emphasis of this project is to treat those areas not previously burned. However, during the life of this plan, the previously burned areas may be ignited as second-entry maintenance burns. The size of each portion burned in any one

operational period will be dependent on weather conditions and air quality approvals from the Arizona Department of Environmental Quality.

The Walhalla Plateau is a large peninsular plateau that juts out of the east side of the North Rim. There are two dominant forest types on the plateau. The southern portion of the plateau contains a pure ponderosa pine forest while the northern portion supports a mixed conifer forest. The burn unit consists of the entire Walhalla Plateau south of the Cape Royal road and the Outlet wildland fire of 2000. The northern boundary follows the Cape Royal road and the Outlet burn on the east. The northwest boundary is a hand line from Cape Royal road south to the head of Bright Angel Canyon. The remaining perimeter is the plateau rim down to the 6,000 foot elevation along the rest of the east, south, and west boundaries. The plateau consists of 14,575 acres.

This project will involve scraping fireline, blacklining peripheral boundaries, hand ignition, and aerial ignition. The fires will be managed as low-intensity fires and will be maintained on the Walhalla Plateau. Fire may slop over the canyon rim down to 6,000 feet but this area will not be intentionally ignited. The first burn for this project is scheduled for summer or fall 2003. The primary intent of this project is to burn areas that have not been previously burned. Subsequent to the first-entry burns, second-entry burns may be ignited during the life of this plan.

There are three burn units that have not had significant fire occurrences in the past. These areas will be considered first-entry burns. The three areas are located south of the Outlet fire, and north and west of the Mathes fire. All other areas on the Walhalla Plateau have experienced past fires. The old burns will be utilized as prescribed fire boundaries for some initial entry burns. Those old burns may not be ignited during initial entry burns, but fire will be allowed to enter and continue burning.

Holding actions include all standard fire suppression actions approved within the current Fire Management Plan. Holding resources include aircraft, engines, water tenders, and hand crews. Minimum Impact Suppression Tactics (MIST) will be used for any necessary suppression actions. Mop up may occur along perimeter boundaries and within the interior of the area when safety or smoke considerations deem it necessary. Wherever possible the fire will be left to burn out naturally.

Raptor nest trees and frequently used snags identified during biological clearance surveys will be lined with a five-foot scrape to protect them from fire. Overstory tree (greater than 16 inches in diameter at breast height [dbh]) mortality will be limited to less than 20 percent within five years post-burn. Fuel moisture and other environmental conditions will be measured prior to ignition to insure that acceptable burning conditions are met. Flame lengths are expected to be between 1 – 6.4 feet with an average flame length of 3 feet. Torching of groups of seedlings and sapling-sized (1 – 4 inch dbh) trees and isolated torching of overstory trees is expected. Rate of spread is expected to be 2 – 15 chains (132-990 feet) per hour.

The MSO habitat on the Walhalla Plateau was last surveyed in 2001. The Park will insure that MSO surveys are conducted in accordance with the Mexican Spotted Owl Survey Protocol prior to project implementation. The Park will plan the burns so as to not allow fire or fire-related activities within 0.5 miles of known Protected Activity Centers (PACs) during the Mexican spotted owl breeding season, March 1 - August 31. The Park considers "inactive" to mean that no owls are detected after four survey visits.

The Park will limit the amount of fire that will be allowed to occur in unplanned runs into MSO habitat. Within steep-slope protected and/or canyon critical habitat the Park may allow as much as 2,500 acres to burn. If that limit is likely to be exceeded, the Park will initiate suppression actions. However, the Park will reinitiate consultation if more than 1,000 acres are burned within this habitat type. Within PACs the Park will initiate suppression actions if it seems likely that more than 1,100 acres of habitat will burn. However, the Park will reinitiate consultation if more than 600 acres of PAC habitat is burned.

Conservation Measures

The Park has indicated that the following conservation measures regarding the MSO and MSO critical habitat are part of the proposed project and will be implemented for each prescribed fire project that occurs (Bowden 2002). The conservation measures for the California condor were confirmed to be part of the proposed action in an April 2, 2003 email message.

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

2. To minimize negative effects on habitat, and on the primary constituent elements of critical habitat, fires will be managed as low-intensity fires, as discussed in the project description.

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

4. The Park will not allow fire or fire-related activities within 0.5 mile of known PACs during the Mexican spotted owl breeding season, March 1 - August 31, unless the PAC has been determined to be inactive for that breeding season.

5. 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.

6. If fireline construction is necessary, the Park will rehabilitate the line after use. This 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.

7. To the maximum extent possible, aircraft will remain at least 1000 feet from the boundary of any designated PAC.

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

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

10. The Park will survey known PACs that can be surveyed from the rim, and that are adjacent to project areas as described in this document.

11. The Park will perform a burn severity analysis on the prescribed fires and will quantify and map the areas of the project that burn at the varied intensity levels. This map will be provided to the FWS.

California condor

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

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

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

4. If condors arrive at any area of human activity associated with prescribed fire 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.

5. No non-permitted personnel will haze condors.

6. All camp areas will be kept free from trash.

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

8. 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.

9. 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.

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

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

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

13. Smoke from prescribed fire projects will be prevented from negatively affecting condor breeding. A given potential prescribed fire will not be initiated, or an existing prescribed fire will be modified or terminated, in order to prevent or stop significant amounts of smoke, 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.

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 FWS appointed the MSO Recovery Team in 1993, which produced the Recovery Plan for the MSO 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 ± 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 RU, which includes most of southern and south-central Utah, plus portions of northern Arizona, northwestern New Mexico, and southwestern Colorado. According to the Recovery Plan, this RU contained 62 (8 percent) of the known owl sites from 1990-1993. The Colorado Plateau RU However, as of 2003, approximately 200 MSO PACs have been designated in the Colorado Plateau RU (Shaula Hedwall, FWS, personal communication 2003). Eleven (approximately 5.5 percent) of those PACS have been involved in actions where incidental take has been anticipated.

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 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, the FWS Southwest Regional Director 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."

Extensive areas of the Kaibab National Forest and Grand Canyon National parks on the Kaibab Plateau 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.

Since the owl was listed, we have completed or have in draft form a total of 111 formal consultations for the MSO. These formal consultations have identified incidences of anticipated incidental take of MSO in 289 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, 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, the FWS 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 approximately two of those PACs located in the Colorado Plateau RU. In addition, we completed a reinitiation of the 1996 Forest Plan Amendment biological opinion which anticipated the additional incidental take of five MSO PACs in Region 3 due to the rate of implementation of the grazing standards and guidelines, for a total of 156 PACs. To date, consultation on individual actions under the amended Forest Plans have resulted in 205 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). The primary constituent elements, 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 then 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

Mexican spotted owls have been reported in numerous visitor accounts for Grand Canyon National Park since the 1920s. As of 1992, the presence of spotted owls within Grand Canyon National Park was confirmed during field surveys conducted on the North and South Rims. These initial surveys encompassed approximately 6,000 acres of suitable habitat and used the formal U. S. Forest Service protocol in existence at the time. The owl responses were from within the canyon itself rather than the plateau areas. In 1994 and 1995, the most suitable South Rim plateau habitat was surveyed with negative results.

In 1998 and 1999, a large-scale survey was undertaken on the North Rim. Those surveys covered all suitable owl habitat on the heavily forested North Rim plateau area, including the Walhalla Plateau, and used the formal U.S. Fish and Wildlife Service survey protocol. No responses were elicited from owls during those surveys.

Additional surveys were conducted in 1999 in side canyon habitat with access achieved through the Colorado River corridor. Those surveys located two pairs and four single male MSOs in side-canyon habitat.

In 2001 and 2002, a large-scale river-based inventory was undertaken with the result of approximately 53 additional side-canyon dwelling owls located. Surveys were also conducted along a 30-mile stretch of South Rim Plateau habitat, and in the Cape Royal and Point Imperial areas. Those surveys resulted in the location of several owl territories within side canyon habitat. The Walhalla and Outlet Plateaus were surveyed in 2001 with negative results. In 2002, a pair of owls was located from a rim calling station near the Bright Angel peninsula.

The above-mentioned inventory efforts are beginning to show that a relatively large spotted owl subpopulation exists in the Grand Canyon National Park. The status and management of these owls is therefore highly relevant to the species' overall conservation.

As a result of the surveys, the Park has designated 38 MSO PACs. The average size of the PACs is 775 acres. All of those PACs have been designated below the rims of 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 histories within those 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. There are approximately 88,012 acres of forested critical habitat within the designated critical habitat unit boundary (Dan Spotskey, personal communication 2003). There are approximately 65,922 acres of canyon critical habitat in the unit. Because acreage within PACs is protected habitat and thus, by definition, critical habitat, approximately 29,437 acres of critical habitat occurs in the 38 designated PACs.

The Walhalla Plateau contains over 5,550 acres of mixed conifer forest that is Mexican spotted owl habitat and critical habitat. There are approximately 6,000 acres of protected habitat (which is also critical habitat) in the form of 10 PACs surrounding the plateau.

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. 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, only approximately 3,493 acres of the 75,432 acres of MSO habitat and critical habitat (4.6 percent) in the Park 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 Walhalla Plateau contains approximately 5,550 acres of protected and restricted MSO habitat. Over the past twenty years a total of two fires, the 1999 Atoko prescribed fire and the 2001 Vista fire, burned approximately 702 acres (13 percent) at the moderate-to-high and high-severity levels.

Mexican spotted owl and California condor

Commercial overflights occur over MSO PACs in Grand Canyon National Park. A formal consultation (2-21-97-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."

The Walhalla Plateau contains over 5,550 acres of mixed conifer forest that is Mexican spotted owl habitat. There are approximately 6,000 acres of protected habitat in the form of 10 PACs which surround the plateau. All habitat was surveyed to Mexican spotted owl inventory protocol in 1998, 1999, and 2001. No spotted owls were detected on the plateau. All predicted canyon habitat that surrounds the plateau was surveyed between the years 2001 and 2002. Those surveys located 15 owls in 10 territories. However, due to the difficulty in accessing canyon habitat, the canyon backcountry surveys did not follow the inventory protocol.

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

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 statements that they will 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

There are 10 PACs proximate to the Walhalla Plateau. Five of the PACs are close enough to the rim that fire may enter them if fire falls to the 6,000-foot level. The Park believes that while prescribed fire projects are not targeted at areas below the rim, it is desirable to draw the project boundary to include areas over the rim and down to approximately the Coconino sandstone layer (6,000 feet), where a natural firebreak commonly occurs.

The perimeter of the Walhalla Plateau, where the rim drops into the canyon, contains mixed-conifer steep-slope protected habitat. While the prescribed fires will be managed as low-intensity fires, there is the possibility that higher intensity fire could occur in this habitat. If a prescribed fire threatens to enter this protected habitat, a Park biologist will be notified as soon as the threat is recognized. The Park biologist in conjunction with the fire incident commander will discuss the possible benefits and impacts associated with either allowing the fire to proceed into, or preventing the fire from entering, the protected habitat.

There are approximately 5,539 acres of mixed conifer restricted habitat on the Walhalla Plateau. The key habitat components that make mixed-conifer restricted habitat important to owls 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 Recovery Plan recommends that 25% of the restricted habitat be maintained in, or targeted for, the following:

> Ten 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.
>
> Total tree basal area should be 32 m^2/hectare (150 ft^2/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 m^2/hectare (170 ft^2/acre), and should also have a density of trees greater than 18 inches 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 use and prescribed fires in mixed-conifer habitat. The fire effects information was also supplemented with remotely-sensed and ground-truthed burn severity data.

There are currently 24 plots installed in mixed conifer and randomized across several North Rim prescribed fire units. Thirteen of these plots have had one year post fire data collected from them.

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 discussed in Table III.B.1. of the MSO Recovery Plan).

In the pre-burn measurements on these 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 exceed the desired goal of 10 percent for each class. Total tree basal area, including all trees greater than one inch dbh, was 219.2 ft^2/acre, while density of trees greater than 18 inches dbh was 30.5 trees/acre. Those measurements also exceed 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 thirteen fire effects plots that burned can provide an indication of the effects of low-intensity fire in mixed-conifer habitat. The post-burn measurements were collected one year post-burn. The Park notes that thirteen 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 thirteen plots, the stand density index represented by the 12-18 inch dbh size class changed from 18 percent pre-burn to 21 percent post-burn. The 18-24 inch dbh size class changed from 11 percent of the total stand density index pre-burn to 13 percent of the total stand density index post-burn. The 24+ inch dbh size class changed similarly, from 27 percent pre-burn, to 29 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 thirteen plots, including all trees greater than one inch dbh, decreased from 226.4 ft^2/acre pre-burn to 195.2 ft^2/acre post-burn. That result still exceeds the 150 ft^2/acre desired on 25 percent of the planning area, as well as the 170 ft^2/acre desired on 10 percent of the planning area. The density of trees greater than18 inches dbh changed from 30.2 trees/acre pre-burn to 27.2, exceeding the desired goal of 20 trees/acre. The density of trees in the 1-6 inch dbh size class decreased from 626.7 trees/acre and a stand density index of 87 pre-burn, to 245.1 trees/acre and a stand density index of 42 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 prescribed fires burn at a low intensity. The Park does not have satellite imagery data for prescribed fires to address burn intensity, but it does have burn-severity information.

The Park's Fire GIS Specialist, Fire Ecologist, and Fire Wildlife Biologist flew over past prescribed fires to observe and assess burn severity. All mixed conifer forest that was treated with prescribed fire during the past 10 years was flown over and assessed for overstory tree mortality and fire scorch. Areas of high severity were mapped using GPS and GIS technology. The high severity areas for the Atoko fire were also mapped from the ground. The maps of high-severity areas produced from the air and ground compared directly. Five fires were flown over and the results are summarized in Table 2.

Table 2. Observed high fire severity in recent prescribed fires in Grand Canyon National Park.

Burn Name	**Burn Year**	**Total Acres**	**Acres and % High Severity**
Northwest I	1992	225	Scattered Trees (< 1 %)
Tiyo I	1997	392	Scattered Trees (< 1 %)
Atoko	1999	1,857	52 acres (2.8 %)
Outlet	1999	4,033	Scattered Trees (< 5 %)
Tiyo 2000	2000	464	1.25 (1 %)

Over the past 20 years a total of two fires, the 1999 Atoko prescribed fire and the 2001 Vista fire-use fire, burned about 702 acres at the moderate-to-high to high intensity levels representing approximately 13 percent of the restricted habitat on the Walhalla Plateau. With the completion of the proposed action, an additional 555 acres of habitat may be significantly altered by moderate-to-high to high intensity fire.

The Park could not provide a map of individual burn unit boundaries for the planned prescribed fires. The Park believes that fixed project boundaries cannot be provided because unplanned events may cause them to shift project boundaries in the future. However, based on the Park's best available information, the proposed action will treat 10,513 acres in total. Most of that acreage will be in ponderosa pine habitat and will be second-entry burns. As part of that amount, 3,173 acres of mixed-conifer restricted Mexican spotted owl habitat will be treated. However, unforeseen events may cause the Park to shift boundaries. The Walhalla Plateau contains about 14,575 acres of forested habitat of which about 5,550 acres are mixed-conifer restricted Mexican spotted owl critical habitat. The Park believes that as much as 10 percent, or 555 acres, of this habitat may be significantly damaged by moderate-to-high to high intensity fire.

The acreage estimates are based on habitat that the Park intends to treat. They do not include the possibility that the prescribed fires will make un-planned runs into Mexican spotted owl steep slope protected and/or canyon critical habitat or PACs. The extent and frequency of those unplanned runs are unknown and the amount of habitat that the runs may potentially affect is not quantified. However, the Park has placed limits on the amount of fire that will be allowed to occur in such instances. Within steep slope protected and/or canyon critical habitat the Park may allow as many as 2,500 acres to burn. If that limit is likely to be exceeded, the Park will initiate suppression actions. However, the Park will reinitiate consultation if more than 1,000 acres are burned within this habitat type. Within PACs the Park will initiate suppression actions if it seems likely that more than 1,100 acres of habitat will burn. However, the Park will reinitiate consultation if more than 600 acres of PAC habitat is burned. As much as 10% or 250 acres within steep slope protected and/or canyon critical habitat, or 110 acres within PACs, may burn at the moderate-to-high or high intensity level.

The Grand Canyon Prescribed Fire Program has been ongoing since 1978. In that time, three fires have been converted to wildfires. Of these fires, two stayed within 10 acres of their planned burn perimeter. The third fire, the Outlet 2000 fire, became a large fire that took considerable resources to contain.

As indicated elsewhere in this biological opinion, it may be possible that low-intensity 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, 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 prescribed 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 fire to aid in MSO recovery. The Recovery Team also recommended monitoring the effects of 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 prescribed fire involve igniting and monitoring the fire's progress. After monitoring weather conditions and insuring that proper fuel moisture and wind patterns exist, firefighters will ignite the perimeter of the project area using standard hand ignition practices. The perimeter will be divided into sections and lit in a controlled manner. Once a defensible perimeter is established, the interior of the project area will be lit by aerial ignition. Large patches of unburned areas within the perimeter may be re-ignited using drip torches or other hand ignition techniques. While the fire is burning, small numbers of fire monitors will patrol the area recording the fire's growth and behavior.

In some cases, it also becomes necessary to use suppression techniques to manage the fire. These can range from small efforts such as putting in a fireline around a cultural resource site to suppressing one flank of a fire while allowing the other to grow. 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 project boundaries, in which case full-scale suppression activities will be undertaken. These activities would result in increased levels of disturbance from personnel on the ground and from aircraft. Should the fire drop over the rim and enter into a PAC, the presence of firefighters in occupied Mexican spotted owl habitat could induce behavioral changes, but the extent of this impact is largely unknown and would be limited to the non-breeding season.

Animal responses reported in the literature have been either physiological or behavioral in nature. 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 Bowden (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, owls will not likely be affected significantly by disturbance from suppression activities.

Smoke

There is little information in the 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 thirteen fire effects monitoring plots which burned in mixed-conifer on the North Rim to illustrate the effects of a low-intensity fire on the primary constituent elements of critical habitat.

High basal area of large diameter trees

On the thirteen plots, basal area of trees larger than 18 inches dbh changed from 115.9 ft^2/acre pre-burn to 103.7 ft^2/acre post-burn.

Moderate to high canopy closure

The Park's fire effects data does not address canopy closure directly. Results from the fire effects 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 thirteen plots, the percent of the total stand density index represented by the 0-6, 6-12, 12-18, 18-24, and 24+ dbh size classes were 23, 20, 18, 11, and 27 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 thirteen 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 (18.9 trees/acre), white fir (6.9 trees/acre), and douglas-fir (0.6 trees/acre).

High snag basal area

On the thirteen plots, basal area of snags 18 inches dbh and larger changed from 24.6 ft^2/acre pre-burn to 23.1 ft^2/acre post-burn, a 6 percent reduction.

High volumes of fallen trees and other woody debris

On the thirteen plots, the total woody fuel load was 19.3 tons/acre pre-burn, including 14.6 tons/acre of fuels greater than three inches in diameter. Post-burn, the total fuel load was 11.9 tons/acre (a 38 percent reduction), with 8.8 tons/acre of fuels greater than three inches in diameter (a 40 percent reduction).

High plant species richness, including hardwoods

The Park has not collected data on the thirteen plots for a long enough period of time 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 thirteen plots contained 6.9 aspen trees/acre in the 6-12 and 12-18 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 enough data from the thirteen 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 prescribed fires and canyon 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. The Park evaluated the effects of prescribed fire 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 fire 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. Other elements would not be affected.

High percent of ground litter and woody debris

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

Riparian or woody vegetation (although not at all sites)

Woody vegetation could be affected as described above, but it is highly unlikely that riparian vegetation would be affected by the prescribed fires.

The Walhalla Plateau contains approximately 5,550 acres of spotted owl critical habitat. Over the past 20 years, fires (fire use, wildfire, and prescribed) on the Walhalla Plateau have resulted in 448 acres of moderate-to-high severity burning and 254 acres of high severity burning. That result represents a total of 13 percent of the critical habitat on the Walhalla Plateau that has been significantly affected by fire. As previously stated, as much as 10 percent or 555 acres of the existing habitat may be altered by moderate-to-high to high intensity fire.

California condor

Prescribed fire activities may increase the potential for condor habituation to humans, and result in collisions of condors and aircraft, damage to 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 prescribed fire 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 prescribed fire 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. 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. 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 prescribed fire, and the possible attraction of condors to other prescribed fire activity, will increase the overall risk of a collision.

Damage to habitat

Prescribed fire 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.

Prescribed fire 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 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 Walhalla Plateau Prescribed Fires and the cumulative effects, it is our biological opinion that the Walhalla Plateau Prescribed Fires, as proposed, are not likely to jeopardize the continued existence of the Mexican spotted owl and California condor, and are 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 555 acres of forested habitat/critical habitat will be affected to a significant degree.

3. 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.

4. 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 fire will occur.

5. 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.

6. 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 percent of the PAC experiences burning of moderately high to high severity as defined in the BE, or suppression actions result in over 10 percent of a PAC being affected in a manner consistent with such burn severities.

2. Fire and/or smoke 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, condors and aircraft in the same airspace), and the behavior of condors make it possible that condors will be killed or injured, and 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, or harm and 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 could 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 or injury, or harm and harassment, of up to one California condor resulting from: interaction with humans during prescribed fire activities on the ground OR collision with aircraft activity associated with prescribed fire 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 this 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 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 following terms and conditions, which implement the reasonable and prudent measures and outline required 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 one:

1.1 The National Park Service shall make every effort, consistent with ensuring human safety, to ensure that no more than one PAC is affected to the extent that take occurs as described above for the life of the project.

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 prescribed fire and suppression activities out of the 100-acre core areas for any PAC affected by prescribed 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 two:

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 cumulative 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 prescribed fire actions.

2.4 Grand Canyon National Park shall notify our Flagstaff Suboffice within two working days of any prescribed fire actions in protected and restricted 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 three:

3.1 A Resource Advisor will be available for all suppression activities associated with prescribed 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 Advisors 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 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 prescribed fire 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. The effectiveness of such closures shall be monitored on a yearly basis.

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 four:

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 prescribed fire, the amount of unoccupied MSO habitat subjected to prescribed fire, 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 prescribed fire 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 prescribed fire 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 prescribed fire 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 habitat components. A summary narrative 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 prescribed fire event occurred.

4.3 Grand Canyon National Park will conduct fire-severity monitoring in protected and restricted MSO habitat after each prescribed fire event. If the observed proportion of the event in high to moderate-to-high severity categories is greater than that expected in the incidental take statement of this biological opinion, then prescriptions will be adjusted to ensure that fire severity of future events are 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 the attempts to allow fire to resume its role in Park ecosystems.

For further information, please contact Bill Austin (928) 226-0614 (extension102) or Brenda Smith (extension101). Please refer to the consultation number, 2-21-03-F-0065, in future correspondence concerning this project.

Steven L. Spangle

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

John Kennedy, Arizona Game and Fish Department, Phoenix AZ

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APPENDIX A - CONCURRENCE

This appendix contains our concurrences with your "may affect, not likely to adversely affect" determinations for sentry milk vetch, 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 (as indicated in an April 2, 2003 email message):

1) No prescribed 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 a prescribed fire, 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, to the extent allowed by personal safety considerations, survey the habitat before fire reaches it. Fire will not be allowed to enter any habitat found to be occupied.

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 prescribed fires will occur at a distance from chub habitat.

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 prescribed fires will occur at a distance from chub critical habitat.

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) Flycatchers occur at a distance from the project area, and any smoke effects to that occurrence are likely to be of short duration.

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) Although eagles are anticipated to be present in the Park during implementation of the project, they are expected to be present at a distance where, and at a time when, fires would not be producing enough smoke to cause disturbance.