

United States Department of the Interior

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In Reply Refer To:

AESO/SE

2-21-01-F-170

November 1, 2001

Mr. John McGee, Forest Supervisor
Coronado National Forest
300 West Congress Street, 6A
Tucson, Arizona 85701

Dear Mr. McGee:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) based on our review of the proposed 10-year Allotment Management Plans (AMPs) for the Marijilda, Hawk Hollow, White Streaks, and Shingle Mill livestock grazing allotments located in Graham County, Arizona, and their effects on the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*) (LLNB) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Critical habitat is not designated for this species; therefore none will be affected.

This BO is based on information provided in the August 17, 2000, Forest Service environmental assessment (EA), January 3, 2001, Forest Service biological assessment and evaluation (BAE), the April 18, 2001, Forest Service information letter (with attachments), the May 11, 2001, Forest Service clarification letter, the May 14, 2001, Forest Service electronic transmission letter regarding loach minnow and spikedace, site visits, and other sources of information. A complete administrative record of this consultation is on file at our Phoenix office.

Consultation History

Your original January 3, 2001, biological assessment and evaluation (BAE) and request for formal consultation were received on January 18, 2001. Our letter requesting additional information was dated February 23, 2001. Your letter providing the additional information, dated April 18, 2001, was received on April 19, 2001. The BAE was written before finalization of designated critical habitat for the Mexican spotted owl (*Strix occidentalis lucida*) (MSO) and the threatened loach minnow (*Tiaroga cobitis*) and spikedace (*Meda fulgida*). After discussion between the Service and the Forest Service, an additional letter dated May 11, 2001, was sent to the Service explaining more fully the rationale and information that led to the Forest Service effect determinations that the AMPs would have "no effect" on critical habitat for razorback sucker (*Xyrauchen texanus*), loach minnow, and spikedace. The Forest Service also determined that the AMPs may affect, but were not likely to adversely affect the LLNB and MSO (see the

BAE, electronic communication from the Forest Service, dated May 17, 2001, and two Forest Service clarification letters). The original BAE stated that, if the Service review and analysis did not lead to a concurrence with the Forest Service findings, the Forest Service requested formal consultation. The Service does not concur with the Forest Service effect determination that the AMPs are not likely to adversely affect the LLNB and formal consultation was initiated after the May 11, 2001, letter was received by the Service. The Service does concur with the Forest Service effect determination that the AMPs are not likely to adversely affect the MSO (see Concurrences).

The Marijilda, Hawk Hollow, White Streaks, and Shingle Mill livestock grazing allotments were included in the short-term (three years) effects assessment of the on-going and long-term grazing biological assessment (BA), which was subject to section 7 consultation with the Service (consultation number 2-21-98-F-399). That consultation considered effects of livestock grazing to eighteen federally listed species. The Forest Service received a non-jeopardy biological opinion (BO) from the Service that included terms and conditions and concurrences for federally listed species.

BIOLOGICAL OPINION

I. Description of the Proposed Action and the Action Area

The project is described in greater detail in the Forest Service environmental assessment (EA) dated August 17, 2000; maps and tables are included. Proposed administrative boundary adjustments can be seen by comparing Figures 2a and 2b in the EA; they are also included in the BAE as Attachment A. The Safford Ranger District of the Coronado National Forest measures livestock use in key areas in each pasture and tracks actual forage use. The proposed action states maximum livestock utilization levels can be as high as 50 percent in uplands and 40 percent in riparian areas. These levels, while higher than documented actual forage use, are the levels under consultation in this BO. These levels constitute adverse effects to the LLNB per the August 25, 1998, guidance criteria for determining the effects of issuing term grazing permits on threatened, endangered, or species proposed for listing in Region 3 of the USDA Forest Service. Actual forage use is documented as being much lower than the submitted maximum percentages, and some areas have 15 years of data. Files are available for review in the Safford Ranger District field office (Chuck Duncan, pers. comm. 2001).

The proposed actions are summarized below:

Marijilda Allotment: The plan for this allotment includes:

1. the Forest Service issuance of a 10-year term grazing permit for the allotment,
2. the Forest Service administrative adjustment of the allotment boundary (a paper-change only; does not result in ground fencing) to eliminate steep, upper-elevation areas “not capable” of supporting livestock grazing due to restricted access and lack of forage,

3. a maximum limit of forage use 50 percent in upland areas and 40 percent in riparian areas (even if actual use is lower),
4. the maintenance of existing pastures and range improvements,
5. an additional 0.50 mile of water pipeline and one water trough to improve livestock distribution, and
6. the use of annual operating instructions to aid in Forest Service coordination of future agency burn plans and noxious weed treatments.

The Marijilda allotment will be managed under a Coordinated Resource Management plan (CRM), which includes three additional pastures (State and private) in the rotation to reduce the amount of grazing time and intensities on all pastures. The CRM proposes 49 livestock on pastures with time ranging from seven to nine months (longer in good years, shorter in worse), with a variable season rotation that includes use of all ten pastures (see Attachment B of the BAE for the full details of rotation). Under this schedule, all ten pastures would receive longer periods of rest. After the 1999 to 2000 transition year, some pastures would receive three winter months of use in four years, while others would receive full growing season rest every year. In general, pastures will hold livestock for two or three months and then would rest for about 20 or more months. This proposed action is a reduction in livestock numbers from the previous permit and an additional use of three off-Forest pastures, and is expected to result in reduced livestock time and intensity on all pastures. This allotment is expected to improve in condition with this proposed action. Actual forage use monitoring will continue through the life (10 years) of the permits.

Hawk Hollow Allotment: The plan for this allotment includes:

1. the Forest Service issuance of a 10-year term grazing permit for the allotment,
2. the Forest Service administrative adjustment of the allotment boundary (a paper-change only; does not result in ground fencing) to eliminate steep, upper-elevation areas “not capable” of supporting livestock grazing due to restricted access and lack of forage,
3. the limitation of forage utilization to a maximum of 50 percent in upland areas and 40 percent in riparian areas (excluding the Ash Creek riparian zone, which is fenced), even if actual use is less,
4. the maintenance of existing pasture and range improvements, and
5. the use of annual operating instructions and coordination of livestock grazing with weed eradication efforts.

The Hawk Hollow allotment will have an increase of 3 livestock (from 30 to 33) for fewer months (from seven to five). The recently completed fencing of the riparian zone at Ash Creek excludes livestock from the zone. This allotment is expected to improve in condition under this proposed action due to the three additional pastures; livestock use will rotate over more land and Forest pastures will have longer rest periods. Actual forage use monitoring will continue through the life of the permit.

White Streaks Allotment: The plan for this allotment includes:

1. the Forest Service issuance of a 10-year term grazing permit for the allotment,
2. the Forest Service administrative adjustment of the allotment boundary (a paper-change only; does not result in ground fencing) to eliminate steep, upper-elevation areas “not capable” of supporting livestock grazing due to restricted access and lack of forage,
3. the limitation of forage utilization to a maximum of 50 percent in upland areas and 40 percent in riparian areas (excluding the riparian zone, which is fenced), even if actual use is less,
4. the maintenance of existing pastures and grazing systems (two pastures, grazed by 38 livestock for six months from November 1 to April 30, annually), and
5. the maintenance of existing range improvements.

The White Streaks allotment will have a 45% reduction in livestock from the previous permit with this proposed action. Agave on this allotment and in nearby State and private lands are comparable; densities have been estimated by ocular and transect methods that yielded a range in plants from 26 to 52 agave per acre. This allotment is expected to improve in condition due to reduced livestock numbers under this proposed action. Actual forage use monitoring will continue through the life of the permit.

Shingle Mill Allotment: The plan for this allotment includes:

1. the Forest Service issuance of a 10-year term grazing permit for the allotment,
2. the Forest Service administrative adjustment of the allotment boundary (a paper-change only; does not result in ground fencing) to eliminate steep, upper-elevation areas “not capable” of supporting livestock grazing due to restricted access and lack of forage,
3. the continuance of permitted numbers plus the addition of one off-Forest permit(120 livestock for six months, November 1 to April 30, annually, plus 25 horses year-long),
4. the limitation of forage utilization to a maximum of 40 percent in upland and riparian areas (excluding the Ash Creek riparian zone, which is fenced), even if actual use is less,
5. the maintenance of existing pastures and range improvements,
6. the construction of 1.5 miles of fence in the Lower Tripp Pasture (to create a new pasture and improve cattle distribution), and
7. the livestock rotation between Upper Tripp and Lower Tripp pastures.

This allotment is maintaining livestock numbers from the previous permit, which includes horses being rotated between pastures unoccupied by livestock. This allotment is expected to improve in condition due to the addition of the Lower Tripp pasture fence. Agave on this allotment and in nearby State and private lands are comparable; densities have been estimated by ocular and transect methods that yielded a range in plants from 26 to 52 agave per acre. Actual forage use monitoring will continue through the life of the permit.

II. Status of the Species/Critical Habitat

Lesser long-nosed bat (LLNB)

The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered on September 30, 1988 (53 FR 38456). Critical habitat has not been designated for this species. The lesser long-nosed bat is a small, leaf-nosed bat. It has a long muzzle and a long tongue, and is capable of hover flight. These features are adaptations to feed on nectar from the flowers of columnar cactus such as saguaro (*Cereus giganteus*) and organ pipe cactus (*Cereus thurberi*), and from paniculate agaves (Palmer's agave, *Agave palmeri*, and Parry's agave, *A. parryi* (Hoffmeister 1986), *A. desertii* (Engelman 1875), and *A. schotti* (Engelman 1875). Characteristics of chiropterophily, such as nocturnal pollen dehiscence and nectar production, light colored and erect flowers, strong floral order, and high levels of pollen protein with relatively low levels of nectar sugar concentrations (Slauson 1996), are exhibited by these agaves and most strongly by Parry's agave (Gentry 1982).

The lesser long-nosed bat is migratory and found throughout its historic range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. It has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County), southeast to the Chiricahua Mountains (Cochise County), and south to the international boundary. Roosts in Arizona are occupied from late April to September (Cockrum and Petryszyn 1991); the bat has only rarely been recorded outside of this time period in Arizona (Fleming 1995, Hoffmeister 1986). In spring, adult females, most of which are pregnant, arrive in Arizona gathering into maternity colonies. These roosts are typically at low elevations near concentrations of flowering columnar cacti. After the young are weaned these colonies disband in July and August; some females and young move to higher elevations, primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Adult males typically occupy separate roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains and recently the Galiuro Mountains (USFWS 2001b) but also occur with adult females and young of the year at maternity sites (Fleming 1995). Throughout the night between foraging bouts both sexes will rest in temporary night roosts (Hoffmeister 1986).

The primary food source for the lesser long-nosed bat in southeastern Arizona from mid-summer through fall is Palmer's agave, which typically occurs on rocky slopes or hill tops, scattered within the desert grassland and oak woodland communities within the elevation range of 3,000 to 6,000 feet (Gentry 1982). Parry's agave reaches higher elevations than Palmer's, extending from grasslands into oak woodland, chaparral, pine/oak forests, and mixed conifer with an elevation range of about 4,900 to 8,200 feet (Gentry 1982). Like Palmers' agave, Parry's is typically found on rocky slopes (Gentry 1982). Concentrations of paniculate agaves are generally found on the rocky, shallow soils of hills and ridges. Palmer's and Parry's agaves are also found scattered in areas of deep, heavy soils within grasslands or where there may be thick stands of shrubs, mesquite, oak, and other trees.

The importance of Parry's agave, as well as desert agave and amole, as a forage resource for *Leptonycteris* bats is unknown. As discussed, Parry's agave generally occurs at higher elevation than Palmer's agave, and occurs in forest openings. Benson and Darrow (1982) note that Parry's agave typically flowers in June and early July, which is before the lesser long-nosed bat arrives at roosts in southeastern Arizona. However, Service personnel (USFWS 2001b) noted many Parry's agave in flower high in the Huachuca Mountains on the crest trail during late July in 1997. It may be that agaves at high elevation bloom later than at lower sites, and could potentially be blooming and be used as a forage resource when lesser long-nosed bats arrive in July or early August. In addition, Parry's agave may be very important as a forage plant for those bats which arrive in southeastern Arizona during late spring and early summer.

As indicated above, the lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. These bats often forage in flocks. Nectar of these cacti and agaves are high energy foods. Concentrations of some food resources appear to be patchily distributed on the landscape and the nectar of each plant species utilized is only seasonally available. Cacti flowers and fruit are available during the spring and early summer; blooming agaves are available primarily from July through October. Columnar cacti occur in lower elevation areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desert scrub areas, desert grasslands and shrublands, and into the oak woodland (Gentry 1982). In the Huachuca Mountains, Parry's agave is generally found at higher elevations than Palmer's agave; the former is common in forest openings to the crest of the Huachuca Mountains.

Ober et al (2000) studied foraging ecology of the LLNB on Fort Huachuca, Arizona, and found the high energy demands of the bat, coupled with the small amount of nectar per flower, forces bats to visit many flowers each night. The daily energy use may be as high as one and one-half to two times higher than previously reported. The amount of food needed to support the southeastern LLNB population may be much higher than previously thought. Maintaining sufficient numbers of food sources is very important to the bat population. Ober et al. (2000) estimated that one *A. palmeri* produces enough nectar to support 1.5 bats throughout the time they are in southeastern Arizona. They found evidence that bats select areas with both high resource abundance and evidence of high resource abundance in previous years, suggesting site fidelity may play a role in the bat's foraging behavior. A reduction in, or a fragmentation of, *A. palmeri* populations could have serious effects on bat behavior, forcing them to fly farther, expend more energy, roost in substandard sites, or compete with each other for food at remaining plants. These negative effects would be somewhat masked in good years, but be more substantial in years of low flower production.

Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the lesser long-nosed bat (Fleming 1995). Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified. Whatever the factors are

that determine selection of roost locations, the species appears to be sensitive to human disturbance. Instances are known where a single brief visit to an occupied roost is sufficient to cause a high proportion of lesser long-nosed bats to temporarily abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days. However, this sensitivity suggests that the presence of alternate roost sites may be critical when disturbance occurs. Interspecific interactions with other bat species may also influence lesser long-nosed bat roost requirements (USFWS 1997).

Known major roost sites include 16 large roosts in Arizona and Mexico (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. According to the same surveys, the maternity roosts are occupied by over 150,000 lesser long-nosed bats and of these, just over 100,000 are found at just one natural cave at Pinacate National Park, Sonora, Mexico (Cockrum and Petryszyn 1991). The numbers above indicate that although a relatively large number of these bats are known to exist, the relative number of known large roosts is quite small. Disturbance of these roosts, or removal of the food plants associated with them could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species. These bats are particularly vulnerable due to many individuals using only a small number of communal roosts.

Potential threats to the lesser long-nosed bat are excess harvesting of agaves in Mexico, the collection of cacti in the United States, and the conversion of LLNB foraging habitat for agricultural uses. Livestock grazing, wood-cutting, and other human development activities may contribute to the decline of long-nosed bat populations. Widmer is studying the effects of livestock grazing on *A. palmeri*. Her preliminary results (2000) were: 1) overall herbivory on agave stalks was 56 percent, 2) one-third of emerging inflorescences were grazed at 70 percent of the sites, 3) herbivory on agave stalks was 29 percent greater at sites grazed by livestock during the agave bolting season. Other livestock grazing effects can be soil compaction, trampling of young agave, watershed changes, reduction of grasses (and reduction of fire), and erosion potential. Study of these and other livestock grazing effects would aid in more fully determining effects of livestock grazing to the species.

III. 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.

These four allotments are located in the Basin and Range Geographic Province of southern Arizona. This province supports a wide variety of biotic communities due to the extreme

changes in elevation over relatively short distances. The allotments encompass the majority of the north flank of the Pinaleno Mountains. Area vegetation is representative of Rocky Mountain Montane Conifer Forest, Madrean Evergreen Oak Woodland, Semidesert Grassland, and Interior Deciduous Riparian Woodland Biotic Communities (Brown 1982). These biotic communities are equivalent to conifer forest, evergreen broadleaf woodland, desert grassland, and deciduous riparian vegetation types (respectively) as defined in the 1986 Coronado National Forest Land Management Plan.

Note that range condition ratings are not comparable to watershed condition ratings. It is possible to have variance in both categories; poor or low to moderate, to good or excellent or high; trends may be upward or downward. Generally, “good” range conditions will also indicate “good” watershed conditions, although there can be exceptions. Watershed conditions could rate as good, but range conditions could rate as low or poor. An example would be if there were a healthy stand of Lehmann lovegrass as the grassland vegetation. The grass holds soils and water and is good from a watershed standpoint, but it is not very palatable to livestock and cattle seem to eat it only when stems are young and green, so it could be rated low from a range standpoint. Unless specified otherwise, ratings referred to in the BAE and BO refer to range conditions.

The Marijilda allotment currently contains 12,470 acres; 4,127 are classified as capable for grazing. The vegetation types found on the allotment are Southwestern desert grassland (30 percent), broadleaf evergreen woodland (27 percent), transitional coniferous forest (17 percent), and deciduous riparian woodland (three percent). Regarding grazing capacity, about 26 percent of the allotment is classified as moderately high with a static trend, three percent moderately high to upward, and 71 percent moderately low to upward. Most of the acres rated as moderately low to upward are desert grassland vegetation at lower elevations supporting woody shrubs.

Marijilda Creek rated as functional at risk due to moderate to heavy human recreational use; livestock use is documented as minimal in the riparian habitat in this allotment. The riparian area in this allotment is unfenced, but livestock use is minimal to non-existent due to the extremely steep and rugged terrain and lack of livestock access into the canyon areas. This is the area hikers had to be rescued out of several years ago because they could not climb out of the canyon (T. Gamberg, Chuck Duncan, pers. comm. 2001). Forest Service personnel inspected the Marijilda allotment and creek in June of 2001; very little livestock sign was seen and that was on the ridgetops of the allotment (J. McDonald pers. comm. 2001).

The Hawk Hollow allotment currently contains 3,970 acres; 1,265 are classified as capable for grazing. The vegetation types found on the allotment are Southwestern desert grassland (63 percent), broadleaf woodland, (27 percent), deciduous riparian (five percent), and transitional coniferous forest (three percent). Approximately 97 percent are classified as moderately low to upward, while three percent are moderately high to upward. The moderately low acres are in broadleaf woodland and desertscrub on slopes less than 15 percent. The low range rating is due to woody shrubs in the grassland community. The upward trend is the result of grassland improvements made by management actions taken during the past 20 years, including livestock number reductions and the completed fence along Ash Creek (where it crosses the allotment) and excludes livestock from the creek.

The White Streaks allotment contains 5,190 acres; 1,686 acres are classified as capable for grazing. The vegetation types found on the allotment are mainly desert grassland (48 percent), broadleaf evergreen woodland (25 percent), mixed coniferous forest (14 percent), transitional coniferous forest, and deciduous riparian area (one percent). Most of the allotment (77 percent) is in moderately low condition with a static trend in desert grassland and broadleaf woodland areas. Areas of desert grassland near the Forest boundary (amounting to 12 percent) are in low condition with an upward trend due to woody shrubs replacing grass areas. Management efforts continue to promote range improvement with livestock number reductions and riparian zone exclusion of livestock. The riparian habitat along Ash Creek above the dam is in proper functioning condition and continues to be excluded from livestock grazing. Below the dam, lack of water limits developing riparian vegetation from developing.

The Shingle Mill allotment contains 34,050 acres; 14,732 acres are classified as capable for grazing. The vegetation types found on the allotment are mainly desert grassland (48 percent), broadleaf woodland (25 percent), mixed coniferous forest (14 percent) deciduous riparian and transitional coniferous forest (one percent). Approximately 38 percent are classified as moderately high to upward, 57 percent are classified as moderately low to upward, and five percent are low to upward. Most of the moderately high acres are broadleaf woodland and the moderately low acres are desert grassland. Areas rated as low are desert grassland along the National Forest boundary and is considered low due to woody shrubs in the grassland community. Riparian condition is in good condition (due to lack of livestock access).

Long-term, historic livestock grazing in all four allotments was heavy, with many areas in poor condition in the 1970's. Changes in, and enforcement of, management permit requirements have slowly improved range conditions in these allotments. Livestock reduction and range management from the perspective that "dry is normal; wet is exceptional" is anticipated to aid in improving range conditions, and ultimately, improving watershed conditions.

One juvenile LLNB was netted in the Pinalenos during surveys conducted in 1986. Several LLNBs have been documented from the Galiuro Mountains (at the Muleshoe Headquarters and in Redfield Canyon), and at least three roost sites are known in the Galiuro Mountains (AGFD 2001). These roosts and bat locations are within 40 miles of the four grazing allotments.

The Forest Service is not conducting LLNB or roost site surveys in the Pinaleno Mountains, and the Service is unaware of any other groups or agencies that may be studying the LLNB in this area. The Forest Service data for agave on these allotments indicates columnar cacti and various agave species are scattered across Federal, State and private lands in this area and nearby at densities from about 25 to 50 per acre (low end estimates) and higher in other lands farther away in southern Arizona. These four allotments occur on the northernmost edge of the LLNB range (M. Coffeen, pers. comm. 2001).

Livestock grazing occurs on nearby allotments on Federal, state and private lands. Other actions on Federal and State lands nearby are mainly recreational (hiking, hunting, and off-highway vehicle riding). Actions on private lands within 40 miles of these allotments include housing and commercial development, agriculture (primarily cotton), and recreation uses.

IV. Effects of the Action

The Forest Service will not disturb any known bat roost sites. The Service is unaware of any LLNB roosts located specifically in the Pinaleno Mountains but unknown roosts may exist. The Forest Service notes typical large sites for LLNB roost sites (caves and mines) are lacking on these four allotments, although potential LLNB habitat potentially exists elsewhere in the Pinaleno Mountain range. LLNB roosts are known to exist in the Galiuro mountains, which is within 40 miles of the project area.

Indirect effects from livestock grazing to LLNB may be direct herbivory on agave stalks early in their bolting season, trampling of small agave, changes in the vegetation communities, degraded watershed conditions, changes in the natural fire regime, and range improvement projects. Adverse effects and their intensity to LLNB that could result from the reduction in forage sources (agaves) depends on the bat's need for forage plants in a specific area in order to reproduce, survive, and grow.

Rotation scheduling and AMP enforcement of current rules and guidelines is expected to reduce the adversity and intensity of these impacts to soils and watershed. Most pastures will contain livestock for two or three months, then receive more months (up to 20 in some cases) of rest. Livestock grazing in these allotments under the proposed action (10 years) is considered long-term. Forest Service monitoring of actual forage use will continue to be gathered and documented by the Safford Ranger District (C. Duncan pers. comm. 2001).

Livestock grazing will occur on allotments supporting agaves during the agave bolting season (April 15 through September 15, annually). About 15,475 acres on these four allotments are likely to support agave (grasslands and oak woodlands).

In 1998, the Holechek et al. literature review showed livestock grazing in southwestern habitats could be sustainable, but only at certain levels of utilization. Those levels occur when livestock forage use maintains enough dry fuels (grasses, seedheads, previous year's dead and dry growth, etc.), on the ground to protect soil, forage plant vigor, wildlife habitat, and support a natural fire regime. Livestock utilization levels recommended by Holechek et al. (1998) for semiarid grasslands range from 25 percent to a maximum of 40 percent in the "best", most easily managed areas (e.g., flats). The proposed action allows 50 percent utilization of forage in the upland areas and 40 percent in riparian areas.

Grazing utilization levels greater than 40 percent are considered damaging to the ecosystem (Holechek et al. 1998). As utilization levels or stocking levels increase, effects to the vegetation

community and agaves also increase. No information is available on the relationship of grazing management systems and utilization levels to the associated effects on agaves. Beginning in 2000, the Forest Service initiated a five-year study on agave ecology and their relationship to livestock management. That report is anticipated to be made available after the 2005 field season. The effects of livestock use today on seedling agaves will not affect the LLNB for 20 years or more, when those plants will finally reach maturity and bolt.

An important point in livestock management in the southwest is the frequency of dry years and drought conditions. Overgrazing occurs under these conditions when stocking levels cannot be quickly reduced to match the limited forage production. Periodic overgrazing can damage range resources and have long-term negative effects. The Forest Service does have a drought management policy; the decision of how to manage under drought conditions is left to the District Ranger in cooperation with the range specialist and the permittee.

One pipeline and accompanying water trough are proposed to be constructed in the Marijilda allotment and are covered here; all other range improvements not discussed here will require evaluation for section 7 consultation at the appropriate time. The water trough and pipeline will be situated on the allotment to minimize impacts of installation, livestock use, and maintenance to agaves in the area.

The effect of livestock today through herbivory on bolting agaves can result in immediate reductions of forage resources available to LLNB; however, anticipated shifts in the abundance and availability of agave on these four allotments are expected to have limited adverse effects due to the relative low density of plants on the landscape, the reduced livestock numbers and the frequent rotation schedule on these allotments, a wide range of agave across the landscape surrounding the Pinaleno Mountains, the allotments occurring at the far northern edge of the LLNB range, and the lack of known LLNB roost sites in the Pinaleno Mountains.

V. 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.

Because these four allotments are Federal lands, future actions and effects are not anticipated to involve State, Tribal, private or local entities. Private lands included in the AMPs and the CRM of the Marijilda allotment may be sold, but permits to graze are not for sale. Should any private lands undergo changes in ownership or use, those changes are evaluated by the Forest Service at that time. The Service is unaware of any pending changes for the involved private lands for the foreseeable future.

VI. Conclusion

After reviewing the current status of the LLNB, 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 implementation of the AMPs for these four allotments, as proposed, is not likely to jeopardize the continued existence of the LLNB. Critical habitat has not been designated for this species; therefore, none will be affected.

This conclusion is based on the record of this consultation, including the BAE, the project description, site visits, and the following information:

1. Anticipated shifts in the abundance and availability of agave on these four allotments are expected to have limited adverse effects due to the relatively low density of plants on the landscape,
2. Implementation of the AMP will result in reduced livestock numbers and a frequent rotation schedule on these allotments,
3. There is a wide range of agave across the landscape surrounding the Pinaleno Mountains,
4. The allotments occur at the far northern edge of the LLNB range, and
5. There are no known LLNB roost sites in the Pinaleno Mountains.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take Anticipated

The Service notes actual incidental take of LLNB will be difficult to detect because this is a wide-ranging species with a small body size, losses may be masked by seasonal fluctuations in bat numbers or other causes, and the species occurs in habitat (caves, mines, and unknown rock crevices) that makes detection difficult. Take of LLNB in the form of harm can be anticipated by the loss of agave blossoms during the early agave bolting season (April 1 through May 15, annually) scattered over about 15,475 acres of allotment lands that likely support agave (at densities between 25 to 50 agave per acre). The number of acres was arrived at by multiplying the amounts of capable range (per allotment) by the percent of lands likely to support agave (a combination of the percent of desert grasslands and broad leaved woodland), and combining the allotment acres for a total number.

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

REASONABLE AND PRUDENT MEASURES

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

1. The Forest Service shall minimize livestock access in agave-supporting allotments early in the agave bolting period (April 1 through May 15, annually), when low-growing, fresh bolts are most accessible and palatable to livestock.
2. The Forest Service shall plan their range improvements so as to minimize disturbance to agaves on allotments.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service 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. In order to implement reasonable and prudent measure # 1, in pastures that support agave, the Forest Service will, when possible, move livestock out of these pastures early.
2. In order to implement reasonable and prudent measure # 2, the Forest Service will ensure that the proposed range project construction is implemented so that no more than one percent of agaves (*Agave palmeri* and *A. perryi*) or saguaros within 0.5 mile of the project are affected.

Disposition of dead or injured species

Upon locating a dead or injured threatened or endangered species, initial notification must be made to the Service's Division of Law Enforcement, 26 North McDonald, #105, Mesa, Arizona, 85201, at (480) 835-8289 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, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animals shall be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information above shall be obtained and the carcass left in place. Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of 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. The Forest Service should arrange a comprehensive LLNB survey for the Pinaleno, Galiuro, and Santa Theresa Mountains; all three mountain ranges are within 40 miles of the Pinalenos and data could provide important LLNB roost site information.

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 formal consultation on the proposed actions 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

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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. Should you have any questions, please contact Thetis Gamberg (520) 670-4619 or Sherry Barrett (520) 670-4617.

Thank you for your assistance throughout this consultation process.

Sincerely,

/s/ David L. Harlow
Field Supervisor

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

Terry Johnson, Nongame Branch, Arizona Game and Fish Department, Phoenix, AZ

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CONCURRENCE

MSO

The Mexican spotted owl (*Strix occidentalis lucida*) (MSO) was listed as threatened on March 16, 1993 (USFWS 1993). Critical habitat was designated for the species on June 6, 1995 (USFWS 1995b), but was withdrawn in a Federal Register notice (USFWS 1998). Critical habitat designation for MSO was later court-ordered and the final critical habitat designation was published February 1, 2001 (USFWS 2001a). Critical habitat was not designated on the Coronado National Forest; therefore, none will be affected..

The current known range of the MSO 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, occupying a fragmented distribution throughout its United States range corresponding to the availability of forested mountains and canyons, and sometimes, rocky canyon lands.

MSO 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 contains mature or old-growth stands which are uneven-aged, multistoried, and have high canopy closure (Ganey and Balda 1989, USFWS 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 are in Douglas-fir trees (*Pseudotsuga menziesii*) (Fletcher and Hollis 1994, Seamans and Gutierrez 1995). A wider variety of tree species is used for roosting; however, Douglas-fir is the most commonly used species (Ganey 1988, Fletcher and Hollis 1994). Foraging owls use a wider variety of forest conditions than for nesting or roosting. In northern Arizona, owls generally foraged slightly more than expected in unlogged forests, and less so in selectively logged forests (Ganey and Balda 1994). In southern Arizona, MSO have been observed nesting on rocky ledges, in large tree cavities, even in holes in large cliff faces (T. Newman, pers. comm. 2001). Patterns of habitat use varied between study areas and individual birds, making generalizations difficult.

MSO 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). Habitats of the owl's common prey emphasize that each prey species uses a unique microhabitat. Deer mice (*Peromyscus maniculatus*) are ubiquitous in distribution in comparison to brush mice (*P. boyleyi*) which are restricted to drier, rockier substrates. 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 (*Microtus 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 effects of livestock and wild ungulate grazing on the habitat of MSO prey species is complex. Impacts vary according to grazing species, degree of use (including numbers of grazers), grazing intensity, frequency, and timing of grazing, habitat type and structure, and plant and prey species composition. Repeated, excessive grazing of plant communities by livestock can significantly alter plant species density, composition, vigor, regeneration, above or below ground phytomass, soil properties, nutrient flow, and water quality, which can ultimately lead to desertification when uncontrolled (USFWS 1995a).

Prey availability is determined by the distribution, abundance, and diversity of prey and by the owl's ability to capture it. Diet studies conducted on MSO show prey species include woodrats, white-footed mice (*Peromyscus* spp.), voles (*Microtus* and *Clethrionomys* spp.), rabbits and hares (*Sylvilagus* and *Lepus* spp.), pocket gophers (*Thomomys* spp.), other mammals, and additional instances of a variety of bats, birds, insects, and reptiles.

Specific studies that document the effects of livestock and wildlife (e.g., elk, deer) grazing on MSO habitat have not been conducted. Grazing can alter a plant community through direct alteration such as plant removal by consumption or trampling, and indirectly through the loss of seed source or through damaging the soil. Moderate to heavy grazing can reduce plant diversity, cover, biomass, vigor and regeneration ability (USFWS 1995a). Livestock activity can also increase duff layers, accelerate decomposition of woody material, produce compacted soils, and damage stream banks and channels. These changes to the biotic and physical landscapes also affect plant community composition, structure, and vigor. If these changes occur in or near areas used by MSO, grazing can influence the owl (USFWS 1995a).

Both cattle and wild ungulates affect riparian and meadow environments. These effects have both direct and indirect adverse impacts on animal species that are dependent on plants for food and cover. Within semiarid rangelands, studies indicate that cattle favor riparian areas over upland areas. Riparian areas may provide an important source of food, especially in drier seasons (Trimble and Mendel 1995). However, moderate to light grazing can benefit some plant and animal species under certain conditions and in certain environments, maintain communities in certain seral stages, and may increase primary productivity (Ward and Block 1995).

Livestock can affect small mammals directly by trampling burrows and compacting soil or competing for food, or indirectly by altering the structure or species composition of the vegetation in a way that influences habitat selection by small mammals. Vegetation cover is often greatly reduced on grazed compared with ungrazed areas, and vegetation typically appears more dense in ungrazed areas (Hayward et al. 1997). Bock and Bock (1994) reported that small mammal species that prefer habitats with substantial ground cover were more abundant on an ungrazed site, where species that prefer open habitats were more abundant on a grazed site in southern Arizona.

Male owls must provide enough food to their female mates during incubation and brooding to prevent abandonment of nests or young; accordingly, ecologists suspect that spotted owls select

habitats partially because of the availability of prey (Ward and Block 1995). Ward and Block (1995) state that conditions that increase winter food resources will likely improve conditions for the owl because this will increase the likelihood of egg laying and decrease the rate of nest abandonment. Thus, food availability in the winter as well as in the summer is important for owl reproduction.

Some knowledge exists regarding the effects that livestock grazing can have on small mammals frequently consumed by spotted owls, and regarding mesic or montane plant communities inhabited by the owl's prey. Based on studies conducted in other areas of the United States, Ward and Block (1995) indicate that under heavy grazing, decreases in populations of voles would be expected, and this would improve conditions for deer mice in meadow habitat. Deer mice are associated with areas containing little herbaceous cover and extensive exposed soil. Long-tailed and Mexican voles use sites with less exposed ground and greater herbaceous cover. Increases in deer mouse abundance in meadows would not offset decreases in vole numbers because voles provide greater biomass per individual and per unit of area (Ward and Block 1995).

The abundance of small mammals in grazed versus ungrazed areas has also been documented. Hayward et al. (1997) found that total abundance of small mammals differed significantly between grazed and ungrazed plots, with the mean abundance of small mammals per census about 50 percent higher on plots from which livestock were excluded. The abundance of small mammals in the diet of spotted owls has been related to reproduction. Ward and Block (1995) suggested that a single prey species did not influence the owl's reproductive success, but by many species in combination. None of the specific prey groups significantly influenced owl reproductive success, but, they concluded it was more likely that total prey biomass consumed in a given year influenced the owl's reproductive success, rather than a single prey species. More young were produced when moderate to high amounts of the three most common prey groups (woodrats, peromyscid mice, and voles) were consumed. Abundance and biomass of individual prey as well as prey species diversity is important for owl reproduction. If adequate prey exists for owls in a PAC it will likely increase the probability of reproductive success and decrease energy depletion by allowing successful foraging to occur closer to the nest site. Both in the summer and winter, meadows provide the greatest biomass for MSO prey (Ward and Block 1995).

The 1995 MSO Recovery Plan provides explicit goals for managing grazing in protected and restricted habitat. One such goal is monitoring use by livestock and wildlife in "key grazing areas". These areas are primarily riparian areas, meadows, and oak types. Other goals include maintaining good to excellent range conditions in key areas while accommodating the needs of the owl and its prey; implementing and enforcing grazing utilization standards that would attain good to excellent range condition within the key grazing area; establishing maximum allowable use levels that are conservative and that will speed attaining and maintaining good to excellent range condition; ensuring that the allowable use of plant species will maintain plant diversity, density, vigor, and regeneration over time; restore adequate levels of residual plant cover, fruits, seeds, and regeneration to provide for the needs of prey species; and restoring good conditions to degraded riparian communities.

Three levels of habitat protection are provided for the MSO in the Coronado National Forest Land Management Plan: 1) protected, 2) restricted, and 3) other forest and woodland types.

Protected habitat includes 600 acres around nest/roost sites (Protected Activity Center or PAC), legally reserved lands, and mixed conifer and pine/oak habitat on steep slopes (greater than 40 percent that have not been logged in the last 20 years). Restricted habitat includes mixed conifer and pine/oak habitat on shallower slopes as well as riparian habitat. Other forest and woodland types are not to be managed specifically for MSO although they may represent occasionally used foraging habitat.

About 5,600 acres of MSO protected habitat (PAC) are within the original allotment boundaries. With the proposed administrative boundary change, that is reduced to about 850 acres. About 15,280 acres of MSO restricted habitat are within the original allotment boundaries. With the proposed administrative boundary change, that is reduced to about 3,100 acres. Livestock access has historically been very limited in these acres due to topography, and the total protected and restricted acres (3,950 acres) still within the allotment boundaries are in, and surrounded by, non-capable range. Livestock grazing effects in non-capable range are much less than effects in capable range because the forage that draws livestock is not present.

Range conditions of these four allotments do not yet rate as good or excellent condition, but do show an upward trend in improvement. Range conditions are expected to continue to improve, although slowly, toward more positive range conditions, and ultimately, to more positive watershed conditions. In general, better the range conditions, the better the habitat for MSO prey species, and ultimately, the better for the MSO. On these allotments, livestock are excluded from the riparian zones and no meadows exist on these allotments where MSO might concentrate their hunting. The Service assumes that MSO may forage at the edges of their PACs located where the trees fringe out into the flatter grazing uplands of the allotments. The steepness of these slopes will very likely protect prey species cover in these acres, and livestock use has been found to be barely discernable.

Livestock are excluded from the riparian areas by fencing, the AMPs are reducing the total livestock numbers, a rest/rotation method of pasture use is enforced, and MSO foraging areas (and prey species) are not affected to any significant degree by livestock grazing due to the steep slopes and lack of forage.

Based on the BAE, the EA, letters, and the above specific information, the Service concurs that the proposed AMPs, as described, are not likely to adversely affect the MSO.