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U.S. Fish and Wildlife Service
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In Reply Refer To:
AESO/SE
22410-2006-FE-0381

December 14, 2006

Ms. Elaine J. Zieroth
Forest Supervisor
Apache-Sitgreaves National Forest
Springerville, Arizona 85938-0640

Dear Ms. Zieroth:

Thank you for your request for formal emergency 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 emergency consultation was dated July 11, 2006, and received by us on July 14, 2006. Your completion of the Emergency-Fire Documentation form fulfills the requirements necessary to initiate emergency consultation typically provided in a biological assessment and evaluation (BAE). At issue are impacts on the Mexican spotted owl (*Strix occidentalis lucida*) (MSO) and its critical habitat associated with suppression and emergency stabilization activities on the Sand Fire in Coconino County, Arizona. Your Emergency-Fire Documentation concluded that the suppression and emergency rehabilitation actions likely adversely affected the Mexican spotted owl and its critical habitat.

This biological opinion is based on information provided in the Emergency-Fire Documentation form (signed July 7, 2006), and telephone and email conversations between Ryan Gordon of my staff and Herbert Ray of the Black Mesa Ranger District (Forest).

Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at our office.

Consultation History

- April 24, 2006: We received a telephone call from the Forest initiating emergency consultation.
- July 14, 2006: We received a July 11, 2006, letter from the Forest requesting initiation of formal section 7 consultation and a final Emergency-Fire Documentation form.

- July 20, 2006: We acknowledged the Forest's July 11, 2006, request for formal consultation via letter.
- October 3, 2006: We submitted a draft BO to the Forest.
- November 24, 2006: We received a request from the Forest to finalize the BO.

BIOLOGICAL OPINION

DESCRIPTION OF THE EMERGENCY ACTION

The Sand Fire began on April 21, 2006, in the vicinity of West Chevelon Canyon, Coconino County, Arizona. The Forest initiated emergency suppression actions on the Sand Fire on April 22, 2006. Suppression is defined as all the work of extinguishing or confining a fire beginning with its discovery (National Wildfire Coordination Group [NWCG] 1996). Wildfire suppression tactics included aerial suppression, ground ignition, and ground suppression. Aerial suppression includes aircraft operations used to aggressively suppress a wildfire, such as helicopters dropping water on a fire. Ground ignition includes all ignition tools and methods used by hand crews to control a wildfire, which is essentially using controlled burning to eliminate fuel. Ground suppression also includes all suppression tools and methods used by hand crews to control a wildfire, such as using a bulldozer to remove fuel (NWCG 1996).

Sand Fire aerial suppression operations consisted of one helicopter and one Cessna, which flew continuously over the fire during the day, at estimated altitudes of between 100 and 300 feet. Helicopters made an estimated 74 water-only drops at an average altitude of approximately 100 feet. Two air tankers completed a total of 29 retardant drops at an approximate altitude of 200 feet. Approximately 73,950 gallons of retardant (Fire-Trol LCA-R) were applied during these aerial suppression operations. During ground suppression operations, Forest Roads (FR) 116, 169, 213a, and 34 were used to access different points of the fire line. FR 116 was widened by a dozer to provide safe access for fire suppression vehicles and crews en route to the fire. Wildfire suppression actions were concluded on April 30, 2006. A more detailed description of aerial suppression and ground ignition/suppression operations within the fire perimeter is found within the Effects of the Action section of this biological opinion. For a complete list of aircraft, ground vehicles, and tools, number of personnel, and locations of aerial and ground suppression actions on the Sand Fire, refer to the Emergency-Fire Documentation form and maps provided for this consultation.

Emergency stabilization procedures commenced on April 28, 2006. Emergency stabilization is defined as planned actions that occur within one year of a wildland fire to stabilize and prevent further degradation to natural and cultural resources and minimize threats to life or property resulting from the effects of a fire. Stabilization efforts on the Sand Fire included a dozer constructing water bars and hand crews rehabilitating dozer lines. Emergency stabilization actions were concluded on April 29, 2006.

The action area includes the fire perimeter, access roads to the fire, flight path corridor, and all lands within the action area boundary shown in the Sand Fire Action Area Map (Appendix A). The final size of the fire perimeter was determined to be 1,279 acres. Of that, 518 acres burned at low-severity, 305 acres burned at moderate-severity, and 31 acres burned at high-severity. Fire burn severity is a qualitative assessment of the heat pulse directed toward the ground during a fire. Burn severity relates to soil heating, large fuel and duff consumption, consumption of the litter and organic layer beneath trees and isolated shrubs, and mortality of buried plant parts (NWCG 1996). The remaining 425 acres within the fire perimeter were left unburned. The Forest indicated that there was no information available to distinguish between the suppression and wildfire burn acres.

STATUS OF THE SPECIES

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 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 (Recovery Plan) in 1995 (USDI 1995).

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, uneven-aged forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico.

The U.S. range of the MSO has been divided into six recovery units (RU), as discussed in the Recovery Plan. 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 11 National Forests in Arizona and New Mexico). Forest Service Regions 2 and 4 (including two National Forests in Colorado and three 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 Sand Fire action area is located in the Upper Gila Mountains RU, a relatively narrow band bounded on the north by the Colorado Plateau RU and to the south by the Basin and Range-West RU. The southern boundary of this RU includes the drainages below the Mogollon Rim in central and eastern Arizona. The eastern boundary extends to the Black, Mimbres, San Mateo, and Magdalena mountain ranges of New Mexico. The northern and western boundaries extend to the San Francisco Peaks and Bill Williams Mountain north and west of Flagstaff, Arizona. This is a topographically complex area consisting of steep foothills and high plateaus dissected by deep, forested drainages. This RU can be considered a "transition zone" because it is an

interface between two major biotic regions: the Colorado Plateau and Basin and Range Provinces (Wilson 1969). The Kaibab, Coconino, Apache-Sitgreaves, Tonto, Cibola, and Gila National Forests administer most habitat within this RU. The north half of the Fort Apache and northeastern corner of the San Carlos Indian reservations are located in the center of this RU and also support MSO.

Historical and current anthropogenic uses of MSO habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. These activities have the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing are prevalent throughout Region 3 National Forest lands and are thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing on all forests, especially in meadow and riparian areas. There is anecdotal information and research that indicate that owls in heavily used recreation areas are much more erratic in their movement patterns and behavior. Fuels reduction treatments, though critical to reducing the risk of catastrophic wildfire, can have short-term adverse effects to MSO through habitat modification and disturbance. As the population grows, especially in Arizona, small communities within and adjacent to National Forest System lands are being developed. This trend may have detrimental effects to MSO by further fragmenting habitat and increasing disturbance during the breeding season.

Currently, high-intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. MSO habitat in the southwestern United States has been shaped over thousands of years by fire. Since MSO occupy a variety of habitats, the influence and role of fire has most likely varied throughout the owl's range. In 1994, at least 40,000 acres of nesting and roosting habitat were impacted to some degree by catastrophic fire in the Southwestern Region (Sheppard and Farnsworth 1995). Between 1991 and 1996, the Forest Service estimated that approximately 50,000 acres of owl habitat have undergone stand-replacing wildfires (Sheppard and Farnsworth 1995). However, since 1996, fire has become catastrophic on a landscape scale and has resulted in hundreds of thousands of acres of habitat seriously impacted by stand-replacing fires. This is thought to be a result of unnatural fuel loadings, past grazing and timber practices, and a century of fire suppression efforts. The 2002 Rodeo-Chediski fire, at 462,384 acres, burned through approximately 55 Protected Activity Centers (PACs) on the Tonto and Apache-Sitgreaves National Forests and the White Mountain Apache Reservation. Of the 11,986 acres of PAC habitat that burned on National Forest lands, approximately 55% burned at moderate to high severity. Based on the fire-severity maps for the fire perimeter, tribal and private lands likely burned in a similar fashion.

Currently, catastrophic wildfire is probably the greatest threat to MSO within the Upper Gila Mountains RU. As throughout the West, fire intensity and size have been increasing within this geographic area. Table 1 shows several high-intensity fires that have had a large influence on MSO habitat in this RU in the last decade. The information in Table 1 is not a comprehensive analysis of fires in the Upper Gila Mountains RU or the effects to MSO. However, the information does illustrate the influence that stand-replacing fire has on current and future MSO habitat in this RU. This list of fires alone estimates that approximately 11% of the PAC habitat within the RU suffered high-to moderate-intensity, stand-replacing fire in the last ten years.

Table 1. Some recent influential fires within the Upper Gila Mountains Recovery Unit, approximate acres burned, number of PACs affected, and PAC acres burned.

Fire Name	Year	Total Acres Burned	# PACs Affected	# PAC Acres Burned
Rhett Prescribed Natural Fire	1995	20,938	7	3,698
Pot	1996	5,834	4	1,225
Hochderffer	1996	16,580	1	190
BS Canyon	1998	7,000	13	4,046
Pumpkin	2000	13,158	4	1,486
Rodeo-Chediski	2002	462,384	55	~33,000
TOTAL		525,894	84	~43,645

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 Forest Service Region 3 most recently reported a total of approximately 989 PACs established on National Forest lands in Arizona and New Mexico (USDI 2005). The Forest Service Region 3 data are the most current compiled information available to us; however, survey efforts in areas other than National Forest System lands have likely resulted in additional sites being located in all Recovery Units. Currently, we estimate that there are likely 12 PACs in Colorado (not all currently designated) and 105 PACs in Utah.

Researchers studied MSO population dynamics on one study site in Arizona (n = 63 territories) and one study site in New Mexico (n = 47 territories) from 1991 through 2002. The Final Report, titled “Temporal and Spatial Variation in the Demographic Rates of Two Mexican Spotted Owl Populations,” (*in press*) found that reproduction varied greatly over time, while survival varied little. The estimates of the population rate of change ($\Lambda = \text{Lamda}$) indicated that the Arizona population was stable (mean Λ from 1993 to 2000 = 0.995; 95% Confidence Interval = 0.836, 1.155) while the New Mexico population declined at an annual rate of about 6% (mean Λ from 1993 to 2000 = 0.937; 95% Confidence Interval = 0.895, 0.979). The study concludes that spotted owl populations could experience great (>20%) fluctuations in numbers from year to year due to the high annual variation in recruitment. However, due to the high annual variation in recruitment, the MSO is then likely very vulnerable to actions that impact adult survival (e.g., habitat alteration, drought, etc.) during years of low recruitment.

Since the owl was listed, we have completed or have in draft form a total of 176 formal consultations for the MSO. These formal consultations have identified incidences of anticipated

incidental take of MSO in 366 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. None of these consultations resulted in biological opinions 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 adoption of the Recovery Plan recommendations through an amendment to their Land and Resource Management Plans (LRMPs). 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 91 of those PACs located in the Upper Gila Mountains RU. In addition, on January 17, 2003, we completed a reinitiation of the 1996 Forest Plan Amendments 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. Consultation on individual actions under these biological opinions resulted in the harm and harassment of owls associated with approximately 243 PACs on Region 3 National Forest System Lands. Region 3 of the Forest Service reinitiated consultation on the LRMPs on April 8, 2004. On June 10, 2005, the FWS issued a revised biological opinion on the amended LRMPs. We anticipated that while the Region 3 Forests continue to operate under the existing LRMPs, take is reasonably certain to occur to an additional 10 percent of the known PACs on Forest Service lands. We expect that continued operation under the plans will result in harm to owls in 49 PACs and harassment to owls in another 49 PACs. To date, consultation on individual actions under the amended Forest Plans, as accounted for under the June 10, 2005, biological opinion has resulted in 19 PACs adversely affected (owls in 7 PACs harassed and 12 PACs harmed), with 5 of those PACs in the Upper Gila Mountains RU.

Mexican Spotted Owl Critical Habitat

The final MSO critical habitat rule (USDI 2004) designated approximately 8.6 million acres of critical habitat in Arizona, Colorado, New Mexico, and Utah, mostly on Federal lands (USDI 2004). Within this larger area, critical habitat is limited to areas that meet the definition of protected and restricted habitat, as described in the Recovery Plan. Protected habitat includes all known owl sites and all areas within mixed conifer or pine-oak habitat with slopes greater than 40 percent where timber harvest has not occurred in the past 20 years. Restricted habitat includes mixed conifer forest, pine-oak forest, and riparian areas outside of protected habitat.

The primary constituent elements for MSO critical habitat were determined from studies of their habitat requirements and information provided in the Recovery Plan (USDI 1995). Since owl habitat can include both canyon and forested areas, primary constituent elements were identified in both areas. The primary constituent elements which occur for the MSO within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the MSO's habitat needs for

nesting, roosting, foraging, and dispersing are in areas defined by the following features for forest structure and prey species habitat:

Primary constituent elements (PCEs) related to forest structure include:

1. A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30% to 45% of which are large trees with dbh of 12 inches or more;
2. A shade canopy created by the tree branches covering 40% or more of the ground; and,
3. Large, dead trees (snags) with a dbh of at least 12 inches.

Primary constituent elements related to the maintenance of adequate prey species include:

4. High volumes of fallen trees and other woody debris;
5. A wide range of tree and plant species, including hardwoods; and
6. Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

The attributes listed above usually are present with increasing forest age, but their occurrence may vary by location, past forest management practices or natural disturbance events, forest-type productivity, and plant succession. These characteristics may also be observed in younger stands, especially when the stands contain remnant large trees or patches of large trees. Certain forest-management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

There are 13 critical habitat units located in the Upper Gila Mountains RU that contain 3.1 million acres of designated critical habitat.

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 within 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.

Status of the species and critical habitat within the action area

North Alder, South Alder, North Station, and Station PACs and associated MSO critical habitat reside within the action area (see Appendix A: Sand Fire Action Area Map). The survey history for North Alder, South Alder, North Station, and Station PACs are outlined in Tables 2-5 below.

None of the four PACs had been monitored for 7-9 years prior to suppression actions on the Sand Fire, although occupancy and/or reproduction had been observed within each PAC at least once in surveys since the early 1990s (Tables 2-5). The Recovery Plan states that even if MSO are not located within PACs in subsequent years, all PACs should be retained for the life of the Plan (USDI 1995). Based on the Recovery Plan recommendation for retention of PACs, the potential of adult survival to reach 16 years or more, high site fidelity of MSO once territories and home ranges have been established, and the potential recruitment of floaters into a territorial population (USDI 2004, 1995), we consider all four PACs to have been occupied prior to the Sand Fire suppression actions. As indicated in the Recovery Plan, the reproductive chronology of MSO varies somewhat across the range of the owl with courtship in Arizona beginning in March and with eggs laid in late March or, more typically, early April (USDI 1995). Because suppression actions occurred between April 22 and April 30 (within the 30 day incubation timeframe), the presence of eggs and nesting MSO was possible within all four PACs.

The habitat within the action area is dominated by pine and pinyon/juniper on the ridge tops and mixed-conifer, alder, pine and oak trees in the canyons. Pinyon tree mortality is evident due to drought and beetle infestation within the action area. Approximately 179 acres of MSO restricted habitat occurs within the action area. Protected habitat within the action areas totals 2,445 acres and is confined to the acres within North Alder, South Alder, North Station, and Station PACs.

The action area is located within critical habitat boundary UGM-10. There is no protected or restricted (and therefore critical) habitat outside of PAC boundaries.

The North Alder PAC (#014024) is 607 acres. Surveys within the PAC have been sporadic with no monitoring information available since 1997. All known nest and roost sites within the PAC are located in Alder Canyon.

Table 2. North Alder PAC Survey History

Year Surveyed	Survey Information	Status
1998 to 2005	Not Monitored	Not Known
1997	Monitored	No Response
1996	Monitored	Single Male-Visual
1995	Monitored	Pair – Reproduction Unknown
1994	Not Monitored	Not Known
1993	Monitored	Pair – Reproduction Unknown

The South Alder PAC (#014025) is 611 acres. Surveys within the PAC have been sporadic with no monitoring information available since 1997. All known roost sites within the PAC are located in Alder Canyon. MSO nests have not been identified within the PAC.

Table 3. South Alder PAC Survey History

Year Surveyed	Survey Information	Status
1998 to 2005	Not Monitored	Not Known
1995 to 1997	Monitored	No Response
1994	Not Monitored	Not Known
1993	Monitored	Pair – Reproduction Unknown

The North Station PAC (#014023) is 620 acres. Surveys within the PAC have not been completed since 1996. All known roost sites within the PAC are located in West Chevelon Canyon. MSO nests have not been identified within the PAC.

Table 4. North Station PAC Survey History

Year Surveyed	Survey Information	Status
1997 to 2005	Not Monitored	Not Known
1996	Monitored	No Response
1995	Monitored	Single Male-Visual
1994	Monitored	Pair – Reproduction Unknown
1993	Monitored	Pair – Reproduction Unknown

The Station PAC (#014017) is 607 acres. Surveys within the PAC have not been completed since 1998. All known nest and roost sites within the PAC are located in West Chevelon Canyon.

Table 5. Station PAC Survey History

Year Surveyed	Survey Information	Status
1999 to 2005	Not Monitored	Not Known
1998	Monitored	Pair – Reproduction Confirmed, 3 Fledglings
1997	Monitored	Pair – Reproduction Unknown
1996	Monitored	Pair – Nesting, 1 Fledgling
1995	Monitored	Pair – Nesting, 2 Fledglings
1994	Monitored	Pair – Reproduction Unknown
1993	Monitored	Pair – 1 Fledgling
1992	Monitored	Pair – Nesting, 2 Fledglings
1991	Monitored	Pair – Nesting, 3 Fledglings
1990	Monitored	Single Male - Audio

Factors affecting the species and its critical habitat within the action area

Past and ongoing factors affecting MSO and its critical habitat in the action area include prescribed burn projects and ongoing grazing. In addition, recreation (horseback riding, hiking, all terrain vehicle travel) and camping is an ongoing factor affecting MSO in the action area. The following prescribed burning operations, ongoing grazing, and recreation and camping impacts leading up to the emergency suppression actions likely contributed to the current status of the MSO and critical habitat within the action area.

In 2004 and 2005, 1,800 acres were treated using prescribed burning around the Chevelon Ranger Station and Workcenter, which is within the Sand Fire action area on the west side of FR 34 and west of North Station and Station PACs. The Forest completed a Categorical Exclusion for this project, which implies that there is “no effect” to listed species or critical habitat; FWS consultation was not requested.

The Wiggins Analysis Area (Consultation #02-21-91-I-0364) is located west of FR 34 north and west of the Sand Fire perimeter but within the action area boundary. Prescribed and hand pile

burning occurred within the Wiggins Analysis Area in 2000 and 2004. Informal consultation was concluded February 19, 1997, with a “may affect, not likely to adversely affect” determination for the MSO. Prescribed burning and hand-pile burning in the Wiggins Analysis Area may have impacted MSO through noise and smoke disturbance. Prescribed burning and hand-pile burning actions were restricted to acres outside of PACs, slopes >40%, restricted habitat, and 0.5 mile from a known roost/nest site. Critical habitat was not affected during the October 2004 prescribed and hand-pile burning actions.

Ongoing and long-term grazing is scheduled within the action area on allotments that contain MSO PACs and critical habitat. Two pastures (Vigil-Durfee and Sandpoint) within the Chevelon Canyon Allotment (Consultation #02-21-94-F-0230) occur within the boundary of the action area. The Chevelon Canyon Allotment is part of an ongoing grazing consultation. Initially, a concurrence was provided to the Forest on February 2, 1999, with a “may affect, not likely to adversely affect” determination for the MSO. Later, reinitiation of the Chevelon Canyon Allotment consultation occurred in response to the final rule designating MSO critical habitat. FWS concurred with the Forests’ “may affect, but is not likely to adversely affect” determination for MSO critical habitat (October 21, 2004). No grazing has occurred within the action area since MSO critical habitat was finalized in 2004. The Vigil-Durfee pasture has not been grazed for approximately ten years, and the Sandpoint pasture has not been grazed since 2001; however, cattle are returning to the Sandpoint pasture this year (2006). Although grazing has not occurred within the action area since 2001, prior grazing activities likely influenced PCE number 6 (adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration).

Recreation and camping are ongoing factors that likely occur along roads and/or trails and in undesignated camp sites within the action area. Designated camping areas are not located or identified within the action area; however, Forest Service roads and trails located within the action area are available for recreation activities. These activities that occur within or near PACs may affect MSO through noise and visual disturbance.

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.

The wildfire and suppression activities occurred between April 22nd and April 30th during the MSO nesting/incubation period. All aerial operations were restricted to daytime use. Ground ignition/suppression operations also occurred primarily during the day with the exception of ground crews working into the evening hours (11:30 pm) on April 22nd. Delaney and Grubb (1999) found that MSO nest attendance during the incubation phase was 99% during the day. Delaney *et al.* (1999) found that helicopter flights flushed MSO 50% of the time within 98 feet,

19% within 197 feet, 14% within 344 feet, and 0% beyond 344 feet. The distance measured between a helicopter and MSO determined the point at which MSO responded to approaching aircraft. A flush response elicited from a helicopter within the said distances indicated by Delaney *et al.* (1999) would equate to MSO leaving the nest for an unknown time period. It is not known if the fire and/or smoke resulted in owls leaving the area. Because MSO nest attendance is high during the day, the combination of ground and aerial suppression actions within the action area likely flushed any nesting MSO in North Alder, South Alder, North Station, and Station PACs. Delaney *et al.* (1999) found prey-delivery rates were also affected by stimulus distance; thus concluding that manipulations in close proximity to MSO territories may affect prey deliveries. Flushed MSO will also lead to decreased nest attendance during the incubation period and may lead to failed reproduction efforts and/or abandonment of the nest. However, without the actions implemented to suppress the fire, additional resources may have been lost including MSO habitat within PACs and private property. It is probable that the suppression activities prevented significant MSO habitat modifications, some of which would have been detrimental. Because there is no protected, restricted, or critical habitat affected by suppression efforts outside of PAC boundaries, the only MSO habitat loss from suppression efforts occurred in North Alder and North Station PACs (described below). No restricted habitat was affected by the fire or suppression efforts.

The following discussion highlights the emergency actions taken to suppress the Sand Fire and the effects to MSO from each operation. Table 6 below summarizes the ground and aerial suppression operations and ground rehabilitation operations that occurred within North Alder, South Alder, North Station, and Station PACs.

Ground Ignition/Suppression and Emergency Stabilization Operations

Backfire operations conducted in North Alder PAC affected protected and critical habitat and may have contributed to general disturbance. Additional backfire operations conducted throughout portions of the Sand Fire perimeter may have resulted in smoke disturbance to MSO in all four PACs. It is difficult to access the magnitude of this effect given the smoke created by the wildfire itself. The combination of wildfire and backfire burned 26 acres on the ridge-top portion of the PAC which is dominated by pine and pinyon/juniper. The burn severity from backfire and wildfire measured low in the PAC. Randall-Parker and Miller (2002) studied the effects of prescribed fire in ponderosa pine forests and found that prescribed fires consumed more than 50% of down logs, approximately 20% of snags, and the loss of old-growth ponderosa pines ranged from 0 to 6%. The 26 acres of low-severity burn within North Alder PAC likely resulted in similar percent consumption of down logs, snags, and trees as indicated by Randall-Parker and Miller (2002). The Forest was not able to differentiate the effects caused by wildfire and those caused by backfire operations.

Similar to the fire effects within the action area, it is impossible to differentiate the amount of smoke resulting from the wildfire and backfire operations. Smoke effects did occur from backfire operations and may have impacted MSO in all four PACs. Prevailing winds during the incident were recorded from the southwest and southeast, likely pushing the smoke to the northeast and northwest away from the four PACs within

the action area. It is not known whether the winds were continuous throughout the incident; therefore, if the winds subsided inversions could have caused smoke to spread throughout the action area. Smoke may have caused MSO to flush from the nest and/or inhibited foraging activities due to reduced visibility within the PACs.

Backfire operations conducted in North Alder PAC resulted in the loss of critical habitat PCEs through the application of fire. Considering the effects of prescribed fire in ponderosa pine forest studied by Randall-Parker and Miller (2002), backfire operations likely adversely impacted 20% of PCE number three (large, dead trees (snags) with a dbh of at least 12 inches) and 50% of PCE number four (high volumes of fallen trees and other woody debris). If prescribed fire is known to consume 50% of down logs and 20% of snags, backfire operations likely reduced the levels of PCE number six (adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration).

Handlines and dozerlines were constructed in the northern portion of the North Alder PAC (0.6 mile long, 8 feet wide) outside of Alder Canyon. Handlines and dozerlines are the initial step required for the preparation of backfire operations. Chainsaws and bulldozers were used during these operations. The known nest and roost locations within the PAC are approximately 1,320 feet away from handline and dozerline operations. Delaney and Grubb (1997) recommended a 344-foot radius, hemispherical, management/protection zone to minimize and possibly eliminate MSO flush response to helicopter overflights and chainsaw noise. Because these actions occurred approximately 1,320 feet away from the known nest and roost locations (beyond the 344-foot management/protection zone), noise from equipment and personnel were not likely to have flushed nesting MSO.

Handline and dozerline operations resulted in the removal of all vegetation within the footprint of the impact area (2 acres), including a wide range of live trees, snags, and dead and down woody debris, resulting in long-term effects to MSO protected and critical habitat within the North Alder PAC. These actions adversely affected PCEs number three (large, dead trees (snags) with a dbh of at least 12 inches), four (high volumes of fallen trees and other woody debris), and six (adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration).

Emergency stabilization efforts started on April 28, 2006, and concluded the next day before the fire was controlled. Dozers and hand crews were used to stabilize and rehabilitate the 2-acre handline/dozerline portion of North Alder PAC. These actions contributed to noise and general disturbance from equipment and personnel operating on the ridge-top portion of the PAC.

During ground-suppression operations, FR 116, 169, 213a, and 34 were all used to access the fire line. FR 116 was widened by a dozer to provide safe access for fire suppression vehicles and crews en route to the fire. These actions contributed to noise and general disturbance from equipment and personnel operations along FR 116 and where Forest Roads are adjacent to or within North Alder, North Station and Station PACs (see Appendix A: Sand Fire Action Area Map).

Aerial Suppression Operations

Aerial suppression actions conducted in North Alder PAC contributed to noise disturbance from aircraft and may have impacted MSO through injury by water or retardant drops if nests or roosts were hit directly. The exact number of water and aerial retardant applications in this PAC is not known, but the locations of drops were most likely along the handline/dozerline and backfire locations away from known nest and roost sites within North Alder PAC.

Aerial water-drafting operations from West Chevelon Canyon Creek (~4 trips on April 26th) located between North Station and Station PACs resulted in noise disturbance that may have forced MSO to flush. Flushed MSO leads to decreased nest attendance during the incubation period and may have lead to failed reproduction efforts and/or abandonment of the nest.

Nine consecutive days of aircraft carrying water and retardant en route to the Sand Fire and over the action area resulted in noise disturbance to all four PACs. Two aircraft (1 helicopter and 1 Cessna) were in continuous daytime operation (~100 to 300 feet above ground) within the flight path corridor (Appendix A). Additional aircraft (helicopters and Air Tankers) completed approximately 103 retardant and/or water drops within the Sand Fire perimeter. These operations occurred at approximate altitudes of 100 to 200 feet above the ground within the flight path corridor. MSO that may have been sitting on eggs, attending to nestlings, or roosting in all four PACs possibly flushed for an unknown time during aerial operations. Also, continuous daytime operation of aircraft for nine days within close proximity of MSO PACs likely prevented flushed MSO from returning to pre-disturbance behavior until after dark, thereby leading to decreased nest attendance and prey delivery during the incubation period and possibly failed reproduction efforts and/or abandonment of the nest.

Table 6. Ground and aerial suppression operations and ground rehabilitation operations that occurred within North Alder, South Alder, North Station, and Station PACs during the Sand Fire.

PAC	Ground Suppression/Rehabilitation Operations			Aerial Suppression Operations	
	Backfire	Hand/Dozer Line	Rehabilitation	Aerial Suppression	Aerial Water Drafting
North Alder	26 acres of protected/critical habitat burned by wildfire and/or suppression.* Possible smoke effects.	2 acres of protected/critical habitat, 0.6 mile long 8 feet wide from hand/dozer line.	2 acres of protected/critical habitat, rehab 0.6 mile long 8 feet wide hand/dozer line.	Unknown # of water and retardant drops within burn area. 9 days of continuous aerial operation 100 to 300 feet above ground within the flight-path corridor.	
South Alder	Possible smoke effects.			9 days of continuous aerial operation 100 to 300 feet above ground within the flight-path corridor.	

North Station	Possible smoke effects.	Protected/critical habitat, widening of FR 116 within portions of PAC		9 days of continuous aerial operation 100 to 300 feet above ground within the flight-path corridor.	~4 water drafts (one day) West Chevelon Canyon Creek
Station	Possible smoke effects.			9 days of continuous aerial operation 100 to 300 feet above ground within the flight-path corridor.	~4 water drafts (one day) West Chevelon Canyon Creek

*The Forest was unable to track and/or distinguish between wildfire and suppression burn acres within the North Alder PAC.

Summary of Effects from Ground Ignition/Suppression/Emergency Stabilization and Aerial Suppression Actions

Adverse effects to MSO occurred in North Alder, South Alder, North Station, and Station PACs as a result of one or more actions, including ground ignition/suppression/emergency stabilization and aerial suppression. In addition, North Alder and North Station PACs experienced adverse effects to critical habitat from ground-suppression actions.

Aerial Suppression Operations

Direct impacts from aerial suppression actions could have affected MSO in North Alder PAC through injury by water or retardant drops if nests or roosts were directly hit. Because MSO surveys within the North Alder PAC have not been conducted since 1997, information on nest or roost locations is not available. However, historical nest and roost locations within the PAC were found 0.25 mile away from aerial suppression actions; therefore, direct impacts from water and retardant drops were not likely to have occurred on nests or roosts. Critical habitat was not adversely affected by aerial suppression operations in this PAC.

Dozerline/Handline Operations

Direct impacts from habitat removal by dozerline/handline operations in North Alder PAC and North Station PAC (along FR 116) removed live trees, snags, and dead and down woody debris within the impact areas. These actions adversely affected protected habitat by reducing the availability of possible future nest and roost trees for MSO. In addition, the removal of live trees, snags and dead and down woody debris adversely affected critical habitat PCE numbers three, (large, dead trees (snags) with a dbh of at least 12 inches), four (high volumes of fallen trees and other woody debris), and six (adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration).

Smoke

Smoke effects may have impacted MSO via disturbance in North Alder, South Alder, North Station, and Station PACs as a result of indirect effects from backfire operations located throughout the Sand Fire containment boundary. Smoke inversions may have caused MSO to flush from the nest and/or inhibit foraging activities due to reduced visibility within the PACs. Information on the duration or intensity of smoke within each

PAC is not available, nor can the effects of backfire smoke be distinguished from those of wildfire smoke.

Backfire Operations

Fire associated with backfire operations may have disturbed MSO nesting or roosting in North Alder PAC. Details on backfire and wildfire acres were not separated within the 26-acre burn portion of the PAC; therefore, we are not certain if the impacts from backfire operations were significant enough to impact nesting MSO beyond the impacts occurring from the fire itself. Backfire operations may have impacted 20% of large, dead trees (snags) with a dbh of at least 12 inches; 50% of fallen trees and other woody debris; and reduced the levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration. Considering the low-severity burn and research conducted by Randall-Parker and Miller (2002), backfire operations adversely affected critical habitat by reducing the availability of PCEs. A reduction in PCEs will affect the owls habitat needs for nesting, roosting, foraging, and dispersal.

Noise

Noise within the action area occurred for a total of nine days from hand crews, chainsaws, and dozers on the ground in portions of North Alder and North Station PACs; ground vehicles operating along FR 116 in portions of North Station PAC; ground vehicles operating along Forest Roads 169, 213a, and 34 adjacent to North Station, Station, and North Alder PACs; and aircraft conducting suppression operations within the flight path corridor impacting all four PACs. Ground-suppression actions occurred on the ridge tops > 344 feet away from all known MSO nest and roost sites in North Station, Station, and South Alder PACs as recommended by Delaney and Grubb (1997). In North Alder PAC ground suppression actions occurred on the ridge tops approximately 1,320 feet away from known nest and roost sites. Because these actions were located greater than the 344-foot distance, MSO were not likely flushed from ground-suppression actions. However, if MSO foraged (during the day) within the 344-foot radius they may have been disturbed by noise during ground-suppression actions thereby reducing MSOs ability to forage effectively.

Aerial operations occurred for a total of nine days within the flight path corridor directly over all four PACs, and all operations were between approximately 100 and 300 feet above the ground. MSO that may have been sitting on eggs, attending to nestlings, or roosting in all four PACs possibly flushed during aerial operations. We believe that the combination of noise disturbance from all aerial and ground suppression actions likely flushed potentially nesting MSO in all four PACs between April 22nd and April 30th.

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. Since the action

occurred on Forest Service land, most actions that would occur in the action area would require additional section 7 consultation.

CONCLUSION

After reviewing the current status of MSO, the environmental baseline for the action area, the effects of the emergency action and the cumulative effects, it is the FWS's biological opinion that the emergency action did not jeopardize the continued existence of the MSO and did not destroy or adversely modify designated critical habitat for the MSO.

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

Based on our analysis of your actions associated with the Sand Fire, we conclude the following:

1. Suppression actions associated with the containment of the Sand Fire are not believed to have impeded the survival or recovery of MSO within the Upper Gila Mountains Recovery Unit.
2. Though suppression actions in critical habitat resulted in the loss of some primary constituent elements, the actions impacted only approximately 28 acres of the 562,988 acres of critical habitat in the Upper Gila Mountains RU-10, and reduced the risk of future catastrophic wildfire.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations 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 (50 CFR 17.3) 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. "Harass" is defined (50 CFR 17.3) 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. "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 the 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.

Using the best available data as summarized within this document, we have identified conditions which were reasonably certain to have resulted in incidental take of MSOs associated with suppression activity in four PACs identified within the action area (North Alder, South Alder, North Station, and Station). Although it is likely that adverse effects to these PACs resulted

from the ground ignition/suppression/emergency stabilization and aerial suppression actions and the wildfire itself, it is the effects of the suppression/emergency stabilization actions which must be addressed in this emergency consultation. Even though take likely occurred, we recognize the suppression activities as necessary and beneficial as they likely prevented further loss to the species and/or helped to restore key habitat components. Based on the best available information concerning the MSO, habitat needs of the species, and the project description and other information furnished by the Forest Service, take is reasonably certain to have occurred in four MSO PACs.

Amount or Extent of Take Anticipated

1. The combination of direct impacts from habitat removal during ground-suppression operations (handline and dozerline); the direct effects of backfire; and noise associated with nine days of aerial suppression operations (100 to 300 feet above ground) likely resulted in the short-term harm of the owls associated with the North Alder PAC.
2. Noise associated with nine days of aerial suppression operations (100 to 300 feet above ground) likely resulted in harassment primarily from disturbance to the owls associated with the South Alder PAC.
3. The combination of direct impacts from habitat removal during ground suppression operations (dozerline along FR 116) and noise associated with nine days of aerial suppression operations (100 to 300 feet above ground) and approximately four water drafts from West Chevelon Canyon Creek likely resulted in harassment primarily from disturbance to the owls associated with the North Station PAC.
4. Noise associated with nine days of aerial suppression operations (100 to 300 feet above ground) and approximately four water drafts from West Chevelon Canyon Creek likely resulted in harassment primarily from disturbance to the owls associated with the Station PAC.

Effect of the Take

In this biological opinion, we determine that this level of anticipated take did not likely result in jeopardy to the MSO or result in destruction or adverse modification of MSO critical habitat.

Incidental take statements in emergency consultations do not include reasonable and prudent measures or terms and conditions to minimize take unless the agency has an ongoing action related to the emergency (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998). The Forest Service has not advised us of any ongoing actions related to the emergency.

The Fish and Wildlife Service 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. Sections 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. Sections 668-668d).

DISPOSITION OF DEAD, INJURED, OR SICK MSO

Upon locating a dead, injured, or sick MSO, initial notification must be made to the FWS's Law Enforcement Office, 2450 West Broadway 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 should 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 specimens to preserve the biological material in the best possible state. If possible, the remains of intact MSO(s) shall be provided to this office. If the remains of the MSO(s) are not intact or are not collected, the information noted above shall be obtained and the carcass left in place. Injured animals should be transported to a qualified veterinarian by an authorized biologist. Should the treated MSO(s) survive, the AESO should be contacted regarding the final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose 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 North Alder, South Alder, North Station, and Station PACs be monitored annually for at least five years and that the results of the monitoring be provided to us.

In order to keep us informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitat, we request notification of the implementation of any conservation recommendations.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR Section 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 that was 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 your consideration of the threatened Mexican spotted owl. For further information, please contact Ryan Gordon (x225) or Mary Richardson (x242). Please refer to consultation number 22410-2006-FE-0381 in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: District Biologist, Black Mesa Ranger District, Overgaard, AZ (Attn: Brian Dykstra)
District Biologist, Black Mesa Ranger District, Overgaard, AZ (Attn: Herbert Ray)
District Ranger, Black Mesa Ranger District, Overgaard, AZ
State Supervisor, Fish and Wildlife Service, Albuquerque, NM (Attn: Eric Hein)
Shaula Hedwall, Fish and Wildlife Service, Flagstaff, AZ

Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ (Attn: Bob Broscheid)

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APPENDIX A

