United States Department of the Interior
U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513

In Reply Refer To:

AESO/SE
22410-2001-F-0352

March 21, 2008

Memorandum

To: Superintendent, Flagstaff Area National Monuments, Flagstaff, Arizona

From: Field Supervisor

Subject: Flagstaff Area Monuments Fire and Fuels Management Plan Biological Opinion

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation was dated October 30, 2007, and received by us on November 5, 2007. This consultation concerns the possible effects of the National Park Service (NPS) Fire and Fuels Management Plan (FMP) for the Flagstaff Area Monuments located in Coconino County, Arizona, on the Mexican spotted owl (*Strix occidentalis lucida*) (MSO) and its designated critical habitat. In addition, the NPS has determined that the proposed action "may affect, but will not likely adversely affect" the endangered black-footed ferret (*Mustela nigripes*). We concur with your determination. The basis for our concurrence is found in Appendix A.

The final rule to remove the bald eagle from the Federal List of Threatened and Endangered Species was published in the Federal Register on July 9, 2007, and took effect on August 8, 2007. On March 5, 2008, the U.S. District Court for the District of Arizona ruled that the FWS was enjoined from removing the discrete population of desert bald eagles from the threatened species list under the Act. However, bald eagles in the Walnut Canyon area do not belong to the discrete desert population of eagles, so they continue to be delisted. Since the bald eagle has been delisted there is no need to consult under section 7 of the Act, and effects to the bald eagle will not be considered in this document. However, bald and golden eagles continue to be protected by the Bald and Golden Eagle Protection Act. Our documentation of the NPS's implementation of minimization measures to reduce the likelihood of take is included in Appendix B.

This biological opinion is based on information provided in the original October 30, 2007, Biological Assessment and Evaluation (BAE), the Draft FMP, conversations and electronic correspondence with your staff, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the MSO or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

Details of the consultation history are summarized in Table 1.

Table 1. Summary of Consultation History

Date	Event
June 11, 2001	We received your request for comments regarding two fuels reduction projects in Walnut Canyon and Sunset Crater National Monuments.
June 22, 2001	We responded to your request for comments and offered our assistance in developing the fuels reduction projects.
June 2001 – July 2003	During this time, the NPS decided to develop a FMP for all of the Flagstaff Area Monuments rather than develop individual projects, and we began participating in discussions to assist them in this task.
July 3, 2003	We received the Fire Management Planning Public Information and Scoping Newsletter and internal planning notes regarding the development of the Flagstaff Monuments FMP and discussed these with NPS staff.
August 25, 2005	We received the Flagstaff Area Monument's Wildland Fire Management Plan Environmental Assessment (EA).
October 19, 2005	We met with NPS staff to discuss the EA. Since the EA includes full suppression in the proposed action, we believed that it would be very difficult to get to a "may affect, not likely to adversely affect" determination for the MSO. We communicated this to NPS staff and leadership. NPS leadership agreed that the document needed to be modified and that they would likely internally revisit the amount of fire suppression actions they wished to include in the FMP.
September 29, 2006	We received the draft resource protection measures for the FMP to reviews.
October 9, 2006	We provided our comments to the NPS on the draft resource protection measures.
November 9, 2006	We provided further clarification to the NPS regarding our comments on the draft resource protection measures.
July 2003 – July 2007	We continued to meet on a semi-regular basis with NPS staff to discuss the FMP and potential implementation and conservation measures.
November 5, 2007	We received your request for formal consultation regarding the effects of the FMP on the MSO and its critical habitat.
December 6, 2007	We acknowledged your request for formal consultation with a 30-day letter. A draft biological opinion was not requested by NPS.

BIOLOGICAL OPINION

DESCRIPTION OF THE ACTION

For a complete description of the proposed action, please refer to the October 30, 2007, BAE and draft FMP. These documents are incorporated herein by reference.

The FMP for the Flagstaff Area Monuments will serve as the primary reference for wildland fire response procedures and for implementing an integrated fire and resource management plan for Sunset Crater Volcano, Walnut Canyon, and Wupatki National Monuments (NM), which are collectively administered as the Flagstaff Area NMs. The NPS policy requires that all parks with vegetation that can sustain fire must have an FMP to guide fire management actions. A little more than half of the landscapes within Sunset Crater and Wupatki NMs, and all of Walnut Canyon NM are dominated by fire-dependent coniferous woodland and grassland vegetation. As a result of fire exclusion and other land management practices over the last 150 years, the vegetation within these fire-adapted ecosystems has deviated from conditions that prevailed when fire functioned as an integral ecological process across these landscapes.

For this consultation, Walnut Canyon NM is the only one of the three monuments with MSO and critical habitat. Therefore, the following analysis will only address effects from implementation of the proposed FMP at Walnut Canyon NM. Walnut Canyon National Monument encompasses approximately 3,580 acres and is located five miles east of Flagstaff, Arizona. Legislation passed in 1996 administratively transferred approximately 1,330 acres from the Coconino National Forest to the NPS, which is commonly referred to as the "expansion area." In accordance with the NPS mission and policies, the monument is managed to protect unique cultural resources in perpetuity and to provide for public enjoyment of these resources.

The overall goal of the FMP is to provide guidance and direction for developing a proactive fire and vegetation restoration program at the Flagstaff Area NMs for the next ten years. The FMP defines organizational responsibilities and procedures for suppressing wildland fires and protecting unique and sensitive cultural and natural resources. Operational activities include prevention and preparedness strategies, appropriate management response, use of minimum impact suppression tactics, rapid assessment by knowledgeable resource advisors, and ready availability of sensitive resource maps and protection guidelines. A "Ten Year Manual Thinning and Prescribed Fire Project Plan" is included within the FMP and a Fire Project Team will be established to oversee project implementation. Wildland fire use is not considered an appropriate wildfire management strategy within the Flagstaff Area NMs and is not included within the FMP.

Recently completed vegetation maps and other technical information were used to define four Fire Management Units (FMUs), which encompass a total of 42,000 acres across all three NMs. These FMUs are described below in Table 2. Within each NM, areas have been assigned to a vegetation-fuel type and then these acres were assigned to an FMU. For example, at Walnut Canyon NM, within the Douglas fir-Gambel oak vegetation type, approximately 380 acres were assigned to FMU-4. Therefore, the management strategy in this area would be to suppress wildland fires and implement small thinning projects to protect cultural resources within this area.

Table 2. Strategies for the FMUs within the Flagstaff Area NMs.

FMU	Characteristics	Strategy
FMU-1	Encompasses NPS facilities, visitor use areas within fire-prone vegetation, and areas adjacent to private property.	Appropriate management response to wildland fires and manual thinning treatments to create fire-defensible areas around facilities.
FMU-2	Encompasses areas of fire-adapted vegetation where presettlement conditions and the natural historical fire regime are known, and natural fire disturbance can feasibly be restored.	Appropriate management response to wildland fires; localized manual thinning around sensitive resources and mixed-age tree groups; and use of prescribed fire.
FMU-3	Encompasses areas of fire-adapted vegetation where additional information is needed on presettlement conditions and fire regimes in order to establish restoration objectives.	Appropriate management response to wildland fires and localized manual thinning to protect resources. Need to acquire information for use in establishing restoration objectives. Additional public involvement and environmental compliance would be needed prior to implementation.
FMU-4	Encompasses a wide range of terrain and vegetation types that are not fire-prone or fire-adapted, or which for other reasons may only be managed with a fire suppression strategy. Most of the four Protected Activity Centers and other protected and restricted habitat occur within this FMU.	Appropriate management response to wildland fires and localized manual thinning to protect at-risk resources.

FMP Implementation Actions

- *Prevention and Preparedness:* These activities will include public education, activity restrictions, area closures, readying fire personnel and equipment, and fire patrols during periods of high fire risk. These activities will primarily occur within NPS developed areas.

- *Ten-year Manual Thinning and Prescribed Fire Plan:* The FMP includes a ten-year implementation plan that outlines a series of 12 fuels reduction projects across all three monuments. Most of the planned thinning focuses on the ponderosa pine woodland and pinyon-juniper woodland stands along the rim terraces at Walnut Canyon NM. Small diameter tree boles and slash would be disposed of using a variety of methods, including lopping/chipping and scattering, removal off-site, and/or piling and burning. Prescribed fire operations will adhere to minimum impact tactics as described in the FMP. As vegetation structure and fuel levels approach more natural conditions, stands will receive maintenance burns every eight to 11 years. Most thinning work would occur in FMU-2,

within mixed ponderosa pine woodlands on level terrain above the Walnut Canyon rim. Project work would likely occur between mid-March and late November each year. Crews will access project areas on foot and use hand-carried equipment to thin small-diameter trees, trim ladder fuels, redistribute ground fuels and/or stack burn piles and prepare burn block perimeters. In addition to project activities in FMU-2, more limited partial thinning work would be completed in FMU-4 around 164 archaeological sites on steep canyon slopes to reduce the risk of wildfire damage to unique cultural resources. Approximately 145 of these sites are within a PAC, and 19 are in the east canyon area. If all priority sites were treated, this work would occur across approximately 29 acres in FMU-4.

- *Wildland Fire Suppression Operations:* For this consultation the NPS desires to limit consultation only to wildfires that originate within the monument boundaries and for which the NPS remains the lead or primary coordinating agency for the initial response. Based upon past experience, most suppression activities and effects for these incidents are fairly predictable and can be evaluated with some accuracy. Endangered Species Act compliance for fires that require extended attack or an interagency response would be handled through the section 7 emergency consultation process. Protected habitat, along with established nest and roost buffers, would be shown on resource maps and made available to resource advisors and incident commanders. Additional conservation measures are listed in Appendix K-3 of the FMP.

- *Burned Area Rehabilitation:* For typical fires originating within the monuments, the NPS develops and oversees burned area rehabilitation actions. At the Flagstaff Area NMs, this work has typically been completed by foot crews using hand tools, and work was completed within a few weeks of the fire. However, if a severe fire occurred in Walnut Canyon or on the cinder cones at Sunset Crater, more extensive soil stabilization measures and facility repairs may be needed in the future. If rehabilitation actions require the use of more extensive crews or equipment than considered in the BAE, Walnut Canyon would include these activities in their emergency consultation.

Conservation Measures

Guidance to protect sensitive cultural and natural resources is integrated into Appendix K of the FMP and are included herein by reference. These conservation measures were developed with the FWS and are largely adapted from the Recovery Plan for the Mexican Spotted Owl (Recovery Plan) (USDI 1995) and other agency fire planning and section 7 consultation documents. The NPS will continue to work with the FWS to update Appendix K to add new information for newly listed species and/or to refine existing measures based upon experience gained during project implementation.

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 stand-replacing wildfire, although grazing, recreation, and other land uses were also mentioned as possible factors influencing the MSO population. The FWS appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the 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.

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 is prevalent throughout Region 3 National Forest lands and is 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 indicates 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 severe 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. West Nile Virus also has the potential to adversely impact the MSO. The virus has been documented in Arizona, New Mexico, and Colorado, and preliminary information suggests that owls may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of owls and the lack of intensive monitoring of banded birds, we will most likely not know when owls contract the disease or the extent of its impact to MSO range-wide.

Currently, high-intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer

forest types in Arizona and New Mexico. Uncharacteristic, severe, stand-replacing wildfire is probably the greatest threat to MSO within the action area. As throughout the West, fire severity and size have been increasing within this geographic area.

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 FS Region 3 most recently reported a total of approximately 1,025 PACs established on NFS lands in Arizona and New Mexico (B. Barrera, pers. comm. June 18, 2007). The FS Region 3 data are the most current compiled information available to us; however, survey efforts in areas other than NFS lands have resulted in additional sites being located in all Recovery Units.

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 (Λ=Lamda) indicated that the Arizona population was stable (mean Λ from 1993 to 2000 = 0.995; 95 percent Confidence Interval = 0.836, 1.155) while the New Mexico population declined at an annual rate of about 6 percent (mean Λ from 1993 to 2000 = 0.937; 95 percent Confidence Interval = 0.895, 0.979). The study concludes that spotted owl populations could experience great (>20 percent) 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 187 formal consultations for the MSO. These formal consultations have identified incidences of anticipated incidental take of MSO in 384 PACs. The form of this incidental take is almost entirely harm or harassment, rather than direct mortality. These consultations have primarily dealt with actions proposed by FS Region 3. However, in addition to actions proposed by FS Region 3, we have also reviewed the impacts of actions proposed by the Bureau of Indian Affairs, Department of Defense (including Air Force, Army, and Navy), Department of Energy, National Park Service, and Federal Highway Administration. These proposals have included timber sales, road construction, fire/ecosystem management projects (including prescribed natural and management ignited fires), livestock grazing, recreation activities, utility corridors, military and sightseeing overflights, and other activities. Only two of these projects (release of site-specific owl location information and existing forest plans) have resulted in biological opinions that the proposed action would likely jeopardize the continued existence of the MSO. The jeopardy opinion issued for existing Forest Plans on November 25, 1997 was rendered moot as a non-jeopardy/no adverse modification BO was issued the same day.

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 proposed 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 that 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:

- 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 percent to 45 percent of which are large trees with diameter-at-breast height (dbh) of 12 inches or more;

- A shade canopy created by the tree branches covering 40 percent or more of the ground; and,

- Large, dead trees (snags) with a dbh of at least 12 inches.

PCEs related to the maintenance of adequate prey species include:

- High volumes of fallen trees and other woody debris;

- A wide range of tree and plant species, including hardwoods; and

- Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

The forest habitat 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.

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 statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to 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.

A. Status of the species and critical habitat within the action area

The earliest NPS record of MSO activity in Walnut Canyon dates to 1980, when a roost site was reported near the mouth of Cherry Canyon. A pair of MSO was observed by NPS staff near this location again in 1986. The Arizona Game and Fish Department (AGFD) informally surveyed the monument from 1987-1989 and the Forest Service conducted surveys from 1991-1994. Additional surveys were conducted by NPS staff in the late 1990s. Based upon all of the surveys conducted, four protected activity centers (PACs) were established within and adjacent to the monument boundary (Cherry #040502, Breezy #040548, Lucida #040546, and Walnut 33 #040510). These PACs essentially encompass the entire monument, except for the 1996 expansion area. The NPS has established nest buffers for all four PACs, based on nest and roost locations, as nest sites are not known for two of the PACs. The two PACs for which pair occupancy was not confirmed by nesting status are the Breezy and Lucida PACs. These PACs were designated in 1999 and 1998 respectively.

Since 2000, the NPS, FWS, Forest Service, and U.S. Geological Survey (USGS) personnel have sporadically surveyed for MSO in and around the monument; no MSO were observed during these efforts. However, surveys were not to protocol and did not adequately cover the habitat. In 2003, NPS cultural resources staff encountered and photographed an MSO in a tributary canyon on the south side of Walnut Canyon, approximately 0.3 mile from the Walnut 33 nest area. In addition, in 2004 an MSO was seen and heard in the expansion area during a night survey and in 2005 an MSO was detected in the Cherry Canyon PAC. In 2005, a MSO call, attributed to a female owl, was heard by NPS and USGS biologists during an informal survey of the Walnut #33 PAC. In 2006, informal surveys were conducted in March and April in the Lucida PAC nest core and no MSO were detected. In 2007, informal surveys within the Breezy PAC resulted in MSO vocalizations on separate occasions. Owls were not located on follow-up visits, but fresh whitewash and owl pellets were located. Based on these detections and sightings, it is apparent that MSO do occupy areas within the monument; however, regular, protocol surveys are encouraged to better determine owl use in the canyon.

Walnut Canyon NM is within MSO critical habitat unit Upper Gila Mountains 12 (UGM-12). There are approximately 17,359 acres within the UGM-12 critical habitat unit; almost all of the

3,580 acres within Walnut Canyon NM falls within this unit. The monument is dominated by coniferous forest and woodland vegetation. There is a relatively compressed environmental/vegetation gradient along the canyon rim terraces, which are dominated by ponderosa pine on the west side of the monument and grade into pinyon-juniper woodland and grassland to the east. The north-facing canyon slopes and tributary canyons are more shaded and moist and are dominated by Douglas fir-Gambel oak forest. The south-facing slopes are more arid and dominated by scattered pinyon and juniper trees with a sparse, but diverse, understory of shrubs, herbaceous species, and succulents. The narrow riparian corridor along the canyon bottom is dominated by broadleaf deciduous trees, shrubs, and vines. The canyon habitat contains a mix of the forested and canyon primary constituent elements listed in the critical habitat rule (USDI 2004).

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

Factors affecting the species and its critical habitat within the action area include, but are not limited to, wildfire and fire suppression, noxious weeds and control, forest insects and control, facility management, and recreation. Within the monument, general public access is restricted to established trails, roadways, and developed facilities. The remainder of the monument has long been closed to unguided entry to protect archaeological features. NPS operations and visitor activities have most likely affected MSO habitat utilization in the monument since at least 1987. This has probably resulted in disturbance to within 0.25 to 0.5 mile of the Island Trail due to heavy visitation and operations in this area.

Walnut Canyon NM is bordered on all sides by the Coconino National Forest, so actions that occur on the Forest can result in impacts to the monument as well. As stated earlier, legislation passed in 1996 administratively transferred approximately 1,330 acres from the Coconino National Forest to the NPS. The NPS recently surveyed and began fencing the new area. Until a decision notice is issued on the Final Environmental Impact Statement/General Management Plan, the expansion area will remain open to public use in accordance with the Coconino National Forest Land and Resource Management Plan, as amended. Predominant uses on the forest include livestock grazing on the Youngs Canyon, Cosnino, and Walnut Grazing Allotments; hunting and target shooting; off-road vehicle use; and camping. Most of these activities occur along the terraces adjacent to the Walnut Canyon rim, and activity within the canyon is limited. After the NPS closes the boundary expansion area, use in this area will decrease.

The Arizona Trail route was originally established through the Coconino National Forest, but as a result of the 1996 boundary expansion, two short trail segments are now within the monument. A 0.25 mile segment traverses the entrance road corridor approximately 0.5 mile north of the visitor center area, and another 0.25 mile segment traverses the northwest corner of the monument. This section of the trail traverses a steeply-sloped tributary canyon with a Douglas fir-Gambel oak stringer and is routed approximately 300 feet inside the perimeter of the Walnut 33 PAC, about 0.6 mile from the nearest known nest sites within the PAC. It is reasonable to expect that the presence of the Arizona Trail system within the monument may aid in increasing visitation to the monument in the future. In the 10-year period between 1982 and 1992, day hiking alone in the United States has increased almost two-fold, from 26 million to 50 million people (Flather and Cordell 1995). Already, books and maps are available that advertise the

Arizona Trail (e.g., *Biking the Arizona Trail* by Andrea Lankford). In addition, the peak recreational use period of the Arizona Trail overlaps the entire MSO breeding season (March 1 through August 31).

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.

NPS fire and fuels management activities at Walnut Canyon NM will occur in proximity to MSO nesting sites and within portions of the Walnut 33, Breezy, Lucida, and Cherry PACs. In addition, these activities will be conducted within designated critical habitat. The activities that may affect MSO in Walnut Canyon as a result of implementing the FMP include fuels reduction treatments consisting of manual thinning and prescribed fire, limited wildland fire suppression actions, and burned area rehabilitation.

Fuels Reduction Treatment (Manual Thinning and Prescribed Fire)

The Recovery Plan encourages land management agencies to conduct fuels reduction projects within MSO habitat and provides guidelines for these actions that will aid in reducing fuels but still maintain habitat and minimize effects to MSO and critical habitat. These actions are supposed to protect owl habitat over the long-term by reducing the likelihood of stand-replacing fire; however, short-term effects from fuels reduction treatments can adversely affect owls directly or indirectly by affecting their prey and critical habitat PCEs. This project proposes to mechanically thin and burn approximately 401 acres of MSO protected and critical habitat over the next ten years. Project areas are designed to be small and widely distributed over the landscape so that crew activity within any one MSO PAC only occurs for one or two consecutive growing seasons at a time, followed by prescribed fire, then no activity for seven or more years. During the MSO breeding season, work would be prohibited within PACs and chainsaw use would be prohibited within 0.25 mile of the canyon rim or steep slopes. However, though projects above the rim are expected to focus on the removal of small diameter trees, there is the potential for larger trees and snags to be removed during thinning actions to reduce wildfire risk to archaeological sites that occur within PACs. In addition, this work may occur within the nest cores of the Breezy, Cherry, and Lucida PACs (Table 3).

In general, prescribed burning or thinning activities may indirectly affect the spotted owl by changing the owl's habitat structure (snags, downed logs, woody debris, multi-storied canopies, dense canopy cover, etc) and potentially result in relocation of owls. In addition, the proposed activities may change the structure of spotted owl prey species' habitat, affecting the abundance and composition of prey species. Although treatments, especially prescribed burning, may have adverse effects to prey species and their habitat in the short-term, the proposed treatments may increase the diversity of vegetative conditions that in turn provide for a diverse prey base.

Table 3. FMP ten-year implementation actions and affected areas within MSO PACs at Walnut Canyon NM.

Activity	Breezy PAC Affected Acres	Cherry PAC Affected Acres	Lucida PAC Affected Acres	Walnut #33 PAC Affected Acres
Manual thinning and prescribed fire activities in FMU-2	115 acres	51 acres	128 acres	81 acres
Archaeological site manual fuels reduction activities in FMU-4	2.5 acres inside nest buffer 10.8 acres within PAC	0.5 acres inside nest buffer 2.7 acres within PAC	0.5 acres inside nest buffer 5.2 acres within PAC	3.8 acres within PAC

The effects of fire (both prescribed and wildfire) include both negative and beneficial effects on MSO habitat. Beneficial aspects include increased response of herbaceous vegetation after a fire. Negative effects include the loss of MSO prey habitat components such as herbaceous cover, down logs, and snags. The effects of fire on the prey base of the spotted owl are complex and are dependent on the variations in fire characteristics and in prey habitat. Fire intensity, size, and behavior are influenced by numerous factors such as vegetation type, moisture, fuel loads, weather, season, and topography. Fire can effectively alter vegetation structure and composition, thereby affecting small mammal habitat. The initial effects of fire may be detrimental to rodent populations as cover and plant forage species would be reduced.

However, population responses by small mammals to fire-induced changes in their habitat vary. For example, deer mouse populations might increase immediately following fire and then decrease through time (Ward and Block 1995). Campbell et al. (1977) noted that populations of peromyscid mice decreased immediately following fire in an Arizona ponderosa pine forest that removed one-fourth (moderately burned) to two-thirds (severely burned) of the basal area; populations then returned to pre-fire numbers two years following the burn. Further, no differences were found in rodent populations between moderately and severely burned areas. They concluded that the effects of the fire that they studied were short-term, and the short-term positive numerical responses of mice were attributed to an increase in forage, particularly grasses and forbs, after the fire (Ward and Block 1995). Small mammal diversity and densities are typically depressed for one to three years after a fire (Wright and Bailey 1982). Biswell et al. (1973) suggested that rodent populations would be less affected during fall fires, because at that time of year rodents have accumulated seed caches that will mitigate loss of food sources. Predation of surviving rodents that are part of the diet of the spotted owl may increase immediately after the fire. In one study in northern California, radio-collared northern spotted owls spent considerable time in burned-over areas. This activity was assumed to be due to easy capture of prey (Patton and Gordon 1995). Our own observations and limited research (Bond et al. 2002) indicate that MSO tend to stay within their historical home range in the short-term following wildfire. This is most likely due to spotted owls' high site-fidelity (Bond et al. 2002, Forsman et al.1984).

The net effect of prescribed fires on MSO foraging is unclear: a fire that removes the tree canopy would likely render a portion of the area unusable for foraging by owls, but if the spatial extent of crown loss is limited, a mosaic is created that could provide a diversity of prey for the owl and actually be beneficial (Ward and Block 1995). Although owl prey species evolved in ecosystems where fire is a natural process, fire has been excluded from most southwestern ecosystems during the 20th century, resulting in systems where fire behavior may deviate substantially from natural conditions. Effects of fire on small mammals under present environmental conditions are unclear (Ward and Block 1995). Temporary indirect effects to MSO present on NPS land may occur from smoke, heat, noise, and a reduction in MSO prey species (due to changes in prey species habitat) because areas that may be used by MSO could be treated. Because the proposed action emphasizes low to moderate intensity burns, and the NPS will implement conservation measures (Appendix K of the FMP) before implementation of prescribed burns and adjust actions if necessary, these indirect effects are unlikely to adversely affect the survival or reproduction of any owls that may be in the area.

Smoke, heat, and noise in or near MSO habitat within the project area may cause adult MSO or juveniles (late breeding season) to move, or result in other temporary changes in their activities to avoid these impacts, but these effects would be minimal and likely only occur during implementation of the proposed action. These disturbances may have a greater impact on nestlings or juveniles (early in the breeding season) because of their lack of mobility. These disturbances may result in additional stress and disruption of activities (including feeding), but these effects would be temporary, and stress and activities would soon return to pre-disturbance levels. Smoke, heat, and noise impacts are greatly reduced with implementation of the conservation measures.

The FMP includes thinning and burning of MSO protected and critical habitat. However, thinning and burning above the canopy rim is expected to have minimal impacts to MSO as it will focus removal on small diameter trees, will occur outside the breeding season in PACs or at least 0.25 mile from the rim if not in a PAC, and should reduce wildfire risk to MSO. In addition, Ganey and Balda (1994) reported that MSO in Walnut Canyon infrequently hunted and very rarely roosted in areas above the canyon rim, so we would expect that fuels reduction treatments in these areas would result in fewer impacts to MSO than those that occur within the inner canyon.

Scattering low volumes of slash within canopy openings across the Walnut Canyon rim terraces would not likely have any foreseeable adverse effects to MSO, and some effort would be made to minimize this activity within PACs (pile burning is prohibited within PACs). Prescribed burns will occur outside the MSO breeding season and no more than one fire would be implemented per year within the NM. Fires may be implemented in August if enough is known about MSO activity near the proposed burn and fuels and weather conditions are optimal. Fire blocks are designed to be small enough to burn out within 12 to 24 hours, with some smoldering and hot spot activity for up to an additional 48 hours.

The manual thinning treatments to reduce fire risk to archaeological sites expected to occur within the canyon (and within PAC nest cores) are expected to be small in size and will remove as few trees as possible. This is not only to reduce effects to MSO, but also to reduce effects to archaeological sites. Trees greater than 9 inches dbh may be removed from within PACs, within

nest core areas, and designated critical habitat. These actions may affect canopy cover and result in the removal and/or loss of large trees, and loss of snags and coarse woody debris within the nest cores of the Breezy, Cherry, and Lucida PACs.

Wildland Fire Suppression

For this consultation the NPS desires to limit consultation only to wildfires that originate within the monument boundaries and for which the NPS remains the lead or primary coordinating agency for the initial response. Our understanding of this definition is that the NPS wants to limit the suppression actions we analyze to those fires that would be easily controlled, contained, or confined within the NM. Though we have received little guidance as to what this means specifically, we believe that due to the proximity of Walnut Canyon to the City of Flagstaff and Lake Mary (which is a source of the city's drinking water), only relatively small fires (~20 to 30 acres maximum in size) that are burning on the ground or only torching individual trees and are controlled during initial attack would meet this definition. Any fire that climbed into the canopy and could move rapidly through the canyon would exceed the NPS's definition and they would likely initiate emergency consultation. Our recent experience with fires in the NM for the last several years has consisted of very small, lightning caused fires that were either suppressed immediately by hand or were put out quickly by monsoonal rains. However, since initial response could include both ground and aerial suppression actions, we will analyze the potential effects from this to MSO in the NM.

The effects of fire (both prescribed and wildfire) are discussed in the above section. Direct effects from fire suppression actions to MSO depend upon their proximity to occupied habitat and their timing during the breeding season. Disturbance to MSO from tanker overflights and firefighters will be greatest the closer these actions occur to the owl's core area. Activities associated with wildfire suppression can directly affect the MSO through auditory or visual disturbance. This disturbance can disrupt activities such as breeding, feeding, and roosting. The response of wildlife to noise disturbance is complex, being neither uniform nor consistent. Delaney et al. (1997, 1999) reviewed literature on the response of owls and other birds to noise and concluded the following: (1) raptors are more susceptible to disturbance-caused nest abandonment early in the nesting season; (2) birds generally flush in response to disturbance when distances to the source are less than approximately 200 feet and when sound levels are in excess of 95 dBA; and (3) the tendency to flush from a nest declines with experience or habituation to the noise, although the startle response cannot be completely eliminated by habituation.

Owls have more sensitive hearing than other birds (Bowles 1995). If noise arouses an animal, it has the potential to affect its metabolic rate by making it more active. Increased activity can, in turn, deplete energy reserves (Bowles 1995). Noisy human activity can cause raptors to expand their home ranges, but often birds return to normal use patterns when the humans are not present (Bowles 1995). Such expansions in home ranges could affect the fitness of the birds, and thus their ability to successfully reproduce and raise young. Species that are sensitive to the presence of people may be displaced permanently, which may be more detrimental to wildlife than recreation-induced habitat changes (Hammitt and Cole 1987, Gutzwiller 1995, Knight and Cole 1995). If animals are displaced from areas that are essential for reproduction and survival, then that population will decline. Likewise, if animals are disturbed while performing behaviors such

as foraging or breeding, that population will also likely decline (Knight and Cole 1995). Birds may respond to disturbance during the breeding season by abandoning their nests or young; by altering their behavior such that they are less attentive to the young, which increases the risk of young being preyed upon; by disrupting feeding patterns; or by exposing young to adverse environmental stress (Knight and Cole 1995). There is also evidence that disturbance can result in lost foraging time that, in turn, may cause some raptors to leave an area or to not breed at all (Knight and Cole 1995).

Suppression actions occurring through the first two-thirds of the breeding season could result in the death of nestlings or juveniles due to their lack of mobility. Later in the breeding season, fire suppression actions are less likely to result in the direct death of juveniles because of their increased mobility during this period, or of an adult MSO.

If a fire occurs under low fuel moisture and/or high wind conditions, has a rapid rate of spread, and excessive tree torching or crowning behavior, aggressive suppression tactics, especially the use of aircraft, would likely be necessary. Wide fire lines may be constructed by hand crews or with heavy equipment in proximity to the monument boundary or along the canyon rim. Backfires may be initiated to widen fuel breaks. Helicopter bucket drops of water or retardant or air tanker drops might be used along the canyon rim or on canyon slopes as well. Emergency suppression could directly kill nestlings or juveniles through the management actions used to control or suppress the fire, such as fire line construction and aerial retardant or water drops. The likelihood of this mortality during widespread, aerial suppression activities could be high within Walnut Canyon as almost the entire inner canyon is considered occupied. The inner canyon is extremely narrow, and there are few escape routes. In addition, aircraft flights over occupied MSO habitat may increase the possibility of a flight response in MSO, which can result in nesting adults temporarily fleeing or permanently abandoning a nest or nestlings. All four MSO PACs within the monument may be impacted by wildfire suppression actions at some point in the next ten years.

Burned Area Rehabilitation

Burned area rehabilitation actions would likely be completed by field crews using hand-carried equipment. Some actions to reduce erosion or sedimentation could occur on canyon slopes or in the ephemeral drainages in side canyons. However, rehabilitation crews would likely not be capable of accessing areas on the steepest slopes and rock ledges where MSO are known to roost in Walnut Canyon. Though crews would be active during the day, potentially within MSO PACs, any disturbance to MSO present should be of limited frequency and duration. Over the long-term, rehabilitation activities should speed vegetation recovery and maintain or improve the quality of MSO prey habitat.

Summary

In summary, we believe that MSO and critical habitat will likely be adversely affected in the near term, and perhaps long-term, through impacts to protected (PAC) habitat from actions associated with fire suppression that may result in disturbance, injury, or mortality of owls associated with the Breezy, Cherry, Lucida, and Walnut #33 PACs during the breeding season. In addition, manual thinning and prescribed burning activities may result in temporary

degradation of habitat (including small portions of the three nest cores) and PCEs due to reduction in canopy cover, the removal and/or loss of large trees, and loss of snags and coarse woody debris.

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. Future actions within the project area that are reasonably certain to occur include: increased recreation around the monument due to the increasing Flagstaff population; fuels reduction treatments; increased development; increased ambient noise from the nearby Interstate 40, Santa Fe Railroad, and Pulliam Airport; and other associated actions on nearby state and private land. These activities have the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, cause disturbance to breeding MSOs, and therefore contribute as cumulative effects to the proposed action. Because of the predominant occurrence of MSOs on Federal lands in this area, and because of the role of the respective Federal agencies in administering the habitat of the MSO, actions to be implemented in the future by non-Federal entities on non-Federal lands are considered to be of minor impact to the owl population. However, non-Federal actions in this area may have significant impacts on the Breezy, Cherry, Lucida, and Walnut 33 PACs.

CONCLUSION

After reviewing the current status of Mexican spotted owl, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Walnut Canyon FMP will not likely jeopardize the continued existence of the Mexican spotted owl or adversely modify its critical habitat.

We present these conclusions for the following reasons:

1. Though tree removal in critical habitat may result in the loss of some PCEs, and tree removal in protected habitat may reduce key habitat components, the proposed action will not decrease the long-term viability of MSO habitat within the project area.

2. The implementation of the proposed action is not expected to significantly impede the conservation of MSO within the Upper Gila Mountains Recovery Unit. The four PACs potentially affected by this action represent a fraction of the approximately 624 known PACs within the Upper Gila Mountains Recovery Unit.

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 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 available information as summarized within this document, we have identified conditions of possible adverse effects to MSO leading to incidental take associated with implementation of the Walnut Canyon FMP within the Breezy, Cherry, Lucida, and Walnut #33 PACs.

Amount or Extent of Take Anticipated

We anticipate that two MSO (one pair) and/or associated eggs, nestlings, or juveniles associated with the Breezy, Cherry, Lucida, or Walnut #33 PACs may be taken during full implementation of the FMP over the next ten years. The incidental take will be in the form of harm resulting from wildfire suppression actions or harassment due to habitat alteration within the PACs.

EFFECT OF THE TAKE

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

REASONABLE AND PRUDENT MEASURES/TERMS AND CONDITIONS

We determine that the proposed action incorporates sufficient measures that reasonably and prudently minimize the effects of incidental take of MSO. All reasonable measures to minimize take have been incorporated into the project description. Thus, no reasonable and prudent measures are included in this incidental take statement.

DISPOSITION OF DEAD, INJURED, OR SICK MSO

Upon locating a dead, injured, or sick spotted owl, 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 owl(s) shall be provided to this office. If the remains of the owl(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 owl(s) survive, this office 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 NPS work with the FWS to continue to develop and refine the conservation measures in Appendix K of the FMP. We would like to meet with you either yearly, or as necessary, to review the FMP and determine where we might be able to improve measures to protect and/or minimize effects to listed and sensitive species.

2. We recommend that the NPS work with the FWS and others to conduct regular, protocol surveys for MSO to better determine owl use in the canyon.

3. We recommend that the NPS work with the FWS to better identify potential bald and golden eagle habitat within the NMs, so that we can better protect these sensitive areas.

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.

Thank you for your continued coordination. In all future correspondence on this project, please refer to the consultation number 22410-2001-F-0352. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

Should you require further assistance or if you have any questions, please contact Shaula Hedwall at (928) 226-0614 (x103) or Brenda Smith (x101) of our Flagstaff Suboffice.

/s/ Steven L. Spangle

cc:

Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ
Paul Whitefield, Walnut Canyon National Monument, Flagstaff, AZ

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APPENDIX A – CONCURRENCE

This appendix contains our concurrences with your "may affect, not likely to adversely affect" determination for the black-footed ferret.

Black-footed ferret (*Mustela nigripes*)

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the endangered black-footed ferret. We base this concurrence on the following:

- There are no historical occurrence records of black-footed ferrets within the Flagstaff Area NMs, and they are considered extirpated within this area. There are no Gunnison's prairie dog colonies at Walnut Canyon NM, but there are small burrows located at both Sunset Crater NM (estimated to be less than 5 acres) and Wupatki NM (a larger area if state and private lands are included, but burrow density is less than 8 per acre).

- NPS fire management activities in proximity to Gunnison's prairie dog burrows of sufficient area to be potential black-footed ferret habitat would be limited to suppressing wildland fires in the Wupatki grasslands. Fire suppression in these areas would likely not require excessive ground-based tactics such as bulldozed fire lines or air-support operations. Conservation measures include restrictions on using motor vehicles, constructing fire line, and aircraft operations in proximity to prairie dog burrow areas and recommend avoidance of these areas (see Appendix K of FMP).

- All known active and inactive prairie dog burrows areas would be included on sensitive resource maps and made available to resource advisors and incident commanders.

- Prescribed fires will generally maintain or improve grassland habitat for prairie dogs, and potentially black-footed ferrets should they ever occur at Wupatki NM.

APPENDIX B - TECHNICAL ASSISTANCE

This appendix contains recommendations to the Forest Service to reduce the likelihood of take of bald eagles (*Haliaeetus leucocephalus*) from implementation of the proposed Flagstaff Area National Monuments FMP. Bald eagle winter roost sites occur near Sunset Crater NM, and there is potential for roost sites in and around Walnut Canyon NM. Golden eagles (*Aquila chrysaetos*) occur within and adjacent to Wupatki NM. There are active and historical nest areas on the steep bluffs along the Doney Monocline.

The bald eagle in action area and golden eagles continue to be protected by the Bald and Golden Eagle Protection Act (Eagle Act). The Eagle Act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking eagles, including their parts, nests, or eggs. "Take" is defined under the Eagle Act as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" eagles. Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based upon the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (USDI 2007).

The NPS and FWS jointly developed the following conservation measures to minimize impacts to eagles in the project area. We agree that implementation of the following measures will reduce the likelihood of take of both bald and golden eagles.

Bald eagle

- Bald eagle activity will continue to be monitored within the Flagstaff Area NMs. If any winter roost or other habitat use areas are discovered, these areas will be mapped and the information made available to resource advisors, agency representatives, and incident commanders.

- Low-level aircraft overflights and aerial retardant drops are restricted within a 0.25-mile radius around bald eagle winter roost sites between October 15 and April 15.

- Fire line construction and other habitat disturbance from ground suppression will be avoided within 0.25 mile of bald eagle winter roost sites.

Golden eagle

- In the absence of reliable monitoring information, recently active nests will be considered occupied during the breeding season (February 1 through August 15).

- Aerial suppression actions are restricted within a 0.5-mile radius around active nests. If air attack is necessary, targeted water drops will be conducted.

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