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AESO/SE
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March 23, 2001

Mr. Robert E. Hollis
Division Administrator
U.S. Department of Transportation
Federal Highway Administration, Arizona Division
234 North Central Avenue, Suite 330
Phoenix, Arizona 85004

Dear Mr. Hollis:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion, based on our review of the proposed Pavement Preservation, Tree Thinning, and Passing Lane Construction on State Route (SR) 89A (milepost 386.60 to the Flagstaff Airport traffic interchange), Coconino County, Arizona, and its effect on the Mexican spotted owl (*Strix occidentalis lucida*) (MSO) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended. Your November 7, 2000, request for consultation was received on November 9, 2000. The Federal Highway Administration (FHA) has made a determination that the project, as proposed, "is likely to adversely affect" the MSO.

Your November 7, 2000, letter included a request for conferencing on proposed critical habitat for the MSO. The Service designated final critical habitat on February 1, 2001 (FR 66: 8530). In Arizona, approximately 831,000 acres were designated and all U.S. Forest Service lands in Arizona and New Mexico were excluded from the final designation. Because the entire project area is located within the Coconino National Forest or within Arizona State Trust lands, the proposed project is not located within designated critical habitat for the MSO, and conferencing is not necessary.

This biological opinion is based on information provided in the November 2, 2000, Biological Assessment and Evaluation (BAE) prepared by EcoPlan Associates, Inc., meetings held on September 28, 1999, March 20 and April 3, 2000, between the Service and FHA and/or EcoPlan Associates, and the Coconino National Forest, telephone conversations between the Service and EcoPlan Associates, field investigations, and other sources of information.

CONSULTATION HISTORY

Informal consultation on this project began on September 28, 1999, when the Service met with FHA, Arizona Department of Transportation (ADOT), the Coconino National Forest, and EcoPlan Associates' consultants regarding the pavement overlay work that was scheduled to take place that summer on SR 89A between the switchbacks and the Flagstaff Airport. The need for surveys of MSO habitat and monitoring of MSO protected activity centers (PACs) were discussed as were the potential effects to the subspecies. On January 14, 2000, a draft BAE prepared by EcoPlan Associates, was provided to Michele James of the Service's Flagstaff Office for review. Ms. James provided written informal comments on the draft BAE to EcoPlan Associates via facsimile on January 26, 2000. A meeting was held between EcoPlan Associates, Coconino National Forest and the Service on March 20, 2000, regarding tree thinning planned along 89A in the same vicinity as the pavement overlay work. The need for tracking of the size and types of trees proposed for removal along 89A was discussed, as were the time frames associated with preparation of the BAE, thinning and paving work. Another meeting was held on April 3, 2000, between the FHA, ADOT, Coconino National Forest, and the Service. Timing of the proposed pavement overlay and tree thinning work were discussed, as was a recently added proposal to include the construction of one or more passing lanes in the project consultation. Ms. James of the Service received a carbon copy of a memorandum from EcoPlan Associates to Dee Bowling, FHA, on May 16, 2000. This memorandum regarded the work planned for MSO surveys and tree inventory on SR 89A during the summer of 2000.

The FHA requested formal consultation for the MSO and its proposed critical habitat in a letter dated November 7, 2000, and received by the Service on November 9, 2000. The Service notified the FHA of our receipt and acceptance of the request for formal consultation in a letter dated January 22, 2001.

The Service sent a draft copy of the proposed action with questions highlighted via facsimile to EcoPlan Associates on March 6, 2001. EcoPlan responded with answers to identified questions in a letter dated March 10, 2001, sent to the Service via facsimile on March 11, 2001. Additional project related items were discussed between the Service and EcoPlan Associates via telephone on March 15 and 16, 2001.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

FHA and ADOT are proposing improvements along 12.29 miles of SR 89A extending from south of Pine Flat Campground at milepost (MP) 386.60 to the Flagstaff Airport interchange at MP 398.89. Section 1 of the project starts south of Pine Flat Campground below the switchbacks (MP 386.60) and ends at the top of the switchbacks (MP 389.77); this section of the project remains unfinished from a previous project. Section 2 of the project is located from the top of the switchbacks (MP 389.77) to the end of the project (MP 398.90). The project begins in

T19N, R6E, section 34 and ends in T20N, R7E, section 7. The Service has described the action area to include a ½ mile corridor on each side of the highway (total of 1 mile) and ½ mile on each of the north and south ends of the project, from MP 386.60 to MP 398.89. Most of the project area is located within the Coconino National Forest. The remainder of the project area lies within Arizona State Trust lands which are located in a checkerboard pattern with the Coconino National Forest.

The proposed project is composed of three actions: pavement preservation, tree thinning, and construction of a passing lane. The initial phase of the project includes the removal of selected trees from within the existing 30-foot right-of-way (ROW) to create an irregular, sculptured edge and establish an effective “recovery zone” for vehicles which may leave the pavement. Outside the ROW, selected ponderosa pine trees that cast shadows on the roadway during the winter will be thinned to aid in de-icing the roadway. Selected tree removal will occur between MP 390.3 and MP 398.7 (Table A). Within the ROW, the proposed project will remove 303 Gambel oak trees with a diameter at root collar (drc) of 5 inches or more and 3,504 ponderosa pine trees. Outside of the ROW, 363 ponderosa pine trees will be removed on both sides of approximately four miles of roadway. Outside the ROW, no Gambel oak trees will be removed and no pine trees greater than 9 inches diameter at breast height (dbh) will be removed. Tree removal will not occur within the ROW or outside of the ROW within the Fry Canyon PAC (between stations 100 and 130) (George Ruffner, EcoPlan Associates, pers. comm.). Tree removal will occur between September 15 and February 15. The earliest this would occur would be in 2001 and 2002; it is likely that this activity may extend to out years (e.g. 2002/2003 or 2003/2004) (EcoPlan Associates, *in litt.* March 10, 2001). If tree removal is scheduled to occur after February 28, 2002, an additional year of follow-up survey for MSO will be conducted during the 2002 breeding season in all restricted habitat within the project area prior to removal in these areas (George Ruffner, EcoPlan Associates, pers. comm.).

Table A. Trees to be Removed Along SR 89A between MP 390.3 and MP 398.7

Area of Removal	Pulp Trees (5"-9" dbh)	Sawtimber (9"-19.9")	Sawtimber (20"+)	Gambel Oak (5"+ drc)
Inside ROW	1,216	1,990	298	258
Outside ROW	363	N/A	N/A	N/A
New ROW	103	191	2	45

The second phase of the proposed project includes the overlay and preservation of the existing pavement between MP 386.6 and MP 398.9. The paving includes a 12-foot travel lane and a 4-foot shoulder on either side of the roadway. Existing turnouts will be graded and paved. Pavement will be striped, signs will be erected and existing guardrail will be reconstructed. Sections of the asphalt-lined cut ditch at MP 389.00 will be replaced with reinforced concrete. All pavement preservation activities will remain within the existing ROW.

This phase of the project is scheduled to begin on approximately June 1, 2001. FHA indicates that pavement preservation activities must take place in June because pavement surface temperature must be above 85 degrees Fahrenheit to administer the overlay/friction coat of pavement preservation. Temperatures are too cool earlier in the year and following the end of June, afternoon thunderstorms reduce pavement surface temperature. In addition, FHA indicates that it is necessary that pavement preservation work take place during the nighttime hours because of the high volume of tourist traffic in the summer. A pilot vehicle will conduct one-way traffic through the construction zone when paving is being performed in the opposite lane. This action will concentrate nighttime traffic into intervals of 14 to 45 minutes. Paving will require a total of 23 days to complete, including asphaltic concrete (AC) and friction course.

To limit disturbance to nesting MSO associated with the Fry Canyon PAC and to provide the maximum amount of time for fledgling of young prior to disturbance associated with this portion of the proposed action, the contractor will begin the pavement preservation work at the northern limit of the project area at MP 398.9 and proceed to MP 391.9, located approximately 0.5 miles north of Fry Canyon; work will then be discontinued until reaching a location approximately 0.5 miles south of Fry Canyon at MP 392.8 where work will continue until the southern limit of the project area at MP 386.6; finally, the contractor will come back to pave the approximately one mile area in the immediately vicinity of Fry Canyon to complete the pavement preservation work (EcoPlan Associates, *in litt.* March 10, 2001).

Various types of equipment will be used in the process of pavement preservation, including construction equipment and chainsaws for tree cutting. Paving work will require the use of oil application trucks, paving machines, and haul trucks. The haul truck will dump the AC on the roadway and then find turn-around sites. Multiple turn-around sites will be available for the project and FHA states that usually an existing turnout will be used.

The AC is placed on the roadway with a paving machine. The production rate of the laydown is dependent upon the lift thickness of the asphalt. With the laying of a 1-inch overlay as proposed for Section 1 of the project (MP 386.60 to 389.77), production will be approximately five to six lanes per 12-hour shift. The remainder of the project (from MP 389.77 to the end of the project, MP 398.90) will require a two-inch AC overlay with a 0.5 inch friction coat. On a 2-inch AC lift, production will be about two to three lane miles per 12-hour shift. One lane mile is a single, 12-foot lane, 1 mile long.

After the laydown machine places the AC, two to three double drum steel wheel rollers will compact it. On the 2-inch lift north of the switchbacks, a 20-ton rubber roller will also be used. The roller requires a water truck. Water is to be obtained from municipal or private sources. Then, a friction course is placed on the new AC to provide better traction. A friction course is a thin layer of crushed rock applied to the surface. This is done by applying a chip seal on the new AC with the use of a special piece of equipment, ten-wheel end dump trucks, and three or four rubber tire rollers. After curing, which usually takes four to five hours, the excess chips are swept off by a self-propelled power sweeper. Next, a second, much thinner coat of oil is placed

on the chips and sand is spread on top of that. The excess sand is swept off after curing has taken place. Twelve land miles per shift are common with a chip seal and sand operation. Placement of a friction course or a chip seal will be done at night.

During nighttime pavement operations, internal-combustion light plants will be required at each of the traffic control flagging stations. The flagging stations will be spaced from 2 to 6 miles apart depending on the amount of pavement that can be placed in one night. The flagging stations, with their light plants, will be placed at least 0.25 miles outside of MSO PACs, creating a buffer zone to minimize disturbance to MSO activities. The three light plants will run from sunset until sunrise for the duration of the paving operation. An additional large light plant is also attached to the laydown machine itself. This light plant, essential to the safety of the workers, will move as the paving progresses. Rollers, trucks, and other mobile equipment are also equipped with built-in lights.

Additional work associated with pavement preservation include the removal and replacement of 9,393 linear feet of guardrail. Guardrail work may be done prior to, or after, paving. The contractor will determine the timing and phasing of guardrail work and this work will be completed during the daytime. A lane closure will be required to complete the work. Traffic will be stopped and either flagged through one lane at a time or led by a pilot car. The guardrail work will be accomplished using an auger to drill holes and place the posts, with three or four laborers assembling and installing the guardrail sections. Guardrail work will require 14 days to complete.

Additional miscellaneous work includes: Striping of the pavement using a truck is estimated to take four days. Flexible delineators and snow markers shall be installed in two working days. At the conclusion of the project, new signs will be erected. Sign placement will take two working days and will be accomplished with a flat bed truck and short lane closures. Cleanup will require a front-end loading tractor and end dump truck to haul away wasted AC. Duration for cleanup will be about five working days.

On disturbed areas, seeds will be hydromulched or drilled into the ground and then a layer of straw mulch applied with a second coat of "tackifier" applied to the straw to hold it in place. The straw mulch will be certified weed free; in the event that the contractor cannot obtain suitable straw, a weed free substitute would be utilized (EcoPlan Associates, *in litt.* March 10, 2001). The seed mixture will be a mixture of native species that is acceptable to the U.S. Forest Service. Seeding is expected to take four days to complete. Striping, installation of delineators and markers, erecting of new signs, cleanup, reseeding and hydromulching will be done during daylight hours.

During the entire project, many personnel will be working throughout the project area. ADOT or their representatives will conduct surveying, monitoring of the contractor, inspection and testing. Each day a core drill, which fits into the back of a pickup truck, will be used to take core samples in 10 locations after placement of the AC in order to verify that compaction is adequate. Core sampling will require approximately 3 hours of work time each day.

The third phase of the project is the addition of a northbound passing lane from MP 392.90 to MP 394.30. The southern boundary of the new passing lane is approximately 0.25 miles north of the Fry Canyon MSO PAC. The new passing lane will consist of an additional 12-foot lane alongside the existing northbound lane. The creation of the passing lane requires the purchase of additional ROW from the Forest Service and ASLD. Within the new ROW, 296 ponderosa pine trees and 45 large Gambel oak trees will be removed. Culverts in this area will be extended to accommodate the additional lane. Addition of the passing lane will require the import of borrow and base material. This material will be obtained from an approved ADOT-owned materials source or an approved commercial source. A motor grader will be used to place materials that will then be compacted with a steel-wheel compactor. All material placement and grading will precede the paving operation and will take place during daylight hours. The passing lane will likely be constructed in 2002 or 2003 (EcoPlan Associates, *in litt.* March 10, 2001). The timing of paving has not been determined at this time and may or may not occur during June; at this time it appears that the passing lane could be constructed without the road closures that will be necessary for the pavement preservation portion of the proposed action (EcoPlan Associates, *in litt.* March 10, 2001). Construction work associated with the passing lane, including paving, will occur during the daylight hours and during one season (George Ruffner, EcoPlan Associates, pers. comm.).

Conservation Measures:

The BAE commits to the following items as “recommended mitigation.” The Service considers these items incorporated into the project description.

- 1) ADOT will fund MSO inventory surveys from MP 390.60 to MP 396.80 and monitoring surveys in the Fry Canyon and Sterling Canyon PACs. Where responses are positive, additional surveys for nests will be conducted and active nests will be monitored according to a monitoring protocol to be developed prior to surveys and approved by the U.S. Forest Service and the U.S. Fish and Wildlife Service.
- 2) All tree removal will occur between September 15 and February 15 to avoid the MSO breeding season. Within the project corridor, no ponderosa pine trees more than 9 inches dbh will be removed from outside the ROW. In addition, no oak trees, regardless of size, will be removed from outside the ROW. No trees will be removed from the Fry Canyon PAC.
- 3) To limit the disturbance to any Mexican spotted owl and to provide the maximum amount of time for fledging of young, pavement preservation work will begin at the northern limit of the project area and proceed toward the southern limit. In addition, construction of the passing lane will be scheduled to take place outside of the MSO breeding season.

STATUS OF THE SPECIES

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 Final MSO 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, much remains unknown about the species' distribution and ecology. This is especially true in Mexico where much of the MSO's range has not been surveyed. The MSO currently occupies a broad geographic area but does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to forested isolated mountain systems, canyons, and in some cases, steep, rocky canyon lands. The primary administrator of lands supporting MSO in the United States is the U.S. 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 2 National Forests in Colorado and 3 in Utah) support fewer owls. According to the Recovery Plan, 91% of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service.

Surveys have revealed that the species has an affinity for older, well-structured forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico. The range of the MSO has been divided into six Recovery Units (RUs), as discussed in the MSO Recovery Plan (USDI 1995). The Recovery Plan reports an estimate of owl sites. An owl "site" is defined as a visual sighting of at least one adult owl or a minimum of two auditory detections in the same vicinity in the same year. This information was reported for 1990-1993. The greatest known concentration of known owl sites in the United States occurs in the Upper Gila Mountains RU (55.9%), followed by the Basin and Range-East RU (16.0%), Basin and Range-West RU (13.6%), Colorado Plateau RU (8.2%), Southern Rocky Mountain-New Mexico RU (4.5%), and Southern Rocky Mountain-Colorado RU (1.8%). Owl surveys conducted from 1990 through 1993 indicate that the species persists in most locations reported prior to 1989.

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.

The Forest Service reported a total of approximately 935 PACs established on National Forest lands in the Southwestern Region (USDA Forest Service, Southwestern Region, February 28, 2001). The information provided from the Forest Service also included a summary of acres of protected habitat, acres of restricted habitat, and PACs in the Region by MSO Recovery Unit

From 1991 through 1997, Gutierrez *et al.* (1997, 1998) studied the demographic characteristics of two Mexican spotted owl populations in the Upper Gila Mountains Recovery Unit. The owl populations studied were located on the Coconino and Gila National Forests. Results of this several-year study have shown a decline in the population trend of MSOs within these areas. The

reason for the reported decline is unknown. According to Gutierrez *et al.* (1997), such a trend could be a result of: 1) density dependent responses to an increase over carrying capacities; 2) a response to some environmental factor; or 3) senescence. The latter (i.e. senescence) seems unlikely because there was also a negative linear trend in survival estimates for owls less than three years of age. Regarding carrying capacities, responses to density dependence are difficult to prove in the absence of removal or addition experiments. Environmental factors undoubtedly play a role in owl survival, either through weather events causing direct mortality or indirectly through availability of habitat or prey (Gutierrez *et al.* 1997). This study found that the ability of adult birds to survive successive years of poor environmental conditions may be low (Gutierrez *et al.* 1998).

The proposed Pavement Preservation, Tree Thinning, and Passing Lane Construction on SR 89A Project is located within the Upper Gila Mountains RU as defined by the MSO Recovery Plan (USDI 1995). This RU is a relatively narrow band bounded on the north by the Colorado Plateau RU and to the south by the Basin and Range West RU. The southern boundary of this RU includes the drainages below the Mogollon Rim in central and eastern Arizona. The eastern boundary extends to the Black, Mimbres, San Mateo, and Magdalena Mountain ranges of New Mexico. The northern and western boundaries extend to the San Francisco Peaks and Bill Williams Mountain north and east of Flagstaff, Arizona. This is a topographically complex area consisting of steep foothills and high plateaus dissected by deep forested drainages. This RU can be considered a "transition zone," because it is an interface between two major biotic regions: the Colorado Plateau and Basin and Range Provinces (Wilson 1969). Habitat within this RU is administered by the Kaibab, Coconino, Apache-Sitgreaves, Tonto, Cibola, and Gila National Forests. The north half of the Fort Apache and northeast corner of the San Carlos Indian Reservations are located in the center of this RU and contain an important habitat link between owl subpopulations at the western and eastern ends of the RU and the subpopulations directly south within the Basin and Range West RU.

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 to provide a platform to assess the effects of the action now under consultation.

Status of the Mexican Spotted Owl and its Habitat in the Project Area

All or parts of seven PACs occur in the project area (Table B). Highway 89A bisects the Fry Canyon PAC for about 0.2 miles and parallels the PAC for an additional 1.5 miles. The highway

parallels the Sterling Canyon PAC for 1.25 miles. Monitoring of the Fry Canyon and Sterling Canyon PACs by the Forest Service has been sporadic since 1990 (Table C). Documented

Table B. MSO PACs Located in the Vicinity of SR 89A

PAC No.	Name	Distance from Project Area	Affected by Project?	Last Survey Date
040214	Fry Canyon	bisects	Yes	2000
040215	Sterling Canyon	adjacent	Yes	2000
040228	Woody Ridge	0.6 mile	No	1998
040509	James Canyon	0.3 mile	No	1992
040512	Pumphouse Wash	0.3 mile	No	1991
040539	Kelly Canyon	0.5 mile	No	1993
040601	Cave Springs	0.3 mile	No	Unknown

Table C. Monitoring Results for Fry Canyon and Sterling Canyon PACs, 1990-2000

Year	Fry Canyon PAC (040214)	Sterling Canyon PAC (040215)
1990	Nested	Pair, nesting undetermined
1991	Pair, three young fledged	Male, nesting undetermined
1992	Nest failed	Pair, one young fledged
1993	Pair, nesting undetermined	Pair, two young fledged
1994	Pair, non-nesting, dead owl found	Pair, nesting undetermined
1995	Single, nesting undetermined	No response
1996	Pair, nesting undetermined	Not monitored
1997	Not monitored	Not monitored
1998	No monitored	No response
1999	Not monitored	Not monitored
2000	No response	No response

nesting has occurred in the Fry Canyon PAC at a distance of 0.25 miles from SR 89A, roosting has taken place within 0.20 miles and the nearest MSO observation in this PAC was 0.15 miles from the highway. Nesting has not been documented in the Sterling Canyon PAC. The PAC had pair occupancy in 1990, and 1992-1994; one and two young were produced in 1992 and 1993 respectively. Surveys in 1995, 1998, and 2000 did not locate MSO (USDI Fish and Wildlife Service 2000). The majority of response from owls in the Sterling Canyon PAC to date have been concentrated above the Mogollon Rim at distances between 0.25 and 0.5 miles from 89A; however, 3 of 16 responses from past surveys occurred immediately adjacent to and within 0.25 miles of the highway (USDI Fish and Wildlife Service 2000).

FHA estimates that approximately 640 acres of protected habitat exist within 0.5 miles of the highway within the project area. The total amount of restricted habitat within 0.5 miles of the highway was estimated to be 6,700 acres based on topography, vegetation and current land use. FHA indicates that restricted habitat is not present from MP 397.0 to the end of the project at MP 389.90 due to the lack of Gambel oak and the extent of residential development. A large portion of the project vicinity was surveyed for MSO by the Forest Service between 1989 and 1994. The State Land Department last conducted surveys on State land in the vicinity of the project area in 1998. EcoPlan Associates indicates that all of the project area (defined as a 0.5 mile buffer on either side of the highway) outside of PACs has been surveyed for at least two years to protocol prior to 1997 (George Ruffner, EcoPlan Associates, pers. comm.). Because more than one breeding season has elapsed since the last surveys of the project area, EcoPlan conducted an additional year of MSO surveys to protocol along the SR 89A corridor in 2000 in areas of ponderosa pine/Gambel oak habitat. In addition, EcoPlan conducted monitoring of the Fry Canyon and Sterling Canyon PACs. Surveys and monitoring took place between June 4 and August 10, 2000. No MSO were located either along the habitat in the 89A corridor or in the two monitored PACs.

The Upper Gila Mountains RU consists of deep forested drainages on the Mogollon Plateau. Vegetation generally consists of pinyon/juniper woodland, ponderosa pine/mixed conifer forest, some spruce/fir forest, and deciduous riparian forest in mid and lower elevation canyon habitat. Climate is characterized by cold winters and over half the precipitation falls during the growing season. Much of the mature stand component on the gentle slopes surrounding the canyons has been partially or completely harvested. Most of the forest habitat on steeper ground that may serve as MSO nesting habitat is in suitable condition. MSO are widely distributed and use a variety of habitats within this RU. Owls most commonly nest and roost in mixed-conifer forests dominated by Douglas fir and/or white fir and canyons with varying degrees of forest cover (Ganey and Balda 1989; USDI 1995). Owls also nest and roost in ponderosa pine-Gambel oak forest, where they are typically found in stands containing well-developed understories of Gambel oak (USDI 1995).

This RU contains the largest known concentration of MSO with approximately 55% of known MSO territories (USDI 1995). The Forest Service reports a total of 542 PACs within the Upper Gila Mountains RU (USDA Forest Service, Southwestern Region, February 28, 2001). This RU

is located near the center of the MSO's range within the United States and is contiguous to four of the other five RUs within the United States. Because of its central location and its large and relatively continuous spotted owl population, the MSO Recovery Team believes that the population in this RU could be uniquely important to the overall stability and persistence of the MSO population in the United States. Specifically, this population could serve as the source population, providing immigrants to smaller, more isolated populations in other RUs. Although the Recovery Team has no data on dispersal patterns or movements between RUs, the Recovery Team believes that this population should be maintained at current levels and with at least the current level of connectivity within the RU (USDI 1995). Significant discontinuities that develop in the MSO's distribution within this RU, and the loss of habitat to support the local sub-populations, may compromise the recovery of the species.

The project area contains three distinct topographic areas: Oak Creek Canyon where 89A is located within the bottom of the canyon adjacent to Oak Creek and its associated riparian area containing sycamore, narrow-leaf cottonwood, ash and alder along the banks; the steep slopes along the "switchbacks" which traverses upward in elevation from Oak Creek Canyon to the Mogollon Rim and contains Douglas fir, ponderosa pine, Arizona cypress and scrub live oak, with the confluence of Pumphouse Wash and Sterling Canyon forming the upper Oak Creek Canyon at the base of the "switchbacks;" and, the ponderosa pine and Gambel oak forest above the Mogollon Rim which contains smaller forested canyons such as Fry Canyon that intersect the highway. SR 89A ascends from an elevation of 5,500 feet in Oak Creek Canyon to 7,000 feet above the Mogollon Rim.

A total of 229 projects have undergone formal consultation for the owl in Arizona and New Mexico. Of that aggregate, 87 projects resulted in a total anticipated incidental take of 203 owls plus an additional unquantifiable number of owls. These consultations have primarily dealt with actions proposed by the Forest Service, Region 3, but have also addressed 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 construction activities.

EFFECTS OF THE ACTION

FHA states that of the seven PACs in the vicinity of the project area, five will not be affected by the proposed project due to distance and topographic separation from the project. The boundaries of the Pumphouse Wash PAC (040512), James Canyon PAC (040509), and Kelly Canyon PAC (040539) are more than 0.25 miles from SR 89A and all nest and roost locations for these three PACs are located at least one mile from the highway. Cave Springs PAC (040601) is across Oak Creek and the eastern boundary of the PAC is over 0.25 miles from the

highway, with owl locations at over 0.50 miles from 89A. Woody Mountain PAC (040228) is more than 0.5 miles from the highway. Therefore, these five PACs should not be effected by the proposed action.

Two PACs will be negatively effected by the proposed action. SR 89A bisects the Fry Canyon PAC for 0.2 miles and also parallels the PAC for 1.5 miles. A nest associated with the Fry Canyon PAC has been documented within 0.25 miles of SR 89A, and roosting has been documented within 0.2 miles. The Sterling Canyon PAC is located immediately adjacent to SR 89A for over one mile along the switchbacks. Owls have been detected on both the east and west sides of the highway with some owl locations documented immediately adjacent to the road.

Tree removal will take place within the ROW that does not follow the recommendations of the MSO Recovery Plan. Specifically, nearly 300 trees 20 inches dbh and greater will be removed within MSO restricted habitat along approximately 8 miles of the ROW. The Recovery Plan recommends that large trees (≥ 18 inches dbh) be retained within restricted habitat, and that all trees > 24 inches dbh be retained in restricted habitat. It is unclear from the information provided in the BAE how many of these nearly 300 trees are over 24 inches in diameter, but a site visit conducted by the Service indicated that trees over 24 inches in diameter are present within the ROW, and thus we assume that some number of these largest trees will be removed associated with the proposed action. In addition, over 250 large Gambel oak trees (≥ 5 inches drc) will be removed from within the ROW. The Recovery Plan recommends that difficult to replace habitat elements be retained and enhanced in restricted habitat, and that specifically, hardwoods should be retained. Often, larger oaks provide nesting structures for MSO and removal of these trees may effect nesting MSO now and in the future. In this case, it is unlikely that these large oaks would be used by nesting MSO due to their location within the 30-foot ROW immediately adjacent to this heavily used highway.

Tree removal will take place from MP 390.3 to 398.7; the Fry Canyon PAC is located at the southern end of this segment of 89A but no tree removal will take place between station 100 (at MP 392) and station 130 (at about MP 393) which will be of some benefit to the PAC. Opening of the canopy next to roads and associated increase in moisture along roadways may lead to increased herbaceous vegetation and thus increased prey species may be available for MSO in this area. If additional prey species are found along the roadway, this in turn may increase the possibility that owls foraging for rodents along and in the roadway may be hit by vehicles (further discussion of this will follow).

FHA indicates that all tree removal within and outside of the ROW will take place between September 15 and February 15 to avoid the MSO breeding season. Thus, disturbance from machinery used to accomplish this portion of the proposed action will not impact nesting MSO associated with the nearby Fry Canyon PAC.

Pavement overlay and preservation of the existing pavement will take place both within and adjacent to the Fry Canyon PAC during the MSO breeding season and at night. The BAE indicates that pavement work will begin approximately June 1 and should be completed prior to the July 4 holiday. FHA has committed to completing the last of the pavement work, from 0.5 miles north and south of the Fry Canyon PAC, at the end of June and beginning of July. Work will take place in this mile-long section over a period of 4 nights. To assist in the reduction of impacts to MSO in the Fry Canyon PAC, FHA indicates that night work will not be conducted in the Fry Canyon PAC for more than two nights in succession. The proposed work which will take place within and adjacent to this PAC during the breeding season will include the use of heavy equipment and large lights. This work will take place during one breeding season in 2001 (George Ruffner, EcoPlan Associates, pers. comm.).

Delaney *et al.* (1997) reviewed literature on the response of owls and other birds to noise and drew the following conclusions: 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. Service policy is to limit disturbing activities within 1,320 feet of MSO nest sites during the breeding season (March 1-August 31). This corresponds well with the Delaney *et al.*'s 1,330-foot threshold for alert responses to helicopter flights. Emergency maintenance activities associated with this project will likely occur within 1,330 feet (¼ mile) of potential nesting habitat during the MSO breeding season. Delaney *et al.* (1997) found that ground-based disturbances elicited a greater flush response than aerial disturbances.

Owls have more sensitive hearing than other birds (Bowles 1995). The Fry Canyon and Sterling PACs are located immediately adjacent to the highway where pavement preservation and associated activity will take place during the breeding season. 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 (Hammit 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).

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 by 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). The physical characteristics of the Sterling PAC may assist in providing topographic screening. Topographic screening between the area of disturbance and the birds location creates a noise buffer, and may assist in the reduction of noise disturbance (Knight and Cole 1995). But, the physical structure of canyons can also tend to magnify disturbances and limit escape/avoidance routes for owls (USDI 1995).

Research on all subspecies of the spotted owl indicate that it exhibits docile behavior when approached by researchers, and there is no clear evidence of significant impact by research activity except for a negative effect on reproduction from back-pack radio transmitters (Gutierrez *et al.* 1995). However, researchers purposefully make as little noise as possible, and disturbance is very limited in duration. In the long term, some species may become less responsive to human disturbance if they are not deliberately harassed; others may become very stress-prone towards humans (Bowles 1995; Hammitt and Cole 1987). Excessive interaction with humans may cause a lowering of call response rates or habituation; the effects of habituation on spotted owls are unknown (Gutierrez *et al.* 1995). Owls have been known to begin calling during the breeding season in response to the sound of human voices (Michele James, Service, personal observation). Such behavior is likely characteristic of a certain percentage of individuals, and this response to humans may create a situation where these owls are discovered by humans, thereby exposing themselves to potential direct impacts. The Service believes there is a risk that MSO associated with the Fry Canyon and Sterling PACs will be affected as described above.

The use of heavy equipment at night and the use of powerful lights within and adjacent to the Fry Canyon PAC is expected to disrupt normal MSO behavior and activity patterns including nesting as well as foraging. If MSO nest the year of the action in their previously used nest stand within 0.25 miles of the highway, the pavement preservation work beginning June 1 may impact adults and young through noise and light disturbance. Nestling MSO generally fledge in early to mid-June (Ganey 1988), at approximately the same time pavement work will be taking place in and adjacent to the PAC. Fledglings usually leave the nest before they can fly and within a week of leaving the nest, most owlets can make short, clumsy flights between trees (USDI 1995), thus it is unlikely that fledglings could depart the nest stand immediately if disturbed by nearby construction activity. Fledglings depend on their parents for food during the early portion of the fledgling period and feeding by the adults may continue into August and September, thus if adults are disrupted from their normal behavior and unable to adequately feed their young, the fledglings will be negatively impacted. In addition, the use of lights along the highway may impact the usual foraging activity and patterns of adults, which may lead to a decrease in food for both the adults and young. This in turn may result in less fit adults and/or young owls.

The effect of the use of powerful lights within and immediately adjacent to the Fry Canyon PAC at night are largely unknown. FHA indicates that three light plants associated with the flagging stations will be placed at least 0.25 miles outside of PACs and the Service believes this should reduce some the associated impacts of this action. However, MSO may encounter these three lights during foraging which takes place outside the PACs and one light plant is attached to the laydown machinery and will enter this 1/4 mile buffer zone. The use of these powerful lights along this segment of the roadway may lead to an appearance of daylight and may keep the MSO from their usual nighttime foraging activity. It is also possible that MSO may forage in other portions of the PAC away from the lights.

The effects to the MSO, associated with the Sterling PAC are largely the same as discussed above for the Fry Canyon PAC. However, work adjacent to the Sterling PAC will take place earlier in June and will take place immediately adjacent to the entire eastern edge of the PAC, a total of 1.5 miles. MSO in this PAC have been located proximate to the highway although a nest site has never been located. Pavement work may affect nesting MSO and their young if nesting takes place proximate to the highway. MSO associated with the Sterling PAC have also been documented using both side of the highway, thus pavement preservation work and the use of powerful lights may also effect adult foraging behavior.

The southern end of the new passing lane that will be constructed is located 0.25 miles north of the Fry Canyon PAC. Its construction will require further removal of trees, including 2 trees over 20 inches dbh and 45 large Gambel oak. The passing lane will increase the total width of the roadway by an additional 12 feet. MSO are known to forage outside of designated 600-acre PACs, and in the Upper Gila Mountains RU, MSO pairs have home ranges of 941-3,831 acres (USDI 1995). Therefore, it is likely that MSO associated with the Fry Canyon PAC may forage in the area of the passing lane. While there could be associated beneficial effects of road widening connected with increase prey availability on the shoulders of the road, the Service is concerned with the increased speed of vehicles associated with the passing lane, which may in turn lead to increased probability of MSO being hit by moving vehicles while foraging on the road side and/or attempting to cross the highway in this widened section.

Spotted owls have been known to be hit by vehicles (USDI 1995; Gutierrez *et. al*, 1995; USDI 1992; USDA 1992; Russell Duncan, Southwestern Field Biologists pers.comm.). A MSO was found dead adjacent to Highway 260 in 1999 during a telemetry study which was attempting to determine the effects of road widening on MSO in adjacent PACs proximate to the highway; the necropsy report indicated that the cause of death for this adult owl was blunt trauma likely from collision with a moving vehicle (USDI 1999). Owls may be hit by vehicles for a variety of reasons including such factors as the speed the vehicle is traveling, the number of vehicles, the time of day, and the use of the area by owls. Vehicle headlights may also play a role if they blind the owl. MSO may be attracted to the opening in the forest created by the road because potential prey may be more visible in that area. The Service believes the risk of MSO being hit by vehicles using the passing lane is a possibility because of its location proximate to the Fry Canyon PAC, because cars will be traveling at a fast rate of speed and abreast of each

other, and because vehicles are commonly on the highway at all times of the day and night, including during the periods the MSO are most active (sunset, sunrise, and nighttime). In addition, the sheer number of vehicles that travel this highway plays a role in increasing the likelihood of collision; in 1995, the Forest Service estimated that 6 million people in 2.4 million cars traveled through Oak Creek Canyon (Sedona/Oak Creek EcoSystem Characteristics and Condition: Executive Summary and Supplemental Information, Sedona Ranger District, 1996).

Associated with the passing lane construction, which will take place in 2002 or 2003, is the paving of the passing lane. FHA indicates that the timing of the paving had not been determined, but it is believed that this will not have to take place during June which will be of benefit to the MSO. Paving will take place during daylight hours, which will also protect the MSO. The effects of paving during the breeding season proximate to PACs has been discussed above.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are subject to the consultation requirements established under section 7, and, therefore, are not considered cumulative in the proposed action. In past Biological Opinions, it has been stated that, "Because of the predominant occurrences of MSO on Federal lands, 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 of minor impact." Future actions within the project area that are reasonably certain to occur include urban development, trail creation, recreation, timber harvest, prescribed burning, and other associated actions. These activities have the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, and cause disturbance to breeding MSO, and would contribute as cumulative effects to the proposed action.

CONCLUSION

After reviewing the current status of the Mexican spotted owl, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the Service's biological opinion that the pavement preservation, tree thinning, and passing lane construction on SR 89A, as proposed, is not likely to jeopardize the continued existence of the MSO.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to

engage in any such conduct. Harm is further defined by the Service 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 by the Service 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 FHA so that they become binding conditions of any grant or permit issued to APS, as appropriate, for the exemption in section 7(o)(2) to apply. The FHA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHA (1) fails to assume and implement the terms and conditions or (2) fails to require ADOT to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHA must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

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

In past Biological Opinions, the management territory was used to quantify incidental take thresholds for the MSO (see Biological Opinions provided by the Service to the Forest Service from August 23, 1995). The current section 7 consultation policy for MSO provides for incidental take if an activity compromises the integrity of a PAC. Actions outside PACs will generally not be considered incidental take, except in cases when areas that may support owls have not been adequately surveyed.

Using available information as presented in this document, the Service has identified conditions of probable take for the MSO associated with PACs and inadequately surveyed restricted habitat. Based on the best available information furnished by FHA, take is anticipated for the MSO as a result of the following:

- a) Pavement preservation and associated work taking place within and adjacent to the Fry Canyon PAC and adjacent to the Sterling PAC during the breeding season and at night.
- b) The associated effects of long-term use of the passing lane proximate to the Fry Canyon PAC.

AMOUNT OR EXTENT OF TAKE

This biological opinion anticipates the following forms and amount of take in regard to the proposed action:

One pair of MSO and/or associated young in the form of harassment associated with nighttime pavement preservation work taking place within and adjacent to the Fry Canyon PAC during the 2001 breeding season.

One pair of MSO and/or associated young in the form of harassment associated with nighttime pavement preservation work taking place adjacent to the Sterling PAC during the 2001 breeding season.

One MSO in the form of direct mortality due to vehicular collision associated with the use of the new passing lane located proximate to the Fry Canyon PAC.

The Service anticipates that incidental take of MSO will be difficult to detect because owl nests can often be difficult to locate. Any incident of harm or harassment is likely to be of limited extent and intensity, and therefore difficult to distinguish from normal behavior and difficult to document.

If, during project activities, the amount of extent of take is exceeded, the FHA must reinitiate consultation with the Service immediately to avoid violation of section 9. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible or adverse impact on the species, as required by 50 CFR 402.14(i). An explanation of the causes of the taking will be provided to the Service.

EFFECT OF THE TAKE

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

Reasonable and prudent measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of MSO:

1. The FHA shall minimize adverse affects of the tree removal and all work associated with pavement preservation.
2. The FHA shall monitor affected PACs and ensure all potential habitat is adequately surveyed.

Terms and conditions

In order to be exempt from the prohibitions of section 9 of the Act, the FHA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions are necessary to implement the reasonable and prudent measure 1.

- 1.1 No tree removal shall occur either within or outside of the ROW in the Fry Canyon PAC.
- 1.2 Work conducted in association with pavement preservation (guardrails, pavement striping, sign placement, seeding, core sampling, etc.) shall occur only during daylight hours in areas adjacent to and within 0.25 miles of the Fry Canyon and Sterling PACs.

The following terms and conditions are necessary to implement the reasonable and prudent measure 2.

- 2.1 The Fry Canyon and Sterling PACs shall be monitored in 2001 prior to and after pavement preservation work. Monitoring shall occur twice prior to June 1 and twice after pavement work is completed.
- 2.2 FHA shall provide a report of the PAC monitoring results and results of follow-up surveys of restricted habitat if conducted in 2002 to the Service by the end of the calendar year in which the work takes place.

The Service believes that no more than 5 MSO (2 pairs and/or associated young and one individual MSO) will be incidentally taken as a result of the proposed action. 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, this level of incidental take is exceeded, such incidental take would represent new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. FHA must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

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

DISPOSITION OF DEAD, INJURED, OR SICK SPOTTED OWLS

Upon locating a dead, injured, or sick spotted owl, initial notification must be made to the Service's Law Enforcement Office, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (telephone: 480/835-8289) 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 set 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, the Service 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 purposes of 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. FHA should consider using only existing turnouts along 89A during pavement preservation work.
2. FHA should consider conducting guardrail work within and adjacent to the Fry Canyon and Sterling PAC outside of the MSO breeding season or as late in the breeding season as possible if this does not compromise public safety.
3. FHA should consider limiting core sampling within and adjacent to the Fry Canyon and Sterling PACs during the MSO breeding season.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests 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 §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.

The Service appreciates your consideration of the threatened Mexican spotted owl. For further information, please contact Michele James (520) 527-3042 or Debra Bills (602) 242-0524 (x239). Please refer to the consultation number 2-21-01-F-122 in future correspondence concerning this project.

Sincerely,

/s/ David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Field Supervisor, Fish and Wildlife Service, New Mexico Field Office, Albuquerque, NM

Forest Biologist, Coconino National Forest, Flagstaff, AZ (attn: Cecilia Overby)
District Ranger, Peaks Ranger District, Flagstaff, AZ (attn: Sandy Nagiller)
District Ranger, Sedona Ranger District, Sedona, AZ (Attn: Janie Agayagos)
John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

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