



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 21, 2012

Cons. # 22420-2000-F-473

Robert Trujillo, Forest Supervisor
Lincoln National Forest
3463 Las Palomas Road
Alamogordo, New Mexico 88310

Dear Mr. Trujillo:

This responds to your request for formal consultation with the U.S. Fish and Wildlife Service (Service) under section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). This consultation concerns the effects of the reauthorization of continued livestock grazing on the Sacramento and Dry Canyon Allotments, located on the Lincoln National Forest, Otero County, New Mexico. This biological opinion analyzes the anticipated adverse effects of the proposed action on the threatened Mexican Spotted Owl (*Strix occidentalis lucida*) and its designated critical habitat, the threatened Sacramento Mountains thistle (*Cirsium vinaceum*), and the endangered Sacramento prickly poppy (*Argemone pleiacantha* spp. *pinnatisecta*).

In future communications regarding this project, please refer to consultation #2-22-00-F-473.

Sincerely,

Wally "J" Murphy
Field Supervisor

Enclosure

cc:

Assistant Regional Director, Region 2 (ES), U.S. Fish and Wildlife Service, Albuquerque, NM
Director, New Mexico Department of Game and Fish, Santa Fe, NM
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry
Division, Santa Fe, NM
Director, Wildlife, Fish and Rare Plants, U.S. Forest Service, Southwestern Region,
Albuquerque, NM



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Dear Mr. Trujillo:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). This reinitiated consultation resulted after the Sacramento Ranger District on the Lincoln National Forest (LNF), determined that greater flexibility in the grazing rotation was needed to respond to forage use levels that may vary from those in the Final Environmental Impact Statement (FEIS) (USFS 2004c).

On September 26, 2006, you requested reinitiation on those modifications that may cause an effect to listed species not previously considered in the 2004 biological opinion (BO). On August 4, 2010, you notified us that the Sacramento Ranger District issued a new 10-year term grazing permit for the Sacramento and Dry Canyon Allotments on November 11, 2009. This consultation addresses the effects of continued livestock grazing for the remaining seven years of the 10-year permit.

At issue are effects from the reauthorization of continued livestock grazing on the Sacramento and Dry Canyon Allotments, located in the Sacramento Mountains on the LNF in Otero County, New Mexico. You have determined that the proposed action “may affect and is likely to adversely affect” the threatened Mexican Spotted Owl (*Strix occidentalis lucida*) (MSO) and its designated critical habitat, the threatened Sacramento Mountains thistle (*Cirsium vinaceum*) (thistle), and the endangered Sacramento prickly poppy (*Argemone pleiacantha* spp. *pinnatisecta*) (poppy). This BO is based on information provided in the May 12, 2003 biological assessment (BA), and supplemental information and amendments to the BA prepared by the LNF as detailed in the consultation history below. A complete record of this consultation is on file at our office.

This BO does not rely on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6,

2004, Ninth Circuit Court of Appeals decision in Gifford Pinchot Task Force v. USDI Fish and Wildlife Service (CIV No. 03-35279) to complete the following analysis with respect to critical habitat. This consultation analyzes the effects of the action and its relationship to the function and conservation role of MSO critical habitat to determine whether the current proposal destroys or adversely modifies MSO critical habitat. This document represents our BO for the MSO and its designated critical habitat, the thistle, and the poppy in accordance with section 7 of the Act.

Consultation History

- Refer to previous biological opinions (22420-2000-F-0473) dated February 4, 2004, and October 15, 2004 for the prior consultation history.
- **September 28, 2006:** We received your September 26, 2006 BA and request to reinstate consultation. We also received monitoring information for the thistle.
- **October 28, 2006:** We met with members of your staff and conducted a site visit to lower Alamo Canyon and Dog Canyon.
- **December 12 - 13, 2006:** We met with members of your staff and conducted another site visit to lower Alamo Canyon and Dog Canyon.
- **March 28, 2007:** We responded to your March 9, 2007, request to reinstate consultation and acknowledged that all information required of you to initiate consultation had been provided. We also provided notification that the Sacramento Allotment consultation would begin following the consultation for the Perk-Grindstone Fuel Reduction project on the LNF, a project given regional priority by the Forest Service. (This consultation was completed on April 28, 2008).
- **September 11, 2008:** We met with the Forest Service to discuss the status of this consultation, specifically a potential jeopardy determination for the poppy. We finished a draft BO, but did not provide a copy of the BO to the Forest Service per your request.
- **March 20, 2009:** We received your March 20, 2009 correspondence clarifying your intent to restore water in the Mule Pasture trick tanks by November 2009.
- **March 31, 2009:** We responded to your March 20, 2009 letter and requested clarification on four items to complete the consultation: 1) the intended purpose of the Mule Pasture trick tanks; 2) the status of a Allotment Management Plan (AMP) for the Sacramento Allotment; 3) copies of the Annual Operating Instructions (AOIs) for the 2008/2009 winter season; and 4) copies of the December or January forage utilization monitoring reports for the Alamo Pasture.
- **April 24, 2009:** We received your April 21, 2009 request that completion of a draft BO be suspended until your staff can complete a supplement to your 2003 and 2006 BAs as they relate to the status of the poppy and the effects of livestock grazing. You provided the January 17, 2006 AMP, the 2008/2009 AOI, and the March 10, 2009 Sacramento

Grazing Allotment Range and Vegetation Monitoring Report for February 25-27, 2009. You also clarified that the trick tanks in Mule Pasture are not permanent sources of water such that, the Mule Pasture would not always be available to provide for management flexibility.

- **July 17, 2009:** We received your July 10, 2009, letter and the enclosed *Supplemental Information to the 2003 Biological Assessment for the Sacramento Grazing Management Plan, Sacramento Prickly Poppy Section*, July 2009, that provides the history of survey and monitoring data, your assessment of general threats to the poppy, and your continued determination of adverse effects from the proposed action to the species.
- **August 26, 2009:** We requested clarification on seven items regarding: the permitted number of livestock in the Alamo Pasture, your rationale that effects from livestock grazing are discountable, any actions taken by your staff to assist in the dispersal of cattle across the allotment, and adverse effects of livestock trampling to seedlings.
- **March 22, 2010:** We received your response to our August 26, 2009, letter informing us that we should consider this your final response to our requests for additional information. We received copies of your reports entitled “Riparian Contextual Photographs of Caballero Canyon”, “Riparian Plant Community Condition of the lower drainages of the Sacramento Mountains”, “Botany Notes”, and a copy of your February 9, 2007 follow-up inspection report.
- **April 8, 2010:** We provided notification of our consultation budget and staffing shortfall for the remainder of fiscal year 2010. We met with your Regional Office to prioritize consultations and since the Sacramento Allotment was not identified as a regional priority, we would not complete the consultation until fiscal year 2011.
- **June 14, 2010:** We received your correspondence providing the status and expected completion of the reconstruction of the trick tanks within the Mule Pasture of the Sacramento Allotment. We also received additional help from our Arizona Office on this consultation.
- **June 28, 2010:** We received your June 17, 2010, “Management of the Winter Range on the Sacramento Allotment” report.
- **August 4, 2010:** We received your electronic correspondence with the following statement on the Term Grazing Permit: “In 2006, the Forest Service modified the existing term grazing permit issued in 1999 in order to implement the 2004 Record of Decision (ROD). Upon expiration of that permit in November 2009, the Forest Service issued a new grazing permit under the same terms and conditions as the modified 1999 permit. Although the current permit does not expire until 2018, the Forest Service has initiated a new analysis of the Sacramento Allotment and anticipates development of a new proposed action in 2011. The Forest Service expects to reinstate consultation on the Sacramento Allotment upon the development of a preferred alternative under the new allotment analysis, currently scheduled to occur prior to the end of 2013. This

consultation covers the remaining seven years of the 2009 term grazing permit, or until consultation is reinitiated as a result of development of a new preferred alternative for management of the Sacramento and Dry Canyon Allotments. Livestock grazing is not authorized on the Davis Allotment and therefore, not considered in this consultation”.

- **October 6, 2010:** We received your electronic correspondence providing recent monitoring information for the MSO.
 - **February 10, 2011:** We met with the LNF and Forest Service Regional Office staff to discuss our concern regarding the continued declining status of the poppy and alternatives to the current proposed action in order to minimize impacts to the species.
 - **June 21, 2011:** We spoke with you in a conference call to clarify the five conservation measures you proposed for the poppy.
 - **July 1, 2011:** You provided five new conservation measures for the poppy to be incorporated into your proposed action.
 - **August 24, 2011:** We received your electronic correspondence providing recent monitoring information for the poppy, forage utilization data, and a report of field observations collected in June 2011.
 - **September 28, 2011.** We provided poppy survey data from Alamo Canyon collected on September 27, 2011.
 - **November 22, 2011:** We met with the Lincoln National Forest to discuss alternatives, including immediately moving the 50 head of livestock out of the Alamo Pasture into two other pastures that are currently grazed under the same permit, but have no poppies.
 - **December 7, 2011:** We met with Forest Service staff in your Regional Office to discuss our concerns for the Sacramento prickly poppy, the Sacramento Allotment, and the LRMP consultation.
 - **December 15, 2011:** You provided grazing utilization data for the Alamo Canyon Pasture of the Sacramento Allotment, including data from 2007, 2008, and 2009 that had not previously been reported to us.
 - **December 19, 2011:** We met with the Forest Service to continue discussions regarding conservation measures that may benefit the Sacramento prickly poppy within the Alamo Canyon Pasture of the Sacramento Allotment.
 - **January 6, 2012:** You provided supplementary information to us in a draft biological assessment.
- January 9-10, 2012:** We provided comments to you on the supplementary information in the draft biological assessment.

- **January 12, 2012:** You provided another draft of the supplementary information within a draft biological assessment.
- **January 18, 2012:** You provided the final version of the supplementary information within a biological assessment.

BIOLOGICAL OPINION

Action Area

This includes all areas to be affected directly or indirectly by the proposed action. We have defined the action area as lands within the Sacramento and Dry Canyon Allotments, including lands used for existing and proposed livestock exclosures, livestock traps, and those lands proposed for range betterment and mitigation projects. We also include City of Alamogordo lands in upper and lower Alamo Canyon that are contained within the Sacramento Allotment boundary because livestock drift freely into these areas.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the continued management on the remaining years of the 10-year term grazing permit for the Sacramento and Dry Canyon Allotments. This consultation expires at the end of the term permit on December 31, 2018. To ensure an accurate description, the following narrative has been adapted from the ROD and FEIS (USFS 2004b, 2004c), as well as, a summary of the proposed action described in the September 22, 2006 and March 9, 2007 supplementary information (USFS 2006, 2007a). The July 10, 2009 letter and August 24, 2011 electronic correspondence also provides updated information on the poppy, including a summary of surveys. This information was incorporated into the “Status of the Species” and “Environmental Baseline” sections.

As described under the consultation history section above, in February 2011, we met with the LNF and Forest Service Regional Office staff to discuss our concern regarding the continued declining status of the poppy and alternatives to the current proposed action in order to minimize impacts to the species. As a result, in July 2011, the Forest proposed five conservation measures to be incorporated into your proposed action.

Conservation Measures

1. Develop a local Sacramento prickly poppy management plan in coordination with the grazing permittee, the Service, and any other partners willing to contribute or cooperate in recovery efforts;
2. Initiate a review of hydrologic and riparian conditions within the Alamo and Caballero Canyons, and develop a monitoring plan to help ensure maintenance or improvement of the overall watershed and riparian condition;

3. Develop a plan for the placement of minor structural bank stabilization improvements within the Alamo and Caballero Canyon system designed to reduce erosion and protect prickly poppy habitat. This plan will be informed by the review of the hydrologic and riparian conditions with the Alamo and Caballero Canyons;
4. Maintain a limit of 50 cow/calf units to be grazed in the Alamo Pasture for the next two winter grazing seasons while the above proposals are being developed and/or implemented; and
5. Monitor livestock distribution and use of livestock-accessible prickly poppy habitat within the Alamo Pasture over the next two years.

The Forest will report the progress on these commitments to the Service in May 2012 and 2013 (for numbers 4 and 5) (USFS 2011f).

Following our analysis of these five conservation measures above, we met with the Forest Service to continue discussions regarding additional conservation measures that may benefit the Sacramento prickly poppy within the Alamo Canyon Pasture of the Sacramento Allotment. Following these discussions, the Forest proposed to implement the following additional recovery actions, designed to conserve and enhance the status of the Sacramento prickly poppy (USFS 2012). These proactive measures are divided into the following three categories:

A. Protection of mature plants and watershed improvement actions

1. Protect mature plants located on NFS lands in the Alamo Pasture, with a goal of protecting 75% of the mature plants in upper Alamo Canyon (as described by Tonne in 2007) and Caballero Canyon. Construct enclosure fencing and provide microsite protection to prevent damage to mature plants and encourage natural seeding using the following criteria:
 - a. Coordinate livestock grazing with microsite protection for those plants which may be susceptible to damage on NFS lands.
 - b. Mature poppy plants that are inaccessible to livestock and wild ungulates would receive low priority for microsite protection.
 - c. Mature poppy plants that are accessible to and are observed to have regular use by livestock and wild ungulates would be identified for microsite protection.
 - d. At least three times during the grazing season, monitor to determine cattle distribution in relation to poppy locations to observe efficacy of microsite protections.
2. Initiate coordination meetings with the City of Alamogordo and Sacramento Allotment permittee to protect mature plants located on city lands in the Alamo Pasture.
3. Coordinate with the Service and City of Alamogordo to consider watershed improvement

actions which would stabilize existing headcuts that have the potential to alter the hydrology of the wet meadows in the upper watershed of Alamo Canyon.

4. Coordinate with the Sacramento Allotment permittee to continue ongoing salting and pursue other means that would result in wider distribution of livestock in the Alamo Pasture.
5. Conduct a Proper Functioning Condition assessment on the perennial and intermittent reaches of the Alamo Canyon Watershed by April 2012.

Check Points:

- April 2012 – Report on Proper Functioning Condition assessment;
- June 2012 (and annually thereafter) – Report on mature plant counts and grazing utilization and distribution monitoring;
- October 2012 (and annually thereafter) – Report on established seedling counts; and
- October 2012 – coordination with City of Alamogordo, coordination with and Sacramento Allotment permittee.

B. Stabilize and Increase Population Numbers

1. Initiate an Adaptive Management Approach to increasing the Sacramento prickly poppy population (# of mature individuals) through transplanting individuals of various sizes in different seasons and consider seeding where appropriate when excess seed is available. With the objective of stabilizing and increasing poppy numbers, the goal is to expand the known population by 200 additional plants rangewide in a four year period (estimated at an additional 50 plants/year), and attaining an adult population of at least 400 mature plants in Alamo and Caballero Canyons in 2016.
2. Stabilize and increase poppy numbers in Alamo Pasture:
 - a. Goal: increase numbers by a minimum of 33 plants/year (2/3 of known individuals are in Alamo canyon, 2/3 of 50 = ~33, increase of 50 individuals/year rangewide) over the current surveyed population (August/September 2011) of 257 in Alamo and Caballero Canyons.
 - b. Goal: increase numbers by a minimum of 17 mature plants per year across the rest of the range of the poppy.
3. Explore increasing water supplied to planted and reintroduced colonies with the goal of increasing the Sacramento prickly poppy population throughout its range.

Check Points:

- February 2014 – Review, under adaptive management, all management actions and needs to further securing the poppy. If the goal in Alamo Pasture is not being met then the USFWS and the USFS will meet to consider more aggressive recovery actions such as:
 - Increase the number of individuals to be transplanted;
 - Increase number of sites where transplanting or seeding occurs;
 - Identify and manipulate sites that could become potentially suitable through vegetation manipulation;
 - Protect more mature plants from damaging effects that can be controlled (trampling or other);
 - Increase water availability to plants in areas where transplanting or seeding has occurred; and
 - Rest of the Alamo Pasture for one year.

C. Validation

1. Establish critical areas located in occupied poppy habitat in upper Alamo and Caballero Canyons and monitor forage conditions at a minimum of three times annually: 1) within 15 days prior to or immediately upon livestock entry into the Alamo Pasture; 2) at the mid-point of the grazing season; and 3) within 2-3 weeks of livestock removal from the Alamo Pasture.
2. Conduct annual mature poppy counts within 2-3 weeks of cattle removal from the Alamo Pasture, coordinated with end-of-season key area and critical area monitoring.
3. Conduct annual seedling counts in the Alamo Pasture during mid to late September.
4. Conduct surveys of mature poppy plants on at least one additional canyon system currently known to support prickly poppy colonies (Fresnal/La Luz/Salado, Marble, San Andres, and Dog Canyons), with the goal of surveying each canyon system at least once by the end of 2016.

Check Points:

- June 2012 (and annually thereafter) – Report on mature plant counts and grazing utilization and distribution monitoring;
- October 2012 (and annually thereafter) – Report on established seedling count; and

February 2014 – USFWS and USFS will meet to review validation methods to determine if

forage monitoring or poppy survey methods require modification to increase efficacy or efficiency of monitoring efforts.

Livestock Grazing Authorization

The Sacramento Allotment is composed of a summer and winter range (Table 1). The summer range consists of four pastures North, South, Atkinson, and Nelson that are authorized for variable stocking from 200 to 412 cow/calf¹ pairs and 5 horses from May 15th to October 31st. Partial numbers of livestock may be allowed to enter the summer range prior to May 15th and after May 1st only when key forage species meet the range readiness criteria (1 inch of new growth on Kentucky bluegrass). The maximum allowable forage utilization for all key areas on the summer range is 35 percent.

The winter range also consists of four pastures: Alamo, Mule, Pasture Ridge, and Grapevine. The Alamo, Pasture Ridge, and Grapevine Pastures will be grazed annually with 200 to 335 cow/calf pairs and 5 horses from November 1st to May 14th. The maximum allowable forage utilization for all key areas on the winter range is 40 percent.

Livestock use has not been assigned to the Mule Pasture for decades due to the non-functional water sources. Non-use of the Mule Pasture will continue until the water sources are functional and contain enough water to support livestock.

On the Dry Canyon Allotment, the LNF authorized up to 75 cow/calf pairs from November 1 to May 14. Stocking will be based on forage production and utilization monitoring. The maximum allowable forage use is 35 percent for all key areas.

Table 1. The amount of acres associated with each pasture in the Sacramento and Dry Canyon Allotments.

Pasture	Total Acres	Usable Grazing Acres
Sacramento Allotment		
Summer Range		
North Pasture (Formerly Benson)	16,348	5,080
South Pasture (Formerly Wills)	26,266	6,460
Atkinson	2,966	510
Nelson	8,190	821
Total Summer Range	54,190	12,871

¹*The short-age calf policy indicates that calves under 6 months of age as of January 1 shall be permitted on the allotment until March 31. By April 1st these calves shall be removed or counted against the permit. Alternatively, all cattle six months or over entering an allotment will be counted toward permit numbers.*

Table 1. Continued		
Winter Range		
Mule (Formerly Burleson)	11,328	2,826
Alamo	11,113	3,027
Grapevine	15,295	5,275
Pasture Ridge	19, 558	4,397
Total Winter Range	57,294	15,524
Total Sacramento Allotment	111,484	28,395
Dry Canyon Allotment	16,000	4,072

Additionally, the proposed action includes the following modifications made to Alternative B of the ROD (USFS 2004b):

1. The North and South summer Pastures will be used for the entire summer season;
2. Up to 30 cow/calf pairs will be scattered across the Atkinson and Nelson summer pastures for the entire summer season, to the extent forage and water allow;
3. The Forest will discontinue the removal of livestock from the Alamo Pasture by February 1 for the first two years of the permit in order to protect the poppy. Alamo, Pasture Ridge, and Grapevine winter Pastures will continue to be grazed annually. Mule Pasture may be grazed in the future, contingent upon stable water sources being repaired/developed. Monitoring in December/January will determine whether a modification to the number of livestock is needed.
4. Additional actions related to livestock grazing management include: replacing prey-species monitoring for the MSO with forage utilization monitoring; stocking rates will be set using current resource conditions and monitoring information collected from the previous grazing season, and will be decided by January or February in time for the AOI to be provided to the permittee. No schedule for monitoring/reporting was provided.

The Forest Service will also provide forage for a portion of the elk population that occur within the Sacramento Allotment boundary and are within the New Mexico Game and Fish Department (NMGFD) Game Management Unit 34. As of 2009, the estimated elk population within Game Management Unit 34 is between 3,013 to 4,322 individuals (NMDGF Harvest Report 2009). The Forest Service will implement an elk/livestock monitoring plan in cooperation with affected parties. No monitoring plan has been completed, nor was a timeline for monitoring/reporting provided.

Monitoring

The Forest Service will implement the following:

- Poppy populations in Alamo Pasture will be monitored every year during the life of the

term grazing permit.

- Monitor two new key areas for prey base cover within the Hubble and Bluff Springs MSO protected activity centers (PACs). No schedule for monitoring/reporting was provided.
- To limit the chances of livestock within thistle enclosures, fences will be maintained before May 1st and at least once during the summer. Informal monitoring of enclosures will be conducted throughout the grazing season.
- Conduct regular 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. No schedule for monitoring/reporting was provided.
- Measure long-term condition and trend on key sites during the life of the term grazing permit. 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 to grazing. 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. No schedule for monitoring/reporting was provided.
- Perform monitoring visits prior to entry of cattle to the winter and summer pastures, at approximately the mid-point of the grazing season on the summer pastures, and within 15 days after the end of the permitted grazing season on both the winter and summer pastures. Cattle will be herded from areas showing high use. Each year the intensity of monitoring and the type of monitoring will be determined based on the previous year's results and the needs for that grazing season. No schedule for monitoring/reporting was provided.
- Range management may be adjusted as a result of monitoring data collected. These modifications would not require additional National Environmental Policy Act (NEPA) analysis if the effects are within the range analyzed in Chapter 3 of the FEIS.

Range Betterment Improvement Projects and Mitigation Projects

Nineteen Range Betterment Improvement and Mitigation Projects are proposed (Table 2). The Forest Service will continue to maintain seven livestock grazing exclosures that total 264 acres. Four new exclosures totaling 20 acres have also been proposed, three of which (Telephone Canyon, Wills Canyon, Water Canyon) are designed to protect the thistle. No livestock grazing will occur within these exclosures. Completion of these projects is dependent on available funds. No schedule for their completion was provided.

The Forest Service proposes to maintain six existing livestock traps that encompass 465 acres of Forest Service land, as well as, construct three new traps totaling 55 acres. Livestock traps are small pastures designed to facilitate livestock management by holding cattle when they are

gathered for a pasture move or during the annual shipping of calves. The major use period for traps will occur around scheduled pasture moves in early spring, mid-summer and late fall. Livestock traps are used for approximately 14 days during each of these periods, unless livestock are injured and require medical care. The allowable forage use within the existing and proposed livestock traps is 70 percent due to high-intensity, short-duration grazing.

Table 2. List of the proposed range improvement and mitigation projects on the Sacramento Allotment.

Name	Description	Type
TE&S Plant Enclosure	The only known population of the wood lily (<i>Lilium philadelphicum</i>) on the allotment will be fenced to exclude livestock grazing. The enclosure will be less than 10 acres and will require approximately ½ mile of fence.	Mitigation
Wills Canyon Riparian Enclosure	Involves enclosure of the riparian zone within the existing Wills Canyon Trap and a 4-acre enclosure in Wills Canyon to protect the Sacramento Mountains thistle. Water troughs will be established in the trap to provide livestock water. The project will require approximately ½ mile of fence.	Mitigation
Peñasco Riparian Enclosure	This will exclude cattle from a portion of the riparian zones within the Peñasco Trap by constructing a 2-acre enclosure surrounding a saturated spring out-flow containing Blumer's dock (<i>Rumex orthoneurus</i>) and Sacramento Mountains thistle in the Rio Peñasco drainage. The project will require approximately ¼ mile of fence.	Mitigation
Rio Peñasco Enclosure Modification	This will modify the existing Upper Rio Peñasco enclosure. An additional fence will be constructed along the New Mexico Highway 6563 and Forest Service Road (FR) 164 to the first cattle guard about ¾ mile south of FR 164. The additional fence will create a lane where cattle can pass around the Upper Rio Peñasco Enclosure without having to pass through occupied thistle habitat, a spring, and riparian area.	Mitigation
Sunspot Pipeline Reconstruction	This is a reconstruction of an existing pipeline system. The project will require approximately 4 miles of pipeline.	RB ¹
Rim Drift Fence	This involves construction of a drift fence (up to ½ mile) to prevent unauthorized livestock drift between winter and summer ranges.	RB
Wills Corral Reconstruction	This is a reconstruction of an existing facility.	RB
Thousand Mile Corral Reconstruction	This is a reconstruction of an existing facility.	RB

Russia Trap	This involves construction of a livestock holding trap approximately 20 acres in size to facilitate livestock management. The project will require approximately ¾ mile of fence.	RB
Wright Springs Trap Reconstruction	This would reconstruct portions of the existing Wright Springs Trap. The project will require approximately 1/8 mile of fence.	RB
Atkinson Trick Tank	This involves the construction of a collection apron, storage, and trough in the head of Atkinson Canyon.	RB
Masterson Trap	This involves the construction of a livestock holding trap approximately 30 acres in size to facilitate livestock management in the Hay Canyon area. The project will require approximately 1 mile of fence.	RB
McAfee Canyon Wetland Enclosure	This involves the enclosure of approximately 2 acres of riparian wetland at the mouth of McAfee Canyon. The project will require approximately ¼ mile of fence.	RB
Sacramento Lake Wetland Enclosure Expansion	This involves expansion of the north end of the existing enclosure to include the wetland area currently accessible to livestock. The project involves an area of less than 1 acre, The project will require approximately 1/8 mile of fence.	RB
Alamo Canyon Waterline Improvement	This involves minor modifications to the plumbing of existing troughs in Alamo and Caballero Canyons.	RB
Grapevine Pipeline Extension	This would extend the existing pipeline in Grapevine Canyon approximately 1 mile of pipeline.	RB
Earthen Tanks in Mule Pasture	This involves cleaning out five of the existing earthen tanks.	RB
Mule Trap Expansion	This involves the expansion of the existing livestock-holding trap to facilitate livestock management. The trap will be less than 5 acres in size. The project will require approximately 3/8 mile of fence.	RB
Reconstruction of Mule Trick Tanks	This involves replacing the catchments pads and other materials to make two existing trick tanks functional.	RB

¹RB=Range Betterment.

STATUS OF THE SPECIES AND CRITICAL HABITAT

Mexican spotted owl

The MSO was listed as a threatened species in 1993 (USDI 1993). The primary threats to the

species were cited as even-aged timber harvest and stand-replacing wildland fire, although grazing, recreation, and other land uses were also mentioned as possible factors influencing the MSO population. The Service appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican Spotted Owl in 1995 (USDI 1995). Critical habitat was designated for the MSO in 2004 (USDI 2004a).

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the MSO as a threatened species (USDI 1993) and in the Recovery Plan (USDI 1995). The information provided in those documents is included herein by reference. Although the MSO's entire range covers a broad area of the southwestern United States and Mexico, the MSO does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Surveys have revealed that the species has an affinity for older, uneven-aged forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico.

The U.S. range of the MSO has been divided into six recovery units (RU), as discussed in the Recovery Plan. The primary administrator of lands supporting the MSO in the United States is the Forest Service. Most MSOs have been found within Forest Service Region 3 (which includes 11 National Forests in Arizona and New Mexico). Forest Service Regions 2 and 4 (which includes two National Forests in Colorado and three in Utah) support fewer MSOs. According to the Recovery Plan, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service.

Historical and current anthropogenic uses of MSO habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. These activities have the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout Region 3 National Forest lands and is thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing on all forests, especially in meadow and riparian areas. There is anecdotal information and research that indicates that MSOs in heavily used recreation areas are much more erratic in their movement patterns and behavior. Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to MSO through habitat modification and disturbance. As the human population grows, especially in Arizona, small communities within and adjacent to National Forest System lands are being developed. This trend may have detrimental effects to MSO by further fragmenting habitat and increasing disturbance during the breeding season. West Nile Virus also has the potential to impact the MSO. The virus has been documented in Arizona, New Mexico, and Colorado, and preliminary information suggests the MSO may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of the MSO and the lack of intensive monitoring of banded birds, we will most likely not know when MSOs contract the disease or the extent of its impact to MSO range-wide.

Currently, high-intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic, high-severity, stand-replacing

wildland fire is probably the greatest threat to MSO within the action area. As throughout the West, fire severity and size have been increasing within this geographic area.

Global climate change may also be a threat to the MSO and synergistically result in increased effects to habitat from fire, fuels reduction treatments, and other factors discussed above. Studies have shown that since 1950, the snowmelt season in some watersheds of the western U.S. has advanced by about 10 days (Dettinger and Cayan 1995, Dettinger and Diaz 2000, Stewart et al. 2004). Such changes in the timing and amount of snowmelt are thought to be signals of climate-related change in high elevations (Smith et al. 2000, Reiners et al. 2003). The impact of climate change is the intensification of natural drought cycles and the ensuing stress placed upon high-elevation montane habitats (IPCC 2007, Cook et al. 2004, Breshears et al. 2005, Mueller et al. 2005). The increased stress put on these habitats is likely to result in long-term changes to vegetation, invertebrate, and vertebrate populations within coniferous forests and canyon habitats that effect ecosystem function and process.

A reliable estimate of the number of MSOs throughout its entire range is not currently available (USDI 1995) and the quality and quantity of information regarding number of MSOs vary by source. USDI (1991) reported 2,160 MSOs throughout the U.S. Fletcher (1990) calculated that 2,074 MSOs existed in Arizona and New Mexico. However, Ganey *et al.* (2000) estimates approximately $2,950 \pm 1,067$ (SE) MSOs in the Upper Gila Mountains RU alone. Based on PACs on National Forest lands alone, the Upper Gila Mountains RU likely is home to about half the population of MSO range-wide. A gross estimate would place the number of birds for the species around 6,000 individuals range-wide (USFS 2011b).

Researchers studied MSO population dynamics on one study site in Arizona ($n = 63$ territories) and one study site in New Mexico ($n = 47$ territories) from 1991 through 2002. The Final Report, titled "Temporal and Spatial Variation in the Demographic Rates of Two Mexican Spotted Owl Populations" (Gutierrez et al. 2003), found that reproduction varied greatly over time, while survival varied little. The estimates of the population rate of change ($\Lambda = \text{Lambda}$) indicated that the Arizona population was stable (mean Λ from 1993 to 2000 = 0.995; 95 percent Confidence Interval = 0.836, 1.155) while the New Mexico population declined at an annual rate of about 6 percent (mean Λ from 1993 to 2000 = 0.937; 95 percent Confidence Interval = 0.895, 0.979). The study concludes that MSO populations could experience great (>20 percent) fluctuations in numbers from year to year due to the high annual variation in recruitment. However, due to the high annual variation in recruitment, the MSO is then likely very vulnerable to actions that impact adult survival (e.g., habitat alteration, drought, etc.) during years of low recruitment.

Since the MSO was listed, we have completed or have in draft form a total of 223 formal consultations. These formal consultations have identified incidences of anticipated incidental take of MSO in 440 PACs over the course of 17 years. The form of this incidental take is almost entirely harm or harassment, rather than direct mortality, and many of these actions have resulted in single or short-term disturbance to MSOs that has not resulted in long-term harassment, habitat degradation, or habitat loss. These consultations have primarily dealt with actions proposed by Forest Service Region 3. However, in addition to actions proposed by 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 two of these projects (release of site-specific MSO location information and existing Forest Plans) have resulted in biological opinions that the proposed action would likely jeopardize the continued existence of the MSO. The jeopardy opinion issued for existing Forest Plans on November 25, 1997 was rendered moot as a non-jeopardy/no adverse modification BO and was issued the same day.

In 1996, we issued a biological opinion on Forest Service Region 3 adoption of the Recovery Plan recommendations through an amendment to their Land and Resource Management Plans (LRMPs). 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. In addition, on January 17, 2003, 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. Consultation on individual actions under these biological opinions anticipated incidental take in the form of harm and/or harassment of MSOs associated with 243 PACs on Forest Service Region 3 lands. Forest Service Region 3 reinitiated consultation on the LRMPs on April 8, 2004. On June 10, 2005, the Service issued a revised biological opinion on the amended LRMPs. We anticipated that while the Region 3 Forests continue to operate under the existing LRMPs, take is reasonably certain to occur to an additional 10 percent of the known PACs on Forest Service lands. We expect that continued operation under the plans will result in harm to 49 PACs and harassment to another 49 PACs. To date, consultation on individual actions under the amended Forest Plans, as accounted for under the June 10, 2005, biological opinion has resulted in the incidental take of MSOs associated with 42 PACs over approximately five years. However, because some of this incidental take has been in the form of short-term harassment that has occurred and is no longer on-going, we are continuing to track incidental take in 35 PACs associated with actions covered under the 2005 LRMP BO (16 harm, 19 harass). Incidental take associated with Forest Service fire suppression actions, which was not included in the LRMP proposed action, has resulted in the incidental take of MSOs associated with 27 PACs (6 harm, 21 harassment).

Mexican spotted owl critical habitat

The final MSO critical habitat rule designated approximately 8.6 million acres of critical habitat in Arizona, Colorado, New Mexico, and Utah, mostly on Federal lands (USFWS 2004a). Within this larger area, critical habitat is limited to areas that meet the definition of protected and restricted habitat, as described in the Recovery Plan. Protected habitat includes all known MSO sites and all areas within mixed conifer or pine-oak habitat with slopes greater than 40 percent where timber harvest has not occurred in the past 20 years. Restricted habitat includes mixed conifer forest, pine-oak forest, and riparian areas outside of protected habitat.

The primary constituent elements (PCEs) for MSO critical habitat were determined from studies of their habitat requirements and information provided in the Recovery Plan (USFWS 1995).

Since MSO habitat can include both canyon and forested areas, PCEs were identified in both areas. The PCEs which occur for the MSO within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the MSO's habitat needs for nesting, roosting, foraging, and dispersing are in areas defined by the following features for forest structure and prey species habitat:

Primary constituent elements related to forest structure include:

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30 percent to 45 percent of which are large trees with diameter-at-breast height (dbh) of 12 inches or more;
- A shade canopy created by the tree branches covering 40 percent or more of the ground; and,
- Large, dead trees (snags) with a dbh of at least 12 inches.

Primary constituent elements related to the maintenance of adequate prey species include:

- High volumes of fallen trees and other woody debris;
- A wide range of tree and plant species, including hardwoods; and
- Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration.

The forest habitat attributes listed above usually are present with increasing forest age, but their occurrence may vary by location, past forest management practices or natural disturbance events, forest-type productivity, and plant succession. These characteristics may also be observed in younger stands, especially when the stands contain remnant large trees or patches of large trees. Certain forest management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

Recovery Unit

The LNF is within the Basin and Range – East (BR-E) Recovery Unit (RU). This RU is an important source population for other areas (USFWS 1995). Unit BR-E-1 is located in the Sacramento Mountains within the Sacramento Ranger District and contains critical habitat for the species. There are 196 PACs within the BR-E RU, with 145 PACs on the LNF. The Sacramento Ranger District has 114 PACs; the Guadalupe Ranger District has 10 PACs; and the Smokey Bear Ranger District has 21 PACs. Additional PACs are located on the Mescalero Apache Reservation, and the Cibola National Forest, New Mexico and the Guadalupe Mountains National Park, Texas.

Major threats, in order of potential effects, include: 1) catastrophic, stand-replacement fires, 2) some forms of timber harvest, 3) fuelwood harvest, 4) grazing, 5) agriculture or development for

human habitation, and 6) forest insects and disease (USFWS 1995). Minor threats include: 1) certain military operations, 2) other habitat alterations (e.g. power line and road construction, noxious weed control), 3) mining, and 4) recreation. Mexican spotted owls occurring in the Sacramento Mountains have been exposed to various disturbances for more than a century. Natural disturbances include forest fires, and human disturbances include timber and fuelwood harvest, livestock grazing, development, and recreation. Much of the habitat currently used by MSOs in the Sacramento Mountains is “second growth” forest with a high density of relatively small sized trees, poles, and saplings.

Fires such as the Peppin, Scott Able, and Walker have modified thousands of acres of habitat and impacted multiple MSO territories. The Peppin Fire in the Capitan Mountains Wilderness burned approximately 65,000 acres (26,315 ha). The Scott Able fire burned 16,034 acres (6,491 ha), of which 14,551 acres (5,889 ha) are administered by the Lincoln National Forest and 1,483 acres (600 ha) were on private land. Approximately 12,291 acres (4,976 ha) that burned were considered suitable MSO habitat. The Scott Able fire affected all or portions of 6 PACs and 2 PACs are adjacent to the burned area. Heavy fuel loads contributed to these large-scale fires, which likely caused relatively short-term (3 to 5 years) adverse impacts on soils and water resources from fire-induced erosion and increased sediment delivery to streams.

The Service consulted on eleven wildland urban interface fuels (WUI) reduction projects containing MSO habitat in the BR-E RU as a part of the WUI programmatic opinion (USFWS 2001a). Approximately 71 of the 133 viable PACs on the LNF occur within the 0.5 mile wildland urban interface buffer. However, in order to maximize the likelihood that these PACs will be able to support reproductive pairs, the LNF proposed to thin mixed conifer stands according to the Recovery Plan guidelines. The proposed action is expected to affect approximately 11,238 acres of protected habitat, with 7,600 acres receiving intensive fuels reduction treatments not in compliance with the Recovery Plan guidelines. In addition, approximately 41,000 acres of restricted habitat within 0.5 mile of private land was proposed to be treated.

Sacramento Mountains Thistle

The Sacramento Mountains thistle was listed as a threatened species on June 16, 1987 without critical habitat (52 FR 22933). The Recovery Plan was completed in 1993 (USFWS 1993a). The thistle is also listed as a New Mexico State endangered plant species under Title 19, Chapter 21, Part 2 of the New Mexico Administrative Code (NMAC 2010). The New Mexico Forestry Division is the issuing agency and as directed under the statutory authority of NMSA 1978 Section 75-6-1, is responsible for prohibiting the taking, possession, transportation and exportation, and selling or offering for sale any listed plant species (EMNRD undated).

Life history

The thistle is a monocarpic, short-lived perennial initially forming robust rosettes of spiny leaves that live for one or more years as juvenile plants (Burks 1994). Each rosette eventually bolts a flowering stem, spends a single growing season as a reproductive individual, and dies upon seed set. Mature plants reach 3.3 feet to 5.9 feet tall and have stems are brown-purple and highly

branched. Basal leaves are green, 12 to 20 inches long, and up to 8 inches wide, with ragged edges. Flowering occurs only once from late June through August, when pink-purple flower heads form at the tips of stems (75 FR 30757). Seed production usually occurs from cross-pollination, although this species is capable of reproducing asexually, using genetic material from a single individual to produce a clone. Pollen is carried by a variety of animal vectors including several species of native bees, flies, butterflies, and hummingbirds (Griswold 1990; Tepedino 2002).

Habitat

The thistle is a wetland-obligate species generally confined to travertine deposits on springs and seeps, along streams in meadows or forest margins, and in water-saturated alkaline soils in open valley bottoms. These sites are rich in calcium carbonate, from limestone, that often precipitates out to create areas of travertine, which occasionally become large bluffs or hills. Suitable thistle habitats are relatively rare, spotty in distribution, and range in size from five square meters (m²) to several 1,000 m². Within these habitats, thistles occur in small, dense groupings (USFWS 2005). Occupied habitats occur in relatively close proximity such that, they may be sufficiently connected genetically to form one or more metapopulations (Burks 1994).

The extent of occupied sites and plant numbers fluctuate with rainfall conditions and available surface water. Plants are most abundant at sites with water available at or just below the surface. Water flow fluctuates with rainfall patterns from year to year and is believed to be re-channeled as passages are cemented in naturally with travertine deposits. This causes the flows to migrate back and forth across travertine slopes that are hundreds of years old (USFS 2003b).

Distribution and Abundance

The thistle occurs within the mixed-conifer zone between 7,500 to 9,200 feet elevation. Occupied sites occur at springs, primarily in montane meadows and partly shaded forested areas in six large canyon drainages on the eastern slopes of the Sacramento Mountains. Only a few occupied sites occur on the western slope. More than 95 percent of known thistle sites occur on the LNF. The known geographic range of this species extends from about 6 miles northeast to about 17 miles south of Cloudcroft in an area of about 150 square miles (USFWS 1993b, 2010). There are two additional thistle sites near the southern boundary of the Mescalero Apache Reservation, and one known site on a private property seep in Fresno Canyon that is visible from State Highway 82. The extent of thistle habitat on private property inholdings within the LNF is unknown.

The Forest Service catalogs thistle occurrences as habitat locations or sites. In 1987, the thistle was known to occur in 20 populations in an approximately 150-square mile area near the Village of Cloudcroft. This initial determination was based on an assessment of discrete patches of thistles that were thought to experience little gene flow between occupied sites because of geographic distance. Subsequent discoveries of several additional patches of thistles between these 'populations' and observations of seed dispersal by stream flows have significantly reduced the number of thistle patches that could conform to the traditional biological definition of a population (Craddock and Huenneke 1997). These thistle groups more likely represent

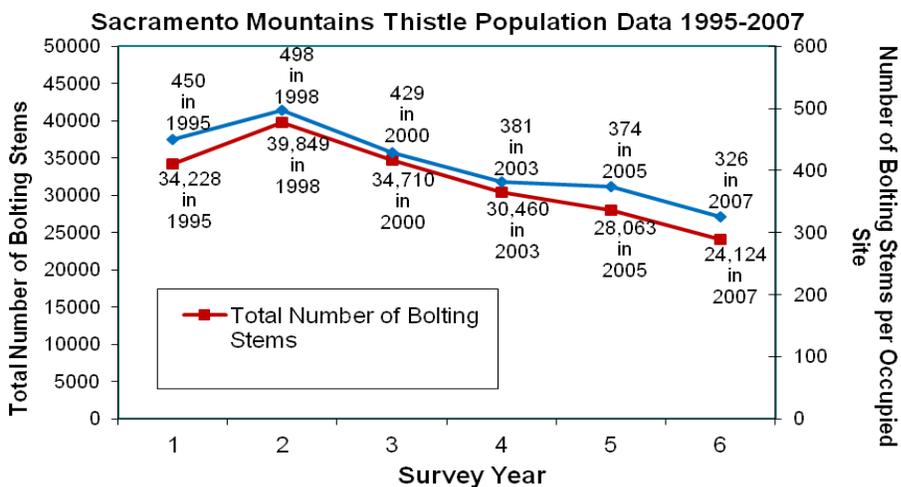
subpopulations.

Since 1987, however, newly occupied sites have been documented on the LNF. In 1993, 62 habitat sites were identified, with 58 of those on Forest Service land (USFWS 1993a). In 1995, 77 habitat sites were known on the LNF (USFWS 2004b). By 2005 and 2007, the LNF cataloged 104 extant, historic, or potential thistle sites. Of these, the Forest Service has monitored 83 sites since 1995 (USFWS 2010b). However, most of these sites are subdivisions of the original 20 ‘populations’ (Barlow-Irick 2007). Some sites are sporadically occupied by a few plants during wet years, and unoccupied or dormant during droughts (Barker, USFS pers. comm., 2006). Therefore, the 104 thistle sites identified by the LNF cannot be meaningfully compared numerically to the original 20 populations identified in 1987.

In another attempt to estimate the number of plants, the Service and the LNF estimated total population numbers of Sacramento Mountains thistles based on a 1995 adopted monitoring protocol of multiplying the number of flowering individuals by 10 to account for the numerous juvenile rosettes (USFS 2003a). This multiplier of 10 was based upon a 1989 count of all rosettes in 4 thistle patches, which found that flowering individuals ranged from 10 to 13 percent of the rosettes (Thomson 1991). However, because this protocol relied on a very limited sample in a single year, it likely does not provide an accurate estimate for the entire population in any given year. In 1995, and between 1998 and 2007, inventories for the thistle were based on standardized survey methods. These inventories counted only the number of flowering stems, rather than all age classes at most of the LNF locations known at the time and are the most accurate and consistent data available for the species.

Based on these data, there is an overall declining trend in the number of bolting (flowering) stems (Figure 1; USFS, unpublished data; Barlow-Irick 2007). Surveys of thistles were not conducted in 2009, 2010, or 2011. While most thistle patches have decreased in number of flowering stems during the monitoring period, a few sites have increased in stem numbers (Barlow-Irick 2007). Additionally, between 1998 and 2007, the thistle has been extirpated from seven sites.

Figure 1. Number of occupied sites for Sacramento Mountains thistle (1995-2007).



Threats

Threats to the thistle include impacts from grazing, drought, water extraction, noxious weeds, insect predation, and recreation.

Livestock grazing

The thistle occurs on four grazing allotments on the LNF. Livestock grazing is the prevailing land use throughout the range of the thistle. Consumption and trampling of the thistle as well as hoof damage to travertine continue in areas with unmaintained or inadequate fencing. Threats from livestock include direct impacts such as herbivory, damage to vulnerable seedlings, rosettes and flowering stalks, as well as trampling damage to travertine and soft substrates (Thomson 1991, USFS 1994).

Drought

Because the thistle is a riparian species requiring surface or immediate sub-surface water flows, loss of water has resulted in a reduction of the number of individuals or caused a loss of all plants at previously occupied sites (USFS 2003b). Water loss in thistle habitat may occur both naturally and because of human impacts. Examples of naturally occurring water loss include changes in precipitation patterns and watershed condition, as well as shifts in travertine deposits and slopes (USFS 2003b).

January to August 2011 was the driest precipitation period ever recorded (National Weather Service 2011). Water flow at a number of springs occupied by the thistle has declined substantially. Monsoonal summer precipitation can be very patchy, with some areas receiving considerably less rainfall than others. Monitoring has shown that when water flow declines at springs, decreases in plant numbers and the size of occurrences have occurred (Huenneke, 1996). When increased water is available, the opposite has been observed (USFS 2003b). It is likely that the seasonal distribution of yearly precipitation also plays a role in water availability for the species (73 FR 66003).

Water Extraction

Appropriation of water rights from springs curtails the natural surface flows, and thus may negatively affect the thistle. Water diversion by roads, trails, and spring development are examples of loss of water flow to occupied sites due to human activity (USFS 2003b). Additionally, the listing rule described an unauthorized 1,900-foot long pipeline and cement spring box constructed at a thistle site, which negatively impacted nearby plants by impeding water flow (52 FR 22933). This unauthorized development of a spring near Bluff Springs resulted in an 84 percent loss of thistles, from 300 plants in 1984 to 47 plants in 1991 (USFWS 1993). Water diversions have increased with the growing population in south-central New Mexico (Office of the State Engineer 2003). The development of additional water rights will likely dewater thistle water sources in the foreseeable future.

Noxious weeds

Noxious weeds have invaded a number of thistle sites and pose a threat to the species. Decreased natural water flows at travertine springs create conditions that favor invasion of weeds such as teasel (*Dipsacus sylvestris*), musk thistle (*Carduus nutans*), and bull thistle (*Cirsium vulgare*) (USFS 2003b). These weeds cannot tolerate the continuously saturated substrates that are typical in thistle patches on spring habitats. However, as soils dry, these plants have encroached in thistle habitat (Huenneke and Thomson 1995).

Insect Predation

The exotic seed-head weevil (*Rhinocyllus conicus*) was documented within thistle sites during 2006. *Rhinocyllus conicus* attacks native thistles and decreases their seed production (Dodge 2005). For example, in the Silver Springs area, the weevil used about 65 percent of thistle flower heads, causing damage to the plant (Sivinski 2008). The stem borer weevil (*Lixus pervestitus*) also has been found within the Silver Springs thistle population, resulting in a significant loss of seed production since 2006 (Sivinski 2007, 2008). *Lixus pervestitus* causes premature stem death and reproductive blooms can be virtually non-existent. Sivinski (2008) studied insect seed predation and herbivory of *C. vinaceum* in September of 2006, 2007, and 2008 in four populations: Silver Springs, Bluff Springs, Upper Rio Peñasco, and Scott Able Canyon. These insect species damaged flower heads or caused premature stem death in all years of the study and predation continues.

Recreation

Recreational impacts are occurring within areas of high visitation, such as Bluff Springs. The majority of the Bluff Springs population has been closed to foot traffic by building a fence around the travertine bluff feature. The Forest Service has routed trails around this population. Other thistle sites are also occasionally impacted by off-road vehicle traffic (USFWS 1993).

Additional Information

In April 2004 and in August 2007, the County of Otero petitioned us to remove the thistle from the list of endangered species. A not substantial 90-day finding was published on December 5, 2006 (71 FR 70479). As part of the 90-day finding, we announced the initiation of the 5-year status review. In 2008, we published a substantial 90-day finding in response to the second petition (73 FR 66003). Following a 12-month review, we published a not warranted finding, indicating the species still meets the definition of endangered based on continuing threats, limited range, and recent downward population trend (75 FR 30757). The 5-year status review provides additional information on the species and is available: <http://ecos.fws.gov/ecos/indexPublic.doi>.

Sacramento Prickly Poppy

The poppy was listed as an endangered species without critical habitat on August 24, 1989 (54 FR 35302). The Recovery Plan was completed on August 31, 1994. The poppy is also protected as a State of New Mexico endangered plant species under the NMAC (2010). The New Mexico

Forestry Division is the issuing agency and as directed under the statutory authority of NMSA 1978 Section 75-6-1, is responsible for prohibiting the taking, possession, transportation, and exportation, and selling or offering for sale any listed plant species (EMNRD undated).

The poppy is endemic to the western escarpment of the Sacramento Mountains, Otero County, New Mexico. No other species of *Argemone* occurs within the range of this subspecies. In 2010, molecular assessment of population-level variation from samples of *Argemone pleiakantha* ssp. *pinnatisecta* and related members of *Argemone* identified that the Sacramento prickly poppy is genetically unique and has been reclassified as a species, *Argemone pinnatisecta* (Cervantes et al. 2010).

Life History

The poppy is a herbaceous, perennial plant (7 to 9 year lifespan) that commonly grows to a height of 20 to 60 inches with 3 to 12 branching stems covered with rigid spines. Poppies usually bloom from May until August. Flowers have six large, white petals that are with numerous orange stamens and a purple stigma (54 FR 35302). The poppy exudes white milky sap that helps distinguish it from the common species, *Argemone pleiakantha* that has yellow-orange sap, less deeply divided leaves, and denser capsule spines. Mature plants have a deep taproot to access moisture below the soil surface. The taproot may also enable them to survive drought conditions and persist following mechanical injury (USFWS 1994). Established mature plants generally die back to their root crown each year, with some plants persisting as basal rosettes through much of the winter (Tonne 2008) or during periods of drought. Seed dispersal likely occurs by water flow, soil movement, birds, or insects.

Germination of seedlings generally follows periods of partial or complete soil saturation (Tonne 2008). Although germination of poppies occurs nearly year-round, field observations found seedling germination to be episodic mostly occurring during the winter and following monsoon rains (Tonne 2008). Germination of seeds and survival to maturity is generally low, with up to 99 percent seedling mortality. Successful germination requires scarification and moist cold stratification (Sivinski 1992). Seedlings lack a deep tap root and are vulnerable to desiccation during periods of below normal precipitation. Because they often grow within dry stream channels, arroyos, or near the channel, they are frequently dislodged and/or destroyed during floods (USFWS 2004b). An increase in seedlings has been observed following floods but the majority of young plants die from desiccation prior to establishing a deep tap root.

Habitat

The poppy occurs from 4,200 feet elevation in lower Dog Canyon to 7,120 feet elevation in upper Alamo Canyon (USFWS 1994). At lower elevations, the species occurs within the pinyon/juniper zone of the Chihuahuan Desert Scrublands and Grasslands up to the edge of the ponderosa pine community in Great Basin Conifer Woodlands at higher elevations. Native species commonly associated with the poppy include desert willow (*Chilopsis linearis*), honey mesquite (*Prosopis glandulosa*), creosotebush (*Larrea tridentata*), velvet ash (*Fraxinus velutina*), red mahonia (*Mahonia haematocarpa*), Wright silktassel (*Garrya wrightii*), one-seed juniper (*Juniperus monosperma*), and blue grama (*Bouteloua gracilis*).

The LNF is the principle land management agency for the species, with the majority of the poppy's total range occurring on Forest Service land (USFWS 1994). Other occupied habitat occurs on lands administered by the Bureau of Land Management (BLM), Oliver Lee Memorial State Park (located at the mouth of Dog Canyon), State of New Mexico, Otero County highway rights-of-way, and land owned by the City of Alamogordo. The Mescalero Apache Reservation was identified in the Recovery Plan as potentially having suitable habitat for the species, but we are not aware of any plants or whether surveys have ever been conducted (USFWS 1994).

The habitat of the poppy has been described as being disturbed and either semi-riparian or with a reliable seasonal provision of water (Malaby 1987). Mature poppies occur in steep, rocky canyons, generally on north-facing slopes on the south side of canyon bottoms (Sivinski 1999, 2000). Poppies inhabit arroyos, stream banks, vegetated bars of silt, gravel, and rock, alluvial benches in canyon bottoms, as well as, along pipeline rights-of-ways, and roadsides. The poppy sometimes occurs in conjunction with large boulders, which may create stable micro-habitat (Sivinski pers. comm. 2010). Seedlings occur primarily in open, areas where competition with surrounding vegetation is minimal. Sites that collect surface water are considered favorable for seedling germination, but they may be susceptible to desiccation (USFWS 1994). It appears that some type of disturbance and sufficient moisture is needed for successful germination and establishment of poppies (USFWS 1994). Still, it is uncertain which forms and how much surface disturbance are optimal for poppy establishment (USFWS 1994).

Distribution and Abundance

In 1989, the poppy was known to inhabit 10 canyons: Dry, Alamo, Caballero, Fresnal, La Luz, Salado, Mule, San Andres, Dog, and Escondido Canyons (USFWS 1994). Populations in Mule and Dry Canyon are considered extirpated (Worthington 2002; Tonne 2008; USFS 2009b) and the status of the poppy on private land in Escondido Canyon is unknown (Tonne 2008).

When the poppy was listed in 1989, its estimated range-wide population size was 1,313 individuals (54 FR 35302). This estimate was derived from intensive surveys conducted by Malaby, who surveyed about 6,300 acres and found 1,290 poppies on just 205 acres within eight canyons (Malaby 1987). About 1,112 poppies were located on Forest Service land and 178 poppies were on privately owned or City of Alamogordo lands. An additional 23 plants were found in Mule and San Andres Canyons in 1988 (Malaby 1988). The greatest number of plants occurred in Alamo Canyon and its tributary Caballero Canyon, which are completely within the Sacramento Allotment. In 1987, the Alamo/Caballero population represented approximately 75 percent of all poppies (USFWS 1994; USFS 2004d).

Since 1987, the observed range-wide abundance has declined steadily (Table 3). Decreases vary from canyon to canyon for reasons that are yet to be fully understood. Prior to 2004, comparison of abundance estimates was confounded by variations in survey intensity, methodology, and by incomplete range-wide surveys in the majority of years largely due to resource limitations and access to private lands. Surveys did not consistently record seedling numbers primarily because the high mortality rate of seedlings renders these numbers meaningless for evaluating population trends. Field observations found that seedling mortality could be as high as 100 percent in some years, indicating that mature poppies are the best metric for monitoring population trends (USFS

2004a; USFS 2010a).

Alamo-Caballero Canyon: The Alamo and Caballero Canyon system contains the majority of mature plants range-wide. Alamo Canyon is approximately 8 miles long and Caballero is approximately 4 miles long. The majority of poppies are scattered throughout the canyon bottoms, along alluvial benches and within the stream channels. There has been a precipitous decline in mature plants from 955 mature plants in 1987 to 316 (281+35) in 2011 (Table 3; USFS 2011, USFWS 2011). Two surveys were conducted in Alamo Canyon during 2011, with 281 mature plants located in Alamo and 35 in Caballero Canyon (USFS 2011d, USFWS 2011). In 2009, about 10 plants were also found in Gordon Canyon, a small tributary to Alamo Canyon (USFS 2010a).

Fresnal/La Luz Canyons: Fresnal and La Luz Canyons were surveyed in parts over various dates between 2006 and 2011 (except 2009). Survey efforts were conducted along the U.S. Highway 82 right-of-way in 2006 and along a City of Alamogordo pipeline right-of-way on the LNF in 2007, 2008, 2010, and 2011. Recent surveys in 2011 located 86 mature plants, significantly lower than the 125 located during 2010 in this canyon system (USFWS 2010c, 2011). About 163 poppies occurred in this canyon system in 1987, with the majority of poppies scattered among City and private lands. Since 2006, no plants have been located within the La Luz Canyon drainage above its junction with Fresnal Canyon.

San Andres Canyon: This canyon is located between Alamo and Dog Canyon. Currently, occupied habitat occurs at the mouth of the canyon on land administered by the BLM. Tonne (2008) surveyed four locations that contained 19 plants in 1988 and found 12 mature plants in two locations. Worthington (2002) found only two plants in the same area in 2002. In 2007, the BLM conducted surveys of San Andres Canyon bajada (below the mouth of the canyon) and located 52 plants, in an area that contained only 2 plants in 2006. Although the numbers have fluctuated between 1987 and 2007, this small population of poppies continues to persist.

Dog Canyon: Malaby (1987) located 157 poppies on Forest Service land, of which eighty were located on a bench while others were growing around the bench and near Fairchild Springs. Two plants were found near the entrance of Oliver Lee State Park. A 2002 survey on Forest Service land found just one mature plant (Worthington 2002) and a 2004 Forest Service survey reported locating 32 mature plants, with 12 dying from the bottom upwards (USFS 2004d). Additional surveys located 14 mature poppies and 150 seedlings on the bench and in an arroyo in 2006 and about 17 plants total were found in these locations in 2007 (Tonne 2008). An attempt to revisit the areas surveyed by Malaby was prevented by flooding in August 2006 (Tonne 2008). In 2007, 34 to 37 poppies were observed below the mouth of Dog Canyon, an area where poppies were previously unknown (Tonne 2008). The occurrence of these plants was attributed to a wet monsoon season and flooding.

Mule, Salado, and Dry Canyons: These canyons supported small populations of less than twelve poppies in 1987. Searches in Mule Canyon have failed to locate plants since 1990 (USFWS 2004b; USFS 2009b) and the population is considered extirpated. In 2009, the Forest Service confirmed poppies in Salado Canyon, but for some reason, did not count or report any numbers (USFS 2009b, 2009c). The last poppy observed in Dry Canyon was in 1994. Surveys

conducted in 2002 and 2007 failed to find the species in Dry Canyon (USFWS 2004b; Tonne 2008). This population is also considered extirpated. Dry Canyon spans over half the distance between the Fresno/La Luz and the Alamo/Caballero Canyon systems. Previously suitable poppy habitat appeared to be degraded and unsuitable, with cattle observed well past their permitted removal date (Tonne 2008). The loss of this canyon likely decreases opportunities for gene flow.

Escondido Canyon: In 1989, 45 poppies were located at Dripping Spring on private lands (Malaby 1989). Between 1988 and 2002, the roads leading to the mouth of the canyon were gated, restricting access (Worthington 2002, Tonne 2008). An incomplete survey, accessed the Canyon from Westside Road in 2007, but failed to locate any poppies (Tonne 2008). Tonne (2008) reported that the main spring above the locality Malaby located in 1988 appears to have been capped, eliminating the water source for the poppies. In 2009, these roads remained gated (E. Hein, pers. observation, USFS 2009b). Without direct access to the canyon, future surveys are unlikely because the steep and rugged terrain makes it dangerous to access the canyon from areas off Westside Road (E. Hein, pers. comm. 2010).

Threats

Threats to the poppy and its habitat include livestock grazing, floods, drought, water diversions/pipelines, road construction and maintenance. The scarcity and limited distribution of the species makes the species vulnerable to natural and man-made threats (54 FR 35302). Since 1999, a fungal disease with symptoms similar to those of a stem canker has been added as a potential threat to the species (Sivinski 1999), especially when the plants are stressed from drought. Reasons for the long-term decline in poppy abundance are not fully understood, but may involve the interaction of a variety of factors, including drought, disease, water diversion, flooding, and livestock impacts (USFWS 2004b; Tonne 2008).

Livestock grazing

Livestock grazing occurs in Alamo, Caballero, Escondido, Fresno, La Luz, Salado, Dry, and San Andreas Canyons (Malaby 1987; USFS 1990, 2008a). Historic overstocking of livestock resulted in plants impacted (USFWS 1994). Soreng (1982) believed that seedlings and young plants may be vulnerable to grazing. Grazing may injure or affect the reproduction of mature plants, whereas grazing and trampling can kill seedlings. Trampling and removal of vegetation by livestock may also degrade poppy habitat by exposing the soils to invasion by weedy species and/or increasing the loss of soil. For example, poppy habitat within riparian areas and canyon bottoms where livestock congregate have at times been severely overgrazed (USFWS 1994).

Flooding

Floods scour poppy habitat within canyon bottoms, destroying many plants and eliminating suitable habitat (USFWS 1994; Tonne 2008). Many populations are particularly vulnerable to flooding because poppies generally occur within floodplains or arroyos and are subject to periodic damage or loss. Mature poppies can be completely removed or buried by floods, with a small percentage re-sprouting from roots (Tonne 2008). A flood in 1978 destroyed

approximately 100 mature plants in Alamo Canyon, while several small floods in Caballero Canyon destroyed 22 mature plants from 1988 to 1989 (USFWS 1994). Although some flooding may scarify seeds and contribute additional water, silt, and nutrients for increased germination and establishment of poppies, floods within Alamo and Caballero Canyons in 2006 and in 2008 were so large that they resulted in a net loss of habitat and poppies (USFS 2007a, Tonne 2008). Loss of mature plants from floods continues (USFS 2011d, USFWS 2011). Damage caused by floods has been exacerbated by ongoing drought and the lack of riparian and herbaceous plant cover due to continued livestock grazing since 1991. Alternatively, some flooding may also create habitat or transport and scarified seeds, to the benefit of the species (USFWS 1994).

Drought

The southwestern region has undergone a severe drought over the last decade, with southern New Mexico experiencing severe drought conditions within the range of the poppy. As noted, January through August 2011 was the driest period ever recorded (National Weather Service 2011). Warming temperatures, milder winters, and less annual precipitation is contributing to drier conditions. Seedlings are particularly vulnerable to drought because they lack a substantial root system and desiccate prior to the establishment of a deep tap root after 1 and 2 years of growth. During periods of drought, the recruitment of significant numbers of mature plants is an unusual event.

In New Mexico, mean annual temperature has increased by 0.6 C degrees per decade beginning in 1970, with warming greatest in spring (Lenart 2005). Higher temperatures lead to higher evaporation rates, which may reduce the amount of runoff, groundwater recharge, and consequently spring discharge (Stewart et al. 2004). Drought is an important contributing factor to the continued decline of the poppy. Future drought will likely limit seed production and germination, depleting the seed bank and reducing the number of mature poppies rangewide. If the period of drought continues for multiple years, mature plants, which are believed to have a lifespan of about seven to nine years, could die without successfully replacing themselves (USFS 2011b). Higher temperatures would also likely increase the risk to poppies from fungal disease, especially when plants are water stressed.

Water diversions/Pipelines

Much of the water for the City of Alamogordo is supplied by surface water originating from watersheds along the western escarpment of the Sacramento Mountains, including the entire poppy's known range (Shomaker and Associates, Inc. and Livingston Associates, P.C. 2005). The City of Alamogordo owns and uses water rights in La Luz/Fresnal and Alamo/Caballero Canyons. Beginning in the early 1900s, the City capped the headwaters of springs in these canyon systems and diverted surface water for livestock, agriculture, and domestic use (Livingston Associates, P.C. and Shomaker and Associates, 2002). Ground water is used during the summer months as surface water recedes. The water pipeline rights-of-way contain suitable occupied habitat for the poppy. Pipelines that historically leaked water in Alamo, Caballero, and Fresnal Canyons, which are occupied by the poppy, have been replaced when calcium carbonate deposits reduce water transmission capacity of pipes. These new pipelines rarely leak water along their routes through poppy habitat. Capped springs and newly replaced pipelines have eliminated a consistent supply of water, an additive factor that may impact the poppy (USFS 2003b). Habitat destruction and loss of poppies also occurs during water pipeline construction

and maintenance (USFS 1987; USFWS 2008). Heavy equipment used to transport, excavate, position, and remove sections of steel pipe can damage or destroy plants.

Road construction and maintenance

Road construction and maintenance also pose a threat to the poppy with a number of mature plants located along roadsides or within the rights-of-way. Plants also have been and continue to be destroyed by herbicide application and soil and gravel dumping (USFWS 1989; Tonne 2008). Coordination between the Forest Service and the New Mexico Department of Transportation has minimized, but not eliminated impacts (USFS 2003b).

ENVIRONMENTAL BASELINE

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

Conservation Measures

In 2005, we addressed the poppy in the Programmatic Biological and Conference Opinion on the Continued Implementation of the Land and Resource Implementation Plans for the Eleven National Forests and National Grasslands of the Southwest Region (USFWS 2005). A set of conservation measures were proposed in response to concerns regarding the tenuous status of the poppy and its environmental baseline. The conservation measures became part of the Forest Service's proposed action. With these measures, we concluded that the proposed action would not jeopardize the continued existence of the poppy.

The four conservation measures for the poppy are listed below along with their status:

Conservation Measure #1: Annually protect newly emerging seedlings from trampling on National Forest System lands.

Status: The Forest Service reported that implementing this measure was impractical because seedlings are usually scattered making them difficult to protect from trampling (USFS 2008c). The poppy germinates in fall, winter, and spring, which causes difficulty locating seedlings throughout the canyons.

Conservation Measure #2: Within the mission and capability of the Forest Service, participate with State and Federal agencies, Forest Service research and others (e.g., Universities) to identify genetic factors essential to future reintroduction efforts and improve our collective understanding of the poppy's ecology in relation to habitat improvement and species recovery.

Status: The Forest Service initiated a working group in 2008. The group met on December 2, 2008, February 3, 2009, and June 16, 2009. The Forest Service partly funded monitoring of the poppy in 2006 (USFS 2008c). No genetic factors or reintroduction methods have been investigated.

Conservation Measure #3: On National Forest System lands limit off-highway vehicle use to established routes.

Status: The Forest has not completed any specific actions to comply with this conservation measure and limit off highway vehicle (OHV) impacts on the poppy.

Conservation Measure #4: To the extent feasible within the mission and capabilities of the Forest Service assist in the propagation and reintroduction of the poppy.

Status: The Forest Service established a poppy garden at the Supervisor's Office. As of July 1, 2011, the Forest Service reported 20 to 30 mature prickly poppies were producing seeds; however, no transplantations or reintroductions have taken place or are planned.

History of Grazing on the Sacramento Allotment

Between 1981 and 1989, the Sacramento Allotment was either lightly stocked (see *Forest Guardians v. United States Forest Service, et. al.*, CIV 00-490 JP/RLP 2002; USFS 2004c) or was vacant (1983-1987) (USFS 1987). As a result, improvement of range conditions occurred until 1991. However, from 1991 until 2004, the Allotment was stocked with 553 cattle (cow/calf pairs), a level that was determined to exceed the Allotment's forage capacity (Galt and Holechek 1998). During this period, range conditions became significantly degraded on the winter unit (Galt and Holechek 1998).

Two studies completed in 1996 and 1998 determined that stocking levels exceeded the Allotment's grazing capacity. Grazing levels were set without considering forage production or the number of elk on the allotment. The 1996 study reported that excessive forage use was occurring in riparian zones and concluded that the Forest Plan guidelines of a maximum 40 percent forage utilization in riparian zones was being exceeded. The decline in the quality of vegetation and soil conditions were caused by overutilization (*Forest Guardians v. United States Forest Service, et. al.*, CIV 00-490 JP/RLP 2002). These historic impacts from livestock continue to cause significant soil loss and modification of poppy habitat.

By 2003-2004, stocking rates in the winter units were reduced to a range of 200-335 cow/calf pairs in order to be aligned with the Allotment's grazing capacity (USFS 2004c). An Allotment Management Plan (AMP) was developed in 2006, but the permittee refused to sign the document (USFS 2006a). It is unclear whether the AMP was ever implemented. To our knowledge, a new Allotment Management Plan for the current 2009 permit has not been developed.

Range and Riparian Conditions

Due the rugged and steep topography of the Sacramento Allotment, livestock grazing is

restricted to canyon bottoms, ridge tops, open grasslands, and along roads (USFS 2004c). Dominate forage species on the summer range include: Kentucky bluegrass, smooth brome, intermediate wheatgrass, and orchard grass. Dominate species on the winter pastures include blue grama, sideoats grama, Sand muhly, wolftail, and plains lovegrass.

Galt and Holechek (1998) noted that little mulch or residual vegetation litter was present to protect soils on the winter range of the Sacramento Allotment. Heavy use of forage resources from a large increase in livestock grazing since 1991 was also reported, leading to a concern regarding watershed degradation (Galt and Holechek 1998). In fact, Alamo Canyon had the lowest ecological condition at 38 percent, with patches of bare ground observed in some areas, which they attributed, in part, to heavy grazing.

Many areas in the Sacramento Allotment have experienced varying degrees of erosion and vegetation changes due to past livestock management practices (USFS 2003c). Reduction in grasses and forbs by tree and shrub invasion and overutilization resulted in a loss of and decline in the quality of vegetation cover and an increase in soil loss (*Forest Guardians v. United States Forest Service, et. al., CIV 00-490 JP/RLP 2002*; USFS 2003b). Without adequate vegetative cover or litter, extensive loss of soils in the winter pastures continues (USFS 2004c, 2011d, USFWS 2011).

In 2004, the Forest reported that more than 90 percent of the riparian areas associated with perennial streams in the Sacramento Allotment were in poor condition (USFS 2004c). Streams on the summer range that are located in the Rio Penasco and Sacramento River Watersheds have incised channels isolated from the floodplain with unstable banks and high width-to-depth ratios. In 1999, a Proper Functioning Condition (PFC) occurred for several stream reaches and their associated riparian communities in Caballero Canyon on the winter range, and the Upper Rio Peñasco, Water Canyon, Wills Canyon, and Hubbell Canyon on the summer range. Although specifics were not provided, twelve reaches were identified as properly functioning with conditions that could withstand a 25-30 year flood event; fourteen were identified as functional but at risk, and one was identified as nonfunctional. Eighteen of the 27 reaches assessed had vegetation grazed too closely, with trampled banks, leading to the potential for decreased root strength and bank stability. Fourteen of the reaches did not have sufficient vegetation to protect bank stability during large floods. The deferred rest-rotation strategy on the summer range was expected to slowly improve range conditions; however, this strategy was only followed for two years before the Forest Service changed to a 6-month continuous seasonal-long grazing in 2006, which is now the proposed action.

In 1994 and 1995, forage use levels in the Alamo Pasture were observed to be between 50 and 70 percent (USFS 1994; USFS 1995). Galt and Holechek (1998) noted that a lack of old vegetation litter to protect soil was problematic on the winter range, with watershed degradation the biggest concern. From 1991 through 2006, forage utilization in most key areas on the summer range averaged between 70-81 percent (USFS 2003c). From 2005-2010, the average percent vegetation litter at key areas has generally remained low: Upper Alamo 16 percent (range 1-38), Lower Alamo 6 percent (range 0-19), and Caballero 15 percent (range 1-44) (USFS 2006, 2007d, 2009a, 2010d, 2010e).

Until December 15, 2011, we were under the impression that forage utilization and/or leaf lengths on the winter range have been irregularly monitored because the Forest had not previously provided any pre-season or end-of-season data for 2007, 2008, or 2009. This newly received data fill in most of the monitoring periods from the winter grazing seasons of 2006 through 2011 (Forest Service 2011g). The Forest's interpretation of these data suggests all grazing intensities fell within the two permitted guidelines of at least 2 inches of short-length grasses and 6 inches of mid-length grasses (Forest Service 2011g).

In Caballero Canyon, we agree that it appears the permitted guideline of short-length grasses were met every year since 2006. However, data are missing for the other permitted guideline, the mid-length category, in years 2007, 2008, and 2010. Moreover, end-of-season data did not meet the minimum permitted guideline in mid-length category for years 2006 (3.6 inches) and 2009 (2.7 inches). We are also unclear how to interpret previously reported 2011 Caballero Canyon end-of-season forage utilization of 76 percent (Forest Service 2011c). This estimate far exceeded the permitted guideline of 45 percent. As such, we are not in complete agreement with the Forest's interpretation of these data on whether the mid-length permitted guidelines were met every year.

In Upper Alamo Canyon, we agree that it appears the permitted guideline of short-length grasses were met every year since 2006, except end-of-season 2007, in which data are missing. Moreover, end-of-season data did not meet the minimum permitted guideline in mid-length category for years 2006 (5.3 inches), 2008 (4.8 inches), and 2009 (5.9 inches). We are also unclear how to interpret previously reported 2010 and 2011 Upper Alamo Canyon end-of-season forage utilization of 53 and 79 percent, respectively (Forest Service 2010d, 2011c). These estimates exceeded the permitted guideline of 45 percent. As such, we are not in complete agreement with the Forest's interpretation of these data on whether the both the short and mid-length permitted guidelines were met every year.

Livestock use in Lower Alamo Canyon appears to be essentially non-existent. This is likely because the cement stock tank in Lower Alamo Canyon that regularly held water prior to 2004 is no longer functioning and is dry. We agree with the Forest's interpretation of these data that all grazing intensities fell within the two permitted guidelines of at least 2 inches of short-length grasses and 6 inches of mid-length grasses (Forest Service 2011g).

In general, we suggest the data for Caballero and Upper Alamo Canyons demonstrate repeated, consistent patterns of exceeding permitted leave length or forage utilization. We note that the Forest Service has not changed the 2004 stocking rate or management regime of the Alamo Pasture.

Cattle and Elk Competition

Elk use in the Sacramento Allotment occurs year round, but seasonal movements across the Sacramento drainage occurs primarily during the spring and fall, depending on snow levels (USFS 2004c). Both the Forest Service and the permittee believe that elk compete with cattle for available forage on the summer range. Their observations of high elk use in the summer pastures following the removal of cattle led to their belief that elk were responsible for excessive

utilization rates in 2000-2001 and 2005-2006 (see Grazing History below). The Forest Service changed to continuous seasonal-long grazing in 2006 as a strategy to distribute livestock and elk evenly within the summer range (USFS 2006). This strategy has not helped ameliorate long-term range degradation because the permitted forage utilization is still regularly exceeded.

Drought

New Mexico has experienced a long-term drought since 1999. The Sacramento Mountains experienced extremely dry winters from 2005 to spring 2006, winter 2007 to spring 2008, and from winter 2010 to summer 2011. Notably, the extremely dry conditions in spring 2008 and spring/summer 2011 forced the closure of the entire LNF to the public. Drought will likely be a continuing factor affecting the action area in the foreseeable future. In fact, the National Weather Service (2011) predicted that the current drought would persist or intensify through 2011, whereas the National Oceanographic and Atmospheric Administration (NOAA) projected the drought would persist through at least April 30, 2012 (NOAA 2012).

History of the Sacramento and Dry Canyon Allotment and the Endangered Species Act

The Forest Service issued a 10-year term grazing permit for the Sacramento Allotment to the Sacramento Grazing Association (SGA) on November 27, 1989. That permit expired on November 27, 1999 and the agency issued a new 10-year term grazing permit to the SGA on November 23, 1999 authorizing 553 cow/calf pairs on the Sacramento Allotment, but the Forest Service did not request consultation. In 2000, Forest Guardians filed suit against the agency alleging that the issuance of the 1999 permit resulted in overgrazing and harm to the MSO and that the agency violated the Act's consultation requirements, National Forest Management Act, and the Administrative Procedures Act. The Forest Service requested consultation on the Sacramento and Dry Canyon Allotments in November 2000 to analyze the effects of grazing 200-412 cow/calf pairs for a three-year period or until NEPA was completed.

The District Court filed judgment in April 2003 against the Forest Service and the Service for violating the consultation requirements under section 7 of the Act by failing to consult on the entire 10-year permit regarding the effects on the MSO from the issuance of the 1999 term grazing permit. We completed formal consultation in 2004. When the Forest Service modified the proposed action in 2006, they requested reinitiation of the consultation. The Forest Service notified us on August 4, 2010, that a new term grazing permit was issued on November 11, 2009 and is active until December 2018. The Forest Service stated that this is the first permit issued under the ROD.

Status of Species within the Action Area

Mexican Spotted Owl and Critical Habitat

The LNF is within the Basin and Range - East (BR-E) RU. This RU is an important source population for other areas (USFWS 1995). MSOs here occur in isolated mountain ranges scattered across the region, the largest portion occurring in the Sacramento Mountains. In this RU, MSOs have been reported on Forest Service lands in the Sandia, Manzano, Sacramento, and

Guadalupe Mountains, and in Guadalupe National Park, Carlsbad Caverns National Park, and the Mescalero Apache Reservation. MSOs are most common in mixed-conifer forest, but have been found in ponderosa pine forest and pinon/juniper woodland (Skaggs and Raitt 1988, USFWS 1995).

There are 199 PACs within the Basin and Range East RU, with 148 PACs on the Lincoln National Forest. The Sacramento Ranger District has 117 PACs; the Guadalupe Ranger District has 10 PACs; and the Smokey Bear Ranger District has 22 PACs. Additional PACs are located on the Mescalero Apache Reservation (37 PACs), the Guadalupe Mountains National Park (11 PACs), and the Cibola National Forest (3 PACs).

Major threats to the MSO, in order of potential effects, include: 1) catastrophic, stand-replacement fires, 2) some forms of timber harvest, 3) fuelwood harvest, 4) grazing, 5) agriculture or development for human habitation, and 6) forest insects and disease (USFWS 1995). Minor threats include: 1) certain military operations, 2) other habitat alterations (e.g. power line and road construction, noxious weed control), 3) mining, and 4) recreation. Minor threats are activities not currently extensive in time or space but are potential threats to the MSO.

The dominant land uses within the RU include timber management and livestock grazing. Recreational activities such as off-road driving, skiing, hiking, camping, and hunting are locally common within the RU (USFWS 1995).

Past and present Federal, State, private, and other human activities that have undergone informal consultation and conferencing and may affect the MSO and its habitat are as follows: The Hay and Scott Able timber sales, Bridge salvage sale, Walker fire salvage sale, Wildland Urban Interface projects, livestock grazing, recreational activities, recreation and scenic vista developments, road construction, maintenance activities, land exchanges, right-of-way issuances, off-road motorcycle events, power line construction, wildlife research projects, urban development, and catastrophic wildfires, their suppression and rehabilitation activities.

The likelihood of MSOs occurring within the action area is very high. Monitoring of the MSO by the Forest Service between 1987 and 2002 has been mostly informal and not consistent between years or among PACs. Still, we received MSO monitoring information in 2010 covering the period from 2002 to 2009. Occupancy was confirmed in 43 PACs, including Hubbell (2003-2009), Lighting (2006-2009), Rice (2004, 2009), and Zoo (2003-2009). Despite confirmation of occupancy, we consider MSO PACs within the action area to be occupied regardless of limited survey data. This is consistent with the Recovery Plan's recommendation for the retention of PACs, the potential of mature survival to reach 16 years or more, and high site fidelity (USFWS 1995).

There are 46 PACs within the Sacramento Allotment. Forty-four PACs are located within the summer range and two PACs, the Joplin and Law-Andres PACs are located within the Mule Pasture of the winter range. The Zoo PAC is located within the Natural Resource Area, an area of 640 acres that is within the Nelson summer pasture. Only a sliver of the Bear Spring, Hidden, and Rio PACs are within the Sacramento Allotment boundary, whereas the majority of the PACs are located within a neighboring allotment. Occupied MSO habitat on the Sacramento Allotment

is 23,363 acres (USFS 2004c). The Dry Canyon Allotment does not have suitable habitat for the MSO.

The majority of the vegetative community on in the summer range is mixed-conifer forest (approximately 20,010 acres) (Ward 2001; USFS 2004c). These mesic woodlands occur above 7,480 feet and is dominated by Douglas-fir (*Pseudotsuga menziesii*) or white fir (*Abies concolor*) on slopes of 16-40 percent and ridgetops. Other communities on the summer range include stands of quaking aspen (*Populus tremloides*) (approximately 708 acres) which occur on 0-40 percent slope and montane meadow grasslands (approximately 705 acres) that occur along canyon bottoms above 6,900 feet elevation. Montane meadows, which include montane grasslands and wet meadows, are dominated by the sod-bound, low producing form of Kentucky bluegrass (*Poa pratensis*) (Ward 2001; USFS 2006a). Pinyon-juniper and ponderosa pine dominated communities also occur on the winter range.

Factors Affecting the Species

Most of the information contained in the 2007 BA is copied from the 2003 BA. Other sources of information, including prior consultations, LNF status reports, or published research, were used to better understand on-the-ground conditions from 2006 to present.

Vegetation in the Sacramento Allotment has been substantially altered over the past century by extensive logging, livestock grazing, agriculture, and water extraction (Ward 2001; USFS 2004c). Natural fire frequencies have been suppressed and fire has been absent in many stands for 60 to 100 years, resulting in changes to the composition of plant communities (aspen successional changing to fir/spruce communities), increased tree densities, and changes to the microclimate (Ward 2001).

All PACs are subjected to some form of disturbance, such as livestock grazing, road maintenance, trail maintenance, and utility line maintenance that has likely resulted in short-term disturbance to the MSOs and has impacted habitat that support prey species. Grazing occurs in all but ten PACs (USFS 2003b). Some PACs are also received moderate to heavy use by recreational activities associated with Forest Service roads and trails that traverse either around, through, or near the PAC. These activities include winter snow recreation, hiking, camping, hunting, mountain biking, and motorized trail use (OHV).

Forage utilization levels in meadow habitat has been exceeded regularly since 2001 (USFS 2007a, 2010f). An analysis on the effects of continued seasonal grazing on the MSO and its designated critical habitat was not completed by the Forest Service. The Forest Service stated in their 2006 BA that their effect determination from the 2003 BA remained unchanged (USFS 2006). In addition, the agency stopped conducting prey base monitoring and implemented forage utilization monitoring, using residual stubble height as the metric for MSO prey.

Past impacts to MSO critical habitat include defoliation of mixed-conifer and aspen forest communities by insect outbreaks to ponderosa pine (USFS 2007a). Defoliation was first observed in 2002 in the Rio Peñasco and Wills Canyons east of the Sunspot observatory, with subsequent defoliation observed each year. The Sacramento Ranger District reported an

outbreak of New Mexico fir looper resulted in defoliation of the mixed conifer forest affecting 5,915 acres in 2004 and 5,295 acres in 2005. The western spruce budworm also caused defoliation of approximately 700 acres but the Ranger District reported that no defoliation by the insect was visible during the aerial surveys in 2005. On September 5, 2007, the LNF Supervisor signed a finding of no significant impact authorizing aerial spraying to suppress the New Mexico fir looper (*Nepytia janetae*) winter conifer defoliation. Approximately 4,419 acres of NFS lands around the Village of Cloudcroft, New Mexico, was treated in November 2007 using the biological insecticide *Bacillus thuringiensis* var. *kurstaki* (*Btk*). Aspen defoliation caused by the western tent caterpillar was minor, but increased to 505 acres in 2005 from 105 acres in 2004 (USFS 2006). Bark-beetle-caused tree mortality occurred on 12,170 acres in 2006, down from 19,670 acres in 2005. Lastly, ponderosa-pine mortality was observed on 2,150 acres and fir mortality on approximately 10,000 acres in 2006 compared to 16,985 acres in 2005. Fir mortality in the mixed conifer (caused by fir engraver beetles) caused the increase in overall bark beetle activity. The LNF reported that this was the greatest amount of fir mortality observed in the past 10 years (USFS 2006).

On April 8, 2009, we consulted on the effects of the Sacramento Mountains Defoliation Project on the MSO and its designated critical habitat. The Forest Service determined that the project was “not likely to adversely affect” the species and its designated critical habitat but we disagreed with the determination and issued a BO. We determined that commercial harvesting of dead conifer trees, caused by four conifer tree defoliating insects, including a looper species, *Nepytia janetae*, would not non-jeopardize the continued existence of the species or adversely modify its designated critical habitat (Consultation 22420-2009-F-0011).

In the 2004 BO for this allotment, we issued incidental take in the form of harassment for two MSO pairs and their young associated with the Hubbell and Bluff Springs PACs for ongoing loss of MSO prey habitat. One of the Terms and Conditions was to provide a report documenting how the project is in compliance with the proposed action. The Forest Service had in addition, proposed to create two new key areas inside these PACs to monitor utilization rates and determine whether adequate prey cover was being met. The Forest Service reported in their 2006 and 2007 BAs that this has not been initiated (USFS 2006, 2007a).

Sacramento Mountains Thistle

Status of the Species within the Action Area

The Sacramento Allotment contains the majority of the known thistle populations. Of the 75 occupied thistle sites in 2007, 68 were within the Sacramento Grazing Allotment while the 7 remaining sites occurred in 4 other allotments. Thistles occur in the North (Newman, Benson, Lucas, and Dark) and South (Water, Brown) summer pastures, the Alamo Watershed, the Peñasco Trap, and in the following exclosures: Bluff, Hubbell, Peñasco, and Wills.

Factors Affecting the Species within the Action area

Factors affecting the thistle in the action area include livestock grazing, drought and water extraction, recreation, and insect predation.

Livestock Grazing

To control herbivory and trampling within the Sacramento Allotment, the Forest Service maintains 23 exclosures around thistle sites, covering approximately 290 acres. These exclosures protect 23.5 percent of the known occupied thistle habitat in the allotment. Thistle numbers can rebound substantially when they are fenced. For example, thistle numbers in Hubble Canyon increased from 0 plants in 1984, when an exclosure was built, to about 500 plants in 1991 (USFS 2003b). Exclosures require constant vigilance and work; livestock have routinely been observed in exclosures of the Sacramento Allotment due to unmaintained fencing, including the 2011 summer season. Since 2006, many instances of livestock presence within thistle enclosures were noted on summer range (USFS 2003b, 2007a, Barlow-Irick 2008).

Drought and Water Extraction

Water flow at a number of springs occupied by the thistle has declined substantially since 2004. There have been no additional special use permits issued by the Forest Service for diversion of water from thistle habitats since this species was listed as threatened in 1987 (Barker, personal communication, 2006). Several thistle habitats have been subjected to direct and indirect impacts from land uses that damage travertine substrates and hydrological characteristics. In 2001 and 2002, a riparian improvement project in Water Canyon and the Rio Penasco improved drainage under roads. This action has increased water availability in formerly occupied habitat, allowing the thistle to reoccupy these sites (USFWS 2005).

Recreation

Recreational impacts to Sacramento Mountains thistles have occurred at the Bluff Springs locality (USFWS 1993, USFWS 2008, Barlow-Irick 2008, USFS 2008b, USFWS 2010). Fencing around thistles in this area has been maintained and foot trails rerouted to protect this population (USFS 2003b). After construction of the fence in 1983, thistles rebounded. Recreationalists have also been observed driving OHVs through other exclosures typically fenced to exclude livestock (USFS 2008b).

Insect Predation

Sivinski (2007, 2008) documented insect seed predation and herbivory of the thistle in late summer within four thistle population zones: Silver Springs, Bluff Springs, Upper Rio Penasco, and Scott Able Canyon. Four native and one introduced insect species damaged flower heads or caused premature stem death of the thistle (Sivinski 2007, 2008). The flower head and seed predators were: 1) a native, specialist tephritid gall fly (*Paracantha gentilis*); 2) a native pterophorid artichoke plume moth (*Platyptilia carduidactyla*); 3) a native, generalist scarabaeid bumble flower beetle (*Euphoria inda*); and 4) an introduced curculionid flower head weevil (*Rhinocyllus conicus*) (Sivinski 2007). The fifth insect predator, the native curculionid stem borer weevil, *Lixus perversitatus*, was also observed (Sivinski 2007, 2008). In September, 2007, these insect predators damaged up to 80 percent of the Bluff Springs population; up to 66 percent in the Upper Rio Penasco population; and 90 percent of the Scott Able Canyon population

(Sivinski 2007). Although thistle rosettes can reproduce asexually from rhizomes, seed production from insect attack was significantly reduced, particularly as a result of the stem boring weevil (Sivinski 2007, 2008).

Sacramento Prickly Poppy

Status of the Species within the Action Area

The status of the Alamo/Caballero Canyon population has declined significantly since 1987 from a high of 955 plants down to the current estimate of 316 (281+35) mature plants in 2011 (Table 3) (USFS 2011, USFWS 2011). This population lies entirely within the Alamo winter pasture, with the majority of the canyons (11,113 of 11,313 acres) composed of Forest Service lands. The Alamo Pasture includes 160 acres at the mouth of the canyon (lower Alamo) and 40 acres at the head of the canyon (upper Alamo), which are also occupied by the poppy and owned by the City of Alamogordo. Caballero Canyon is entirely on Forest Service land. As described below, livestock overgrazing, with utilization rates of 70 percent or more and a prolonged period of drought have been recognized as causal factors in this decline (USFS 2004c).

Beginning in 2003, “walk-through” poppy surveys in Alamo/Caballero Canyons have occurred annually, except in 2007. Surveys are generally conducted to coincide with flowering and increased plant detection, whereas, additional surveys have occurred in the winter to document seedling germination (Tonne 2008). Surveys primarily record mature plant numbers and have not consistently recorded seeding numbers. Surveyors include FWS and Forest Service personnel or contractors whom were present the previous year and are therefore, familiar with the route, identification of plants, and survey methods.

We have not observed any range-wide increase in survival or recruitment of the poppy since 1987, nor, more significantly, since the previous consultation was completed in 2004. During the last 8 years, surveys have been consistently conducted by experienced biologists. For these reasons, we find that the data collected and reported by the Forest Service since 1987 represents the best scientific and commercial information available on poppy abundance range-wide. As such, we agree with the Forest Service that these relative abundance surveys reflect a long-term declining trend of mature poppies within this canyon system and that the range-wide relative abundance has declined significantly from 1987 to 2011 (USFS 2010a). The LNF determined that the poppy populations in Alamo and Caballero Canyons have lost 73 percent and 77 percent of their mature poppies since 1987, and this declining trend continues (USFS 2009b, 2011b, USFWS 2011).

Individual poppies are scattered on alluvial benches, along small, elevated side channels, and slopes and generally occur in the canyon bottoms or arroyos. These areas usually have dry surface soils for more than one meter, but the alluvial aquifer may be in reach of the roots to supply plants with available moisture (Sivinski 1999, 2000). Poppies in upper Alamo Canyon on land owned by the City of Alamogordo occur near a travertine spring deposit that has been captured and diverted for human use (Sivinski 1999; Tonne 2008). In this area, poppies also occur in a large open meadow where they are concentrated near a terminus of a small erosion channel (Sivinski 1999, 2000) and likely obtain moisture from the clay soils or from storm-

runoff.

City parcels are not fenced from adjacent Forest Service land and are grazed by livestock that are managed under the permit issued by the LNF (USFS 2003b). Poppies are scattered throughout city parcels. On September 2, 2008, the Forest Service informed us that the City of Alamogordo previously leased these lands to the permit holders of the Sacramento Allotment (USFS 2008b). The LNF believes that the City abandoned the lease, but maintains informal agreements with the permittees (G. Ziehe, LNF, pers. comm. 2008). The land is not considered by the Forest Service to contribute to the grazing capacity of the Allotment (USFS 2008b).

Prior to finalizing the 2004 BO, our preliminary analysis indicated that ongoing grazing on the Sacramento Allotment may jeopardize the continued existence of the poppy. Following our preliminary analysis, the Forest Service proposed to remove cattle by February 1, 2004 and 2005. Livestock use in Alamo Pasture was also proposed to be monitored at mid-season to determine whether an adjustment to the number of livestock, commensurate with the potential for livestock impacts on the poppy from herbivory and trampling, was needed (USFWS 2004b). To the best of our knowledge, the Forest Service removed livestock in February during the 2004 and 2005 winter grazing seasons. Still, the Forest Service did not provide any information, including mid-season winter range or other monitoring data, such that the effectiveness of conservation measure could be assessed.

In 2008, our agencies held informal meetings to address ongoing grazing in the Alamo Pasture and the declining status of the poppy because our preliminary analysis, for the current BO, indicated significant concerns to declining poppy populations. The Forest Service proposed to complete the repair of two trick tanks in the Mule Pasture, a range improvement project originally proposed in 2003 in the FEIS (USFS 2003b). At that time, it was thought that maintenance and restoration of these water sources could be used to rest the Alamo Pasture by shifting livestock into the Mule Pasture. This action would have distributed cattle into areas that are not occupied by the poppy (USFS 2010a). The Mule Pasture has not been grazed for several decades because there are currently no functioning water sources (USFS 2003b, 2004c). The Forest Service was in the process of completing one of the trick tanks as of June 11, 2010, the status of the second one is unknown (USFS 2010b). Although the Forest Service indicated we would receive photographs of the new and reconstructed water developments when they were complete (USFS 2010b), no information or photographs have been provided.

Factors Affecting the Species within the Action Area

Threats to the poppy in the action area include grazing, unauthorized use, drought, water diversion, flooding, and fungus. Management concerns for the poppy center on activities that prevent seedling establishment or destroy mature plants. With the present low number of mature plants, it is crucial to have successful seedling recruitment and maintain seed-producing mature plants.

Grazing

Ongoing livestock grazing and trampling are threats to the poppy and its habitat (USFWS 1989, 1994, 2004b). The arroyos, wetlands, and riparian communities within the action area experience direct and indirect impacts from cattle. In the 1980s, after livestock grazing in the Sacramento Allotment was suspended, poppy abundance peaked. By 1991, the allotment was stocked with 553 cow/calf pairs and overutilized (Galt and Holechek 1998; USFS 1999); the poppy concurrently declined. The overlap of annual grazing with germination of the poppy has resulted in cumulative impacts to the species and is likely contributing to its declining status (USFWS 2004b). Germination of poppies occurs nearly year-round, including when livestock are present within this allotment. Cattle graze in the arroyos and adjacent benches of Alamo and Caballero Canyons, where poppy seedlings are most likely to germinate. As such, the Forest Service concluded that trampling of poppies is unavoidable when livestock are present in the Alamo Pasture (USFS 2003b, 2009b).

In the Alamo Pasture, removal of vegetation through grazing combined with the impacts ungulate's hooves has increased soil compaction and erosion, in addition to contributing to incising channels and decreasing bank stability, especially during floods (Tonne 2008). The Forest Service found that heavy livestock use in Alamo Pasture negatively impacted vegetation and reduced the moisture-holding capacity of soils (USFS 2003b, 2004c). For example, between 1993 and 1998, forage utilization averaged 70 percent (USFS 1994, 1995, 2004c). By 2004, the FEIS reported that continued excessive forage utilization led to soil instability and deterioration of range and watershed conditions, primarily in riparian areas of the Alamo Pasture (USFS 2004c). As noted, we are not in agreement with the Forest's interpretation of leaf length data on whether the both the short and mid-length permitted guidelines were met every year.

Following the issuance of the 2004 ROD, the Forest Service proposed to limit forage utilization on the winter unit, including the Alamo Pasture to 40 percent (USFS 2006, 2007a), but the Forest Service has continued to authorize a higher forage utilization level of 45 percent in the Alamo Pasture. Even with a 40 percent guideline, the Forest Service determined that the population viability of the poppy might still be at risk (USFS 2004c). In 2004, they reported that strict compliance to the new forage/range guidelines was necessary, given the extremely high overutilization of forage and impairment of stream/riparian conditions on the allotment. The Forest Service concluded in the 2004 EIS that 40 percent forage utilization was necessary to achieve gradual improvement of riparian communities (USFS 2004c). The LNF concluded that vegetation restoration may still take decades within the Alamo Pasture (USFS 2004c). They noted that implementation of the allowable use guideline of 40 percent must be followed, especially during dry periods. We found that the permitted forage guidelines have not been consistently met within the Alamo Pasture. Finally, the 2006 AMP acknowledged that a livestock distribution strategy would be necessary in the winter pastures (USFS 2006a); however, our understanding is that a strategy has not been designed or implemented.

Although the selected alternative in the 2004 EIS identified that livestock distribution patterns and information on the use of salt or mineral supplements would be collected and used in range management decisions, to our knowledge this information has never been collected. Additionally, to our knowledge the Forest has not collected any data, using the Parker 3-step method, to assess long-term condition or trend as specified in the 2004 EIS (USFS 2004c). Therefore, we have no information to assess long-term range condition.

Unauthorized Use

A history of permit unauthorized use has resulted in adverse effects to the poppy. The March 2005 AOI permitted 330 cow/calf pairs from November 1 to May 15, 2006. In June 2006, a month past the permitted removal date, cattle were still grazing the Alamo Pasture and the Forest Service requested the permittee remove their livestock (USFS 2006). On August 25, 2006, the Forest Service again informed the permittee that cattle continued to be present in Alamo Canyon. On August 28, 2006, approximately 22 cows were observed in upper Alamo Canyon on City of Alamogordo and Forest Service lands and at least three cows were present in Caballero Canyon (USFS 2006). During this period, poppy seedlings were trampled by livestock (Tonne 2008, USFS 2006, 2007a). The Forest Service notified the permittee a third time and requested compliance by August 31 (USFS 2006). On September 20, 2006, the permittee notified the Forest Service that 12 head of mature cows were removed. That same day, the Forest Service conducted a pasture inspection and found two cattle were still in Caballero Canyon (USFS 2006). The permittee was notified a fourth time.

In 2006, salt blocks were reported to be within a few feet of occupied poppy habitat in Alamo Canyon and within 50 feet of the creek in Caballero Canyon (Tonne 2008), which is inconsistent with the conditions of the grazing permit. On December 14, 2006, we notified the Forest Service, that salt blocks were located adjacent to a mature poppy and were concentrating cattle within occupied areas. The Forest Service sent a non-compliance letter to the permittee on January 26, 2007 (USFS 2007b). On February 2, 2007, the District Ranger notified them that he was extending the date for relocating the salt blocks in Alamo and Caballero Canyons to February 7, 2007, nearly 2 months after their discovery. A February 9, 2007, pasture inspection confirmed compliance.

In June 2008, we notified the Forest Service that 25 head of cattle were still present in upper Alamo Canyon (USFWS 2008b). We notified the Forest Service again in July after observing 21 cows in the same area (USFWS 2008c). The Forest Service did not provide additional information and we do not know whether these cattle were removed prior to initiation of the 2009 winter grazing season. These examples of permit unauthorized use negatively affect the status of the species and its habitat.

Drought

One aspect of the environmental baseline that applies to the poppy is on-going drought, which is likely an additional cause of the poppy's continual decline. Over the last 10 years, a substantial reduction in snow pack has also been reported in the watersheds feeding the spring systems of the Sacramento Mountains (John Shoemaker and Associates, Inc. and Livingston Associates, P.C. 2005). From 1999 to present, the action area has been under severe drought. For example, extreme drought conditions were present during 2001, 2002, 2005, 2007, 2008, 2010, and continue currently. In the recent past, segment of streams within Alamo and Caballero Canyons were perennial, but they are now sometimes dry or their flow is much reduced. Drought resulted in significant reductions in forage production on the allotment and almost no ability for the riparian or upland range conditions to recover. Moreover, below normal precipitation has led to low soil moisture conditions that contribute to low survival and recruitment of poppies (USFWS

2004b; Tonne 2008). The National Weather Service (2011) predicted that the current drought will persist or intensify.

Water diversion

The diversion of surface and pumping of ground water has exacerbated dry conditions in the action area and adjacent canyons (USFWS 1989; Sivinski 1999; Livingston Associates, P.C. and Shomaker and Associates, 2002, USFS 2008d). The demand for water from the City of Alamogordo has increased over the last few decades in response to growing human population. Historic as well as continued surface water diversions and withdrawals from the watershed that feeds Alamo and Caballero Canyons may have negatively affected the poppy in the past and present (Forest Service 2012). Poppies are likely sensitive to a reduction in the water table and are likely to be either water stressed or become desiccated from the limited availability of soil moisture. Because poppy seedlings are delicate and sensitive to drying until they establish their taproot, any factor that increases soil dryness likely affects poppy establishment and recruitment. The Forest Service has issued special-use permits to the City of Alamogordo for the operation and maintenance of existing pipeline in Alamo and Caballero Canyons but has not requested section 7 consultation with us on this action.

Flooding

Streams within the action area, including those in Alamo Pasture are prone to recurring floods (USFS 2009b). These events have damaged and destroyed poppies and potential habitat. For example, floods in the summers of 2006 and 2008 in Alamo and Caballero Canyons scoured vegetation and soils from occupied poppy habitat, washing much of the material downstream. Vegetative losses included grasses, forbs, shrubs, and trees that held soil in place and the soil structure that supports the poppy. Silt, sand, and loam were largely removed from the system, whereas the remaining material generally consisted of cobbles and boulders, which is suboptimal habitat for the poppy. Flooding likely removed much of the seed bank within long stretches of Alamo Canyon. While some poppy seeds may have been deposited in suitable habitat, much of it was likely washed downstream to areas that will not sustain the poppy. The Forest Service indicated that the occupied poppy habitat within lower Alamo Canyon has been substantially affected by flood damage, with individuals or groups of poppies in middle and lower Alamo Canyon lost to flooding (USFS 2007a, 2009b).

Plant composition and cover in the riparian zones have also been altered by floods (USFS 2003b, 2006). Observations over the past several years of flood-damaged canyon bottoms in Alamo and Caballero report dramatic shifts in the gravel basin and terraces because of altered stream channels, soil deposition, scouring, and removal of soil that supported plants. Monitoring in 2006 suggested that the loss of plants and top soil from floods was likely aggravated by reduced herbaceous cover and less root-mass in the riparian zone due to livestock grazing and water extraction (USFS 2007a).

Fungus

Since 1990s, tissue damage, attributed to the fungus *Alternaria*, has been observed on poppies

within Alamo Pasture, mostly during drought (Tonne 2008). When the poppy is stressed by drought, *Alternaria* appears to become pathogenic causing leaf, stem, bud, flower, and fruit damage. Although sometimes damaging to the poppy, the significance of this fungus remains unclear to the Alamo and Caballero poppies.

Consultation

Four project-specific formal consultations have been conducted on the poppy, including our 2004 and 2005 biological opinions on the Sacramento Allotment. On December 5, 2006, we issued a BO on the effects of a 10-year term grazing permit for Pumphouse and South La Luz Grazing Allotments for the poppy. On April 25, 2008, we issued a BO on the effects of authorizing the continued use, operation, and maintenance of the existing water transmission pipelines and water collection facilities in Fresnal, La Luz, and Maruche Canyons (USFWS 2008). We concluded that these proposed actions would not jeopardize the continued existence of the species.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

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.

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 (USFWS 1995). Vegetation cover is often greatly reduced on grazed relative to ungrazed areas, and vegetation typically appears more dense in ungrazed areas (e.g., see Belsky and Blumenthal 1997). 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 (USFWS 1995).

The Recovery Plan postulates on the direct and indirect effects of both grazing by livestock and wildlife (i.e., elk, deer) (USFWS 1995). A direct effect is excessive grazing that alters prey availability. Indirectly, 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 (USFWS 1995). The Recovery Plan notes that moderate to heavy grazing can reduce plant density, cover, biomass, vigor, and regeneration ability (USFWS 1995). 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 (USFWS 1995).

To minimize these impacts, the Recovery Plan and 1996 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. Neither of these strategies have been successful on the Sacramento Allotment.

The FEIS for the Forest Plan Amendments acknowledged that the health of herbaceous and shrub components of an ecosystem are important for MSO prey species (USFS 1995a). Range maintenance and restoration was proposed through the implementation of forage utilization guidelines across the landscape in all vegetation types (USFS 1995a). Strategies to accomplish this could include active livestock management (i.e., regularly monitoring and 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

(USFS 1995a).

There are approximately 60,000 ac of mixed conifer habitat within the Sacramento Allotment. 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. Eleven 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 11 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). 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 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.

As mentioned above, the Forest Service developed grazing criteria to assist in determining effects to the MSO and other species from issuing term grazing permits. 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. In the action area, 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 PACs, in the action area, 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; and
3. In MSO foraging areas, forage utilization will be maintained at conservative levels (i.e., between 30-40 percent of annual forage production by weight). Qualitative indicators of conservative use can be described by the following; forage plants have abundant seed stalks; areas more than a mile from water show little use; about one third to one half primary forage plants show grazing on key areas.

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. We noted in the 2004 BO that good range conditions for some PACs might take years to achieve. This is still accurate. 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. When forage/range guidelines are exceeded, adverse effects to MSO prey habitat will continue to occur.

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 were excessive from 1991 to 2005, and not consistent with the needs of long-term range management, the MSO, the Recovery Plan, or the Forest Plan Amendments. The BA indicates that monitoring of the winter allotment did not occur during 2004/2005. Similarly, during 2005, 2006, 2007, and 2010 forage use on key areas exceeded the forage/range guidelines (USFS 2006, 2007a, 2007d, 2010f).

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 (USFS 2004c). 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 (18 of 27) that were assessed had vegetation that had been grazed too closely, with banks trampled, and no vegetation that would protect bank stability during large floods (USFS 2004c).

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 (USFS 2004c). 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. These factors, which lead to the degeneration of riparian plant communities and impair the ability of plant communities to develop into MSO habitat, are likely to continue.

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. Alternatively, when the proposed herbaceous ground cover height and forage utilization standards are not met, adverse effects will occur to MSOs and their prey habitat.

Grazing criteria number 3, identified above, relates to maintaining forage utilization at conservative levels 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.

The intent of the Recovery Plan is that the grazing guidelines should be applied year-round. If adequate habitat is not maintained during the plant dormant period (i.e., winter), prey species may be negatively impacted, reducing the MSO's prey base. Adverse effects to the MSO and its prey habitat will occur when these guidelines are not met.

The yearly 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). Such revision could include, for example, seasons of use or numbers of livestock (36 CFR 222.4). The BA and subsequent discussions indicate that the Forest Service will monitor key areas to determine compliance with forage/range guidelines. They may take appropriate management action to achieve the guidelines in some years; otherwise, adverse impacts to the MSO and its habitat will occur.

Forage/range guidelines

We agreed with the Forest Service's conclusion that a downward trend in range condition can be expected from the current grazing pressure (USFS 2004c). They submitted monitoring data in the 2006 BA and again in December 2007. These data indicate that forage/range guidelines are still being exceeded in some areas within certain years (e.g., Benson, Kerr, Wills, and Lucas Canyons) and that current range conditions likely remain in poor condition. The information we reviewed indicate that the forage/range guidelines have been consistently exceeded across the Sacramento Allotment during 2005, 2006, 2007, and 2010 (USDA 2006, 2007a, 2007d, 2010f). The effects of heavy grazing have 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). For these reasons, we conclude that some MSO PACs containing meadows that are within ½ mile of nest/roost areas may also be in poor condition.

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), forage utilization may be exceeded some years and grazing levels may not provide habitat for MSO prey. 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 concluded that their proposed action allows adverse effects to MSO prey cover because the 35 percent guideline could be exceeded during dry periods. We agree with their conclusion.

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.

In 2004, riparian conditions on the allotment did not meet Forest Regional criteria, the ecological condition of the range was not satisfactory, and many key areas did not meet or maintain leaf length, herbaceous ground cover height or utilization guidelines (USFS 2000, 2001, 2002, 2002b, 2003a, 2003b, 2003c, 2003d). As noted above, during 2005, 2006, 2007, and 2010 forage use on key areas exceeded the forage/range guidelines (USFS 2006, 2007a, 2007d, 2010f). As such, current range conditions across the allotment do not meet the intent of the Recovery Plan, the MSO grazing criteria, the Lincoln National Forest Plan, or the Forest Plan Amendments.

When the forage/range conditions fall below the guidelines, the amount of suitable MSO prey habitat will be reduced. Although we believe that the current proposal has the potential to gradually improve the range/forage conditions within PACs, the current degraded conditions within some PACs, indicate that the range/forage guidelines may not be attained within the remaining years of the permit. These effects are considered adverse, especially since these actions are not consistent with the Recovery Plan (USFWS 1995) 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. We believe that failing to attain the forage/range guidelines will result in reduced MSO prey, and likely temporarily impact MSOs in some PACs during the breeding season. When the forage/range guidelines are not met during the breeding season, harassment of MSOs is likely.

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 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.

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 96-acre 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.

As noted under the proposed action, the current BA indicates that the timing of range betterment projects is not set and depends on funding. These proposed projects included livestock enclosures around environmentally sensitive areas, trick tank and pipeline repair and construction, and corral and livestock trap building and reconstruction. Although these projects are noted in the BA and described in the 2003 BA and FEIS, we have no assurance that they will ever be completed and did not rely on their completion in our effects analysis and conclusion section of this consultation.

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. If reconstruction occurs, it is proposed to be outside the breeding season. 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 enclosure is proposed within the Telephone PAC to limit impacts on the Forest Service sensitive plant, *Lilium philadelphicum*. Construction of this enclosure 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 expected to help in distributing grazing use.

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 are 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 OHVs, are expected to be limited and not likely to result in adverse affects.

Mexican spotted owl critical habitat

Under the current proposed action, we conclude that livestock grazing only has the potential to affect MSO critical habitat when grazing occurs within protected or restricted habitat that contains the PCEs of “adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.” Throughout this biological opinion we refer to this PCE as MSO prey habitat.

Similar to our findings in the final rule designating critical habitat for the MSO, we note that grazing usually does not occur within mixed conifer habitat because livestock generally remain within meadows or riparian areas (69 FR 53182). In fact, on the LNF, protected or restricted habitat, is generally composed of mixed conifer (Service 1995). Thus, the majority of potential effects related to livestock grazing within designated MSO critical habitat will be insignificant and discountable, because high volumes of fallen trees and other woody debris in addition to the other primary constituent elements in forested habitats will not be substantially affected. Additionally, the habitat-based guidelines and definitions of protected and restricted habitat of the MSO Recovery Plan were utilized for our critical habitat designation and the previous consultations; consequently, much of our previous analyses and conclusions are relevant to the current adverse modification analysis. Therefore, our analyses and conclusions detailed below are similar with regards to effects on protected and restricted areas and the PCE MSO prey habitat.

The designation includes primary constituent elements related to canyon habitat, but this habitat type does not occur within the Sacramento Allotment or will be unaffected by livestock grazing activities. Therefore, we do not analyze the effects of livestock grazing activities on primary constituent elements within canyon habitat.

There are all or portions of 46 PACs 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 utilization 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. For these reasons, grazing within these PACs is considered insignificant and discountable with regard to designated MSO critical habitat. The remaining 34 PACs and associated critical habitat, 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). Using information in the BA, we find that critical habitat on the Sacramento Allotment that has the potential to be adversely affected by the proposed action consists of meadow habitat and riparian areas totaling approximately 1,665 ac. Meadows within PACs comprise about 805 out of these 1,665 ac.

Recovery Plan and Forest Plan Amendments

Our analyses and conclusions above apply equally to designated critical habitat. We find that parts of the proposed action are consistent with the grazing guidelines identified in the Recovery Plan and the 1996 Forest Plan Amendments (Forest Plan Amendments) (USFS 1995a), and will thus minimize some, but not all, of the adverse effects to the relevant PCE of designated MSO critical habitat. We anticipate some adverse effects on the PCE relating to adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration. Nevertheless, the function and conservation role of this primary constituent element would not be compromised by the proposed action because, in general, the Forest has included forage and range guidelines to maintain MSO prey habitat. Moreover, we recognize that even if the PCE MSO prey habitat is temporarily affected in some areas, these impacts will be limited to scope (i.e., no more than the meadows within two PACs).

Grazing Criteria

Under the forage/range guidelines of the proposed action, the Forest Service will monitor key areas. During 2005, 2006, 2007, and 2010 forage use on key areas exceeded the forage/range guidelines (USFS 2006, 2007a, 2007d, 2010f). Although this process is designed to ensure compliance with the grazing criteria as they relate to designated MSO prey habitat (the exception will be within livestock traps), we anticipate that some adverse effects to the MSO prey habitat are likely to occur when these guidelines are not met. Nonetheless, we anticipate that the function and conservation role of the PCE MSO prey habitat would not be compromised by the proposed action because adverse effects will be limited in geographic scope (i.e., limited to the Hubble and Bluff Springs PACs) and would not be expected to occur throughout all of the MSO habitat on the allotment.

Forage/range guidelines

We noted in the February 4, 2004 BO that the 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. We continue to believe this information is accurate. These areas are considered critical habitat and include the PCE MSO prey habitat. The best scientific and commercial information consistently indicate that the forage/range guidelines have not been maintained on the Sacramento Allotment. During 2005, 2006, 2007, and 2010 forage use on key areas exceeded the forage/range guidelines (USDA 2006, 2007a, 2007d, 2010f). When forage/range guidelines are exceeded, adverse effects to MSO prey habitat will continue to occur. The Forest Service concluded in the EIS and the BA that past range management is inconsistent with the Forest Plan standards and guidelines (USFS 2003a; 2004c). We agree with this conclusion, and find that the PCE MSO prey habitat is currently being adversely affected in some areas.

We remain concerned about the condition of meadows within the Sacramento Allotment, and the possible effects on the PCE MSO prey habitat. This is especially significant because the Forest Service states in their BA and FEIS, that their proposed action allows adverse effects to MSO prey habitat if forage/range guidelines (e.g., 35 percent utilization) are exceeded during dry periods (USFS 2002, 2004c). We agree with their conclusion.

Information is available for the Hubble and Bluff Springs PACs that indicate forage/range guidelines are below the minimum forage/range guidelines. These data also indicate that MSO critical habitat within these PACs is currently being adversely affected. Consequently, we conclude that the amount of MSO prey habitat is currently reduced. Until the monitoring data indicate that the forage/range guidelines are met throughout the year, we conclude that adverse effects to the PCE MSO prey habitat will occur for the Hubble and Bluff Springs PACs. The PCE MSO prey habitat retains the ability to be functionally established when the forage/range guidelines are met within the Hubble and Bluff Springs PACs. We find that the effects to the function and conservation role of critical habitat relative to the Recovery Unit and the entire designation are not significant because the impacts are temporary and occur in a very small area relative to the Recovery Unit and the overall critical habitat designation. Therefore, we conclude that the PCE MSO prey habitat will serve the intended conservation role for species with implementation of the proposed action.

Interdependent and Interrelated Actions

The Forest Service concludes that MSO prey habitat would not be provided within livestock traps, and that the proposed 70 percent forage utilization would adversely affect designated critical habitat within PACs that are contained within livestock traps. We agree with the conclusion, because the action is inconsistent with the Recovery Plan and the Forest Plan Amendments. For example, 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. Other livestock traps with minor proportions of PAC acreages on the Sacramento Allotment include the Benson, Wills, and Thousand Mile livestock traps. Although 70 percent forage utilization within PACs contained in livestock traps will adversely affect designated critical habitat, we do not expect the effects to appreciably alter the function and conservation role of MSO critical habitat because the surrounding critical habitat will remain intact and provide adequate levels of MSO prey habitat. Additionally, we recognize that the PAC areas within livestock traps are a minor proportion of each of the overall PACs.

The proposed livestock projects on the winter unit are not expected to affect MSO critical habitat because they are outside of protected and restricted habitat. Alternatively, a new 10-acre livestock trap is proposed to be constructed adjacent to the Masterson PAC on the summer unit. 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 or designated critical habitat. We believe that construction activities will increase use and human activity, but these activities are not considered adverse since they are located outside of critical habitat. As noted above, the proposed forage utilization is considered inconsistent with the recommendations in the Recovery Plan and Forest Plan Amendments to maintain good to excellent grazing conditions. Nevertheless, we conclude that the indirect effects to adjacent critical habitat within the Masterson and Telephone PACs will be insignificant and discountable because the PCE MSO prey habitat will not be affected (i.e., grazing within the new trap will not be within the Masterson PAC or designated critical habitat). The Forest Service identified that a 10-acre livestock enclosure is proposed within the Telephone PAC to limit impacts on the Forest Service sensitive plant, *Lilium philadelphicum*. Construction of this enclosure is not expected to adversely impact critical habitat within the Telephone PAC. Similarly, the sunspot pipeline is proposed for reconstruction within the Moore PAC. This project along with other water improvements is expected to distribute grazing use. For these reasons, we do not anticipate adverse effects will occur to critical habitat within the Moore PAC.

Additional activities that concentrate cattle (trailing, gathering, and placement of waters, salt, and nutrient supplements) are proposed to be conducted within critical habitat (i.e., within some PACs). 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 are inconsistent with the Recovery Plan and Forest Plan Amendments. We believe that salt blocks placed within PACs or riparian areas concentrate livestock in the area is not conducive to attaining good to excellent range conditions within the key areas or to restore good conditions to degraded riparian communities as soon as possible. For this reason, we expect that the PCE MSO prey habitat within these PACs will be adversely affected by these activities.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. In past BOs, it has been stated that, "Because of predominant occurrences of the MSO on Federal lands, and because of the role of the respective Federal agencies in administering the habitat of the MSO, actions to be implemented in the future by non-Federal entities on non-Federal lands are considered of minor impact." However, there has been a recent increase of harvest activities on non-Federal lands within the range of the MSO.

Future actions on non-Federal lands adjacent to the Forest within or adjacent to the project area that are reasonably expected to occur include livestock grazing, urban development, road construction, logging, fuelwood gathering, vegetation management (e.g., mowing or herbicide

treatments), fuels management, fire suppression activities, wildland urban interface vegetative treatments, trail construction, and other associated actions. These activities reduce the quality and quantity of MSO nesting, roosting, and foraging habitat, cause disturbance to MSOs and will contribute as cumulative effects to the proposed action.

The major concern in assessing cumulative impacts is the further loss of currently occupied and unoccupied habitat that contributes to a functioning MSO population, including those areas necessary to provide connectivity between populations. We believe that the continuing rate of habitat loss has the potential, to disrupt the population dynamics of this species.

Sacramento Mountains Thistle

Grazing practices in the Sacramento Allotment are sufficiently significant to influence the general status of *Cirsium vinaceum* because this allotment contains the majority of sites and individuals. In 2001, the Sacramento Grazing Allotment contained 74 of 86 occupied *C. vinaceum* sites found on the LNF. As of 2007, 68 of the 75 occupied sites were within the Sacramento Grazing Allotment, with approximately 62 percent of the total number of *C. vinaceum* stems for the species (Barlow-Irick 2007). The proposed action would continue permitting livestock to be present in the summer pastures occupied by the Sacramento Mountains thistle during the entire summer season (USFS 2007a). Sacramento Mountains thistle is frequently grazed upon outside of fenced areas by livestock, with peak use occurring early and late in the grazing season (USFS 2007a). Season-long presence of livestock within both North and South Pastures will increase grazing and trampling impacts to the thistle. The Forest Service concluded that increased exposure to livestock, with forage use and documented thistle herbivory peaking early and late in the summer grazing season (May to October), may not provide the thistle an opportunity to recover (USFS 2007a). We agree with this assessment and anticipate that, within sites that are grazed, thistles will be significantly affected.

Starting around 1990, livestock management practices to control herbivory and trampling and to ensure the suitability and sustainability of thistle habitat have been implemented, such as the construction of 23 enclosure fences covering approximately 290 acres around thistle populations located in the Sacramento Allotment (USFS 2004c). Within the Sacramento Allotment, enclosures protect 23.5 percent of the area of known occupied habitat. Some fenced sites now have Sacramento Mountains thistle extending outside enclosures, indicative of the positive effects of excluding cattle. The existing enclosures are extremely important for the survival and recovery of the species because, when they are functional, they limit livestock grazing and trampling of these sites by precluding access. However, livestock routinely have been sighted in enclosures due to unmaintained fencing and have been documented drifting from their prescribed winter range into the summer pastures before the set entry date (USFS 2003a, 2007a, Barlow-Irick 2008). We believe these impacts are likely to continue, resulting in further effects to the thistle.

The Forest Service has proposed to construct three more grazing enclosures (Telephone Canyon, Wills Canyon, and Water Canyon) with the goals of restricting cattle access to thistles, protecting bank stability, and maintaining vegetative cover, but the construction of these fences is pending based on funding (USFS 2007a). However, we have no assurance that these projects will ever be

completed.

Thistles located in livestock traps are likely to be severely impacted. One occupied site continues to be a location for cattle drives twice each year (USFS 2003b). Traps will also concentrate livestock for short periods of time, with utilization levels up to 70 percent. Impacts to thistles through herbivory and trampling are likely to increase correspondingly.

Damage to travertine crusts can adversely affect surfaces critical to the successful germination and reproduction of thistle and inhibit thistle seed movement and dispersal by flowing water (USFS 2003). During drought, the effects of compaction and trampling in drying travertine thistle sites may be even more severe. This damage causes a loss of normal soil structure and permeability that may inhibit processes necessary for the development and establishment of new plants when water flows return to these sites. Grazing and trampling of thistles can damage seedlings, rosettes, and flowering stalks (USFS 2003b). Broken flowering stalks render affected thistles incapable of reproduction (USFS 2007a).

The extended presence of livestock may adversely affect seedlings and their rate of successful establishment and recruitment (USFS 2007a). Trampling can affect recruitment of new plants in soft-substrate outflow streams to the extent that disturbance and damage reduce seedling establishment. We expect that 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.

Within the summer pastures, the majority of sites providing water for livestock are springs, with many containing thistles. During drought conditions, livestock are likely to concentrate around springs for water or forage, which is frequently in occupied thistle habitat. This fragile habitat would continue to be subjected to trampling and hoof damage. Impacts to flowering mature plants may effectively negate reproduction because a plant bolts and produces flowers only once in its lifetime. Therefore, we anticipate that broken or consumed flowering stems will render individual affected thistles incapable of reproduction. We find that livestock grazing remains an ongoing threat to the thistle, particularly from season-long grazing throughout the summer pastures.

Cumulative Effects

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 regularly impacts plants and habitat on non-National Forest System land between Cloudcroft and High Rolls.

Sacramento Prickly Poppy

Ongoing livestock grazing under the proposed action will cause adverse effects to the poppy (USFWS 1994, 2004b; USFS 2003a). For example, livestock grazing in the Alamo Pasture

overlaps with the germination of poppy seedlings. Germination has been documented to occur nearly year-round (in August, late-fall, winter, and spring). Early “green-up” or growth of vegetation begins in February in the Alamo Pasture. The early growth of grasses and vegetation in riparian areas attracts livestock and increases the use and disturbance in sites that are likely to also support poppy seedlings (USFS 2003b).

Although livestock grazing and trampling in occupied habitats will continue to affect the poppy, the Forest has proposed conservation measures, population enhancement, and validation commitments in the proposed action. These actions were developed by the Forest in coordination with the Service. They include specific targets related to protecting mature plants and microhabitat sites in the upper reaches of the two main canyons within the Alamo Pasture, assessing watershed conditions, and implementing a strategy to re-establish poppy colonies in areas of potential habitat that may be currently unoccupied. They also include guidelines for working with the permittee and with the City of Alamogordo to take actions that are intended to reduce erosion and improve the water holding capacity of soils in poppy habitat, and further reduce the opportunity for incidental trampling of poppy plants. For this reason, we have strongly relied on their completion.

Seedling poppies are particularly vulnerable to trampling while they are in the process of establishing a taproot (USFS 2003b; Tonne 2008). The proposed action is to stock Alamo, Pasture Ridge, and Grapevine Pastures of the winter unit with 200 to 335 cow/calf pairs from November 1st to May 15th, with no more than 50 cow/calf pairs stocked within the Alamo Pasture during the 2011 and 2012 grazing seasons. The Forest has provided no specific instructions on how these animals will be dispersed among the winter pastures from 2013 to 2018. As such, we anticipate the Alamo Pasture will continue to be stocked through 2018, potentially with numbers higher than 50 cow/calf pairs. Although grazing is expected to cause injury or mortality to poppy seedlings, the Forest has proposed to protect mature plants located on NFS lands in the Alamo Pasture, with a goal of protecting 75 percent of the mature plants in upper Alamo Canyon (as described by Tonne in 2007) and Caballero Canyon (Forest Service 2012). They also will construct enclosure fencing and provide microsite protection to prevent damage to mature plants and encourage natural seeding of poppies. Finally, the Forest will coordinate with the Sacramento Allotment permittee to continue ongoing salting and pursue other means that would result in wider distribution of livestock in the Alamo Pasture.

While direct effects from cattle have been and will continue to be moderated by reduction in stocking density from historic levels and enforcement of on-off dates in the Alamo Pasture, adverse effects will continue. This is due to the fact that the potential threats of herbivory and trampling, although greatly reduced, will not be totally eliminated. Additional conservation measures are fully described under the proposed action and are designed to conserve and enhance the status of the Sacramento prickly poppy. These actions include protection of existing mature plants, reintroduction and population enhancement actions with associated targets for population increases, and validation of successful implementation over the next four years. We find these actions will benefit the poppy.

Indirect Effects

Within the Alamo Pasture, canyon-bottom riparian areas attract livestock because of early spring plant growth and proximity to water. The early green-up of forage species increases the use and disturbance of these areas (USFS 2003b). Like the poppy, cattle frequently congregate in these productive canyon bottoms, especially during periods of drought, resulting in a reduction in the amount of herbaceous vegetation that holds the alluvial bottoms and terraces in place. Due to the highly erodible nature of soils in the action area, grazing, combined with the impacts of livestock's hooves, has led to an increase in erosion and channel incision, while decreasing bank stability (Tonne 2008). The Forest Service reported that during drought, repeated cattle grazing of grasses produced during the spring puts a strain on their roots and reduces energy storage ability, which can affect plant community composition, riparian health, soil stability, and water-hold capacity (USFS 2003b).

The Forest Service's 2006 BA reported that grazing in riparian areas has reduced herbaceous cover and caused soil instability, resulting in loss of poppies and its habitat during floods (USFS 2006, 2007a). Consequently, the damaging effects of floods have likely been exacerbated by a reduction in the amount and vegetative composition and cover in riparian zones, particularly within Alamo and Caballero Canyons, where historic and ongoing livestock grazing has reduced many of the grasses and eliminated many forbs. This decrease in plant cover leads to accelerated soil loss, increased exposure of soils to downpour events, reduced capacity of the vegetation to filter sediments, loss of top soil, and decreased ability of the soil to retain moisture (USFWS 1989, 2004b; USFS 2003b, 2004c). While the high-volume floods in recent years may have been destructive in the absence of livestock, continual livestock presence since 1991 has likely increased the vulnerability to these episodic flood events and contributed to their destructive nature (Tonne 2008).

Repeated observations have noted the absence of vegetation or any structures (e.g., gabions) within the Alamo/Caballero canyon system that has resulted in significant loss of soils and poppies from scouring floods (Tonne 2008, USFS 2011d, USFWS 2011). Livingston Associates, P.C. and Shomaker and Associates, (2002) recommended the installation of small dams to reduce flood damage within canyon systems of the Sacramento Mountains and allow water to recharge the aquifer. The Forest Service will consider watershed improvement actions which would stabilize existing headcuts that have the potential to alter the hydrology of the wet meadows in the upper watershed of Alamo Canyon. The Forest will also conduct a proper functioning condition assessment on the perennial and intermittent reaches of the Alamo Canyon Watershed. These actions should reduce indirect effects and benefit the poppy.

Interdependent and Interrelated Actions

City parcels on the Sacramento Allotment are not fenced from Forest Service lands and will continue to be grazed by livestock as interrelated/interdependent actions with the permit issued by the LNF (USFS 2003b). The City tracts in Alamo Canyon (upper and lower), are not covered under the terms and conditions of grazing permit currently held by the permittee because there is no private land permit associated with those tracts. The land is not considered by the Forest Service to contribute to the grazing capacity of the Allotment, nor is it covered under their monitoring and forage use guidelines (USFS 2008b). Nevertheless, the Forest Service will initiate coordination meetings with the City of Alamogordo and Sacramento Allotment permittee

to protect mature poppies located on City lands in the Alamo Pasture. Therefore, direct and indirect impacts to the poppy will likely be minimized under the proposed action.

When the Forest Service proposed the repair of trick tanks in the Mule Pasture as part of the selected alternative in the 2004 ROD, it was believed that use of this pasture would relieve grazing pressure in the Alamo and Caballero Canyons. In our discussions with the Forest Service since 2007, both of our agencies were overly optimistic in not only the completion schedule of the water repairs, but also in their possibility of providing an alternative pasture in order to rest or reduce the grazing intensity within the Alamo Pasture. This belief was largely based on the incorrect assumption that the repairs would provide permanent sources of water. We now understand that the Forest Service is relying on precipitation to fill these tanks, which is unreliable and sporadic, in light of the continuing drought. Likewise, the Forest has identified that the initial strategy for the Mule Pasture will be to shift use from Pasture Ridge and Grapevine Pastures (which are not occupied by the poppy) (USFS 2010c). Livestock would continue to graze the Alamo Pasture under this strategy, which would not provide any conservation benefit to the poppy.

Cumulative Effects

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 clearing and maintenance adjacent to Highway 82 and on roads where plants occur (e.g., Alamo Canyon pipeline).

Conclusion

Mexican spotted owl

This biological opinion does not rely on the regulatory definition of “destruction or adverse modification” of critical habitat in 50 CFR 402.02 because of various court cases surrounding the FWS’s jeopardy and adverse modification analyses. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat. Critical habitat is defined in section 3 of the Act “as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.” We have also relied upon the Consultation Handbook which provides guidance on determining adverse modification of critical habitat and jeopardy pursuant to the following: “Adverse effects on individuals of a species or constituent elements or segments of critical habitat generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species’ range, or appreciably diminish the capability of the critical habitat to satisfy essential requirements of the species” (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998:4-34).

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 nor is it likely to destroy or adversely modify designated critical habitat within the Basin and Range East RU or rangewide. We also do not expect the effects of the proposed action to appreciably alter the function and intended conservation role of MSO critical habitat, nor is it expected to impede the survival or recovery of Mexican spotted owls. We make these findings for the following reasons:

1. We found that some aspects of the proposed action have the potential to cause adverse effects to areas within 6 PACs (Radio Tower, Wilmeth, Bluff Springs, Dark, Lightning, Hubble) of the Sacramento Allotment that contain greater than 50 ac of meadow habitat. Nevertheless, it is anticipated that these impacts will be short-term and will not affect the role of critical habitat unit BR-E-1b relative to the conservation of the MSO and to the overall critical habitat designation.
2. The PCE that will be affected by the proposed action is MSO prey habitat. Even with adverse effects occurring to this PCE in some areas of the allotment, we conclude that the surrounding PCEs of critical habitat will remain intact and, and essentially be unaffected (i.e., the effects will be insignificant and discountable) by livestock grazing.
3. When adhered to, the proposed forage/range guidelines and monitoring and enforcement should allow the overall range conditions to gradually improve within PACs on the summer pastures within the allotment. Still, we found that the current degraded conditions within some PACs indicate that the range/forage guidelines may not be attained in the short-term.
4. The primary effect to MSO will be loss of prey cover in some years. As noted above, only 6 of 46 PACs have greater than 50 acres of meadow habitat. We anticipate that only 2 of 6 PACs will not have prey cover within meadows in a given year, which represents less than 1 percent of the 196 PACs identified in the Basin and Range East RU and less than .01 percent of the 1,025 PACs located within the Forest Service lands of Arizona and New Mexico. This is a relatively small percentage of the total number of PACs.

Sacramento Mountains thistle

The proposed 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 because 38 of the 75 occupied population sites have been fenced to exclude livestock and two localities are considered to be inaccessible due to very steep slopes or cliffs. Even though the proposed action will result in annual significant adverse effects to the species, protection provided by the enclosures has

resulted in high survival of thistle populations and the ability to recover in areas, even expanding populations outside fences. The maintenance of these existing exclosures is extremely important and will continue to protect occurrences of the thistle from livestock impacts.

Sacramento 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 Forest Service adjusted their proposed action and committed to initiating a series of protective and recovery actions designed to reduce threats and improve the status of the poppy.
2. The conservation measures include specific actions to: a) protect mature poppies and improve watershed conditions; b) stabilize and increase population numbers; and c) validate, through the use of check points, that the conservation measures are implemented and effective.
3. Although some of the conservation measures relating to protection of mature poppies and improving watershed conditions include coordinating activities, our expectation is that the Forest Service will provide a written report to us that these measures have been completed by their check point date of October 2012, and by every October in subsequent years.
4. We believe the Forest Service has provided certainty of implementation because they have established milestones, called check points, for all of the conservation measures. We recognize that their previous lack of implementation of conservation measures from the 2005 LRMP BO and have specifically included a light reinitiation trigger to address this issue in this current consultation.
5. We also do not have certainty that the conservation measures will be effective for improving the biological status of the poppy. To address this lack of certainty, we have also specifically included a light reinitiation trigger to ensure that the status of the poppy does not further decline.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit take of endangered and threatened species without special exemption. Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm means an act that actually kills or injures listed species. Such acts may include significant habitat modification or degradation that result in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Harass means an intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior that includes, but is not limited to, breeding, feeding or sheltering. Incidental take is incidental to, and not the purpose of, carrying out an otherwise lawful activity. In section 7(b)(4)(iv) and section 7(o)(2) of the Act, incidental take not intended as part of agency action is not considered prohibited taking if such taking meets the terms and conditions of an Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of federally listed 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.

Mexican spotted owl

Amount or extent of take

Our policy states that incidental take can only be supported if an activity compromises the integrity of an MSO PAC (USFWS 1996). The Service anticipates that the proposed action will result in incidental take of MSOs in the form of harassment due to potential for significant habitat alterations of MSO prey habitat.

To the extent that this statement concludes that take of MSO, a migratory bird will result from the agency action for which consultation is being made, the Service will not refer the incidental take of any such migratory bird for prosecution under the MBTA of 1918, as amended (16 U.S.C. §§ 703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

For the purpose of evaluating incidental take of Mexican spotted owls from the action under consultation, incidental take can be anticipated as the alteration of habitat that affects behavior (e.g., breeding or foraging) of birds only temporarily, or to such a degree that the birds are considered lost as viable members of the population and thus “taken.” Birds experiencing only temporary or short-term effects may fail to breed, fail to successfully rear young, or raise less fit young; longer-term disturbance may result in owls deserting the area because of chronic disturbance or because habitat no longer meets the owl’s needs.

We anticipate that the proposed action is reasonably certain to result in incidental take of Mexican spotted owls. However, it is difficult to quantify the number of individual owls taken because: (1) dead or impaired individuals are difficult to find and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is secretive and we rarely have information regarding the number of owls occupying a PAC and/or their reproductive status. For these reasons, we will attribute incidental take at the PAC level. This fits well with our current section 7 consultation policy which provides for incidental take if an activity compromises the integrity of an occupied PAC to an extent that we are reasonably

certain that incidental take occurred (USFWS Memorandum, February 3, 1997). Actions outside PACs will generally not result in incidental take because we are not reasonably certain the owls are nesting and roosting in areas outside of PACs. We may modify this determination in cases when areas that may support owls have not been adequately surveyed and we are reasonably certain owls may be present.

For this proposed project, take of MSOs may be in the form of harassment within affected PACs. The level of incidental take can be anticipated when forage utilization results in MSO prey cover less than 4 inches. 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:

We believe that some PACs currently have reduced prey cover from not meeting the forage utilization guideline during the MSO breeding season. 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 every year. Consequently, good to excellent range conditions are not likely to be attained in 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. We identified 6 PACs within the Sacramento Allotment that contain greater than 50 ac of meadow habitat (Radio Tower, Wilmeth, Bluff Springs, Dark, Lightning, and Hubble). We anticipate that incidental take is reasonably certain to occur within two of these PACs in a given year. As such, two pairs of MSOs and their associated young are anticipated to be harassed by the proposed action.

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 reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

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 FEIS 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 AOIs 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, 2-22-00-I-397, or forthcoming EIS).

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

2.1 The new AMP for the 2009 permit will be submitted to the New Mexico Ecological Services Field Office within 3 months from the date this consultation.

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 all of 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, or any amendments to the AOI.

2.4 Consistent with the LNF 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 and will follow the reporting schedule above.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not represent complete fulfillment of the agency's section 7(a)(1) responsibility for this species. We recommend the following conservation recommendations be implemented:

Mexican spotted owl

1. 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 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 insect predators to determine whether the threat is increasing.
3. The Forest should continue extensive monitoring of thistle occurrences.
4. We strongly encourage the continued protection of thistles through construction and maintenance of exclosures.

Sacramento prickly poppy

1. The Forest should implement the agency-specific actions identified in the Sacramento prickly poppy spotlight species action plan (Service 2009).

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 dead, injured, or sick individual endangered or threatened species, initial notification must be made to the nearest Service Law Enforcement Office. In New Mexico, contact the Law Enforcement Office (505-346-7828) or the New Mexico Ecological Services Field Office (505-346-2525). Written notification must be made within 5 calendar days and include date, time, and location, 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, remains of intact specimens of listed species will be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, information noted above will be obtained and the carcass left in place.

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

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the Sacramento Allotment. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the

proposed action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take shall cease pending reinitiation.

We are also including reinitiation triggers related specifically to the Sacramento prickly poppy to ensure that its status declines no further in Alamo Pasture. Reinitiation of formal consultation is required if any of the following occur: 1) the relative abundance of poppies in Alamo/Caballero Canyons drops below 300 mature poppies at any time; 2) the conservation measures are not fully implemented by the timeframes identified in the Forest Service's "check points", including the written report delivered to us not later than October 2012 and by every October in subsequent years; 3) the "validation" actions are not fully implemented within their respective timeframes; or 4) the relative abundance of poppies in Alamo/Caballero Canyons does not reach 400 mature poppies by 2016. If any of these instances occur, grazing operations shall cease in Alamo/Caballero Canyons, pending reinitiation of formal consultation.

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 me at (505) 761-4781.

Sincerely,

A handwritten signature in black ink, appearing to read "Wally J. Murphy". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Wally "J" Murphy
Field Supervisor

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Table 3. Sacramento Prickly Poppy survey data 1984 to 2011.

Canyon	Year																						
	1984	1987	1988	1989	1991	1993	1994	1996	1997	1999	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2011	
Alamo (Caballero)		828 [744 Forest Service lands; 84 City lands] (117) ^B	778 [Forest Service lands only] ^G	730 [Forest Service lands only] ^G						354 ad, 48 sd incomplete count ^{I,J}	190 Incomplete count ^K		411 ad, 50 sd (90 ad, 4 sd) ^L	345 ad, 388 sd (80 ad, 6 sd) ^{M,N} ; 244 ad 127 sd [Forest Service lands only] ^X	330 ad, 816 sd (57 ad) ^N	438 ad, 178 sd (50 ad, 57 sd) ^{O,N}		259 ad, 3 sd ^U 431 sd reported elsewhere ^N (40 ad, 55 sd) ^N	344 ad, 89 sd (33 ad, 7 sd) ^V	303 ad, 78 sd (46 ad, 38 sd) ^S	197 ad, 6 sd [Forest Service], 35 ad, 4 sd [City]; (35 ad, 2 sd) ^{A1}	222 ad, 113 sd [Forest Service; Alamo only], 59 ad, 4 sd [City](Caballero not surveyed) ^{B1}	
Alamo Canyon [BLM lands]				6 ^{ZZ}															17 ^{ZZ}				
Dog		159 ^B										1 ^K		32 ^M		14 ad, 150 sd ^O ;	17 ^O						
Dog Bajada																34 ^{P,ZZ}	37 ^O		12 ^{ZZ}				
Dry		11 ^B					1ad, 3 sd ^H							0 ^M		0 ^O							
Escondido				45 ^E													0 ^O						
Fresnal		135 ^B		13 ^E	68 ^W								62 ^{K,N}				600, 69Q	63 ad, 14 sd ^O , T		124 ad, 51 sd ^S		86 ad, 26 sd ^{B1}	
La Luz		33 ^B																					
Marble	12ad ^{A1}																						
Mule			7 ^C	1 ^D										0 ^M							13 ^R		
Salado		4 ^B												0 ^M							Occ ^Z		
San Andres		3 ^B	16 ^C	13 ^D	15-30 ^{ZZ}	15-30 ^F ; 16 ^{ZZ}	2[Forest Service] ^H					2 ^K		2 ^M									
San Andres Bajada							17[BLM] ^{ZZ}	5 ^{ZZ}	10 ^{ZZ}								2 ^{O,ZZ}	52 ^{O,ZZ}	7 ^{ZZ}	23 ^{ZZ}			

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summary.