2-21-F-317

BIOLOGICAL OPINION SUMMARY

Robinson Mesa Prescribed Fire Project on the Clifton Ranger District of the Apache-Sitgreaves National Forests

Date of opinion: October 5, 1999

Action agency: U.S. Forest Service

Project: Robinson Mesa Prescribed Fire project

Location: Apache-Sitgreaves Forests, Clifton Ranger District

Listed species affected: Threatened Mexican spotted owl (*Strix occidentalis lucida*) and threatened loach minnow (*Tiaroga [=Rhinichthys] cobitis*).

Biological opinion: Non-jeopardy

Incidental take statement: The Service anticipates that take will occur for the loach minnow and the Mexican spotted owl. The Service has determined that one pair of MSO will be taken, and has indexed take of loach minnow to the fire prescription given by the Forest Service. Should burning occur outside the prescription, take is considered exceeded.

Reasonable and Prudent Measures: The biological opinion presents four measures (with terms and conditions) for assisting in the reduction of incidental take of MSO and loach minnow: 1) gather all possible information on MSO occupancy prior to the start date of the second phase of the project, 2) gather habitat information after the burn to assess impacts to MSO, 3) ensure that the spring burn does not affect adjacent MSO or restricted habitat, 4) minimize the potential for sedimentation and toxic ash to reache Eagle Creek.

Terms and Conditions: Eight mandatory terms and conditions are included to implement the reasonable and prudent measures. The terms and conditions require that the Forest Service minimize adverse effects of prescribed fire actions to MSO restricted habitat by surveying for MSO prior to the spring burn, protecting and monitoring key areas and habitat components to prevent fire spread and/or damage. Terms and conditions for minimizing effects to loach minnow include the use of vegetation debris dams to capture excess sediment from prescribed burning.

Conservation recommendations: Three conservation recommendations are provided. These include conducting a watershed-level analysis of all impacts to the Eagle Creek watershed and conducting surveys for MSO for all future projects to prevent future adverse effects to MSO.

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In Reply Refer To:
AESO/SE
2-21-99-F-317 October 7, 1999

Mr. Frank A. Hayes, District Ranger
Apache-Sitgreaves National Forests
Clifton Ranger District
HC1 Box 733
Duncan, Arizona 85534

Dear Mr. Hayes:

This letter acknowledges the U.S. Fish and Wildlife Service's September 17, 1999, receipt of your September 16, 1999, letter requesting initiation of formal section 7 consultation under the Endangered Species Act. The consultation concerns the possible effects of the proposed Robinson Mesa Prescribed Burn project in Greenlee County, Arizona, on Mexican gray wolf (*Canis lupus baileyi*), jaguar (*Panthera onca*), bald eagle (*Haliaeetus leucocephalus*), Mexican spotted owl (*Strix occidentalis lucida*), razorback sucker (*Xyrauchen texanus*), spikedace (*Meda fulgida*), and loach minnow (*Tiaroga cobitis*). The Forest has made a determination of "not likely to jeopardize" the experimental, nonessential population of Mexican gray wolves, "may affect, not likely to adversely affect" for bald eagle, jaguar, razorback sucker and spikedace, and "likely to adversely affect" for loach minnow and Mexican spotted owl.

Concurrences

The proposed project will not alter Mexican gray wolf habitat detrimentally, and disturbance from prescribed fire is not expected to reduce the likelihood of both the survival and recovery of this species. Regarding the jaguar, no known individuals exist in the project area. The bald eagle has been observed on the Clifton Ranger District. However, there are no known bald eagle nest or roost sites in the project area, and even winter use of the project area would be infrequent, as the primary watershed used by eagles is Eagle Creek, not East Eagle Creek. The razorback sucker was stocked into Eagle Creek from 1981 to 1988. These stockings were approximately 20 miles downstream of the project area, and it is highly unlikely the project will affect razorback sucker. In 1987, spikedace were found approximately 20 miles downstream of the project area. The probability that spikedace will be affected 20 miles downstream of the burn is extremely low because the prescribed burn is of low-intensity, and the area of the slope burn is very small (250 acres).

Based on the above, the Service concurs with your determination of "not likely to jeopardize" for the experimental, nonessential population of Mexican gray wolves and "may affect, not likely to adversely affect" for jaguar, bald eagle, spikedace, and razorback sucker.

Consultation History

Informal consultation began when the Service received a draft Biological Assessment for the Robinson Mesa Prescribed Burn project in July of 1999. Since that time, informal consultation consisted of several conversations and a field visit between staffs of the Service and the Apache-Sitgreaves National Forests. During informal consultation, the Service indicated that we would not be able to concur with a determination of "may affect, not likely to adversely affect" the MSO and the loach minnow, given that prescribed fire was in unsurveyed restricted habitat, and that burning would occur without a riparian buffer. The Forest Service requested formal consultation for the MSO and loach minnow on September 16, 1999, with a change in the determination of effects for the above two species to "likely to adversely affect".

BIOLOGICAL OPINION

Description of Proposed Action

The proposed Robinson Mesa Prescribed Burn is located in Greenlee County, Arizona, within T2N, R28E of the Apache-Sitgreaves National Forests. It is located in the Eagle and Mud Springs Ecosystem Management Areas and the East Eagle Grazing Allotment. It is bordered by East Eagle Creek on the north, Robinson Canyon on the south, Eagle Creek on the west, and the Hot Air Fire Management area on the east. The project area is predominately characterized by pinyon-juniper woodland vegetation bounded on the north by a narrow stringer of ponderosa pine and Gambel oak forest.

The Clifton Ranger District proposes to broadcast burn a portion of the 1600 acre project area, with the following objectives: 1) reduce the chance of unwanted wildfire spreading from Robinson Canyon north across East Eagle Creek to the Mogollon Rim, and 2) enhance winter and summer range for several ungulate species. Fire will be managed in two phases. Objectives of the first phase are to reduce fuel loadings within the ponderosa pine/Gambel oak fuel type to provide a buffer against fire spread and potential soil movement resulting from the second phase of burning. The first phase is also intended to improve foraging habitat for raptors. Low intensity fire and substantive soil moisture will be key in the first phase to burn within ponderosa pine stringers and side slopes.

The first phase of the project will be completed between the first week in October through the first part of November, 1999, and is primarily designed to produce a mosaic of burned and unburned patches and reduce carrier fuel loading. Spatial location of talus slopes, a lack of

contiguous grass areas, and a patchy configuration of duff/needlecast will ensure a mosaic burn pattern. Quality snags and down logs within this portion of the project area will be opportunistically lined. The steepness of the slope precludes lining mid-slope snags due to fire fighter safety issues. Although about 250 acres of ponderosa pine/Gambel oak type has been identified, discontinuous carrier fuels, talus, and slope juxtaposition will likely result in only about 200 acres being effectively treated with fire in the first phase. Burning will occur according to the prescription given in Table 1.

Objectives of the second phase are to substantially reduce density and canopy cover of alligator juniper and pinyon pine on adjacent mesa tops, and invigorate browse species where present and susceptible to fire effects. Moderate intensity fire will be used to reduce canopy and scorch or kill individual trees. Timing of this second phase is anticipated to occur between May 1 to June 30, 2000, depending on burning conditions necessary to achieve desired results. Adjacent, pre-burned slopes will already have been "fire-proofed" in the first phase, effectively containing the spring burn to the mesa tops. This burn strategy will significantly reduce the potential for erosion. Burning during this time period will also allow time for herbaceous plant regrowth and needlecast fall on slopes prior to monsoonal rains. The burning prescription for phase two will purposely be more severe than a fall burn to effectively stress trees and reduce canopy by scorch or isolated torching. Although the project area has been deferred from livestock grazing for 4 years, fine fuels remain discontinuous in many parts of the area planned for phase two spring fire treatment. Only about 70% of the acreage is expected to burn.

In addition to fire, selective thinning of mesa-top woodland species will occur immediately following the second phase burn, targeting those areas which were not effectively treated with fire. Junipers will be felled, lopped, and scattered to improve conditions by providing: 1) a microhabitat for cool season grasses and forbs, 2) short-term protection of grasses and forbs from ungulate grazing, 3) reduced potential for erosion, and 4) cover for rodents and birds. Overstory juniper canopy cover reduction is targeted for a minimum of 20-30% of the existing cover. Some seeding of native species cool season grasses/forbs, primarily under the freshly cut trees, will occur. Rocky Mountain Elk Foundation funds have been acquired to assist the USFS in implementing this project. At least two years growing season rest will be alloted to the entire project area before livestock grazing is allowed.

Monitoring points have been established within the pine-oak vegetation types in the project area following guidelines provided in the Mexican Spotted Owl Recovery Plan Microhabitat Monitoring Protocol (Forest Service Region 3 protocol). Existing monitoring points established by a recent compartment exam were also relocated within the project area. In addition, photo points and baseline density/canopy transects will be established within the pine-oak woodland type to document treatment results. Following the burn, transect measures will be taken to evaluate key habitat components resulting from the burn.

Table 1: Burn Prescription

	Fall Burn	Spring Burn
Project acres	250	1350
Acres of Protected/Restricted -	Protected = 0; Restricted = 250	0
Fuel Model	9	4
Flame length	< 4.5 feet	1.3-7.1
Minimum Relative Humidity	5%	4%
Maximum Relative Humidity	50%	89%
Dead Fuel Moisture (1000 hr.	20-25%	N/A
Live Fuel Moisture	150%-200%	75-100%
Maximum air temperature	89 degrees	109
Minimum air temperature	50 degrees	60 degrees
Soil moisture	50-120%	30-120%
Scorch Height	4-12 feet	7-15 feet

Status of the Species (range wide)

1. Loach Minnow (*Tiarog*a *cobiti*s)

Loach minnow was listed as a threatened species on October 28, 1986 (USDI 1986). Critical habitat was designated for loach minnow on March 8, 1994, including portions of the San Francisco, Tularosa, and upper Gila Rivers, Aravaipa Creek, and the Blue River from Campbell and Dry Blue Creeks downstream to the confluence with the San Francisco River (USDI 1994a). The critical habitat for loach minnow has been set aside by order of the federal courts in *Catron County Board of Commissioners, New Mexico v. U.S. Fish and Wildlife Service*, CIV No. 93-730 HB (D.N.M., Order of October 13, 1994). The United States District Court for the District of Arizona recognized the effect of the Catron County ruling as a matter of comity in the *Southwest Center for Biological Diversity v. Rogers*, CV 96-018-TUC-JMR (D. Ariz., Order of December 28, 1996). The critical habitat for loach minnow was subsequently revoked by the Service (USDI 1998). Therefore, no finding regarding the effects of the proposed project on the former critical habitat designation for loach minnow is required.

The loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley 1973). Historic range of loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila Rivers (Minckley 1973; Sublette *et al.* 1990). Habitat destruction plus competition and predation by nonnative species have reduced the range of the species by about 85 percent (%) (Miller 1961, Williams *et al.* 1985, Marsh *et al.* 1989). Loach minnow remains in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White Rivers; and Aravaipa, Eagle, Campbell Blue, and Dry Blue Creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst *et al.* 1985, Propst *et al.* 1988, Marsh *et al.* 1990, Bagley *et al.* 1995, Bagley *et al.* 1998).

Loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989, Propst and Bestgen 1991). Loach minnow uses the spaces between, and in lee of, larger substrate for resting and spawning (Propst *et al.* 1988, Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). The life span of loach minnow is about 2 years (Britt 1982, Propst and Bestgen 1991). Loach minnow feeds exclusively on aquatic insects (Schreiber 1978, Abarca 1987). Spawning occurs in March through May (Britt 1982, Propst *et al.* 1988); however, recent reports have confirmed that under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley 1990). The eggs of loach minnow are attached to the underside of a rock that forms the roof of a small cavity

in the substrate on the downstream side. Limited data indicate that the male loach minnow may guard the nest during incubation (Propst *et al.* 1988, Vives and Minckley 1990).

Recent biochemical genetic work on loach minnow indicate there are substantial differences in genetic makeup between remnant loach minnow populations (Tibbets 1993). Remnant populations occupy isolated fragments of the Gila River basin and are isolated from each other. Based upon her work, Tibbets (1992, 1993) recommended that the genetically distinctive units of loach minnow should be managed as separate units to preserve the existing genetic variation.

The status of loach minnow is declining range wide. Although it is currently listed as threatened, the Service has found that a petition to uplist the species to endangered status is warranted. A reclassification proposal is pending, however work on it is precluded due to work on other higher priority listing actions (USDI 1994b).

2. Mexican spotted owl (*Strix occidentalis lucida*)

The Mexican spotted owl was listed as threatened on March 16, 1993 (58 FR 14248). Critical habitat was designated for the species on June 6, 1995 (60 FR 29914), but was subsequently withdrawn (63 FR 14378). The Mexican spotted owl was originally described from a specimen collected at Mount Tancitaro, Michoacan, Mexico, and named *Syrnium occidentale lucidum*. The spotted owl was later assigned to the genus *Strix*. Specific and subspecific names were changed to conform to taxonomic standards and the subspecies became *S. o. lucida*. The American Ornithologists' Union currently recognizes three spotted owl subspecies, including the California, *S. o. occidentalis*; Mexican, *S. o. lucida*; and northern, *S. o. caurina*. The Mexican spotted owl is mottled in appearance with irregular white and brown spots on its abdomen, back, and head. The spots of the Mexican spotted owl are larger and more numerous than in the other two subspecies giving it a lighter appearance. Several thin white bands mark an otherwise brown tail. Unlike most owls, spotted owls have dark eyes.

The Mexican spotted owl is distinguished from the California and northern subspecies chiefly by geographic distribution and plumage. The Mexican spotted owl has the largest geographic range of the three subspecies, although its distribution is patchy and disjunct. The range extends north from Aguascalientes, Mexico through the mountains of Arizona, New Mexico, and western Texas, to the canyons of southern Utah and southwestern Colorado, and the Front Range of central Colorado. Although this range covers a broad area of the southwestern United States and Mexico, much remains unknown about the species' distribution within this range. This is especially true in Mexico where much of the owl's range has not been surveyed. Information gaps also appear for the species' distribution within the United States. It is apparent that the owl occupies a fragmented distribution throughout its United States range corresponding to the availability of forested mountains and canyons, and in some cases, rocky canyon lands. There are no estimates of the owl’s historic population size. Its historic range and present distribution are thought to be similar.

The *lucida* subspecies is a distinguishable taxon based on allozyme electrophoresis (Barrowclough and Gutiérrez 1990). Analysis of mitochondrial DNA shows further evidence that the three designated subspecies are valid. Despite the demonstrated phylogenetic relatedness, there is evidence of reduced gene flow between the subspecies, indicating that the three subspecies should be treated as separate conservation units (Barrowclough *et al*. 1999).

The primary administrator of lands supporting owls in the United States is the Forest Service. According to the Mexican Spotted Owl Recovery Plan (USDI 1995), 91 percent of Mexican spotted owls known to exist in the United States between 1990 and 1993 occur on land administered by the Forest Service. The majority of known owls have been found within Region 3 of the Forest Service, which includes 11 National Forests in New Mexico and Arizona. Forest Service Regions 2 and 4, including two national forests in Colorado and three in Utah, support fewer owls.

A reliable estimate of owl numbers throughout its range is not currently available due to limited information. Owl surveys conducted from 1990 through 1993 indicate that the species persist in most locations reported prior to 1989, with the exception of riparian habitats in the lowlands of Arizona and New Mexico, and all previously occupied areas in the southern states of Mexico. Increased survey efforts have resulted in additional sightings for all recovery units. Fletcher (1990) calculated that 2,074 Mexican spotted owls existed in Arizona and New Mexico in 1990 using information gathered by Region 3 of the Forest Service. Fletcher's calculations were modified by the Service (USDI 1991), who estimated that there were a total of 2,160 Mexican spotted owls in the United States. While the abundance throughout its range is currently not available, the Recovery Plan reports an estimate of owl sites based on 1990 - 1993 data. 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.” Surveys from 1990 through 1993 indicate one or more Mexican spotted owls have been observed at a minimum of 758 sites in the United States and 19 sites in Mexico. At best, total numbers in the United States range from 777 individuals, assuming each known site was occupied by a single owl, to 1,554 individuals, assuming each known site was occupied by a pair of owls.

Past, current, and future timber-harvest practices in Region 3 of the Forest Service, in addition to catastrophic wildfire, were cited as the primary factors leading to listing of the spotted owl as a threatened species. Fletcher (1990) estimates that 1,037,000 acres of habitat were converted from suitable (providing all requirements of the owl, e.g., nesting, roosting, and foraging) to capable (once suitable, but no longer so). Of this, about 78.7 percent, or 816,000 acres, was a result of human management activities, whereas the remainder was converted more or less naturally, primarily by wildfire. Other factors which may have contributed to the decline of this species include a lack of adequate regulatory mechanisms.

Mexican spotted owls breed sporadically and do not always nest every year. Mexican spotted owl reproductive chronology varies somewhat across the range of the owl. In Arizona, courtship

apparently begins in March with pairs roosting together during the day and calling to each other at dusk (Ganey 1988). Eggs are laid in late March or, more typically, early April. Incubation begins shortly after the first egg is laid, and is performed entirely by the female (Ganey 1988). The incubation period for the Mexican spotted owl is assumed to be 30 days (Ganey 1988). During incubation and the first half of the brooding period, the female leaves the nest only to defecate, regurgitate pellets, or to receive prey from the male, who does all or most of the foraging (Forsman *et al.* 1984, Ganey 1988). Eggs usually hatch in early May, with nestling owls fledging four to five weeks later, and then dispersing in mid September to early October (Ganey 1988).

Little is known about the reproductive output for the Mexican spotted owl. It varies both spatially and temporally (White *et al.* 1995), but the subspecies demonstrates an average annual rate of 1.001 young per pair. Current demographic research in Arizona and New Mexico has documented populations that are declining at ≥10 percent a year (Seamans *et al*. 1999). This may or may not reflect the growth rate of Mexican spotted owls throughout their range, but it provides insight into possible population trends.

Based on short-term population and radio-tracking studies, and longer-term monitoring studies, the probability of an adult Mexican spotted owl surviving from one year to the next is 0.8 to 0.9. Juvenile survival is considerably lower at 0.06 to 0.29, although it is believed these estimates may be artificially low due to the high likelihood of permanent dispersal from the study area and the lag of several years before marked juveniles reappear as territory holders and are detected as survivors through recapture efforts (White *et al.* 1995). Little research has been conducted on the causes of mortality of the Mexican spotted owl, but predation by great horned owls, northern goshawks, red-tailed hawks, and golden eagles may all be contributing sources of mortality.

Mexican spotted owls nest, roost, forage, and disperse in a diverse array of biotic communities. Nesting habitat is typically in areas with complex forest structure or rocky canyons, and contain mature or old-growth stands which are uneven-aged, multi-storied, and have high canopy closure (Ganey and Balda 1989a, USDI 1991). In the northern portion of the range (southern Utah and Colorado), most nests are in caves or on cliff ledges in steep-walled canyons. Elsewhere, the majority of nests appear to be in Douglas-fir trees (Fletcher and Hollis 1994, Seamans and Gutiérrez 1995). A wider variety of tree species is used for roosting; such as fir, oak, and pine species (Ganey 1988, Fletcher and Hollis 1994, Young *et al*. 1998). Spotted owls use mixed conifer, pine-oak, and pine forests when foraging. In northern Arizona, owls generally foraged slightly more than expected in unlogged forests, and less so in selectively logged forests (Ganey and Balda 1994). However, patterns of habitat use varied among study areas and individual birds, making generalizations difficult.

Seasonal movement patterns of Mexican spotted owls are variable. Some individuals are year-round residents within an area, some remain in the same general area but show shifts in habitat-use patterns, and some migrate considerable distances (20-50 kilometers / 12-31 miles) during

the winter, generally migrating to more open habitats at lower elevations (Ganey and Balda 1989b, Willey 1993, Ganey *et al.* 1998). Home-range size of Mexican spotted owls appears to vary considerably among habitats and/or geographic areas (USDI 1995), ranging in size from 261 to 1,487 hectares for individual birds, and 381 to 1,551 hectares for pairs (Ganey and Balda 1989b, Ganey *et al.* 1999). Little is known about habitat use by juveniles during natal dispersal. Ganey *et al.* (1998) found dispersing juveniles in a variety of habitats ranging from high-elevation forests to pinyon-juniper woodlands and riparian areas surrounded by desert grasslands.

Mexican spotted owls consume a variety of prey throughout their range but commonly eat small and medium sized rodents such as woodrats (*Neotoma* spp.), peromyscid mice, and microtine voles. They may also consume bats, birds, reptiles, and arthropods (Ward and Block 1995). Habitat correlates of the owl's common prey emphasizes that each prey species uses a unique microhabitat. Deer mice (*Peromyscus maniculatus*) are ubiquitous in distribution in comparison to brush mice (*Peromyscus boylei)* which are restricted to drier, rockier substrates, with sparse tree cover. Mexican woodrats (*N. mexicana*) are typically found in areas with considerable shrub or understory tree cover and high log volumes or rocky outcrops. Mexican voles (*Micotus mexicanus*) are associated with high herbaceous cover, primarily grasses; whereas, long-tailed voles (*M. longicaudus*) are found in dense herbaceous cover, primarily forbs, with many shrubs, and limited tree cover. A diverse prey base is dependant on the availability and quality of diverse habitats.

The Mexican Spotted Owl Recovery Plan (USDI 1995) provides for three levels of habitat management: protected areas, restricted areas, and other forest and woodland types. "Protected habitat" includes all known owl sites, and all areas in mixed conifer or pine-oak forests with slopes >40% where timber harvest has not occurred in the past 20 years, and all reserved lands. "Protected Activity Centers" (PACs) are delineated around known Mexican spotted owl sites. A PAC includes a minimum of 243 hectares (600 acres) designed to include the best nesting and roosting habitat in the area. The recommended size for a PAC includes, on average from available data, 75% of the foraging area of an owl. The management guidelines for protected areas from the recovery plan are to take precedence for activities within protected areas. "Restricted habitat" includes mixed conifer forest, pine-oak forest, and riparian areas; the recovery plan provides less specific management guidelines for these areas. The Recovery Plan provides no owl specific guidelines for "other habitat."

The range of the Mexican spotted owl in the United States has been divided into six recovery units (RUs) as identified in the Recovery Plan (U.S.D.I. 1995, part II.B.). An additional five recovery units were designated in Mexico. The recovery plan identifies recovery criteria by recovery unit. The Upper Gila Mountain Recovery Unit has the greatest known concentration of owl sites in the United States. This unit is considered a critical nucleus for the owl because of its central location within the owl's range, and presence of over 50 percent of the known owls. The other recovery units in the United States, listed in decreasing order of known number of owls,

are: Basin and Range-East, Basin and Range-West, Colorado Plateau, Southern Rocky Mountain-New Mexico, and Southern Rocky Mountain-Colorado.

At the end of the 1995 field season, the Forest Service reported a total of 866 management territories (MTs) established in locations where at least a single MSO had been identified (U.S. Forest Service, *in litt*. November 9, 1995). The information provided at that time also included a summary of territories and acres of suitable habitat in each RU. Subsequently, a summary of all territory and monitoring data for the 1995 field season on Forest Service lands was provided to the Service on January 22, 1996. There were minor discrepancies in the number of MTs reported in the November and January data. For the purposes of this analysis we are using the more recent information.

The Forest Service has converted some MTs into PACs following the recommendations of the Draft MSO Recovery Plan released in March 1995. The completion of these conversions has typically been driven by project-level consultations with the Service and varies by National Forest.

The Robinson Mesa Prescribed Burn project is located in the Basin and Range-West Recovery Unit (RU). Vegetation ranges from desert scrubland and semi-desert grassland in the valleys upwards to montane forests. Montane vegetation includes interior chaparral, encinal woodlands, and Madrean pine-oak woodlands at low and middle elevations, with ponderosa pine, mixed-conifer, and spruce-fir forests at higher elevations (Brown *et al*. 1980). Isolated mountain ranges are surrounded by Sonoran and Chihuahuan desert basins.

MSO occupy a wide range of habitat types within this RU. The majority of owls occur in isolated mountain ranges where they inhabit encinal oak woodlands, mixed-conifer and pine-oak forests, and rocky canyons (Ganey and Balda 1989a, Ganey *et al*. 1992). Federal lands encompass 36% of this RU, mostly administered by the BLM, followed by the Forest and a small portion by the National Park Service. Privately owned lands amount to 22%, State lands 19%, Tribal lands (San Carlos Apache Reservation) 12%, and Department of Defense lands 11%. Within this RU, MSO occupies primarily Forest lands, and the majority occur within the Coronado National Forest.

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.

Eagle Creek is a tributary of the Gila River in Greenlee County, Arizona. The upper reaches of Eagle Creek are spatially and temporally intermittent, with perennial flow above and below the proposed project area. Human perturbations to Eagle Creek have come primarily from four types of activities. Grazing by livestock has been the primary pervasive use of the Eagle Creek watershed for the past 150 years with substantial alteration of watershed vegetation, soil, erosion, and hydrologic characteristics (Leopold 1946). Water development and interbasin water transfers have altered the volume and timing of flow in the creek. In 1945, Phelps Dodge Corporation constructed a diversion from the Black River (Salt River basin) into Willow Creek, a tributary of middle Eagle Creek. This diversion augments flow in Eagle Creek below Willow Creek by about 27 percent (Minckley and Sommerfeld 1979). That water, plus an additional 9 percent, is removed about 15 miles downstream at a diversion dam and pumping station. The water is piped to the Phelps Dodge copper mine at Morenci. Furthermore, local residents pump groundwater from the basin for domestic and agricultural use and Phelps Dodge pumps groundwater and places it into the stream channel for transport to the diversion dam for subsequent removal (USGS 1994). In addition to water manipulations, mining has affected Eagle Creek through watershed destruction (Dobyns 1981, Marsh *et al*. 1990). Residential and ranch operations, irrigated croplands, and roads along the Eagle Creek flood plain have had substantial impacts to the stream (Dobyns 1981).

In addition to habitat alterations, various nonnative aquatic species have been introduced by humans into Eagle Creek and have adversely affected loach minnow and other native fishes through predation and competition (Marsh *et al.* 1990). Nonnative species that have been reported from Eagle Creek include black bullhead (*Ameiurus melas*), yellow bullhead (*Amelurus natalis*), common carp (*Cyprinus carpio*), red shiner (*Cyprinella lutrensis*), mosquitofish (*Gambusia affinis*), channel catfish (*Ictalurus punctatus*), smallmouth bass (*Micropterus dolomieui*), largemouth bass (*Micropterus salmoides*), rainbow trout (*Oncorhynchus mykiss*), fathead minnow (*Pimephales promelas*), flathead catfish (*Pylodictis olivaris*), and crayfish (prob. *Oronectes virilis*) (Kynard 1976, Minckley and Sommerfeld 1979, Propst *et al*. 1985, Hendrickson 1987, Papoulias *et al.* 1989, Brown 1990, Marsh *et al.* 1990, Knowles 1994). Native species still form the majority of the fish community in Eagle Creek above the Phelps Dodge diversion dam, but nonnatives predominate below the dam. The long-term trend in the native/nonnative species balance is toward more nonnatives and fewer natives. However, the presence of the diversion dam has deterred the upstream movement of many nonnatives and available data are too limited to determine the present rate of the trend in upper Eagle Creek.

Riparian condition (from Forest Service B.A.)

Overstory of the drainage bottom in the project area is composed of scattered mid-age to mature Arizona sycamore, mature narrow leaf cottonwood, mid-age to mature ponderosa pine, and Rocky Mountain juniper. There has been little regeneration of riparian obligate species, due in part to continued winter-spring use by elk and recent scouring in 1993 and 1995. A very recent high flow event early in August of this year (1999) has subsequently restructured the stream channel within the East Eagle Creek drainage. Canopy closure now varies from approximately 30-50%. Understory vegetation is patchy and discontinuous, and probably will remain so unless

recent high flows result in sediment deposition and re-establishment of herbaceous and woody shrub species. Shrub species include sumac and buckbrush ceanothus. Immediately out of the bankfull flow area on the north side of East Eagle Creek, the overstory is dominated by upland species, including Rocky Mountain juniper, alligator juniper, pinyon pine, and occasionally isolated ponderosa pine trees.

Eagle Creek is a perennial riparian system from the confluence of Dry Prong and East Eagle canyon until it reaches an interrupted stretch of the creek about 12-15 miles downstream from the project area. The portion of the live riparian system adjacent to the very west end of the project area contains typical mid-elevation riparian obligate species such as Arizona ash, Arizona sycamore, narrow leaf cottonwood, several willow species, and scattered overstory of ponderosa pine, alligator and Rocky mountain juniper. With managed rest and use by livestock, recent watershed analysis indicate this section of Eagle Creek is functioning, but is at risk to lateral movement of the channel. Extended high flows in the winter of 1993 established substantial debris jams that had been absent from the system for over two decades. These debris dams led to the recolonization of beaver within the last few years.

Overstory species within the riparian zone of Robinson Canyon include mature to old growth Arizona sycamore, narrow leaf cottonwood, Fremont cottonwood, and mid-age to mature Rocky Mountain juniper and alder. Understory species include an abundant growth of representatives of these species, in addition to isolated willows or small willow patches and Gambel oak. Canopy closure varies from 50-80% in the riparian zone. Shrub species include sumac, buckbrush ceanothus, and locust. There is abundant growth of forbs along the stream. Many logs and branches within and along the streambed provide pool habitat and shade.

1. Loach Minnow (*Tiarog*a *cobiti*s)

Although this section of Eagle Creek is occupied by several native fish species, loach minnow in particular have been documented about 4 miles downstream from the project area, occupying riffle habitat downstream from Forest Road 217 on private lands. In early August of this year, a flash flow event apparently originated within the upper drainages of Eagle Creek, much of which lies west on the San Carlos Apache Indian Reservation and flowing into the Middle and Dry prongs of Eagle Creek. While this was a relatively short-lived event lasting about 8 hours, flow rates and depth were similar to the winter storm of 1993. From recent USFS observations of these changes, most seem beneficial to native fish species. Interstitial sediment have been substantially reduced, and deep pool:riffle ratios appear to have increased. Suspended sediment from this event has been removed or deposited, and the water was clear within 5 days of the last full flow. The impact to native fish populations is unknown, especially to the loach minnow, but native fish were observed at three locations adjacent to the project boundary.

Loach minnow was first found in Eagle Creek in 1950 (Marsh et al. 1990). Despite several sampling efforts afterward, it was not found in Eagle Creek until 1994 (Marsh et al. 1990, Knowles 1994). The 1994 records of loach minnow were near Honeymoon campground. The

distribution of loach minnow within Eagle Creek is not presently known, but is presumed to include suitable habitat throughout the length of the creek.

Three formal consultations have been completed addressing effects to loach minnow in Eagle Creek. The first of those was for the Apache-Sitgreaves National Forests Land Management Plan in May 1986. This consultation served as a conference report for loach minnow, which was then a proposed species with proposed critical habitat. The conference report concluded that implementation of the standards and guidelines in the Forest Plan would not jeopardize the survival and recovery of loach minnow and would likely benefit the species. The second formal consultation was concluded in July 1995, on the effects of a Forest Service proposed allotment management plan for Baseline and Horse Springs Grazing allotments, and the third formal consultation was concluded in February 1999, on the effects of Forest Service ongoing grazing activities in the East Eagle Allotment. Both biological opinions concluded that the proposed projects would not jeopardize the continued existence of loach minnow.

Three emergency consultations were initiated by the Corps of Engineers (lead agency) and the Forest on January 25, 1995, February 14, 1995, and March 8, 1995, for emergency road repairs to Forest Road 217 at Eagle Creek. Projects covered by all three emergency consultations may have affected sediment levels and channel morphology of Eagle Creek. The impacts of these actions to loach minnow have not yet been documented, as the Service has not received a Biological Assessment with effects determinations from the action agencies.

Two consultations have been completed in the action area where effect determinations were "may affect, not likely to adversely affect" for loach minnow. The first was a July 1996, repair project for the spillway of the Phelps-Dodge Eagle Creek Diversion Dam. This project was unlikely to affect loach minnow because of the extremely low probability that the fish occurred in a scour pool that was to be emptied during the project. The second consultation was a May 1997, prescribed burn (@400 acres) in the East Eagle drainage. Effects of this low-intensity burn to loach minnow were considered sufficiently mitigated by a quarter mile buffer from East Eagle Creek.

Although Eagle Creek supports a relatively intact native fish community, past and present impacts to the stream and its fish are substantial. At present, ATV use in the East Eagle Creek watershed (particularly the Malay area) is heavily influencing the health of the creek. The habitat is shifting toward a sand dominated substrate in some areas of Eagle Creek. The jeep trail that crosses and parallels the Eagle Creek stream system from Honeymoon Campground to Sawmill Cabin has been identified by the Forest as one of the major contributing factors to this shift (Walls and Subirge 1998). Human-caused impacts have altered hydrologic conditions within the Eagle Creek watershed resulting in an unstable, braided stream channel throughout much of the upper, non-canyon, reach of Eagle Creek. Destabilization of the stream channel has exacerbated flood damage with loss of riparian vegetation, unstable streambanks, and a wide, braided, cobble/gravel flood plain. The rarity of loach minnow is indicative of the existing habitat degradation and increased presence of detrimental nonnative species. The continued

existence of loach minnow in Eagle Creek is uncertain. Any actions which contribute to further degradation of the habitat or which sustain the present degraded condition are cumulative to this existing environmental baseline and are therefore, of greater consequence to this species.

2. Mexican spotted owl (*Strix occidentalis lucida*)

Vegetation description (from Forest Service B.A.)--alligator juniper-pinyon pine woodland
Historically, the uplands and mesa tops within the project area were open grassland savannas characterized by scattered old growth or mature alligator juniper and grey oak. The vegetative community was also interspersed with a small population of pinyon pine. Data recently collected on like soils and woodland vegetation indicate that tree density was low, perhaps 15-20 trees per acre, dominated by mature and old growth alligator juniper trees 18-30" root crown height (rch). Canopy closure probably averaged 20% or less, especially on deeper, more productive soils. Periodic low and moderate intensity fire within this area, combined with vigorous grass competition, kept tree density and establishment low. This is evidenced by fire scars on virtually every alligator juniper over 24" rch. In fact, several old growth pinyon trees (20" dbh) found along the slope ecotone also exhibit fire scarring.

Currently, this vegetative association within the project area is converting to a dense stand of pinyon and alligator juniper. Data collection efforts show tree densities from 600-1000 stems per acre. Young to mid-age alligator juniper dominate the area, and pinyon pine and grey oak are less abundant. Low density old growth alligator juniper trees are interspersed on mesas, and old growth pinyon and alligator juniper comprise slope ecotones. Overstory canopy cover varies from 20-60%. Although the project area has been rested from livestock for over 4 years and vigor of existing grasses has improved substantially, herbaceous productivity continues to decline with advancing succession and canopy closure. Current production ranges between 250-700 pounds.

The northern portion of the uplands is geographically composed of relatively narrow ridge tops dissected by a series of six ephemeral drainages with wide, moderate slopes. This ecotone to the ponderosa pine forest is vegetatively characterized by the same species found on the mesas, only the pinyon pine and grey oak are at higher densities. Canopy cover is often 80-90%, with a very sparse herbaceous understory and cover (0-20% cover). The herbaceous component is dominated by bull muhly, spike muhly, and mutton grass, with several other species accounting for a small percentage of the herbaceous production and cover. East facing slopes have slightly higher herbaceous cover than west facing slopes and ridge tops. However, the lower herbaceous density and cover on west facing slopes and ridge tops generally prevent contiguous fire spread.

Vegetation description (from Forest Service B.A.)–pine-oak forest
North-facing slopes on the south side of East Eagle drainage are steep and rocky, with discontinuous patches of overstory and herbaceous vegetation. These slopes are dominated by a ponderosa pine overstory with a mixed oak, juniper, and shrub understory. To determine if this vegetative community should be classified as restricted MSO pine-oak habitat, field inventory

data were collected in July by Harold Riggs (District Fuels Specialist/Asst Fire Management Officer) and Stewart Bell (Wildlife Technician). The results are summarized in a Forest Service (in-house) report entitled Robinson Mesa Pre-burn Monitoring Report. The inventory survey was conducted using the microhabitat monitoring protocol developed in Region 3 (of the Forest) for assessing existing and anticipated changes in MSO habitat components. Two key objectives were accomplished with the survey. First, recent compartment exam survey plots were relocated within the project area and additional plots were established which now provide a baseline for assessing habitat suitability. Second, pre-burn monitoring plots to assess fire effects on habitat and prescription parameters were established. Including the compartment exam plots, a total of 13 plots were established and examined in the project area.

Results of this inventory indicate that densities of mature, over-mature, and old growth trees within the stand are 5.0, 4.4, and 2.0 per acre, respectively. Ponderosa pine comprises about 40% of the basal area within the project stand, with Gambel oak and alligator juniper accounting for about 35% and 19% of the respective basal area. These results clearly indicate that the stand should be classified as MSO restricted pine-oak habitat as directed by the MSO Recovery Plan. Canopy cover averages about 70-75%. Snag and down log densities are both less than two per acre. The understory shrub component is sparse to moderate, and is primarily composed of grey oak, Gambel oak (primarily near the drainage bottom), buckbrush ceanothus, and mountain mahogony. Many preferred browse plants show heavy use by wild ungulates (primarily elk). With low grass density and sparse needle cast, ground cover is discontinuous. In many areas, this low ground cover is often a result of extensive trailing by wintering bull elk and year-long use by deer populations. The sparse herbaceous understory (10% cover) is primarily composed of bull muhly and mutton grass. Small drainages that extend from East Eagle Creek into the project area generally have an overstory of young to mid-aged ponderosa pine, with similar characteristics to that documented for the remaining stand.

There have been no formal consultations with adverse effects to MSO in the project area. Informal consultations have included a 1999 road closure in an Eagle Creek riparian area, and a 1997 prescribed fire in the Eagle Creek watershed. Neither project substantially altered MSO restricted habitat, and the nearest MSO PAC for the latter project was approximately four miles from the action area.

A total of 213 projects have been formally consulted on in Arizona and New Mexico since 1993, and of those, 202 were consulted on by the Forest Service. These projects have resulted in the anticipated incidental take of 153+ MSO. In addition, the Bureau of Indian Affairs has consulted on one timber sale on the Navajo Reservation which resulted in an anticipated take of five MSO, and a highway reconstruction which resulted in the anticipated incidental take of two MSO. The Federal Highway Administration has consulted on one highway project that resulted in an undetermined amount of incidental take. The take associated with this action will be determined following further consultation. Additionally, the biological opinion for the Kachina Peaks Wilderness Prescribed Natural Fire (PNF) Plan (#2-21-94-F-220) determined thresholds for incidental take and direct take as follows: 1) one spotted owl or one pair of spotted owl adults

and/or associated eggs/juveniles; 2) harm and harassment of spotted owls located in up to two PACs per year; 3) disturbance to spotted owls and habitat modification of a total of seven PACs during the life of the Kachina Burn Plan related to management ignited fire occurring in PACs for which the nest site information is three or more years old; 4) harm and harassment of spotted owls and habitat caused by PNF for which adequate surveys have not been conducted, and; 5) harm and harassment of spotted owls and habitat modification of up to one PAC and 500 acres of potential nest/roost habitat caused by wildfire as an indirect result of PNF during the life of the Kachina Burn Plan.

The Department of the Navy consulted on an observatory project with an anticipated take of one MSO. Consultation with Langley Air Force Base (#2-22-96-F-334) for overflights in both New Mexico and Arizona concerning German Air Force operations at Holloman Air Force Base in New Mexico (for flights over the southern half of New Mexico, southwest Texas, and 40 square miles in eastern Arizona), determined that incidental take of MSO would occur due to harassment. The precise level of the take was impossible to predict due to lack of adequate data. However, incidental take is considered to be exceeded if 5% of monitored PACs are believed to have become nonfunctional through harassment from the overflight. Bandolier National Monument (2-22-95-F-532) consulted on a prescribed fire project with an anticipated direct mortality of one MSO and no more than one PAC buffer area burned.

Effects of the Action

1. Loach Minnow (*Tiarog*a *cobiti*s)

Little is known of prescribed fire effects to fishes of the southwestern United States. At present, both wildfires and prescribed fires occur in riparian and wetland systems. In riparian systems, fire is usually in the form of an unintentional invasion during a wildfire. Prescribed fire is seldom used in riparian systems for their management. However, responses of prescribed fire in riparian systems can be gleaned from experience with wildfires. (Ffolliott *et al*. 1996, Rinne 1996). Such information is the best data available on the subject, and constitutes the primary body of literature from which the Service has formulated its effects determinations.

The major effect that fire has on hydrologic responses is through the removal of plant and litter cover which protects the soil surface (DeBano *et al*. 1996). The amount of plant and litter cover removed during a fire determines the magnitude of hydrologic responses that can be expected following a fire if precipitation amounts and intensities are equal. Among the responses that are related to the amount of protective cover removed is erosion. Even a low intensity prescribed fire can produce substantial runoff and soil loss as sediment if the fire is immediately followed by high intensity rainstorm events (DeBano *et al*. 1996). Sediment yields are usually higher immediately following a fire and then decline rapidly in subsequent years as vegetation is reestablished (DeBano and Neary 1996). Slope also plays a major role in determining the amount of sediment yield. Steeper slopes produce higher amounts of sediment.

Riparian areas provide buffer strips which trap sediment and nutrients that are released when surrounding watersheds are burned (Heede 1990, Osborne and Kovacic). The width of this buffer strip is critical for minimizing sediment and nutrient movement into streams. An important part of developing any prescribed burning program in riparian areas is recognizing their importance as buffer areas for adjacent streams. Guidelines on buffer strip widths for prescribed fires have been established for other parts of the United States. Riparian buffers are important for fires with flame lengths that exceed approximately 2 feet high, and that kill stream-shading and other woody shrubs (DeBano and Neary 1996). A general rule of thumb for the width of the buffer strip is 29.5 feet + (0.46 × % slope) (DeBano and Neary 1996).

There is abundant evidence that fire in riparian areas can influence sediment yield after a rain event, and that buffers can capture sediment to prevent excess runoff. Direct evidence to show possible impacts to loach minnow is lacking, but recent research has found that effects to salmonid species are dramatic after certain fire events. Case studies from five headwater streams in Arizona and New Mexico show effects of wildfire on aquatic habitats , fishes, and their food supply may be marked and long-lasting. Recent wildfires effectively extirpated two populations of brook trout (*Salvelinus fontinalis*), one of rainbow trout and the type locality population of the endangered Gila trout (*O. gilae*) (Rinne and Neary 1996). These case histories suggest the probability is very high that total fish populations will be lost following a large wildfire. Although more subtle, cumulative, and unstudied, the impacts following prescribed burns potentially affect both the short- and long-term habitats and food supply of fishes. Rinne and Neary's (1996) data suggest that toxic slurry or ash flows are immediately fatal to a portion of some populations, and survivors of these events become physiologically stressed.

In a cumulative perspective, the current extensive use of prescribed fire as a forest management tool in the southwestern USA could be an important factor in influencing sustainability of fish populations and distributions. Case history of the Shannon prescribed burn (in Arizona) and accumulations of sediment after a single flood event suggest the potential cumulative effects of sediment on fishes and their food supply and habitats following even prescribed fire are potentially as great a threat as from wildfire (Rinne and Neary 1996). The amounts of sediment (<2 mm) mobilized from watersheds following even small, low-intensity "control" burns could temporarily alter habitat for both fishes and their food supply. Cumulatively in time and space, this impact could become significant. Fine sediment effectively fills the interstices of substrate and ultimately reduces macroinvertebrate density (Rinne and Medina 1988) and loach minnow habitat for resting and spawning. This negative impact on habitat and food supply, combined with aggradation in habitats essential for loach minnow survival may indeed be as great as after a natural wildfire (Rinne and Neary 1996). Additional impacts to stream habitat includes enriched nutrient levels after a prescribed fire. Gottfried and DeBano (1990) reported that nutrient levels changed significantly in a stream following a prescribed fire in ponderosa pine in east-central Arizona. The effects of these inflated nutrient levels might adversely affect reproduction of aquatic fauna, but this question remains unanswered.

For the Robinson Mesa Prescribed Burn project, the mesa top burn is a secondary concern to loach minnow. This is because generally, small areas in flat terrain subjected to prescribed fires have little effect on water resources, especially if Best Management Practices are used (DeBano and Neary 1996). However, the mesa top burn is intended to burn hot, and the ash and sediment following a precipitation event may find its way to East Eagle Creek. Furthermore, water repellency formed as a result of fire can cause rapid overland water flow and erosion. Regarding the slope burn, although the burn intensity is generally low, the slope ranges from 40-80%, flame height will reach 4.5 feet, shrub understory may be thinned by 20-30%, and canopy will be raised in younger trees. This prescription level is high enough to warrant a buffer to protect East Eagle Creek and the loach minnow from high sediment yields. According to the general rule of thumb for buffer widths given above, a riparian buffer width ranging from about 90 to 150 feet would be necessary to protect East Eagle Creek and its tributaries.

The Forest proposes to burn the entire hillslope, including the riparian area in the fall so that there will be no unburned areas for the spring mesa top burn to ignite in the spring. Such an ignition at the spring prescription would be intense, and could result in wildfire. Thus, although the Service supports the preventative measure of "fireproofing" the slope in the fall, there will likely be adverse affects to loach minnow directly, in addition to indirect effects to their resting and spawning areas, and possibly food abundance. These effects will manifest themselves when fine sediment fills the interstices of substrate, and when toxic residue from ash enters stream habitat.

2. Mexican spotted owl (*Strix occidentalis lucida*)

The risk of catastrophic fires is widespread in Southwestern forests and woodlands (Moody *et al.* 1992). Fuel accumulations and forests overstocked with trees place spotted owl habitat at risk with respect to stand-replacing fires. Fire is also the most rapidly acting of natural disturbances. A crown fire can quickly consume forests across vast tracts. After a large crown fire, habitat components for nesting, roosting, and foraging are reduced or eliminated. Small-scale natural fires and prescribed burns, however, can reduce fuel loadings and create small openings and thinned stands that increase horizontal diversity and reduce the spread of catastrophic fire. As such, the Service and the MSO Recovery Plan acknowledge the need to make use of prescribed fire to reduce the risk of catastrophic fire in MSO habitat.

While prescribed fire can be a useful tool for managing the landscape with respect to catastrophic fires, it also has the potential to be harmful if used improperly. Recognizing this risk, the MSO Recovery Plan established guidelines for treating MSO habitat with prescribed fire. In MSO PACs targeted for treatments, 100 acres surrounding the nest site must be delineated. Within this core area, all treatments are prohibited. In the remaining 500 acres, thinning of conifers < 9" dbh, treatment of fuels, and prescribed fire can be used to reduce fires hazard and to improve habitat conditions for owl prey. Habitat components that should be retained or enhanced include large logs (>12" midpoint diameter), snags, grasses and forbs, and shrubs. Treatments can occur only during the nonbreeding season (1 September-28 February) to minimize any potential

deleterious effects to the owl during the breeding season. Finally, within PACs treated to reduce fire risk, either by the use of prescribed fire alone or in conjunction with mechanical removal of stems and ground fuels, pre- and post-treatment assessments (i.e., monitoring) of habitat conditions and owl occupancy must be done.

For the Robinson Mesa Prescribed Burn project, MSO restricted habitat is confined to the fall slope burn. The spring burn on the mesa top is not located in MSO habitat. For the 250 acre fall burn, the Forest has adhered to many of the above stipulations. Prescribed burning will only occur outside the breeding season, and no thinning of trees will take place. The fire prescription in restricted habitat is of low intensity, and is designed to maintain and enhance key habitat components (by prescribing high 1000 fuel moistures). As outlined in their project description, the Forest has committed to implementing the Forest Service Region 3 microhabitat monitoring protocol before and after treatments. In fact, pre-treatment data have already been collected.

Despite the positive efforts to consider the MSO for this project, MSO surveys were not conducted in this area. Thus, if habitat within the project area is occupied by MSO, the Forest will be burning in the nest stand because the 100 acre nest core was not identified or avoided. Pursuant to a July 1, 1996, intra-Service memo, it is the Service's policy that actions "for which no surveys or inadequate surveys for owls have been conducted" may affect owls and must be consulted upon. Without knowing the status of MSO in the action area, the Service must consider the area occupied. As such, burning in the unsurveyed habitat is considered deleterious to MSO, as it may alter key habitat components essential to nesting, roosting, and foraging, especially in regards to an unidentified/undesignated 100 acre core.

The spring mesa burn, which will occur adjacent to MSO restricted habitat, but which will not be in restricted habitat is not expected to substantially affect MSO. There is a possibility that smoke from the mesa tops will travel into the restricted habitat and linger. However, the possibility that substantial quantities of smoke will enter and linger in the steep slope habitat is extremely low, and is considered discountable to MSO.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service cannot identify any cumulative effects to MSO, as the action area is relatively small, and is surrounded by Federal lands. However, the same is not true for loach minnow.

A large proportion of the Eagle Creek stream channel downstream from the East Eagle Allotment is on private inholdings within the National Forest. Ongoing activities occurring on these private lands that would be cumulative to the proposed action include residential use, roads, livestock grazing, and irrigated cropping. No data are available at this time to estimate the level of impacts

from those activities on Eagle Creek and its fish. However, it is probable that these activities contribute substantially to the degraded condition of the stream channel and fish habitat in Eagle Creek and to the intermittent stream flow.

Land use practices in the Eagle Creek watershed, including those of the State, Bureau of Land Management, San Carlos Apache Indian Reservation, and private lands may impact loach minnow within Eagle Creek. Stream channelization, bank stabilization, or other instream management for water diversion may impact loach minnow habitat within Eagle Creek. Phelps Dodge activities, including water discharges from deep well ground pumping result in water level fluctuations that could impact the quality and quantity of loach minnow and spikedace habitats. Several roads and trails intersect the main fork and tributaries of Eagle Creek. Road 217A travels for about ½ mile directly up the perennial portion of the Middle Prong until it crosses into the Reservation. Road 217 crosses Eagle Creek three miles below Honeymoon Campground and the southern boundary of the allotment. Road 8369 crosses Eagle Creek and Dry Prong over 15 times before it leaves the drainage to Saunders cabin. East Eagle Trail 33, a two-track travel-way for vehicles, junctions with the Dry Prong about 1.5 miles above Honeymoon and continues up East Eagle Creek six miles to Sawmill cabin. These roads and trails have their subsequent impacts to loach minnow and potential habitats.

Conclusion

After reviewing the current status of the Mexican spotted owl and the loach minnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Robinson Mesa Prescribed Burn, as proposed, is not likely to jeopardize the continued existence of MSO or loach minnow. Critical habitat for MSO and loach minnow has been revoked.

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 further defined by FWS 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 FWS 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 Forest. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest 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 Forest 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)]

Amount or Extent of Take

1. Loach Minnow (*Tiarog*a *cobiti*s)

The Service anticipates that the proposed Robinson Mesa Prescribed Burn project would result in incidental take of loach minnow. Incidental take could occur as direct loss of fish during heavy rain events following the fall burn, and as suppressed reproduction when fine sediment from runoff fills the interstices of the stream substrate after the spring burn.

The anticipated level of incidental take for loach minnow cannot be directly quantified at this time due to the lack of information on populations in the area and to the changes in instream habitat distribution over time. In addition, the rapid population fluctuations inherent in populations of short-lived species such as loach minnow make accurate predictions of changes in population numbers impossible. Therefore, the Service defines incidental take in terms of the slope habitat that will be burned (which is an index of expected effects to East Eagle Creek). The Service concludes that incidental take of loach minnow from the proposed action will be considered exceeded if burning occurs outside of conditions given in the fire prescription provided by the Forest Service (see Table 1).

2. Mexican spotted owl (*Strix occidentalis lucida*)

The Service anticipates that two adult spotted owls (one pair) could be taken during this project as a result of prescribed burns in unsurveyed MSO restricted habitat. The incidental take of MSO is in the form of harm. The Service believes the action of burning restricted habitat without surveying for MSO would result in harm by altering a potential core nesting area. This level of take is difficult to detect. It is impossible to know the status of owls that might have been in the area prior to the burn. However, because microhabitat monitoring will be implemented, key habitat components can be examined before and after the treatment to assess the extent of habitat alteration. Anticipated take will be considered to have been exceeded if at any time during project activities, burning occurs outside the prescription given by the Forest (see Table 1).

If, during the course of the action, the amount or extent of the incidental take anticipated is exceeded for either loach minnow or MSO, the Forest Service 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 and adverse impact on the species, as required by 50 CFR 402.14(i). An explanation of the causes of the taking should be provided to the Service.

Effect of Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to loach minnow or Mexican spotted owl.

Reasonable and Prudent Measures:

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loach minnow and Mexican spotted owl:

1. Gather all possible information on MSO occupancy prior to the start date of the second phase of the project (which will be during the breeding season, but outside restricted habitat). Based on such information, minimize effects to MSO.

2. Gather habitat information after the burn to assess impacts to MSO.

3. Ensure that the spring burn does not affect adjacent MSO or restricted habitat.

4. Minimize the potential for sedimentation and toxic ash that reaches Eagle Creek.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forest 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.

1. The following terms and conditions will implement reasonable and prudent measure 1:

   1.1 The start date of the spring burn will be no earlier than May 1, 1999 to allow for MSO surveys.

   1.2 The spring burn may occur only after a minimum of four MSO surveys (two in March and two in April) in the adjacent slope habitat have been completed (according to Forest Service Region 3 protocol).

   1.3 If MSO are located during these surveys, the Forest will contact the Service prior to burning the mesa to discuss options for preventing the mesa fire from affecting the adjacent MSO, or to discuss reinitiation of consultation.

2. The following terms and conditions will implement reasonable and prudent measure 2:

2.1 Microhabitat monitoring data will be collected following the fall burn (according to Forest Service Region 3 protocol) to determine the efficacy of the fall burn.

2.2 Prior to fall burning, microsites that may provide nesting or roosting habitat will be confirmed from aerial photos, and ground truthed on topographical maps. These sites will be marked and receive special burning treatment to ensure retention of key habitat components, especially considering down logs, snags, and old growth trees.

3. The following term and condition will implement reasonable and prudent measure 3:

3.1 Based on the habitat data collected for reasonable and prudent measure 2, areas at risk will be identified between the slope and mesa burn areas that will require blacklining to prevent the spring burn from entering restricted MSO habitat.

4. The following terms and conditions will implement reasonable and prudent measure 4:

4.1 Immediately following fall burning, one to two 10" pines will be felled and placed perpendicular to canyon flow in each of the six drainages within the project area to ensure that ash and sediment is effectively trapped within the treatment area. The limbs will be removed, and along with brush, will be piled behind the primary log. These piles will be located in the slope area (not the mesa top), and lower gradient areas will be identified for placement of the structures. This is to prevent possible blow-outs during high flow events.

4.2 Photo points will be established at each debris jam to document the effectiveness of the structure. Photo points will be implemented before the spring burn, after the first precipitation event, and after the summer monsoon following the burn has passed.

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.

The Service is providing the following conservation recommendations:

1) A comprehensive evaluation and section 7 consultation be conducted on the effects to listed species from fire, livestock grazing, and off-road vehicle use on Forest Service lands in

the Eagle Creek drainage basin. Separate analysis of each action within the watershed fails to consider many of the cumulative effects of all actions within the drainage. A comprehensive approach for the drainage would allow a better and more inclusive analysis of the total effects of the above actions on listed species in the drainage, especially the listed fishes.

2) Proposed fire activities in MSO restricted habitat should be formally surveyed (according to the Forest Service Region 3 protocol) for MSO prior to the project start date. This would allow site specific conservation actions that may prevent adverse effects to MSO.

3) Conduct additional surveys in the slope restricted habitat following the spring burn during June, July, and August, as surveys during these months increase the probability of finding owls.

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 NOTICE

This concludes early consultation for the Robinson Mesa Prescribed Burn project. As required by 50 CFR 402.16, reinitiation of formal consultation is required 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 action is subsequently modified in a manner that causes an effect on 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. When the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your efforts in this consultation. If we can be of further assistance, please contact Darrin Thome (Ext. 250) or Bruce Palmer (Ext. 237). Please refer to consultation number 2-21-99-F-317 in further communication on this project.

Sincerely,

/s/ David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (PARD-ES)
Field Supervisor, Fish and Wildlife Service, Albuquerque, NM

John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
robinson mesa.wpd.DMT:

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