

BIOLOGICAL OPINION SUMMARY
Mud-Tinny and Tinny Springs Grazing Allotments

Date of opinion: April 22, 1999

Action agency: U.S. Forest Service, Coconino National Forest, Mormon Lake Ranger District

Project: Mud-Tinny and Tinny Springs Grazing Allotments

Location: Coconino County

Listed species affected: Mexican spotted owl (*Strix occidentalis lucida*), bald eagle (*Haliaeetus leucocephalus*), and American peregrine falcon (*Falco peregrinus anatum*).

Biological Opinion: Non-jeopardy for the Mexican spotted owl. Concurrence with “may effect, not likely to adversely affect” for the bald eagle and peregrine falcon.

Incidental take statement:

Level of take anticipated: The Service anticipates incidental take will occur to three pairs of Mexican spotted owls and their young associated with the Weimer Springs PAC (040532), the Red Raspberry PAC (040503), and the Mint Springs PAC (040523) prior to implementation of reasonable and prudent measures. This incidental take is in the form of harm by the reduction in suitability of the habitat for prey species, thus effecting the ability of these owls to successfully reproduce. Exceeding this level may require reinitiation of formal consultation.

Reasonable and prudent measures: Two measures are provided. These include implementation and enforcement of grazing restrictions at springs and associated meadows in PACs within two pastures, and monitoring of grazing use within key grazing areas in two pastures. Implementation of these measures through the terms and conditions is mandatory.

Terms and conditions: Terms and conditions implement reasonable and prudent measures and are mandatory requirements. Eleven terms and conditions are provided. These include modifying and installing fences at Weimer and Mud Springs, implementing specific utilization levels in two pastures, completing specific monitoring each year, and reporting results yearly to the Service.

Conservation recommendations: Ten conservation recommendations are provided. Implementation of conservation recommendations is discretionary.

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AESO/SE
2-21-96-F-059

April 22, 1999

Mr. Bruce Greco
District Ranger
Mormon Lake Ranger District
4373 Lake Mary Rd.
Flagstaff, Arizona 86001

Dear Mr. Greco:

This document transmits the Fish and Wildlife Service's biological opinion based on our review of the proposed Mud-Tinny and Tinny Springs Grazing Allotments located in Coconino County, and its effects on the Mexican spotted owl (*Strix occidentalis lucida*) (MSO) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your July 22, 1998, request for formal consultation was received on July 27, 1998.

The Forest Service has determined that the Mud-Tinny and Tinny Springs Grazing Allotments "may affect, and are likely to adversely affect" the MSO. In addition, the Forest Service has determined that these allotments "may affect, but are not likely to adversely affect" the bald eagle and the American peregrine falcon, for which the Service provides concurrences for these species below.

This biological opinion is based on information provided in the Allotment Summaries for the MSO (June 25, 1998 and July 22, 1998), numerous conversations with Heather Green (Mormon Lake wildlife biologist) and Mike Hannemann and Buck Wickham (Flagstaff Center range conservationists), field visits conducted on September 21, 1998, and October 15, 1998, additional information presented on proposed monitoring (letter dated February 23, 1999), additional information presented on past monitoring (letter dated March 5, 1999), and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, livestock grazing and its effects to the MSO, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

It is the Service's biological opinion that implementation of the proposed Mud-Tinny and Tinny Springs Grazing Allotments are not likely to jeopardize the continued existence of the Mexican spotted owl.

CONCURRENCES

BALD EAGLE

There are no known bald eagle nests in either the Mud-Tinny or Tinny Springs Allotments. Eagles winter in the area, arriving around October and staying into April but some may linger throughout the year. Winter surveys are conducted annually for this species and counts appear to vary according to prey availability within lows of around five to highs of around 68 in recent years for the area including Mormon Lake and Upper/Lower Lake Mary. Up to 120 eagles were sighted at Mormon Lake in February 1995, presumably capitalizing on a fathead minnow winter die off.

According to the Forest Service, the Mud-Tinny Allotment contains six known winter roosts, two characteristic winter roosts (sites which display appropriate characteristics but where roosting has not been documented), and probably a number of unknown roosts. Known roosts are associated with Mormon Lake and Mormon Mountain. Yellow pines and snags are used for perching and day roosts throughout this allotment, particularly adjacent to Mormon Lake. Foraging may occur year round but is concentrated around Mormon Lake during ice free portions of the winter when eagles feed on waterfowl or fish. Eagles may feed on carrion throughout the allotment.

Because of its proximity to relatively permanent waters, the Tinny Springs Allotment provides foraging opportunities, perches and roosts for bald eagles that winter in the area between October and April. This Allotment contains two known winter roosts as well as various potential winter roosts. On two consecutive days in late January 1996, over 40 eagles were counted leaving one of the roosts in this allotment. Eagle perches are found throughout the allotment.

Eagle roosting could be affected if cattle concentrations, improvement construction or other grazing associated activities occur within an area so as to disturb winter roosting behavior. Roosting and feeding activities could be directly affected if riparian grazing occurs such that recruitment of large trees is retarded or riparian areas are impacted to the extent that fish populations are negatively affected.

Few activities associated with cattle grazing occur when the bald eagles are present. Riparian areas exist as relatively small springs on the Allotments, but do not contain much potential for the large deciduous trees typically used as nesting habitat. Cattle grazing does not affect existing roosts or perches or recruitment of these trees. The only riparian where cattle could affect recruitment of large deciduous riparian trees is Mormon Lake. Cattle grazing for 10 days within this riparian area every fall (in Mud-Tinny) may impact the recruitment of these trees, but the short graze period and the size of the pasture will minimize the overall utilization of these trees.

Utilization monitoring will occur to insure that cattle do not utilize more than 20% of trees. Upland grazing would increase sedimentation levels to some extent but would not be likely to decimate the introduced fish populations in Mormon Lake. The overlap time between eagles and cows is only in the month of October and this is when eagle abundance is still relatively low.

The Service concurs with the Forest Service's determination that the Mud-Tinny and Tinny Springs Allotments "may effect, but are not likely to adversely affect" the bald eagle.

PEREGRINE FALCON

The Mud-Tinny and Tinny Springs Allotments do not contain any known peregrine eyries. The north slope of Mormon Mountain located in the Mud-Tinny Allotment may contain potential nesting habitat. This location is inaccessible to cattle due to topography. Both allotments are used by foraging falcons likely from the Walnut Canyon and Mount Elden eyries which are between nine and twelve miles north of the Mud-Tinny Allotment, and between 18 and 24 miles north of the Tinny Springs Allotment.

Grazing and related action could affect peregrines by impacting key foraging areas (i.e. riparian), habitat loss due to surface disturbing activities, and cattle concentrations or improvement construction too close to eyries. Portions of the watershed (meadows and riparian) are in less than satisfactory condition. Fence construction planned in the Mud-Tinny Allotment is not expected to effect the peregrine falcon.

Mormon Lake and the wetlands associated with Anderson Mesa are expected to provide the main peregrine foraging habitat within and proximate to the two allotments because waterfowl, birds and fish concentrate there. Prey habitat is likely influenced in these areas by fluctuating water levels. Mormon Lake has dried up twice since 1989. Upland grazing could increase sedimentation into Mormon Lake but this is not expected to negatively affect prey habitat. Cattle use of Mormon Lake is for 10 days in the Mud-Tinny Allotment and usually concentrated in meadows surrounding the lake.

In both allotments, prey habitat may be modified as a result of holding/gathering activities, but the effects to falcon prey are expected to be minimal due to duration and scope of the activities in relationship to the falcons foraging area. Some soil disturbance and plant mortality is expected in these pastures but natural revegetation should occur within the holding pastures since gathering occurs over a short time frame. Livestock pressure, combined with elk use, may slow improvement.

The Service concurs with the Forest Service's determination that the Mud-Tinny and Tinny Springs Allotments "may effect, but are not likely to adversely affect" the peregrine falcon.

CONSULTATION HISTORY

On December 4, 1995, the Service concurred with a determination of “may affect, not likely to adversely affect” the MSO and its critical habitat for the Mud and Tinny Springs Allotments. This concurrence was based on building one tank located in a MSO PAC outside of the breeding season, and upon implementation of mitigation to reduce disturbance to MSO during the breeding season when building fence in PACs. Since the last consultation, the Mexican Spotted Owl Recovery Plan has been issued as well as a new Forest Plan Amendment and the Forest Service indicates that they intend to be consistent as much as possible with both of these documents.

The Forest Service requested formal consultation for the Mud-Tinny and Tinny Springs Allotments on July 22, 1998. This request was received by the Service’s Flagstaff Suboffice on July 27, 1998. Since consultation for these two allotments was completed in 1995, some adjustments have been made to rotations and monitoring schemes which is an improvement to prior management. Informal discussions regarding effects determination occurred previous to this date between Heather Green, Mormon Lake wildlife biologist and Michele James of the Service. Field visits were conducted on September 21, 1998, and October 15, 1998. Springs and tanks within MSO protected activity centers (PACs) were visited: Weimer Spring, Mud Spring, and Mint Spring as well as Red Raspberry Tank and the Lockwood Pasture. Further details of the project and consultation were discussed with Heather Green on December 3, December 7, and December 10, 1998, and with Mike Hannemann, range conservationist, on December 3, December 7, and December 14, 1998, and with Buck Wickham, range conservationist on December 7, 1998. A meeting was held on February 23, 1999, between the Service and the Forest Service to discuss proposed terms and conditions. The Forest Service provided information on additional proposed monitoring and a change in proposed utilization levels for the North Mormon Mountain and South Tinny Springs Pastures in a letter to the Service dated February 23, 1999. The Forest Service also provided information on the 1985-1987 inspection and re-reading of range transects on the Tinny Springs Allotment in a letter to the Service dated March 5, 1999. Updated PAC boundaries and acreage figures for the Weimer, Mint and Red Raspberry PACs were provided to the Flagstaff Suboffice on April 6, 1999.

DESCRIPTION OF THE PROPOSED ACTION

This consultation is for continued use of the Mud-Tinny and Tinny Springs Allotments until approximately the year 2002-2003 when additional analysis will occur for the new Allotment Management Plan.

The Mud-Tinny Allotment consists of 75,885 acres southeast of Flagstaff, Arizona, on the Mormon Lake Ranger District of the Coconino National Forest. The Allotment is located within all or portions of T17N, R8E, sections 1-18, 24; T17N, R9E, sections 6-9, 16-21; T18N, R8E, section 1-5, 8-16, 20-28, 22-26; T18N, R9E, sections 4-9, 15-22, 25-36; T18N, R10E, section 30; T19N, R7E, sections 1-4, 9-12, 13-16, 22-26; T19N, R8E, sections 6-8, 11, 14-36; T19N, R9E, sections 31-33.

The Tinny Springs Allotment consists of 12,200 acres southeast of Flagstaff, Arizona, and is located on the Mormon Lake Ranger District of the Coconino National Forest. The Allotment is located within all or portions of T17N, R9E, Sections 1-24, and 28. This allotment partially overlaps with the Mud-Tinny Allotment in T17N R9E, sections 6-9 and 16-21.

The majority of the Mud-Tinny Allotment is composed of ponderosa pine community at an elevation range of 6,900-8,300 feet. Within the ponderosa pine community lies scattered pockets of mountain meadows, ponderosa pine/Gambel oak, mixed conifer, aspen, and riparian community types. Mormon Lake is the only natural wetland. Springs in the Mud-Tinny Allotment which have some riparian vegetation include: Railroad, Sheep, Bristow, Lockwod, Double, Hoxworth, Wallace, Tinny, Mud, Mayflower, Sedge, Iowa Camp, Van Deren, Thomas, Tree, Mint, and Navajo. Hoxworth Spring was excluded from ungulate grazing in the spring of 1998 through the construction of an elk-proof fence.

The Mud-Tinny grazing system is a nine pasture deferred rest rotation system. The current grazing permit information and typical grazing rotations are listed below for this allotment. The Forest Service indicates that these dates may vary from year to year and that this table represents the pattern of pasture use for 1997. Timing and length of grazing may vary from year to year based on a variety of factors (pers. comm. M. Hannemann). For instance, the North Mormon Mountain Pasture may be grazed at any time from August through mid-October, and rested one in four years; the South Tinny Springs Pasture may be grazed from early June through July for two and a half months by the yearlings associated with the Mud-Tinny Allotment, but at any time of the year by the 40 cow/calf associated with the Tinny Springs Allotment (pers. comm. M. Hannemann). A review of the grazing schedules for 1997-1999 indicates that the North Mormon Mountain Pasture, grazed by the Mud-Tinny herd, will not be rested for one year (due to the need for a fence) but has been deferred every other year. The grazing schedules for 1997-1999 for the South Tinny Springs Pasture indicates that this pasture, grazed by the Mud-Tinny herd, is not rested or deferred in any year, and that the every other year the Tinny Springs herd also grazes this pasture.

MUD-TINNY ALLOTMENT

<u>Permitee Name</u>	<u>Permit Type</u>	<u>Season</u>	<u>Permitted No.</u>
Lockett Ranches	Term	6/1 - 10/31	1232 yearlings

<u>Pasture Name</u>	<u>Use Dates</u>	<u>Total Days</u>	<u>Total No.</u>	<u>Tinny Spgs Allot.</u>	
				<u>Days</u>	<u>No.</u>
North Tinny Spgs	6/1 - 6/21	21	1232	54	40
South Tinny Spgs	6/22 - 7/11	21	1232	55	40
Sawmill Spgs	6/22 - 7/11	21	1232	55	40
Brolliar	7/12 - 7/26	15	1232	21	40
Van Deren	7/12 - 7/26	15	1232	21	40
Bar M	7/27 - 8/20	25	~800		

Mud-Tinny and Tinny Springs Allotments

Fulton	7/27 - 8/20	25	~400
S. Mormon Mtn.	8/21 - 9/15	25	1232
Long Park Holding	8/21 - 9/15	25	1232
N. Mormon Mtn.	9/16 - 10/17	30	1232
Mormon Lake	10/18 - 10/28	10	1232
Lockwood holding	mid/late Oct.	up to 10	up to 1232
Pinegrove holding	mid/late Oct.	up to 5	up to 1232
*South Howard Mtn.	Optional use, yearling rest likely	1232	
*North Howard Mtn.	Yearlong rest in Year 1	1232	
*Coulter	Yearlong rest in Year 1	1232	

*Coulter is used as a grazing pasture with North Howard Mountain. In the years when North and South Howard are grazed, up to 30 days of use by full herd would be expected.

Tinny Springs Allotment

Brolliar	21 days	40 head
North Tinny	54	40
South Tinny	55	40

The majority of the Tinny Springs Allotment consists of ponderosa pine at an elevation of approximately 7,000 feet. Within the ponderosa community lie scattered pockets of mountain meadows and riparian community types. Springs on the allotment include Sawmill, Mint, Sedge, Iowa Camp, Tinny, Railroad, Fulton and Van Deren Springs, all of which have some riparian grasses and sedges.

The Tinny Springs Allotment grazing system is a three-pasture deferred rest-rotation. The current term grazing permit information and typical grazing rotation is listed below:

TINNY SPRINGS ALLOTMENT

<u>Permittee Name</u>	<u>Permit Type</u>	<u>Season</u>	<u>Permitted No.</u>
Estate of Virginia Webb	Term	6/1 - 10/31	40 cows/calf & bulls

<u>Pasture Name</u>	<u>Use Dates</u>	<u>Total Days</u>	<u>Total Number</u>
Brolliar	6/1 - 6/21	21	40
Fulton	6/22 - 7/1	21	40
N. Tinny Spgs.	7/12 - 9/3	54	40
S. Tinny Spgs.	9/4 - 10/31_____	55	40

Additional permitted use:

Permittee Name	Permit Type	Season	Permitted No.
Lockett Ranches	Term	6/1 - 10/31	1232 yearlings

Pasture Name	Use Dates	Total Days	Total Number
N. Tinny Spgs.	6/1 - 6/21	21	1232
S. Tinny Spgs.	6/22 - 7/1_____	21	1232
Sawmill Spgs.	6/22 - 7/11	21	1232
Brolliar	7/12 - 7/26	15	1232
Van Deren	7/12 - 7/26	15	1232
Fulton	7/27 - 8/20	25	~400

In both allotments, salt or mineral supplement locations are rotated annually and avoid areas where cattle concentrations could cause excessive vegetation trampling, soil loss or disturbance to sensitive species or habitats. These areas include MSO PACs, northern goshawk PFA's, rare plant habitat, riparian vegetation, meadows and locations closer than 1/4 mile from a water source.

In Mud-Tinny, new structural improvements are planned sometime before 2002 within Bar M Pasture, Mormon Mountain Pasture, and Howard Mountain Pasture. The Dairy Springs electric fence will be converted to barbed wire. These improvements were evaluated in the 1995 consultation. No new structural improvements are planned in the Tinny Springs Allotment.

The Forest Service indicates that the grazing system is intensive with the allowable level of utilization on herbaceous vegetation in all pastures set at 50% on both the Mud-Tinny and Tinny Springs Allotments. The Forest Service believes this level of use is appropriate with these intensive grazing management systems regardless of range condition in this area. The main reasons for this higher use level is the reduction in grazing of regrowth by cattle, increased amount of pasture rest, and the increased amount of seasonal deferment (pers. comm. M. Hannemann). When the 50% utilization levels are reached the livestock will be removed from the pastures. Utilization monitoring is conducted by the permittee in each pasture on a daily basis with Forest Service personnel monitor approximately once a month (pers. comm. M. Hannemann).

The Forest Service states that grazing of some areas within pastures and particularly in riparian and meadow areas in excess of 50% is possible due to the increased forage produced in these sites which attracts both livestock and wildlife. It is also possible that riparian and meadow areas will attain 50% utilization based purely on ungulate use prior to livestock moving into the area. In an average year some level of utilization in these meadows and riparian areas by livestock is likely despite having already attained utilization levels based on wild ungulate use. If in a given year the situation is extreme due to drought, numbers of livestock will be reduced overall prior to grazing (pers. comm. M. Hannemann).

In a letter to the Service dated February 23, 1999, the Forest Service indicated that they were changing the utilization level from 50% to 40% in the North Mormon Mountain and South Tinny Springs Pastures. The Forest Service indicates that they believe the 40% utilization level is appropriate with an intensive grazing system. They anticipate that the 40% utilization will lower height of grasses but believe that the height prior to cows, along with anticipated re-growth and even residual height during grazing should provide cover for a diversity of small mammals. The Forest Service also indicates that utilization in these two pastures will be monitored in key areas of concern which will result in a finer trigger for cow movement (see Proposed Monitoring section below for more information).

Past Monitoring Results

The Mud-Tinny Allotment range condition information was collected in 1960 and indicated that 57,586 acres were in “fair” condition and 2,7318acres were in “poor” condition. The Tinny Springs Allotment range condition information was collected in 1960 and indicated that 11,752 acres were in “fair” condition and 448 acres were in “poor” condition. Since that time, ocular estimates on both allotments indicate that range condition has remained static or improved mainly through thinning the dense ponderosa pine forest. The 1986 report for Tinny Springs (*in litt.* March 5, 1999) indicated that vegetative trend was dramatically up in both the pine-bunchgrass and dry meadow types; in pine bunchgrass, the condition class rose from medium fair to low good, and in the dry meadow type, the condition class rose from a low fair to a low good. The upward trend in the bunchgrass type was due primarily to an increase in cool season decreaseers and moderate increase in plant density, while the increase in the meadow type resulted from increases in both decreaseers and increaseers and a high increase in plant density. The Forest Service indicates that in general, “poor” range conditions exist in meadows and around tanks. The 1986 report for Tinny Springs (*in litt.* March 5, 1999) indicate that during livestock use the meadow and riparian areas have been overgrazed.

Soil conditions in the Mud-Tinny and Tinny Springs Allotments, as reported in the Mud/Tinny Springs Environmental Assessment (November 1995), are satisfactory within those Terrestrial Ecosystem Survey map units dominated by ponderosa pine and mixed conifer. Approximately 89 percent of the allotments are in satisfactory soil condition. Within meadow areas however, soil conditions are unsatisfactory due to soil compaction. This is a result of historic and current activities including grazing by ungulates, roads and recreation. Approximately four percent of the allotments are in unsatisfactory soil conditions. Several areas within the allotments are capable of supporting a diversity of aquatic and terrestrial species that are highly dependent on moist soil conditions. These areas generally occur within drainages and in meadows that support a high water table. The riparian meadows are dominated by grasses such as *Poa pratensis*, *Muhlenbergia wrightii*, *Carex* spp., and *Juncus* spp. *Salix* spp. communities exist in rocky, riparian stream channels (Mud/Tinny Springs Environmental Assessment, November 1995). Hoxworth Spring, Fulton Canyon, and Middle Newman Canyon are major riparian drainages occurring on the Allotments. Several small seeps and springs also occur on the allotments including Mint, Tinny, Mud, Weimer, Lockwood and Tree Springs. These springs have been

modified in the past to impound water. The Forest Service indicates that in 1995 the conditions of the springs were best described as fair (Mud/Tinny Springs Environmental Assessment, November 1995).

Past Monitoring

Utilization monitoring using the methods described in the project description was conducted in 1998. Specifically, monitoring occurred in four key areas in the North Tinny and South Tinny pastures of the Mud-Tinny Allotment (meadow, riparian, aspen, and ponderosa pine). Each key area was visited in May 1998 and again in December 1998. Wickham (*in litt.* December 8, 1998) found that in 1998, overall utilization in the four areas was within the established utilization percentages (50%). Some areas did receive higher utilization levels than desired. The areas which did receive higher use were associated with waters or meadows. Specifically, the areas of concern were the meadows associated with Weimer Spring, Mud Spring, Tie Park, Brollier Park, Long Park, and to a lesser extent the area adjacent to Red Raspberry Tank. Wickham (*in litt.* December 8, 1998) reports that the combined use by both cattle and elk in these areas has resulted in high utilization. Monitoring indicated that riparian areas continued to receive a large amount of use from elk which graze the areas for most of the summer season. Livestock use in conjunction with elk use totaled more than the desired utilization within all but a few riparian areas.

Monitoring at the meadow key area (not located within a PAC) indicated that utilization of Kentucky bluegrass (*Poa pratensis*) was 20% in May and 50% in December; utilization of wheatgrass (*Agropyron* spp.) was 5% in May and 15% in December; and utilization of forbs was 30% in May and 40% in December. Utilization in the riparian monitoring plot (located below the tank at Mint Springs) indicated use at 0% on all species in May. Use in December was 40% on Kentucky bluegrass (*Poa pratensis*), 40% on forb species, and 20% on rushes (*Juncus* spp.). Utilization in the ponderosa pine site indicated use in May of 0% on Arizona fescue (*Festuca arizonica*) and blue gramma (*Bouteloua gracilis*) and use of 10% on Kentucky bluegrass (*Poa pratensis*). December monitoring at this site indicated use of 25% of Kentucky bluegrass (*Poa pratensis*), 30% of blue gramma (*Bouteloua gracilis*), and 0% of Arizona fescue (*Festuca arizonica*). Wickham indicates that much of the use within meadow and riparian areas was a result of elk use as well as livestock.

Monitoring in previous years indicates that the Mud-Tinny permittee was not in compliance in 1997. Minor modifications were made in 1998 to the graze period in the North Howard Mountain Pasture and Hoxworth Spring was fenced. The 1997 Allotment Inspection Report (Wickham and Hannemann 1997) states that elk numbers are high in this allotment and elk use is a significant impact to the forage base (*in litt.* October 31, 1997). The permittee was mostly in compliance in 1998; some minor problems were identified and will be fixed in 1999 (pers. comm. M. Hannemann). In the Tinny Springs Allotment there is no record of compliance monitoring in 1996 or 1997. M. Hannemann (pers. comm.) indicates that compliance was achieved in 1998. The condition and trend monitoring conducted as monitoring for both

allotments consists of reading permanent range cluster transects that were established in the early 1950s. The Forest Service indicates that these transects have not been read since 1986.

Proposed Monitoring

Monitoring of both allotments from 1998 until NEPA is conducted (planned for 2002) will include the following:

Compliance: Throughout each grazing season compliance monitoring will be done by Forest Service personnel to determine accomplishment of the terms and conditions of this permit, Allotment Management Plan (AMP), and annual operation instructions.

Allotment Inspections: Allotment inspections are a written summary done each fall by Forest Service personnel to document compliance monitoring and to provide an overall history of that year's grazing. This document may include weather history, the year's successes, problems, improvement suggestions for the future, and monitoring summary.

Range Readiness: Each spring before cattle move above the Mogollon Rim, range readiness will be assessed by Forest Service personnel to determine if vegetative conditions are ready for cattle grazing. The range is generally ready for grazing when cool season grasses are leafed out, forbs are in bloom, and brush and aspen are leafed out. These characteristics indicate the growing season has progressed far enough to replenish root reserves so that grazing will not seriously impact these forage plants.

Forage Production: Production surveys for the allotment will be done every nine to 13 years. Cattle numbers could be adjusted as a result of evaluating these figures.

Rangeland Utilization: Utilization monitoring is an estimate of the available forage by weight consumed or trampled through grazing and is expressed as a percent of current year's biomass removed. Utilization monitoring is designed to assess key forage utilization levels by cattle and elk during the year and from year to year. Key forage species for this allotment include western wheatgrass, blue grama, squirreltail, and Arizona fescue in the summer range and needlegrass, blue grama, black grama, sand dropseed, and sideoats grama in the winter range. Utilization monitoring will be conducted by the permittee and spot-checked by Forest Service personnel throughout the year in every grazed pasture. This monitoring will calculate an overall utilization value for a pasture 1) before cattle go into a pasture, 2) within five days after cattle leave a pasture, and 3) at the end of the growing season in the fall. Utilization will be averaged into the following five categories: no use (0-10%), light use (11-20%), moderate use (21-50%), high use (51-70%), and extreme use (71+%). The goal for utilization will be 50% or less by cattle throughout the year with this intensive livestock grazing system.

In addition, key site and key species monitoring will be conducted at a minimum of one per herd in each of the following habitat types: pine (oak), riparian, mountain meadow, and aspen, if these

habitat types are grazed by cattle. Four key area plots have been identified (*in litt.* February 23, 1999): One plot is in North Tinny Pasture and represents utilization in large meadows by both herds. Another North Tinny plot is in pure pine roughly between the Iowa and Mint PACs. On South Tinny Pasture plot provides utilization information in a ponderosa pine/aspen community with the nearest water ½ mile distant at Mint Tank within 1/4 mile of the Mint PAC. The fourth key area plot is located in South Tinny Pasture as well, near Mint Tank, but outside of Mint PAC. Utilization monitoring will also occur in selected pastures rested from cattle grazing by Forest Service and/or Arizona Game and Fish Department personnel.

Condition and Trend: Watershed and vegetative condition and trend monitoring will help determine the effectiveness of the AMP. Two types of transect monitoring techniques could be used for the analysis: Parker 3-step and paced transects and paired nested rooted frequency and cover transects. Both these transects will include photo points.

Parker 3-step and paced transect monitoring points were established throughout this allotment in the 1950's-60's. From these transects the Forest Service will select transects that are located in key areas that represent various TES soil units currently in unsatisfactory condition or within threatened, endangered or sensitive species habitat, such as mountain meadow, pine-oak, pinyon-juniper, and desert grassland. Forest Service and ranch personnel will update the vegetative ground cover data or at least retake the photo points at these sites at least every 10 years to help determine long-term trend throughout this allotment. In key areas where the Parker 3-step and paced transects don't currently exist new vegetative ground cover transects, with 300 points, will be established using TES ground cover definitions.

At least one new paired nested rooted frequency and cover monitoring transects over the next five years will be established within the allotment to record statistically how vegetative frequency and ground cover changes over time. These paired transects will compare similar cattle grazed and ungrazed sites as near to each other as possible. Nested rooted frequency plots record ground cover and plant species composition, frequency, and cover data. At each site a permanent tenth acre transect will be established. Five random lines will be run out from this transect and 10 plots per line will be read using a standard canopy cover frame. These transects will be read every five years by Forest Service personnel. These plots will be used to help determine the effectiveness of the new AMP and long-term range and watershed trend.

Precipitation: Precipitation is currently recorded within or near this allotment at Flagstaff National Weather Service Office at Bellmont, Flagstaff Airport, Sedona Airport and all the active fire lookout towers on the Forest.

Soil and Riparian Condition: The Intergovernmental Agreement between the Forest Service and the State of Arizona that controls water quality and the Clean Water Act requires implementation and effectiveness monitoring. The Objectives of monitoring are to: 1) collect data sufficient to assist line officers and resource managers in evaluating effects to management activities on soil and water resources; 2) support changes in management activities to protect soil and water

quality. Monitoring will help determine how successfully managers are implementing Guidance Practices and how effectively those practices are at protecting soil and water quality. Arizona Department of Environmental Quality (ADEQ) will continue to monitor water quality in the area.

Evaluating watershed conditions can be assessed using information from the monitoring schemes above. Monitoring of plant abundance, ground cover, species diversity and estimates of overall soil condition will indicate whether or not management practices are effectively meeting management goals. Trends toward improvements in species abundance and diversity should indicate that management practices are effectively improving soil condition and by inference, maintaining or improving downstream water quality and complying with water quality standards. Conversely, decreases in plant abundance and species diversity may indicate that management practices are not effective and need to be changed. Environmental factors, especially precipitation, will be considered when evaluating monitoring results.

Several fixed station Biocriteria Program and other water quality monitoring sites may be located within or near the allotment. These sites have and are being used to track long-term conditions and trends at critical points in a watershed and to develop biological criteria for stream segments. Information from these sites will be considered in evaluating the effectiveness of management practices, but may be of limited value considering the multitude of influences affecting each monitoring site.

Allowable use monitoring is conducted by the permittee on a daily basis in the pasture of use. This monitoring is checked by Forest Service personnel on about a monthly basis during the grazing season. If use levels are found to exceed those allowable (e.g. 50%) in a particular pasture, adjustments to the number of head or the length of grazing will be modified in the following year (pers. comm. M. Hannemann).

On February 23, 1999, the Forest Service proposed additional monitoring as outlined below (*in litt.* February 23, 1999):

Six key area monitoring sites will be established within the Red Raspberry (2), Weimer Springs (2) and Mint Springs (2) PACs. Three of these plots will be setup at Weimer, Mud and Mint Springs. The other three plots will be established within forested sites within each of the three PACs using Key Area site definitions from the Recovery Plan. At each site, information will be collected on plant species, plant frequency, plant canopy cover, ground cover and utilization data.

Ocular plant canopy cover in 0.10 acre plots will be established at each site. These plots will be read every five years starting in 1999. These plots will be used to compare the similarity of existing conditions with potential and desired vegetative community conditions.

Plant frequency and ground cover data and plant canopy cover will be collected using plant frequency sampling methods outlined in Ruyle *et al.* (1997). These plots (there will be at least 200) will be read yearly for the first three years (1999, 2000 and 2001), then approximately every 10 years. This will allow monitoring of trends in plant species abundance, plant species distribution and ground cover. This information will be statistically valid. Desired vegetative conditions will be developed from the potential vegetative community descriptions in the Terrestrial Ecosystem Surveys (TES). TES will be used to determine the potential vegetation and then the Forest Service will determine the desired vegetative conditions. Desired vegetative conditions would be described by referencing the potential for the site. Each specific site will have its own variation. The factors that will be compared are canopy cover and species richness for wols habitat.

Utilization data will be recorded at each of the six new sites before cattle use, during cattle use, after cattle use and at the end of the growing season. Forty percent use at three forested sites within the North Mormon Mountain and South Tinny Springs Pastures will trigger cattle movement to other pastures within the current grazing period. Perennial grasses will be the species examined for utilization because they comprise the majority of the understory vegetation used as cover and/or seed heads by small mammals. If 40% utilization by wildlife or livestock occurs in forested areas prior to cows coming on , the cows will not on to that pasture and will be directed to go to another area on or off the forest. The “during cow visit” will indicate how much of the perennial grasses have been used since the prior visit. The person doing the monitoring will be able to assess how much time remains until the 40% utilization level is reached and will inform the permittee when the cows need to be moved.

The Forest Service anticipates that the prey ‘landscape’ in the forested sites, at 40% utilization, should resemble the following: Many but not all of the individual perennial grass plants will be grazed. In North Mormon Mountain Pasture, cattle come on mid-growing season so some species will have grown, flowered and gone to seed prior to cattle use. Seedheads will remain on some plants during cattle use and obviously will be removed by wildlife and cattle during the times when they are there. Forb use by wildlife and cattle will be variable depending on what is available during the time they are present, the individual feeding preferences of various ungulates, and will depend on growing conditions during the growing season. Because of these variable, some forbs will have flowered and seeded prior to cattle use, some will be eaten by wildlife, some will be eaten by cattle, some will flower and seed out following cattle use, and some will not be eaten. No loss of vegetative species is expected.

If the existing condition of the plots do not match the desired condition estimates, then the Forest Service will decide what components of MSO habitat need improvement and the rangeland goals will be modified to meet them.

STATUS OF THE SPECIES

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

The Mexican spotted owl is distinguished from the California and northern subspecies chiefly by geographic distribution and plumage. The Mexican spotted owl has the largest geographic range of the three subspecies. The range extends from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah southward through Arizona and New Mexico and, discontinuously through the Sierra Madre Occidental and Oriental to the mountains at the southern end of the Mexican Plateau. There are no estimates of the owl's historic population size. Its historic range and present distribution are thought to be similar.

Using starch-gel electrophoresis to examine genetic variability among the three subspecies of spotted owls, Barrowclough and Gutierrez (1990) found the Mexican spotted owl to be distinguishable from the other two subspecies by a significant variation, which suggests prolonged geographic isolation of the Mexican subspecies and indicates that the Mexican spotted owl may represent a species distinct from the California and Northern spotted owls.

The current known range of the Mexican spotted owl extends north from Aguascalientes, Mexico through the mountains of Arizona, New Mexico, and western Texas, to the canyons of southern Utah and southwestern Colorado, and the Front Range of central Colorado. Although this range covers a broad area of the southwestern United States and Mexico, much remains unknown about the species' distribution within this range. This is especially true in Mexico where much of the owl's range has not been surveyed. Information gaps also appear for the species' distribution within the United States. It is apparent that the owl occupies a fragmented distribution throughout its United States range corresponding to the availability of forested mountains and canyons, and in some cases, rocky canyon lands.

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

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

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

Mexican spotted owls breed sporadically and do not nest every year. Mexican spotted owl reproductive chronology varies somewhat across the range of the owl. In Arizona, courtship apparently begins in March with pairs roosting together during the day and calling to each other at dusk (Ganey 1988). Eggs are laid in late March or, more typically, early April. Incubation begins shortly after the first egg is laid, and is performed entirely by the female (Ganey 1988). The incubation period for the Mexican spotted owl is assumed to be 30 days (Ganey 1988). During incubation and the first half of the brooding period, the female leaves the nest only to defecate, regurgitate pellets, or to receive prey from the male, who does all or most of the foraging (Forsman *et al.* 1984, Ganey 1988). Eggs usually hatch in early May, with nestling owls fledging four to five weeks later, and then dispersing in mid September to early October (Ganey 1988).

Little is known about the reproductive output for the spotted owl. It varies both spatially and temporally (White *et al.* 1995), but the subspecies demonstrates an average annual rate of 1.001 young per pair. There is inadequate data at this time to estimate population trend. Little confidence in initial estimates has been expressed, and is due to its reliance on juvenile survival rates which are believed to be biased low, and due to the insufficient time period over which

studies have been conducted.

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

Mexican spotted owls nest, roost, forage, and disperse in a diverse array of biotic communities. Nesting habitat is typically in areas with complex forest structure or rocky canyons, and contain mature or old-growth stands which are uneven-aged, multi-storied, and have high canopy closure (Ganey and Balda 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 appear to be in Douglas-fir trees (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). However, patterns of habitat use varied among study areas and individual birds, making generalizations difficult.

Seasonal movement patterns of Mexican spotted owls are variable. Some individuals are year-round residents within an area, some remain in the same general area but show shifts in habitat-use patterns, and some migrate considerable distances (20-50 kilometers / 12-31 miles) during the winter, generally migrating to more open habitats at lower elevations (Ganey and Balda 1989, Willey 1993, Ganey *et al.* 1998). Home-range size of Mexican spotted owls appears to vary considerably among habitats and/or geographic areas (USDI 1995), ranging in size from 261 to 1,487 hectares for individual birds, and 381 to 1,551 hectares for pairs (Ganey and Balda 1989). Little is known about habitat use by juveniles during natal dispersal. Ganey *et al.* (1998) found dispersing juveniles in a variety of habitats ranging from high-elevation forests to pinyon-juniper woodlands and riparian areas surrounded by desert grasslands. Some juveniles remained in forests similar to typical owl breeding habitat.

Mexican spotted owls consume a variety of prey throughout their range but commonly eat small and medium sized rodents such as woodrats (*Neotoma* spp.), peromyscid mice, and microtine voles. They may also consume bats, birds, reptiles, and arthropods (Ward and Block 1995). Habitat correlates of the owl's common prey emphasizes that each prey species uses a unique microhabitat. Deer mice (*Peromyscus maniculatus*) are ubiquitous in distribution in comparison to brush mice (*Peromyscus boyleyi*) which are restricted to drier, rockier substrates, with sparse

tree cover. Mexican woodrats (*N. mexicana*) are typically found in areas with considerable shrub or understory tree cover and high log volumes or rocky outcrops. Mexican voles (*Micotus mexicanus*) are associated with high herbaceous cover, primarily grasses; whereas, long-tailed voles (*M. longicaudus*) are found in dense herbaceous cover, primarily forbs, with many shrubs, and limited tree cover. A diverse prey base is dependant on the availability and quality of diverse habitats.

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

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

From 1991 through 1997, Gutierrez *et al.* (1997, 1998) studied the demographic characteristics of two Mexican spotted owl populations in the Upper Gila Mountains Recovery Unit. The owl populations studied were located on the Coconino and Gila National Forests. Results of this several-year study have shown a decline in the population trend of Mexican spotted owls within these areas. The reason for the reported decline is unknown. According to Gutierrez *et al.* (1997), such a trend could be a result of: 1) density dependent responses to an increase over carrying capacities; 2) a response to some environmental factor; or 3) senescence. The latter (i.e. senescence) seems unlikely because there was also a negative linear trend in survival estimates for owls less than three years of age. Regarding carrying capacities, responses to density dependence are difficult to prove in the absence of removal or addition experiments. Environmental factors undoubtedly play a role in owl survival, either through weather events causing direct mortality or indirectly through reduced habitat or prey (Gutierrez *et al.* 1997). This study found that the ability of adult birds to survive successive years of poor environmental

conditions may be low (Gutierrez *et al.* 1998).

At the end of the 1995 field season, the Forest Service reported a total of 866 management territories (MTs) established in locations where at least a single MSO had been identified (U.S. Forest Service, *in litt.* November 9, 1995). The information provided at that time also included a summary of territories and acres of suitable habitat in each RU. Subsequently, a summary of all territory and monitoring data for the 1995 field season on Forest Service lands was provided to the Service on January 22, 1996. There were minor discrepancies in the number of MTs reported in the November and January data. For the purposes of this analysis we are using the more recent information. Table 1 displays the number of MTs and percentage of the total number of each Forest (U.S. Forest Service, *in litt.*, January 22, 1996).

Table 1. Number of management territories (MTs) as reported by the Forest Service (U.S. Forest Service, *in litt.*, January 22, 1996), percent of MTs as a proportion of the MTs in Forest Service Region 3, and the percent of suitable habitat surveyed in each Forest by National Forest (Fletcher and Hollis 1994).

National Forest	Number of MTs	Percent of MTs	Percent Suitable Habitat Surveyed
Apache-Sitgreaves	122	14.0	99
Carson	3	0.3	62
Cibola	43	5.0	41
Coconino	155	17.8	87
Coronado	108	12.4	49
Gila	197	22.7	50
Kaibab	6	0.7	96
Lincoln	126	14.5	90
Prescott	10	1.2	42
Santa Fe	33	3.8	44
Tonto	66	7.6	55
TOTAL	869	100	

The Forest Service has converted some MTs into PACs following the recommendations of the Draft MSO Recovery Plan released in March 1995. The completion of these conversions has

typically been driven by project-level consultations with the Service and varies by National Forest.

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

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

This RU contains the largest known concentration of MSO with approximately 55% of known MSO territories (USDI 1995). This RU is located near the center of the MSO's range within the United States and is contiguous to four of the other five RUs within the United States. Because of its central location and its large and relatively continuous spotted owl population, the MSO Recovery Team believes that the population in this RU could be uniquely important to the overall stability and persistence of the MSO population in the United States. Specifically, this population could serve as the source population, providing immigrants to smaller, more isolated populations in other RUs. Although the Recovery Team has no data on dispersal patterns or movements between RUs, the Recovery Team believes that this population should be maintained at current levels and with at least the current level of connectivity within the RU (USDI 1995). Significant discontinuities that develop in the MSO's distribution within this RU, and the loss of

habitat to support the local sub-populations, may compromise the recovery of the species.

ENVIRONMENTAL BASELINE

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

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

There are 32 PACs in the Mud-Tinny Allotment and all or portions of five PACs within the Tinny Springs Allotment. These PACs have been located through surveys conducted since 1988. The demography study being conducted by Humboldt State University inventories nearly 90% of the Mud-Tinny Allotment annually.

Approximately 1700 acres (2%) of the Mud-Tinny Allotment consists of pine/oak and mixed conifer habitats with slopes over 40%, meeting the definition of protected habitat as defined in the Recovery Plan. These acres are associated with PACs and with steep slopes on the south side of Mormon Mountain. The Tinny Springs Allotment contains 168 acres of protected pine/oak habitat outside of PACs. Mixed conifer on slopes over 40% only occur within PACs in this allotment. No logging has occurred on slopes greater than 40% in either allotment.

Restricted mixed conifer habitat is very limited in the Mud-Tinny Allotment. The majority of the remaining 74,000 acres of this allotment are pine/oak habitat and the Forest Service states that they probably meet restricted habitat definitions, although exact calculations have not been conducted to date. Within this restricted habitat, stands meeting definitions for threshold and target conditions are likely, although this analysis has not been conducted to date.

The Forest Service states that all of the PACs in both the Mud-Tinny and Tinny Springs Allotments have some range capacity. All PACs within the Mud-Tinny Allotment have some percentage of steep slope such that cattle are not likely to use. This percentage varies by PAC with some PACs (040503 and 040507) having a high percentage of steep slope, and others (040526 and 040533) being nearly 100% accessible by livestock. In general, PACs in this allotment are densely forested and have high canopy cover which limits forage production and does not attract cattle. Small openings in PACs can support high vegetative species diversity and abundance, particularly in mixed conifer areas such as PACs 040432, 040504, and 040528. The Forest Service indicates that grazing would be expected to be moderate if cattle access these areas. In the five PACs within the Tinny Springs Allotment, the areas grazed are more typical of foraging habitat for the MSO. In these five PACs, the areas used by owls for nesting and roosting are generally not utilized by livestock due to steep slopes and dense canopy cover with

minimal herbaceous understory.

The Forest Service has formally consulted on 198 timber sales and other projects in Arizona and New Mexico since August 1993. These projects have resulted in the anticipated incidental take of 115 MSO. In addition, the Bureau of Indian Affairs has consulted on one timber sale on the Navajo Reservation which resulted in an anticipated take of five MSO, and a highway reconstruction which resulted in the anticipated incidental take of two MSO. The Federal Highway Administration has consulted on one highway project that resulted in an undetermined amount of incidental take. The take associated with this action will be determined following further consultation. Additionally, the biological opinion for the Kachina Peaks Wilderness Prescribed Natural Fire (PNF) Plan (#2-21-94-F-220) determined thresholds for incidental take and direct take as follows: 1) one spotted owl or one pair of spotted owl adults and/or associated eggs/juveniles; 2) harm and harassment of spotted owls located in up to two PACs per year; 3) disturbance to spotted owls and habitat modification of a total of seven PACs during the life of the Kachina Burn Plan related to management ignited fire occurring in PACs for which the nest site information is three or more years old; 4) harm and harassment of spotted owls and habitat caused by PNF for which adequate surveys have not been conducted, and; 5) harm and harassment of spotted owls and habitat modification of up to one PAC and 500 acres of potential nest/roost habitat caused by wildfire as an indirect result of PNF during the life of the Kachina Burn Plan.

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

EFFECTS OF THE ACTION

The Mexican Spotted Owl Recovery Plan specifically identifies overgrazing as a threat to the owl in the Upper Gila Mountain Recovery Unit:

"Overgrazing is suspected to be detrimental in some areas and can affect both habitat structure and the prey base. Effects on the prey base are difficult to quantify, but removal of herbaceous vegetation can reduce both food and cover available to small mammals (Ward and Block 1995). This may be especially true with respect to voles, which are often associated with dense grass cover. Direct effects on habitat are obvious in some places, particularly with respect to browsing on Gambel oak (*Quercus gambeli*). In some areas, oak

is regenerating well but unable to grow beyond the sapling stage because of this browsing....We do not attribute these effects solely to livestock. Forage resources are shared by livestock and wild ungulates" (USDI 1995).

Grazing in MSO habitat can affect habitat structure and composition, as well as food availability and diversity for the owl. However, predicting the magnitude of grazing effects requires a better understanding of the relationship between owl habitat and grazing. The Mexican Spotted Owl Recovery Plan (USDI 1995) summarizes the effects of grazing to spotted owls in four broad categories: 1) altered prey availability, 2) altered susceptibility to fire, 3) degeneration of riparian plant communities, and 4) impaired ability of plant communities to develop into spotted owl habitat.

Based on existing data on the foraging behavior of Mexican spotted owls, a PAC would include on average only 75% of the bird's foraging range. Therefore, prey species abundance and habitat suitability on, and adjacent to a PAC is important in assessing affects to the owl from livestock grazing activities. The Service has concentrated our effects analysis on the PACs located within the allotment. Specifically, we have focused on springs and their associated meadows as these areas are likely to provide the greatest diversity of prey species within PACs. Within both allotments, seven PACs contain springs (see summary below). None of the springs are excluded from cattle at this time. The Forest Service indicates that these springs receive substantial use by both cattle (when cattle are in the pasture) and elk throughout the year. Meadows are associated with Mud, Weimer, and Mayflower Springs and Red Raspberry Tank. The Forest Service indicates that the adverse effect determination for the MSO in the Mud-Tinny Allotment is due primarily to the condition and use of Mud and Weimer Springs and their associated meadows. Both of these PACs (040503 and 040532) are located on the slopes of Mormon Mountain and are composed primarily of mixed conifer habitat. Both are located in the North Mormon Pasture. The adverse effect determination for the Tinny Allotment is due to the condition and use of Mint Springs located within PAC 040523, within the South Tinny Pasture, in both the Mud-Tinny and Tinny Springs Allotments.

<u>PAC Name and #</u>	<u>Spring</u>
Sawmill Springs (040409)	Sawmill Springs
Red Raspberry (040503)	Mud Springs
Iowa Camp (040504)	Iowa Camp Spring
Bristow Tank (040518)	Bristow Spring
Mint Spring (040523)	Mint Spring
Weimer Springs (040532)	Weimer Springs
Lockwood (040541)	Lockwood/Mayflower

According to Green (*in litt.* November 20, 1998) the fence at Weimer Spring will be modified in fiscal year 1999. This spring is currently fenced with 4-strand barbed wire which restricts motorized vehicle and cattle access when the gates are closed. Ungulate use within the meadow and spring area is resulting in excessive loss of vegetation, soil, and spring channel downcutting and compaction. The Forest Service will move the existing fence closer to the spring and

eliminate cattle use from the spring and meadow area (approximately 2-3 acres). The tank located adjacent to the spring may be completely or partially available to livestock. The Forest Service expects vegetative and soil conditions of the spring and associated meadow to improve with livestock exclosure, thus providing an indirect benefit to cover dependent prey species of the MSO. Wild ungulate use will not be excluded.

Green (*in litt.* November 20, 1998) indicates that a pole fence and barbed wire fence will be installed at Mud Springs in fiscal year 1999. The Mud Springs area consists of a tank adjacent to a 15 acre meadow. A two-track road is located along the side of the tank and meadow leading to dispersed camping sites in the forest. Much of the pasture in which Mud Spring is located is heavily forested so it is not unexpected to find cattle and other ungulates concentrating in the meadow area and associated tank. The result of historical and current concentrated livestock and wildlife use combined with ATV use and camping use in the meadow has resulted in significant compaction and reduction in vigor and density of meadow vegetation. A pole fence will be located adjacent to the roads and a barbed wire fence will be woven through the trees. A portion of the tank will be fenced allowing cattle access on the one side when they are in the pasture. The net effect will be to eliminate cattle and motorized vehicle use from about 15 acres of the meadow, while leaving approximately 5 acres unfenced (pers.comm. H. Green). The road through the meadow will not be closed and non-motorized recreational use would still be possible (*in litt.* February 23, 1999). The Forest Service expects an improvement in vegetation density and vigor and soil condition with livestock exclusion from this area. Wild ungulate use will not be restricted.

The effects of livestock and wild ungulate grazing on the habitat of spotted owl prey species is a complex issue. Impacts can vary according to grazing species; degree of use, including numbers of grazers, grazing intensity, grazing frequency, and timing of grazing; habitat type and structure; and plant or prey species composition. It is well documented and intuitive that repetitive, 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, water quality, and ultimately lead to desertification when uncontrolled (USDI 1995).

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 Mexican spotted owls have indicated that prey species of the owl include woodrats (*Neotoma* spp.), white-footed mice (*Peromyscus* spp.), voles (*Microtus* and *Clethrionomys* spp.), rabbits and hares (*Sylvilagus* and *Lepus* spp.), pocket gophers (*Thomomys* spp.), other mammals including a variety of bats, birds, insects, and reptiles. Ward and Block (1995) report that rangewide, 90% of an "average" Mexican spotted owl diet would contain 30% woodrats; 28% peromyscid mice; 13% arthropods; 9% microtine voles; 5% birds; and 4% medium-sized rodents, mostly diurnal sciurids. These rangewide patterns, however, are not consistent among MSO Recovery Units as data indicates significant differences in owl diets among geographic location (Ward and Block 1995). Ganey (1992) conducted a MSO prey study between 1984-1990 in Arizona and found that woodrats, white-footed mice and voles accounted for 59-88% of total biomass. He found that in northern Arizona, MSO ate fewer woodrats and more voles in mesic high elevation forest areas. In mixed conifer habitat of the

San Francisco Peaks he found the following percentages of prey biomass in the diet of the owl: 49.1% woodrats; 15% voles; 12.5% peromyscid mice; 9.1% pocket gophers; 6.7% rabbits; 4.4% other medium mammals; 3.1% birds; and 0.1% arthropods.

Specific studies that document the effects of livestock and wildlife (e.g., elk, deer) grazing on spotted owl 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 (USDI 1995). 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 affects plant community composition, structure, and vigor. If these changes occur in or near areas used by spotted owls, then grazing can influence the owl (USDI 1995).

Both cattle and wild ungulates effect 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 semi-arid 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 manner that influences habitat selection by small mammals. Vegetative cover is often greatly reduced on grazed relative to ungrazed areas, and vegetation typically appears more dense in ungrazed areas (Hayward *et al.* 1997). Bock (1994) reported that small mammal species that prefer habitats with substantial ground cover were more abundant on their ungrazed site, whereas species that prefer open habitats were more abundant on a grazed site in their study area in southern Arizona.

Prey that positively influences owl survival, reproduction, or numbers may increase the likelihood of persistence of MSO populations (USDI 1995). 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). In two studies in Arizona and New Mexico, Ward and Block (1995) found that the owl's food resources are quite variable among vegetative communities through time. In the communities they studied, summer prey biomass arranged in descending order indicated: meadows> mixed conifer forests>ponderosa pine/pinyon juniper/oak woodlands>ponderosa pine/Gambel oak forest. Rearranging the same communities according to winter prey biomass indicates: meadows>ponderosa pine/pinyon juniper/oak woodlands>ponderosa pine/Gambel oak forest>mixed conifer forest. Results of both studies indicate that the owl's food is most abundant during the summer months when young are being raised. Decreases in prey biomass occur from late fall through the winter. Seasonal decreases

like these are typical of small mammal populations. 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. Whereas 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). Such decreases could negatively influence spotted owls in the Upper Gila Mountains Recovery Unit where voles are common prey or used as alternative food sources when other prey species are diminished (Ward and Block 1995).

The abundance of small mammals in grazed versus ungrazed areas has 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% 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 the owl's reproductive success was not influenced by a single prey species, but by many species in combination. None of the specific prey groups significantly influenced owl reproductive success, but rather, they concluded it was more likely that the owl's reproductive success was influenced by total prey biomass consumed in a given year, rather than by 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.

Optimal foraging theory predicts that predators consume prey providing the greatest energetic benefit-to-cost ratio (Krebs 1978). Theoretically, selection of larger prey should provide parents with an energetic surplus enabling them to meet the increased energy demands associated with producing young (White 1996). Thrailkill and Bias (1989) and White (1996) found that the diet of California and northern spotted owls that successfully fledged young differed significantly in terms of prey size from the diet of owls that failed to fledge young. Specifically, White (1996) found the northern spotted owls which successfully fledged young ate significantly more large prey items (*Neotoma* spp.) than unsuccessful owls. Unsuccessfully breeding owls consumed more medium and small prey (*Glaucomys* spp., *Arborimus* spp., *Clethrionomys* spp., *Peromyscus* spp., *Microtus* spp) which White related back to the increased energetic demands of transporting prey back to a central place such as a nest thereby resulting in an energetic trade-off. Ultimately, this would cause spotted owls to suspend breeding in a given year if food fell below levels necessary to maintain adult energy requirements. Thrailkill and Bias (1989) found that successful breeding in California spotted owls was correlated to a diet consisting of a greater

relative proportion of large mammal prey. Thraikill and Bias (1989) indicate that they were unable to infer whether their results indicated a preferential selection of large mammal prey by breeding pairs or greater availability of large mammal prey within territories of breeding pairs. Ward (1990) found a different pattern for northern spotted owls. He found that large prey was taken in relatively equal frequency by breeding and nonbreeding owls, presumably because woodrats were a common food resource for owls regardless of breeding status. Barrows (1987) found shifts by breeding spotted owls to larger prey items post-hatching which contrasted with the opposite trend in non-breeding owls, supporting a hypothesis of preferential predation on larger prey by breeding pairs. Zabel *et al.* (1995) found that home range size of northern spotted owls is influenced by density of food and patterns of dispersion. Specifically, they found that owls preying on the larger woodrat (*Neotoma*) did not need to forage as widely as owls preying on flying squirrels (*Glaucomys sabrinus*) in order to meet their energy requirements.

It is evident that both abundance and biomass of individual prey as well as prey species diversity is important for owl reproduction. If adequate prey exist 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).

Monitoring of the seven PACs within one or both of the allotments containing springs and associated meadows since 1987 is as follows (PAC Summary Report for Mormon Lake; pers. comm. Heather Green). No information exists for these PACs prior to 1987.

<u>PAC # 040409</u>	<u>PAC #040503</u>	<u>PAC # 040504</u>	<u>PAC # 040518</u>
1987 - NI	O-NU	NI	NI
1988 - NI	O-NY	M-NU	NI
1989 - 2Y	2Y	2Y	1Y
1990 - O-NU	O-NU	O-NU	NI
1991 - 1Y	2Y	2Y	1Y
1992 - 2Y	O-NF	O-NF	2Y
1993 - 1Y, 2YD	O-NY	O-NY	1Y
1994 - A	O-NU	O-NU	O-NN
1995 - M-NU	F-NU	F-NU	1Y
1996 - A	M-NU	NR	NR
1997 - A	NR	NR	NR
1998 - O, nest failed, adult male found dead	O-NN	NR	NI
<u>PAC # 040523</u>	<u>PAC # 040532</u>	<u>PAC #040541</u>	
1987 - NI	NI	NI	
1988 - NI	NI	NI	
1989 - NI	NI	NI	

1990 - O-NY	NI	NI
1991 - 2Y	NI	NI
1992 - O-NN	M	NI
1993 - 3Y	O-NN	NI
1994 - O-NN	O-NF	NI
1995 - 1Y	A	O-NN
1996 - O-NU	M-NN	O-NN
1997 - 1YD	O-NN	O-NN
1998 - A	NR	3Y

(NI=no information; Y=young; YD=young dead; NU=nesting unknown; O=occupied; NR=no response; NN=non-nesting; NF=nest failed; M=male; F=female; A=absent)

The past condition of the springs and associated meadows of Weimer, Mud and Mint Springs are likely to have been similar to their current condition. It is impossible to draw direct correlations between reproductive success in these three PACs (040503, 040532 and 040523) and grazing in the springs and meadows. Reproduction in these PACs has varied over the past seven to 12 years. The last year owls successfully reproduced in the Red Raspberry PAC (040503) was in 1991. Less information is available for the Weimer Springs PAC (040532) where owls have only been known for the last seven years. In this PAC, despite presence in most years, the owls have not nested and in 1994 the nest failed. Reproduction in the Mint Springs PAC (040523) has been more successful, with six young produced since 1990, including triplets in 1993. Gutierrez *et al.* (1998) have shown a 10% decline in the population of MSO in the Upper Gila RU each year between 1991 and 1997 (90% of the PACs in these allotments are located within this study area). Although the reasons for these declines are unknown, they are of concern to the Service.

The Recovery Plan provides explicit goals for managing grazing in protected and restricted habitat. These include: Monitoring use by livestock and wildlife in “key grazing areas.” These areas are primarily riparian areas, meadows and oak types; Maintaining good to excellent range conditions in key areas while accommodating the needs of the owl and its prey; implement and enforce grazing utilizations standards that would attain good to excellent range conditions within the key grazing area; establish maximum allowable use levels that are conservative and that will expedite attaining and maintaining good to excellent range conditions; ensure 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 restore good conditions to degraded riparian communities.

Within conifer forests, grazing can remove or greatly reduce grasses and forbs, thereby allowing large numbers of conifer seedlings to become established because of reduced competition for water and nutrients. Establishment of seedling conifers coupled with the reduction in light ground fuels (e.g., grasses and forbs) may act with fire suppression to contribute to building of fuels in the forest, alter forest structure, and decrease the potential for beneficial low-intensity ground fires while increasing the risk of catastrophic fire (USDI 1995). Oak regeneration may

also be affected by grazing. Wickham (*in litt.* December 8, 1998) reports that monitoring of livestock in the Mud-Tinny Allotment previous to 1998 found foraging of Gambel oak leaves to be significant particularly in dry years. He indicates that if such foraging were to be high it may effect oak reproduction. This was not observed in 1998 presumably due to high precipitation levels.

Monitoring indicates utilization levels in excess of 50% in meadows and spring areas (Wickham and Hannemann, *in litt.* October 31, 1997, Wickham, *in litt.* December 8 1998). The Forest Service plans to fence Weimer and Mud Springs and their associated meadows from livestock and motorized recreation use in 1999. The Service believes this will assist in allowing these areas to maintain more ground cover for MSO prey particularly in the late summer and fall when the livestock have traditionally used these areas. Some adverse effects to MSO associated with these PACs is still likely however, even with proposed fencing at Weimer and Mud Springs, due to their current condition resulting from past overuse, as well as from the use of these meadows and springs by wild ungulates in both the past and the future. Good to excellent range conditions are not being managed for in these key areas located within PACs, as the Recovery Plan recommends. Proposed plant frequency monitoring as described by the Forest Service (*in litt.* February 23, 1999) will be useful for determining if utilization exceeds 40% on the North Mormon Mountain Pasture, but will only affect a removal of cattle if that utilization level is reached in the pine/oak monitoring plots. It is likely that use in small meadows in this pasture may reach 40% utilization before pine/oak sites,. Thus, given the importance of small meadows for MSO prey species, utilization in excess of that recommended in the Recovery Plan is likely in these areas. The Service believes that the failure of adequate range conditions and cover to be maintained at Weimer and Mud Springs, as well as at Red Raspberry Tank may affect the ability of MSO in these two PACs to successfully produce young.

In addition, utilization monitoring at Mint Springs in 1996 indicated use of between 40-60% in the early part of the season and then an increase to >60% later in the season. The Forest States that although 1996 was a drought year, similar use has been documented in prior years as well. The South Tinny Pasture in which Mint Springs is located, is used each year for a period of two and a half months between June and mid-September by the 40 head associated with the Tinny Springs Allotment. This pasture receives additional use every other year for a period of 21 days in early June through July from the 1232 yearlings associated with the Mud-Tinny Allotment. The Service's concerns relate to the time of use (during the MSO breeding season) and the use of this pasture by both the Tinny Springs and Mud-Tinny livestock. This pasture receives no rest and is grazed by both herds every other year. The wet area associated with Mint Springs is long and narrow and perhaps this is the reason it has not been fenced to date. The Service believes that in drought years, utilization is likely to be very high as was evidenced in 1996. This use is exacerbated by wild ungulate use as well. Proposed plant frequency monitoring as described by the Forest Service (*in litt.* February 23, 1999) at Mint Spring will not trigger removal of livestock if utilization reached 40%, as the Forest Service proposed only to use utilization monitoring at the pine/oak sites in the South Tinny Pasture. Mint Springs and its associated meadow is likely to continue to receive utilization levels of 60% or more by two herds of livestock. The Service believes such use of Mint Springs may be a detriment to MSO reproduction in the Mint Springs

PAC (040523).

The Service does not believe that the Forest Service's proposal to reduce utilization levels from 50% to 40% in the North Mormon Mountain and South Tinny Springs Pastures where the three PACs of concern are located (*in litt.* February 23, 1999) meets the intent of the Amended Forest Plan which was developed to implement the MSO Recovery Plan and address concerns for other species. The Forest Service states "We don't feel that the Allowable Use Table in the Forest Land Management Plan is appropriate or meaningful for these two allotments because of the inaccurate data from the Parker Three Step range condition classification and because the grazing systems from the table do not apply" (*in litt.* February 23, 1999). The Allowable Use Table presented in the Record of Decision was an attempt by the Forest Service to implement the recommendations of the Recovery Plan which states: "implement and enforce grazing utilization standards that would attain good to excellent range conditions within key grazing areas" and "establish maximum allowable use levels that are conservative and that will expedite attaining and maintaining good to excellent range conditions." Site-specific monitoring indicates clearly that utilization levels in "key areas" such as meadows and riparian areas have been in excess of 50%. While the Service supports the Forest Service's increased monitoring effort and improved strategy for determining range condition, we do not believe proposed utilization levels of 40% in the two pastures is supported by site-specific monitoring and therefore does not meet the intent of the Recovery Plan to maintain good to excellent range conditions. In addition, the use of only the pine/oak utilization monitoring results to indicate when cattle should be removed from the North Mormon Mountain and South Tinny Springs Pastures does not address the concern for small meadows. It is evident that over-utilization of meadows and riparian areas have been of concern since the early 1980s (*in litt.* February 23, 1999).

In summary, the Service believes that reproductive success of MSO associated with three PACs (Red Raspberry, Weimer Springs and Mint Springs), may be negatively effected due to the high utilization by ungulates within springs and meadows within these PACs. These three PACs are located within the North Mormon Mountain and South Tinny Springs Pastures. Good to excellent range conditions are not being managed for in these key areas as the Recovery Plan recommends. Range condition information for both allotments was collected over 30 years ago and indicated "fair" and "poor" conditions. The Mud-Tinny Springs Environmental Assessment (1995) recognized that poor conditions and overutilization of riparian and meadow areas still exist as a result of both livestock and wild ungulate use. Current utilization monitoring calculates overall utilization in a pasture which dilutes the actual use levels within key areas. It is well known that these key areas receive utilization by ungulates that exceed the recommended 50% utilization levels for the pastures. These effects are aggravated by ungulate use and it is unclear if livestock fencing alone, as proposed, will alleviate concerns. The Service does not believe an adequate analysis or justification of the 40% utilization level has been conducted. We have concentrated our effects analysis primarily to the North Mormon Mountain and South Tinny Springs Pastures, but it is likely that good to excellent range conditions are not being maintained in key areas within other pastures. We strongly advocate the application of the at least the intent of the Allowable Use Guide located in the Record of Decision for the Amended Forest Plans (1996) in the absence of more specific analysis for this allotment.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are subject to the consultation requirements established under section 7, and, therefore, are not considered cumulative in the proposed action. In past Biological Opinions, it has been stated that, "Because of the predominant occurrences of MSO on Federal lands, and because of the role of the respective Federal agencies in administering the habitat of the MSO, actions to be implemented in the future by non-Federal entities on non-Federal lands are considered of minor impact." However, there has been a recent increase of harvest activities on non-Federal lands within the range of the MSO. In addition, future actions within or adjacent to the project area that are reasonably certain to occur include urban development, road building and widening, land clearing, trail construction, and other associated actions. These activities have the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, and cause disturbance to breeding MSO, and would contribute as cumulative effects to the proposed action.

CONCLUSION

After reviewing the current status of the Mexican spotted owl, the environmental baseline for the action area, the effects of the proposed actions, and the cumulative effects, it is the Service's biological opinion that the Mud Tinny and Tinny Springs Allotments as proposed, is not likely to jeopardize the continued existence of the MSO. Designated critical habitat for this species has been revoked, therefore; none will be affected.

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 FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by FWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the (agency) so that they become binding conditions of any grant or permit issued to the (applicant), as

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

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

In past Biological Opinions, the management territory was used to quantify incidental take thresholds for MSO (see Biological Opinions provided by the Service to the Forest Service from August 23, 1993 through 1995). The 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, except in cases when area that may support owls have not been adequately surveyed.

Amount or extent of take

The Service anticipates that take of Mexican spotted owl will be difficult to detect because finding a dead or impaired specimen is unlikely. However, the level of incidental take can be anticipated by the loss of essential elements in the habitat that would affect the reproductive success of the species. The primary type of take expected to result from grazing on the Mud-Tinny and Tinny Springs Allotments is through harm by the reduction of suitability of the habitat for prey species, thus limiting the availability of prey for owls. This would impair the ability of Mexican spotted owl adults to successfully raise young. The Service anticipates that incidental take will occur to one pair of Mexican spotted owls and their young associated with each of the following PACs: Weimer Springs (040532), the Red Raspberry (040503), and Mint Springs (040523), for a total of three pairs.

The Service has defined incidental take in terms of habitat characteristics, and has used surrogate measures to identify when take has been exceeded. The Service concludes that incidental take of Mexican spotted owls from the proposed actions will be considered to be exceeded if the following conditions are met:

1. Required monitoring and reporting of utilization levels (livestock and wild ungulates) as well as written justification for desired conditions for the six key area plots located in PACs are not completed within the designated time frames.

2. Using key area monitoring in each pasture, utilization levels of 40% in the North Mormon Mountain Pasture and/or South Tinny Springs Pasture are exceeded by 10% or more in any one year, in either the pine or meadow plots.

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

Effect of the take

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

Reasonable and prudent measures

Regulations (50 CFR §402.02) implementing section 7 of the Act define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) would, the Service believes, avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

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

1. Implement and enforce grazing restrictions at springs and associated meadows in PACs within the North Mormon Mountain and South Tinny Springs Pastures.
2. Monitor grazing use by livestock and wildlife in key grazing areas (riparian areas, meadows, oak types) (USDI 1995) in the North Mormon Mountain and South Tinny Springs Pastures. Report findings to the Service on a yearly basis through the year 2002 -2003 (or until the allotment management plan (AMP) is completed).

Terms and conditions

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

The following terms and conditions are necessary to implement the reasonable and prudent measures. These actions have been identified by the Forest Service as either actions they plan to complete in fiscal year 1999, or in their monitoring plan for the two allotments. The Service reiterates these actions in order to emphasize their importance.

Terms and conditions to implement reasonable and prudent measure 1:

- 1.1 Modify the current fence at Weimer Springs to protect the spring itself and wet area below the spring. Prohibit livestock grazing within this area. This modification shall be completed prior to any livestock use of the North Mormon Mountain Pasture.
- 1.2 Install livestock-proof fencing at Mud Springs such that the spring and a portion of the tank are protected from livestock use and such that the majority of the meadow is no longer impacted by either livestock or dispersed recreation use (other than light impact use such as tent camping). Fence installation will be completed as early in the season as possible to reduce impacts caused by motorized vehicles, and it must be completed prior to livestock use of the North Mormon Pasture.
- 1.3 Both permittees (Mud-Tinny and Tinny Springs) will herd cattle out of Mint Spring and its associated meadow to ensure an even distribution of livestock in the South Tinny Pasture.

Terms and conditions to implement reasonable and prudent measure 2:

- 2.1 Each year, complete compliance monitoring, allotment inspections, range readiness assessments, rangeland utilization monitoring. Complete all aspects of long-term monitoring such as forage production surveys, condition and trend monitoring (particularly measurements of the permanent range cluster transects), soil and riparian conditions, and evaluation of watershed conditions at least once prior to completion of the allotment management plan.
- 2.2 Ensure that allowable use monitoring is conducted by the permittee and ensure that Forest Service personnel check such monitoring no less than once a month when livestock are in a pasture.
- 2.3 Identify locations of the key areas and key species in both the North Mormon Mountain and South Tinny Springs Pastures as outlined in the February 23, 1999, letter to the Service and provide this information to the Service prior to the issuance of the 1999 Annual Operating Plan. Key areas should include meadows, riparian areas, and oak types.
- 2.4 Add an additional key area monitoring plot in the South Tinny Springs Pasture; locate it in a small grassy opening inside the Mint Springs PAC. If such a site cannot be located, place the monitoring plot in opening within restricted habitat as close to the

- Mint Springs PAC as possible.
- 2.5 Fully document the methodology applied in the plant frequency monitoring described in the February 23, 1999, letter to the Service. Provide this to the Service upon completion.
 - 2.6 Livestock will be removed immediately from the South Tinny Springs Pasture, which is used by both herds, when 25% utilization is reached in either the pine/oak monitoring site or the small opening monitoring site within the Mint Springs PAC. Conduct formal monitoring of the Mint Springs PAC for all years these utilization levels are applied in the Pasture, until the year 2003 or until the AMP is completed. Demography study monitoring completed by Humboldt State University meets the intent of formal monitoring.
 - 2.7 Within the North Mormon Pasture, place key area monitoring plots in meadows that are not excluded from livestock grazing; if 40% utilization is reached in any plot, livestock will be removed from the pasture.
 - 2.8 All monitoring required as part of this incidental take statement, and reporting of the effectiveness of the terms and conditions shall be completed annually (calendar year or grazing year), and submitted to the Arizona Ecological Services Field Office at least 30 days prior to the issuance of the Annual Operating Plan. Signature responsibility for this annual report shall be the appropriate journey-level specialist(s). This report shall summarize for the previous calendar year: 1) application and effectiveness of the terms and conditions; 2) documentation of direct take, if any; 3) utilization monitoring summary and analysis; 4) justification for the desired condition definitions for the six key area plots located in Weimer, Mint, and Red Raspberry PACs, and 5) any suggestions for improving how terms and conditions are to be applied. If, at any time, expected monitoring results are not accomplished (e.g., utilization levels exceeded, monitoring is not completed on schedule) report these findings and any corrective actions taken to the Service as soon as possible, but within at least 15 days.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that no more than one pair of spotted owls and/or their associated young associated with the Mint Springs PAC (040523) will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Forest Service must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Notice: While the incidental take statement provided in this consultation satisfies the requirement of the Endangered Species Act, as amended, it does not constitute an exemption from the prohibitions of take of listed migratory birds under the more restrictive provisions of the Migratory Bird Treaty Act.

DISPOSITION OF DEAD, INJURED, OR SICK SPOTTED OWLS

Upon locating a dead, injured, or sick spotted owl, initial notification must be made to the Service's Law Enforcement Office, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (telephone: 602/835-8289) within three working days of its finding. Written notification must be made within five calendar days and should include the date, time, and location of the animal, a photograph, if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling specimens to preserve the biological material in the set possible state. If possible, the remains of intact owl(s) shall be provided to this office. If the remains of the owl(s) are not intact or are not collected, the information noted above shall be obtained and the carcass left in place. Injured animals should be transported to a qualified veterinarian by an authorized biologist. Should the treated owl(s) survive, the Service should be contacted regarding the final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA 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. Install a fence at Mint Springs and a portion of the linear meadow associated with the spring, or rest the South Tinny Springs Pasture until such a time as the fence is installed. Due to the potential cost of such an effort, we recommend pursuing alternative funding sources.
2. Implement a deferred or rest rotation grazing system for the Tinny Springs herd in South Tinny Springs Pasture.
3. Install a fence at Red Raspberry Tank to reduce impacts from recreationists.
4. Develop and initiate studies to gain a comprehensive understanding of how grazing affects the habitat of the Mexican spotted owl and its prey species.
5. Develop utilization standards for local geographic areas and habitat types, particularly in key

habitat types such as riparian areas, meadows, and pine/oak and mixed conifer forests, that incorporate allowable use levels based on current range conditions, key species, and the type of grazing system and standards which will accomplish moving rangeland conditions to good to excellent in the most expedient manner possible.

6. Apply a 40% or lower utilization standard across all pastures in the Mud-Tinny and Tinny Springs Allotments (excluding the North Mormon Mountain and South Tinny Springs Pastures which have already been discussed).
7. Conduct formal or informal MSO monitoring of the Red Raspberry, Mint Springs and Weimer Springs PACs between 1999 and completion of the AMP.
8. The issues of high utilization levels in both allotments and double-use of the South Tinny Springs Pasture should be addressed in detail in the upcoming AMP.
9. Do not double-enter the South Tinny Springs Pasture. This pasture should only be used by one year each year, not two as it is currently.
10. Install elk-proof fencing at Mud and Wiemer Springs in coordination with the Arizona Game and Fish Department.

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

REINITIATION - CLOSING STATEMENT

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

The Service appreciates your consideration of threatened and endangered species in amendment development. For further information, please contact Michele James or Bruce Palmer. Please refer to the consultation number 2-21-96-F-059 in future correspondence concerning this project.

Sincerely,

/s/ Dave L. Harlow
Field Supervisor

cc: Field Supervisor, Fish and Wildlife Service, New Mexico Field Office, Albuquerque, NM
Forest Biologist, Coconino National Forest, Flagstaff, AZ (attn: Cecilia Dargan)

Director, Arizona Game and Fish Department, Phoenix, AZ

Mud-Tinny Allotment.BO:MAJ:

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