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AESO/SE
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July 23, 2004

Memorandum

To: Superintendent, Chiricahua National Monument and Fort Bowie National Historic Site,
Willcox, Arizona

From: Field Supervisor

Subject: Chiricahua National Monument Fire Management Plan Biological and Conference Opinion

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation and conference was dated March 25, 2004, and received by us on March 29, 2004. At issue are impacts that may result from the proposed Chiricahua National Monument (CNM) Fire Management Plan (FMP) and future emergency wildfire suppression actions located in Cochise County, Arizona. You determined that the proposed action is likely to adversely affect the threatened Mexican spotted owl (*Strix occidentalis lucida*) (MSO) and its proposed and designated critical habitat.

In your letter, you requested our concurrence that the proposed action was not likely to adversely affect the endangered northern aplomado falcon (*Falco femoralis septentrionalis*), jaguar (*Panthera onca*), and Mexican gray wolf (*Canis lupus baileyi*), and the threatened lesser long-nosed bat (*Leptonycteris currosae yerbabuena*). We concur with your determination for these species. Our analysis is provided in Appendix A of this biological and conference opinion (BO).

This BO is based on information provided in the March 2004, biological assessment, meetings and telephone conversations in 2002, 2003, and 2004 with your office, and other sources of information. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern, fire management and its effects, or on other subjects considered in this BO. A complete administrative record of this consultation is on file at this office.

Consultation History

- January 30, 2002: We met with your staff regarding project concerns.

- March 29, 2002: We met with University of Arizona (UA) staff (your contractor) to review species addressed and the Biological Evaluation (BE) format.
- May 21, 2002: We met with UA staff to discuss MSO critical habitat and fire timing concerns for listed species.
- June 4, 2002: We met with your staff to review a draft of the BE.
- March 13, 2003: We received the BE and request for concurrence (dated March 10, 2003).
- December, 2003: We discussed with the UA staff the possibility of incorporating specific fuel-reduction and fire-use projects in the Biological Assessment, and the resulting BO, in order to reduce consultation over the tenure of the FMP.
- January 14, 2004: We met with the UA staff to discuss the content of the Biological Assessment (BA), including appropriate conservation measures.
- March 29, 2004: We received your BA and request for formal consultation (dated March 25, 2004).
- May 25, 2004: We recommended that your office include emergency wildfire suppression as part of the proposed action for this consultation. Your office concurred with including suppression and requested a draft BO.
- June 9, 2004: We sent a draft BO for your review and comment.
- June 22, 2004: We received your e-mail response to the draft BO; with comments and recent MSO survey information.

BIOLOGICAL AND CONFERENCE OPINION

SCOPE OF THIS BIOLOGICAL AND CONFERENCE OPINION

This consultation includes all the actions as described in the FMP, along with emergency suppression actions for wildfires during the next five years. No further consultation would be needed for prescribed fire, managed wildland fire, fuel thinning, or wildfire emergency suppression unless one or more of the reinitiation criteria, listed in the “REINITIATION STATEMENT” of this document, are triggered.

DESCRIPTION OF THE PROPOSED ACTION

CNM proposes to decrease fuels and improve vegetation conditions through managed wildland fire, prescribed fire, and thinning, and to suppress wildfires for a five-year period (2004 to 2009) on CNM and adjacent lands. Only 3 acres of thinning (fuel reduction around developed areas) is proposed over the tenure of the plan. These activities could occur throughout the year. This project proposes that most of the CNM backcountry be managed for wildland fire use. This

project intends that wildland fire and prescribed fire may cross the boundary that separates CNM from U. S. Forest Service (Forest Service) lands, and fire will be managed in this “zone of cooperation” by both agencies. For CNM land, an appropriate number of acres per year to burn were determined to be 1,200, or 10 percent of the park. That limit might be exceeded if a wildland fire use event is predicted to yield outstanding resource benefits. Currently the largest prescribed burn proposed over the tenure of the new plan is 1,000 acres. The project proposes the following:

- Two fire management units (FMUs) (Figure 1): FMU 1 is a corridor encompassing canyon-bottom developed areas and the site of suppression and prescribed burning. FMU 2 is a backcountry unit covering the rest of the park that permits wildland fire use (formerly known as prescribed natural fire) under pre-decided, specific conditions (see next section), with emergency suppression and prescribed burning also allowed.
- A "zone of cooperation" that extends beyond the CNM boundary with the Forest Service. CNM and the Forest Service will jointly decide whether or not to suppress wildfires in this zone. The Forest Service would maintain responsibility for emergency suppression actions. The CNM would plan (with FS counsel and review) and conduct fires that would be managed and allowed to burn in this zone that uses geographic and topographic landforms for appropriate and safer fire management instead of arbitrary lines that separate agency holdings.
- There would be designated and protected subunits within the FMUs that would dictate special procedures for protection of listed species, their habitat, and other resource concerns.

Prescribed fire is the use of human ignited fires to meet desired resource objectives. Ignition could be by a variety of methods on the ground or in the air. Wildland fire, which previously was known as prescribed natural fire, is using naturally ignited fires to meet resource objectives. Emergency wildfire suppression may be implemented to suppress a wildfire that will not be managed as a wildland fire, including fires that may have been managed as prescribed fires and wildland fires but do not stay within prescriptions. The fires will be monitored from the ground or air to assess whether they are meeting resource objectives and to determine appropriate suppression actions. A variety of suppression actions may be implemented to manage prescribed fires and wildland fires, and to suppress wildfires. Suppression activities could include fireline construction, aerial water and retardant drops, backfires, and other suppression activities.

General Description of the Project Area

CNM is located in the northern end of the Chiricahua Mountains in southeastern Arizona (Figure 2). Located 124 miles southeast of Tucson, Arizona and 70 miles north of Douglas, Arizona and the International Border with Mexico, most of CNM’s 11,985 acres are federally designated wilderness. The CNM is bordered on three sides (north, east, and south) by lands administered by the Coronado National Forest and on the west side by privately owned ranch land in the Sulphur Springs Valley.

CNM and adjacent lands feature spires and unusual rock formations that are the eroded remnants of a 2,000-foot layer of ash and pumice fused into rock called rhyolite tuff. These materials were deposited by an immense volcanic eruption about 27 million years ago. This geologic attraction sits at the four-way intersection of the Chihuahuan and Sonoran deserts, the southern Rocky Mountains, and the northern Sierra Madre Occidental. “Crossroads” geography and elevational ranges between 5,000 feet to 10,000 feet within the Chiricahua Mountains create an area of high biological diversity.

The action area for this project includes all lands within CNM, Forest Service lands within the “zone of cooperation” and other lands to the north, south, and east within approximately ¼ mile of the “zone of cooperation”. These are the areas that may be directly or indirectly affected by the proposed action. Lands within approximately ¼ mile of the “zone of cooperation” are included within the action area because of possible smoke moving into these areas during fire use that may affect MSO.

Fire Management Units

The 300-acre FMU 1 (“corridor”) is the sloping bottom portion of Bonita Canyon. The western edge is at 5,140 feet in elevation and the eastern edge is at 5,360 feet. Bonita Creek forms the northern boundary of the FMU on its west side. The FMU boundary then follows the 5,360-foot contour (line) east to the northernmost point in the Bonita Canyon campground. The boundary turns south onto Bonita Canyon Drive, loops around the Visitor Center parking lot to the outside of the housing area fuel break, then connects back to the road. With the exception of the geology exhibit building at Massai Point, all CNM structures lie within FMU 1.

FMU 2 (“backcountry”) covers the remaining wilderness-designated areas of CNM (11,685 acres) and includes the zone of cooperation.

Vegetation

The proposed project designates four vegetation types in the CNM (Figure 3). This project is based on the structural vegetation types recognized by National Park Service fire personnel and currently defined as fire monitoring vegetation types.

Mixed grasses with minor shrub-tree component. At the west end of CNM, this type occurs in several patches totaling about 1,000 acres. Original composition is difficult to determine given a history of grazing, fire suppression, and invasion by non-native Lehmann lovegrass (*Eragrostis lehmanniana*), but several native grama grasses (*Bouteloua* spp.) are present. The tree ring work of Kaib et al. (1996) suggests that fires may historically have ignited in valley grasslands and burned into Chiricahua canyons every four to eight years. Fuel models 1 and 2 (Anderson 1982) are used to characterize fire behavior in this type. Table 1 presents properties of these models.

Anticipated outcomes from prescribed burning or wildland fire use within burn units in mixed grasses are:

- 1) Increase native grass and forb cover by 10-30 percent, two years post-burn.

- 2) Maintain non-native plant species at less than 10 percent of cover composition, five years post-burn.
- 3) Reduce density of woody invasive species by 10-30 percent, five years post-burn.
Manzanita shrub community. Small patches of this type occur within FMU 1, with most of the 1,600 acres of this vegetation type occurring in FMU 2. Wright and Bailey (1982) report that a stand-replacing fire regime best characterizes interior chaparral communities. Using fire scar data from pinyon pine (*Pinus discolor*) found within pointleaf manzanita (*Arctostaphylos pungens*) stands, Baisan and Morino (1999) estimated a 30-year to 80-or 90-year fire return interval in the CNM. Fuel models 5 and 6 (Anderson 1982) are used to characterize fire behavior in this vegetation type (Table 1).

Anticipated outcomes from prescribed burning or wildland fire use within burn units in manzanita are:

- 1) Reduce shrub cover by 30-50 percent, immediately post-burn.
- 2) Maintain shrub cover at less than 50 percent, five-years post-burn.
- 3) Increase native grass and forb cover by 10-30 percent where they occur, five-years post-burn.

Mixed oaks is a general woodland category that covers the areas where oaks make up at least 60 percent of the canopy. Pinyon pine, alligator juniper (*Juniperus deppeana*), Apache pine (*P. englemannii*), pointleaf manzanita, and Arizona cypress (*Cupressus arizonica*) also appear in this type. The type covers approximately 7,500 acres of the CNM's 11,985 acres and is common in both FMUs. The major species in this vegetation type re-sprout following top-kill by fire. These woodlands are thought to experience less-frequent fire than the other CNM vegetation types, on the order of fifty to hundreds of years between events, depending on stand composition and location (Baisan and Morino 1999). Fuel models 8 and 10 (Anderson 1982) are used to characterize fire behavior in this vegetation type (Table 1).

Anticipated outcomes from prescribed burning or wildland fire use within burn units in mixed oak are:

- 1) Reduce live pole-sized (<6" DBH) tree density by 30-50 percent, five-years post-burn.
- 2) Reduce live overstory (>6" DBH) tree density by 10-30 percent, five-years post-burn.
- 3) Increase native perennial grass and forb cover by 10-30 percent, two-years post-burn.
- 4) Reduce manzanita cover by more than 40 percent, five-years post-burn.
- 5) Reduce dead and down fuel loadings (1, 10, 100, and 1,000 time lag fuel moisture size classes) by 40-60 percent, immediately post-burn.

- 6) Maintain non-native plant species to less than 10 percent of cover composition, five-years post-burn.
- 7) Reduce litter fuel loadings 10-50 percent, immediately post-burn.

Pine with mixed conifers and hardwoods occupy the highest elevations and patches along major drainages in CNM (1,900 acres). Arizona (*Pinus arizonica*), Apache, and Chihuahua (*P. leiophylla* var. *chihuahuana*) pines of this structural type are thick-barked, fire-tolerant species that will dominate with increasing fire frequency. This vegetation type is found mostly in FMU 2. Baisan and Morino (1999) found minimum fire return interval at a given point in this type to be nine to 16 years. Fuel models 9 and 10 (Anderson 1982) are used to characterize fire behavior in this vegetation type (Table 1).

Anticipated outcomes from prescribed burning or wildland fire use within burn units in pines are:

- 1) Reduce live pole-sized tree density by 30-60 percent, one year post-burn.
- 2) Reduce dead and down fuel loadings (10, 100, and 1,000 time lag fuel moisture size classes) by 40-60 percent, one year post-burn.
- 3) Reduce live overstory tree density by 5-20 percent, five-years post-burn.
- 4) Reduce manzanita cover by more than 40 percent, five years post-burn.
- 5) Reduce litter fuel loadings by 40-60 percent, immediately post-burn.
- 6) Increase cover of native grasses and forbs by 10-30 percent, two years post-burn.

The vegetation and other characteristics within the “zone of cooperation” are similar to adjacent lands on CNM. Goals, objectives, and outcomes are the same for these areas for fires that are managed through this proposed action.

A strict set of criteria governs the decision-making process (Table 2) for allowing natural ignitions to burn, and the Superintendent, Chief of Resource Management, and Ecologist all must be available for consultation at the time of ignition to consider wildland fire use. For this project, natural ignitions poised to enter the zone of cooperation beyond the CNM boundaries will also require agreement from the Forest Service District Ranger and/or qualified Fire Management Officer.

Prescribed burning is the centerpiece of the new fire management plan. CNM began its prescribed burning program in 1975 and, to date, about 3900 acres have been treated. Figure 4 shows the burn complexes (larger subdivisions) and individual burn units planned for the coming 10 years. Table 3 reviews past burns. Table 4 is the proposed schedule of future prescribed burns, with general objectives listed for each.

Conservation Measures

The following conservation measures are to be implemented only to the extent that doing so will not compromise human health and safety.

For all threatened and endangered species

- By December 31 of each year, CNM will submit a report to us detailing that calendar year's actions involving prescribed fires, wildland fires and emergency wildfire suppression. The report will describe the fires and associated actions, impacts on threatened and endangered species, implementation and effectiveness of the conservation measures in this BO and Appendix A, quantification of any incidental take as defined in this BO, rehabilitation completed for this and previous year's fire and suppression actions under this consultation, and planned fuel-reduction activities for the next year. CNM will work with us in determining the specific information necessary and the format.
- By March 1 of each year, prior to any managed fire implementation that year, CNM will meet with us to review the report and discuss the upcoming year's plans relative to the previous year's actions and cumulative actions.

For Mexican spotted owl

CNM proposes the measures listed below to minimize and mitigate effects of prescribed burning, wildland fire, mechanical thinning, and emergency wildfire suppression on MSO and critical habitat. Measures that protect Protected Activity Centers (PACs) in the CNM (Echo and Shake Spring) will also apply to the PACs on the CNF (Wood Canyon and Indian Spring), the remainder of the CNM's FMU 2, and the zone of cooperation to the extent feasible. CNM will:

- 1) Consult park biologists when making decisions about fire use and suppression.
- 2) Restrict prescribed fire and wildland fire to low (preferably) and moderate (when necessary to achieve goals) intensity burns in Pine with Mixed Conifers and Hardwoods, and Mix Oaks vegetation types. High-intensity burns are acceptable (at the CNM's discretion) in other vegetation types.
- 3) As a first entry burn, conduct low-intensity prescribed fire and wildland fire within and immediately adjacent to the MSO PACs to consume surface fuels in order to reduce risk of catastrophic fire. Develop prescriptions that target jackpotted fuels and that will meet desired objectives. Manually reduce fuels that may contribute to a catastrophic fire. As a re-entry burn, conduct low- to moderate-intensity prescribed fire and wildland fire within and immediately adjacent to the PACs to consume dead and downed fuels as well as to clear understory vegetation that may contribute to a catastrophic fire.
- 4) Minimize heat impacts to the MSO and known and possible nest sites by conducting low-intensity prescribed burns and wildland fire use that will have slow rates of spread and low flame lengths in the most sensitive areas. Keep high flame lengths away from areas immediately below known and possible nest sites by varying ignition patterns, excluding

those areas from ignition, rearranging fuels to facilitate low-intensity burning, and burning in cooler months where fire behavior is less extreme.

- 5) Conduct prescribed fire, wildland fire, and mechanical thinning treatments to minimize effects on reproduction; avoid actions with known potential for negative effects.
- 6) Use prescribed fire and wildland fire to maintain and enhance MSO habitat inside and outside of the PACs by varying the management prescriptions to (a) reproduce natural disturbance patterns; (b) maintain all species of native vegetation in the landscape, including early seral species; (c) allow natural gap processes to occur, thus producing horizontal variation in stand structure; and (d) promote the growth of additional large oaks and pines by thinning out understory vegetation through the use of moderate-intensity burning and by pre-treating large trees (ringing, foam, limbing).
- 7) Follow the MSO Recovery Plan (RP)(U. S. Fish and Wildlife Service 1995) pine-oak forest habitat structure guidelines in setting project objectives: (a) minimize cutting of trees and snags larger than 18 inches dbh, and avoid altogether cutting trees or snags larger than 24 inches DBH (exceptions can be made when absolutely necessary for safety reasons) and (b) thin trees measuring up to 9 inches DBH. The RP specifies retaining a majority of down logs measuring greater than 18 inches at midpoint diameter, but few such logs exist at the CNM; logs greater than 16 inches at midpoint diameter will be retained. Treatments should result in increased cover of grasses and forbs one year out. Other objectives as detailed in the Mexican spotted owl RP are unattainable in this specific situation due to topographic and geologic features, i.e. large rock formations and no existing trees in large size classes.
- 8) Monitor fire behavior and long-term effects on vegetative/habitat characteristics for adaptive management.
- 9) Delineate maximum manageable areas (MMAs) to avoid impacts to sensitive areas. An MMA is a large perimeter around a smaller prescribed burn unit within which fire is allowed to spread before suppression action must be taken. It is not actively ignited during the prescribed burn, and it allows for setting up the trigger points that will drive management actions based on resource values.
- 10) Adhere to Arizona Department of Environmental Quality air quality standards. Use small-scale ignition to reduce temporary smoke impacts to the MSO. Limit the number of acres burned per day as well as the burn duration to mitigate smoke hazards. Ensure that transport winds are favorable to move smoke up and away from the PACs.
- 11) Locate staging areas and other fire “activity centers” outside the park or at the park entrance more than a mile from designated PAC boundaries.
- 12) Carry out thorough rehabilitation of areas within and immediately adjacent to the PACs affected by suppression actions.
- 13) Avoid aircraft flight closer than 1,000 feet from any designated PAC boundaries.

- 14) Limit retardant/water drops on the perimeter of and within the PACs. Do not drop retardant or water on known or suspected nests.
- 15) Notify a park biologist if MSO are discovered during fire operations, and adjust activities to minimize impacting reproduction. Fire crewmembers will neither approach nor haze any owls they find.
- 16) Continue to survey known PACs in the CNM.
- 17) Survey any PAC that year for MSO status before implementing a prescribed burn or mechanical thinning in or adjacent to that PAC.

The following analysis and conclusions address the effects of the proposed action on the MSO. Concurrences for other species are addressed in Appendix A.

STATUS OF THE SPECIES

The Mexican spotted owl was listed as a threatened species in 1993 (U. S. Fish and Wildlife Service 1993). The primary threats to the species were cited as even-aged timber harvest and the threat of catastrophic wildfire, although grazing, recreation, and other land uses were also mentioned as possible factors influencing the MSO population. We appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the RP for the Mexican Spotted Owl in 1995 (U. S. Fish and Wildlife Service 1995).

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the MSO as a threatened species (U. S. Fish and Wildlife Service 1993) and in the RP (U. S. Fish and Wildlife Service 1995). The information provided in those documents is included herein by reference. Although the MSO's entire range covers a broad area of the southwestern United States and Mexico, the MSO does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolate forested mountain systems, canyons, and in some cases steep, rocky canyon lands. 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 U.S. range of the MSO has been divided into six recovery units (RU), as discussed in the RP. The action area is within the Basin and Range West RU. According to the RP, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service. Most owls have been found within Forest Service Region 3 (including 11 National Forests in Arizona and New Mexico). Forest Service Regions 2 and 4 (including 2 National Forests in Colorado and 3 in Utah) support fewer owls.

A reliable estimate of the numbers of owls throughout its entire range is not currently available (U. S. Fish and Wildlife Service 1995), and the quality and quantity of information regarding numbers of MSO vary by source. U. S. Fish and Wildlife Service (1991) reported a total of 2,160 owls throughout the United States. Fletcher (1990) calculated that 2,074 owls existed in

Arizona and New Mexico. However, Ganey *et al.* (2000) estimates approximately $2,950 \pm 1,067$ (SE) MSOs in the Upper Gila Mountains RU alone. The Forest Service Region 3 most recently reported a total of approximately 980 PACs established on National Forest lands in Arizona and New Mexico (USDA Forest Service, Southwestern Region, December 19, 2002). Based on this number of MSO sites, total numbers in the United States may range from 980 individuals, assuming each known site was occupied by a single MSO, to 1,960 individuals, assuming each known site was occupied by a pair of MSOs. The Forest Service Region 3 data are the most current compiled information available to us; however, survey efforts in areas other than National Forest System lands have likely resulted in additional sites being located in all Recovery Units. Currently, we estimate that there are likely 12 PACs in Colorado (not all currently designated) and 105 PACs in Utah.

Since the owl was listed, we have completed or have in draft form a total of 128 formal consultations for the MSO. These formal consultations have identified incidences of anticipated incidental take of MSO in 339 PACs. The form of this incidental take is almost entirely harm or harassment. These consultations have primarily dealt with actions proposed by the Forest Service, Region 3. However, in addition to actions proposed by the Forest Service, Region 3, we have also reviewed the impacts of actions proposed by the Bureau of Indian Affairs, Department of Defense (including Air Force, Army, and Navy), Department of Energy, National Park Service, and Federal Highway Administration. These proposals have included timber sales, road construction, fire/ecosystem management projects (including prescribed natural and management ignited fires), livestock grazing, recreation activities, utility corridors, military and sightseeing overflights, and other activities. Only one of these projects (release of site-specific owl location information) has resulted in a biological opinion that the proposed action would likely jeopardize the continued existence of the MSO.

In 1996, we issued a biological opinion on Forest Service Region 3's adoption of the RP recommendations through an amendment of their Forest Plans. In this non-jeopardy biological opinion, we anticipated that approximately 151 PACs would be affected by activities that would result in incidental take of MSOs, with approximately 26 of those PACs located in the Basin and Range West RU. In addition, we completed a reinitiation of the 1996 Forest Plan Amendments biological opinion, which anticipated the additional incidental take of five MSO PACs in Region 3 due to the rate of implementation of the grazing standards and guidelines, for a total of 156 PACs. To date, consultation on individual actions under the amended Forest Plans has resulted in 254 PACs adversely affected, with 68 of those in the Basin and Range West RU.

The current condition of MSO habitat within Arizona and New Mexico is a result of historical and recent human use, as well as climate change, vegetation species conversion, and wildfires. As stated in the 1996 Forest Plan Amendments biological opinion, a precise assessment of baseline owl habitat is difficult to assemble. Based on a regional habitat mapping exercise conducted last year, there is an approximate total of 6.6 million acres of MSO habitat on National Forest Lands in the Southwestern Region. This figure included approximately 935 PACs (588,000 acres), other protected habitat (2.1 million acres), and restricted habitat (3.9 million acres). Though we have received more current information regarding PAC delineation and occupancy (980 PACs have been delineated on Region 3 National Forest lands as of December 31, 2002), we consider the estimate of PAC acres and habitat to be fairly accurate.

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

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

The Basin and Range West RU encompasses a small portion of New Mexico and the majority of southern Arizona and is the second largest RU in the United States. The base of the Mogollon Rim defines the northern border of this RU. The western boundary defines the western extent of the MSO's range. Land ownership within this RU is a mosaic of public and private lands, with the MSO primarily occupying Forest Service lands. The Forest Service has designated 154 PACs on the Coronado, Tonto, Prescott, and Apache-Sitgreaves National Forests, 149 of which are considered occupied. These PACs contain approximately 80,000 acres.

The RU is characterized by numerous mountain ranges, which rise abruptly from the broad, plain-like valleys and basins. In southern Arizona, these mountain ranges are often referred to as

the Sky Islands. Vegetation ranges from desert scrubland and semi-desert grassland in the valleys upwards to montane forests (chaparral and pine-oak woodlands at low and middle elevations and ponderosa pine, mixed-conifer, and spruce-fir forests at higher elevations). Within the Sky Islands, MSO habitat is characterized by woodland habitat and territories occur in both heavily forested terrain and in areas with hardwood and conifer stringers dominated by Madrean evergreen woodland. In general, however, much of the MSO habitat occurs in forested, steep-slope canyons and drainages. The mature trees throughout much of the forest outside of these canyons and drainages have been partially or completely harvested.

The primary threats to MSO within this RU are catastrophic wildfire, recreation, and livestock grazing (U. S. Fish and Wildlife Service 1995). As in the Upper Gila Mountain RU, this area has experienced multiple wildfires that have influenced MSO habitat. The Clark Peak, Gibson Canyon, Miller, Noon, Rattlesnake, Shovel, Bullock, and Oversight fires burned at varying intensities throughout MSO PACs on the Coronado National Forest. The Four Peaks/Lone Fire was a catastrophic, high-intensity wildfire on the Tonto National Forest that burned through two MSO PACs. In 2003, there were two fires that burned at high-intensity across significant acreage that included MSO habitat. The Aspen Fire on the Coronado National Forest burned approximately 85,000 acres and partially burned nine MSO PACs and the Helen's 2 Fire burned approximately 3,500 acres and impacted three MSO PACs within Saguaro National Monument.

There are a total of 38 wildland urban interface projects in this RU. Nineteen of the proposed projects contain MSO PACs; 28 PACS within this RU will receive fuels reduction treatments. No more than 2,000 acres of protected habitat are expected to be intensively treated, with the remainder of protected habitat treated per the recommendations in the RP. The restricted habitat is all located within 0.5 mile of private land and will most likely receive fairly intensive treatments.

Critical Habitat

A final rule designating critical habitat for Mexican spotted owl was published on June 6, 1995 (60 FR 29914). Critical habitat designated in the 1995 rule was set aside by a New Mexico federal court ruling in 1997 (*Coalition of Arizona-New Mexico Counties for Stable Economic Growth v. U.S. Fish and Wildlife Service*, No. 95-1285-M Civil, April 1, 1997), which affirmed an earlier ruling that analysis of the effects of critical habitat designation pursuant to NEPA was required (*Catron County Board of Commissioners v. United States Fish and Wildlife Service*, 75 F.3d 1429, 1439 [10th Cir. 1996]). These court rulings prompted us to withdraw critical habitat designation for Mexican spotted owl (63 FR 14378).

In March 2000, a New Mexico federal court ruling ordered us to publish a final designation of critical habitat for Mexican spotted owl by January 15, 2001 (*Southwest Center for Biological Diversity and Silver v. Babbitt and Clark*, CIV 99-519 LFG/LCS-ACE, 13 March 2000). Critical habitat was again proposed in July, 2000, and a final rule designating critical habitat for Mexican spotted owl was published on February 1, 2001 (66 FR 8530). In 2003, a Federal court in Arizona ruled (*Center for Biological Diversity v. Norton*, Civ. No. 01-409 TUC DCB, January 13, 2003) that the 2001 critical habitat designation violated the requirements of the Act and the Administrative Procedures Act (5 U.S.C. 551 *et seq.*). Although critical habitat as designated in

the 2001 rule was allowed to stand in the interim, we were ordered to re-propose critical habitat by April 13, 2004 and publish a final rule on critical habitat by August 20, 2004. On November 18, 2003, we published a notice in the *Federal Register* reopening the public comment period on the July 2000 proposed rule to designate critical habitat for Mexican spotted owl (68 FR 65020).

The primary constituent elements essential to the conservation of the MSO include those physical and biological features that support nesting, roosting, and foraging. The primary constituent elements for Mexican spotted owl were determined from studies of their habitat requirements and the information provided in the RP. Since owl habitat can include both canyon and forested areas, primary constituent elements were identified in each area.

The primary constituent elements that occur in mixed conifer, pine-oak, and riparian forest types, as described in the RP, have the following attributes:

- High basal area of large diameter trees;
- Moderate to high canopy closures;
- Wide range of tree sizes suggestive of uneven-age stands;
- Multi-layered canopy with large overstory trees of various species;
- High snag basal area;
- High volumes of fallen trees and other woody debris;
- High plant species richness, including hardwoods;
- Adequate levels of residual plant cover to maintain fruits, seeds, and regeneration to provide for the needs of Mexican spotted owl prey species.

For canyon habitat, the primary constituent elements include the following:

- Cooler and often more humid conditions than the surrounding area;
- Clumps or stringers of trees and/or canyon wall containing crevices, ledges, or caves;
- High percent of ground litter and woody debris;
- Riparian or woody vegetation (although not at all sites).

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and

private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

A. Status of the species within the action area

MSO PACs totaling 1,200 acres are located in FMU 2. These PACs are Echo (CNM #001) and Shake Spring (CNM #002). In CNM, MSO records from 1973 to 1994 include a total of 21 visual sightings or vocalizations. All of these occurred within the area now designated as the Shake Spring PAC. These efforts have annually detected 0, 1, or 2 MSO using the two designated PACs. Reproduction was never confirmed in any year for either PAC. A single pair of owls occupied the Echo PAC area in 2003. Mousing was used to determine that the pair was not nesting. A single pair of owls occupied the Echo PAC area in 2004 (possibly the same pair as in 2003). Mousing on two separate visits did not result in conclusive results, but the mousing results indicated that reproductive activity may be occurring. See Appendix B for details of CNM MSO PAC survey and monitoring results since 1994. It is unlikely that any MSO will establish in other portions of CNM due to lack of vegetation characteristics for nesting and roosting, likely limits on nesting areas in the rock formations, and considering that extensive surveys and monitoring have been conducted since 1973.

Two PACs are located on Forest Service land on the edge of the proposed zone of cooperation, with very small portions within the zone of cooperation. They are designated as Wood Canyon (CNF #0501A011) (T16S, R30E, Sec 6 & 7 in the Wood Canyon drainage) and Indian Spring (CNF #0501A012) (T16S, R30E, Sec 8 & 17 in the Indian Creek drainage). Both PACs were derived from Management Territories that were developed from historical data in 1990. The CNF has had no projects in those areas that have necessitated MSO analysis and thus have conducted no recent surveys or monitoring in the areas. Portions of these PACs are within the action area, and small portions are within the project area that may be burned. Douglas Ranger District (CNF) maps show a nest/roost site near the heads of Wood Canyon and Indian Springs Canyon.

The CNM PACs are comprised of pine with mixed conifers, and hardwoods and mixed oak vegetation communities. The 100-acre core consists of the same communities, where the MSO would likely nest in the sparsely vegetated rock pinnacles. The vegetation types used by owls are not predicted by the CNM to become nesting and roosting habitat since the geology and climate at the CNM are not likely to generate the stands characterized by high basal tree area, large trees, multi-storied canopy, high canopy cover, and downed logs and snags. However, most of FMU 2 meets the definition of "Reserved Lands," as described in the RP, given that it consists of designated wilderness in a national park. On Reserved Lands, careful application of wildland fire use (prescribed natural fire, in the terminology of the RP) and prescribed fire are permitted. As described in this document, the CNM is cautious about prescribed fire and monitors the results. A description of monitoring data collected for each vegetation type appears in Appendix C. The CNF PACs are likely of similar vegetation characteristics, but possibly with less rock substrate for nesting.

Prey habitat is diverse, which likely supplies diverse prey composition and numbers. Current density and availability of prey is unknown, but it is likely sufficient to provide for the few MSO that may occur in the action area. Because reproduction has not been confirmed, it is unknown if prey availability is sufficient for reproduction, but other factors may be influencing reproductive activities. CNM is currently conducting small mammal surveys in the Shake Spring and Echo PACs to determine and monitor prey composition and habitat.

Critical Habitat

CNM lies within current designated critical habitat. The action area outside of CNM lies within proposed critical habitat. The vegetation in the project area (areas that may be treated) generally does not have the constituent elements for mixed conifer, pine-oak, or riparian forest types. Areas within the project area may provide constituent elements of canyon habitat since areas known, and suspected, to be used by MSO for nesting or roosting are rock pinnacles, which more closely resemble canyon habitat. These areas likely include cooler conditions than the surrounding areas, canyon walls containing crevices or ledges, some areas with a high percent of woody debris, and woody vegetation.

B. Factors affecting species' environment within the action area

Current activities within the action area are mainly recreation and vehicle use. These activities generally occur on established roads and trails, though some off-trail hiking may occasionally occur. Recreation and vehicle use is relatively high on CNM near the visitor center and along the main road through the CNM, and vehicle use is high on the Pinery Canyon Road (in the "zone of cooperation"). Recreation and vehicle use is relatively low in the remainder of the action area due to the remote and steep topography of the areas. Some livestock use may occur in the bottoms of canyons outside the CNM (such as along Pinery Canyon Road).

EFFECTS OF THE ACTION

The proposed action includes activities that could directly and indirectly affect the MSO and critical habitat. All actions may occur anytime during the year, including during the MSO breeding season, but are limited by implementation of conservation measures and by appropriate prescriptions for prescribed fire and wildland fire use.

The proposed action is highly unlikely to result in the direct death of an adult MSO or juveniles (late breeding season) because of their mobility during fire or suppression actions. The proposed action could result in the death of nestlings or juveniles (early breeding season) because of their lack of mobility (as compared to adults) in the PACs if there is reproduction that year. Prescribed fire, wildland fire use, and emergency suppression could directly kill nestlings or juveniles through the managed fire or through the management actions used to control or suppress the fire, such as fireline construction and aerial retardant or water drops. The likelihood of this mortality is low because:

- There are conservation measures to determine the presence of MSO in and near the PACs, CNM will alter management if presence is determined, and CNM will limit or avoid actions that may affect survival or reproduction (Measures 10, 11, 13, 14, 15, 16, and 17).

- There are conservation measures to limit the intensity of managed fires in the PACs that would decrease the likelihood of fires reaching nestlings or juveniles (Measures 2, 3, 4, and 5).
- Reproduction in and adjacent to the CNM PACs has not been confirmed even though survey and monitoring efforts (including mousing attempts) have been conducted since 1994. The likelihood of a pair nesting or of reproductive success in any year is low, and it is unlikely that reproductive activity would occur every year. (Appendix B).
- The likelihood of a wildfire occurring specifically at or near a nest or juvenile is very low considering that the nest and juvenile roosting sites early in the breeding season would likely be in the rock pinnacles or cliff faces that will limit flame length and fuels near the roost or nest.

No impacts to nesting habitat are anticipated because possible nesting areas in the action area are mostly associated with rock substrates, and none of the vegetation types in the action area are likely nesting or roosting habitat, nor likely to ever be nesting or roosting habitat. Treatments may be implemented within the 100-acre core areas, which the RP identifies as no-entry areas in order to protect nest and roost characteristics. Restrictions in these 100-acre areas are not necessary since the crevices or ledges that MSO in the area might use for nesting will not be impacted.

Temporary indirect effects to MSO on CNM may occur from smoke (including on Forest Service lands), heat, noise, and a reduction in MSO prey species (due to changes in prey species habitat) because areas that are or may be used by MSO (including the 100-acre cores) may be treated. Because the proposed action emphasizes low-to-moderate-intensity burns, and CNM will implement the conservation measures, such as surveying PACs before implementation of prescribed burns and adjusting actions if necessary, these indirect effects are unlikely to adversely affect the survival or reproduction of any owls that may be in the area.

- Smoke, heat, and noise in or near PACs within the project area may result in adult MSO or juveniles (late breeding season) moving, or in other temporary changes in their activities to avoid these impacts, but would be minimal and likely only occur during implementation of the proposed action. These disturbances may impact nestlings or juveniles (early breeding season) because of their lack of mobility. These disturbances may result in additional stress and disruption of activities (including feeding), but this would be temporary, and stress and activities would return to pre-disturbance levels. Smoke, heat, and noise impacts are greatly reduced with implementation of the conservation measures, such as those that limit actions in and near PACs.
- Indirect effects from smoke to owls on Forest Service lands within the action area (but outside the project area) would be the same as what was described on CNM. MSO within and outside of PACs may adjust some of their activities during the smoke period, but they would likely return to pre-burn activities.
- A temporary reduction in prey species may occur in burned areas for the first growing season after a burn. Prey species composition may change slightly in a treated area due to changes in vegetation characteristics and composition, but prey availability will likely return to similar conditions during and after the next growing season. Canopy closure in the forested areas is not expected to measurably change. Ground, herbaceous, and shrub cover may be

decreased substantially in some treated areas (part of the expected outcomes). These changes will alter habitat characteristics for some prey species, with some species' numbers likely increasing and some likely decreasing. The CNM emphasis on providing a diversity of age and structural characteristics throughout the project area will likely result in a diversity of prey species over time. To monitor prey status, CNM is conducting small mammal surveys in the Shake Spring and Echo PACs.

The RP identifies catastrophic fire as a primary threat to the MSO. Prescribed fire and wildland fire will reduce the chance of catastrophic fire in the project area by reducing the fuels on the ground. The RP also recommends that any actions manage for nest and prey habitat characteristics for MSO. The proposed actions will have no impact on nest habitat since nests are associated mainly with rock substrates on the CNM. Prey habitat may be impacted by the proposed actions, but such impacts are anticipated to be only temporary. We anticipate that prey habitat will increase in diversity in the short to long-term, which will provide prey availability similar to current conditions.

Critical Habitat

The constituent elements of MSO critical habitat for nesting or roosting structure in canyons (cool conditions, crevices/ledges) are unlikely to be affected in the action area. The proposed action may impact constituent elements for MSO prey in this area by decreasing woody debris and vegetation. As described previously, decreasing woody debris and vegetation will alter the habitat conditions for MSO prey. This alteration may result in decreased habitat quality for MSO prey in the short-term, but will likely result in greater diversity of prey habitat throughout the project area, starting after the first growing season post-fire and to the long-term. CNM will be conducting small mammal surveys in the PACs that will provide information on whether this assumption is supported.

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 action area occurs entirely on Federal land, and therefore non-Federal actions are likely to be minimal.

CONCLUSION

After reviewing the current status of MSO, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that the proposed action, with the conservation measures, is not likely to jeopardize the continued existence of the MSO, and is not likely to destroy or adversely modify designated or proposed critical habitat. We present these conclusions for the following reasons:

1. We anticipate that no more than one MSO PAC may be affected to a significant extent (see incidental take statement below).
2. The intent of the RP in protecting nesting substrates and providing a diversity of prey habitats will be met.
3. The chance of catastrophic fire in the area, which is one of the concerns for MSO described in the RP, will decrease from current levels.
4. Reproduction has not been confirmed in the CNM PACs.
5. No MSO PACs or designated or proposed critical habitat is likely to be impacted to a significant extent. We anticipate that nesting and roosting habitat in the rock substrates will not be impacted. Prey habitat may be impacted, but habitat will recover, and likely provide more diversity in prey than before project implementation.
6. Conservation measures will be implemented that will reduce the likelihood of managed fire or emergency wildfire suppression actions affecting MSO survival or reproduction, if present during that year.

In summary, our conclusion that the proposed action is not likely to jeopardize the continued existence of the MSO, and is not likely to destroy or adversely modify designated or proposed critical habitat, is based on our analysis of the rangewide status of the MSO, the environmental baseline, the effects of the proposed action, and the cumulative effects. There are concerns with the long-term effects of the recent catastrophic fires throughout the species range, including the Chiricahua Mountains in which the action area is located. The proposed action addresses this concern by reducing the likelihood of catastrophic fire on the CNM and surrounding areas. The proposed action may have some negative impacts on individuals, their habitat, and their prey, but these impacts would be temporary. Implementing the proposed action, including the conservation measures, will likely result in a more diverse landscape that would maintain the quality of habitat for the survival and reproduction of the MSO in the CNM and surrounding areas.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as 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.

Amount or Extent of Take

For the purposes of this consultation, incidental take is anticipated 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 die or fail to breed, fail to successfully rear young, raise less fit young, or desert the area because of disturbance or because the habitat no longer meets the owl's needs.

Our current section 7 consultation policy provides for incidental take if an activity compromises the integrity of a PAC. Actions outside PACs will generally not be considered incidental take.

This biological opinion anticipates that one MSO PAC may be affected to the extent that taking of MSO will occur. This taking could be in the form of death, injury, harm, or harassment of up to two adults and associated eggs or juveniles. Authorized taking will be considered to have been exceeded if fire management or suppression actions affect more than one PAC in any of the following manners:

1. Over 10 percent of the PAC experiences a high-intensity burn as defined in the FMP and supporting documents.
2. Fire, smoke, heat, noise, or other disturbances associated with fire management and suppression affects a 100-acre core area during the MSO breeding season (March 1-August 31) if reproductive activities are known or suspected.

We recommend that if, during the five-year duration of the proposed action, any PAC is affected in one or more of the manners described above, the CNM contact our office to determine if reinitiation of consultation is necessary so as to avoid exceeding the amount of authorized incidental take.

Effect of Take

In this BO, we have determined that this level of anticipated take is not likely to result in jeopardy to the species.

Reasonable and Prudent Measures

Due to the relevant conservation measures that are described in the Description of the Proposed Action section, and are part of the proposed action, no reasonable or prudent measures are necessary.

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

DISPOSITION OF DEAD OR INJURED LISTED SPECIES

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

CONSERVATION RECOMMENDATIONS

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

1. We recommend that you fully characterize the rock pinnacle areas that are used by MSO on the CNM, and use this information to identify other areas on the CNM that may provide this nesting substrate. This information can be used when you revise your FMP after five years to possibly provide other management considerations to help recover MSO.
2. We recommend that you continue your prey monitoring within the PACs for the full five years, and possibly expand your sample areas outside of PACs. This information can be used when you revise your FMP after five years to possibly provide other management considerations to help recover MSO.
3. We recommend that you coordinate with CNF in determining the status of the two PACs on the eastern edge of the action area, and use this information in your planning for fires in these areas.

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

REINITIATION NOTICE

This concludes consultation and conferencing for the proposed action. You may ask us to confirm the conference opinion as a biological opinion issued through formal consultation if critical habitat is designated. The request must be in writing. If we review the proposed action and find there have been no significant changes in the action as planned or in the information used during the conference, we will confirm the conference opinion as the biological opinion for the project and no further section 7 consultation will be necessary.

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your efforts to identify and minimize effects to listed species from this project. For further information please contact Mark Crites (520) 670-6150 (x229) or Jim Rorabaugh (602) 242-0210 (x238). Please refer to the consultation number 02-21-03-F-0265 in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Field Supervisor, Fish and Wildlife Service, Albuquerque, NM
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ
Forest Supervisor, Coronado National Forest, Tucson, AZ
District Ranger, Douglas Ranger District, Coronado National Forest, Douglas, AZ

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ
Brooke Gebow, University of Arizona, Tucson, AZ

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TABLES AND FIGURES

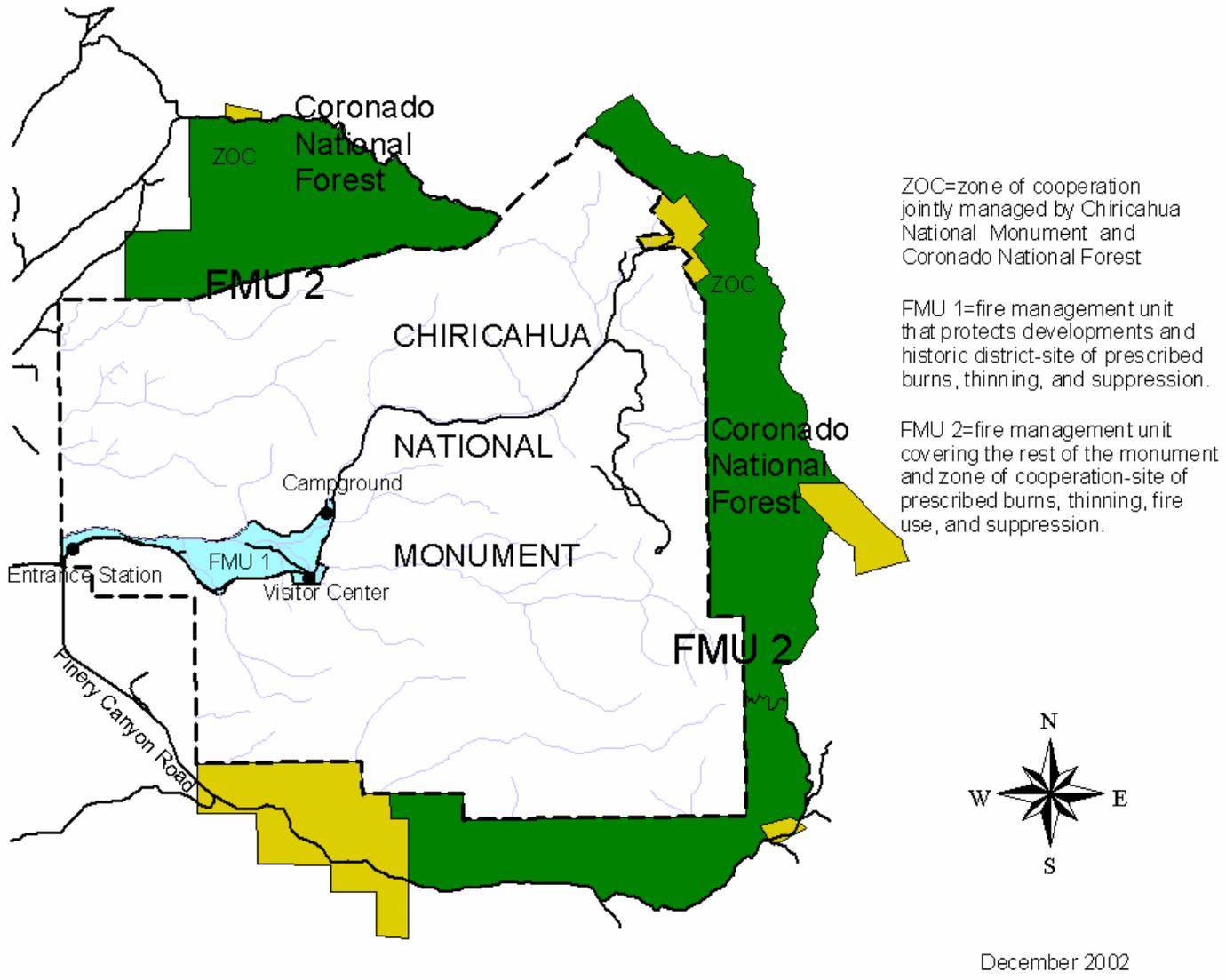


Figure 1. Fire Management Units and Zone of Cooperation.

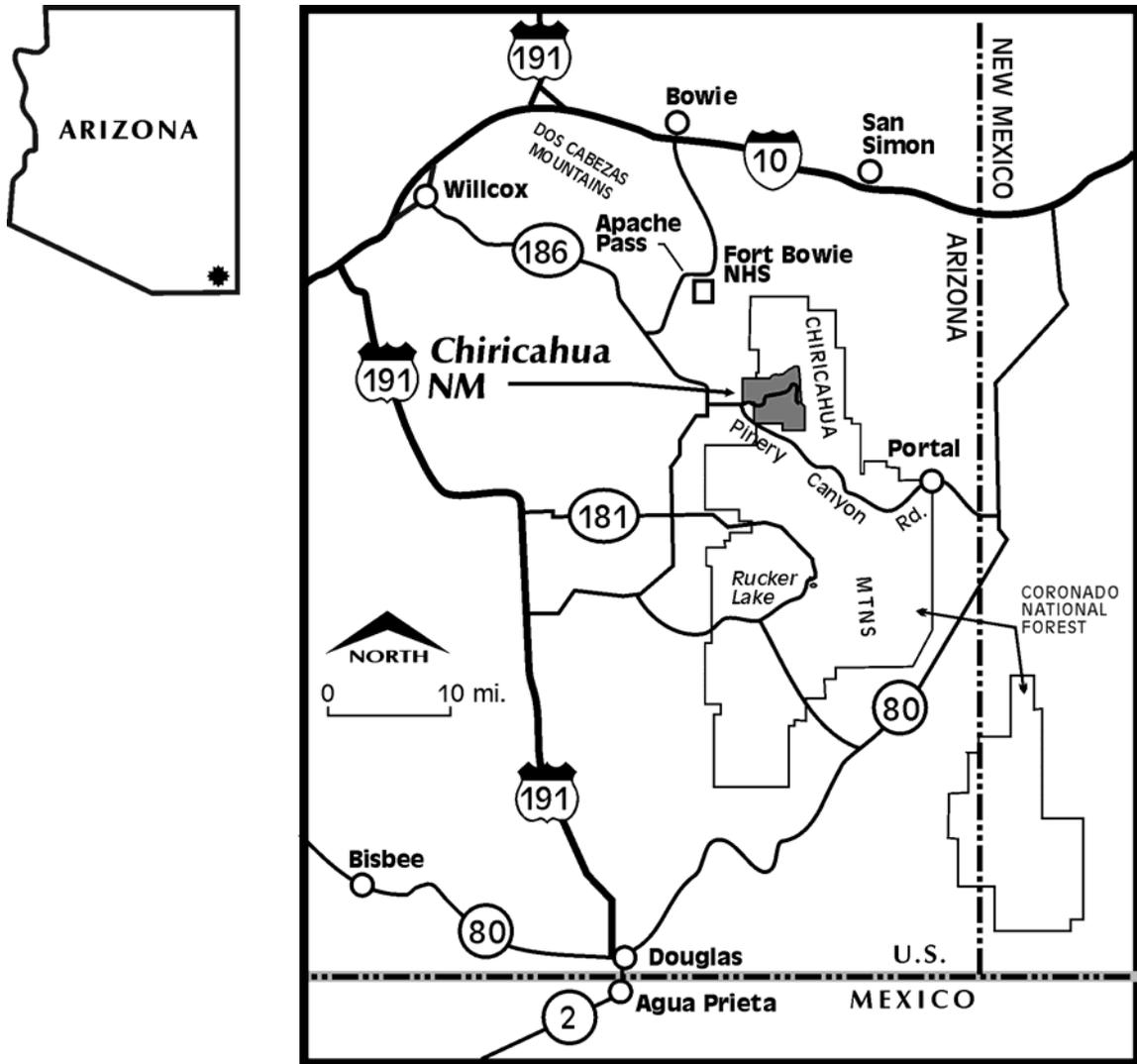


Figure 2. Location of CNM.

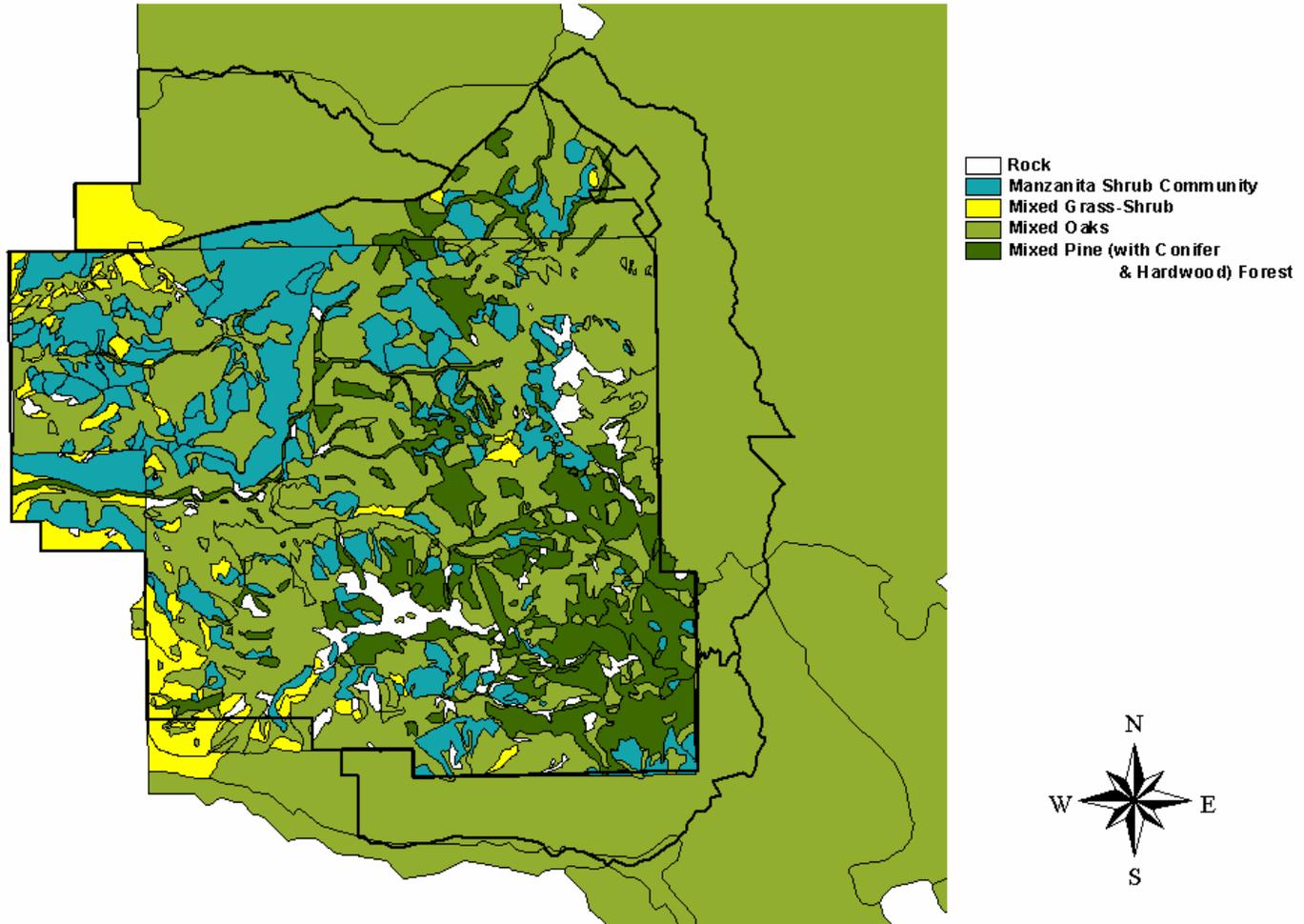


Figure 3. Vegetation monitoring types at CNM. The CNM has been mapped to a finer level of detail than the surrounding Coronado National Forest.

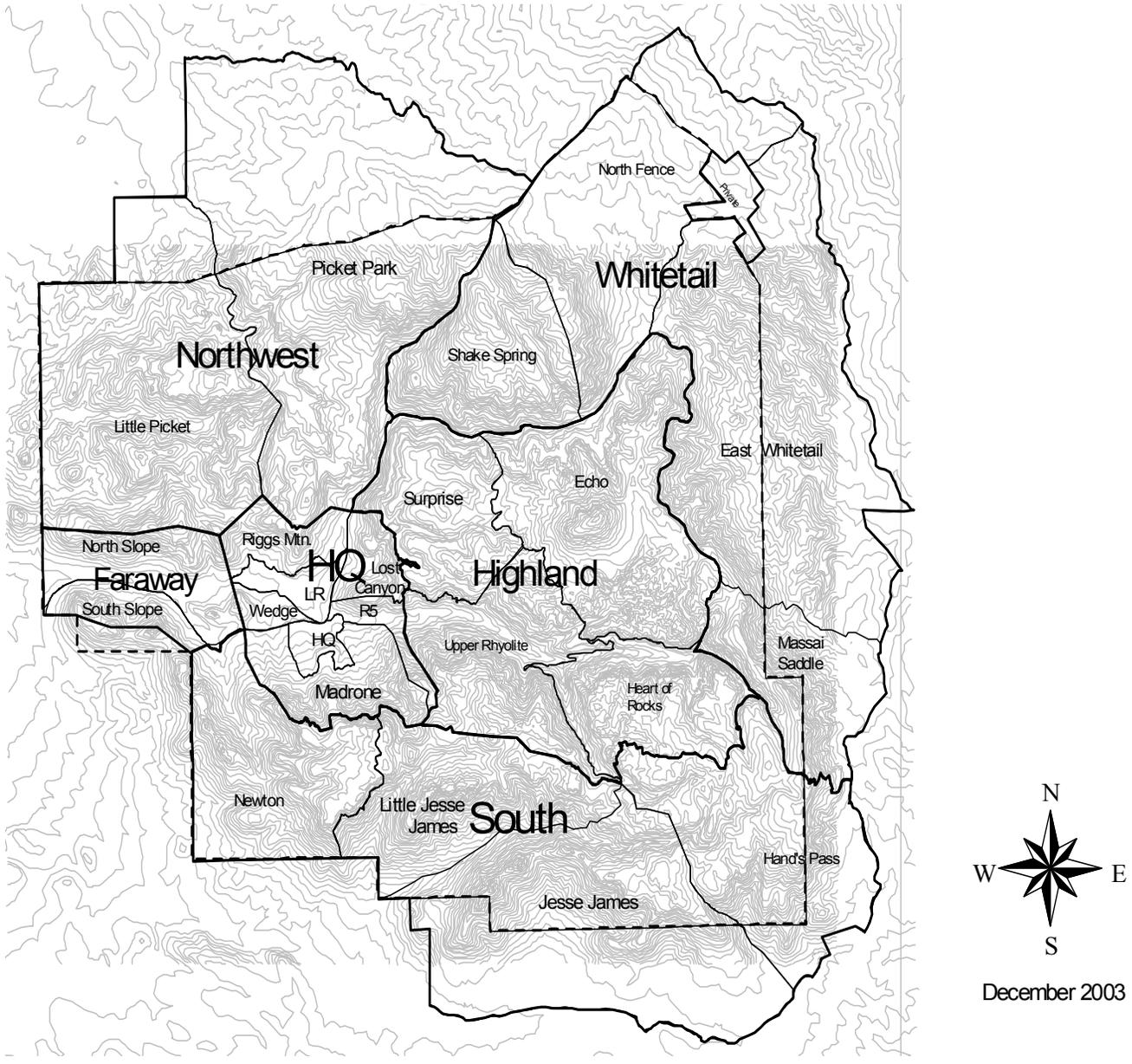


Figure 4. Burn complexes and units.

Table 1. Fuel model values for estimating fire behavior in vegetation monitoring types. Model numbers and values come from Anderson (1982) or from observations at Chiricahua National Monument (*). Rate of spread and flame length apply to situations where dead fuel moisture content is 8 percent, live fuel moisture content is 100 percent, and effective wind speed at midflame height is 5 mi/hr.

Fuel model	Monitoring type(s)	Total fuel load, < 3-in dead and live (tons/ac)	Dead fuel load, ¼-in (tons/ac)	Live fuel load, foliage (tons/ac)	Fuel bed depth (ft)	Rate of spread (chains/hr)	Flame length (ft)
1	mixed grasses with minor shrub-tree component	0.74	0.74	0	1.0	78	4
2	mixed grasses with minor shrub-tree component	4.0	2.0	0.5	1.0	35	6
5	manzanita shrub community	3.5 (5.42*)	1.0 (0.21*)	2.0 (20.04*)	2.0 (2.62*)	18	4
6	manzanita shrub community	6.0	1.5	0	2.5	32	6
8	mixed oaks	5.0 (3.66*)	1.5 (0.21*)	0 (2.49*)	0.2 (2.52*)	1.6	1.0
9	pine with mixed conifers and hardwoods	3.5 (6.3*)	2.9 (1.3*)	0	0.2 (0.125*)	7.5	2.6
10	pine with mixed conifers and hardwoods & mixed oaks	12.0	3.0	2.0	1.0	7.9	4.8

*NOTE: These Chiricahua numbers for fuel models 5, 8, and 9 cannot be used to determine fire behavior. Adjusted numbers are needed to derive rate of spread and flame length.

Table 2. Wildland Fire Decision-making Criteria/Daily Review

Factor	Criteria <i>Wildland fire use will be designated only:</i>
number of fires	if there are no more than two other wildland fires of any type currently burning within the CNM, or if any other fire activity does not preclude successful management of this fire
risk analysis	if relative risk indicators or risk assessment results are acceptable to agency administrators (ERC, BI, drought indices)*
ignition location	for ignitions in FMU 2, or for ignitions in FMU 1 that have potential to safely move into FMU 2 or for ignitions on Forest Service land outside FMU 2 that move into the ZOC
ignition cause	for natural ignitions (lightning)
danger	when life, property, or critical resources will not be endangered, or when the threat can be mitigated
fire behavior	if the current and forecasted (next 24 hours) fire behavior will not cause fire to leave the ZOC, or if ZOC boundaries are threatened, that the FS is consulted and agrees to manage fire outside of the ZOC
fire weather	if the current and forecasted weather conditions do not indicate that a red flag watch or warning will be issued for southeast Arizona or that other fire weather factors are likely to cause the risk indicators to be unacceptable within the next three days
smoke management	if there are no requests from the Arizona Department of Environmental Quality for the curtailment of smoke production
preparedness level	if new fires are allowed at Levels IV and V with regional/national approval and suppression of ongoing fires at Level III (Arizona Mobilization Guide) is authorized (definitely suppress at Level IV)

*ERC and BI will be decision-making parameters because they can be used to interpret fire behavior. The prescribed ERC and BI indices are the average 90th percentile values over a ten-year record period. The 90th percentile ERC and BI indices are considered the point at which very high fire danger is present.

Table 3. Prescribed Burns through 2003 at Chiricahua National Monument.

Vegetation type abbreviations are as follows:

G = mixed grasses with minor shrub-tree component

O = mixed oaks

P = pine with mixed conifers and hardwoods

M = manzanita shrub community

Burn Complex	Burn Unit	Veg Types	Acres Burned	Year
Faraway	Faraway I	G	2	1975
Faraway	Faraway	G	4	1975
NW	Picket Park #1	O, P	10	1980
HQ	Rhyolite	O, P	15	1980
NW	Picket #2	O, P	10	1981
HQ	Rhyolite #2	O,P	65	1981
HQ	Rhyolite #3	O,P	80	1982
Highlands	Inspiration Point	O, P	150	1983
HQ	Meadow Woods	O,P	50	1984
NW	NW Corner	G, M	200	1986
HQ	Rhyolite T	M, O,P	10	1986
HQ	Meadow Woods #2	O,P	8	1987
Faraway	West Faraway #1	G	10	1987
HQ	Massai	O, P	10	1990
Faraway	West Faraway	G	9.2	1990
HQ	Powerline I	P, O	5	1991
HQ	Rhyolite I	O, P	20	1992
HQ	Silveredge	P, O	13.2	1992
HQ	Rhyolite	P, O	2	1992
HQ	Residence HQ #2	P, O	5	1992
HQ	Silver Spur	G	4	1993
HQ	HQ/Rhyolite #4	P, O	8	1993
Highlands	Sugarloaf	G, M	15	1993
Faraway	Faraway #3	G	4	1993
Faraway	West Faraway #4a	G	6	1993
HQ	HQ/Wedge	P, O, M	2	1995
Highlands	Echo #1	P	69	1996
Whitetail	Bonita #1	P, O	10	1997
HQ	Wedge	M	5	1998
HQ	Headquarters (reburn)	O	5	1998
South	Newton	G, M, O	800	1998
NW	Little Niagara	O, M, G	540	1999
HQ	Wedge	M	2	1999
HQ	Powerline II (reburn)	P, O	25	1999
HQ	Headquarters	O	10	1999
South	Newton	G, M, O	125	1999
HQ	Silver Spur	G	5	2001
NW	Picket Park	O, P	500	2002
HQ	Wedge	M	35	2002
NW	Little Picket	O, M, G	640	2003
HQ	Madrone	O, M	450	2003

Table 4. Proposed Prescribed Fire Projects 2003-2011.

Complexes and burn units are shown on Figure 4. MSO PAC = Mexican spotted owl protected activity center.

Vegetation Types: G=Mixed grassland, M=Manzanita shrub, O=Oak woodland, P=Mixed conifers and hardwoods

Condition Class: 1 = Fire regimes within historical range, 2 = Fire regimes moderately altered from their historical range* , 3= Fire regimes significantly altered from their historical range

Complex	Burn Unit	Veg Types	Condition Class	Acres Burned (proposed)	Year	Purpose of Project
Whitetail	Massai Saddle	P, O, M	2 (S ^a)	(300)	2004	conduct first burn in area with long (unknown) interval since last fire
South	Hand's Pass	M, P	2 (S ^a)	(1000)	2004	restore historical frequent fire interval to pines in drainage. Manzanita type in this burn unit will likely remain shrubland.
HQ	Lower Rhyolite (LR)	O, P	2	(30)	2005	reduce fuels to protect canyon-bottom developments; thin overstocked oak stands
Whitetail	East Whitetail	M, O	2 (S ^a)	(800)	2007	cooperative project with USFS for restoring historical frequent fire interval to pines in drainage
Highlands	Echo Park	P	2	(110)	2007	conduct low-intensity burn for MSO PAC maintenance
Whitetail	Shake Spring	M, P, O	2 (S ^a)	(400)	2008	conduct low-intensity burn for MSO PAC maintenance
Faraway	South Slope	G, M	2 (G ^b)	(50)	2008	reduce fuels to protect canyon-bottom developments and historic structures
Highlands	Upper Rhyolite	P, O	2	(200)	2009	restore historical frequent fire interval; thin overstocked oaks
South	Jesse James	P, O, M	2 (G ^b at lower elev; S ^a at higher)	(500)	2009	open up thick vegetation that in the past likely had frequent fires brought in by valley bottom grasslands

Complex	Burn Unit	Veg Types	Condition Class	Acres Burned (proposed)	Year	Purpose of Project
HQ	Rhyolite # 5 (R5)	O, P	2	(50)	2010	reduce fuels to protect canyon-bottom developments; thin overstocked oak stands
Highlands	Inspiration Point	P, O	2	(150)	2010	reburn for restoring historical frequent fire regime
Highlands	Echo Park	P	2	(110)	2011	conduct low-intensity burn for MSO PAC maintenance
South	Little Jesse James	P, O, M	2 (G ^b at lower elev; S ^a at higher)	(500)	2011	open up thick vegetation that in the past likely had frequent fires brought in by valley bottom grasslands
Faraway	North Slope	G ^c , M	2 (G ^b)	(50)	2012	research burn to look at Lehmann lovegrass response

* Detailed definition of Condition Class 2:

Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Wildland fires burning in Condition Class 2 lands can have moderately negative impacts to species composition, soil conditions, and hydrological processes.

^aS indicates manzanita type (M) in this unit will likely remain shrubland after burning.

^bG indicates manzanita type (M) in this unit will likely convert to grassland after burning.

^cGrassland type (G) in this unit is a mosaic of native patches and Lehmann lovegrass stands.

Appendix A - Concurrences

The appendix contains our concurrences with your determinations that the proposed action may affect, but is not likely to adversely affect the lesser long-nosed bat (*Leptonycteris currosae yerbabuena*), northern aplomado falcon (*Falco femoralis septentrionalis*), jaguar (*Panthera onca*), and Mexican gray wolf (*Canis lupus baileyi*). These concurrences are based on the full implementation of the proposed action as described in the Description of the Proposed Action section of the Biological Opinion, including the conservation measures presented in the BO and in this Appendix.

Lesser Long-nosed Bat

This nectar-feeding bat migrates between its breeding and summering grounds in northern Mexico, southern Arizona, and southern New Mexico, and its wintering area in southern Mexico. Migration is timed with the availability of pollen and fruit of columnar cacti and the nectar and pollen of blooming agave plants. This species forms large, female maternity colonies during the summer where they give birth to young. Maternity roosts are typically found in abandoned mines or caves, and at lower elevations near flowering columnar cactus concentrations (U. S. Fish and Wildlife Service 1995). The lesser long-nosed bat (LLNB) was listed as endangered on September 30, 1988 (FR Vol. 53, No. 190), primarily because of the loss of roosting sites. Adult females and their recent young are the first to arrive. Females and young generally depart during the monsoon season (July – August), relocating to higher elevations where blooming agave plants are located. Their main food sources in Arizona include Palmer agave (*Agave palmeri*), Parry agave (*A. parryi*), Desert agave (*A. deserti*), Schott's agave (*A. schottii*), giant saguaro (*Carnegia gigantea*), and organ pipe cactus (*Stenocereus thurberi*).

Day roosts have been found in a variety of sites, including abandoned mines and caves that possess wide variations in microclimates. It has been reported that this species is sensitive to human disturbance, and that individuals will temporarily abandon day roosts, returning in a few days. This finding suggests that they have alternate roost sites to use. The RP identifies two critical features for this species—food concentrations and day roosts.

Roosts have not been found in the CNM. A transitory night roost has been identified in the old Kasper Mine Tunnel (T16S, R30E, Sec. 33) approximately 1 mile east of CNM/CNF border, just beyond the zone of cooperation. More than 1,000 bats are known to use this roost. Recent monitoring by CNF has been limited and shows night use, though day use is also likely. This location is along the eastern flank of the Chiricahua Mountains, and it is likely that bats forage to the east where lower elevation grasslands and agave plants are nearer and more numerous. An unnamed mine shaft (part of Hilltop Complex) exists 1.5 miles east of CNM/CNF border; its use as a spring and summer migratory day roost dates back to at least the late-1960s. There is another large colony roost seven miles east of the CNM at lower elevation on private land, and a smaller colony roost site six miles north of CNM at the very northern end of the Chiricahua Mountains. Although no formal inventory has been conducted, there are no known caves other than very small alcoves within the CNM or these burn units due to the lack of limestone geology that promotes cave formation.

Although some areas in the southern part of the Chiricahuas and other mountain ranges (for example the Huachucas and Whetstones) in southeast Arizona contain significant limestone caves, the geology of the CNM (and likely throughout the action area) is volcanic in origin (Pallister et al. 1993). No LLNB roosts have been found in the abandoned mines in the area (King of Lead Mine, T16S, R30E, Sec. 18). LLNBs have been seen in small numbers at hummingbird feeders within the CNM. It is probable that these individuals travel from the known roosts, or more distant sites, for nighttime foraging.

Karen Krebbs of the Arizona-Sonora Desert Museum conducted bat surveys at CNM water sources in 2000, 2001, and 2003. In August 2000, she caught a single young male LLNB and observed another while mist netting near Silver Spur Meadow in the canyon bottom near the campground. No LLNBs were observed in 2001, and in August 2003 another young male was caught in the same location.

Conservation Measures

CNM proposes the measures listed below to minimize effects of prescribed burning, wildland fire use, and suppression on LLNBs.

1. Conduct surveys to determine if possible roosts are located on the CNM.
2. Protect agave plants from modifications by treatment activities to the greatest extent possible in areas of low agave density.
3. Instruct personnel implementing prescribed fires in the identification and importance of protecting agave plants for bats.
4. Monitor agaves so that there is no more than 20 percent agave mortality in a burn area over the life of the Fire Management Plan. Monitor spread of Lehmann lovegrass changes in density and distribution after burns.
5. Minimize smoke that moves to the east of the CNM in order to decrease impacts on known roosts.

Determination of Effects

Fire is not likely to directly affect any LLNBs that may occur in the CNM due to their mobility. Fire can indirectly affect LLNB by destroying their food source of Palmer's agave. Bats feed on the nectar of these plants. Smoke may disturb roosting bats, but the CNM is required to meet Arizona Department of Environmental Quality standards for prescribed burns and wildland fire use. Burns are ignited when winds move away from the nearest bat roosts. In general, due to prevailing southwest winds, smoke pushes up and over the mountain range, rises quickly towards the northeast, and dissipates at about 1,000 feet (mixing height).

The CNM contains approximately 500 acres where the highest concentrations of Palmer's agaves occur. Eighty percent of that area lies within the mixed grassland vegetation type, where 568 and 51 agaves (of all sizes), respectively, were intercepted along ten 100 meter x 2 meter (328.1 feet

by 6.6 feet) belt transects on two plots in grassland burn units. The remaining 20 percent of the “agave area” is in the transition between the mixed oaks and manzanita types. Widely scattered individuals also occur through other areas of the CNM.

Non-native Lehmann lovegrass (*Eragrostis lehmanniana*) burns hotter than native grasses, and where this species is the dominant grass surrounding them, fire puts agaves at higher risk for mortality. Less intensive burning, such as would occur in a grassland of native species, would not necessarily consume the plant. Low-intensity fires are anticipated to result in agave mortality at less than 20 percent. Data from the CNM fire effects monitoring program for the 1998 Newton burn (the higher density site indicated above) showed apparent mortality immediately post-fire at 11.3 percent with actual mortality one year post-fire at 1.8 percent.

Conclusion

We concur that the proposed action of the CNM FMP is not likely to adversely affect the LLNB. Our concurrence is based on the proposed action, including the conservation measures, that no day roosts are likely to be impacted, and that impacts to food sources will be insignificant.

Northern Aplomado Falcon

The northern Aplomado falcon is a medium sized falcon, 15-18 inches long, with a wingspan of 32-36 inches. Aplomado falcons are smaller than peregrine falcons and larger than kestrels. Rufous underparts, a gray back, a long, banded tail, and a distinctive black and white facial pattern characterize adults. They prey primarily upon birds, but also eat insects, snakes, lizards, and rodents (U. S. Fish and Wildlife Service 2001). Aplomados are most often seen in pairs. They do not build their own nests, but utilize stick nests built by other birds, such as ravens or hawks.

Aplomado falcons generally inhabit open grasslands with scattered trees, relatively low ground cover, an abundance of small to medium-sized birds, and a supply of suitable nesting platforms. Historically, these birds were found in Cochise and Santa Cruz counties, Arizona; southern New Mexico; and southern Texas, as well as most of Mexico. The only known nests to have occurred in Arizona were documented in 1887. Currently, these birds are very rare, with only a few confirmed sightings in New Mexico and Texas since 1995. The northern Aplomado falcon was listed as endangered in January 1986. A Recovery Plan was written in 1990. No critical habitat has been designated for this species (U. S. Fish and Wildlife Service 2001). The Peregrine Fund is reintroducing Aplomado falcons at the Laguna Atascosa National Wildlife Refuge in Texas as part of a captive rearing program (U. S. Fish and Wildlife Service 2001). There is no current documentation of this species in Arizona, but it occurs in small numbers nearby in southwestern New Mexico.

Determination of Effects

While Chihuahuan Desert grassland is potentially suitable habitat for this bird, the small patches of Lehmann lovegrass-dominated grassland in the canyon bottom or on hillsides, mostly at the west end of the CNM, are likely to only be used occasionally, if at all. Most of the use, if present, would occur in the more suitable Sulphur Springs Valley grasslands (about 900,000 acres) that are directly adjacent to the CNM.

Conclusion

We concur that the proposed action of the CNM FMP is not likely to adversely affect the aplomado falcon. Our concurrence is based on the proposed action, no documented use of the general area, and a lack of suitable habitat in the action area.

Jaguar

The jaguar was listed as endangered in the United States in July 1997 (62 FR 39147), without critical habitat. Non-United States populations were listed as endangered in March 1972 (37 FR 6476).

Determination of Effects

Individual jaguars have been seen and photographed infrequently in southern Arizona during the last few decades. It is possible jaguars may travel in and through CNM. Fire is not likely to directly affect jaguar due to their mobility. Fire could indirectly affect them by lessening their travel and foraging cover, and a localized change in deer patterns on the landscape may occur as forage is burned and re-sprouts later in the growing seasons following a fire.

Conclusion

We concur that the proposed action of the CNM FMP is not likely to adversely affect the jaguar. Our concurrence is based on the proposed action, no documented use of the general area, and insignificant negative effects to travel and potential prey habitat.

Mexican Gray Wolf

The Mexican gray wolf was listed as Endangered without critical habitat in 1976. An experimental, nonessential population of Mexican gray wolf was introduced into the Blue River Primitive Area, located on the Apache-Sitgreaves and Gila National Forests, in the hopes of re-establishing the species. A Recovery Plan was written in 1982 (32 FR 4001, 41 FR 17736, 43FR1912).

Determination of Effects

Mexican gray wolves are not known to occur in CNM, and the Coronado National Forest considers this species extirpated since 1970. Should any wolves travel through the park, fire is not likely to directly affect them due to their great mobility. Indirectly, fire could lessen their cover in travel areas or corridors, and localized reductions in small mammal prey species could occur.

Conclusion

We concur that the proposed action of the CNM FMP is not likely to adversely affect the Mexican gray wolf. Our concurrence is based on the proposed action, no documented use of the general area, and insignificant negative effects to travel and prey potential habitat.

Literature Cited

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Appendix B

CNM MSO Survey History

Russell Duncan and Helen Snyder conducted the first systematic CNM MSO survey in 1994. They identified a roosting MSO pair within the Shake Spring PAC about 0.75 mile north of the campground, on the east side of the paved road and high up in a rocky grotto. Duncan determined that the birds were not reproducing, possibly in response to a very dry year. No other birds were located within CNM in 1994.

A single female MSO was found during the 1995 survey, and in the same approximate area as the 1994 pair. Duncan banded and collected a blood sample from that bird. MSO were not detected during the 1996 survey. In 1997, MSO were not detected in the Shake Spring PAC, but a Mexican spotted owl of unknown age and sex was located through vocalization and visual identification in the Echo Canyon PAC in May 1997. This bird was found on the same rocky ledge high above Echo and Upper Rhyolite Canyons for three nights, but did not respond to mouse offerings. Very little whitewash and no pellets were found at that location indicating this was probably a new or alternate roost area.

MSO were not detected during the 1998 survey. The 1999 survey located one MSO within the Shake Spring PAC about one mile north of the campground high in the rocky pinnacles on the east side of the road in May. This identification was made by vocalization and visual observation. This individual responded to early morning vocalizations on May 31, but was uninterested in mouse offerings. The exact location high in a rocky pinnacle area is completely inaccessible so no visual information is available about a possible roost/nest site. A second MSO vocalization response occurred in the Echo Canyon PAC on June 6, 1999, during the second survey visit of the season to that PAC. This identification was made initially by vocalization with visual confirmation the following morning. This individual did approach for mouse offerings, and was captured. This recaptured owl is the same female banded by Duncan during the 1995 survey in the Shake Spring PAC. Duncan again took a blood sample, since the laboratory lost the one taken in 1995 before analysis. This female was roosting in the same general location as the one found in 1997. It seems possible that a single female Mexican spotted owl is using both PAC areas in 1999, possibly looking for a mate. Neither this MSO nor any other MSO has been relocated during subsequent 1999 surveys in both PACs. Both areas have been surveyed simultaneously in an effort to determine whether there are one or more birds, but MSO were not detected at that time.

The 2000 survey located one MSO on February 13, by vocalization only, just across the road from the Natural Bridge trailhead. One MSO was heard again on July 10 and 11th, about 0.50 mile north of the campground. An attempt was made to locate a nest site, but it remains undetected.

2001 surveys (A. Whalon) - Surveys were conducted from April through July 2001. Responses were heard on 5/6/01 and 7/2/01 in the Echo Park area. One owl was observed, becoming very agitated and making a call like a "wounded baby seal," as well as the standard 4-note call. It is assumed that this is the same female that has been in residence during previous years. Surveys

were also conducted near Shake Spring and at Natural Bridge trailhead, with no response in either of these areas.

2002 surveys (A. Whalon) - Surveys were conducted from April through August 2002. Both the Echo Park and Shake Spring areas were surveyed, with no response heard at any time during the survey season.

2003 surveys (R. Olsen / A. Whalon) - Surveys were conducted from May through July 2003. On June 4, 2003, a pair of owls was detected in the Echo Park area. Per the USFWS protocol, mousing was conducted to establish breeding status. On June 11, 2003, mousing was attempted, but the owls did not show up until it was too dark to continue. Both owls were observed on this occasion. On June 12, 2003, mousing was again attempted, with only one owl responding to calls (believed to be a female based on size). This owl ate three mice and ate or cached a fourth mouse before leaving the area. On July 3, 2003, mousing was also attempted, this time both owls arrived on the scene. The larger (female?) owl ate 2 mice before calling the male(?) owl to the area. She then ate 3 more mice (5 total). Although the male was in close proximity and direct contact with a mouse (it crawled up onto his foot), he would not feed. Neither of these birds appeared to be banded, although it is difficult to see the leg area due to heavy feathers. Based on the feeding behavior during mousing (per U. S. Fish and Wildlife Service protocol), this pair of birds was apparently not breeding during the 2003 season.

No attempt was made to capture the birds, but it is assumed that neither of these birds is the banded female that had been in residence for many years previous. Brief call surveys were also performed at the Natural Bridge trailhead and the Shake Spring area, in order to ensure that the single female observed in previous years was not still in the vicinity. No response was heard in either of these areas, so it is assumed that the old female owl is no longer in the park, and that a new pair of owls is now in the vicinity of Echo Park. Surveys will be conducted again in 2004, and will probably be expanded to include new areas near Hands Pass and the North Fork of Pinery Canyon.

2004 surveys (R. Olsen) - During surveys in 2004, a pair of owls (presumably the same ones found in 2003) were again located in (or directly adjacent to) the Echo Park PAC. During two mousing sessions (May 19th and June 2nd), only one of the two owls came to take mice (although the second owl was heard giving a brief contact call from another location during both sessions). The mousing results indicate the potential for nesting/reproduction to have occurred, although no nest has been located, due to the topography and inaccessibility of the area. During the first mousing session, the single owl ate 3 mice, but left the mousing area between the 2nd and 3rd mouse. Three more mice were given to the owl, which left the area (fate of the mouse unknown) with each of the last 3 mice. Due to the topography (steep, rocky drainage) we were unable to follow the owl, but could hear it hooting from a location above the drainage. During the second mousing attempt, more people were utilized in order to facilitate location of the (potential) nest area. Again, only a single bird came for the mice, with the second bird giving a brief call from another location. During this session, only the second mouse was eaten, all other mice (six additional) were taken away from the mousing area (fate unknown). Unfortunately, during the second mousing session, the owl did not hoot from the (potential) nest area, so even with additional people scattered around the area, CNM was unable to locate any nest. It seems likely

that the owl was taking the mice to a mate and/or nestlings, but CNM have not confirmed this and likely will not be able to locate a nest due to the topography in the area. The probable nesting location is somewhere near the split of Sarah Deming and Rhyolite Canyons, likely in the rock pinnacles of the north or northwest facing slope.

MSO surveys of the Indian Creek and Wood Canyon PACs on the Coronado National Forest have not been conducted (due to lack of projects in the area) since the PACs were designated around 1990 on the basis of historical data (G. Helbing, pers. comm).

Appendix C

Chiricahua National Monument
Post-fire Monitoring Data Collection

Vegetation type abbreviations:

P = Pine with mixed conifers and hardwoods

O = Mixed oaks

M = Manzanita shrub community

G = Mixed grasses with minor shrub-tree component

Feature	Plot Size	Data Collected	Vegetation Type
overstory	50x20 m	species ID, dbh, live/dead; canopy location, damage	P, O
pole-sized	25x10 m	species ID, dbh, height, live/dead	P, O
brush	50x2 m	species ID, seedling/mature/resprout, live/dead	P, O, M, G
herbs	50-m point intercept	species ID, height, live/dead	P, O, M, G
dead and down	4 50-m line intercept	tons/acre litter, duff, all sizes of woody material; 1, 10, 100, 1000-TLFM classes	P, O
seedling photos	5x10 m 8 photo points	species ID, height, live/dead	P, O
photos	2 photo points		M, G