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In Reply Refer To:
AESO/SE
22410-F-1997-0193

October 15, 2010

Memorandum

To: Superintendent, Navajo National Monument, National Park Service, Tonalea, Arizona

From: Field Supervisor

Subject: Aspen Trail Re-opening at the Betatakin Unit of Navajo National Monument

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 was dated February 8, 2010, and received by us on February 10. At issue are impacts that may result from the proposed Aspen Trail re-opening at the Betatakin Unit of Navajo National Monument (NNM) located in Navajo County, Arizona. The proposed action may affect the threatened Mexican spotted owl (*Strix occidentalis lucida*) (MSO, or spotted owl).

This biological opinion is based on information provided in the February 2010 biological evaluation (BE), meetings, telephone conversations, field investigations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, the effects of recreation, or other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

February 21, 1997	The National Park Service (NPS) contacted the FWS about the proposed action, which at that time was called the Betatakin Canyon Trail Repair and Reconstruction.
May 19, 1997	We (Arizona Ecological Services Office – AESO) received a draft biological assessment for the Betatakin Canyon Trail action.
August 4, 1997	We sent a letter to the NPS documenting the consultation for the Betatakin Canyon Trail action. Subsequent communication documented in our file consists of telephone, telefacsimile and email records, with no conclusion to the consultation.

October 16, 2007	The NPS reinitiated contact with us about the proposed action.
November 1, 2007	The NPS, Navajo Nation Department of Fish and Wildlife (NNDFWL), Bureau of Indian Affairs (BIA), Natural Resources Conservation Service and FWS met at NNM to tour and discuss the proposed action, the section 7 consultation process, and coordinating relevant MSO surveys.
November 19, 2009	The NPS and FWS met to discuss the proposed action and the schedule for consultation.
December 13, 2009	We provided comments on the NPS 12/04/09 draft project description.
January 26, 2010	We provided comments on the NPS 1/11/10 draft BE.
February 10, 2010	We received your February 08, 2010, letter requesting initiation of formal section 7 consultation on re-opening the Aspen Trail.
August 10, 2010	We sent the draft biological opinion to you for review.
October 5, 2010	We received your September 29, 2010 letter with comments on the draft biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The NPS proposes re-opening the Aspen Trail in 2010 as the primary access route for visitors to Betatakin Cliff Dwellings (cliff dwellings) via ranger-guided tours. In the event the Aspen Trail is subsequently closed for maintenance, the route off Tsegi Point, which is currently used to access the cliff dwellings, will be used as an alternate route. Both Aspen Trail and the route off Tsegi Point pass through the same MSO territory located in Betatakin Canyon and designated by the NNDFWL as the Betatakin Canyon Protected Activity Center (PAC number 542101). The description of the proposed action below is adapted from the BE.

The 1.5-mile long Aspen Trail starts behind the visitor's center and promptly descends approximately 800 feet in elevation from the head of Betatakin Canyon to an aspen forest in the canyon bottom and continues down canyon to the cliff dwellings. The alternate route consists of a vehicular road that transitions into a foot trail at the Betatakin Parking Area and runs along the middle of the peninsular mesa that forms the north rim of Betatakin Canyon. The foot trail heads east, entering Navajo tribal lands, and descends into the canyon off Tsegi Point, then cuts back onto the Monument in approach to the cliff dwellings. The foot trail for the alternate route is approximately 2.5 miles long (Figure 1).

The Aspen Trail was constructed in 1963 and closed to visitor tours in 1983 due to rock falls, but is occasionally used for administrative purposes. Since 2008, the NPS has been restoring the trail to ensure its stability and safe access for staff and visitors. Restoration work has been conducted between September 1 and December 30.

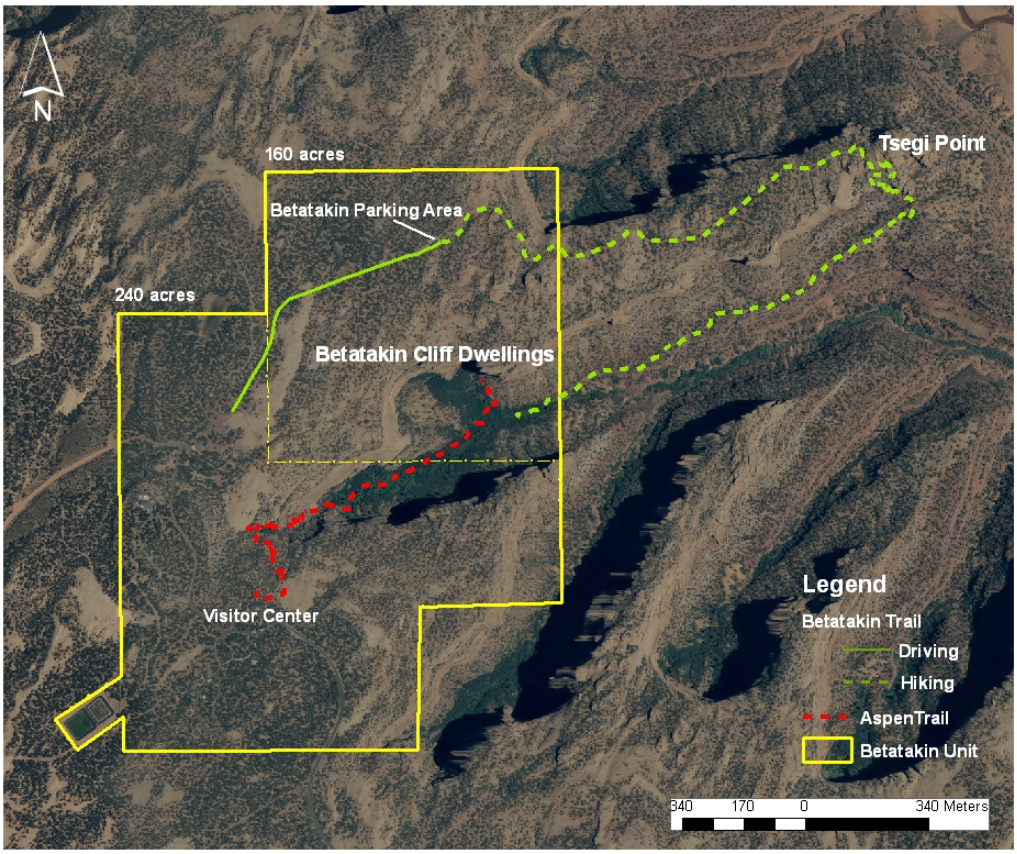

Figure 1. Project location for the Aspen Trail re-opening and the current route off Tsegi Point at the Betatakin Unit of Navajo National Monument.

The NPS proposes the following annual guided tour schedule. The NPS will offer one tour per day on weekends, with a maximum group size of 15, starting the Saturday of the second to last weekend in March (i.e., varying between March 17 and 22) and continuing through the weekend before Memorial Day. In addition, the NPS will offer a total of three school group tours of up to 20 people per tour during this period. From the Friday of Memorial Day weekend (i.e., varying between May 22 and 28) through September, two tours a day with a maximum tour group size of 25 will be offered. The NPS will offer one tour a day from October through December, limited to 25 people per tour. NPS guides will provide visitors with information about the natural resources on whichever trail is in use, including information and education about the MSO, particularly about life history and status, and will advise hikers to minimize noise while in MSO habitat to reduce disturbance to the owl.

Table 1. Yearly tour schedule to Betatakin Cliff Dwellings for the Aspen Trail or the alternate route off Tsegi Point, with earliest start date indicated where applicable(*).

Time Period	**Tour Schedule**	**Maximum tour size**
January through mid-March	No Tours	N/A
March 17* through weekend before Memorial Day	1 tour per day on weekends 3 tours (school groups)	15 20
May 22* through September	2 tours per day	25
October through December	1 tour per day	25

Trail maintenance within the PAC will occur primarily from September through February, during the MSO non-breeding season. Minor maintenance could occur during the breeding season if the Aspen Trail becomes unsafe. Minor maintenance includes work lasting less than two weeks and up to two people using non-mechanized hand tools to remove debris, small rocks, branches or trees from the trail, repair masonry steps, and restore tread. Major maintenance that requires work by more than two people, more than two weeks in duration or with heavier equipment will be conducted from September through February. Any time the Aspen Trail is closed, for minor or major repairs, the trail off Tsegi Point will be reopened for guided tours to the cliff dwellings.

Aspen Trial will continue to be used for administrative purposes, such as inspections of the trail, cliff dwellings and other facilities. These activities will occur infrequently and by a limited number of staff.

The action area is based on the location of both the Aspen Trail and the trail off Tsegi Point, from each trails' staging area to the observation area at the cliff dwellings. The action area extends a maximum distance of 0.25 miles in all directions from the boundaries of each trail to account for the approximate threshold at which activities may elicit a response from MSOs at the nest or roost during the breeding season. This distance may be less depending on a variety of factors such as the nature of the activities associated with trail-use, and factors that may screen sound and/or visual stimuli such as topographic features or vegetation. In general geographic terms, the action area consists of Betatakin Canyon, portions of the side canyons to the south, and the immediately adjacent mesa tops that surround the canyon and its side canyons.

The 2004 GMP provides direction for management of GMP for 15 to 20 years. Therefore, management of the trail system will be re-evaluated by approximately the year 2024.

Conservation Measures

In an effort to minimize impacts to the MSO, the NPS' proposed action represents a reduction in both the number of tours and the maximum size of tours during the early part of the breeding season. Currently, pursuant to the NNM's 2004 General Management Plan (GMP) the NPS has been offering one tour per day early in the season with a limit of 25 people per tour. Under the proposed action, one tour per day will be offered two days per week (Saturday and Sunday) with a limit of 15 people per tour. A total of three additional tours of up to 20 students will also be offered. The NPS will also include MSO interpretation

in the tours that will include a caution to minimize noise. The NPS has determined limiting maximum group size as described will allow the NPS to maintain the visitor access to cliff dwellings with minimal change to visitation, and will reduce effects on the MSO by reducing the potential for disturbance early in the breeding season.

STATUS OF THE SPECIES AND CRITICAL HABITAT

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 wildland fire, 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 for the Mexican (Recovery Plan) in 1995 (USDI 1995). Critical habitat was designated for the MSO in 2004 (USDI 2004).

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 wildland fire, can have short-term adverse effects to MSO through habitat modification and disturbance. As the human 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, high-severity, stand-replacing wildland fire is probably the greatest threat to the MSO. Fire severity and size have been increasing throughout the West.

Global climate change may also be a threat to the MSO and synergistically result in increased effects to habitat from fire, fuels reduction treatments, and other factors discussed above. Studies have shown that since 1950, the snowmelt season in some watersheds of the western U.S. has advanced by about 10 days (Dettinger and Cayan 1995, Dettinger and Diaz 2000, Stewart et al. 2004). Such changes in the timing and amount of snowmelt are thought to be signals of climate-related change in high elevations (Smith et al. 2000, Reiners et al. 2003). The impact of climate change is the intensification of natural drought cycles and the ensuing stress placed upon high-elevation montane habitats (IPCC 2007, Cook et al. 2004, Breshears et al. 2005, Mueller et al. 2005). The increased stress put on these habitats is likely to result in long-term changes to vegetation, invertebrate, and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem functions and processes.

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 Forest Service Region 3 most recently reported a total of approximately 1,025 PACs established on National Forest System (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" (Gutierrez et al. 2003), found that reproduction varied greatly over time, while survival varied little. The estimates of the population rate of change (Λ=Lambda) 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 MSO populations could experience great (>20 percent) fluctuations in numbers from year to year 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 221 formal consultations for the MSO. These formal consultations have identified incidences of

anticipated incidental take of MSO in 442 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 Forest Service Region 3. However, in addition to actions proposed by Forest Service Region 3, we have also reviewed the impacts of actions proposed by the BIA, Department of Defense (including Air Force, Army, and Navy), Department of Energy, NPS, 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

Because there is no designated critical habitat in the action area, a description of critical habitat is not relevant to the effects analysis. Information about critical habitat can be found in the final MSO critical habitat rule (USDI 2004).

ENVIRONMENTAL BASELINE

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

A. Status of the species within the action area

Betatakin Canyon is oriented east-west, is about 1.5 miles in length, and has three tributary canyons on its south side, the most westerly being named Fir Canyon. Elevation ranges from 6,400 feet at the mouth of Betatakin Canyon to 7,200 feet at its head. An alcove on the north side of Betatakin Canyon, near its head, houses the cliff dwellings, which is the destination of the Aspen Trail and its alternate trail. Vegetation types on the mesa tops are primarily Pinyon-Juniper-Mixed Shrub and Pinyon-Juniper-Sage. Overstory vegetation within the canyon includes Douglas fir, aspen and oak in more mesic areas, transitioning to ponderosa pine and pinyon pine where the canyon is more open and drier. A perennial stream runs through the upper part of Betatakin Canyon; in the lower half of the canyon the stream becomes intermittent, supporting a stand of Russian olive. Betatakin Canyon is a tributary of Tsegi Canyon.

Suitable nesting and roosting habitat for MSO occurs primarily in the upper one-third of Betatakin Canyon (up canyon of Fir Canyon), on the on north-facing cliffs downstream of Fir Canyon, and in the three tributary canyons. In the upper third of Betatakin Canyon, canyon width varies from 300 to 500 feet, widening further down canyon.

NPS staff detected MSO, aurally and visually, in Betatakin Canyon in 1989 and 1995 through 1997, with confirmation by NNDFWL staff in 1997. Four of the six NPS detections were in the upper third of Betatakin Canyon. Documentation of those observations is incomplete. There was, however, enough information for the Navajo Nation to designate a PAC centered in Betatakin Canyon in 1997.

The NPS, BIA, Navajo Nation, and FWS conducted interagency surveys for the MSO were in 2008 and 2009 in conjunction with the proposed action. The survey area was Betatakin Canyon, its tributaries, and the canyon immediately to the north of Betatakin Canyon. The surveys resulted in the detection of a minimum of one MSO and the designation of a MSO activity center on the north face of the mesa between Fir Canyon and the canyon immediately to the east. The Aspen Trail and the trail off Tsegi Point come within 0.43 and 0.17 miles of the activity center, respectively, at their closest points. Surveyors were unable to determine nesting status of the MSO. Other locations where surveyors detected MSO activity were in the canyon east of Fir Canyon and on the south face of Betatakin Canyon opposite the north face of Fir Mesa. Based on the 2008 and 2009 findings, the NNDFWL modified the PAC to account for these observations, including the newly designated activity center, and to reflect a more complete understanding of habitat distribution associated with Betatakin Canyon. The PAC is roughly centered on the activity center, encompassing approximately 650 acres of suitable nesting and foraging habitat within Betatakin Canyon and its tributaries. The PAC includes both Navajo Nation lands and areas of NNM, including the canyon section of the Aspen Trail and the entire trail off Tsegi Point within Betatakin Canyon. Information about the PAC is maintained in files of the NNDFWL.

Surveyors did not locate a MSO nest site or evidence of nesting (e.g., juvenile birds). The designated activity center may be a roost site. However, single roost locations are poor predictors of nest locations (Ward and Salas, 2000). Surveys have detected MSO at various locations throughout Betatakin Canyon, based on the recent survey results and observations from the late 1980's and mid-1990's. Therefore, for the purpose of our effects analysis, we considered the potential for MSO to nest where there is suitable habitat in Betatakin Canyon. We feel this is a prudent approach given the duration of the action (about14 years) and the potential for MSO to use more than one nest site during this time period.

B. Factors affecting species' environment within the action area

Past and present activities that may affect the MSO in the action area are activities associated with management of NNM, and activities outside NNM, mainly in the lower half of Betatakin Canyon. Management activities within NNM are categorized as resource stewardship, facilities and operations, and visitation. Resource stewardship involves the study and protection of cultural and natural resources. Within the action area, activities associated with cultural resources have been focused at the cliff dwellings. Activities associated with facilities and operations within the action area mainly involve the maintenance of trails and overlooks. Visitation, which has the most frequent and intense effect on MSO in the action area, involves use of the trails and observation of the cliff dwellings, located within the PAC.

The Aspen Trail was constructed in 1963 then was closed in 1983 at which time the primary visitor access to the cliff dwelling became the trail off Tsegi point. Historically, during the

busy summer season (Memorial Day weekend through September) tours to the cliff dwellings have been scheduled twice a day, seven days a week. The 2004 GMP limits group size up to 25 people per tour; however, not all scheduled tours are filled and some are cancelled due to no attendance or inclement weather. Over the last five years 19% of tours offered were cancelled. During the spring and fall (late March to late May, and mid-September to October) tours occur less frequently, typically with one tour offered per day.

Use of the route off Tsegi Point from March through August, over the last five years, averaged eight people per tour. Fourteen percent of those tours had more than 12 people. During the early part of the MSO's breeding season (March through May) when only one tour was offered per day, trail use during the same five-year period averaged 10 people/tour. Twenty-two percent of those tours had more than 12 people. Offering one tour per day, as opposed to two, increases the demand per tour resulting in more hikers per tour early in the breeding season. Compared to the current one tour per day all week, we expect that offering one tour per day only on weekends will also increase demand and result in larger average group size, up to the limit of 15 during the early part of the breeding season. Attendance is also likely to increase because the Aspen Trail is shorter and shadier than the route off Tsegi Point.

Although the GMP describes a limit of 25 people per tour, a small number of tours exceeded 25 during the aforementioned five-year period. Overall, one percent of tours (13 of 1704) involved more than 25 people (range 26-37), and during the early part of the MSO's breeding season, two percent exceeded the limit.

Outside of the monument, the two primary activities that may affect MSO are grazing and dispersed recreation, primarily by the area's rural residents. Given the remoteness, ruggedness and aridity of the area, both activities are limited.

Although we believe the ongoing activities described above, both within and outside NNM, have had an effect on the resident MSO, these effects have not resulted in abandonment of the territory since there is documentation of its use, at least periodically, for over 20 years. Because MSO use of the PAC has not been monitored, we do not know the continuity of use, what activities have affected that use, or to what extent reproduction may have been affected.

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 proposed action may affect the MSO, directly and indirectly, through noise and visual stimuli associated with hiking, minor trail maintenance, and administrative activities during the breeding season. Disturbance from these activities may have an immediate effect, such as flushing a MSO from a roost or nest, or longer term effects, by altering how MSO utilize

habitat, both of which may significantly disrupt normal behavior, such as feeding, breeding and sheltering. Indirect effects may also be felt through habitat alteration. The NPS adjusted the tour schedule to balance visitor use and disturbance to MSO associated with visitation of the cliff dwellings. These conservation measures are described in the Description of the Proposed Action section of this document.

There are a growing number of studies attempting to describe and quantify the impacts of non-lethal disturbance on the behavior and reproduction of wildlife, and MSO in particular. Delaney *et al*. (1997) reviewed literature on the response of owls and other birds to noise and concluded that raptors are more susceptible to disturbance-caused nest abandonment early in the nesting season; and 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. Pedestrian activities have been found to be more disruptive on raptors than many other activities, such as disturbances from automobiles, boats and aircraft (Belanger and Bedard, 1989, McGarigal et al. 1991, Holmes et al. 1993). Awbrey and Bowles (1990), in their meta-analysis of noise disturbance research on raptors, noted aircraft overflights were less detrimental than common ground-based activities such as hiking. Delaney *et al*. (1999) found that ground-based disturbances elicited a greater flush response than aerial disturbances. Our guidance is to limit potentially disturbing activities to areas greater than 0.25-mile from MSO nest sites during the breeding season (March 1 through August 31). This corresponds well with the Delaney *et al*. (1999) 0.25-mile threshold for alert responses to helicopter flights. MSO use of the activity center in Betatakin Canyon is likely affected by hiking along the route off Tsegi Point which comes within 0.17 miles of the activity center.

Owls are dependent on their sense of hearing to detect prey and have greater auditory sensitivity than other birds in general (Bowles 1995, Delaney et al. 1997). If a noisy sound source arouses an animal, it has the potential to affect its metabolic rate by making it more active. Increased activity can, in turn, deplete energetic reserves (Bowles 1995). Noisy human activity can cause raptors to expand their home ranges, but often the 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 denied access to areas that are essential for reproduction and survival, then that population will decline. Likewise, if animals are disturbed while performing essential behaviors such as foraging or breeding, that population will also likely decline (Knight and Cole 1995). Topographic screening between the area of disturbance and the bird's location creates a noise buffer and may assist in the reduction of noise disturbance (Knight and Cole 1995).

Visual stimuli also affect raptors, including MSO. Grubb and King (1991) in their classification model of bald eagle response, ranked noise sixth, behind distance, duration of disturbance, visibility, number of disturbances per event, and stimulus position, in that order. Delaney *et al*. (1999) stated that disturbing activities in close proximity to a spotted owl's location may also be more visible and therefore elicit a greater response than an activity farther away, regardless of noise level (although, they believe visibility had limited effect on their results). Swarthout and Steidl (2003), in their study of the effects on hiking on MSO,

surmised that females in nests highest above trails, with a more commanding view, were exposed to disturbance from hikers for a longer period of time, suggesting the importance of effects from visual stimuli. Therefore, MSO may be affected by visual stimuli from hiking activity at a distance where sound associated with the hiking is attenuated.

Swarthout and Steidl (2001) studied the effects of recreational hiking on MSO behavior in the narrow canyons of southern Utah. They found that MSO modified their behavior (e.g., increased perch height) and/or flushed in response to hikers. Based on their results, they recommended placing buffer zones (conservative buffer = 180 ft; less conservative buffer = 40 ft.) around known roosting sites to minimize impacts. Most of the suitable nesting and roosting habitat in the upper part of Betatakin Canyon falls within the conservative buffer distance from the Aspen Trail. In a study to assess the effects of hikers on the behavior of nesting MSO, Swarthout and Steidl (2003) noted that female MSO decreased the amount of time they handled prey by 57% and decreased the amount of time they performed daytime maintenance activities by 30% while hikers were present. In addition, hikers caused both female and male owls to increase the frequency of contact vocalizations. 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 the young being preyed upon or disrupting feeding patterns; or by exposing young to adverse environmental stress (Knight and Cole 1995). There is also evidence that disturbance during years of a diminished prey base can result in lost foraging time which, in turn, may cause some raptors to leave an area or not to breed at all (Knight and Cole 1995). Potential for hikers to disturb MSO is probably greatest where hiking is concentrated in narrow canyon bottoms occupied by nesting or roosting owls (USDI 1995).

Group size and the total number of hikers are also important factors in assessing effects of hiking on MSO. Most MSO appear relatively undisturbed by small groups of 12 people or less passing nearby (USDI 1995). Conversely, Swarthout and Steidl (2003) recommend that canyons receiving more than 50 hikers per day receive additional management consideration such as monitoring MSO occupancy rates, nesting success and behavioral responses to human activities. The proposed action sets a group size limit of 15 (with three additional groups of up to 20) early in the MSO breading season and 25 for the rest of the year. Although average tour group size over the past five years was ten early in the breeding season, group size exceeded 12 almost one-quarter of the time. Based on the rationale given under the ENVIRONMENTAL BASELINE, we anticipate average group size to increase and exceed 12 more often. We recognize that although average group size will likely increase, there will be fewer tours early in the breeding season (two per week as opposed to seven).

The proposed action involves groups of hikers, which we expect to routinely exceed 12 people in size, moving through a MSO territory, annually on a regular basis during the breeding season in close proximity to where MSO may be nesting or roosting. The noise and visual stimuli associated with hiking has the potential to disrupt normal behavior of MSO using this territory. Because MSO are particularly sensitive to disturbance early in the breeding season (March-April) this level of disturbance could interrupt breeding behavior to the extent that a nesting attempt is aborted. Disturbance of less magnitude (e.g., smaller group size) or later in the breeding season may interfere with breeding behavior such as prey delivery to the nest and/or nestling/nest maintenance, resulting in diminished nesting productivity. Hiking may also disturb roosting owls, through the interruption of resting

activities (e.g., flushing from the roost; or staying on the roost but in a heightened state of awareness) or by permanently displacing MSO to a less preferred roosting area. This would result in an above-normal expenditure of energy, reducing individual fitness and the contribution of that individual to any reproductive efforts. It is likely that current hiking is affecting MSO nesting and/or roosting use of the upper one-third of Betatakin Canyon in the vicinity of the cliff dwellings. Hiking the Aspen Trail will increase the extent of those effects throughout the entire upper one-third of Betatakin Canyon, possibly displacing some MSO use from this part of the canyon. The presence of hikers may also alter use of the territory for foraging, displacing MSO from preferred areas and shifting foraging into less preferred areas where, for example, the prey base has a lower density.

Minor trail maintenance and administrative activities will have similar effects, although on a less frequent basis, and will add to the effects of hiking.

Disturbance to MSO from hiking may also occur indirectly through altered habitat caused by trampling of vegetation, soil damage or both (USDI 1995). Habitat alteration along the route off of Tsegi Point is relatively minor because it is constrained to a narrow corridor along that route, probably due to the guided nature of the hikes and relatively small tour group size. The Aspen Trail, which has been in use for administrative purposes, is similarly narrow with limited habitat alteration in the canyon bottom. For the proposed action, we expect impacts to vegetation and soil along the Aspen Trail will be similar to those along the route off Tsegi Point because of the overall similarity in foot traffic intensity.

Based on the proximity of both trails to suitable MSO nesting and roosting habitat in an occupied territory located in a narrow canyon bottom, and the use of those trails by groups of people that will exceed small group size (12) at times throughout the nesting season, the proposed action is likely to significantly affect use of this territory. The effects of the action will be chronic disturbance, occurring every year at least until the year 2024, at which time the GMP for NNM will be reviewed.

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 non-federal actions reasonably likely to occur are the continuation of limited dispersed recreation and grazing inside the PAC (outside NNM). These activities are likely to affect MSO by altering use of the PAC in the lower half of Betatakin Canyon and altering habitat for prey species by the removal of forage.

CONCLUSION

After reviewing the current status of the MSO, the environmental baseline for the action area, the effects of the proposed re-opening of the Aspen Trail and the cumulative effects, it is the FWS's biological opinion that the Aspen Trail re-opening, as proposed, is not likely to jeopardize the continued existence of the MSO. Critical habitat for this species has not been

designated in the action area; therefore, critical habitat will not be affected.

We base this conclusion on the following:

- The proposed action will affect the use of one MSO PAC, which is a small fraction of MSO habitat in the Colorado Plateau Recovery Unit.

- The implementation of the proposed action is not expected to impede the survival or recovery of MSO in the Colorado Plateau 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 the conservation measures 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 part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the NPS for the exemption in section 7(o)(2) to apply. The NPS has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the NPS fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the NPS must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Take of MSO will be difficult to detect because finding an impaired specimen is unlikely. However, the level of incidental take can be anticipated by assessing the chronic disturbance that will affect the reproductive success and survival of MSO within the action area.

We anticipate that the effects of the proposed action will likely harass MSO resulting in chronic disturbance. This disturbance may result in disrupted MSO reproduction and the

ability of this PAC to contribute to recovery of the species. We anticipate the take of one pair of MSO and/or associated eggs/juveniles in the form of harassment associated with the Betatakin PAC (#542101) due to the proposed action. This anticipated take is in the form of chronic (greater than eight breeding seasons) disturbance, which we define as a non-habitat altering action that disrupts or is likely to disrupt owl behavior.

The FWS will not refer the incidental take of any migratory bird for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703-712, if such take is in compliance with the terms and conditions specified herein.

EFFECT OF THE TAKE

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

REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the NPS must comply with the following reasonable and prudent measure and the implementing terms and conditions. These terms and conditions are necessary and appropriate to minimize take of the MSO, and are non-discretionary.

1. The NPS shall evaluate the effectiveness of the proposed action's conservation measures.

    A. The NPS shall monitor Betatakin PAC (#542101) occupancy for at least one out of every three years over the life of the action.

2. The NPS shall document implementation of conservation measures that are part of the proposed action.

    A. The NPS shall document conservation measures by collecting and maintaining standard NPS visitation statistics. This information shall include the trail in use, the number of tours offered and the number of people attending each tour, by date, on a daily basis. The NPS will also record all incidental observations of MSO associated with use of the trail by visitors or staff, or by staff during other routine duties.

3. The NPS shall report the results of monitoring the Betatakin PAC (#542101) and documentation of implementation of conservation measures to the FWS.

    A. The NPS shall submit an annual report to the Arizona Ecological Services Field Office by January 31 beginning in the year 2012. The report shall cover activities for the previous calendar year and summarize the results of monitoring the Betatakin PAC (#542101) when applicable, summarize standard visitation statistics for use of the Aspen Trail and/or the route off Tsegi Point, and locations of MSO observed, and, if any are found dead, suspected cause of mortality (which is in addition to notification requirements under 'Disposition of Dead or Injured

Listed Species' below). The report shall make recommendations for modifying or refining the conservation measures to enhance MSO protection or reduce needless hardship on the NPS.

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

Disposition of Dead or Injured Listed Species

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

CONSERVATION RECOMMENDATIONS

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

1. We recommend that the NPS work with the NNDFWL and Bureau of Indian Affairs, with our assistance, to establish a program to enhance monitoring of the Betatakin PAC (#542101) to include, for example, nesting productivity and more frequent occupancy monitoring.

2. Based on the results of monitoring the Betatakin PAC (#542101) we recommend working with the NNDFWL and us to evaluate tour schedules for the purpose of minimizing disturbance to MSOs, if appropriate.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal

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

The FWS appreciates the NPS' efforts to identify and minimize effects to listed species from this project. For further information please contact John Nystedt at 928-226-0614, (x104) or Brenda Smith at 226-0614 (x101). Please refer to the consultation number, 22410-F-1997-0193 in future correspondence concerning this project.

/s/ Shaula Hedwall for Steven L. Spangle

cc: President, Navajo Nation, Window Rock, AZ
Director, Navajo Nation Department of Fish and Wildlife, Window Rock, AZ
Director, Historic Preservation Department, Navajo Nation, Window Rock, AZ
Director, Hopi Cultural Preservation Office, Kykotsmovi, AZ
Natural Resource Manager, Southern Four Corners Group, National Park Service, Chinle, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ
NEPA Coordinator, Environmental Services, Navajo Regional Office, Bureau of Indian Affairs, Gallup, NM
Wildlife Biologist, Fish and Wildlife Service, Flagstaff, AZ (Attn: Shaula Hedwall)
Tribal Liaison, Southwest Region, Fish and Wildlife Service, Albuquerque, NM (ARD-EA)

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