United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

SUMMARY
BIOLOGICAL OPINION ON THE EFFECTS TO THE MEXICAN SPOTTED OWL, SACRAMENTO MOUNTAINS THISTLE, AND SACRAMENTO MOUNTAINS PRICKLY POPPY FROM THE PROPOSAL TO ISSUE A PERMIT FOR THE SACRAMENTO GRAZING ALLOTMENT, SACRAMENTO RANGER DISTRICT, LINCOLN NATIONAL FOREST, OTERO COUNTY, NEW MEXICO

Cons. #2-22-00-F-473

Date of the final opinion: February 4, 2004

Action agency: Sacramento Ranger District, Lincoln National Forest

Project: The proposed action includes issuing a 10-year term grazing permit for the Sacramento Grazing Allotment for 200 to 412 cattle and 5 horses from May 15- October 31 on the summer range and 200 to 335 cattle and 5 horses from November 1 - May 14 on the winter unit. This term grazing permit is proposed to be issued in 2004. The proposed Sacramento Grazing Allotment includes the following forage use: 1) 35 percent allowable forage use guideline for all key areas on the summer range; 2) 40 percent allowable forage use guideline for all key areas on the winter unit; and 3) 70 percent allowable forage use within temporary livestock holding facilities (livestock traps). These forage use guidelines include use by wild ungulates (e.g., elk).

Species affected: Mexican spotted owl (*Strix occidentalis lucida*), Sacramento Mountains thistle (*Cirsium vinaceum*), and the Sacramento Mountains prickly poppy (*Argemone pleiacantha* ssp. *pinnatisecta)*

Biological Opinion: The proposed action is not likely to jeopardize the Mexican spotted owl, the Sacramento Mountains thistle, or the Sacramento Mountains prickly poppy

Incidental take statement: There are two Mexican spotted owl protected activity centers (PACs) that are expected to be taken through harassment as a result of this project. We have provided reasonable and prudent measures and terms and conditions for the species.

Conservation Recommendations: Implementation of conservation recommendations is discretionary. Nine conservation recommendations are provided.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

February 4, 2004

Cons. #2-22-00-F-473

Jose M. Martinez, Forest Supervisor
Lincoln National Forest
Federal Building
1101 New York Avenue
Alamogordo, New Mexico 88310-6992

Dear Mr. Martinez:

This document constitutes the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed reauthorization of livestock grazing on the Sacramento Grazing Allotment, Sacramento Ranger District, Lincoln National Forest, USDA Forest Service (Forest Service), New Mexico. The proposed action is described under Alternative B of the Sacramento, Dry Canyon, and Davis Grazing Allotments Draft Environmental Impact Statement (DEIS) (Forest Service 2002) and the Biological Assessment for the Sacramento Grazing Allotment Management Plan and Ten-Year Term Grazing Permit (BA) (Sacramento Allotment) (Forest Service 2003a). The BA evaluates the potential impacts of this project on the Mexican spotted owl (*Strix occidentalis lucida*) (MSO), Sacramento Mountains thistle (*Cirsium vinaceum*) (thistle), the Sacramento Mountains prickly poppy (*Argemone pleiacantha* ssp. *pinnatisecta)* (poppy), and the proposed endangered Sacramento Mountains checkerspot butterfly (*Euphydryas anicia cloudcrofti*) (checkerspot butterfly) and its proposed critical habitat. You have determined that the proposed action "may affect, is likely to adversely affect" the MSO, the poppy, and the thistle, and will have "no effect" on the checkerspot butterfly and its proposed critical habitat.

The checkerspot butterfly and its proposed critical habitat are found within a portion of the Nelson Pasture, on the summer range of the Sacrament Allotment. According to the BA, this area does not receive any cattle use because of topography and lack of water. The Forest Service also indicated that the checkerspot butterfly and its proposed critical habitat are located within meadows that livestock are not prone to use, because the meadows are bounded by steep canyons and are inaccessible (G. Garcia, Forest Service, pers. comm., 2003). Moreover, there are no range improvements proposed for this area that would provide a water source for livestock. Russia Canyon is known to contain New Mexico penstemon (*Penstemon neomexicanus*) and orange sneezeweed (*Helenium hoopesii*), the larval and adult foodplants of the checkerspot butterfly (E. Hein, Service, pers. obs., 2003). However, adult and larval checkerspot butterfly surveys that have been conducted within the Sacramento Allotment in Russia Canyon have failed

to locate any individuals (Forest Service 1999, 2000a, 2000b, 2002c). During a site visit June 9, 2003, the Service and Forest Service discussed the proposed livestock grazing and any potential impacts to the checkerspot butterfly. Forest Service staff indicated that the checkerspot butterfly was only known to occur within the northern portion of the Nelson Pasture (G. Garcia, pers. comm., 2003). The Forest Service also indicated that the best information available supported their determination of "no effect" for the checkerspot butterfly, because the occupied and proposed critical habitat will not be grazed by livestock. Additionally, the Forest Service stated that they would reinitiate consultation if the checkerspot butterfly was documented within any portion of the Sacramento Allotment that was grazed by livestock, because this new information would reveal effects of the proposed action that may affect the checkerspot butterfly in a manner or to an extent that was not considered (50 CFR 402.16).

This document represents our biological opinion for the MSO, the thistle, and the poppy in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act).

Consultation History

This biological opinion is based on information provided in the BA (Forest Service 2003a); the DEIS for the project (Forest Service 2002); the previous consultation's administrative record including the June 9, 2003, revised and subsequently withdrawn, biological assessment for ongoing grazing on the Sacramento Allotment (Forest Service 2003e); email and telephone conversations between our staffs; data in our files; data presented in the MSO Recovery Plan (Recovery Plan), thistle, and poppy Recovery Plans (Service 1993, 1994, 1995a); Forest Service regional MSO data; literature review; and other sources of information including the final rules to list the MSO as threatened (Service 1993; 58 FR 14248) and final rule to designate critical habitat (Service 2001; 66 FR 8530). References cited in this biological opinion are not a complete bibliography of all literature available on the MSO, the thistle, poppy, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office. We received all the information necessary to begin formal consultation on July 14, 2003, when you submitted an amendment to the proposed action. Comments on the draft biological opinion from attorneys for the applicant were forwarded to the Service by the Forest Service on December 23, 2003. We have taken these comments into consideration during the preparation of the biological opinion.

Additionally, the following proposed action includes issuing a grazing permit for the Dry Canyon Allotment to the Sacramento Grazing Association. The Environmental Analysis for the Dry Canyon Allotment was completed on April 14, 1999. A biological assessment and evaluation was completed and signed on September 10, 1998. Consultation on the Dry Canyon Allotment was completed in late 1998, but is reinitiated as part of this proposal because the Forest Service analyzed the Dry Canyon Allotment in the DEIS, and updated the BA for the Dry Canyon Allotment and submitted it to the Service (Forest Service 2003f). The BA was updated because the Forest Service proposed to issue a term grazing permit for up to 75 cattle on the Dry Canyon Allotment in the DEIS, and the 1998 grazing criteria (Forest Service 1998) was revised

on April 15, 2002 (revised grazing criteria) (Forest Service 2002c). Using the revised grazing criteria, the Forest Service determined that the proposed action would result in a "may affect, not likely to adversely affect" for the poppy. We concur with your determination for the following reasons: 1) you will insure that monitoring of forage/range guidelines occurs (see description below), and implement remedies (e.g., livestock will be moved to other areas of the allotment) when your guidelines are not met; 2) no poppies or viable poppy seeds are present within the Dry Canyon Allotment; and 3) rangewide monitoring will occur for the poppy (Forest Service 2003f, 2003g). Thus, we concur with your determination.

The DEIS also considered reauthorization of livestock grazing on the Davis Allotment, but proposed the preferred action would not issue a grazing permit because of resource and management problems.

DESCRIPTION OF THE PROPOSED ACTION

Protection provided by the Grazing Standards and Guidelines

For clarity in both use of terms and process, we describe in detail our assumptions concerning the issuance and administration of the Sacramento Allotment. The Sacrament Grazing Allotment and other grazing permits are administered and enforced under the Forest Service's range management regulations (36 CFR 222), whereas Forest Plans are regulated by the National Forest System Land and Resource Management Planning (36 CFR 219).

In 1996, the 11 National Forest Plans in the Southwestern Region of the Forest Service were amended to add specific standards and guidelines for the MSO, grazing, and other management prescriptions (Forest Plan Amendments) (Forest Service 1995, 1996b). Standards and guidelines are the bounds and constraints within which all Forest Service management activities are to be carried out in achieving Forest Plan objectives (Forest Service 1996b, p. 87). Guidelines are the detailed information about implementation standards. While standards and guidelines both specify management bounds and constraints, the standards contain no discretionary elements, whereas the guidelines may occasionally contain discretionary elements. Grazing standards and guidelines were identified in the Forest Plan Amendments and were recently analyzed for the MSO in a programmatic biological opinion (Forest Service 1995; Service 2003). The language and intent of the Forest Plan Amendments were to incorporate the recommendations of the Recovery Plan (Service 1995a) to provide primary direction for site-specific project design (Forest Service 1995) (i.e., the Forest Plan Amendments are applied through project level environmental analysis and decisions).

The Forest Plan Amendments provided standards and guidelines applicable to livestock grazing and the MSO. Following these standards and guidelines, the Forest Service developed guidance criteria for determining the effects of on-going grazing and issuing term grazing permits on threatened, proposed, or endangered species (Forest Service 2002). The purpose of this guidance is to streamline consultation by using criteria to make section 7 effects determinations for

livestock grazing activities in the Forest Service's Southwestern Region. These guidance criteria do not constitute an amendment to Forest Plans, nor do they provide allotment management direction. However, the Lincoln National Forest used the criteria in the current BA to assess whether adverse affects are anticipated from the issuance of a 10-year grazing permit on the Sacramento and Dry Canyon Allotments. The Forest Service has proposed not issuing a permit for the Davis Allotment; thus, no species or critical habitat will be affected.

The Forest Service issues term permits for grazing allotments, and manages livestock grazing through the development of an allotment management plan (AMP). Terms and conditions of a 10-year term grazing permit can be modified to conform to current situations (e.g., drought) or because of resource conditions. These conditions can be modified in annual operating instructions or through the permit revision process, which is generally a letter from the District Ranger to the permittee.

The Lincoln National Forest Plan provides management direction and standards and guidelines for managing grazing on National Forest lands. These standards and guidelines are listed in the 1985 Lincoln National Forest Plan, as amended, (Lincoln National Forest Plan) and in the Forest Plan Amendments (Forest Service 1986, 1995). Generally, these standards and guidelines will: 1) manage range conditions to promote long-term health and sustainability of key forage species; 2) provide for other multiple resources and uses; 3) identify and monitor key forage areas and allowable forage use; and 4) assure the recovery and continued existence of listed species (Forest Service 1986, 1995).

The applicable standards and guidelines from the Lincoln National Forest Plan are:

1. Meet T&E species requirements in all range or grazing activities (p. 35);

2. Protect and enhance T&E species habitat. Collect plant seed. Protect riparian habitat (p. 87);

3. Achieve moderate (C) and high (D) levels of management on all full capacity range by end of second period (moderate is defined as management that provides, as a minimum, for deferment of pastures and improvement in livestock distribution. Moderate management may also provide for full rest of one or more pastures on an allotment, but requires additional improvement not normally associated with low level management; high is defined as management associated with extensive improvement development, which assures year-long rest of pastures and good distribution of livestock. Provides fully for plant and livestock needs. May entail extensive non-structural improvement for maximization and utilization of forage production) (p. 87 and 211);

4. Maintain level A management in Alamogordo watershed (level A excludes livestock grazing to protect other values or eliminate conflicts with other uses) (p. 87 and 211);

5. Protect and manage essential and critical habitats of threatened, endangered, and sensitive species through ensuring that legal and biological requirements of designated plant and animal species are met; further, identify data needs for threatened, endangered, and sensitive species (p. 205);

6. Identify, protect, and enhance existing and potential habitat of all T&E and sensitive species (p. 205);

7. Manage T&E species to attain total recovery levels over time (p. 205);

8. Limit human activity in protected activity centers during the breeding season (p. 206);

9. Forage use by ungulates will be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species (p. 206);

10. Manage and enhance the vegetation resource and bring permitted grazing use in balance with the forage allocated for use by domestic livestock. Place all allotments under appropriate levels of management (page 12);

11. Manage riparian areas to provide optimum vegetation and ecological diversity (page 13); and

12. Protect and enhance riparian habitat consistent with riparian area management policy set forth in the Regional guidelines (page 32).

The Forest Plan Amendments guidelines (Forest Service 1996b) applicable to this consultation are:

1. Implement forest plan forage utilization standards and guidelines to maintain MSO prey availability, maintain potential for beneficial fire while inhibiting potential destructive fire, maintain and restore riparian ecosystems, and promote development of MSO habitat. Strive to attain good to excellent range conditions (ROD p. 90);

2. Emphasize restoration of lowland riparian habitats (ROD p. 90); and

3. Identify key ungulate forage monitoring areas. These key areas will normally be 1/4 to 1 mile from water, located on productive soils on level to intermediate slopes, and be readily accessible for grazing. Size of the key forage monitoring areas could be

20 to 500 acres. In some situations such as high mountain meadows with perennial streams, key areas may be closer than 1/4 mile from water and less than 20 acres. Within key forage monitoring areas, select appropriate key species to monitor average allowable use (ROD p. 94).

4. In consultation with the Service, develop site-specific forage use levels. In the event that site-specific information is not available, average key species forage utilization in key forage monitoring areas by domestic livestock and wildlife should not exceed levels identified on page 94 of the ROD during the growing season.

The Forest Service has indicated that the Forest Plan Amendments are non-discretionary actions that must be implemented by each of the 11 National Forests in the Southwestern Region (P. Gaulke, Forest Service, pers. comm., 2003). We also note that, similar to other site-specific decisions, authorized grazing permits must be consistent with the applicable Forest Plan at the time they are issued (36 CFR 219.10). The DEIS found that the proposed action is consistent with National Forest Management Act (50 CFR 219). The applicable findings of the DEIS that relate to the consultation are:

1. Permitted grazing would be brought into balance with forage use allocated for use by domestic livestock;

2. The Sacramento Allotment would be under an appropriate level and intensity of management;

3. Forage use would be consistent with other resources and uses. Watershed, riparian, and surface water conditions would all improve. Recreation and wildlife conflicts would be reduced;

4. Forage use is at a level that assures recovery of threatened and endangered species;

5. Key monitoring areas are identified; and

6. Specific forage use levels are specified.

The Forest Service concluded in 1996 that the Forest Plan Amendments would be applied across the landscape during site-specific projects design (e.g., range allotments), and not just within MSO habitat (Forest Service 1995). The primary purpose of this and other standards and guidelines from the Forest Plan Amendments is to maintain and restore adequate levels of residual plant cover, fruits, seeds, and regeneration to provide for the needs of prey species and development of future MSO foraging and dispersal habitat. One of our major assumptions in Programmatic and site-specific consultations for the Forest Service is that activities will be planned within the bounds of the Forest Plan Amendments for the MSO, as well as the grazing management standards and guidelines. For these reasons, the Service assumes that the proposed

action will conform to the Lincoln National Forest Plan, as amended, including the Forest Plan Amendments.

Sacramento Allotment Permit

The proposed action includes issuing a 10-year term grazing permit for the Sacramento Allotment for 200 to 412 cattle and 5 horses from May 15 - October 31 on the summer range and 200 to 335 cattle and 5 horses from November 1 - May 14 on the winter unit. This term grazing permit is proposed to be issued in 2004.

The proposed Sacramento Allotment includes the following forage use: 1) 35 percent allowable forage use guideline for all key areas on the summer range; 2) 40 percent allowable forage use guideline for all key areas on the winter unit; and 3) 70 percent allowable forage use within temporary livestock holding facilities (livestock traps). These forage use guidelines include use by wild ungulates (e.g., elk). A guideline is defined in the DEIS as, "any issuance that assists in determining the course of direction to be taken in any planned action to accomplish a specific objective" (Forest Service 2002). The Forest Service has indicated that the implementation of the proposed action will improve overall range conditions. Although there is no specific time frame to accomplish this goal, our analysis assumes that the Forest Service will improve range conditions over the life of the 10-year term permit.

Our analysis of the Forest Service's BA and subsequent discussions with the Forest Service indicate that the term "leaf length" in the proposed monitoring section of the BA should be replaced by the term "herbaceous ground cover height" as it applies to the 4-in threshold proposed for MSO (G. Garcia, pers. comm, 2003). Within key areas, the 35 percent allowable forage utilization level on key forage species will be met. The Forest Service indicated that maintaining a 4-in herbaceous ground cover height for MSO prey habitat is part of the current proposal, and they will comply with this and other guidelines by monitoring key areas (Attachment A).

Therefore, our understanding of the proposed action is that the Forest Service will attempt to maintain the following range/forage guidelines on the Sacramento Allotment (i.e., the 10-year term grazing permit will be managed to ensure that the range conditions are not reduced below these minimum thresholds): 1) **herbaceous ground cover height**, which applies to both palatable and non-palatable species and is a standard that relates to the Forest Plan Amendments and the subsequent development of the MSO grazing criteria. Herbaceous ground cover height is proposed to be 4 in across the allotment; and 2) **forage utilization** is a percentage that indicates the difference between the amount of annual forage (i.e., as it applies to key palatable forage species) produced and consumed during the growing season. Forage utilization is proposed to be 35 and 40 percent for the summer and winter units, respectively, and 70 percent within the livestock traps. Forage utilization will be monitored, and could entail leaf length measurements, clipping and weighing, utilization cages or other methods the Forest Service determines is

appropriate. Throughout this biological opinion we refer to these terms collectively as forage/range guidelines.

The Sacramento Allotment consists of a summer and a winter unit. The summer grazing season would be from May 15 to October 31 and the winter grazing season from November 1 to May 14. The May 15th entry and the move dates on the summer pastures may vary up to 15 days in either direction, depending on range readiness, use, and the time it takes to move animals.

Within the summer unit are two main pastures, the North (Benson) and South (Hay/Wills). These pastures are proposed to be grazed under a two-year deferred rotation system. Each of the pastures are proposed to receive grazing use during approximately half of the summer season, alternating early and late season use annually. During year one, the Hay/Wills pasture would receive use during May, June, and July, and the Benson pasture would receive use during August, September, and October. During year two, the Hay/Wills pasture would receive use during August, September, and October, whereas the Benson pasture would receive use during May, June, and July. Likewise, the Atkinson and Nelson pastures are also part of the summer unit and would be on a two-year deferred rotation system. During year one, the Atkinson pasture would receive use during May, June, and July and the Nelson pasture would receive use during August, September, and October. During year two, the Atkinson pasture would receive use during August, September, and October, whereas the Nelson pasture would receive use during May, June, and July. Under this proposal, no more than 412 cattle and five horses would be grazed among the four pastures.

Within the winter unit, there are four main pastures, Alamo, Mule (Burleson), Pasture Ridge and Grapevine. Mule (Burleson), Pasture Ridge, and Grapevine Pastures would be grazed annually during the winter season (November 1 to May 14). Alamo Pasture will be grazed from November 1 to January 31 during the first two years of the new permit In the eight subsequent years of the permit, livestock use in Alamo Pasture will be monitored each December or January to determine whether an adjustment is needed to the number of livestock commensurate with the potential for livestock impacts on the poppy from herbivory and trampling. Adjustments could entail livestock removal, herd management (moving livestock within Alamo Pasture), or livestock reductions. Each pasture would only be grazed during part of the growing season (i.e., Alamo Pasture would be grazed from November 1 to January 31, whereas Mule (Burleson), Pasture Ridge, and Grapevine Pastures would be grazed from November 1 to May 14 each year. Under this proposal, no more than 335 cattle and five horses would be divided and distributed in all 4 pastures.

The proposed action will also manage the Sacramento Allotment to provide forage for the allotment's portion of the 1,000 head elk herd to be maintained in Game Unit 34. As part of this proposal the Forest Service and New Mexico Department of Game & Fish will jointly monitor livestock and elk use with utilization cages and pellet group transects established in key areas. The Forest Service indicated that livestock numbers and elk numbers may require additional adjustment depending on monitoring results. An estimated $72,000 in additional range

improvements and mitigation measures (identified below) would be implemented on the Sacramento Allotment (costs include materials funded by Range Betterment Funds). We assume that the Forest Service will provide a detailed schedule for these projects in the forthcoming AMP, including a description of monitoring methods and selection of key areas (see discussion below).

The BA identifies a variety of Range Betterment Improvement Projects and Mitigation Projects that are part of the proposed action on the Sacramento Allotment. These include projects to exclude livestock from environmentally sensitive areas, trick tank and pipeline repair and construction, and corral and livestock trap building and reconstruction. These projects are described below or are hereby incorporated by reference (Forest Service 2003a).

Livestock traps are small pastures designed specifically to hold livestock as they are gathered for a pasture move or during the annual shipping of calves. The permittees on the Sacramento Allotment do not have any adjacent private lands; therefore, livestock traps are located on Forest Service lands. We are not aware of specifics relating to base property for the Sacramento Allotment (e.g., see 36 CFR 222.3). Under the proposed action, livestock traps will encompass 502 acres (ac) of Forest Service lands (Table 1).

Table 1. Existing and proposed livestock traps within the Sacramento Allotment, Lincoln National Forest.

Existing Trap	Acres	Proposed Trap	Acres
Wills	100	Masterson	10
Peñasco	165	Russia	20
Wright Springs	186	Mule (Burleson) expansion	5
Mule (Burleson)	0.5		
Sacramento River	12		
Benson Canyon	3		
Total	467	Total	35

The forage use guideline in the livestock traps is proposed to be 70 percent of current growth, which is higher than the 35 percent on the summer and 40 percent on the winter unit. The allowable forage use guideline in the existing and proposed livestock traps will be higher as a result of high-intensity, short-duration grazing on these small areas. The major use period for livestock traps will occur around scheduled pasture moves, which occur in early spring, mid-summer and late fall (J. Goss, Sacramento Grazing Association, pers. comm., 2003). Forest Service staff and the permittee indicated that the livestock traps are used for approximately 14 days during each of these periods, unless livestock are injured and require medical care (J. Goss, pers. comm., 2003; G. Garcia, pers. comm., 2003).

Grazing exclosures are located within the Sacramento Allotment boundary but are not part of the Sacramento Allotment. Under this proposal, grazing exclosures will encompass 284 ac (Table 2).

Table 2. Existing and proposed exclosures that are not part of the Sacramento Allotment, Lincoln National Forest.

Existing Exclosure	Acres	Proposed Exclosure	Acres
Sacramento Lake	28	Telephone Canyon	10
Hubbell	13	Wills Canyon	4
Upper Mauldin	6	Water Canyon	3
Lower Mauldin	2	Sacramento River	3

Western Riparian	3		
Upper Peñasco	96		
Bluff Springs	116		
Total	264		20

The proposed action also includes the following:

1. Reconstruct the Wills Corral;
2. Reconstruct the Thousand Mile Corral;
3. Construct a 20-ac livestock trap in Russia Canyon;
4. Reconstruct Wright Spring livestock trap;
5. Construct a trick tank apron, storage, and trough in the head of Atkinson Canyon.
6. Construct a livestock trap approximately 10 ac in size in the Hay Canyon area;
7. Extend the existing pipeline in Grapevine Canyon by approximately 1 mile;
8. Expand the livestock trap in Mule (Burleson) pasture to less than 5 ac in size;
9. Fence about 2 ac of riparian wetland at the mouth of McAfee Canyon to exclude livestock;
10. Expand the existing wetland exclosure at Sacramento Lake by less than 1 ac;
11. Modify the plumbing of the existing troughs in Alamo and Caballero Canyons; and
12. Clean five existing earthen tanks in the Mule (Burleson) Pasture.
13. Fence a lane for cattle passage in the edge of the Upper Rio Penasco exclosure.

The following were identified in the BA and DEIS as actions that will be fully implemented as part of the proposed action. These conservation measures represent actions proposed by the Forest Service that were evaluated below as part of our jeopardy analyses. They are intended to minimize or avoid take associated with the MSO, and adverse impacts to the thistle and poppy. Therefore, these actions are non-discretionary, and must be undertaken by the Forest Service because they are part of the proposed action. If they are not fully implemented, the Service

should be contacted to determine if reinitiation of formal consultation is required (50 CFR 402.16).

We assume that as part of the proposed action documentation and reporting of the following will also occur:

1. Livestock use of traps will be limited to approximately 14 days in early spring, mid-summer and late fall, unless livestock require medical care;

2. Exclosures will have no livestock use at any time;

3. A livestock/elk monitoring plan will be developed and implemented;

4. A noxious weed assessment will be completed for all ground disturbing or site altering range improvement projects to determine the risk of increasing the spread of noxious weeds;

5. Salt locations will be rotated to reduce impacts caused by concentration of livestock around salt grounds;

6. Use of salt will be prohibited within 1/4 mile of riparian areas or within sight of the Cloudcroft to Sunspot Highway #6563 and the Sacramento River Road #537;

7. Livestock grazing will be excluded with temporary fencing on future revegetation projects and on sites where livestock grazing is hindering natural revegetation;

8. Water will be made available for wildlife use at all existing and future water development projects in pastures where livestock are present. Storage tanks will be left full, where feasible, when livestock are removed from a pasture;

9. Cattle will be removed from Alamo Pasture prior to February 1 during the first two years of the permit (i.e., grazing will only occur from November 1 to January 31). In the eight subsequent years of the permit, livestock use in Alamo Pasture will be monitored each December or January to determine whether an adjustment to the number of livestock is necessary commensurate with the potential for livestock impacts on the poppy from herbivory and trampling;

10. Regular scheduled and unscheduled allotment inspections will be conducted to determine the condition and efficiency of range improvements, forage/range guidelines, livestock distribution patterns, and locations of salt and mineral supplements;

11. Monitoring guidelines and thresholds of when management changes are needed have

been established (Attachment A). Proposed monitoring includes visits on: 1) May 1st or prior to the entry of cattle to the winter and summer pastures; 2) May 31st or within 15 days after livestock leave winter pastures; 3) August 1st at approximately the mid-point of the grazing season or 10 days after rains start in the summer unit (monitoring in all key areas will determine if the 4-in herbaceous ground cover height is being achieved); 3) both the summer and winter pastures within 15 days after the end of the permitted grazing season; and 4) the winter unit in October. The Forest Service indicated that management action will be taken if the forage/range guidelines, as described above (i.e., herbaceous ground cover height, and forage utilization), are not met. As part of this process, they will also include the effect of elk and deer on forage/range guidelines;

12. Measure long-term range condition and trend on key sites during the 10-year life permit;

13. Assess adherence to the prescribed forage utilization guidelines using measurements on key forage species. Monitoring on key areas will determine compliance with forage/range guidelines.

14. Construct and maintain the Wills Canyon riparian exclosure within the existing Wills Canyon Trap. Water troughs will also be established in the trap to provide livestock water;

15. Construct and maintain the Peñasco pens riparian exclosure within the existing Peñasco Trap. This action will exclude about 2 ac in the upper portion of the trap in Water Canyon and fence two thistle populations in the eastern portion of the trap;

16. Reconstruct two trick tanks in Mule (Burleson) Pasture. This action will replace the catchments pads and ensure these existing tanks are functional;

17. Construct and maintain up to a 0.5 miles of a rim drift fence between the winter and summer units. This action will prevent unauthorized livestock drift between the winter and summer units; and

18. Construct an additional fence in the existing Rio Peñasco exclosure The fence will be situated along the west side of Forest Road 164 from the existing cattle guard at the intersection of New Mexico Highway 6563 and Forest Road 164, to the first cattle guard about ¾ mile south of Forest Road 164. The additional fence will create a lane where cattle can only pass through the edge of Upper Rio Peñasco exclosure without having to pass through the center of it.

STATUS OF THE SPECIES (range-wide)

Mexican spotted owl

a. Species/critical habitat description

The MSO was listed as threatened on March 16, 1993 (Service 1993; 58 FR 14248). Critical habitat was designated on June 6, 1995 (Service 1995; 60 FR 29914), but was subsequently withdrawn on March 25, 1998 (Service 1998; 63 FR 14378). Critical habitat was proposed again on July 21, 2000 (Service 2000; 65 FR 45336) and finalized on February 1, 2001 (Service 2001; 66 FR 8530). There is no critical habitat designated on Forest Service lands in New Mexico. Background and status information on the MSO is found in the Final Rule listing the MSO as a federally-threatened species (Service 1993; 58 FR 14248), previous biological opinions provided by us to the Forest Service, and the Recovery Plan (Service 1995a). The information on species description, life history, population dynamics, status, distribution, and range-wide trends provided in those documents is included herein by reference and is summarized below.

The American Ornithologist's Union recognizes three spotted owl subspecies: California spotted owl (*S. o. occidentalis*), MSO (*S. o. lucida*), and northern spotted owl (*S. o. caurina*). The MSO is distinguished from the California and northern subspecies by plumage, genetic makeup, and geographic distribution. The MSO is mottled in appearance with irregular white and brown spots on its abdomen, back and head. Its white spots are larger and more numerous than in other subspecies giving it a lighter appearance. Several thin white bands mark its brown tail. Unlike most other owls, all spotted owls have dark eyes.

Although the vegetative communities and structural attributes used by the MSO vary across its range, they consist primarily of warm-temperate and cold-temperate forests, and to a lesser extent, woodlands and riparian deciduous forests. The mixed-conifer community appears to be the most frequently used community (Skaggs and Raitt 1988, in U.S. Fish and Wildlife Service 1995a).

b. Life history

MSOs breed sporadically and do not nest every year (Gutierrez *et al.* 1995). Reproductive chronology varies across its range. MSOs call mainly from March through November and are usually silent from December through February (Ganey 1990). Calling activity increases from March through May (although nesting females are largely silent during April and early May), and then declines from June through November (Ganey 1990). 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 early April. The incubation begins shortly after the first egg is laid and is done entirely by the female (Ganey 1988). Incubation period for MSOs is assumed to be 30 days (Ganey 1988, Forsman *et al.* 1984). During incubation and the first half of the brooding period, females leave the nest only to defecate, regurgitate pellets, or receive prey from their mate (Forsman *et al.* 1984, Ganey 1988). Foraging is done entirely by males during incubation and the first half of the brooding period.

Clutch sizes of 1 to 3 eggs have been reported but little information on clutch size exist because of general inaccessibility of nests (Gutierrez *et al.* 1995). Geo-Marine (2002) reported that during the 2001 field season in their study, 12 pairs established nests, 8 hatched young, and 6 fledged at least 1 young (9 owlets fledged).

Nestlings fledge in four to five weeks and disperse in September and October (Ganey 1988, Gutierrez *et al.* 1995, Arsenault *et al.* 1997, Willey and van Riper 2000). Eighty-five percent of juveniles disperse in September and 15 percent in October (Willey and van Riper 2000). MSOs banded as juveniles were not observed settling in natal territories (Gutierrez *et al.* 1996, Arsenault *et al.* 1997, Willey and van Riper 2000). Arsenault *et al.* (1997) reported that three sub-adult females paired temporarily with adult males in their first summer, but left in the fall, suggesting that dispersal can continue through the second year. More data are needed on patterns of juvenile dispersal to help form the basis for structuring individual and metapopulation models.

Little research has been conducted on causes of MSO mortality. Great horned owls (*Bubo viginianus)* and northern goshawks (*Accipiter gentilis*) are the primary causes of mortality for fledged young and dispersing juveniles and rarely for adults (Gutierrez *et al.* 1995). Other known mortality factors are starvation and accidents.

Previous studies (reviewed in Ganey and Dick 1995) suggest that MSOs are highly selective for roosting and nesting habitat, but forage in a wider array of habitats. The Recovery Plan assumed that availability of roosting/nesting habitat was a key factor limiting the distribution of the MSO. MSOs prefer the coolest parts of the forest in order to dissipate their body heat, and therefore, usually choose nest sites on northern and northeastern facing slopes (Peery *et al.* 1999). These communities are structurally diverse and are characterized by uneven-aged, multistoried forests with high canopy closure (U.S. Fish and Wildlife Service 1995a).

Nesting habitat is typically in complex forest structure or rocky canyons and contains mature or old-growth stands with uneven-aged, multistoried, high canopy closure (Ganey and Balda 1989a, Peery *et al.* 1999). Nest sites have been reported at elevations of 7,000 feet (ft) to 9,350 ft (Seamans and Gutierrez 1995, Geo-Marine 2003). Aspect at the nest site ranged from northwest to northeast with slope ranging from 5 percent to 62 percent (Seamans and Gutierrez 1995, Geo-Marine 2003). In southern Utah and Colorado, most nests are in caves or on cliff ledges in steep-walled canyons. Gutierrez and Rinkevich (unpublished 1991) reported that all MSOs were found in deep, steep-walled canyons in Zion National Park, Utah. In the Gila National Forest, nests were always found in some type of mixed-conifer forest (Douglas-fir/mixed-conifer, white fir, Engelmann or blue spruce forest) (Geo-Marine 2003). Seamans and Gutierrez (1995) reported that all nests in their study were on limbs deformed by dwarf mistletoe infection in Douglas-fir. Nest trees were the oldest and largest within the nest stand (Seamans and Gutierrez 1995). In north-central Arizona, MSOs nested in areas with 70 percent or higher proportions of a closed canopy (Grubb *et al.* 1997). This is also consistent with MSO habitat descriptions in other areas of Arizona and in New Mexico (Ganey and Balda 1989, 1994; Seamans and Gutierrez 1995; Ganey *et al.* 1999).

A wider variety of tree species are used for roosting, but Douglas-fir is still used most frequently (Ganey 1988, Fletcher and Hollis 1994, Zwank *et al.* 1994, Seamans and Gutierrez 1995, Young *et al.* 1998, Peery *et al.* 1999, Ganey *et al.* 2000, Geo-Marine 2003). Roost sites tend to have steeper slopes, more canopy layers, higher canopy height, greater canopy closure, and greater live tree and snag basal area than random sites and are closely associated with well-shaded areas, low on canyon slopes or in canyon bottoms and cool areas and riparian habitats (Ganey and Balda 1989, Zwank *et al.* 1994, Ganey *et al.* 1998, Young *et al.* 1998). Gutierrez and Rinkevich (1991) reported finding MSOs in steep canyons characterized with high humidity, multiple vegetation strata and high percentage of ground litter in narrow canyons. Mean slope aspect was northwest to northeast (Seamans and Gutierrez 1995, Geo-Marine 2003). The position of most roost sites (94 percent) on the slope was within the lower two-thirds (Zwank *et al.* 1994, Seamans and Gutierrez 1995, Ganey *et al.* 2000, Geo-Marine 2003). Seamans and Gutierrez (1995) suggested that mixed-conifer forests provide stable and favorable year-round conditions, whereas MSOs residing in pine-oak forests are forced to adjust roost-site use. Roost sites have been reported at elevations of 6,200 ft to 9,200 ft (Zwank *et al.* 1994, Seamans and Gutierrez 1995, Tarango *et al.* 1997, Young *et al.* 1998, Geo-Marine 2003). Slope angles range from 0 to 67 degrees (Tarango *et al.* 1997, Geo-Marine 2003). In pine-oak stands where mixed-conifer is not available, MSOs roost in the middle to upper third of the slope (Young *et al.* 1998, Ganey *et al.* 2000). Canopy closure at roost sites ranges from 48 percent to 85 percent (Tarango 1997, Seamans and Gutierrez 1995, Young *et al.* 1998, Geo-Marine 2003). Roost trees range from 30 ft to 100 ft in height and 10 in to 24 in diameter at breast height (dbh) (Tarango *et al.* 1997, Geo-Marine 2003). Ganey and Balda (1994) reported both roosting and foraging sites in northern Arizona had greater canopy closure, more big logs, greater densities and basal areas of both trees and snags than random sites. Ganey and Balda (1994) also concluded that mature forests are important to MSOs in northern Arizona, and different forest types may be used for different activities. In Chihuahua, Mexico, Young *et al.* (1998) reported 16 percent of MSOs roasted in caves, all with high timber component surrounding the caves.

Seasonal movement patterns of MSOs are variable. Some MSOs are year-round residents others remain in the same general area, but show shifts in habitat use patterns. Some MSOs move 12 to 31 miles (mi) in winter, generally to more open habitats at lower elevations (Ganey and Balda 1989b, Willey 1993, Ganey *et al.* 1998). MSO home-range size appears to vary considerably between habitats and geographic areas (U.S. Fish and Wildlife Service 1995a). It ranges in size from 647 to 3,688 ac for individual birds, and from 945 to 3,846 ac for pairs (Ganey and Balda 1989b, Ganey *et al.* 1999).

MSOs disperse into diverse biotic communities. Little information exists about habitat use by juveniles during natal dispersal. Arsenault *et al.* (1997) reported dispersing juveniles were found to roost in habitat unlike that normally used by adults, including open ponderosa pine and pinyon/juniper habitat. 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. The onset of juvenile dispersal is sudden and in various directions

(Arsenault *et al.* 1997, Willey and van Riper 2000). Juvenile dispersal takes place in September and October, with 85 percent leaving in September (Gutierrez *et al.* 1995, Arsenault *et al.* 1997, Willey and van Riper 2000).

Riparian forests function as important components of ecosystems supporting MSOs. These communities, particularly mature, multilayered forests, can be important linkages between otherwise isolated subpopulations of MSOs. They may serve as direct avenues of movement between mountain ranges or as stopover sites and connect large expanses of landscape that otherwise would be inhospitable to dispersing MSOs. Historical evidence shows that MSOs once nested in riparian habitats (U.S. Fish and Wildlife Service 1995a).

Geo-Marine (2003) reported that winter and early spring rainfall emerged as significant predictors of MSO presence. Their preliminary results showed that MSOs preferred areas with greater rainfall. Closed and unused roads were also significant predictors of MSO pair occupancy (Geo-Marine 2003).

Ward (2001) provided strong evidence that spotted MSOs select habitats according to the distribution of their prey. MSOs generally use a wider variety of forest conditions (mixed-conifers, pine-oak, ponderosa pine, pinyon-juniper) for foraging than they use for nesting/roosting. In northern Arizona, Ganey and Balda (1994) reported that MSOs foraged more in unlogged forests containing uneven-aged stands of Douglas-fir and white fir, frequently with a strong component of ponderosa pine, than in managed forests.

The primary MSO prey species are woodrats (*Neotoma* spp.), peromyscid mice (*Peromyscus* spp.), and microtine voles (*Microtus* spp.) (U.S. Fish and Wildlife Service 1995a, Young *et al.* 1997, Seamans and Gutierrez 1999). MSOs also consume bats, birds, reptiles, and arthropods (U.S. Fish and Wildlife Service 1995a). Habitat correlates of MSO's common prey show that each prey species uses unique habitats. A diverse prey base is dependant on availability and quality of diverse habitats. MSO foraging habitats include canyon bottoms, cliff faces, tops of canyon rims, and riparian areas (Willey 1993, Gutierrez and Rinkevich 1991). Previous studies have found variation in MSO's prey according to geographic region (U.S. Fish and Wildlife Service 1995a, Young *et al.* 1997). Patterns in the consumption of some prey, like woodrats, vary as a latitudinal-longitudinal cline, with more woodrat biomass consumed in northwestern portions of the MSO's range and the least taken in southern portions (Sorrentino and Ward 2003). Consumption of other species, like voles, is clearly limited to areas where MSOs hunt near or within montane meadows (Sorrentino and Ward 2003).

Mexican woodrats (*N. mexicana*) are typically found in areas with considerable shrub or understory tree cover and high log volumes, or rocky outcrops associated with pinyon-juniper woodlands (Ward 2001). Willey (unpublished data) found that MSOs in canyons were foraging primarily in pinyon-juniper. This corresponds to woodrat distribution and abundance (Sureda and Morrison 1998). Ward (2001) reported moderate amounts of tree cover and snags corresponded to higher woodrat abundance. Mexican woodrat abundance increased with the

volume of large, undecomposed and highly decomposed logs (Ward 2001). The diet of Mexican woodrats was 70 percent forbs and 7 percent shrubs (Ward *et al.* 2003). These proportions were similar to that found in the woodrats' local environment.

Sorrentino and Ward (2003) considered woodrats an important food source for the MSO occurring in the Guadalupe Mountains, New Mexico. Seamans and Gutierrez (1999) found that woodrats were the most important prey based on relative biomass, followed by white-footed mice. Delaney *et al.* (1999) and Young *et al.* (1997) reported that woodrats represented the highest percentage of prey biomass in MSOs' diets in the Sacramento Mountains and in Aguascalientes, Mexico, respectively.

Deer mice (*P. maniculatus*) are ubiquitous in distribution in comparison to brush mice (*P. boylei*), which are restricted to drier, rockier substrates, with sparse tree cover (Ward 2001). Although deer mice were common in all vegetation types sampled, Ward (2001) found them to be more abundant in the mid-seral stage (60 to100 years in age) of mixed-conifer forests. Sureda and Morrison (1998) reported deer mice distribution in all vegetation types they surveyed. They attributed its ubiquitous distribution to the heterogeneous distribution of vegetation types in their study area.

Mexican voles (*M. mexicanus*) are associated with montane meadows and high herbaceous cover, primarily grasses; whereas, long-tailed voles (*M. longicaudus*) are found in mesic forest habitats with dense herbaceous cover, primarily forbs, many shrubs, and limited tree cover (Ward 2001). Ward (2001) reported that when biomass in montane meadows dropped below 1 kilogram per hectare, no Mexican voles were found in either mesic or xeric forests in the Sacramento Mountains. Production of grasses and forbs had a strong positive association with summer abundance of Mexican voles (Ward 2001). In his study, Ward (2001) reported 2.6 in (6.6 cm) of mean maximum height of summer grasses or forbs was a threshold, above which Mexican vole abundance increased with the height of herbaceous vegetation during summer months.

Geo-Marine (2003) results suggest that MSOs avoid areas with aircraft noise and were found in areas with low aircraft noise. Johnson and Reynolds (2002) and Geo-Marine (2003) reported that MSOs did not flush from their roost or nest as a response to aircraft noise. Delaney *et al.* (1999) found that MSOs did not flush when noise stimuli from helicopters and chainsaws were greater than 115 yd (105 m) away. Chainsaws were more disturbing to MSOs than helicopter flights at comparable distances (Delaney *et al.* 1999). Delaney *et al.* (1999) recommended a 115-yd buffer for helicopter overflights to minimize MSO flushing responses and any potential effects on nesting activity. Other recommendations were diurnal flights and separating overflights along the same path by 7 days (Delaney *et al.* 1999).

c. Population dynamics

Historic population estimates and range distributions are not known; however, present population size and distribution are thought to be similar (U.S. Fish and Wildlife Service 1995a). Ninety-

one percent of known MSOs existing in the United States between 1990 and 1993 occurred on land administered by the Forest Service; therefore, it is the primary administrator of lands supporting MSOs (U.S. Fish and Wildlife Service 1995a). Most MSOs have been found within 11 National Forests of Arizona and New Mexico. It is unknown why forests in Colorado and Utah support fewer MSOs. The Recovery Plan divides the MSO's range into 11 Recovery Units (RU), 5 in Mexico and 6 in the United States. The six RUs in the United States are: (1) The Southern Rocky Mountains - Colorado, (2) Southern Rocky Mountains - New Mexico, (3) Basin and Range East, (4) Basin and Range West, (5) Upper Gila Mountains, and (6) Colorado Plateau. The Recovery Plan identifies locations, descriptions, recovery criteria, and provides distribution, abundance, and density estimates for each RU.

In 2003, the Forest Service, Region 3 reported 987 PACs in Arizona and New Mexico (Forest Service 2002e). Based on this number of MSO sites, total MSO numbers in the National Forests within Region 3 range from 987 to 1,974, depending on whether one bird or a pair occupies the PAC. Geo-Marine (2003) reported that 306 out of 662 (46 percent) MSO detections were made in known Forest Service PACs. The remaining 356 of 662 (54 percent) detections were in previously unidentified areas on Forest Service land, indicating that additional surveys are needed. Survey efforts in areas other than Forest Service lands are also likely to result in additional sites throughout the different RUs. The Service believes that 12 PACs are in Colorado and 105 PACs are in Utah on Forest Service lands. Therefore, a total of 1,104 PACs has been identified on Forest Service lands. Tribal, State, private lands, and Mexican PACs are not included in this calculation.

Seamans *et al.* (1999) reported strong evidence of 10 percent or greater population declines in central Arizona and west-central New Mexico. Populations in both of the study sites (i.e., the upper Gila Mountains on the Coconino Plateau, Arizona and the Tulorosa Mountains, New Mexico) experienced lower survival rates at the end of the study period (late 1990s). Trends in annual fecundity and juvenile survival were similar between study areas; MSOs experienced higher fecundity and juvenile survival in the earlier years of the study. Seamans *et al.* (1999) stated that the large influx of subadult birds into the territorial populations in early years and the rapid decline of the populations thereafter suggests that no floater (i.e., non-breeding, non-territorial) population existed on either study area or that the floater population was not large enough to compensate for mortality among territorial individuals. In addition, density on the two study areas appeared to be closely related to reproductive output from the previous 2 years (Seamans *et al.* 1999). This suggested that the floater population was nonexistent or declining and that population densities were sustained only after relatively "good" years of reproduction. Because the trends in reproduction were strongly correlated between the two study areas, the authors suggested that a regional phenomenon, possibly in combination with other factors, may have influenced population dynamics (Seamans *et al.* 1999).

d. Status and distribution

The MSO has the largest geographic range of the three subspecies. The range extends north from

Aguascalientes, Mexico, through the mountains of Arizona, New Mexico, and western Texas, to the canyons of southern Utah, and southwestern Colorado, and the Front Range of central Colorado. Because this is 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 MSOs' range has not been surveyed. The MSO 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.

Past, current, and future timber harvest practices in Region 3 of the Forest Service, in addition to catastrophic wildfire, were cited as primary factors leading to the listing of the MSO as a federally threatened species. Other factors that have or may lead to the decline of this species include a lack of adequate regulatory mechanisms. In addition, the Recovery Plan notes that forest management has created ecotones favored by great horned owls, increasing the likelihood of predation on the MSO. Scientific research, birding, educational field trips, and agency trips are also likely to increase and could lead to harassment. Finally, there is a potential for increasing malicious and accidental anthropogenic harm, and the potential for the barred owl (*Strix varia*) to expand its range, resulting in competition and/or hybridization with the MSO.

Bond *et al.* (2002) reported on short-term effects of wildfires on spotted owls throughout the species range. The authors reported that relatively large wildfires that burned nest and roost areas appeared to have little short-term effect on survival, site fidelity, mate fidelity, and reproductive success of spotted owls, as rates were similar to estimates independent of fire. Bond *et al.* (2002) hypothesized that spotted owls may withstand the immediate, short-term (1-year) effects of fire occurring at primarily low to moderate severities within their territory. The Forest Service (2003) reported similar results following the 2002 Lakes Fire in the Jemez Mountains of north-central New Mexico. Danney Salas (Forest Service, pers. comm., 2003) reported that of the ten PACs that are currently being monitored within the footprint of the Scott Able Fire, nine sites has MSO detected. He also reported that the same number of MSO pairs before and after the Bridge Fire have been detected and have reproduced within the fire footprint. He also indicated that there were two MSO nest areas found in areas where fire retardant (slurry) was used during suppression activities. Since the fire, these areas have not been used as nest sites, in spite of the trees not having burned at the nest sites; however, MSOs have been detected in the general area (D. Salas, pers. comm., 2003). Given historical fire regimes within its range, the MSO may be adapted to survive wildfires of various sizes and severities.

Since the owl was listed, we have completed or have in draft form a total of 125 formal consultations for the MSO. These formal consultations have identified incidences of anticipated incidental take of MSO in 347 PACs. These consultations have primarily dealt with actions proposed by the Forest Service, Region 3. However, in addition to actions proposed by the Forest Service, Region 3, we have also reviewed the impacts of actions proposed by the Bureau of Indian Affairs, Department of Defense (including Air Force, Army, and Navy), Department of Energy, National Park Service, and Federal Highway Administration. These proposals have included timber sales, road construction, fire/ecosystem management projects (including

prescribed natural and management ignited fires), livestock grazing, recreation activities, utility corridors, military and sightseeing overflights, and other activities. Only one of these projects (release of site-specific owl location information) has resulted in a biological opinion that the proposed action would likely jeopardize the continued existence of the MSO.

In 1996, the Service issued a biological opinion on Forest Service Region 3's adoption of the Recovery Plan recommendations through an amendment of their Forest Plans. In this non-jeopardy biological opinion, we anticipated that approximately 151 PACs would be affected by activities that would result in incidental take of MSOs, with approximately 26 of those PACs located in the Basin and Range East RU. In addition, we completed a reinitiation of the 1996 Forest Plan Amendments biological opinion which anticipated the additional incidental take of five MSO PACs in Region 3 due to the rate of implementation of the grazing standards and guidelines, for a total of 156 PACs. To date, consultation on individual actions under the amended Forest Plans have resulted in 262 PACs adversely affected, with 41 of those in the Basin and Range East RU.

Sacramento Mountains prickly poppy

a. Species/critical habitat description

The poppy was described in 1958 (Ownbey 1958). The type locality for the poppy is 9.6 miles west of Cloudcroft, New Mexico, at an elevation of 6,600 ft. This subspecies occurs from the lower edge of the ponderosa pine community down through the pinyon/juniper zone into the Chihuahuan Desert (7,100 ft to 4,300 ft). It is found only on the west face of the Sacramento Mountains escarpment between La Luz Creek and Escondido Canyon where it occurs in seven canyon systems. Occupied canyons have largely intermittent flows after storm events or have springs that flow for a limited distance. However, plants do not grow directly in saturated soils. The poppy is an early successional plant, often occupying sites that have been disturbed and exhibit enhanced soil moisture conditions. Plants grow directly in the rocks and gravel of stream beds, on vegetated bars of silt, gravel, and rock, on cut slopes, and occasionally up on the banks. Sites range from full exposure to 50-75 percent shaded.

The poppy was listed as endangered August 24, 1989 (Service 1989, 54 FR 35302). No critical habitat was designated. The Recovery Plan for the poppy was signed in August 1994 (Service 1994).

b. Life history

The poppy is a short-lived, perennial, herbaceous, sub-shrub that dies back to the root crown each year. The life-cycle of the subspecies includes germination in the late winter/spring, as early as February at the lower elevations. Germination sites must have sufficient moisture for establishment of seedlings, conditions that likely require episodes of sufficient rainfall or semi-riparian conditions (Malaby 1987). Seedlings grow slowly, producing a juvenile plant rosette the

first year. Young plants must survive sustained drought conditions from germination, as early as February, until the start of monsoonal rains, usually in July. Seedlings have been described as delicate and not tolerating disturbance well until they have had a chance to establish their taproot (Wood and Galeano Popp 1992).

Second-year plants green-up in February at lower elevations. Adult plants bloom after the plant bolts, generally the second year, if moisture availability has allowed for sufficient growth. Flowers are present from late May into September at the lower elevations. Fruits mature throughout the flowering season, shedding seeds that are distributed by water flow, soil movement, birds, or insects. Observations on life span indicate that individual plants live about seven to nine years. Mature plants have been observed to be large and vigorous for years, and then to not re-grow in a subsequent year (Forest Service 2003a).

Sarah Wood, Mayhill/Cloudcroft District Botanist, observed in 1991 that poppy populations appear to increase after flash floods (Wood 1991). The tumbling action of the water and gravel is believed to provide scratching or scarification of the seed coat needed to allow germination. Although the soil seed bank may be high, a lack of disturbance may result in a lack of germination in some years leading to wide fluctuations in poppy occurrence. Sivinski (1992), conducted a study of poppy seed germination. He determined that cold treatment and scarification together led to the highest germination rates. Seedling germination trials were also carried out by the Desert Botanical Gardens in Phoenix, Arizona (2003). Seeds were not scarified or cold treated. There was no germination success for 110 seeds placed on sterile medium and kept in temperature and light conditions simulating natural conditions for the five-month trial period (Forest Service 2003a). Both of these studies support the assumption that poppy seeds require some kind of seed coat scarification in order to germinate. The optimal type and amount of disturbance are not known.

c. Population dynamics

Although the poppy has been shown to produce a relatively large amount of seed (Sivinski 1992), germination rates and seedling success are also influenced by available moisture. Environments that provide little soil moisture may limit seedling success significantly. Sivinski (1992) noted "... there is an abundance of moderately to severely disturbed habitats all around these prolifically seeding plants that remain unoccupied. Apparently, there are very few sites in which this poppy can successfully become established, and for reasons that are not readily apparent. The poppy produces an abundance of viable seed, so the population bottleneck is either in germination or seedling establishment. Most likely, the relative rarity of this plant is caused by its frequent failure to become established after germination. This is a vulnerable period when the young plant has insufficient roots to survive a prolonged dry spell. Rare micro-habitats that harvest runoff or have soils with better water holding capacities may be the only places where juveniles can survive to adulthood. This could account for the sporadic distribution of this poppy." Lack of sufficient moisture at the optimal time during germination is likely to result in wide fluctuations in poppy occurrence from year to year. Poppy seedlings were monitored at the mouth of Alamo Canyon in the spring of 2001. On March 14, 2001, 210

seedlings were found. By June 11, 2001, 13 seedlings remained, and by July 26, 2001, only 2 seedlings remained (Guaderrama and Barker 2001). Seedlings were not found in this location in 2002 or 2003 (Forest Service 2003a).

Sustainability of poppy populations is also greatly influenced by their dependence on pollinators. Tepedino (1992) investigated pollination biology, fruit set, and seed production of poppies and concluded "...that [the poppy] will set little or no fruit unless visited by pollinators." Self-pollination resulted in significantly fewer seeds per fruit. Lower levels of out-crossing also result in lower fruit set (Tepedino 1992).

d. Status and range-wide trends

In 1977, poppies were known from La Luz, Fresnal, Alamo and Dog Canyons. Between May and July 1987, a survey was conducted for the poppy (Malaby 1987) on 6,331 ac of Federal, State, City of Alamogordo, and private lands. A total of 1,290 plants were found. Seventy-four percent of all poppies found (955 plants) were located in Alamo and Caballero Canyons. Eighty-four poppies were found on 46 ac of suitable habitat owned by the City of Alamogordo at the mouth of Alamo Canyon. Within the Forest Service managed portion of Alamo Canyon, 570 plants were found in continuous habitat of 60 ac near the mouth of Purgatory Canyon. Deadman Canyon, a branch off lower Alamo Canyon, contained only two poppies. Only two canyons outside of Alamo and Caballero Canyons contained more than 100 plants. Dog and Fresnal Canyons were reported to have 157 and 130 poppies, respectively (Malaby 1987). Surveys conducted on both Bureau of Land Management and Mescalero Apache Nation lands documented one population of 12 poppies in San Andres Canyon. The 1987 surveys documented a peak in recorded population levels. The summer of 1987 represented the culmination of a string of 18 years of above mean annual precipitation levels, with only 1970, 1973, 1975, 1977, and 1980 having below mean precipitation (Forest Service 2003a). It is likely that high precipitation resulted in greater success of poppy germination and establishment. Additional surveys extended the geographic range of the subspecies in Mule Canyon (18 plants) in 1988, and Escondido Canyon (45 plants) at Dripping Spring in 1989 (Forest Service 2003a).

In 1990, 861 poppies were documented in Alamo and Caballero Canyons, a 10 percent reduction from the 1987 survey. One hundred and ninety-four poppies were reported in Dry, Salado, Mule, San Andres and Dog Canyons in 1990. A visit in the summer of 2001 to the poppy population on City of Alamogordo land at the head of Alamo Canyon failed to locate poppy plants previously observed on several occasions in the late 1990s. Plants in the openings away from the dirt road were no longer present (Forest Service 2003a).

Salas (1999) conducted a partial survey of Alamo and Caballero Canyons. He estimated the survey covered only two-thirds of the suitable habitat and located 402 plants. If two-thirds of the habitat yielded 402 plants, 603 plants could be estimated as the number present if all habitat had been surveyed. This number of poppies represents a 37 percent reduction from the 955 found in 1987, and a 30 percent reduction from the 861 plants reported in 1990. Seedlings, or plants of

the year which had not bolted or flowered, accounted for 12 percent of plants found. This level of seedling presence was higher than general observations had indicated over the previous four years. The New Mexico Rare Plant Technical Council (1999) reported that the number of poppies "appears to have declined in recent years. The reasons are unknown; it is speculated that plant establishment is very episodic."

A survey of all canyons historically reported as supporting the poppy, except for Alamo/Caballero and Fresnal/La Luz Canyons, was conducted in the summer of 2002. Only three plants were located, one in Dog Canyon and two in San Andres Canyon (Worthington 2002). This represents a substantial decline, especially in Dog Canyon, down from 157 plants reported in 1990, and from 18 plants reported in San Andres Canyon in 1990.

The Alamo and Caballero Canyon population contains the majority of the poppies (Table 3). In 2003, surveys conducted in Alamo and Caballero Canyons documented 545 adults in June (Salas 2003). Table 3 summarizes poppy survey data from 1987 through 2003.

Table 3. Data collected during poppy surveys (Forest Service 2003a)

Canyon/Year	1987	1988	1990	1994	1999	2001	2002	2003
La Luz								
Fresnal	130							
Alamo/ Caballero	**955**		**861**		**~603**			**545**
Dog	157		157				1	
Mule Canyon		7	~10				0	
Escondido		45						
San Andres	12		18				2	
Salado			~9				0	
Dry			~11	8		0	0	

Major threats identified in the final listing rule (Service 1989, 54 FR 35302) and in the Recovery Plan (Service 1994) include surface-disturbing activities from water pipeline projects (repair, replacement and maintenance), road construction and maintenance (including mowing and herbicide use), flash floods, trampling and grazing from livestock, and off-road vehicles. Since the listing of the poppy in 1989, new threats to the species have been documented. A fungal stem canker was documented by Sivinski (1999). Seven out of eighteen plants in Dog Canyon

failed to set fruit and subsequently died as a result of the canker. Decreasing genetic diversity is a growing concern as populations of poppies and their distribution throughout historic habitat decrease.

Recovery Criteria are described in the Recovery Plan as follows: 1) establish or maintain 10 reproducing populations of the poppy within 10 currently occupied canyons, 2) maintain populations documented through monitoring over at least a 10-year period, and 3) populations should be geographically distinct and represent the total geographic range and genetic variability of the species.

Sacramento Mountains thistle

a. Species/critical habitat description

The thistle was first collected near Fresnal, New Mexico in 1899. This location is believed to be in Fresnal Canyon where several travertine formations can be seen within the highway right-of-way along US Highway 82 on private lands. Wooton and Standley (1913) described the thistle. The Service listed the thistle as threatened on June 16, 1987 (Service 1987, 52 FR 22933). No critical habitat was designated. The original proposal for critical habitat included a 155 square mile area. The Service determined "the large area included in the (critical habitat) proposal to accommodate the Forest Service's management needs cannot be justified as an area that is essential to the conservation of *C. vinaceum*. The proposed critical habitat is thus being withdrawn." Smaller tracts of occupied habitat were considered for designation as critical habitat, but concern for vandalism caused this consideration to also be dropped.

The thistle occurs within the mixed conifer zone between 7,500 to 9,200 ft, primarily on limestone substrate in the Sacramento Mountains. It is an obligate riparian species endemic to travertine seeps and springs and their outflow creeks. Occupied sites occur primarily in non-forested and forested areas with partial shade. The extent of occupied sites and plant numbers fluctuate with rainfall and the amount of surface flow available. Plants are most abundant at sites with water available at, or just beneath the surface. Water flow fluctuates with annual rainfall patterns and is re-channeled as passages are blocked naturally with travertine deposits. This causes the flows to migrate back and forth across travertine slopes that are hundreds of years old (Forest Service 2003a).

b. Life history

The thistle is biennial (lives for two years). There is no documentation of the timing of seed germination in the wild. In the first year, a basal rosette develops. Basal leaves are spiny along the margins. Individual plants may produce more than one rosette along basal rhizomes and damaged or cut leaves have been observed to produce roots (Thomson 1991). The plants go dormant in the fall and winter and turn yellow. The following spring, the basal rosette becomes green and then bolts, producing a purple flowering stalk beginning in late June. Flower stalks

may reach 6 ft in height and produce numerous purple flower heads on a widely-branched inflorescence. Flower and seed production occur primarily in July and August. Adult plants die in their second year, after flowering.

The flowers are pollinated by insects, including the hawk moth and 28 species of bees, and 5 species of hummingbirds (Tepedino and Griswold 1989). Seeds are relatively large and often may not shed readily from the flowering head (Forest Service 2003a). Seeds are carried with water flow when they are dispersed (Craddock and Huenneke 1997). Thomson (1991) found that the thistle appears to experience heavy seedling mortality, and also has low tolerance of freezing.

c. Population dynamics

Travertine substrates at springs and streams are the most densely occupied habitats. Along streams and wet seeps, thistles tend to be more scattered in their distribution. The Recovery Plan (Service 1993a) states that these scattered individual plants may serve as "stepping stones" in the flow of genes between larger populations on more suitable habitats. As discussed, pollinators include hummingbirds, numerous species of bees, beetles, flies, and moths. The seeds are heavy, and do not disperse from the seed head readily (Forest Service 2003a). The Recovery Plan surmises that gene flow from pollen vectors and seed dispersal is probably effective up to about 0.5 miles. However, it has been reported that five species of hummingbirds pollinate the thistle (Tepedino and Griswold 1989), suggesting that gene flow through pollen may be much more extensive, potentially throughout the range of the thistle.

A 1990 inventory located 196,000 rosettes (approximately 49,000 plants), both juvenile and mature. By 1993, the number of known population areas had increased from the original estimate of 20 at the time of listing, to 62 sites, some being subdivisions of the original populations, within approximately 150 square miles. In 1993, the 58 known sites on National Forest System lands were reported to support at least 49,000 plants on 66 ac (Service 1993a). Intensive surveys have since been completed within suitable habitat throughout the range of the species on the Forest. In 1995, there were 77 occurrences known on the Lincoln National Forest. All known sites, except two that are inaccessible, were visited by Dr. Laura Huenneke during a monitoring study in 1995, when she documented 342,310 plants (Forest Service 2003a).. Starting in 1995, a new counting method was implemented following recommendations of Dr. Huenneke. This method uses the number of bolted stems times 10 to estimate the number of plants (Forest Service 2003a). Dr. Barlow-Irick surveyed 81 sites in 1998, and found 398,490 plants (Forest Service 2003a). In 2001, number of estimated plants decreased to 347,090 at 82 sites (Forest Service 2003a). Other sites occur on private or Mescalero Apache Nation lands, but the number of thistles at these sites are unknown.

d. Status and distribution

At the time of listing, the range of the thistle was understood to be approximately 20 known population areas containing an estimated 10,000 to 15,000 sexually reproducing individuals.

Threats to the thistle include: habitat destruction through the impacts of livestock and water development, competition with introduced plant species, road construction, logging, and recreational activities. (Service 1987, 1993a).

The thistle has a recovery priority number of 2 out of 18, with 1 being the highest priority. Recovery Criteria as determined in the Recovery Plan are described as follows: 1) acquire water rights for the purpose of maintaining travertine habitats and protecting at least 30 percent of the occupied spring localities, including at least one occupied spring in each of the 20 occupied main canyon systems, 2) ensure permanent protection for the thistle in at least 75 percent of the known occupied habitat, both spring and riparian sites, under established management plans, and 3) establish a 10-year monitoring and research program to demonstrate effectiveness of management plans. The Recovery Plan acknowledges that New Mexico does not have an instream-flow statute and calls upon the Forest Service to protect thistle sites by controlling the point of water withdrawal by Special Use Permits. "Until the State of New Mexico adopts instream-flow or similar legislation, the Sacramento Mountains thistle must remain listed as threatened under the Act" (Service 1993a).

ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the Act, when considering the effects of the action on federally listed species, we are required to take into consideration the environmental baseline. Regulations implementing the Act (50 FR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. We have defined the action area for the MSO to include the Basin and Range East RU.

Status of the species within the action area

Mexican spotted owl

The entire Lincoln National Forest is within the Basin and Range East RU. The Basin and Range East RU contains the second highest concentration of known MSO sites (16 percent) in the United States. Because of the high concentration of MSOs, the Basin and Range East RU has been referred to as an important MSO distribution center in the Recovery Plan. This subspecies occurs in isolated mountain ranges scattered across the Basin and Range East RU, but the largest portion of the MSO subpopulation occurs in the Sacramento Mountains. MSOs are most common in mixed-conifer forest, but have been located in ponderosa pine forest and piñon/juniper woodland on a few occasions (Skaggs and Raitt 1988). This subspecies has been reported on National Forest lands in the Sandia, Manzano, Sacramento, and Guadalupe

Mountains, as well as the Guadalupe National Park and on Mescalero Apache Nation lands (Service 1995a).

The range-wide population of the MSO is naturally fragmented into geographically distinct subpopulations. Because of its size and location, the Basin and Range East RU likely plays a very important role in the metapopulation dynamics of the MSO in the southwest (Stacey 2000). However, other authors believe that the MSO population in the Sacramento Mountains likely contributes very little to other subpopulations (e.g., Ward 2001). Nevertheless, dispersal is the mechanism that connects subpopulations and the larger metapopulation (e.g., see Gutierrez *et al.* 1996; Ganey *et al.* 1998). Adult and subadult MSOs are relatively sedentary; however, juveniles almost always disperse from their natal sites (Service 1995a and references therein). Consequently, the key to maintaining connectivity between distinct subpopulations appears to be reproduction (i.e., the production of juveniles that are likely to disperse). It is likely that weather, habitat condition, the MSO's population structure, and prey availability all interact to influence variation in the MSO's reproductive performance (Ward 2001).

MSOs occurring in the Sacramento Mountains have been exposed to various disturbances for more than a century. Disturbances include forest fires and human disturbances, including timber and fuelwood harvest, grazing, land development, and recreation. Coniferous forests, especially the mixed-conifer, were extensively logged during an era of railroad logging from 1890 to 1945 (Glover 1984). After the railroad logging era, trees grew rapidly and attained merchantable sizes in about 40 to 50 years on favorable sites. Consequently, much of the habitat currently used by MSOs in the Sacramento Mountains is regrowth forest that has attained a high density of moderately sized trees, poles, and saplings, together forming multiple layers. According to the Recovery Plan, the greatest threats in the Basin and Range East RU, in order of potential effects, are catastrophic fire, timber harvest, fuelwood harvest, grazing, human developments, and forest insects and disease. Other activities that are considered potential threats to the MSO include certain military operations, other habitat alterations (such as powerlines and roads), mining, and recreation. Recovery in this unit will require management and maintenance of existing and future populations by managing and conserving habitats in areas not only inhabited by MSOs, but also in unoccupied suitable or potentially suitable habitats (Service 1995a). Forest management activities (timber sales, etc.) on adjacent Tribal and private lands, urban development in and around the Village of Cloudcroft, and fire suppression also affect the environmental baseline of the MSO.

Other past and present Forest Service projects that may contribute to the environmental baseline are: the Wildland Urban Interface programmatic biological opinion (Service 2001c), the Rio Peñasco II vegetation management project (Service 2002), the historic and ongoing grazing within the Sacramento, Scott Able, and North Bluewater Allotments and other grazing allotments, the Bridge fire fuelwood salvage, and programmatic biological opinions for the Forest Service's Forest Plan Amendments (Service 1996b).

In addition, the risk of catastrophic habitat loss due to fire is extremely high (Service 1995a,

Government Accounting Office 1999, Kaufman *et al.* 1998). Past fires such as the Burgett, Bridge, and Scott Able fires, have modified thousands of ac of habitat and impacted multiple MSO territories. The Scott Able fire burned 16,034 ac, of which 14,551 were administered by the Lincoln National Forest and 1,483 ac were private land. Approximately 12,291 ac that burned were considered suitable MSO habitat. The fire affected all or portions of six PACs and two additional PACs are adjacent to the burned area. Additionally, the Peñasco Fire of 2002, burned 2,921 (4 percent) out of 71,825 ac of mixed conifer within the Peñasco proposed project area. The Peñasco Fire burned 516 ac within 5 PACs, 427 ac of mixed conifer at slopes greater than 40 percent and 2,144 ac of restricted habitat (Forest Service 2002d).

The Sacramento Allotment consists of approximately 111,484 ac of National Forest System lands, ranging in elevation between 4,500 and 9,700 ft. About 83,089 ac within the allotment are not usable for grazing due to steep topography, dense canopy cover, areas of insufficient forage production because of natural site limitations such as rock, or inaccessibility because of private land holdings. Vegetation types within the allotment vary primarily with elevation and aspect, and include mixed-conifer and ponderosa pine forest, aspen, oak and pinon-juniper woodlands, mountain meadows, desert scrub, desert grassland, riparian (high and low elevation), and desert washes. The Sacramento Allotment contains approximately 40 miles of perennial streams, which is approximately 50 percent of all riparian resources on the Sacramento Ranger District. Based on the Forest Service's Region 3 standards and guidelines for riparian areas and riparian inventory data, less than 10 percent of the riparian zones associated with these perennial waters are in satisfactory condition (Forest Service 2002).

MSO density within the Basin and Range East RU is relatively high, but little is known about the population trend (Service 1995a). Currently, there appears to be fewer occupied PACs on the Sacramento Ranger District compared to the early 1990s (Forest Service 2002a, Stacey 2000). However, the difference may be related to survey methods and corresponding survey efforts (e.g., informal monitoring results in substantially less survey effort than formal monitoring) (Service 1995a). As a complicating factor, PACs that are monitored are not a random sample of all existing PACs within the Basin and Range East RU (Service 1995a). The Recovery Plan found that changes in occupancy rates of existing PACs does not provide for a valid inference about changes to the MSO population (Service 1995a). For example, on the Sacramento Ranger District in 2001, 53 of 109 PACs were not surveyed and 21 were informally monitored, but no MSOs were detected, whereas formal monitoring found that 33 PACs were occupied and 1 was unoccupied (Forest Service 2002a). It is important to note that where formal monitoring was conducted, 97 percent of the PACs were found to be occupied. Alternatively, many of the PACs were not surveyed or the survey procedures varied substantially among PACs. Thus, we came to a similar conclusion as the Recovery Plan, that changes in occupancy rates for PACs over the last decade may not reflect true changes in the MSO population and may only represent different levels of survey effort or other administrative factors. The monitoring program for a recently proposed study on MSO within the Sacramento Ranger District will use consistent survey methods to survey 90 PACs outside the proposed project area to provide additional data to analyze the effect of treatments on the MSOs (Service 2002). These and other data will be essential to understanding the population trends of MSOs within the Basin and Range East RU.

Currently, there are a total of 138 MSO PACs on the Lincoln National Forest. Of these, 109 PACs are on the Sacramento Ranger District. Of these PACs, many have a variety of uses occurring in them including grazing, powerlines, winter recreation (e.g., snowmobile use), and other recreational uses (hunting, camping, hiking, etc.). On the Lincoln National Forest, mixed conifer habitat is considered either protected or restricted habitat as defined in the Recovery Plan (Service 1995a). PACs and slopes greater than 40 percent (that have not experienced timber harvest in the last 20 years) are considered protected habitat. There are 46 PACs within the Sacramento Allotment (Appendix A). Two PACs are located within the winter unit, and an additional 44 PACs are located within the summer unit.

The current Sacramento Allotment is a result of the combination of 10 historical allotments. In the late 1970s, the High Nogal Ranch Inc. acquired the grazing permits for all 10 allotments. The District took the opportunity to combine the allotments, since the control of livestock was under one entity.

An Environmental Analysis and AMP were approved in 1979. The AMP prescribed an intensive rotation grazing system to be implemented along with an extensive range improvement development program. This plan was followed for two years. In 1983, bankruptcy was filed which left the implementation of the AMP only partially realized. Between 1983 and 1989, the Sacramento Allotment experienced light stocking to years of total non-use by livestock. In 1989, the Sacramento Grazing Association acquired the grazing permit for the Sacramento Allotment. They did not acquire the accompanying private land, which was an integral part of the allotment. The allotment was gradually stocked to the permitted numbers under an interim grazing system, involving separate summer and winter units. Each of the two summer pastures was grazed for the full summer season on alternating years. The strategy on the winter unit involved scattering livestock as best as existing water sources would allow. The range improvements on the entire allotment had also deteriorated because of non-maintenance. This made the AMP of 1979 essentially nonfunctional.

Monitoring in 1991 and 1992, when full livestock permit numbers were present showed forage use levels above Forest Plan standards and guidelines and other resource needs. Monitoring, since 1992, has also shown that the Sacramento Allotment has not been able to consistently meet the previous forage/range guidelines on the summer unit (Forest Service 2000d, 2001, 2002, 2002b, 2002c, 2003a, 2003b, 2003c, 2003d). Monitoring in 2001 and 2002 indicated that the 35 percent forage utilization standard from 2000 was exceeded in both years. For example, in 2001 and 2002, monitoring documented that the combined grazing of cattle and elk utilized 81 and 76 percent of available forage, respectively (Forest Service 2003c).

During these years, herbaceous ground cover heights/leaf lengths at the end of the summer grazing season were also minimal. Although annual operating instructions since 2001 have identified a 4-in herbaceous ground cover height/leaf length standard for Kentucky bluegrass (*Poa pratensis*) and 6 in for orchard grass and smooth brome (*Bromus inermis*), the average

herbaceous ground cover height/leaf length on Kentucky bluegrass was only 2.7 in and only 3.9 in for orchard grass and smooth brome. Monitoring of forage utilization has documented that by mid-September allowable use levels were already met, even though 1.5 months remained in the permitted summer grazing season (Forest Service 2003a). Leaf length data collected at 19 sites in 2001 and 2002, also documented that only one of the sites met the 4-in guideline in October. From these data, the Forest Service determined that the leaf length standard for September and October was not maintained within meadows and riparian areas on the Sacramento Allotment (Forest Service 2003a).

Moreover, in 2001 and 2002, cattle began moving onto the summer unit prior to the permitted May entry date. In fact, livestock were reported within the Atkinson Pasture of the summer unit in March 2003. Early entry of livestock into the summer unit can further degrade range conditions, prior to the beginning of the growing season. In August 2003, the Forest Service concluded that by the end of the grazing season, key forage leaf lengths would drop below the minimum threshold, and individual forage plants could suffer damage and possible mortality. To ensure that this did not happen, the Forest Service required the permittee to remove livestock prior to the end of the grazing season (Forest Service 2003c). The New Mexico Range Improvement Task Force (NMRITF) also conducted monitoring on the Sacramento Allotment in 2003. Although the Forest Service does not agree with the averaging methodology used by the NMRITF, results from this rapid assessment methodology found an average forage leaf length of 4.7 and 3.65 in the north and south pastures, respectively between September 29 and October 1, 2003, (New Mexico State University 2003). We are unclear how to interpret these data.

This year, additional monitoring was also conducted throughout the Sacramento Ranger District to evaluate whether herbaceous ground cover height for Mexican vole, a forest management indicator species, was being maintained. Methods were detailed in Ward (2001), and entailed randomly selecting a 10-m line intercept and sampling height of the tallest grass stem or forb leaf across 10 points along the transect. The 2003 annual operating instructions indicated that leaf length/stubble height should be monitored very carefully throughout the grazing season (May 16 to October 31) (Forest Service 2003b). Consequently, results from this year's monitoring were used to assess whether herbaceous ground cover height was being maintained across the District.

The MSO PACs were selected at random, and key areas within the Sacramento Allotment were monitored during July and August 2003. Average maximum grass-forb height for 4 of 6 key areas were less than 1.4 in, and only one ungrazed key area (Telephone) had a height over the permitted standard (Table 4) (P. Ward, Forest Service, pers. comm., 2003). The average maximum height for these key areas was significantly below the standard of providing at least 4 in throughout the grazing season, which was identified in the 2003 annual operating instructions. The Forest Service indicated in their 2000 BA for the allotment, herbaceous ground cover height of 2.4 in has been found to be a lower threshold, below which the Mexican vole, a primary MSO prey species, is essentially not found (see also Ward 2001). Ward indicated that a more comprehensive analysis demonstrated that 1.6 in was the lower threshold where, on average, no Mexican or long-tailed voles would be expected to occur in key grazing areas when the

maximum grass-forb height was equal to or less than this value (P. Ward, pers. comm., 2004). In fact, abundance estimates of Mexican and long-tailed voles from July and August 2003 indicate that these species were found in low numbers or were non-existent within many of the key areas monitored (P. Ward pers. comm., 2004). These data indicate that the majority of key areas, including the Hubble and Bluff Springs PACs, did not maintain the minimum herbaceous ground cover height during the summer grazing season (Table 4).

Table 4. Average maximum grass-forb height of key areas within meadows of an MSO PAC (i.e., key areas) within the Sacramento Allotment.

PAC (meadow acres)	Date Sampled	Average Maximum Grass-Forb Height (in)
Masterson (45)	July 3, 2003	1.7
Telephone (10)	July 6, 2003	7.2*
Water (26)	July 18, 2003	1.2
Bluff Springs (97)	July 16, 2003	1.4
Wills (14)	July 30, 2003	0.8
Hubble (86)	August 1, 2003	0.8

*Monitoring indicated no livestock use within this key area

In summary, the Forest Service has determined that the previous forage/range guidelines have consistently not been met on the Sacramento Allotment (Forest Service 2003a). The lack of consistent application of these forage/range guidelines has likely adversely affected the MSO. Since 1999, the Forest Service documented the following adverse activities within the Sacramento Allotment: 1) livestock grazing has repeatedly occurred within exclosures that are not part of the allotment; 2) the minimum 4-in herbaceous ground cover height and 35 percent grazing utilization guidelines have not been met; 3) riparian areas have continued to degrade 4) cattle grazing has occurred before and after the permitted grazing period; 5) healthy cattle were confined to livestock traps during periods not permitted; 6) salt blocks and livestock concentration areas were located within riparian communities and adjacent to water sources; 7) forage utilization already exceeded guidelines in some pastures prior to authorized grazing; and 8) little to no standardized monitoring and reporting, and a subsequent lack of permit enforcement has occurred (Forest Service 2000d, 2001, 2002, 2002b, 2002c, 2003a, 2003b, 2003c, 2003d). We do not consult on the permit enforcement issues, because these are not considered an otherwise lawful activity (50 CFR 402); however, the above activities have occurred within the action area and affect the current status of the species.

<u>Sacramento Mountains prickly poppy</u>

All or portions of five canyon systems historically and currently occupied by this species are included in winter pastures of the Sacramento Allotment. Alamo and Caballero Canyons, which had 74 percent of all poppies found in 1987, are completely within the Alamo winter pasture of the allotment. Surveys conducted in June 2003, documented 545 poppies in Caballero and Alamo Canyons; a 43 percent decrease from a population high of 955 plants in 1987.

Occupied or suitable habitat for the poppy in Mule, San Andres and Escondido Canyons is either inaccessible to livestock, or occurs well below grazed areas (Forest Service 2003a). The headwaters of Fresnal Canyon are included within summer pastures of the allotment. A survey of all canyons historically reported as supporting the poppy, except for Alamo/Caballero and Fresnal/La Luz Canyons, was conducted in the summer of 2002. Only three plants were located, one in Dog Canyon and two in San Andres Canyon (Worthington 2002).

Threats to the poppy in the action area include surface-disturbing activities such as road and pipeline maintenance, grazing and trampling by livestock, off-road vehicles, water extraction, drought, fungus, and flooding. Motorized trail use affects poppies within Alamo and Caballero Canyons. Plants are also impacted by Otero County road maintenance along unpaved National Forest System roads in Fresnal Canyon. Plants are also impacted in Fresnal Canyon by State Highway Department maintenance work along US Highway 82. A fungal stem canker has been reported as the cause of 7 of 18 plants failing to set fruit and dying in Dog Canyon (Sivinski 1999). The impacts of water extraction, drought, and grazing are discussed in greater detail.

Currently, the Sacramento Ranger District, and the area occupied by the poppy, are experiencing drought conditions. Five of the last 7 years have received less than the 62-year mean amounts of rainfall (Western Regional Climate Center 2003). The City of Alamogordo captures water at the head of Alamo and Caballero Canyons reducing the amount of water available to the poppy. The drought and exportation of water decrease the amount of water available to the poppy. Approximately 0.25 mile sections of stream exist in Alamo and Caballero Canyons when drought conditions are not too severe. Because the poppy seedlings are delicate and sensitive to drying until they establish their taproot, any factor that increases soil dryness most likely affects seedling establishment.

The Forest Service (2003a) also believes that livestock use in Alamo pasture has impacted vegetation and reduced the moisture-holding capacity of soils. For example, decreases in sod-forming root masses and woody vegetation can lead to an increase in flood-water velocity and subsequent loss of top soil. Canyon-bottom riparian areas provide increased levels of livestock forage and represent the majority of the suitable acres within the Alamo pasture. Canyon bottoms also provide shade that livestock take advantage of as temperatures warm in the spring. These sites are believed to be the enhanced-moisture habitat that are most favorable to seedling establishment for the poppy. Based on observations of poppy germination, the failure to locate very many seedlings since 2001, drought conditions, and grazing impacts after germination, the Forest Service is concerned that sites in the canyon bottoms may not be suitable for poppy survival (Forest Service 2003a).

Thirty-nine mature poppies and 12 seedlings were monitored at 3 sites in Alamo Canyon in April 1994. No herbivory or trampling of seedlings was documented. Thirteen mature plants had evidence of herbivory or trampling (13/[39+12] = 25 percent of plants received use or trampling). Livestock were removed from the Alamo Canyon area by May 15, 1994. During the June 1994 visit, no plants showed any signs of herbivory or trampling. Plants that had evidence of herbivory or trampling in April appeared to have recovered by June. Poppies with fresh grazing evidence showed black tips on grazed leaves (Forest Service 2003a). In 1994, black tips on plants found early in the growing season were interpreted as freezing damage (Forest Service 2003a).

In 1995, 48 poppies were monitored at three sites in Alamo Canyon. Eight plants showed evidence of herbivory (8/48 = 17 percent of plants received use). Livestock were removed from Alamo Canyon by May 15, 1995. During the June visit, 45 of the plants were found. No plants showed any sign of herbivory or trampling. Plants that had evidence of herbivory in April appeared to have recovered by June (Forest Service 2003a).

Following field surveys, Salas (1999) estimated 603 plants occurred in Alamo and Caballero Canyons in 1999. Seventy-two percent of the plants seen in the two canyons were accessible to livestock. Because the canyons contain many inaccessible side drainages that were not surveyed, the real proportion of plants that are accessible to livestock was estimated to be considerably less than 72 percent. Evidence of grazing on the plants was not visible because livestock had not been in the pasture for 4 months.

In 2000, photo monitoring was conducted in Alamo Canyon by district wildlife staff. A total of 13 plants in each of three plots in the lower, middle and upper canyon were photographed in April, May, and August. Only two plants showed evidence of herbivory in April. Photos of several small plants indicate that very little growth occurred during the monitoring period, perhaps due to the drought conditions (Forest Service 2003a). Monitoring of the poppy was conducted in lower Alamo Canyon in February 2002 (Salas 2002). No poppy seedlings were found, although adults were greening-up. The Forest Service documented herbivory on a majority of the adult poppy plants found in March 2003, between the mouth of Alamo Canyon and the junction with Caballero Canyon.

Studies of pollination biology and subsequent fruit set and seed production conducted by Tepedino (1992) conclusively show that the poppy will set little or no fruit unless visited by pollinators. Self-pollination, either within one flower or among flowers of the same plant, results in significantly fewer fruits and fewer seeds per fruit ($P<0.001$ in each case) (Tepedino 1992). With fewer, more widely spaced plants, out-crossing may become more difficult, while lower fruit set and seed production could inhibit population recovery.

Livestock grazing is currently authorized on the winter unit of the Sacramento Allotment from November 1 to May 14. However, the lack of consistent application of previous forage/range

guidelines has likely historically, and currently continues, to adversely affected the poppy. The Forest Service documented the following effects within the winter unit of Sacramento Allotment: 1) forage utilization levels averaged 70 percent since 1991; 2) no monitoring data was collected from key areas within the Alamo Pasture from 1993 through 2001; 3) extreme forage use and drought conditions during 2001 and 2002 resulted in significant reductions in forage production; 4) adult poppies are at their lowest numbers since records have been kept; and 5) the continued (i.e., yearly) overlap between livestock grazing and poppy germination and seedling growth has likely affected the ability of the species to recover during this period of low populations levels, low seed production, and drought (Forest Service 2003e). In June 2003, the Service expressed concern regarding the overlap of grazing in the Alamo Pasture, given the current status of the poppy. The Forest Service acknowledged that damage could occur to poppies after February 1 in Alamo Pasture from grazing activity and associated trampling (Forest Service 2002, 2003, 2003g). Subsequently, the AOI for the current winter grazing season (i.e., November 2003 through May 14 2004) included a provision that livestock would be removed from the Alamo Pasture prior to February 1, 2004 (L. Barker, Forest Service, pers. comm., 2004). This is consistent with the Forest Service's proposed action currently under review, and limits adverse affects to the poppy until a new 10-year permit is issued for the Sacramento Allotment. It also insures that the Forest Service is meeting the applicable standards and guidelines from the Lincoln National Forest Plan detailed above, and that the status of the poppy does not further decline from grazing activity and associated trampling.

Sacramento Mountains thistle

Hydrology

The thistle is an obligate riparian species that requires surface or immediately sub-surface water flows. Spring dessication at thistle sites has contracted occurrence boundaries, reduced the number of individuals, and in some cases, caused a loss of all plants at previously occupied sites (Forest Service 2003a). The loss of water can be: 1) naturally caused due to drought conditions; 2) caused by other factors that may cause a spring to go dry (i.e., rerouting of underground channels) or; 3) human-caused impacts such as spring development or loss of water flow to an occupied site through diversion by roads or trails. Trampling by livestock, wildlife, or humans can cause damage to travertine formations or out-flow creek beds in ways that may alter water flow to sites.

Because of the drought, water flow at a number of springs occupied by the thistle has declined substantially. Monsoonal summer precipitation over the allotment can be very patchy, with some areas receiving considerably less rainfall than others. It is likely that the seasonal distribution of yearly precipitation also plays a role in water availability for the thistle. It is not clear what other factors may be affecting spring flow from the porous limestone parent materials which underlay the Sacramento Mountains and the Sacramento Allotment.

Invasive Species

Noxious weeds have invaded a number of thistle sites and pose a threat its continued occupancy. It is believed that decreased natural water flows at travertine springs create conditions that favor the introduced weeds over the thistle. Introduced weeds that are growing on the Lincoln National Forest, and at thistle occurrence sites include musk thistle (*Carduus nutans*), teasel (*Dipsacus sylvestris*), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*) and poison hemlock (*Conium maculatum*). The Lincoln National Forest has completed National Environmental Policy Act (NEPA) documentation and consultation on herbicide treatment of these weeds at selected experimental sites where the thistle is present, but implementation has not yet begun.

Huenneke and Thomson (1995) studied the interaction between the thistle and teasel to provide further information on the threat of this particular weed. Like the thistle, teasel is a rosette-forming biennial. Huenneke and Thomson (1995) reported no differences in measured habitat characteristics between sites supporting these two species. Teasel was better able to germinate in low light than the thistle, suggesting that teasel might invade thistle populations. It would also suggest that thistle recruitment would be unlikely in dense stands of teasel. In greenhouse studies, the growth of thistle rosettes was significantly reduced by the presence of teasel, but the teasel was unaffected by the thistle.

An exotic seed-head weevil (*Rhinocyllus conicus*) (weevil) was introduced to control musk thistle in Virginia, Montana, and California in 1969, in Nebraska in 1972, and subsequently in Colorado. The weevil spread on its own into New Mexico with hundreds found per 10 square ft near Farmington (Forest Service 2003a). Stands of musk thistles can be reduced by 80-95 percent when the weevil becomes established (Service 1999, letter to attorney for Mescalero Apache Tribe). In 1999, the Mescalero Apache Tribal administration disclosed plans to release the weevil. Weevils were found in the wild at Bonito Lake and at the Inn of the Mountain Gods on the Mescalero Apache Nation in the summer of 2001 (Forest Service 2003a). In greenhouse tests conducted at Utah State University, the thistle was shown to be susceptible to attack from the weevil. The Service reported that the weevil has created severe reductions in populations of the native Platte thistle (*Cirsium canescens*) in the sandhills of Nebraska (Service 1987). There is concern, therefore, that the weevil that has been found just 18 miles from known thistle sites may pose a threat to this species.

Livestock Impacts

Threats from livestock have been described by several observers and include direct impacts such as loss of photosynthetic tissue to herbivory, damage to vulnerable seedlings, rosettes and flowering stalks, as well as trampling damage to travertine and soft substrates in occupied and potential habitat (Thomson 1991, Forest Service 1994). The final listing rule (Service 1987, 52 FR 22933) discussed threats to the poppy as a result of livestock grazing. "There are numerous areas where the thistle formerly existed, or now exists in very low numbers. Many of these sites still appear to be suitable habitat for the species. The populations that formerly occurred on them apparently have been eliminated or reduced by livestock impacts or through competition with the

introduced exotic plant species *Carduus nutans* and *Dipsacus sylvestris* [Fletcher 1978 and 1979]" (Service 1987). Predation on the thistle by herbivores was described as minimal, with browsed flowering stalks or leaves being observed occasionally. The majority of detrimental effects on this species by livestock are due to ground disturbance (Service 1987). The 1989 Forest Service Interim Management Plan mentioned grazing of buds and plants, soil compaction, and trampling damage caused by livestock and wildlife as potential conflicts.

Todsen (undated) documented the effects of grazing on the thistle in an undated manuscript. He wrote "The most striking example of the influence of cattle grazing is in Silver Springs Canyon where the large colony in the canyon bottom is almost entirely inside the Reservation fence with only a few scattered plants on the pasture side of the boundary." His observations were made prior to the fencing of this site on Lincoln National Forest lands, most likely some time after the May 1984, listing proposal, based on his comment that "steps have already been taken to have it included in the national listing under the Endangered Species Act." The portion of this occurrence on Forest Service lands expanded to 62,000 plants in 1995 and 95,700 plants in 2001 (Forest Service 2003a).

Thomson (1991) reported much smaller rosette size (mean rosette size = 6.8 in ± 2.0 in) in a grazed population adjacent to a population in an exclosure (mean rosette size 24.7 in ± 4.4 in) in Lucas Canyon. "The differences between these two populations remained very noticeable 2 months after the initial measurement even after the grazing pressures had evidently declined."(Thomson 1991). Monitoring of herbivory within the allotment prior to 1992, showed that "more rosettes were eaten and more rosette leaves per plant were removed in sites open to both wildlife and livestock than in sites available to wildlife only." (Forest Service 2003a). In Lucas Canyon, leaves in plots receiving livestock use were 66 percent shorter than those in plots receiving only wildlife use. Counting all the plots, rosette leaf-length in plots receiving livestock use were 30 percent shorter than plots receiving only wildlife use. As a function of this, rosette diameter was smaller in sites open to both livestock and wildlife than in sites open only to wildlife, whether they exhibited recent herbivory or not. "Reasons for this are inconclusive, however, it may reflect reduced vigor due to repeated use" (Forest Service 2003a).

Thistle numbers in Hubble Canyon increased from 0 plants in 1984, when an exclosure was built, to about 500 plants in 1991 (Forest Service 2003a). An exclosure was also built in Lucas Canyon in 1984. Plant numbers in this canyon increased from 350 plants at three springs in 1984, to 3,414 plants distributed among 5 springs and the riparian bottom in 1991 (Forest Service 2003a). The Bluff Springs area was fenced in 1983. In 1979, only a single rosette was found at this location (Forest Service 2003a). The springs in the meadow above Bluff Springs recreation area have maintained a population of about 750 thistle plants since 1984 (Forest Service 2003a). At one spring in the enclosed Bluff Springs area, the plant count has decreased from 450 plants in 1984, to 45 in 1991 (Forest Service 2003a). Causes for the decrease are unknown (Forest Service 2003a).

The Forest Service conducted an intensive monitoring study of herbivory on the thistle in 1992-

1993 (Forest Service 2003a). Plants were monitored to determine if herbivory was significant enough to require management action. One hundred and sixty-nine visits were made at monthly intervals during the grazing period to the Sacramento Allotment. The threshold of significance was set at 40 percent herbivory of rosette surface area on 40 percent of a population during spring (prior to July 1) and fall (after September 15), or on 25 percent of a population during the reproductive period (between July 1 and September 15). Precipitation had been greater than normal for the 2 years prior to monitoring so it is likely that forage other than the thistle was readily available (Forest Service 2003a).

Herbivory was monitored at 17 sites in the South Pasture of the Sacramento Allotment in 1992. The threshold was reached 11 times at 6 sites during the summer; 3 sites exceeded the threshold more than once, and 2 exceeded the threshold 3 times. During spring and fall, half of the thresholds were reached , and the other half during the reproductive period. In 1993, in the South Pasture, 13, rather than the 17 sites, were monitored. Four exclosed sites were omitted, and 7 new sites were added in the fall. Thresholds were approached or exceeded 10 times at 10 different sites, 2 in July and the remainder in the fall (Forest Service 2003a).

In 1993, in the North Pasture, out of 13 occupied sites with complete data available, 3 sites approached or exceeded threshold levels, three sites had zero to 1 percent herbivory, 60 percent consistently had measurable herbivory, and 50 percent showed steady increases in herbivory over the 3-month use period (Forest Service 1994). Among the sites monitored both years, three sites exceeded thresholds both years (Forest Service 1994).

The BA (Forest Service 2003a) summarized conclusions of the monitoring:

1. Wildlife herbivory on the thistle was non-existent to negligible compared to livestock herbivory. Use was reported during the monitoring only for sites accessible to livestock;

2. Herbivory occurred in all months studied, May to October;

3. During 1992, percent use peaked in June (76 percent) and again in September (over 90 percent) and October (over 90 percent). In 1993, use peaked during September and October at over 90 percent

4. The thistle was found to have the ability to put on "substantial compensatory growth following herbivory when it occurred early in the growing season prior to flowering. It is assumed that this type of compensatory growth is characteristic of the thistle in all years, except possibly those of severe or prolonged drought.";

5. A comparison of thistle use and other forage use was not made due to differences in the type of data collected and the inability to do statistical tests

with the differing data. Use levels on other forage species were determined to have little or no obvious relationship to herbivory on the thistle. Use amounts on the thistle appeared to be correlated more to number of plants available, time of year, and proximity to travel ways, gentle topography and livestock congregating/resting sites; and

6. Frequency of use (the number of sites with some measurable herbivory) on the thistle was generally very high throughout the study period. Within one month of cattle entering a pasture, at least 75 percent and up to 100 percent of the thistle sites visited were found to have been impacted during every monitoring session. This indicates that the thistle is a forage plant of some value to cattle. After entry onto the South Pasture in August 1993, and in spite of widely available forage, herbivory by livestock was detected at 100 percent of sites accessible to livestock. No herbivory was present when cattle first entered.

Between 1994 and 1996, a protocol for long-term monitoring of thistle was developed by Dr. Laura Huenneke through a Challenge-Cost Share Agreement with the Lincoln National Forest. In 1996, Dr. Huenneke completed the initial intensive monitoring of 34 sites. Sampling sites were selected to represent grazed and ungrazed occurrences, and soft and hard substrates (Forest Service 2003a). Drought in 1994-1996 caused many spring and seep areas to dry up, creating conditions more favorable for other native and exotic species.

Monitoring of herbivory within the allotment continued during the flowering period at thirteen "red flag" sites that were consistently used. Monitoring in July 1994, in the South Pasture showed 7 of 11 sites in Wills and Water Canyons at or above threshold levels. The 10 other sites in the South Pasture had dropped below threshold levels by August 2 (Forest Service 2003a).

On July 7, 1995, at 1 site in the North Pasture, 68 percent of 2,054 plants had received above-threshold levels of use or damage by trampling. Grazing permittees were told to begin moving cattle away from that site, and on to the South Pasture in mid-July. In the South Pasture on July 18, 1 site in Wills Canyon had 33 percent of 278 plants receiving above-threshold use by elk that had been seen nearby. The cattle had not arrived yet. By August 29, none of the thistle sites had above-threshold levels of use (Forest Service 2003a).

Several sites in the Sacramento Allotment were monitored in 1996, a year of drought (Forest Service 2003a). In Brown Canyon a spring was estimated to be flowing at 20 percent of average. Fifty percent of plants were in dry habitats. The number of plants seemed to be the same as in 1995, but the density appeared lower. In the wet area, use was estimated at 60 percent biomass removal on 50 percent of plants. Fifty percent of the flowering stalks had been removed. Remaining stalks were three-times taller than those in the dry area. In the dry area, overall use was estimated at 80 percent of plants being grazed 50 percent or more. Many plants were grazed to ground level and the few remaining flower stalks were less than one foot tall

(Forest Service 2003a).

In Water and Telephone Canyons, 5 sites were monitored. Two sites showed little to no use and had no water flowing. One site had good vigor and there was less than 1 percent use of these plants at the spring. Another site had 30 percent of plants grazed past threshold and another had thistle damages estimated at 75 percent. The site had been bedded in and trampled. Plants on a dry bench showed low vigor those next to water had stalks and flowers, and good vigor. Less than 10 percent use was estimated in this portion of the site (Forest Service 2003a). In Wills Canyon, 5 sites were monitored. Two exclosures were found to be open and to have received use. Use at the 5 sites ranged from 50 to 60 percent or more on up to 80 percent of plants, all described as being in the rosette stage.

The Forest Service contacted the Service on June 12, 1996, regarding the reaching or exceeding of thresholds at all thistle monitoring sites (Forest Service 2003a). Emergency consultation was conducted on June 14, and it was agreed that temporary fencing was the best alternative, short of removing cattle from the allotment.

A comparison of data from 1995, 1998, and 2001, when extensive monitoring was conducted, showed both increases and decreases of relatively similar magnitude in both grazed and ungrazed sites. It also showed that individual sites may contract one year, and increase to an even larger number of plants by the next monitoring visit. Accessibility to grazing, precipitation and substrate do not appear to explain these increases and decreases. The sites appear to fluctuate independently of each other and from year to year so it is not clear what factor or factors are affecting population size (Forest Service 2003a).

Effects of the action

Mexican Spotted Owl

This section includes an analysis of the direct and indirect effects of the proposed action on the species and its interrelated and interdependent activities. The effects of livestock grazing on MSO prey populations and their habitats is extraordinarily complex. The discussion below outlines the current information we have on MSO-prey relationships and the current knowledge of the effects of grazing on MSO and their habitat.

The most current, detailed study on MSO prey relationships was conducted within the action area by Ward (2001) in the Sacramento Mountains of central New Mexico. The investigation focused on one population of MSOs over a 6-year period (1991-1996) concentrating on five rodents that were most common in the MSO's diet; deer mouse, brush mouse, Mexican vole, long-tailed vole, and Mexican woodrat. Comparing the dietary proportions of the MSO's common prey to proportions estimated to occur in the MSO's foraging areas, he found that mice and voles were captured in proportion to their availability and that woodrats were selected in greater proportions relative to their availability. Given the 6-year averages of percent biomass consumed, woodrats

could be considered a primary prey for these MSOs. Additional analysis of prey selection ratios relative to the MSO's potential for meeting energetic needs for reproduction indicated that these MSOs preferred Mexican woodrats. However, during one of the six breeding seasons examined, MSOs tended to select voles when woodrats and white-footed mice were less available. Also despite the preference for Mexican woodrats, reproductive output by MSOs in the Sacramento Mountains was correlated with available biomass of mice and voles, and not with biomass of woodrats. Thus, because Mexican woodrats are currently less available and consumed less compared to other MSO populations, the MSOs in the Sacramento Mountains have demonstrated a greater use of alternative prey, including long-tailed and Mexican voles. Ward (2001) postulated that voles may be important in this area because they could be an alternative food source when other prey species are diminished.

Although the effects of livestock and wild ungulate grazing on the habitat of MSO prey species is a complex issue, there exists some knowledge regarding the effects of livestock grazing and small mammals frequently consumed by MSO and regarding mesic or montane plant communities inhabited by the MSO's prey (Ward and Block 1995; Ward 2001). For example, Szaro (1991) examined the effects of grazing in New Mexico within livestock exclosures compared to areas continuously grazed. Greater numbers and more species of small mammals were captured in the exclosure compared to the grazed areas. Schultz and Leininger (1990) examined effects of cattle exclusion along a riparian community in Colorado. Deer mice were significantly more abundant in grazed areas and western jumping mice were significantly more abundant in ungrazed areas. Further, long-tailed and mountain voles were not observed in grazed areas. Other studies have shown similar results: lack of a numerical decrease by deer mice following grazing (Reynolds 1980), and significant decrease in voles caused by grazing induced by loss of cover in mesic habitats (Grant *et al.* 1982).

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 (Service 1995a). Livestock can affect small mammals directly by trampling burrows, compacting soil, and 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. Vegetation cover is often greatly reduced on grazed relative to ungrazed areas, and vegetation typically appears more dense in ungrazed areas. Because MSO eat primarily small mammals, obligate herbivores are the most likely to experience adverse effects from grazing. Rodents, especially voles, are vulnerable to grazing impacts because they rely on grasses and forbs for food and cover.

The Recovery Plan summarizes the effects of grazing to MSOs in four broad categories: 1) altered prey availability; 2) altered susceptibility to fire; 3) degradation of riparian plant communities; and 4) impaired ability of plant communities to develop into MSO habitat. In general, predicting the magnitude of grazing effects on MSOs and their habitats requires a better understanding of the relationship between MSO habitat and grazing (Service 1995a).

The Recovery Plan (Service 1995a) postulates on the direct and indirect effects of both grazing by livestock and wildlife (i.e., elk, deer). A direct effect is excessive grazing that alters prey availability. Indirectly, within conifer forests, grazing can remove or greatly reduce grasses and forbs thereby allowing large numbers of conifer seedlings to become established, decreasing the potential for beneficial low-intensity ground fires. Establishment of large numbers of seedlings coupled with the reduction in light ground fuels may act synergistically with fire suppression to contribute to dense overstocking of ladder fuels. This dense overstocking can alter forest structure and composition and degrade MSO and prey habitats while increasing risks of stand-replacing fires (Service 1995a). The Recovery Plan notes that moderate to heavy grazing can reduce plant density, cover, biomass, vigor, and regeneration ability (Service 1995a). Moreover, the Recovery Plan indicates that grazing in riparian areas can reduce or eliminate important shrub, tree, forb, and grass cover, all of which are important to the MSO or its prey (Service 1995a).

To minimize these impacts, the Recovery Plan and Forest Plan Amendments recommend that grazing by livestock and wildlife be monitored in key areas, including riparian areas, meadows, and oak types. Further recommendations focus on implementing and enforcing grazing utilization standards and guidelines that would attain good to excellent range conditions within the key grazing areas. To do this, the Recovery Plan and the Forest Plan Amendments incorporate allowable use levels based on current range condition, key species, and the type of grazing system. The management strategy of the Forest Plan Amendments is to restore good conditions to degraded riparian communities as soon as possible, and strive to attain good to excellent range conditions by implementing range-related standards and guidelines. The final EIS for the Forest Plan Amendments acknowledged that the health of herbaceous and shrub components of an ecosystem are important for MSO prey species (Forest Service 1995). Range maintenance and restoration was proposed through the implementation of forage utilization guidelines across the landscape in all vegetation types (Forest Service 1995). Strategies to accomplish this could include active livestock management (i.e., regularly monitoring moving livestock), reductions in grazing levels and increased numbers of exclosures, complete rest, limited winter use, or other methods. Consequently, the forage/range guidelines proposed for the Sacramento Allotment should apply across the entire allotment, not just the MSO key areas (Forest Service 1995).

The Sacramento Allotment is within the Basin and Range East RU. The Recovery Plan indicates that grazing by domestic livestock and elk within this unit has altered herbaceous cover, specifically plant composition and structure. Range management has been oriented toward domestic livestock and other wildlife goals, but not for the MSO. Regardless of its past orientation, grazing can affect MSO habitat and prey populations in conflicting and poorly understood ways. Effects of grazing are largely manifested in meadow and riparian areas, but effects within forests cannot be discounted. Implementation of the grazing recommendations within the Recovery Plan is needed (Service 1995a).

There are approximately 60,000 ac of mixed conifer habitat within the Sacramento Allotment.

On the Lincoln National Forest, mixed conifer habitat is considered either protected or restricted habitat in the Recovery Plan. There are 46 PACs that have some portion within the Sacramento Allotment. Two are on the winter unit and the other 44 PACs are within the summer unit. Ten of these 44 PACs have little or no grazing due to steep slopes, access and very little meadow habitat within the PACs. In general, these 10 PACs and other protected habitats would receive light forage use because of high canopy closure, multistoried conditions, and high basal area of woody species that limit understory production; and because of the association these areas have with steep slopes and distance from large meadows. The remaining 34, which are subject to cattle grazing, have differing amounts of meadow habitat, ranging from 1 to 97 ac per PAC (total 805 ac of meadows within PACs) (Attachment A). Meadow habitat including riparian areas consist of 1,665 ac within the Sacramento Allotment, indicating that meadows within PACs make up a significant proportion of these areas (i.e., 805 out of 1,665 ac).

The proposed action is that the Forest Service will maintain the following range/forage guidelines on the Sacramento Allotment (i.e., the 10-year term grazing permit will be managed to ensure that the range conditions are not reduced below these minimum thresholds): 1) **herbaceous ground cover height**, which applies to both palatable and non-palatable species and is a standard that relates to the Forest Plan Amendments and the subsequent development of the MSO grazing criteria. Herbaceous ground cover height is proposed to be 4 in across the allotment; and 2) **forage utilization** is a percentage that indicates the difference between the amount of annual forage (i.e., as it applies to key palatable forage species) produced and consumed during the growing season. Forage utilization is proposed to be 35 and 40 percent for the summer and winter units, respectively, and 70 percent within the livestock traps. Forage utilization could be monitored by leaf length measurements, clipping and weighing, utilization cages or other methods the Forest Service determines is appropriate.

Herbaceous ground cover height may include plants such as musk thistle, bull thistle, teasel, or others that the Lincoln National Forest is actively controlling under their noxious weed management program (Forest Service 1995a, 2000e; USDA Natural Resources Conservation Service 2002). The Forest Service indicated that they include noxious weeds within their herbaceous ground cover height measurements (i.e., all herbaceous plants are measured regardless of status as an exotic or native) (Jose Martinez, Forest Service, pers. comm., 2003). The Lincoln National Forest has previously indicated that species such as elk, voles, and some birds that depend significantly upon meadows for foraging or reproducing may be negatively affected by the spread of these noxious weeds (Forest Service 1995a). Noxious weeds, by their nature, are usually unpalatable and contribute nothing to available forage for livestock and wildlife. Although we understand that the herbaceous ground cover height measurements may include noxious weeds, we acknowledge that there is a potential for biased monitoring data if key areas are randomly located and include noxious weeds disproportionately to their occurrence. We assume that the forthcoming AMP will include methods that will minimize the potential for bias.

As mentioned above, the Forest Service developed criteria to assist in determining effects to the MSO and other species from issuing term grazing permits (Forest Service 2002c). The Forest

Service grazing criteria that must be met to make a determination of may affect, not likely to adversely affect the MSO are:

1. Livestock grazing or livestock management activities will occur within PACs, but no human disturbance or construction actions associated with the livestock grazing will occur in PACs during the breeding season.

2. Livestock grazing and livestock management activities within protected and restricted MSO habitats will be managed for levels that provide the woody and herbaceous vegetation necessary for cover for rodent prey species, the residual biomass that will support prescribed natural and ignited fires that would reduce the risk of catastrophic wildfire in the Forest, and regeneration of riparian trees.

3. In mountain meadows (subject to seasonal livestock use May-October), which are MSO foraging areas, livestock grazing will be at a level that maintains a minimum cover height of 4 in of herbaceous vegetation, providing cover for the MSO's' prey species. The 4-in herbaceous ground cover height minimum will be met 10 days after the onset of summer rains or August 1, whichever comes first, and maintained through the end of the grazing season.

Alternatively, proposed grazing actions that are inconsistent with the Forest Service's guidance criteria adversely affect the MSO. We analyze the proposed action below by reviewing the Forest Service's grazing criteria, the Lincoln National Forest Plan, the Forest Plan Amendments, and the Recovery Plan.

Recovery Plan and Forest Plan Amendments

In the following discussion, the grazing guidelines identified in the Recovery Plan are summarized (paragraphs numbered 1, 2, and 3) along with the Forest Plan Amendments that address the intent of the Recovery Plan guidelines.

(1) Monitor grazing use and livestock and wildlife in "key grazing areas" to detect changes in plant composition. The intent is to maintain good to excellent range conditions in key areas while accommodating the needs of the MSO and its prey.

The Forest Plan Amendments for grazing management include identification of key ungulate forage monitoring areas. Within these areas, key species are to be selected to monitor average allowable use. The proposed action is consistent with the guidance to monitor key grazing areas. However, the Forest Service acknowledges in the BA that during periods of drought, these proposed forage/range guidelines may not be attained. Good range conditions for some PACs (Table 4) will not be met instantaneously, when the permit for the Sacramento Allotment is issued in 2004. Recent and historical overgrazing may preclude range restoration for decades, even with strict compliance with forage/range guidelines. Moreover, the BA indicates that the proposed monitoring and permit administration procedures do not allow for adjustments to

grazing levels until after forage/range guidelines have been exceeded. For example, if the 4-in herbaceous ground cover height is not attained in August, the Forest Service would not be aware that this minimum standard was not met until the third proposed monitoring period in September.

(2) Implement and enforce grazing utilization standards that would attain good to excellent range conditions within the key grazing areas. Establish maximum allowable use levels that are conservative and that will expedite attaining and maintaining good to excellent range conditions. A primary purpose is to maintain and restore adequate levels of residual plant cover, fruits, seeds, and regeneration to provide for the needs of prey species and development of future MSO foraging and dispersal habitat.

Allowable use guidance for given range conditions and management strategies is provided in the Forest Plan Amendments, with the provision that they be applied in the absence of more specific guidelines currently established through site specific NEPA analysis for individual allotments. Within the Sacramento Allotment, forage/range conditions and use levels have been excessive since 1991, and not consistent with the needs of long-term range management, the MSO, the Recovery Plan, or the Forest Plan Amendments. For example, herbaceous ground cover height and forage utilization, as determined by leaf length, have consistently been below established standards, and forage utilization has been 70 to 80 percent (Forest Service 2000d, 2001, 2002, 2002b, 2002c, 2003a, 2003b, 2003c, 2003d). These forage/range conditions have not expedited the attainment of good to excellent range conditions. Nevertheless, the proposed action will implement and enforce forage/range guidelines that can improve the overall forage/range conditions. The implementation and enforcement of the 10-year term grazing permit, consistent with the proposed forage/range guidelines will maintain and restore adequate levels of habitat for MSO prey. We note that during some years, the forage/range guidelines may not be fully attained; however, we expect that the Forest Service will administer the Sacramento grazing permit consistent with the Lincoln National Forest Plan, which includes attempting to maintain the proposed minimum herbaceous ground cover height and maximum forage utilization guidelines. As noted above under the proposed action, the Forest Service will monitor key areas and management action will be taken if guidelines are not met. For example, these data will be used to set the annual stocking rate, which will vary based upon forage production and utilization monitoring (Forest Service 2002). We anticipate such management actions could include modifying seasons of use or numbers of livestock (36 CFR 222.4).

As described above under the proposed action, a deferred-rotation system will permit all of the summer pastures to be grazed on an annual basis, but over successive years each pasture is rested for a different part of the growing season. This will decrease the amount of time livestock are grazed in high-use areas, reduce impacts to prey species, and remove disturbance from livestock or livestock related activities during different summer months. If these activities result in consistent attainment of forage/range guidelines, they may reduce the adverse effects to MSO prey.

Grazing does not occur within mixed conifer habitat because livestock generally remain within

meadows or riparian areas. Down woody material, in addition to leaf and needle litter in mixed conifer habitat will not be substantially affected by grazing and should provide MSO prey habitat. Thus, we believe that impacts to the nest/roost and other mixed conifer habitat within PACs will be insignificant and discountable.

(3) Implement management strategies that will restore good conditions to degraded riparian communities as soon as possible. Strategies may include reductions in grazing levels and increased numbers of exclosures to protect riparian plant cover and regeneration, and to prevent damage to stream banks and channels.

Currently, the ecological condition of the range within some MSO key areas is poor, and high forage use has led to soil instability and watershed degradation across much of the Sacramento Allotment (Forest Service 2002). For example, a proper function condition evaluation was conducted on 27 stream reaches and associated riparian communities throughout the Sacramento Allotment. Most of the reaches that were assessed (18 of 27) had vegetation that had been grazed too closely, with banks trampled, and no vegetation that would protect bank stability during large floods (Forest Service 2002).

The Forest Service found that livestock use within riparian areas would be high, and plant vigor and density would decline when the 35 percent forage use guideline is not met (Forest Service 2002). Belsky and Blumenthal (1997) note that general livestock grazing can lead to compacted soils, which results in increased runoff and decreased water storage; and can also lead to increased erosion and runoff due to reduced plant cover and compacted soils. However, these factors, which lead to the degeneration of riparian plant communities and impair the ability of plant communities to develop into MSO habitat, are not expected to continue. Under the proposed 10-year grazing permit, we expect that the Forest Service will manage riparian communities for gradual improvement. Proper administration of the permit, consistent with the Lincoln National Forest Plan, should begin to restore riparian vegetation to good conditions "as soon as possible".

The Forest Service will implement all of the conservation measures identified under the proposed action. These conservation measures represent actions proposed by the Forest Service that were evaluated as part of the jeopardy and the incidental take analysis. To this extent, these actions are non-discretionary, and must be undertaken by the Forest Service because they were part of the proposed action. If they are not fully implemented, reinitiation of formal consultation may be required (50 CFR 402.16). These conservation measures will help minimize or avoid adverse impacts to the MSO. Conservation measures 1, 2, 3, 5, 6, 7, 10, 13, 14, 15, 17, and 18 will promote management, restoration, and maintenance of riparian habitat. For the reasons detailed above, we believe these measures have the potential to restore good conditions to degraded riparian communities (Service 1995a). Proposed livestock management projects and conservation measures 4, 11, 12, and 13 also have the potential to expedite attaining and maintaining "good to excellent range conditions" (Service 1995a). Without these livestock management projects and conservation measures, the negative effects to the MSO likely would

be greater.

Grazing Criteria

Grazing criteria number 2 relates to managing forage levels within MSO restricted and protected habitat to provide residual woody and herbaceous vegetation necessary for prey habitat, and support prescribed natural and ignited fires. Under the forage/range guidelines of the proposed action, we believe the current proposed action will generally meet this criterion (the exception will be within livestock traps). When the Forest Service meets the range/forage guidelines, residual MSO prey habitat will be provided from the previous year. For example, the 65 percent residual forage amount, as determined by leaf length or other appropriate measurements, should provide adequate prey habitat during fall, winter, and spring months. Snow pack could affect these residual forage amounts by compaction, but snow serves as cover for both forest and meadow dependent MSO prey species during the winter months. During the spring, early growing non-palatable species, combined with the 65 percent residual growth during the previous growing season would be expected to provide adequate MSO prey habitat (Forest Service 2002). Additionally, many non-palatable plants that contribute to the MSO prey habitat (i.e., herbaceous ground cover height) put on growth early in the spring from winter moisture and snow melt. The Forest Service did not analyze this scenario in the current BA. However, they previously concluded in the 2000 BA and 2002 DEIS that these conditions would maintain adequate prey habitat during the late fall, winter, and spring. If the proposed herbaceous ground cover height and forage utilization standards are not met, the Forest Service can modify the grazing permit to meet these standards (Forest Service 2002). Consequently, we expect that the current proposal will provide residual woody and herbaceous vegetation necessary for prey habitat, and residual vegetation to support prescribed natural and ignited fires.

Belsky and Blumenthal (1997) note that livestock grazing alters forest dynamics by reducing the biomass and density of understory grasses and sedges, which otherwise outcompete conifer seedlings and prevent dense tree recruitment, and by reducing the abundance of fine fuels, which formerly carried low-intensity fires through forests. Fire susceptibility is not likely to change during the life of this project. The Forest Service concludes in their BA that under the proposed action, the prescribed use of grasses and forbs by livestock will not limit the implementation of prescribed fire. We agree with this conclusion.

Grazing criteria number 3, identified above, relates to the maintenance of a 4-in herbaceous ground cover height from the onset of the summer rains or August 1 (whichever comes first) through the end of the grazing season on the summer pastures (the end of October). It is our understanding that no data currently exist on MSO prey habitat requirements for September and October, but during these months the proposed action is to apply the forage utilization guidelines. Currently, the 35 percent forage utilization guideline for this allotment is based upon a 4 in leaf length for Kentucky bluegrass, and a 6 in leaf length for orchard grass and smooth brome. It is our understanding that the forage/range guidelines and corresponding monitoring methods/measurements (e.g., leaf length, forage utilization cages, or other methods) will be

detailed in an AMP. For example, the 35 percent forage utilization guideline is designed to maintain long-term range conditions as they relate to range management (e.g., 36 CFR 222), and not for the MSO.

The intent of the Recovery Plan is that the grazing guidelines should be applied year-round (Service 1999). The MSO recovery team suggests that if adequate habitat is not maintained during the plant dormant period (i.e., winter), prey species may be negatively impacted, reducing the MSO's food base (Block 1998). Conditions that increase food resources (i.e., abundant prey populations) for the MSO during winter and early spring will likely increase egg laying and decrease the rate of MSO nest abandonment (Service 1995a). Because food availability in the winter, spring, and summer are important for MSO reproduction, it is important that grazing guidelines are strictly adhered to year-round. Therefore, year-round application of the forage/range guidelines would ensure that adequate residual habitat is maintained for the MSO's prey. We have reviewed the best scientific and commercial information (Forest Service 2000d, 2001, 2002, 2002b, 2002c, 2003a, 2003b, 2003c, 2003d; administrative record from the previous consultation for this allotment; Ward 2001), and agree with the Forest Service's previous conclusions based upon information presented in 2000 BA (Forest Service 2000c), that herbaceous ground cover height should be a minimum of 4 in during periods outside of the MSO breeding season (e.g., fall, winter spring). Although the current BA did not specify whether the Forest Service will provide for year-round application of the forage/range guidelines, the DEIS indicated that adequate cover for the Mexican vole would be provided during late fall, winter, and spring (Forest Service 2002). Therefore, we anticipate that the Forest Service will attempt to provide the forage/range guidelines during late fall, winter, and spring, which will limit adverse effects to the MSO and its habitat.

An AMP was not included in the DEIS or BA. However, it is our understanding that an AMP will be developed by the Forest for the Sacramento Allotment, and that it will be consistent with the proposed action as described above. This AMP will specify: 1) the manner in and extent to which livestock operations will be conducted; 2) the type, location, ownership, and specifications for livestock management facilities in place or to be installed and maintained; and 3) other provisions relating to livestock grazing, including monitoring (36 CFR 222.1). Annual stocking rate will be determined and specified in the annual operating instructions, which will include a variable stocking rate from 200 to 415 cattle and 5 horses during the summer and from 200 to 335 cattle and 5 horses during the winter. The annual stocking rate will be varied based upon forage production and utilization monitoring (i.e., implementation of the forage/range guidelines) (Forest Service 2002). Such revision could include, for example, seasons of use or numbers of livestock (36 CFR 222.4). Although the methods for measuring production of key forage species and herbaceous ground cover height is not described in the BA or DEIS, we assume that the Forest Service will document the specific methods. The methods should be detailed in the forthcoming AMP, and may follow Holechek and Galt (2000), since they have been previously proposed (Forest Service 2000c). The BA and subsequent discussions indicate that the Forest Service will monitor key areas to determine compliance with forage/range guidelines, and take appropriate management action to achieve the guidelines. These activities will limit adverse impacts to the MSO and its habitat.

Forage/range guidelines

The current range conditions are explained under the environmental baseline section above. Thus, they are not repeated here. Field observations in 1999 indicated range conditions were poor to fair and were declining (Forest Service 1999). We agree with the Forest Service's conclusion that a downward trend in range condition can be expected from the current grazing pressure (Forest Service 2002). We believe their data indicate that current range conditions are declining, and it is likely that some MSO PACs containing meadows that are within ½ mile of nest/roost areas may be in poor condition.

The effects of heavy grazing has reduced herbaceous cover and grass/forb herbaceous ground cover height, likely resulting in a significant decrease in the number of voles within some PACs (Ward 2001; Ward pers. comm., 2004). Ward (2001) found that density and biomass of voles increased with abundance of herbaceous (grass/forb) height and cover. The information in the DEIS, the BA, and data collected from 1991 through August 2003, consistently indicate that the forage/range guidelines have not been maintained on the Sacramento Allotment. The Forest Service concluded in the DEIS and BA that the present range management is inconsistent with the Forest Plan standards and guidelines (Forest Service 2003a). We agree with this conclusion.

Our current policy for conducting section 7 consultation on the MSO states that incidental take is likely if a habitat altering action compromises the integrity of the PAC (i.e., an action is proposed that does not fall under the specific recommendations of the Recovery Plan) (Service 1996a).

A multitude of factors (e.g., weather patterns, fluctuating prey populations, etc.) influence the nesting success of the MSO and these factors change yearly, suggesting that the amount of foraging and protective cover an MSO may need on a given year may also change. It is possible that MSO pairs that lose a small amount of habitat within a 600-acre PAC are able to survive and successfully reproduce in good years or make up for this loss of habitat by foraging beyond the designated boundary of the PAC. However, the additional energy expenditure of foraging beyond PAC boundaries may reduce the likelihood of reproductive success. As a result, we are concerned about the condition of meadows within the Sacramento Allotment, and the possible effects on MSO prey habitat.

The BA states that when forage utilization of 35 percent is met on the summer range, it will provide adequate herbaceous habitat for prey species. The BA also indicates that in meadow areas within PACs (i.e., 5 to 16 percent of PACs), grazing levels may not provide habitat for prey or support prescribed fire. These statements appear to contradict one another. The DEIS provides some clarity to the statements, in that, the 35 percent utilization is a guideline that could be exceeded during dry periods (Forest Service 2002; p. 63). The BA also indicates that the forage utilization is not an upper limit, but only a guide and that precise attainment of allowable use does not have to occur for range conditions to be improved (Forest Service 2003a). The Forest Service acknowledges in their BA that rodent prey habitat may not be attained if: 1)

forage utilization is too high; 2) forage growing conditions are below what was expected in a given year; or 3) drought conditions persist. In fact, the Forest Service acknowledges in their BA and DEIS, that their proposed action allows adverse effects to MSO prey cover because the 35 percent guideline could be exceeded during dry periods (Forest Service 2002, p. 63).

The Forest Service states in the BA that within the meadow habitat of the Sacramento Allotment, sufficient herbaceous and woody vegetation is expected to be retained within all PACs to provide for MSO prey and to support prescribed natural and ignited fires. We agree with this conclusion for the following reasons. First, the Recovery Plan provides direction for grazing management that will expedite improved range conditions and assist in the recovery of the MSO. We believe the current proposal to establish forage/range guidelines is consistent with the Recovery Plan and Forest Plan Amendments, when the standards and guidelines are implemented and enforced in all protected and restricted MSO habitat. The Recovery Plan and Forest Plan Amendments reiterate that forage/range standards and guidelines will expedite attaining and maintaining good to excellent range conditions. We acknowledge that attainment of the proposed forage/range guidelines may not be possible every year of the permit (e.g., see discussion below); however, over the span of 10 years, we anticipate that the forage/range guidelines will improve the overall range conditions and adverse affects to MSO will be reduced.

As noted above, we understand that during some years, the forage/range guidelines may not be attained. Nevertheless, we expect that the Forest Service will administer the Sacramento Allotment permit consistent with the Lincoln National Forest Plan, which includes maintaining the proposed herbaceous ground cover height and forage utilization, even during drought conditions. We reached this conclusion based upon the following analyses in the DEIS: 1) allowable use guidelines (i.e., forage/range guidelines) would require that cattle be moved when forage is not sufficient to protect riparian and aquatic systems; 2) during dry periods the allowable use guidelines (i.e., forage/range guidelines) must be followed or the effects from the proposed action would be identical to current conditions (e.g., overutilization of forage) and not adhere to the Lincoln National Forest Plan; 3) the variable stocking rate in the permit reflects that during dry periods livestock numbers can be reduced when required to meet forage/range guidelines (Forest Service 2002); and 4) the Forest Service intends to manage and protect long-term range conditions consistent with their range management regulations (e.g., see 36 CFR 222)

We agree with the Forest Service's conclusions in the DEIS that the proposed action will result in a gradual improvement of range conditions. We expect that MSO prey habitat will be maintained and improved over the life of the 10-year permit, and that the Forest Service will strive to meet their forage/range guidelines. As provided in 40 CFR 402.16, reinitiation of formal consultation may be required if range conditions do not show improvement or if the Forest Service does not attempt to meet these forage/range guidelines as they are described in this consultation.

We identified 6 PACs within the Sacramento Allotment that contain greater than 50 ac of meadow habitat (Radio Tower, Wilmeth, Bluff Springs, Dark, Lightning, Hubble). Although we

do not have information on the range/forage conditions within four of these PACs (Radio Tower, Wilmeth, Dark, or Lightning), we believe that grazing in meadows can adversely affect breeding MSOs when range/forage guidelines are not maintained because prey habitat is expected to be negatively affected. It is unknown whether these four PACs are currently being adversely affected by forage/range conditions. Nevertheless, it is our expectation that range/forage conditions will improve under the current proposed action, because they will be applied across the landscape and should result in management activities that will minimize adverse impacts to the MSO by maintaining and restoring good range conditions.

Information is available for the Hubble and Bluff Springs PACs that indicate forage/range conditions are below the established guidelines (Table 4). Ward and Block (1995) indicate that decreases in populations of voles and increases in populations of deer mice are expected in upland meadow habitats of the southwest from moderate to heavy grazing. They believe that such decreases in the number of voles could negatively influence MSO in several recovery units, including the Basin and Range East, where voles are common prey or are used as alternative food sources when other prey are diminished. Increases in deer mice abundance in meadows probably would not be offset by decreases in vole numbers, because voles provide greater biomass (Ward and Block 1995).

It is important to note that Ward (2001) found that grass-forb stubble height had a strong positive association with summer abundance of Mexican voles and long-tailed voles, two species commonly consumed by MSO in the Sacramento Mountains. He indicated that voles require herbaceous vegetation for food and cover (e.g., see also Birney *et al.* 1976; Johnson 1981), and that about 2.4 in of mean maximum grass-forb stubble height was a threshold, above which Mexican vole abundance increased with increasing height of both grasses and forbs during summer months. There also appears to be a maximum grass-forb stubble height between 4.6 and 6.4 in. Beyond this upper threshold range, increased stubble height of grasses and forbs would benefit vole populations, but provide little direct benefit to MSOs (i.e., MSO access to capturing voles is expected to be diminished as stubble height increases above this range) (Ward *et al.* In prep.). Ward (2001) also found that increasing grass-forb height was positively associated with population abundance of deer mice. All three species (i.e., Mexican voles, long-tailed voles, and deer mice) depend on sufficient grass-forb height to provide for food and/or cover (Johnson 1981; Davis and Schmidly 1994, Ward 2001). On average, no Mexican or long-tailed voles would be expected to occur in key grazing areas when grass-forb height is below 1.6 in, but 4.5 to 6.2 in of herbaceous ground cover maximizes availability of both voles species (Ward 2001). In fact, one method frequently recommended by Cooperative Extension wildlife specialists to control damage from a variety of vole species including the Mexican and long-tailed voles, is mow or eliminate ground cover of grasses or forbs (Andelt and Ahmed 2003). They indicate that summer removal of grasses and forbs will diminish the amount of available vole habitat and reduce their numbers because voles avoid exposed areas (Andelt and Ahmed 2003). Because the Hubble and Bluff Springs PACs had maximum grass-forb stubble heights below this lower threshold (Table 4), we believe the amount of suitable MSO prey habitat is currently reduced. This conclusion is substantiated by abundance estimates from July and August 2003 that

estimated low numbers of Mexican voles (Hubble = 0 and Bluff Springs 47) and long-tailed voles (Hubble = 2 and Bluff Springs 0) within key areas of these PACs (Ward pers. comm., 2004).

Although we believe that the current proposal will gradually improve the range/forage conditions within the Hubble and Bluff Springs PACs, the current degraded conditions within these PACs, indicate that the range/forage guidelines may not be attained within the next few years. Part of our rationale is that the DEIS discusses that "once [forage] guidelines are achieved" riparian habitat would move toward good conditions, prey habitat requirements for the MSO would be provided, and natural and prescribed fire would be supported within and outside of PACs (Forest Service 2002). Information from Ward (2001) and the BA indicate that without adequate herbaceous ground cover height, overall density and biomass of voles will continue to be minimal, resulting in lower numbers of MSO prey. These effects are considered adverse, especially since these actions are not consistent with the Recovery Plan (Service 1995a) and the Forest Plan Amendments. We believe that these actions could result in a significant portion of the habitat being lost or modified, disrupting normal behavior patterns such as breeding, sheltering, or feeding. As discussed above, desired range conditions for some PACs (Table 4) will not be met instantaneously, when the permit for the Sacramento Allotment is issued in 2004. We believe that failing to attain the forage/range guidelines will result in reduced MSO prey, and likely temporarily compromise the MSOs in these PACs during the next few breeding seasons. Nevertheless, these impacts are not expected to cause avoidance/abandonment or lead to future unoccupancy of the Hubble or Bluff Springs PACs. Until the monitoring data indicate that the forage/range guidelines are met throughout the year, we conclude that harassment will occur for the Hubble and Bluff Springs PACs.

The Forest Service has proposed that they will consider the effect of deer and elk on the allotment. There are a significant number of elk on the Sacramento Allotment. In Forest Guardians v. United States Forest Service, and Sacramento Grazing Association v. United States Department of Agriculture Civ. Nos. 00-490 JP/RHS and 00-1240 JP/RHS (Consolidated), the United States District Court for the District of New Mexico found that the Forest Plan Amendments mandates the Forest Service to maintain forage use that assures the recovery and continued existence of listed species, and requires that they ensure consumption of forage by livestock and wild ungulates (e.g., elk) does not exceed set utilization levels. The present level of forage being used by wildlife is about 25 to 40 percent (Forest Service 2002). In 2001, the New Mexico Department of Game and Fish changed the management objective for game management unit 34. A 5-year plan was adopted to reduce the number of elk from about 4,000 to 1,000 across the entire game management unit (Forest Service 2002). The Forest Service has not described how they would consider the effect of deer and elk; however, we assume that this information will be detailed in the forthcoming AMP and will likely include monitoring herbaceous ground cover height and forage utilization in relation to use (see also New Mexico Department of Game and Fish 2001). Similar livestock-elk issues have been successfully resolved through AMPs (e.g., see Roberts and Becker 1981).

Monitoring

The proposed action includes the following monitoring, in addition to establishing thresholds of when management changes are needed (Attachment A). Proposed monitoring includes visits on: 1) May 1st or prior to the entry of cattle to the winter and summer pastures; 2) May 31st or within 15 days after livestock leave winter pastures; 3) August 1st at approximately the mid-point of the grazing season or 10 days after rains start in the summer unit (monitoring in all key areas will determine if the 4-in herbaceous ground cover height is being achieved); 3) both the summer and winter pastures within 15 days after the end of the permitted grazing season; and 4) the winter unit in October. The Forest Service indicated that management action will be taken if the forage/range guidelines, as described above (i.e., herbaceous ground cover height and forage utilization), are not met. As part of this process, they will also include the effect of elk and deer on forage/range guidelines;

The Forest Service will also: 1) conduct regularly scheduled and unscheduled allotment inspections to determine the condition and efficiency of range improvements, forage utilization, livestock distribution patterns, and locations of salt and mineral supplements; and 2) measure long-term range condition and trend in established Parker monitoring locations during the life of the 10-year grazing permit; and 3) assess adherence to the prescribed forage/range guidelines using, for example, leaf length or other measurements the Forest Service determines are appropriate on key forage species.

Although the BA did not identify the methods that will be used during these inspections, we assume that, as discussed above, the Forest Service will provide this information to the Service during the development of an AMP. In our conversations with the Lincoln National Forest, they indicated that adaptive management could be used for the purposes of resource protection when monitoring indicates that forage/range guidelines are not being met (L. Sansom, Forest Service, pers. comm., 2003). Although Attachment A provides some information related to monitoring, additional details related to monitoring and subsequent management actions are vague in the BA and DEIS. For example, the Lincoln National Forest did not indicate how the monitoring data were going to be used to evaluate or adjust livestock numbers, actively manage livestock (e.g., strategic placement of salt or minerals, herding, or fencing), or enforce permit compliance. We assume these specific monitoring methods will use the established thresholds (Attachment A), with further details in the AMP. As an example, we believe that when monitoring occurs within a specific pasture within the allotment, this information could be used to manage appropriate livestock numbers or determine whether annual operating instructions or the term permit should be modified. This type of adaptive management process would ensure forage/range guidelines will be attained by describing the monitoring and potential management actions that would be utilized such as: 1) moving livestock to other areas of the pasture or to a new pasture; 2) removing or reducing the number of livestock; or 3) other appropriate measures.

The proposed monitoring entails evaluating range conditions prior to the entry of livestock into a pasture (range readiness). The Forest Service established a 1-in leaf length standard of range

readiness. As noted above, the intent of the Recovery Plan is that the grazing standards and guidelines are applied year-round (Service 1999), whereas the Forest Plan Amendments indicated that grazing/forage guidelines will be applied across the landscape in all vegetation types (Forest Service 1995). We believe that the Forest Service intends to provide for year-round application of the forage/range guidelines, because, the DEIS indicated that adequate habitat for the Mexican vole would be provided during late fall, winter, and spring (Forest Service 2002). Thus, we anticipate that the Forest Service will attempt to meet the forage/range guidelines during late fall, winter, and spring, which will limit adverse effects to the MSO and its habitat.

The current proposal establishes a monitoring-management threshold based on a 4-in herbaceous ground cover height not being met or maintained in key areas (i.e., when monitoring demonstrates that the 4-in herbaceous ground cover height has not been maintained in key areas in the pasture, management adjustments will be made so that forage/range guidelines will be attained). Based on this scenario, adjustments will be made when non-compliance occurs in key areas within a pasture. Excessive forage utilization has been a continual concern on the Sacramento Allotment since 1991 (Forest Service 2002). Present management is not consistent with the standards and guidelines of the Lincoln National Forest Plan (Forest Service 2002). Currently, riparian conditions on the allotment do not meet Regional Plan criteria, the ecological condition of the range is not satisfactory, and many key areas have not met or maintained leaf length, herbaceous ground cover height or utilization guidelines (Forest Service 2000d, 2001, 2002, 2002b, 2002c, 2003a, 2003b, 2003c, 2003d). Current range conditions do not meet the intent of the Recovery Plan, the MSO grazing criteria, the Lincoln National Forest Plan, or the Forest Plan Amendments; however we believe the current proposed action is consistent with these guidance documents. Consequently, the proposed monitoring and related management thresholds will limit adverse affects to the MSO and its habitat, and should achieve compliance with the Recovery Plan, the MSO grazing criteria, the Lincoln National Forest Plan, or the Forest Plan Amendments.

The Forest Service provided maps of key areas, which were established following the criteria cited in the Forest Plan Amendments. The 2003 annual operating instructions indicated that key areas were within upper Kerr Canyon, Benson Canyon, Lucas Canyon, Dark Canyon, Hay Canyon, Wills Canyon, Rice Canyon, and McAfee Canyon. The annual operating instructions also indicated that these key areas will be monitored in May, August, and October to determine compliance with forage/range guidelines (the 2003 annual operating instructions are not part of the current consultation). Still, we expect the Forest Service to use similar descriptions for the current proposed term permit. The Forest Plan Amendments detailed that these key areas will normally be 1/4 to 1 mile from water, located on productive soils on level to intermediate slopes, and be readily accessible for grazing. We assume these key areas will be fully described in the forthcoming AMP. These key areas and related monitoring must be established to limit potential adverse effects to MSO prey.

In summary, the Forest Service has proposed monitoring to determine whether grazing levels comply with the 10-year term permit for the Sacramento Allotment. It is our understanding that

these data will assess whether the following proposed forage/range guidelines are met: 1) the 4-in herbaceous ground cover height for MSO prey habitat; 2) the 35 percent forage utilization for the summer unit; 3) the 40 percent forage utilization for the winter unit; and 4) the 70 percent forage utilization guideline for livestock traps. We assume that methods and procedures to manage and monitor the Sacramento Allotment will be detailed in the forthcoming AMP. For example, we anticipate that when the Forest Service determines one of the forage/range guidelines will not be met, they would follow a similar process to manage and protect long-term range conditions consistent with the Lincoln National Forest Plan and range management regulations (e.g., see 36 CFR 222). This administrative process will generally provide adequate protective measures to limit adverse impacts to the MSO and its habitat.

Interdependent and Interrelated Actions

We also must consider indirect effects and the effects of interdependent and interrelated actions of this proposed project to the MSO. Indirect effects are those that are caused by, or result from, the proposed action, and are later in time, but are reasonably certain to occur. Interrelated actions are actions that are part of a larger action, and are dependent on the larger action for their justification. Interdependent actions are actions that have no independent utility apart from the action under consideration. The livestock projects, including exclosures, livestock traps, and the use of salt blocks and other livestock management activities (e.g,. vehicle use) are considered interrelated and interdependent with the implementation of the proposed project. Many of these activities relate to grazing criteria number 1, which applies to limiting disturbances to MSO PACs during the breeding season.

The proposed 70 percent forage utilization standard for the livestock traps is double what is being proposed across the allotment. The significance of forage utilization (e.g., currently measured using leaf length) guidelines, monitoring, and their relationship to range health and production are described in the 2003 annual operating instructions; leaf length has been used as the metric to describe the lower threshold to avoid damage and possible mortality to individual forage plants. The Forest Service documented in 2001 and 2002 that over 50 percent of the monitored key areas had leaf lengths at the end of the grazing season that exceeded established guidelines, indicating over-use and the potential for resource damage. They concluded that the combination of extreme forage use and drought conditions resulted in significant reductions in forage production across the allotment. Nevertheless, the proposed action is for livestock use to occur within traps during pasture moves in early spring, mid-summer, and late fall. The Forest Service concludes that habitat for MSO prey would not be provided within livestock traps, and that this action would adversely affect these PACs. We agree with the conclusion, because the action is inconsistent with the Recovery Plan and the Forest Plan Amendments.

The Forest Service has previously indicated that musk thistle, teasel, and other noxious weeds reduce grass and native forb production (Forest Service 1995a). As noted above, voles and other species that depend significantly upon meadows for foraging or reproducing may be negatively affected by the spread of these noxious weeds (Forest Service 1995a). The use of livestock traps

will likely result in continual growth of noxious weeds within and immediately adjacent traps (e.g., within 100 yards). Therefore, we conclude that livestock traps can facilitate the spread of noxious weeds and may adversely affect MSO prey habitat.

There are 25 ac of the Marcia PAC, 0.8 ac of the Rice PAC, and 2 ac of the Bluff PAC that are within the Peñasco livestock trap. This livestock trap is proposed to receive 70 percent forage utilization. We consider these impacts adverse, but believe they are unlikely to result in harassment or harm of MSO, because the area within the Peñasco livestock trap is a minor proportion of each of the overall PACs (i.e., only 4 percent of the Marcia PAC and less than 1 percent of the Rice and Bluff PACs). Other livestock traps with minor proportions of PAC acreages on the Sacramento Allotment include the Benson and Wills livestock traps. The Benson and Wills livestock traps contain approximately 3 and 17 PAC ac, respectively. Although 70 percent forage utilization within PACs contained in livestock traps will adversely affect MSOs, we do not expect the effects to disrupt normal behavior patterns such as breeding, sheltering, or feeding.

The proposed livestock projects on the winter unit are not expected to affect the MSO because they are outside of protected and restricted habitat. Alternatively, the livestock projects on the summer unit are proposed to occur within four PACs (Thousand Mile, Masterson, Telephone, and Moore). The Thousand Mile livestock trap currently exists and will have use limited to livestock gathering periods as described earlier. Reconstruction will occur outside the breeding season and the PAC is currently being monitored for the Sacramento River Road consultation (Service 2000). We conclude that habitat for MSO prey would not be provided within this livestock trap, and that the action would adversely affect the Thousand Mile PAC. However, we do not expect the effects from the Thousand Mile livestock trap to disrupt normal behavior patterns such as breeding, sheltering, or feeding or result in take.

A new 10-acre livestock trap is proposed to be constructed adjacent to the Masterson PAC. The Forest Service concludes that the construction of the livestock trap will increase both use and human activity within the 45-acre meadow, but this activity will not be within the Masterson PAC. We believe that construction activities will increase use and human activity, but these activities are not considered adverse since they are located outside of the PAC. Nevertheless, the Forest Service is proposing 70 percent forage utilization within the new livestock trap. As noted above, this high forage utilization is considered inconsistent with the recommendations in the Recovery Plan and Forest Plan Amendments to maintain good to excellent grazing conditions. For this reason, we conclude that the adjacent PACs (i.e., Masterson and Telephone) will be adversely affected, but we do not expect the effects to disrupt normal behavior patterns such as breeding, sheltering, or feeding.

A 10-acre livestock exclosure is proposed within the Telephone PAC to limit impacts on the Forest Service sensitive plant, *Lilium philadelphicum*. Construction of this exclosure would be completed outside of the MSO breeding season, and is not expected to adversely impact the Telephone PAC. Similarly, the sunspot pipeline is proposed for reconstruction within the

Moore PAC. This project would be completed outside of the breeding season and, along with other water improvements, is expected to distribute grazing use. For these reasons, we do not anticipate adverse affects will occur to the Moore PAC.

Additional activities that concentrate cattle (trailing, gathering, and placement of waters, salt, and nutrient supplements) are proposed to be conducted inside of some PACs and during the MSO breeding season. For example, salting is proposed to occur within the lower Wills and other PACs. Although the Forest Service determined that these impacts will be incidental, we believe they have the potential to concentrate livestock within PACs and/or riparian areas, both of which appear to be inconsistent with the Recovery Plan and Forest Plan Amendments. We believe that salt blocks placed within PACs or riparian areas is not conducive for attaining good to excellent range conditions within the key grazing areas or to restore good conditions to degraded riparian communities as soon as possible. For this reason, we expect these PACs will be adversely affected by these activities.

The use of vehicles by permittees or Forest Service personnel are considered interrelated and interdependent with the implementation of the current proposed project. Affects related to these or other activities are considered incidental and should not be any greater than those described above, because the Forest Service will ensure that road use from vehicles will be kept to the existing roadbeds and pullouts. Consequently, the potential for effects from vehicle use, including ATV's, are expected to be limited and not likely to result in adverse affects.

Sacramento Mountains prickly poppy

Within the winter unit, there are four main pastures, Alamo, Mule, Pasture Ridge and Grapevine. Mule, Pasture Ridge, and Grapevine Pastures are proposed to be grazed annually during the winter season (November 1 to May 14). Alamo Pasture is proposed to be grazed from November 1 to January 31 during the first two years of the permit In the eight subsequent years of the permit, livestock use in Alamo Pasture will be monitored each December or January to determine whether an adjustment to the number of livestock, commensurate with the potential for livestock impacts on the poppy from herbivory and trampling is necessary. Adjustments could entail livestock removal, herd management (moving livestock within Alamo Pasture), or livestock reductions. Each pasture would receive partial growing season rest from early February (Alamo) or mid-May (Mule, Pasture Ridge, and Grapevine) to the end of October each year. Under this proposal, no more than 335 cattle and 5 horses would be divided and distributed in all 4 pastures.

The Alamo winter pasture contains a total of 11,113 ac, 3,027 of which are suitable for grazing. This acreage represents 19 percent of the usable winter unit. The Alamo pasture consists of two east-west running canyons, Alamo and Caballero Canyons, which rise very steeply on both sides. Water is provided at five locations in the canyon bottoms, at the top, middle and lower ends of the canyons. Short stretches of open water surface in the upper reaches of each canyon when drought conditions are not too severe. A bench or mesa between the upper arms of the two

Moore PAC. This project would be completed outside of the breeding season and, along with other water improvements, is expected to distribute grazing use. For these reasons, we do not anticipate adverse affects will occur to the Moore PAC.

Additional activities that concentrate cattle (trailing, gathering, and placement of waters, salt, and nutrient supplements) are proposed to be conducted inside of some PACs and during the MSO breeding season. For example, salting is proposed to occur within the lower Wills and other PACs. Although the Forest Service determined that these impacts will be incidental, we believe they have the potential to concentrate livestock within PACs and/or riparian areas, both of which appear to be inconsistent with the Recovery Plan and Forest Plan Amendments. We believe that salt blocks placed within PACs or riparian areas is not conducive for attaining good to excellent range conditions within the key grazing areas or to restore good conditions to degraded riparian communities as soon as possible. For this reason, we expect these PACs will be adversely affected by these activities.

The use of vehicles by permittees or Forest Service personnel are considered interrelated and interdependent with the implementation of the current proposed project. Affects related to these or other activities are considered incidental and should not be any greater than those described above, because the Forest Service will ensure that road use from vehicles will be kept to the existing roadbeds and pullouts. Consequently, the potential for effects from vehicle use, including ATV's, are expected to be limited and not likely to result in adverse affects.

Sacramento Mountains prickly poppy

Within the winter unit, there are four main pastures, Alamo, Mule, Pasture Ridge and Grapevine. Mule, Pasture Ridge, and Grapevine Pastures are proposed to be grazed annually during the winter season (November 1 to May 14). Alamo Pasture is proposed to be grazed from November 1 to January 31 during the first two years of the permit In the eight subsequent years of the permit, livestock use in Alamo Pasture will be monitored each December or January to determine whether an adjustment to the number of livestock, commensurate with the potential for livestock impacts on the poppy from herbivory and trampling is necessary. Adjustments could entail livestock removal, herd management (moving livestock within Alamo Pasture), or livestock reductions. Each pasture would receive partial growing season rest from early February (Alamo) or mid-May (Mule, Pasture Ridge, and Grapevine) to the end of October each year. Under this proposal, no more than 335 cattle and 5 horses would be divided and distributed in all 4 pastures.

The Alamo winter pasture contains a total of 11,113 ac, 3,027 of which are suitable for grazing. This acreage represents 19 percent of the usable winter unit. The Alamo pasture consists of two east-west running canyons, Alamo and Caballero Canyons, which rise very steeply on both sides. Water is provided at five locations in the canyon bottoms, at the top, middle and lower ends of the canyons. Short stretches of open water surface in the upper reaches of each canyon when drought conditions are not too severe. A bench or mesa between the upper arms of the two

canyons is accessible to livestock and water is provided there in two locations. The majority of the pasture is not accessible for use by livestock. The winter unit of this allotment has three other pastures containing 46,181 ac of which 12,497 are considered suitable for grazing (Forest Service 2002).

Herbivory

Monitoring of adult poppies has shown numerous times that livestock herbivory is occurring on adult plants (see section "Factors Affecting the Species in the Action Area). Nevertheless, in the rosette stage, with a minority of leaves affected, the poppies recover and go on to bolt and flower. Continuing growth has been shown to make herbivory much less obvious within one week. Poppies have been observed grazed to the ground by cattle under high stocking rates (Service 1994). Seedlings and young plants may be more palatable (Service 1989); however, the Forest Service has no evidence regarding herbivory on young plants. Light to moderate herbivory is not expected to have long term negative impacts to adult poppies. Excess herbivory, or overuse of forage species affects riparian area species composition as well as its soil and moisture retention-ability which in turn affect poppy habitat and functioning of the riparian corridor (L. Barker, pers. comm., 2004).

Trampling

Trampling of individual poppies is unavoidable when livestock graze in occupied habitat. The BA states that light trampling of adult plants is not likely to kill them, as they have a substantial underground root mass. Nevertheless, damage to poppies from trampling could occur during periods of low forage availability, and could have significant impacts on future poppy recruitment. For example, seedling poppies are most vulnerable to mortality while they are in the process of establishing a taproot. Trampling of fragile seedlings could easily cause the loss of individuals. In addition, grazing may affect riparian vegetation and indirectly result in damage to poppies from lack of soil moisture retention ability.

It is believed that poppies germinate as early as February at lower elevations (Forest Service 1989). In the first 2 years of the permit, the absence of livestock during late spring and summer will allow vulnerable seedlings and young plants that may be present to put on growth and root storage, particularly during summer rains, without damage. Removal of livestock prior to the emergence of seedlings will avoid impacts to poppy seedlings as they develop their taproot. After the first two winter grazing seasons, seedlings may be utilized by livestock and mortality may result. The Forest Service proposes to monitor livestock use on poppies and adjust livestock numbers accordingly, to reduce or avoid adverse effects to the poppy.

Livestock grazing in the Alamo Pasture from October through January may provide disturbance that will facilitate the germination of poppy seedlings. These poppies, and other members of the genus *Argemone* in general, are known to take advantage of newly disturbed soil (Forest Service 2003a). *Argemone* has also been described as an early-successional genus. The poppy has been

observed numerous times to occupy disturbed road banks, newly dug pipeline routes and berms, and abandoned fields. However, the amount and timing of disturbance is important, as is the amount of moisture available at these sites. Sufficient moisture is required for both germination and establishment of plants. As mentioned in the BA, germination and establishment will more likely be successful in disturbed sites that collect extra moisture, or during years of higher rainfall.

At a time of low population levels, low seed production, and drought conditions, the establishment of new plants is critical. Heightened concern exists for direct and indirect effects of livestock grazing on germination habitat and seedlings. Seedlings are especially vulnerable to damage by trampling. Seedlings are most likely to germinate and succeed in moister sites in swales on low benches that also support grasses and forbs that green up early in the spring and attract livestock, raising the possibility for hoof damage to young poppy plants. Livestock use in riparian areas, and of riparian shade, creates physical disturbances and alteration of habitat needed to support the vulnerable seedling life stage of the species. Rest from livestock use during the first two years of the permit may allow the poppy some ability to respond with increased recruitment of adults into the population. In future years, the success of seedling establishment will depend on good management of livestock within the pastures and adequate rainfall. In the eight subsequent years of the permit, livestock use in Alamo Pasture will be monitored each December or January to determine whether an adjustment to the number of livestock is necessary to protect the poppy from herbivory and trampling.

Indirect effects-plant community changes

Because of the preponderance of heavy forest, dense woodland, steep slopes, and rock and cliff, only about 29,000 ac of the allotment are usable for grazing. Livestock grazing would affect the vegetation on the approximate 29,000 ac usable by livestock. Out of the approximately 11,000 ac on the Alamo winter pasture, only about 3,000 ac are usable. Improper stocking rates will result in negative impacts to the existing upland and riparian plant communities. Livestock grazing can affect vegetation species composition, plant density, and plant vigor (Forest Service 2003a). Recruitment of seedlings into the adult population is also affected by any actions that lower the moisture-holding capacity of the soil, or increase the likelihood of destructive flash floods. The BA discusses the indirect impacts of a changing or degraded riparian plant community on the poppy; 1) Loss of riparian vegetation affects the moisture-holding capacity of the soils in riparian areas, 2) decreases in sod-forming root masses and woody vegetation lead to an increase in flood-water velocity, and 3) loss of top soil, and of the moisture-holding capability of the soil. All of these factors indirectly affect habitat and potentially affect poppy plants, particularly younger plants at the vulnerable germination and establishment phases. We anticipate that implementation of the forage/range guidelines outlined in the proposed action will improve the range condition in the Alamo pasture.

Indirect effects- flash floods

Concern has been expressed in the various sources cited above for the loss of plants due to flash floods in the canyons, particularly in Alamo Canyon (Service 1987). However, rebounds in the number of poppy plants have been observed in years subsequent to damaging floods. Poppy seeds show the highest germination rates when the seed coat has been lightly nicked (Sivinski 1992). In the wild, seeds are believed to receive this mechanical scarification through tumbling along a stream bed with water flows. Flash floods may provide the disturbances that facilitate preparation of a seedbed and seed scarification in natural systems. The damaging effects from flash floods can be exacerbated, however, by changes in vegetative composition and cover in riparian zones, particularly in those canyons where livestock grazing has reduced many of the grasses and eliminated many forbs. Significant changes in flood frequency or intensity may not allow poppy populations to recover and re-establish between flood events.

The amount and duration of livestock use plays a significant role in vegetation composition in the riparian bottoms. As stated in the BA, repeated use of new photosynthetic tissue produced during the spring drought period puts a strain on roots and reduces energy storage ability for forage plants that can eventually affect plant community composition, riparian health, soil stability and water-holding capacity. Overutilization of forage has been occurring on the Sacramento Allotment since 1991, and current livestock use has resulted in adverse affects to the poppy (Forest Service 2003a). Any impacts to the plant community that result in decreased ability for poppies to withstand and recover from flooding will have significant and long-term effects on poppy sustainability and recovery.

The poppy has shown relatively wide fluctuations in the number of adult plants through the years. It has shown the ability, at least in years of normal or above normal rainfall, to maintain stable populations or recover. A certain level of disturbance is therefore believed to be needed for the species. Biological concerns relate more to indirect effects in the canyons at a time when the number of adults is fewer, and when the seed bank in the soil could be reduced. Currently, adult plants appear to be at their lowest numbers.

Indirect effects-population viability

Poppy populations in Alamo and Caballero Canyons decreased by approximately 43 percent between 1987 and 2003. Additionally, distribution of the poppy decreased from 10 canyons to 5 (Forest Service 2003a). During periods of low plant numbers of plants, the combination of several threats occurring concurrently becomes more significant. Small population sizes are of concern because of decreased opportunities for out-crossing, resulting in in-breeding that may lead to higher possibilities for the fixation and expression of adverse genetic mutations. Lower levels of out-crossing also result in lower fruit set and seed production (Tepedino 1992). Periods of prolonged drought may result in germination without establishment, depleting the seed bank in the soil. Adult plants may die without successfully replacing themselves if drought periods extend longer than their approximately 7 to 9-year lifespan. Monitoring observations in 2001 indicate that seedling establishment may be a critical, or bottleneck stage in the life cycle of this species (Guadenrama and Barker 2001).

City of Alamogordo water developments impact poppy habitat by reducing water availability during germination of seedlings and throughout the year. Livestock herbivory and trampling impacts to overall poppy numbers, either through reduced seedling recruitment or adult mortality, may contribute to reduced population viability through reduced genetic diversity and an inability for individuals to out-cross during pollination. Reduced genetic diversity will ultimately limit the poppy's ability to withstand significant changes in population levels, both those that are naturally caused (drought, flash floods, disease etc.) and those that are human caused (livestock grazing, habitat destruction, increased flash flooding).

Interrelated and interdependent actions

Placement of livestock supplements, such as water and minerals, are an impact to the poppy. The Forest Service has documented placement of minerals in riparian bottoms in occupied habitat several times (Forest Service 2003a). Concentration of livestock in occupied poppy habitat as the result of mineral placement and water development will impact poppies through increased trampling and herbivory.

Other potential actions include fence and water development maintenance. These actions may result in short term impacts to poppies if construction activities occur in occupied habitat while poppies are present.

The Mule Pasture has not been grazed for the last several seasons because there are currently no functioning water sources (Forest Service 2003a). The Service believes that maintenance and restoration of water sources on the Mule Pasture would reduce some of the use on the Alamo Pasture by allowing use of the Mule Pasture containing 2,826 ac of livestock-useable land, currently not usable because of lack of water. Additionally the Mule Pasture is situated in between the Alamo and Grapevine Pastures. Restoring waters here would allow shorter and/or lighter stocking in Alamo Pasture which currently receives increased forage utilization and impacts to the poppy.

The recovery rate for a species is considered to be the time needed for populations to return to equilibrium after disturbance. For individual poppy plants, recovery may be considered to be the time needed to produce a mature, seed-producing adult from seed. This period is believed to be two years at minimum, given sufficient rainfall, but could be three years in times of moisture stress. Impacts to seedlings from the proposed action may occur throughout the 10-year period of the permit. This yearly impact could hamper the poppy's ability to recover from year to year, particularly at a time of low population levels. In the short term, direct effects on seedlings and recruitment in the spring are of immediate concern. Indirect effects on the riparian plant community, vegetative cover, soil moisture-retention ability, and soil stability as it relates to destruction from flash floods, are of concern in the long term.

Sacramento Mountains thistle

The Sacramento Allotment contains 74 of 86 occupied thistle sites found on the Lincoln National Forest as of 2001. These 74 sites contained 333,800 of 347,090 total thistle plants found on the Lincoln National Forest in 2001. This represents a total of 96 percent of all the plants counted in 2001. All of the 74 sites are within the North and South summer pastures of the allotment, with 38 of these 74 sites either fenced to exclude livestock or considered to be inaccessible.

The DEIS for the Allotment states that the North and South Pastures of the summer unit contain 42,614 ac. Of this acreage, 11,540 ac are considered usable grazing acres, based on the absence of steep topography, dense canopy cover, insufficient forage production or inaccessibility. Approximately 73 percent of the acreage of the 2 pastures is not usable for livestock grazing (Forest Service 2002). Habitat for the thistle largely falls within acreage considered usable under these criteria, except for extremely steep occurrences.

Direct effects-herbivory and trampling

As stated in the BA, a reduction of photosynthetic tissue and plant size can adversely impact plant growth, vigor, reproductive potential, and the ability of the plants to compete with invasive weeds. The thistle has also been observed to only make one attempt per rosette at producing a flowering stalk. If that stalk is lost to herbivory, reproductive potential for that plant is lost.

Herbivory and trampling are also of concern with relation to seedling establishment and survival. Huenneke and Thomson (1995) report fairly high numbers of seedlings, but also substantial mortality of those seedlings over the course of a year. Herbivory and trampling at a vulnerable point in the thistle life cycle when seedlings are young and not well established can cause significant losses of plants. Grazing early in the spring is more likely to produce adverse impacts to seedlings. Trampling can affect recruitment of new plants in soft-substrate outflow streams to the extent that disturbance and mechanical damage reduce seedling establishment.

Thistles located in livestock traps are likely to face the most severe impacts. Traps will concentrate livestock for short periods of time. During that time utilization levels will be severe and impacts to thistles through herbivory and trampling are likely to increase correspondingly.

Indirect effects-habitat destruction and hydrology

Springs and creeks provide a majority of the watering sites for both livestock and wildlife species, especially elk. These wet sites are subject to trampling and hoof damage, and receive especially heavy use during drought periods when both water and green forage are not readily available elsewhere.

Intact travertine provides a unique substrate that the thistle is very well adapted to occupying. Damage to the travertine, causing a loss of normal substrate structure, may inhibit seed germination and seedling establishment when water flows return to these sites. In addition, water-flow channels within the travertine structures may be damaged by heavy trampling. Soft-

substrate outflow creeks are habitat for the thistle that is especially vulnerable to hoof damage from livestock use and trampling.

The summer pastures and thistle occurrences in the upper Rio Peñasco, including those in exclosures, are subject to entry by livestock drifting from the winter unit well before the turn-on date of May 15. It has been difficult to keep exclosure fences intact for various reasons. The thistle is currently found within two of the traps used to gather livestock. New exclosures in Wills and Peñasco/Water Canyon will exclude more of the thistle plants, but some plants will still be subject to livestock impacts in the Peñasco trap.

Monitoring of the thistle has shown a simple and direct relationship between water availability in suitable habitat and numbers and extent of plants in occurrences (Forest Service 2003a). As water flow has been observed to decline at springs, decreases in plant numbers and the size of the sites have occurred. The situation reverses when increased water is available.

Within the summer pastures, the majority of sites providing water for livestock are the natural springs and streams. During drought conditions when streams dry up, livestock are forced to seek springs for water which puts them more frequently in occupied thistle habitat. Concerns exist at these sites for both travertine and soft-substrate habitats because of impacts created by livestock use. As stated in the BA, compaction and down-cutting of soft-substrate streambeds and banks cause water tables to lower resulting in drier sites that may not be suitable for thistles. Damage to travertine in hard-substrate sites causes pulverization of the calcium carbonate and alteration of seedbed characteristics for the thistle, thus affecting suitability of habitat. During spring drought periods when water and green forage are in short supply, impacts at springs can be particularly heavy. Early drift of livestock onto summer pastures contributes to impacts. Periods of drought in the fall when the thistle appears to be especially palatable also increase the likelihood of impacts to individual plants and their habitat.

Indirect effects-population viability

To the extent that herbivory, trampling, or habitat degradation may reduce the density of plants, seedlings are more exposed to adverse temperatures. Reduced thistle density also puts the thistle at a disadvantage in competition with invading weeds such as teasel (Huenneke and Thomson 1995). Thistles in traps will also experience higher levels of competition with weeds and seedling recruitment may be reduced as a result of this competition.

As described in the 1994 Forest Service Monitoring Report, small thistle sites may be more vulnerable and at higher risk from the impacts of grazing. To the extent that growth, vigor, reproductive output and recruitment are affected by impacts to plants and their habitats, small sites are of special concern. Expansion at these sites can be affected by the impacts to habitat described above, as well as by the loss of seedlings. The ability to attract pollinators relates directly to the size of the site. Small or declining sites are put at a further disadvantage for successful reproduction.

Interrelated and interdependent actions

Placement of livestock supplements, such as water and minerals, are an impact to the thistle. Concentration of livestock in occupied thistle habitat as the result of mineral placement and water development will impact thistles through increased trampling and herbivory.

Other potential actions include fence and water development maintenance. These actions may result in short term impacts to thistle if construction activities occur in occupied habitat while thistles are present.

Depending on the timing of the impacts, thistles will respond in varying ways to grazing. Impacts to flowering adults may result in long term effects to population recruitment. Adults bolt and produce flowers only once in their lifetimes. Any removal or mortality to adults at this time will effectively remove that adult and its reproductive potential from the population. If impacts are large scale and effect an entire site, population numbers in that area may decline significantly in subsequent years.

Similar impacts would result if livestock impacts to seedlings were large scale. If impacts are severe enough to result in mortality to seedlings, then effectively, both the adult which produced it as well as its reproductive potential have been removed. At significant levels, this may have large impacts on occurrences of thistles.

Impacts to thistle habitat will be most severe and have the most significant long-term impacts on the species. Travertine habitats are fragile in their hydrology and impacts through trampling will negatively impact their suitability for thistles. Similarly, impacts to soft substrates provided by springs and their outflow streams may reduce the suitability of habitat for the thistle and result in reduction or removal of occurrences.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions on endangered or threatened species or critical habitat that are reasonably certain to occur in the foreseeable future in the action area considered in this biological opinion. Future Federal actions that are unrelated to the action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Cumulative effects analysis as stated here applies to section 7 of the Act and should not be confused with the broader use of this term in the NEPA or other environmental laws.

Mexican spotted owl

In past biological opinions, it has been stated that, "Because of the predominant occurrence of the MSOs 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 (e.g., timber harvest on neighboring Mescalero Apache Tribe, private land timber sales on inholdings in and around the Lincoln National Forest). In addition, future actions on non-Federal lands adjacent to the Forest Service lands that are reasonably expected to occur include urban development, road construction, land clearing, logging, fuelwood gathering, and other associated actions.

The Sacramento Allotment is generally located between the Village of Cloudcroft, and Timberon, New Mexico. The area is interspersed by National Forest and non-Federal lands including highways, forest roads, existing infrastructure (e.g., powerlines), developed private campgrounds, and surrounding residential areas, where activities occur either seasonally or year-round. We are aware that impacts to the MSO from recreation (e.g., ATVs), timber harvest, and subdivisions are reasonably certain to occur. These activities reduce the quality and quantity of MSO nesting, roosting and foraging habitat, and cause disturbance to breeding MSOs and contribute as cumulative effects of the action.

Sacramento Mountains prickly poppy

Cumulative effects on the poppy may result through actions on private lands. These impacts may include grazing, noxious weed treatment, clearing of land, as well as maintenance on Highway 82 and local dirt roads where plants occur in the rights-of-way.

Sacramento Mountains thistle

Cumulative effects may accrue to the thistle through actions taking place on private lands and along highway rights-of-ways. Water rights granted by the State Engineer, and the subsequent development of wells and water systems affect water availability in springs and seeps to varying degrees, depending upon their locations. Development, clearing, grazing, noxious weeds and their treatment on private lands may affect the thistle and its habitat. State highway crew maintenance of the Federal Highway 82 right-of-way impacts plants and habitat on non-National Forest System land between Cloudcroft and High Rolls. The presence of the weevil, introduced by the Mescalero Apache Nation may also affect the thistle.

CONCLUSION

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

Mexican Spotted Owl

After reviewing the current status of the MSO, the environmental baseline for the action area, the effects of the proposed Sacramento Allotment and the cumulative effects, it is our biological

opinion that the project, as proposed, is not likely to jeopardize the continued existence of the MSO within the Basin and Range East RU or rangewide. Critical habitat for this species; however, this project does not occur within this designation. Therefore, this action does not affect any areas of critical habitat and no destruction or adverse modification of critical habitat is anticipated. Nevertheless, the designated critical habitat for the MSO may change in the near future because the United States District Court for the District of Arizona, in Center for Biological Diversity et al. v. Gale A. Norton, CIV 01-409 ordered us to redesignate critical habitat for the MSO. We make this finding for the following reasons:

1. The proposed forage/range guidelines, monitoring and enforcement, development of an AMP, reduced stocking levels, and deferred-rotation strategy will allow overall range conditions to improve over the 10-years considered in this consultation.

2. We anticipate that when the Forest Service determines one of the forage/range guidelines will not be met, they will manage and protect long-term range conditions consistent with the Lincoln National Forest Plan and range management regulations (e.g., see 36 CFR 222). The Service is available to assist the Forest Service and other interested parties (e.g., the New Mexico Range Improvement Task Force) in exploring flexible options for long-term range condition improvement.

Sacramento Mountains prickly poppy

After reviewing the current status of the poppy, the environmental baseline for the action area, the effects of proposed livestock grazing on the Sacramento Allotment and the cumulative effects, it is our biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the poppy. Critical habitat for this species has not been designated; thus none will be affected. We make this finding for the following reasons:

1. The proposed forage/range guidelines, monitoring and enforcement, development of an AMP, reduced stocking levels, and deferred-rotation strategy will allow overall range conditions to improve over the 10-years considered in this consultation.

2. The removal of livestock from the Alamo Pasture, where the majority of known poppies exist, by February 1 will allow for germination and growth of seedlings without the threat of trampling or herbivory. Also, this management action will reduce herbivory and trampling of poppies for much of the year. After the first two years, monitoring of livestock effects to poppies is expected to guide management such that negative impacts resulting from any documented trampling or herbivory of seedlings will be eliminated or minimized through management changes.

3. We anticipate that when the Forest Service determines that impacts are occurring to the poppy as the result of livestock grazing, they will manage and protect poppy occurrences consistent with the Lincoln National Forest Plan, the EIS, and range management regulations (e.g., see 36 CFR 222).

Sacramento Mountains thistle

The selected alternative for management of the Sacramento Allotment allows interaction between livestock and accessible thistle occurrences, as well as with suitable and potential habitat. Impacts are both direct and indirect. After reviewing the current status of the thistle, the environmental baseline for the action area, the effects of the proposed livestock grazing on the Sacramento Allotment and the cumulative effects, it is our biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the thistle. Critical habitat for this species has not been designated; thus none will be affected. We make this finding for the following reasons:

1. The proposed forage/range guidelines, monitoring and enforcement, development of an AMP, reduced stocking levels, and deferred-rotation strategy will allow overall range conditions to improve over the 10-years considered in this consultation.

2. The continued construction of exclosures will protect isolated occurrences of the thistle. Continued maintenance of existing exclosures will continue to protect some thistle occurrences from livestock impacts.

3. We anticipate that when the Forest Service determines that impacts are occurring to the thistle as the result of livestock grazing, they will manage and protect thistle occurrences consistent with the Lincoln National Forest Plan, the EIS, and range management regulations (e.g., see 36 CFR 222).

INCIDENTAL TAKE

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 harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct. Harass is further defined by us as intentional or negligent actions that creates 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, and sheltering. Harm is further defined by us to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as 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 a 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 for the MSO are non-discretionary and must be implemented by the Forest Service so that they become binding conditions of any grant or permit issued, as appropriate, in order for the exemption in section 7(o)(2) to apply.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of Federally endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

The Forest Service has discretion to regulate the activity that is covered by this incidental take statement. If the species is listed and the Forest Service: 1) fails to require that any permittee or contractor adheres to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, grant, or contract document, and/or 2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, we recommend that the Forest Service report the progress of the action to the Service as specified in the incidental take statement.

Amount or extent of take

For this proposed project, take of MSOs may be in the form of harassment within each of the affected two PACs. We anticipate that the take of MSOs 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. The primary type of take expected to result from grazing on the Sacramento Allotment is through harassment by the reduction of suitability of the habitat for prey species, thus limiting the availability of prey for MSOs. Based on the best available information concerning the MSO, habitat needs of this species, the proposed project description, and information furnished by the Forest Service, take is considered likely for the MSO as a result of the following actions:

1. We believe that improving range conditions for some PACs will not be met instantaneously, when the permit for the Sacramento Allotment is issued in 2004. Range restoration is a long-term process. Improvement in the overall range conditions on the Sacramento Allotment will likely be a slow process and will only occur if forage/range guidelines are met. Consequently, good to excellent range conditions are not likely to be attained in the next few years for the Hubble and Bluff Springs PACs. We believe that implementation and enforcement of forage/range guidelines will be enough to improve prey habitat conditions within and adjacent to most PACs on the allotment. However, we anticipate that incidental take is reasonably certain to occur to two pair of MSOs and their young associated with the Hubble and Bluff Springs PACs.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to jeopardize the continued existence of the MSO.

Reasonable and Prudent Measures

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

1) Conduct all proposed activities in a manner that will minimize disturbance to the MSO.

2) Conduct all proposed activities in a manner that will minimize modification and loss of MSO habitat.

Terms and Conditions for the MSO

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service and their employees, contractors, or subcontractors must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

The following Terms and Conditions are established to implement Reasonable and Prudent Measure 1.

1.1 Fences, corrals, trick tanks, livestock traps, or other livestock management construction activities that occur within PACs will be conducted outside of the MSO breeding season or after non-nesting status has been determined.

1.2 Within PACs, Forest Service employees and the livestock permittee shall strictly limit their activities, vehicles (including off-highway vehicles), equipment, and construction materials to the open roads and motorized trails or appropriate livestock management areas/activities (e.g., livestock traps). Exceptions are allowed to monitor key areas.

1.3 PAC boundaries shall be discussed with the permittee to ensure that livestock concentrations and associated activities such as salt or mineral supplement sites shall not occur within PACs. Salting guidelines from the DEIS shall be followed. Exceptions will only include salting within those areas of some PACs (i.e., ridgetops and open-canopied areas) when used as a range management tool to decrease impacts in riparian and MSO high-use areas. The AOI shall indicate areas that are appropriate for salting to minimize impacts to PACs.

1.4 The Forest Service shall attempt to eradicate noxious weeds in all livestock traps and a 100-yard buffer area immediately adjacent to the traps as needed. This shall be accomplished through the implementation of your noxious weed control projects (consultation numbers 2-22-94-I-009 and 2-22-00-I-397).

The following Terms and Conditions are established to implement Reasonable and Prudent Measure 2.

2.1 The final AMP will be submitted to the New Mexico Ecological Services Field Office within 3 months from the date this agency action is completed (i.e., after clearance of administrative appeals). The AMP should not differ significantly from the proposed action.

2.2 All unauthorized activities that affect the environmental baseline of the MSO (i.e., impacts outside of the proposed project description) shall be immediately reported to the Service by the Forest Service.

2.3 The Forest Service shall provide a report documenting how the project is in compliance with the proposed action (i.e., implementation monitoring). The Forest Service shall provide the Service with the forage/range guidelines monitoring information, any related documents (e.g,. a copy of the AOI), and an annual implementation progress report. Except for the reporting requirements for forage/range guidelines that will be due within 30 days of each monitoring period (including any management actions taken as a result of monitoring), the AOI and the project report shall be submitted to the Service annually, within one month of issuing the AOI, generally in February for the duration of the permit.

2.4 Consistent with the Lincoln National Forest Plan and ongoing monitoring for other grazing allotments (e.g., Bluewater, Pumphouse, Scott Able) on the Forest, the Forest Service shall apply forage/range guidelines allotment-wide, including attaining forage/range guidelines within all key areas. The Forest Service shall adjust livestock grazing, as appropriate, in an attempt to achieve forage/range guidelines within all key areas. Compliance will be attained if the forage/range guidelines are met at key areas.

2.5 During periods when forage production may be low on summer pastures, the Forest Service will monitor forage/range guidelines and manage the Sacramento Allotment consistent with the Forest Service's range management regulations (e.g., 36 CFR 222), (e.g., adjustments will occur to meet forage/range guidelines).

2.6 The Forest Service shall establish two more key areas within the Hubble and Bluff Springs PACs. Monitoring of these and other key areas shall follow appropriate monitoring methods. Monitoring of herbaceous ground cover will be conducted during the required time frame (Attachment A). These data will be used to determine when forage/range guidelines within key areas are attained.

CONSERVATION RECOMMENDATIONS

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

relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibility for these species. In order for us to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species and their habitats, we request notification of the implementation of the conservation recommendations. We recommend the following conservation recommendations be implemented:

Mexican spotted owl

1. The Forest Service should emphasize and implement restoration of lowland riparian habitats for the MSO (Service 1996b).

2. We recommend the Forest Service reduce any possible effects of grazing on the prey base by improving upland range conditions in pastures in and adjacent to protected and restricted habitat.

3. We recommend that the Forest Service work with other entities to identify studies designed to gain a comprehensive understanding of how ungulate grazing affects the habitat of the MSO and its prey species.

Sacramento Mountains prickly poppy

1. If the opportunity arises, the Forest should pursue restoration of hydrological processes required by the poppy through cooperation with the City of Alamogordo or other entities, and through restoration of developed spring habitat throughout the Sacramento Allotment.

2. The Forest should restore and maintain water developments in the Mule Pasture such that this pasture will be usable by livestock and so that use on the Alamo Pasture can be reduced by additional forage availability on the adjacent Mule Pasture.

3. The Forest Service should continue germination studies of poppy seeds and initiate a reintroduction program into currently occupied sites as well as sites that were historically occupied.

Sacramento Mountains thistle

1. The Forest should continue to pursue restoration of hydrological processes throughout the Sacramento Allotment that are required by the thistle through cooperation with the permittee.

2. The Forest should explore and continue to pursue control of exotic competitors of the thistle, such as teasel. Likewise the Forest should monitor the potential range expansion of weevil to determine whether the impending threat of its predation on the thistle is increasing.

3. The Forest should continue extensive monitoring of thistle occurrences.

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.

DISPOSITION OF DEAD OR INJURED LISTED ANIMALS

Upon finding a dead, injured, or sick individual of an endangered or threatened species (e.g., MSO), initial notification must be made to the nearest Service Law Enforcement Office. In New Mexico, contact (505/346-7828) or the New Mexico Ecological Services Field Office (505/346-2525). Written notification must be made within five calender days and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animals shall be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, we should be contacted regarding the final disposition of the animal.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the Sacramento Allotment, Sacramento Ranger District, Lincoln National Forest. As required by 50 FR 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 impact 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 future communications regarding this project, please refer to consultation #2-22-00-F-473. If you have any questions or would like to discuss any part of this biological opinion, please contact Eric Hein of my staff at (505) 761-4735

Sincerely,

Joy E. Nicholopoulos

Joy E. Nicholopoulos
State Supervisor

cc:
Deputy ARD, Ecological Services, U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico
Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, Phoenix, Arizona
Assistant Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Suboffice, Tucson, Arizona
Assistant Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Suboffice, Flagstaff, Arizona

LITERATURE CITED

Andelt, W. F., and S. Ahmed. 2003. Managing voles in Colorado. Colorado State University, Cooperative Extension Service, Ft. Collins.

Arsenault, D.P., A. Hodgson, and P.B. Stacey. 1997. Dispersal movements of juvenile Mexican spotted owls (*Strix occidentalis lucida*) in New Mexico. In Biology and Conservation of Owls of the Northern Hemisphere (D.H. Johnson and T.H. Nichols, eds.). United States Department of Agriculture Forest Service General Technical Report NC-190, St. Paul, Minnesota.

Belsky, A.J. and D.M. Blumenthal. 1997. Effects of livestock grazing on stand dynamics and soils in upland forests of the interior west. Conservation Biology 11:315-327.

Birney, E. C., W. E. Grant, and D. D. Baird. 1976. Importance of vegetative cover to cycles of *Microtus* populations. Ecology 57:1043-1051.

Block, W.M. October 8, 1998. Letter to Nancy Kaufmann, Regional Director, U.S. Fish and Wildlife Service, Region 2 addressing seven topics discussed at a MSO Recovery Team meeting during August 18-20, 1998. Forest Service, Rocky Mountain Research Station, Flagstaff, Arizona.

Bond, M.L., R.J. Gutierrez, A.B. Franklin, W.S. LaHaye, C.A. May, and M.E. Seamans. 2002. Short-term effects of wildfires on spotted owl survival, site fidelity, mate fidelity, and reproductive success. Wildlife Society Bulletin 30:1022-1028.

Craddock, C.L. and L.F. Huenneke. 1997. Aquatic seed dispersal and its implications in *Cirsium vinaceum*, a threatened endemic thistle of New Mexico. American Midland Naturalist. 138:215-219.

Davis, W. B., and D. J. Schmidly. 1994. The mammals of Texas: Mexican vole. Texas Parks and Wildlife, Nongame and urban program, Austin.

Delaney, D.K., T.G. Grubb, P. Beier, L.L. Pater, and H. Reiser. 1999. Effects of helicopter noise on Mexican spotted owls. Journal of Wildlife Management 63(1):60-76.

Desert Botanical Garden. 2003. Germination report for *Argemone pleiacantha* ssp. *pinnatisecta* and *Cirsium vinaceum*. Phoenix, AZ. 3 pp.

Fletcher, K., and H. Hollis. 1994. Habitats used, abundance, and distribution of the Mexican spotted owl (*Strix occidentalis lucida*) on National Forest System Lands in the Southwestern Region. USDA, Forest Service, Southwestern Region, Albuquerque, New Mexico. 86pp.

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. Wildlife Monographs 87:1-64.

Ganey, J.L., W.M. Block, J.S. Jenness, and R.A. Wilson. 1999. Mexican spotted owl home range and habitat use in pine-oak forest: implications for forest management. Forest Science 45:127-135.

Ganey, J.L., W.M. Block, J.K. Dwyer, B.E. Strohmeyer, and J.S. Jenness. 1998. Dispersal, movements, and survival rates of juvenile Mexican spotted owls in Northern Arizona. Wilson Bull., 110:206-217.

Ganey, J.L., and J.L. Dick, Jr. 1995. Habitat relationships of the Mexican spotted owl: current knowledge. *In* Mexican Spotted Owl Recovery Plan. U.S. Department of the Interior, Fish and Wildlife Service, Albuquerque, New Mexico.

Ganey, J.L. and R.P. Balda. 1994. Habitat selection by Mexican spotted owls in northern Arizona. The Auk 111(1):162-169.

Ganey, J.L. and R.P. Balda. 1989a. Distribution and habitat use of Mexican spotted owls in Arizona. Condor 91:355-361.

Ganey, J.L. and R.P. Balda. 1989b. Home-range characteristics of spotted owls in northern Arizona. Journal of Wildlife Management 53:1159-1165.

Ganey, J.L. 1988. Distribution and habitat ecology of Mexican spotted owls in Arizona. MS Thesis. Northern Arizona University, Flagstaff, Arizona.

Ganey, J.L., W.M. Block, and R.M. King. 2000. Roost of radio-marked Mexican spotted owls in Arizona and New Mexico: Sources of variability and descriptive characteristics. Journal of Raptor Research.

Geo-Marine, Inc. 2003. Effects of aircraft noise on the reproduction and occupancy of Mexican spotted owls, Final Annual Report, May 2003. Newport News, Virginia.

Glover, V. J. 1984. Logging railroads of the Lincoln National Forest, New Mexico. Cultural Resources Management Report No. 4. Forest Service, Southwestern Region Albuquerque, New Mexico. 65 pp.

Government Accounting Office. 1999. Western National Forests: a cohesive strategy is needed to address catastrophic wildfire threats. GAO/RCED-99-65, Washington, D.C.

Grant, W.E., E.C. Birney, N.R. French, and D.M. Swift. 1982. Structure and productivity of grassland small mammal communities related to grazing induced changes in vegetative cover. J. Mammal. 63:248-260.

Grubb, T.G., J.L. Ganey, and S.R. Masek. 1997. Canopy closure around nest sites of Mexican spotted owls in northcentral Arizona. Journal of Wildlife Management 61(2):336-342.

Guaderrama, R. T. and L. M. Barker. 2001. Prickly-poppy seedling monitoring at the mouth of Alamo Canyon: March-July, 2001. Lincoln National Forest, Alamogordo, New Mexico. 3 pp.

Gutierrez, R. J., M. E. Seamans, and M. Z. Peery. 1996. Intermountain movement by Mexican spotted owls (Strix occidentalis lucida). Great Basin Naturalist 56:87-89.

Gutierrez, R.J. and Rinkevich, S.E. 1991. Final Report Distribution and Abundance of Spotted Owls in Zion National Park, 1991, National Park System Order No. PX-1200-9-C820.

Gutierrez, R.J., A.B. Franklin, and W.S. LaHaye. 1995. Spotted owls (*Strix occidentalis*). In The Birds of North America, No. 179 (A. Poole and F. Gill, eds.) The Academy of Natural Sciences, Philadelphia, and the American Ornithologist' Union, Washington, D.C.

Holechek, J. I., and D. Galt. 2000. Grazing intensity guidelines. Rangelands 22:11-14.

Huenneke, L. F. and J. K. Thomson. 1995. Potential interference between a threatened endemic thistle and an invasive nonnative plant. Conservation Biology. 9:416-425.

Johnson, S. J. 1981. Impacts of domestic livestock grazing on small mammals of forest grazing allotments in southeastern Idaho. Pp. 242-250 *in* Symposium: wildlife-livestock relationships. Department of Wildlife Resources, College of Forestry, Wildlife, and Range Sciences, University of Idaho, Moscow.

Johnson, C.L. and R.T. Reynolds. 2002. Responses of Mexican spotted owls to low-flying military jet aircraft. United States Department of Agriculture Forest Service Research Note RMRS-RN-12. Rocky Mountain Research Station.

Kaufmann, M. R., L. S. Huckaby, C. M. Regan, and J. Popp. 1998. Forest reference conditions for ecosystem management in the Sacramento Mountains, New Mexico. General Technical Report, RMRS-GTR-19, U.S. Forest Service, Rocky Mountain Forest and Range Experimental Station, Fort Collins, Colorado.

Malaby, S. M. 1987. Survey report: *Argemone pleiacantha* (ssp. *pinnatisecta*). Lincoln National Forest, Alamogordo, New Mexico.

New Mexico Department of Game and Fish. 2001. Operational plan for the management of New Mexico's elk, Federal Aid in Wildlife Restoration, Grant W-93-R42. New Mexico Department of Game and Fish, Santa Fe.

New Mexico State University. 2003. Letter from Dr. John M. Fowler, Coordinator, Range Improvement Task Force to Frank Martinez, Sacramento District Ranger detailing current conditions on the Sacramento Allotment.

New Mexico Rare Plant Technical Council. 1999. New Mexico rare plants: http://nmrareplants.unm.edu (Version 15 March 2002). Albuquerque.

Ownbey, G.B. 1958. The genus *Argemone* for North America and the West Indies. Mem. Torr. Bot. Club. 21:1-159.

Peery, M., R.J. Gutierrez and M. Seamans. 1999. Habitat composition and configuration around Mexican Spotted Owl nest and roost sites in the Tularosa Mountains, New Mexico. Journal of Wildlife Management 63:36-43.

Reynolds, T. D. 1980. Effects of some different land management practices on small mammal populations. J. Mammal. 61:558-561.

Roberts, H. B., and K. G. Becker. 1981. Managing central Idaho rangelands for livestock and elk. Pp. 537-543 *in* Symposium: wildlife-livestock relationships. Department of Wildlife Resources, College of Forestry, Wildlife, and Range Sciences, University of Idaho, Moscow.

Salas, D. June 2003 (2003). Prickly poppy surveys–Alamo and Caballero Canyons, Alamo Pasture–Sacramento Grazing Allotment, June 18, 19, and 20, 2003. Unpublished report, Sacramento Ranger District, Cloudcroft, New Mexico.

Salas, D. February 28, 2002 (2002). Monitoring at the mouth of Alamo Canyon. E-mail to acting District Range Staff and District Ranger. Sacramento Ranger District, Cloudcroft, New Mexico.

Salas, D. September 9, 1999 (1999). Poppy surveys in Alamo and Caballero Canyons. Lincoln National Forest, Sacramento Ranger District, Cloudcroft, New Mexico. 1 pp.

Schulz, T. T. and W. C. Leininger. 1990. Differences in riparian vegetation structure between grazed areas and exclosures. Journal of Range Management 43(4):295-299.

Seamans, M. E., R. J. Gutiérrez, C.A. May, and M.Z. Peery. 1999. Demography of two Mexican spotted owl populations. Conservation Biology 13:744-754.

Seamans, M. E. and R. J. Gutiérrez. 1995. Breeding habitat of the Mexican spotted owl in the Tularosa Mountains, New Mexico. Condor 97:944-952.

Sivinski, B. 1992. Section 6 progress report to the USDI Fish and Wildlife Service: *Argemone pleiacantha* ssp. *pinnatisecta.*

Sivinski, B. 1999. Section 6 progress report to the USDI Fish and Wildlife Service: Sacramento prickly poppy habitat study during 1998-1999.

Skaggs, R. W., and R. J. Raitt. 1988. A spotted owl inventory of the Lincoln National Forest, Sacramento Division, 1988. New Mexico Department of Game and Fish, Santa Fe. 12 pp.

Sorrentino, G. and J.P. Ward Jr. 2003. Analysis of Mexican spotted owl food habits gathered from two caves in the Guadalupe Mountains, Lincoln National Forest, New Mexico. Rocky

Mountain Research Station, Cloudcroft, New Mexico.

Stacey, P. 2000. The current status of the Mexican spotted owl in the Sacramento Mountains in New Mexico. Declaration in the United States District Court for the District of New Mexico. 10 pp.

Sureda, M. and M.L. Morrison. 1998. Habitat use by small mammals in southeastern Utah, with reference to Mexican spotted owl management. Great Basin Naturalist 58:76-81.

Szaro, R.C. 1991. Wildlife communities of southwestern riparian ecosystems. Pages 174-201 in Rodiek, J.E., and E.G. Bolen eds. Wildlife and habitats in managed landscapes. Island Press, Washington, D.C. 219 pp.

Tarango, L.A., R. Valdez, P.J. Zwank, and M. Cardenas. 1997. Mexican spotted owl habitat characteristics in southwestern Chihuahua, Mexico. The Southwestern Naturalist 42(2):132-136.

Tepedino, V .J. and T. L. Griswold. 1989. Pollination biology of threatened and endangered plants. Partial manuscript on file at the Lincoln National Forest.

Tepedino, V .J. December 10, 1992 (1992). Final research report for USDI Fish and Wildlife Service endangered species subpermit PRT-676811.

Thomson, J. 1991. An investigation of the biology of *Cirsium vinaceum.* Draft Master's Thesis. New Mexico State University, Las Cruces, New Mexico.

Todsen, T.K. undated. *Cirsium vinaceum*, a threatened New Mexico species. Unpublished comments on species' status. New Mexico State University.

USDA Forest Service. May 12, 2003 (2003a). Biological assessment for the Sacramento Allotment management plan and ten-year term grazing permit. Sacramento Ranger District, Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 2003b. Annual operating plan, Sacramento Allotment(s), Sacramento Grazing Association Permittee(s). Sacramento Ranger District, Lincoln National Forest, Cloudcroft, New Mexico.

USDA Forest Service. February 25, 2003 (2003c). Certified mail: letter from Frank R. Martinez, Sacramento District Ranger to Larry G. Bell, Director New Mexico Department of Game and Fish detailing current drought conditions on the Sacramento Allotment, livestock and elk use, and past overutilization of forage.

USDA Forest Service. August 7, 2003 (2003d). Certified mail: letter from Frank R. Martinez, Sacramento District Ranger to Jimmy Goss, President Sacramento Grazing Association detailing current forage conditions on the Sacramento Allotment and monitoring data, with a

request to remove all livestock by September 8, 2003.

USDA Forest Service. June 9, 2003 (2003e). Biological assessment: Sacramento Grazing Allotment on-going grazing activities. Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. September 12, 2003 (2003f). Updated biological assessment: Sacramento prickly poppy within the Dry Canyon Allotment. Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. July 11, 2003 (2003g). Letter from Frank R. Martinez, Sacramento District Ranger to Eric Hein, U.S. Fish and Wildlife Service detailing a proposal to remove livestock by February 1 from the Alamo Pasture of the winter grazing within the Sacramento Allotment. Sacramento Ranger District, Lincoln National Forest, Cloudcroft, New Mexico.

USDA Forest Service. November 2002 (2002). Draft Environmental Impact Statement: Sacramento, Dry Canyon, and Davis Grazing Allotments. Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 2002a. Annual report on the inventory and monitoring of the Sacramento Mountains checkerspot butterfly and Mexican spotted owls, Sacramento Ranger District. Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 2002b. Annual operating plan, Sacramento Allotment(s), Sacramento Grazing Association Permittee(s). Sacramento Ranger District, Lincoln National Forest, Cloudcroft, New Mexico.

USDA Forest Service. 2002c. Guidance criteria for determining the effects of on-going grazing and issuing term grazing permits on selected threatened and endangered species, and species proposed for listing and proposed and designated critical habitat, Region 3, Wildlife, Fisheries, and Rare Plants, USDA Forest Service, Albuquerque, New Mexico.

USDA Forest Service. 2002d. Biological Assessment for the Rio Peñasco II Non-Programmatic Vegetation Management Project and Forest Plan Amendment, on the Sacramento Ranger District, Lincoln National Forest. Alamogordo, New Mexico.

USDA Forest Service. 2002e. U.S. Forest Region 3 Mexican spotted owl Protected Activity Centers for Arizona and New Mexico. Unpublished. USDA Forest Service, Region 3. Albuquerque, New Mexico.

USDA Forest Service. 2001. Annual operating plan, Sacramento Allotment(s), Sacramento Grazing Association Permittee(s). Sacramento Ranger District, Lincoln National Forest, Cloudcroft, New Mexico.

USDA Forest Service. 2000a. Survey summary from 1999, information, and comments regarding the status review for the Sacramento Mountains checkerspot butterfly. Lincoln

National Forest.

USDA Forest Service. 2000b. Cloudcroft checkerspot butterfly 2000 survey summary. Sacramento Ranger District, Lincoln National Forest, New Mexico.

USDA Forest Service. 2000c. Revised biological assessment for ongoing grazing activities on the Sacramento Allotment. Sacramento Ranger District, Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 2000d. Annual operating plan, Sacramento Allotment(s), Sacramento Grazing Association Permittee(s). Sacramento Ranger District, Lincoln National Forest, Cloudcroft, New Mexico.

USDA Forest Service. 2000e. Environmental assessment for noxious weed management #2. Sacramento Ranger District, Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 1999. Cloudcroft checkerspot butterfly 1998 survey summary. Sacramento Ranger District, Lincoln National Forest New Mexico.

USDA Forest Service. 1998. Guidance criteria for preliminary determinations of effects of term grazing permits on threatened and endangered species. USDA Forest Service, Southwestern Region. Albuquerque, New Mexico. 52 pp.

USDA Forest Service. 1996b. Record of decision for amendments of Forest Plans, Arizona and New Mexico. USDA Forest Service, Southwest Regional Office. Albuquerque, New Mexico. 97 pp.

USDA Forest Service. 1995. Final environmental impact statement–amendment of forest plans–Forest Service, Southwestern Region–Arizona and New Mexico. October 1995. Southwestern Region, Albuquerque, New Mexico. 262 pp.

USDA Forest Service. August 1995 (1995a). Wildlife and fish report for the Lincoln National Forest noxious weeds management environmental assessment. Sacramento Ranger District, Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 1994. Results of monitoring herbivory on *Cirsium vinaceum* (Sacramento Mountain Thistle) during 1992-1993. Report prepared by Renee Galeano-Popp. Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 1989. *Argemone pleiacantha* ssp. *pinnatisecta*, survey and monitoring report. Lincoln National Forest, Alamogordo, New Mexico.

USDA Forest Service. 1988. Report on *Argemone pleiacantha* ssp. *pinnatisecta*. Lincoln National Forest, Alamogordo, New Mexico

USDA Forest Service. 1986. Environmental impact statement for the Lincoln National Forest Plan. Alamagordo, New Mexico. 406pp.

USDA, Natural Resources Conservation Service. 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov) National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDI Fish and Wildlife Service. January 17, 2003 (2003). Final biological opinion on the proposed rate of implementation of the grazing standards and guidelines in the June 1996 Forest Plan amendments for National Forests in New Mexico and Arizona, and its affects on the Mexican spotted owl (consultation number 000031RO). Ecological Services, Regional Office, Albuquerque, New Mexico.

USDI Fish and Wildlife Service. September 27, 2002 (2002). Final biological opinion: Rio Peñasco II Non-Programmatic Vegetation Management Project and Forest Plan Amendment, on the Sacramento Ranger District, Lincoln National Forest. 2-22-02-F-397. New Mexico Ecological Services Field Office, Albuquerque, New Mexico.

USDI Fish and Wildlife Service. 2001. Endangered and threatened wildlife and plants; final designation of critical habitat for the Mexican spotted Owl; Final rule. Federal Register 66:8530-8553.

USDI Fish and Wildlife Service. April 10, 2001 (2001c). Biological opinion on the Forest Service's proposed wildland urban interface fuel treatments in New Mexico and Arizona, R2/ES-TE, CL 04-005. U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico.

USDI Fish and Wildlife Service. May 2, 2000 (2000). Final biological opinion: reconstruction of New Mexico Forest Highway 45, Sacramento River Road, Sunspot to Timberon (Sacramento River Road), within the Sacramento Ranger District of the Lincoln National Forest, Otero County, New Mexico, 2-22-00-F-044. New Mexico Ecological Services Field Office, Albuquerque, New Mexico.

USDI Fish and Wildlife Service. 2000a. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the Mexican spotted Owl; Proposed rule. Federal Register 65:45336-45353.

USDI Fish and Wildlife Service. 1999. Letter from Regional Director, Region 2 to Dr. William M. Block, Leader Mexican spotted owl Recovery Team regarding the application of grazing utilization standards year-round. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico.

USDI Fish and Wildlife Service. 1998. Endangered and Threatened Wildlife and Plants; revocation of critical habitat for the Mexican spotted owl, loach minnow, and spikedace. Federal Register 63:14378-14379.

USDI Fish and Wildlife Service. 1996a. Conducting section 7 consultation on Mexican spotted owls and critical habitat–policy. Memorandum from Assistant Regional Director, Ecological Services, Region 2. 3 pp.

USDI Fish and Wildlife Service. November 25, 1996 (1996b). Final biological opinions: Mexican spotted owl and critical habitat and existing forest plans, U.S. Forest Service, Southwestern Region, 000031RO; Mexican spotted owl and critical habitat and forest plan amendments, 000032RO. U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico.

USDI Fish and Wildlife Service. 1995. Endangered and threatened wildlife and plants; determination of critical habitat for the Mexican spotted Owl; Final rule. Federal Register 60:29914-29951.

USDI Fish and Wildlife Service. 1995a. Recovery plan for the Mexican spotted owl *(Strix occidentalis lucida)*. Albuquerque, New Mexico. 85pp.

USDI Fish and Wildlife Service. 1994. Sacramento prickly poppy (*Argemone pleiacantha* ssp. *pinnatisecta*) recovery plan. Albuquerque, New Mexico.

USDI Fish and Wildlife Service. 1993. Endangered and Threatened Wildlife and Plants; Final rule to list the Mexican spotted owl as threatened. Federal Register 58:14248-14271.

USDI Fish and Wildlife Service. 1993a. Recovery plan for the Sacramento Mountains thistle (*Cirsium vinaceum*). Albuquerque, New Mexico.

USDI Fish and Wildlife Service. 1989. Final rule to determine *Argemone pleiacantha* ssp. *pinnatisecta* (Sacramento prickly poppy) to be an endangered species. Federal Register 54:35302-35305.

USDI Fish and Wildlife Service. 1987. Final rule to determine *Cirsium vinaceum* (Sacramento Mountains Thistle) to be a threatened species. Federal Register 52:22933-22936.

Ward, J.P., Jr.., W. M. Block, S. C. Kyle, and C. Chambers. In Prep. Herbaceous cover, voles, and spotted owls: information for monitoring grazing impacts in southwestern uplands.

Ward, J.P. Jr., J.L. Ganey, and G. Sorrentino. 2003. Coordinated management, monitoring, and research program for the Rio Penasco Watershed Project (Sacramento Ranger District, Lincoln National Forest) Progress Report for Pilot Study-2002. Rocky Mountain Research Station. Cloudcroft, New Mexico.

Ward, J.P., Jr. 2001. Ecological Responses by Mexican spotted owls to environmental variation in the Sacramento Mountains, New Mexico. PhD. Dissertation. Colorado State University, Fort Collins.

Ward, J.P. Jr., and W.M. Block. 1995. Mexican spotted owl prey ecology. *In* Mexican Spotted Owl Recovery Plan. U.S. Department of the Interior, Fish and Wildlife Service, Albuquerque, New Mexico.

Western Regional Climate Center. 2003. Historical climate information. http://www.wrcc.dri.edu/index.html. Desert Research Institute. Reno, Nevada.

Willey, D. W. 1993. Home range characteristics and juvenile dispersal ecology of Mexican spotted owls in southern Utah. Unpubl. Rep. Utah Div. Wildl. Resour., Salt Lake City.

Willey, D.W. and C. van Riper III. 2000. First-year movements by juvenile Mexican spotted owls in the canyonlands of Utah. Journal of Raptor Research 34(1):1-7.

Wood, S. 1991. Notes on field review of *Argemone* with Anne Cully, USFWS.

Wood, S. and R. Galeano Popp. 1992. Seedling mortality of *Argemone pleiacantha* ssp. *pinnatisecta* in lower Alamo Canyon. Unpublished manuscript.

Wooton, E.O., and P.C. Standley. 1913. Description of new plants preliminary to a report upon the flora of New Mexico. Contribution of the U.S. National Herbarium 16:109-196.

Worthington, R. D. 2002. Final Report: prickly-poppy survey. Southwestern Research and Professional Services. El Paso, Texas. 3 pp.

Young, K.E., R. Valdez, P.J. Zwank, and W.R. Gould. 1998. Density and roost site characteristics of spotted owls in Sierra Madre Occidental, Chihuahua, Mexico. Condor 100:732-736.

Young, K.E., P.J. Zwank, R. Valdez, J.L. Dye, and L.A. Tarango. 1997. Diet of Mexican spotted owls in Chihuahua and Aguascalientes, Mexico. Journal of Raptor Research 31:376-380.

Zwank, P.J., K.W. Kroel, D.M. Levin, M. Southward, and R.C. Romme. 1994. Habitat characteristics of Mexican spotted owls in southern New Mexico. Journal of Field Ornithology 65(3):324-334.

Attachment A

Sacramento Allotment
Range Monitoring Information

When: May 1st or prior to summer entry
What: Measure leaf-length on key forage species = *Poa pratensis*
Guideline: Meet 1" height
Triggers: Delay of entry if guideline is not met

When: By May 31st or within 15 days after cows leave winter pastures
What: Monitor use in winter pastures in all key areas
Guideline: 40 percent use allowed
Triggers: Consideration for setting herd size, distribution and/or length of next winter season

When: August 1st at the latest or 10 days after rains start on allotment
What: Monitor for herbaceous ground cover height (all herbaceous species may be measured)
Guideline: 4" must be met at 10 key areas, plus new Bluff and Hubble key areas. The Forest will attempt to achieve compliance with herbaceous ground cover height in key use areas
Triggers: Management action will be taken if either guideline is not met

When: October
What: Assess forage production on winter range
Guideline: Consider available forage and prior-year use levels
Triggers: Establish stocking rate, distribution and/or length of current winter season

When: November 15th or 15 days after all cows leave summer pastures
What: Estimate use on forage species at key areas on two summer pastures
Guideline: 35 percent use
Triggers: Management action will be taken the following summer if guideline is not met