



New Mexico Meadow Jumping Mouse Habitat Improvement Projects on the Sacramento Grazing Allotment Draft Environmental Assessment



Forest Service

**Lincoln
National
Forest**

**Sacramento
Ranger District**

June 2018

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Contents

Contents	3
Chapter 1 – Purpose and Need	5
1.1 Introduction and Background	5
1.2 Purpose and Need	6
Figure 1. Sacramento Grazing Allotment with pastures and NMMJM critical habitat displayed.	7
1.3 Proposed Action	8
1.4 Public Involvement	8
1.5 Issues	8
Issues Dismissed from Further Analysis	9
Chapter 2 – Alternatives.....	10
2.1 Alternatives Considered and Eliminated from Detailed Study	10
2.2 Alternatives Considered in Detail.....	10
2.2.1 Alternative 1—No Action.....	10
2.2.2 Alternative 2— Proposed Action	10
2.2.3 Forest Plan Consistency.....	18
2.3.1 Project Design Features.....	21
2.3.2 Monitoring Requirements	23
Chapter 3 –Environmental Consequences	25
3.1 Introduction	25
3.2 Range, Vegetation and Invasive Species	25
Affected Environment:.....	25
Effects of Alternative 1 (No Action):.....	30
Effects of Alternative 2 (Proposed Action):	30
3.3 Heritage Resources.....	31
Affected Environment:.....	31
Effects of Alternative 1 (No Action):.....	32
Effects of Alternative 2 (Proposed Action):	32
3.4 Threatened and Endangered Species	32
Affected Environment:.....	32
Effects of Alternative 1 (No Action):	35
Effects of Alternative 2 (Proposed Action):.....	35
3.5 Forest Service Region 3 Sensitive Species	40
Affected Environment:.....	40
Effects of Alternative 1 (No Action):	44
Effects of Alternative 2 (Proposed Action):.....	44
3.6 Management Indicator Species	48
Affected Environment:	48
Effects of Alternative 1 (No Action):.....	53
Effects of Alternative 2 (Proposed Action):.....	53
3.7 Migratory Birds.....	55
Affected Environment:.....	55

Effects of Alternative 1 (No Action):.....	56
Effects of Alternative 2 (Proposed Action):.....	56
3.8 Soils.....	57
Affected Environment:.....	57
Effects of Alternative 1 (No Action):.....	59
Effects of Alternative 2 (Proposed Action):.....	59
3.9 Hydrology, Watersheds, and Riparian Habitat.....	60
Affected Environment:.....	60
Effects of Alternative 1 (No Action):.....	64
Effects of Alternative 2 (Proposed Action):.....	65
3.10 Cumulative Effects.....	67
Past, Present and Reasonably Foreseeable Future Actions.....	67
Cumulative Environmental Consequences.....	69
Chapter 4 – Consultation and Coordination.....	76
Chapter 5 – Literature Cited.....	78
Appendix A- Comments received during scoping.....	84
Appendix B- Federally Listed Species on the Lincoln National Forest.....	118
Appendix C- 2013 Regional Forester Sensitive Species list for the Lincoln National Forest.....	120

Chapter 1 – Purpose and Need

1.1 Introduction and Background

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA discloses direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. This EA analyzes the effects of the New Mexico Meadow jumping mouse (NMMJM) habitat improvement projects on the Sacramento Grazing Allotment within the Sacramento Ranger District of the Lincoln National Forest.

The U.S. Fish and Wildlife Service (USFWS) listed the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) as an endangered species pursuant to the Endangered Species Act in June, 2014. The critical habitat for the NMMJM was designated in March, 2016. Critical habitat is defined as geographic areas that contain physical and biological features essential to the conservation of the species. The species was listed due to habitat loss and lack of protective regulations ([Federal Register 2014](#)). Specific threats to the NMMJM habitat that were identified include “grazing pressure from livestock, water use and management, global climate change and drought, severe wildland fire, floods, highway reconstruction, residential and commercial development, coalbed methane development, unregulated recreation, and the reduction in the distribution and abundance of beaver” ([USDI FWS 2014](#)). These factors contribute to habitat loss by either destroying habitat, fragmenting habitat or degrading habitat by reducing the amount of available forage and cover available to the NMMJM necessary for survival. The current status of the NMMJM shows it has a high risk of extinction without active conservation ([USDI FWS 2014](#)).

After the listing of the NMMJM in 2014, temporary electric fencing and closures were put in place for the proposed occupied habitat on the Lincoln National Forest during the livestock grazing season (May-October) to protect the habitat from impacts from livestock grazing. Occupied habitat is defined as geographic areas that were occupied by the species at the time of listing that contain physical and biological features essential to the conservation of the species. After the designation of the critical habitat in 2016, additional acres were fenced and closed with temporary electric fencing to protect portions of the critical habitat, as well as continuing to protect occupied habitat during the livestock grazing season. The fencing was put in place to protect habitat while still allowing for livestock grazing in the affected pastures. Without fencing, the utilization level in the NMMJM habitat would need to be kept at a light level (~20%) or the livestock would need to be removed from the entire pasture. That level would likely be exceeded prior to the end of the grazing season forcing the permittee to remove cattle from the pasture early, which would not be favorable to the grazing permit holder. Fencing is a way to compromise between maintaining livestock grazing and protecting the NMMJM habitat. Handling facilities were included as part of the 2016 grazing season proposal to reduce the pressure on existing handling facilities located within NMMJM critical habitat in Wills and Rio Peñasco drainages in the Sacramento Grazing Allotment. A large handling facility was built in the Atkinson Field area, and another was reconstructed in the Wright Spring area. This analysis is necessary to look at long term habitat improvement projects that would continue to provide protection for the NMMJM habitat beyond the measures that have been in place since 2014.

The NMMJM is active only during the summer months when food is most available. On the Lincoln National Forest, the NMMJM is active from approximately June to September and hibernates for 9 months from September/October to May/June. Due to the long hibernation, the NMMJM must gain

sufficient fat reserves to survive over the winter. The NMMJM feeds primarily on grass and forb seeds. The females nest in uplands to raise young, while depending on riparian areas to provide a sufficient food source. The NMMJM requires dense riparian herbaceous vegetation associated with streams and wetlands along with adjacent uplands that can support the vegetation characteristics needed for cover, foraging, breeding, and hibernating ([USDI FWS 2014](#)).

The Lincoln National Forest intends to protect designated NMMJM habitat within the Sacramento Allotment to improve the habitat; and therefore, the viability of the species. These actions include a combination of administrative actions and infrastructure developments. Administrative actions would be handled through Annual Operating Instructions for the Sacramento Allotment, which are developed in coordination with the grazing permit holder and outline the grazing management for each year. This EA will analyze the effects of the infrastructure developments on the Sacramento Grazing Allotment to aid in the protection of NMMJM and its designated critical habitat. The project area is located within the Sacramento Grazing Allotment (Figure 1) in Otero County, New Mexico.

The Sacramento Grazing Allotment is located within:

- Township 16 South, Range 10, 11, and 12 East
- Township 17 South, Range 10, 11, and 12 East
- Township 18 South, Range 10, 11, and 12 East
- Township 19 South, Range 10, 11, and 12 East

The Sacramento Grazing Allotment contains designated critical habitat in the Rio Peñasco and Wills Canyon drainages and designated occupied critical habitat in Wills Canyon within the summer grazing range (Figure 1). The Sacramento Grazing Allotment is 111,484 acres and includes a wide variety of terrain and elevations (4,500 feet to 9,500 feet above mean sea level). The allotment is divided into eight pastures including summer range (North, South, Atkinson and Nelson Pastures) and winter range (Mule, Alamo, Pasture Ridge and Grapevine Pastures and the Dry Canyon Allotment). The winter range on the west side of the allotment consists of desert scrub on the low elevations, and Piñon-juniper with some ponderosa pine on the higher slopes; the higher elevation summer range on the eastern portion of the allotment is primarily mixed conifer forest with narrow grassy meadows. The winter range is grazed by livestock from November-April and the summer range is grazed by livestock from May-October.

1.2 Purpose and Need

The purpose of this proposal is to protect and improve the NMMJM critical habitat within the Sacramento Grazing Allotment by reducing impacts such as grazing and recreation, which decrease the cover and food essential for the continued survival of the NMMJM, while continuing to allow for livestock grazing and recreational activities. There is a need to address the federal listing of the NMMJM as an endangered species, to improve riparian habitat and to be in conformance with the Lincoln National Forest Land and Resource Management Plan (Forest Plan). Standards and Guidelines in the Forest Plan for Federal and State Threatened and Endangered (T&E) Species and riparian habitats include: Protect and manage essential and critical habitats of threatened, endangered, and sensitive species through ensuring that legal and biological requirements of designated plant and animal species are met; Identify, protect and enhance existing and potential habitat of all T&E and sensitive species; prohibit activities likely to cause disturbance, including public use, in the vicinity of any essential habitat for T&E species; Provide for the improvement of habitat for threatened and endangered species to meet the goals and intent of the Endangered Species Act of 1973; and Manage riparian areas to provide optimum vegetation and ecological diversity ([USDA FS 1986](#)).

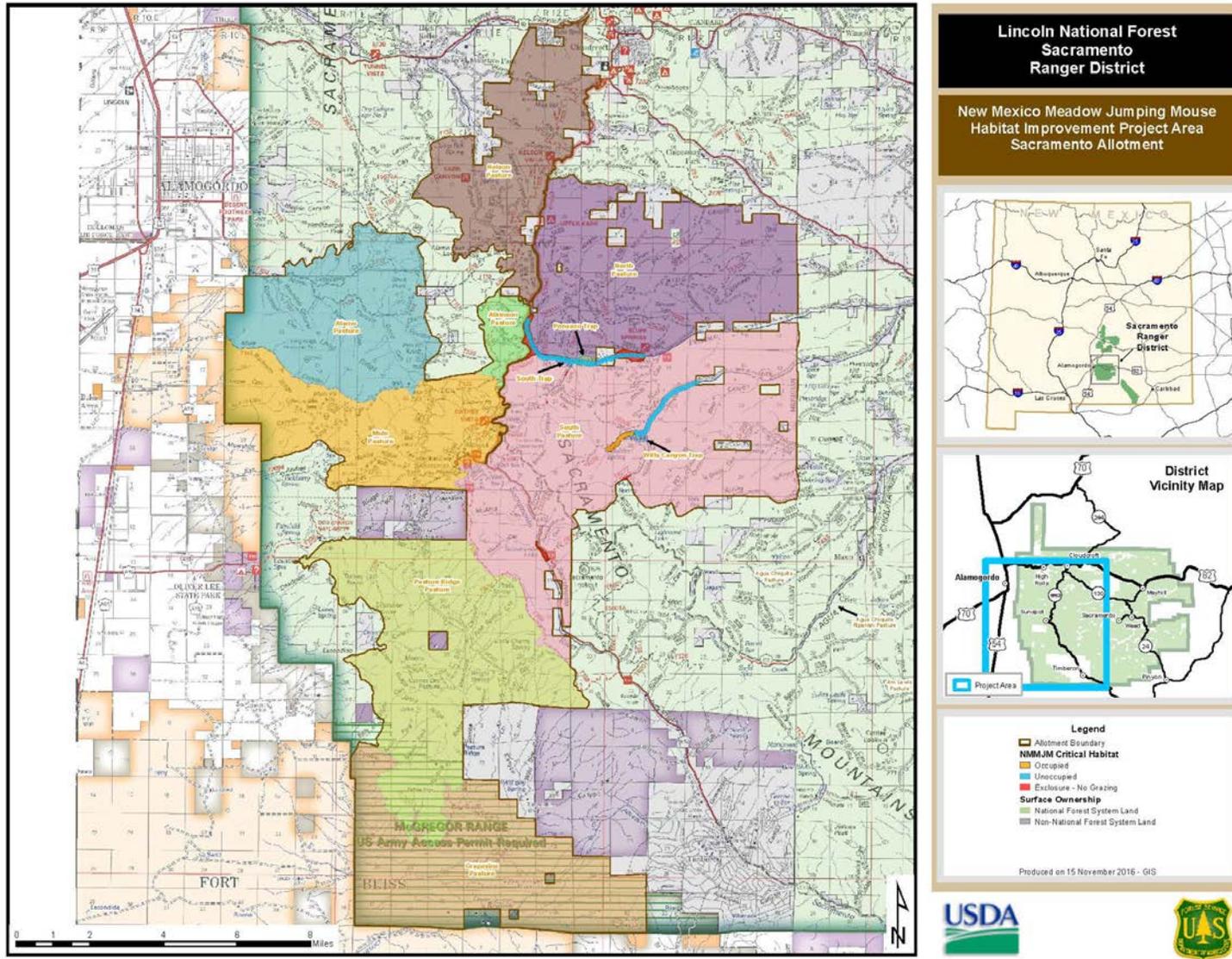


Figure 1. Sacramento Grazing Allotment with pastures and NMMJM critical habitat displayed.

1.3 Proposed Action

This section briefly summarizes the proposed action, which is described in detail in Chapter 2.

The Lincoln National Forest is proposing to replace temporary enclosure fencing that was completed for the 2016, 2017 and 2018 grazing seasons with permanent enclosure fencing with modifications, construct additional livestock handling facilities, and to develop additional water for livestock and wildlife within the Sacramento Grazing Allotment to reduce impacts on critical habitat for the NMMJM and improve riparian habitat. A closure order for enclosures fenced with electric fencing would be included as part of the proposal to protect human health and safety, by reducing the risk of electric shock to forest users. The closure order would be lifted when the electric fence is replaced by permanent fence.

1.4 Public Involvement

The Sacramento Ranger District involved interested parties throughout the project planning process. The project was first listed in the Lincoln National Forest Schedule of Proposed Actions on February 28, 2017. Public scoping for the proposed project included a designated 30-day comment period. The Lincoln National Forest published a legal notice in the *Alamogordo Daily News* on March 5, 2017, and issued a press release that was released on February 28, 2017, to request public comments on the project. A scoping letter was issued on February 28, 2017. The letter was mailed or emailed to Forest Stakeholder contacts, including local, state, and federal government agencies; elected officials; tribal councils and offices; the grazing permit holder; non-government organizations; interested individuals; and media contacts. Native American tribes and pueblos contacted about the project included the Hopi, Mescalero-Apache, Zuni, Fort Sill Apache, Ysleta Del Sur, Isleta, Kiowa, White Mountain Apache, Yavapai-Apache, Tonto Apache, San Carlos Apache, Salt River Pima-Maricopa, Gila River, and Comanche. More information about the scoping process is available in the project record and available upon request.

Multiple meetings were held with the grazing permit holder on the Sacramento Grazing Allotment since the listing of the NMMJM. The permit holder was able to inform the Forest Service how the temporary fences were working over the 2016 and 2017 grazing season, and what changes they requested to make them less problematic for their management. The suggestions and modifications that allowed for adequate protection of the NMMJM helped guide the current proposal for long-term fencing. The grazing permit holder gave the Forest Service a proposal of desired projects including handling facilities and additional waters, which they felt would help their operation improve management. The projects proposed by the grazing permit holder were included and considered in this analysis.

1.5 Issues

Issues are concerns about the potential effects of the proposed action to the environment. The interdisciplinary team used internal and external comments about the project to identify any potential issues. No key issues that would require the development of additional action alternatives were identified. This analysis addressed general concerns for resource impacts that could occur from implementing the project. Specific comments received during public scoping and how they were addressed are summarized in Appendix A. Internal and external issues brought up are as follows:

- **NMMJM:** Is the fencing proposal sufficient to adequately protect the species? Will there be impacts to the NMMJM from constructing fences? How will the upland habitat be protected?

- **Mexican spotted owl:** How will the proposed infrastructure affect the Mexican spotted owl? How will the prey base be affected by the proposed traps and corrals?
- **Grazing/Range:** How will the grazing permit holder be impacted by the fencing? Will the cattle be more stressed from the fencing and walking further to water? Will cattle have sufficient access to water? How will the projects affect grazing distribution and management?
- **Recreation:** Popular dispersed camping sites impact habitat by reducing vegetation where vehicles park. Will there be a loss to recreation?
- **Sacramento Mountains thistle/sensitive plants:** Will there be impacts to the thistle from the riparian fencing? How will sensitive plants be protected?
- **Water Quality/Quantity:** How will water quality be impacted by the water lanes and fencing? Will water be reduced downstream by having more riparian vegetation?
- **Monitoring:** Will monitoring take place to ensure the fencing is protecting/improving the habitat?
- **Elk:** How do elk affect the NMMJM habitat? How will the proposed infrastructure affect Elk?

Issues Dismissed from Further Analysis

The issues associated with recreation were dismissed from further analysis because there are no popular dispersed camping sites affected by the fencing proposal. Popular dispersed camping sites exist east of the proposed fenced areas further downstream Rio Peñasco and would not be impacted by this proposal and are outside of critical habitat for the NMMJM. Bluff Springs is a popular recreation site further east of the proposed fencing on the Rio Peñasco and does include critical habitat for the NMMJM; improvements to that site would be included in a separate analysis. The proposed fencing would keep vehicles from parking in areas that are protected for NMMJM habitat needs. There would not be a loss to recreation from this proposal as dispersed camping sites are numerous in the area and no authorized roads or trails would be closed.

Chapter 2 – Alternatives

2.1 Alternatives Considered and Eliminated from Detailed Study

No key issues that would require the development of additional action alternatives were identified.

2.2 Alternatives Considered in Detail

Two alternatives were considered in detail for this project:

- Alternative 1 – No Action; and
- Alternative 2 – Proposed Action

Alternative 2 was designed to meet the project purpose and need specified in Chapter 1 of this EA and the management directions from the Forest Plan ([USDA FS 1986](#)). The most relevant Forest Plan direction for this project is outlined in Section 2.2.3.

2.2.1 Alternative 1—No Action

The no action would result in no changes to the current management; no fences, handling facilities, or water developments would be constructed and a temporary closure order would not be issued.

2.2.2 Alternative 2— Proposed Action

2.2.2.1 Proposed Activities

The proposed action includes construction and maintenance of enclosure fencing, handling facilities, and water developments, and issuing a temporary closure order.

Enclosure Fencing

The enclosure fencing on the Sacramento Allotment would be constructed along portions of NMMJM critical habitat within Wills Canyon (Figure 2) and the Rio Peñasco drainage including an area bordering critical habitat in Water Canyon where it flows into the Rio Peñasco (Figure 3). The fencing within Wills Canyon would be within an existing livestock trap along with areas outside of the trap. Approximately 4.5 miles of fencing would be constructed within Wills Canyon and would be located within T. 17 S, R 12 E Sections 20-22, 28, 29. The fencing in Rio Peñasco would all be within an existing livestock trap. The enclosure fencing in the Rio Peñasco Trap would be constructed if annual and seasonal monitoring of impacts from livestock grazing indicated that livestock management described in the annual operating instructions was not sufficient for meeting the habitat requirements for the NMMJM. The annual operating instructions would allow for limited (up to 14 days) use during the spring and fall for gathering and/or shipping livestock and would aim to avoid livestock use during the active season of the NMMJM except for occasional incidental use as a hospital pasture for a few animals. If the livestock use outlined in the annual operating instructions is not effective and is the direct cause for further NMMJM habitat decline then approximately 3 miles of permanent fencing would be constructed within Rio Peñasco Trap and would be located within Township (T) 17 South (S), Range (R) 11 East (E) Section 13; and T 17 S, R 12 E Section 18. The fencing would follow the footprint of the temporary electric fencing (Figure 3). Not all critical habitat would be fenced, the fencing would focus on areas known to be occupied by the NMMJM and areas that were previously fenced with temporary fencing that would improve habitat connectivity. Approximately 100 acres would be fenced; 60 acres in Wills Canyon and 40 acres in Rio Peñasco. The 100 acre fenced area is less than 1% (0.09%) of the 111,484 acre Sacramento Grazing Allotment. The linear

amount of fence would be approximately 7.5 miles (including both sides of the enclosures). The fencing would allow livestock access to water or to neighboring pastures through the use of strategically placed water/access lanes where the livestock could cross the stream channel, some large areas of critical habitat outside of the livestock trap would remain open in Wills Canyon. Water lanes would be reinforced with rock or other materials where necessary to reduce erosion and would be located in areas that are naturally resistant to erosion when possible. The enclosure fencing would be a combination of 4 strand barbed wire fencing, pipe fencing and eight-foot tall elk fencing. Areas fenced with barbed wire may be upgraded to pipe fencing over time as funding becomes available. The enclosure fencing would exclude the riparian area along with small portions of upland habitat from livestock grazing; areas with elk fencing would exclude both livestock and elk. The amount of upland habitat included in the enclosure fences varied by location due to topographical constraints, roads, and to allow continued livestock passage and distribution. Electric fencing would be used temporarily until permanent fencing could be built. The enclosure fencing would include gates to remove livestock in the event of accidental entry. The enclosure fence could be modified if necessary to reduce impacts and/or conflict with livestock or wildlife if the same level of protection could be maintained or increased for NMMJM critical habitat. The permanent enclosure fencing would also prevent vehicle entry into the excluded areas reducing impacts from dispersed recreation to the riparian habitat. The enclosure fencing would not close any authorized roads or trails.

The fencing would be constructed by Forest Service personnel or by hired contractors. Trees may be removed within 12 feet on either side of the fence line where necessary for access and to reduce hazards during construction. The fences would be built using wheeled or tracked vehicles, mechanized and non-mechanized equipment and ground labor. The fencing would be built in accordance to any necessary restrictions and design features outlined in Section 2.3 to protect sensitive resources.

Livestock Facilities and Waters

The following proposed projects were included in the list provided by the grazing permit holder to aid in livestock management. The projects would include corrals, traps, storages, troughs, pipelines and water developments. The projects would be built using wheeled and/or tracked equipment, mechanized and non-mechanized equipment and ground labor. All the projects are located within the Sacramento Grazing Allotment except for one in the Dry Canyon Grazing Allotment which is run as a winter pasture in conjunction with the Sacramento Allotment.

Troughs and storages would be located within and/or next to all traps and/or corrals to provide water for livestock unless only used for short time periods or not desired by the permit holder. Preferred methods to provide water for corrals and traps would be connecting to existing water pipelines, or developing new water sources such as spring developments, diverting water from an existing livestock water source, or constructing trick tanks to avoid livestock concentration in riparian areas. A trick tank would include an apron to catch water that pipes into a storage and trough. Pipelines would be placed to provide water to storages and troughs from existing or newly developed water sources. The pipeline would be laid in a path that would cause the least resource damage from installation and maintenance. The pipeline would be placed below ground whenever feasible (18 to 24 inches deep). If no other water source was available other than directly from a stream, and a diversion was not possible; water lanes would be added to traps to provide water for livestock. The water lanes would be strategically placed to minimize damage to riparian areas and would be reinforced with rock or other materials to reduce erosion when necessary. Any necessary water rights would be verified or obtained through the New Mexico Office of the State Engineer.

Existing corrals that could be relocated to a more practical location, or a location that would cause less resource damage, would be reconstructed in an improved location whenever possible, and the old corral would be removed. Existing corrals that are reconstructed could be modified to improve their functionality. Existing corrals that have historic value would not be rebuilt or removed, and the location of the new corral would be relocated near the original location when possible if reconstruction would adversely affect the historic value. Corrals would be constructed of pipe fencing and/or barbed wire fencing and would be up to 300 feet wide by 300 feet long, but on average smaller. New traps would be constructed of 4 strand barbed wire fencing unless specified as otherwise and would be up to 100 acres in size, but on average smaller.

The handling facilities and water developments would be constructed by Forest Service personnel or by hired contractors. Water pipelines would be placed below ground whenever possible to reduce maintenance disturbances and increase the longevity of the pipeline. Pipelines would be laid using two passes with a wheeled or tracked vehicle disturbing an approximately 12-18 inch wide area to lay the pipeline underground. Hand trenchers or shovels may be used to install pipelines in sensitive locations or in areas that are not accessible by vehicle. Pipeline installed above ground would be installed in the same method without any trenching. Areas where troughs and storages are placed would be bladed flat using a wheeled or tracked vehicle. The trough location would disturb an area of approximately 14 feet by 6 feet; storage locations would disturb an area of approximately 20 feet by 20 feet. Areas where an apron would be placed for a trick tank would be bladed and cleared if necessary to create an appropriate catchment. Aprons for trick tanks would be up to approximately 100 feet wide by 100 feet long. Aprons may be fenced directly around the apron to keep livestock and wildlife from damaging the material. All new waters would be accessible by both livestock and wildlife whenever feasible. Trees and shrubs would be removed within the pathway/footprint of a handling facility, or to reduce hazards during construction. Timber may be sold if it is economically viable and feasible. The handling facilities and water developments would be built in accordance to any necessary restrictions and design features outlined in Section 2.3 to protect sensitive resources and minimize impacts. Participation from the grazing permit holder would be requested and encouraged on all projects. The grazing permit holder's preference for water development and handling facility final placement, design, and order for construction would be taken into consideration and followed as closely as possible.

The proposed projects are listed below and the numbers listed for each project correspond to locations shown on the map in Figure 4. The project locations described below and shown in Figure 4 are approximate, and would meet all the design features and mitigation measures outlined in Section 2.3 prior to final placement and construction. Pipelines and water development locations are not shown on the map and the final locations would be determined based on the facility placement and nearest water source; all required design features would be met when finalizing the locations of facilities, pipelines and water developments.

1. Hay Canyon Trap and Corral
 - ◆ Description: Reconstruct the corral and construct a new trap
 - ◆ Approximate Location: South Pasture; T. 17 S., R. 12 E., Sec. 25
 - ◆ Purpose: Improve management flexibility

2. Russia Canyon Trap and Corral:
 - ◆ Description: Rebuild the existing corral and construct a new trap
 - ◆ Approximate Location: North Pasture; T. 16 S., R. 11 E. Sec. 24
 - ◆ Purpose: Improve management flexibility

3. Lucas Canyon/Dark Canyon Trick Tank:
 - ◆ Description: Reconstruct the existing trick tank
 - ◆ Approximate Location: North Pasture; T. 17 S., R. 12 E., Sec. 4
 - ◆ Purpose: Improve management flexibility

4. Benson Canyon Trap and Corrals:
 - ◆ Description: New trap and reconstruct the existing corral
 - ◆ Approximate Location: North Pasture; T. 17 S., R. 12 E. Sec. 9
 - ◆ Purpose: Improve management flexibility

5. Dark Canyon Trap:
 - ◆ Description: New trap
 - ◆ Approximate Location: North Pasture; T. 16 S., R. 12 E. Sec. 34, 35 or 36
 - ◆ Purpose: Improve management flexibility

6. Dry Canyon Trap and Corral:
 - ◆ Description: Relocate the corral, trough and storage and pipeline, and build a new trap at the new location, remove facilities from the old location,
 - ◆ Approximate Location: Dry Canyon Allotment; T. 16 S., R. 10 E., Sec. 1
 - ◆ Purpose: Extensive target shooting occurs at the current location, a new location would be safer and reduce vandalism while maintaining grazing distribution and winter grazing flexibility.

7. Peñasco Horse Trap:
 - ◆ Description: Reconstruct the horse trap with elk fence
 - ◆ Approximate Location: Peñasco Trap; T. 17 S., R. 11 E., Sec. 13
 - ◆ Purpose: Have more available forage within the trap by excluding elk to be able to pasture horses for a longer period and to hold livestock more effectively reducing incursions to NMMJM habitat.

8. Peñasco Trap Extension:
 - ◆ Description: Extend the east side (east of Water Canyon) of the existing Rio Peñasco trap to the north.
 - ◆ Approximate Location: Peñasco Trap; T. 17 S., R. 12 E. Sec. 18
 - ◆ Purpose: Provide more acreage within the trap for livestock to disperse away from NMMJM habitat.

9. Pasture Ridge Trap and Corrals:
 - ◆ Description: New trap and corral
 - ◆ Approximate Location: Pasture Ridge Pasture; T. 18 S., R. 11 E., Sec. 33
 - ◆ Purpose: Improve management flexibility

10. Sacramento River Trap and Corrals
 - ◆ Description: Extend the existing trap below the lake enclosure and add a new corral
 - ◆ Approximate Location: South Pasture; T. 18 S., R. 11 E., Sec. 13
 - ◆ Purpose: Improve management flexibility

11. Apache Point Trap and Corrals:
 - ◆ Description: New corral and trap

- ◆ Approximate Location: South Pasture; T. 17 S., R. 11 E., Sec. 34
- ◆ Purpose: Improve management flexibility

12. Deadman Canyon Corral and Trap:

- ◆ Description: New corral and trap
- ◆ Approximate Location: South Pasture; T. 17 S., R. 11 E., Sec. 26
- ◆ Purpose: Improve management flexibility

13. Upper Hay Canyon Corral and Trap

- ◆ Description: New corral and trap
- ◆ Approximate Location: South Pasture; T. 17 S., R. 12 E., Sec. 27
- ◆ Purpose: Improve management flexibility

14. Wills Canyon Corral

- ◆ Description: Reconstruct the existing corral
- ◆ Approximate Location: South Pasture; T. 17 S., R. 12 E., Sec. 29
- ◆ Purpose: The current corral is old and needs repair

Closure Order

A closure order would be issued for all electric fenced areas to protect human health and safety by reducing the risk of electric shock and to prevent forest users from taking down the fence to drive and camp within the exclosures. The electric fence would be signed to warn the public of hazards. When the permanent fence has been completed in place of the electric fence, the closure order would be lifted because the risk of electric shock would be removed and the permanent fence would provide a barrier to vehicles. The closure order would not close any authorized roads or trails and would include exceptions such as hunters retrieving game animals on foot, the grazing permit holder removing cattle from the exclosures, and any Federal, State or local officer, or member of an organized rescue or firefighting force engaged in the performance of an official duty.

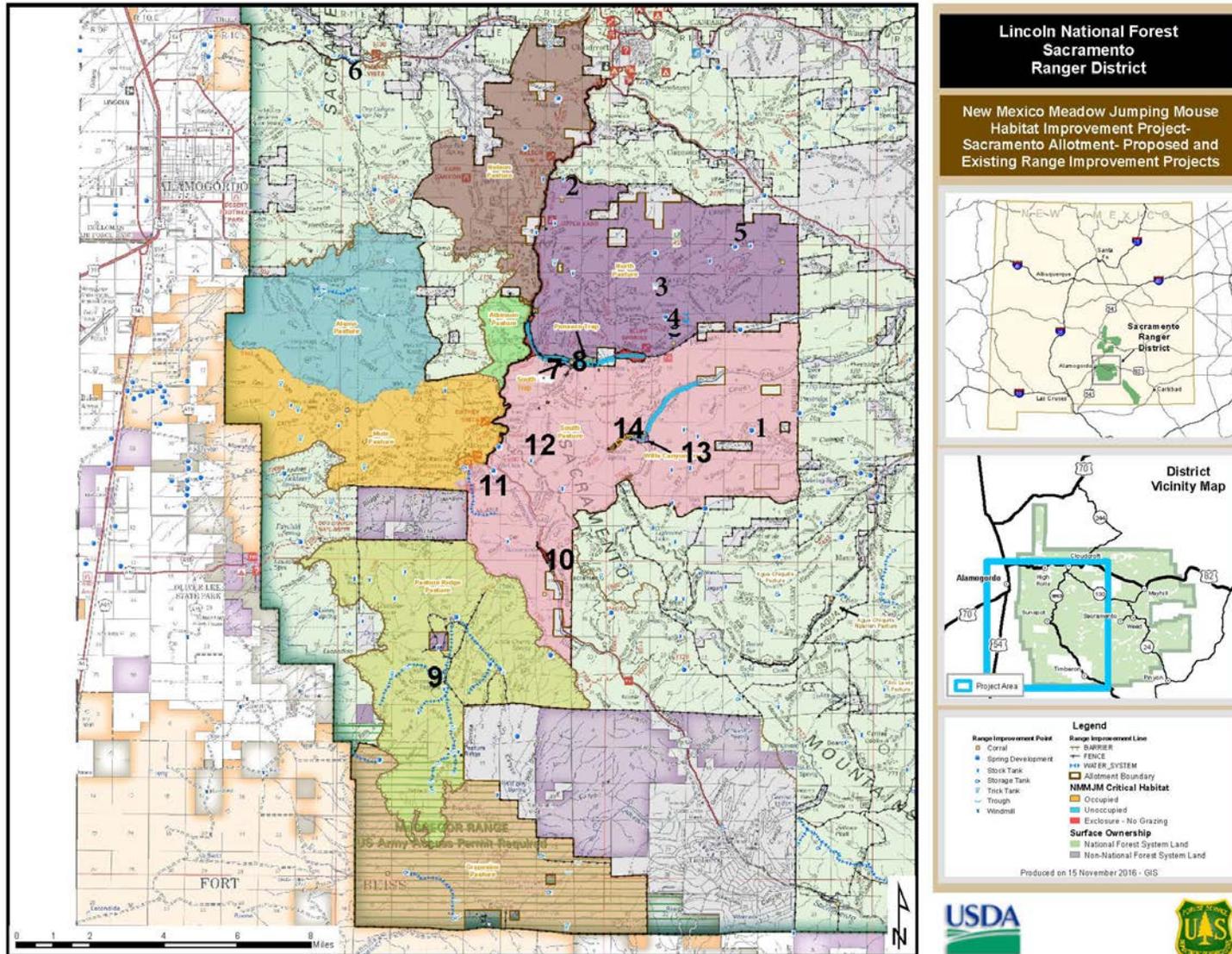


Figure 4. Map of the proposed range improvement project locations, numbers correspond to the projects numbered above in Section 2.2.2.1

2.2.3 Forest Plan Consistency

The proposed action is consistent with the Forest Plan standards and guidelines ([USDA FS 1986](#)). The proposed action meets the specific guidelines for threatened and endangered species, grazing management and the affected management areas. The Sacramento Grazing Allotment falls within Management Areas 2E Upper Peñasco, 2B Alamo, 2D Sacramento River, 2C Grapevine, 2F Mountain Park and 2F-Haynes Canyon Research Natural Area (Figure 5).

2E Upper Peñasco: The Wills Canyon and Rio Peñasco project areas are within management area 2E, Upper Peñasco, where the primary emphasis is on developed and dispersed recreation, wildlife habitat management, and timber management.

2B Alamo: The primary emphasis is on range management. Existing range improvements will be maintained and some additional fences, waters, water storage and distribution facilities, and a driveway will be constructed to distribute and control livestock. The woodland type will be managed to produce livestock forage and a small amount of fuelwood.

2D Sacramento River: The primary emphasis is on management of wildlife habitat and timber management. Structural and nonstructural improvements include openings, vegetation management, prescribed burning, water developments and fences to benefit game animals. All T&E plants will be protected. Existing dispersed recreation facilities will be maintained and protected from deterioration. Timber will be intensively managed to produce sawlogs and fuelwood, and to prevent losses caused by insects and diseases.

2C Grapevine: All resources are managed at low levels, with emphasis on preserving soil productivity.

2F Mountain Park: Primary emphasis will be on developed and dispersed recreation, wildlife habitat management, and timber management. All recreation facilities will be managed at standard service levels. Structural wildlife habitat improvements include water developments and fences to benefit game and non-game animals. Timber will be intensively managed to produce sawlogs and fuelwood, and to prevent losses caused by insects and diseases.

2F Haynes Canyon Research Natural Area (undesignated): Provide condition suitable for research on natural ecosystems, specifically for the study of white fir ecosystems (No projects are proposed within or bordering this management area).

Standards and Guidelines in the Forest Plan for Federal and State Threatened and Endangered (T&E) Species and riparian habitats include: Protect and manage essential and critical habitats of threatened, endangered, and sensitive species through ensuring that legal and biological requirements of designated plant and animal species are met; Identify, protect and enhance existing and potential habitat of all T&E and sensitive species; prohibit activities likely to cause disturbance, including public use, in the vicinity of any essential habitat for T&E species (p. 205). Provide for the improvement of habitat for threatened and endangered species to meet the goals and intent of the Endangered Species Act of 1973 (replacement p. 12). Manage riparian areas to provide optimum vegetation and ecological diversity (replacement p. 13).

Grazing Management Guidelines in the Forest Plan include: Forage use by grazing ungulates will be maintained at or above a condition which assures recovery and continued existence of threatened and endangered species (replacement p. 35); in consultation with US Fish and Wildlife Service, develop site-specific forage use levels. In the event that site-specific information is not available, average key species forage utilization in key forage monitoring areas by domestic livestock and wildlife should not exceed

levels in the Forest Plan during the forage growing season (replacement p. 35A); meet T&E species requirements in all range or grazing activities (replacement p. 35B).

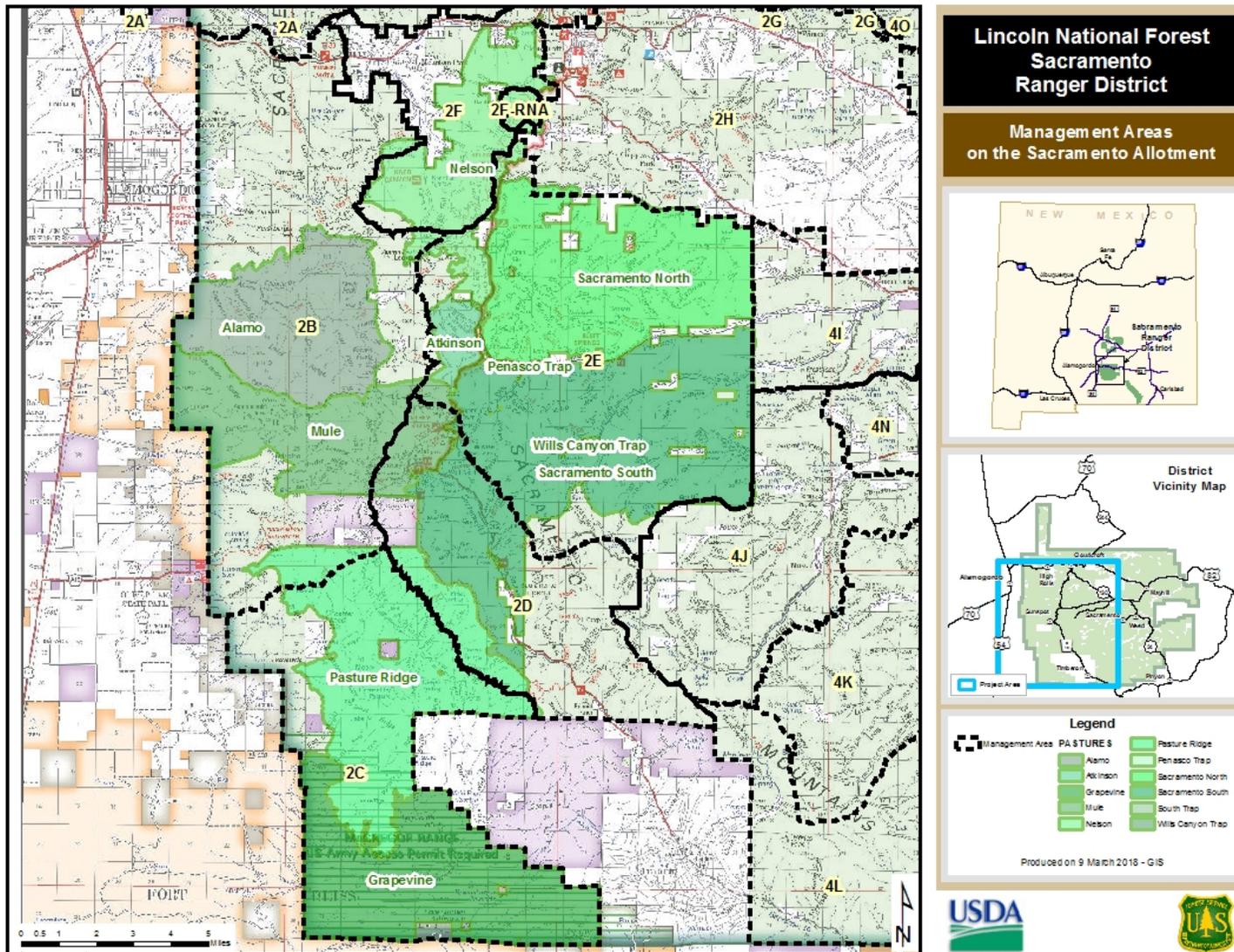


Figure 5. Management Areas within the Sacramento Grazing Allotment.2.3 Project Design Features that Ensure Environmental Protection.

The design features listed below are practices that the ID Team developed during this analysis to address site-specific environmental concerns. Design features were developed to ease some of the potential environmental impacts the proposed action may cause and to respond to public comments on the proposal.

Design features are a tool to ameliorate an undesirable environmental effect; it is identified and included as part of Alternative Two, the proposed action. The analysis of environmental effects is based upon the implementation of the design features.

2.3.1 Project Design Features

2.3.1.1 Soil and Water

- Water lanes will be reinforced with rock or other materials to reduce erosion in areas where natural site stability is not sufficient.
- Minimize trampling and disturbances in the riparian zone during and following construction, especially during May-September growing periods.
- Stage vehicles and equipment outside the riparian zone.
- New handling facilities will avoid riparian areas except for water lanes.
- Pipelines will not be buried in drainage bottoms to reduce potential erosion. Drainage bottoms that need to be crossed will be crossed perpendicular to the drainage.
- Seeding of native species using certified weed free seed will be conducted in areas disturbed by construction or maintenance activities.
- Any necessary water rights will be verified or obtained prior to construction of any new water developments.
- Erosion control features will be placed in areas disturbed by construction or maintenance that are contributing to erosion.
- All heavy equipment will not be used during times soil is saturated to minimize erosion potential.
- Floats will be installed on tanks/troughs, unless piped back to the source.
- Overflow from waters diverted from springs/streams will be piped back to the water source that was being supplied by the stream/spring.

2.3.1.2 Threatened, Endangered, and Region 3 Sensitive Species

- Projects will be surveyed if necessary, and cleared by a biologist and/or botanist prior to construction.
- Where possible, include Sacramento Mountains thistle individuals within exclosures.
- Federally listed plant species and regional sensitive species will be avoided during construction of the exclosure fencing whenever possible.
- Minimize trampling and equipment within NMMJM habitat, follow guidance from USFWS for construction of fences within the habitat.

- All traps, corrals, water developments and pipelines will avoid federally listed plant species and/ or Region 3 Sensitive Plant Species.
- All proposed livestock handling facilities will avoid historical NMMJM sites and potential habitat.
- No ground disturbing work will take place from June 1st through September 30th within or adjacent to occupied NMMJM habitat.
- Survey in unoccupied NMMJM Critical Habitat prior to any ground disturbing work being implemented. If occurrences are detected then timing restrictions or any design features (e.g. fencing) developed through consultation with the USFWS will be implemented.
- Survey for NMMJM in historical sites or areas with potential habitat prior to project implementation. If occurrences are detected then timing restrictions or any design features developed through consultation (e.g. fencing) with the USFWS will be implemented.
- All handling facilities will avoid Mexican spotted owl PAC's
- Consultation with the U.S. Fish and Wildlife Service will be completed prior to construction of any projects where listed species or their critical habitat may be affected.
- All project construction in MSO PAC's will be completed from September 1st through February 28th unless surveys indicate non-breeding or absence for the year.
- Do not cut trees >61 cm (> 24 in) DBH, the average diameter of nest trees, unless overriding management situations require their removal to protect human safety and/or property.
- Strive to retain as many nesting size trees as possible while constructing and then maintaining projects.
- Areas outside of PAC's should be surveyed two years before project implementation if surveys indicate they are older than 5 years.
- All construction of proposed projects would be prohibited within goshawk Post-fledgling Family Areas during the breeding season (March 1 to September 30)
- Any necessary tree removal activities will be completed in a fashion to minimize impacts to sensitive resources, trees will be cut and left on site if removal would cause adverse impacts to listed or sensitive species or habitats.

2.3.1.3 Invasive Plants

- Equipment necessary for fence and project construction will be cleaned prior to entering the Lincoln National Forest/ allotment/construction site to avoid the spread of weed seeds.
- Equipment will be cleaned prior to moving off of or to another site if weeds species were encountered at the previous construction site.

2.3.1.4 Wildlife

- All troughs will be equipped with wildlife escape ramps that are flush with the edge of the trough.
- New water storages will be closed top.

- New water developments will be operational and accessible to provide water for livestock and wildlife throughout the year; unless freezing temperatures will damage the infrastructure and the water needs to be turned off, or for temporary repair.
- All permanent fences will be constructed using New Mexico Game and Fish design recommendations to reduce wildlife entanglement risks. Further, certain visualization techniques (e.g. PVC pipe on top fence wire or vinyl tabs placed on wire) will be used to increase visibility and minimize entrapment and will be placed where signs of extensive elk and/or deer crossing or trailing are obvious.

2.3.1.5 Range

- Management requirements for the NMMJM, in addition to all other requirements outlined in the Annual Operating Instructions and the Allotment Management Plan will be followed by the grazing permit holder.
- Troughs and storages would be anchored to the ground.
- Pipeline will be buried 18-24 inches below ground whenever possible.
- Grazing Permit holders will be consulted for livestock handling facility design and placement and notified when project construction is planned to proceed.
- The gates in the riparian enclosure fences will be placed at appropriate locations where livestock can be removed effectively and safely and where the integrity of the fence will be maintained.

2.3.1.6 Heritage Resources

- Projects will be surveyed if necessary and cleared by an archaeologist prior to construction.
- Discovery of any undocumented cultural resources during project implementation will result in immediate cessation of any ground disturbing activities and notification of the Forest Archaeologist. Work shall not resume until a Notice to Proceed is issued by the Forest Service.
- All fences, traps, corrals, water developments and pipelines will avoid adverse impacts to historic sites listed on the National Register of Historic Places as Eligible.
- A Forest Service archaeologist will monitor all project activities located within the boundary of historic sites listed on the National Register of Historic Places as Eligible to ensure feature avoidance.
- Consultation will be completed with the New Mexico State Historic Preservation Office prior to construction of any projects where historic sites may be affected.

2.3.1.7 Health and Safety

- Electric fences will be signed to warn the public of hazards.
- Trees may be removed at or near project locations if they pose a safety risk.

2.3.2 Monitoring Requirements

Monitoring of the project area would be conducted, including both implementation and effectiveness monitoring. The monitoring would also include the participation of the permittee; however, the ultimate responsibility for monitoring the allotment rests with the Forest Service. Although the responsibility for monitoring the allotment is that of the Forest Service, the permittee would have the responsibility for ensuring guidelines are not exceeded.

2.3.2.1 Project Implementation Monitoring

- Implementation monitoring will occur periodically to ensure projects are built to correct specifications and design features are followed.

2.3.2.2 Project Effectiveness monitoring

- Fenced enclosure areas will be monitored to ensure desired NMMJM habitat conditions are being achieved or are progressing towards achievement.
- Project areas will be periodically monitored to ensure resource impacts are at an acceptable level and for the presence of invasive species.
- Range compliance monitoring will occur to ensure terms and conditions of the Term Grazing Permit, Allotment Management Plan and Annual Operating Instructions are followed.

Chapter 3 –Environmental Consequences

3.1 Introduction

This chapter provides the basis for comparing the two alternatives described in Chapter 2. The chapter is arranged by resource with the effects of each alternative being described under each resource area. The analysis of effects for the proposed action under each resource is described with the assumption project design features described in chapter 2 would be applied.

3.2 Range, Vegetation and Invasive Species

Affected Environment:

The Sacramento and Dry Canyon Allotments are located in the western portion of the Sacramento Ranger District, near Cloudcroft, New Mexico. There is a total of 111,484 acres of Forest Service lands within the Sacramento Allotment. The topography of the allotment ranges from gentle flats to very steep slopes throughout the allotment. Several gently sloping meadows and numerous narrow bottoms provide the majority of the grazing capacity for livestock. In addition, the slopes are densely vegetated with conifer trees and/or rough rocky terrain. Elevations on the allotment run from 4,520 feet in west Grapevine Pasture to 9,695 feet in the South Pasture. Precipitation varies greatly from year to year, ranging from 10 inches to 40 inches, with the average being around 30 inches per year. Some of this precipitation comes in the form of summer “monsoon” rains, but the higher elevations are also subject to heavy snows at times during the winter. A term grazing permit is used to authorize grazing for a twelve month period from March 1 – February 28. There is one term grazing permit holder for the Sacramento Allotment and 3 term grazing permits for the Dry Canyon Allotment. Table 1 shows the permitted livestock for the two allotments.

Table 1. Permitted livestock numbers on the Sacramento and Dry Canyon Allotments.

Allotment	Unit(s) / Pasture(s)	Season	Authorized Stocking (Numbers/Kind/Class)
Sacramento	Winter Unit (Alamo, Mule, Pasture Ridge, Grapevine)	03/01-05/15	335 C/c (Cow/calf)
Sacramento	Summer Unit (Nelson, Atkinson, North and South)	05/15-10/31	412 C/c (Cow/calf)
Sacramento	Winter Unit and Summer Unit	03/01-02/28	5 Horses
Sacramento	Winter Unit (Alamo, Mule, Pasture Ridge, Grapevine)	11/01-02/28	335 C/c (Cow/calf)
Dry Canyon	South Pasture	03/01-05/14	75 C/c (Cow/calf)
Dry Canyon	South Pasture	11/01-02/28	75 C/c (Cow/calf)
Dry Canyon	Dispersed	3/01-5/15	10 C/c (Cow/calf)
Dry Canyon	Dispersed	11/01-2/28	10 C/c (Cow/calf)
Dry Canyon	Dispersed	3/01-5/15	20 C/c (Cow/calf)

Allotment	Unit(s) / Pasture(s)	Season	Authorized Stocking (Numbers/Kind/Class)
Dry Canyon	Dispersed	11/01-2/28	20 C/c (Cow/calf)

The fenced (electric, pipe or barbed wire) riparian enclosure areas in or near NMMJM Critical Habitat are located in mountain meadows surrounded by steep sloped, mixed conifer woodland; these mountain meadows are predominantly narrow. Some of these meadows have flowing water or water near the soil surface where the vegetation and hydrologic functions differ from the rest of the meadow. Riparian areas can be described as areas that are permanently saturated and/or have vegetation adapted for high saturated soils and/or areas that are 0 - 100 meters (328 feet) from the drainage bottom. The species composition observed in functioning riparian areas consist predominantly of sedges spp. and rushes spp. with redtop (*Agrostis gigantea*) as the dominant grass. Other noted grasses and forbs consists of tall fescue (*Schedonorus arundinaceus*), smooth brome (*Bromus inermis*), alpine timothy (*Phleum alpinum*), Kentucky bluegrass (*Poa pratensis*), horsetail (*Equisetum* spp.), Rocky Mountain iris (*Iris missouriensis* Nutt.), shepherds purse (*Capsella bursa-pastoris*), sunflower (*Helianthus* L.), spike verbena (*Verbana macdougalii*), thistle (*Cirsium* spp.), cutleaf coneflower (*Rudbeckia laciniata*), Spanish needle (*Bidens bipinnata* L.), poison hemlock (*Conium maculatum* L.), dock spp. (*Rumex* spp.), and yarrow (*Achillea millefolium*). As the meadow within the enclosures transitions away from permanently saturated areas, Kentucky bluegrass and sleepygrass (*Achnatherum robustum*) tend to be the dominant grass species. Other noted species are wolf tail (*Lycurus setosus*), bottle brush squirrel tail (*Elymus elymoides*), nodding brome (*Bromus anomalus*), blue grama (*Bouteloua gracilis*), mutton grass (*Poa fendleriana*), yarrow, cutleaf coneflower, sunflower, bull thistle (*Cirsium vulgare*), musk thistle (*Carduus nutans*), mullein (*Verbascum thapsus* L.), dandelion (*Taraxacum officinale*), poison hemlock, dock spp., clover (*Trifolium* spp.), and spike verbena. The areas that are undesirable and/or do not meet desired condition for that landscape are likely to have non-native thistle and/or sleepy grass as the dominant species and/or may have Kentucky bluegrass as the dominant species surrounding a flowing drainage bottom. These areas may also show increased bare ground, compacted soil, increased erosional effects, and dominated by less desirable forbs and/or grass for that area.

The riparian enclosures (including the current temporary electric fenced enclosures and the existing riparian enclosures in NMMJM Critical Habitat) are located in the Upper & Lower Rio Peñasco Canyon and Wills Canyon. The enclosures located in Upper & Lower Rio Peñasco Canyon also form the boundary between North and South Pastures and incorporate the Peñasco Trap. Wills Canyon is located in the South Pasture. It is visually apparent in these riparian areas, which have excluded grazing from livestock, have a much higher vegetation yield, especially near active stream channels. Monitoring has indicated that grazing within the enclosures is less than outside the enclosures. During the month of August, 2017 monitoring was collected using the landscape appearance method inside and outside of the enclosures located in the Peñasco Trap/Rio Peñasco Canyon and South Pasture of Sacramento Grazing Allotment. The results of this monitoring is reflected in Table 2. The table shows utilization is higher outside of the enclosures, compared to inside the enclosures. Field observation have presented higher concentration of seed heads within the enclosures when compared to the outside enclosures. The grass appears more productive and taller within the enclosures when compared to those of the same species on the outside of the enclosures.

Table 2. Utilization measurements inside of and outside of exclosures including the existing permanent and temporary exclosures.

Date	Pasture	Site	Exclosure	Key species	Utilization Class
08/24/17	South	Wills Canyon Maulden – Site 1	Outside	Kentucky bluegrass	21-40%
08/24/17	South	Wills Canyon Maulden – Site 1	Inside	Redtop	0-5 %
08/24/17	South	Wills Canyon Maulden – Site 2	Outside	Kentucky bluegrass	21-40%
08/24/17	South	Wills Canyon Maulden – Site 2	Inside	Redtop	0-5%
08/24/17	South	Will Canyon permanent exclosure 1 – site 3	Outside	Redtop	6-20%
08/24/17	South	Will Canyon permanent exclosure 1 – site 3	Inside	Redtop	0-5%
08/24/17	South	Will Canyon permanent exclosure 2 – site 3	Outside	Kentucky bluegrass	21-40%
08/24/17	South	Will Canyon permanent exclosure 2 – site 3	Inside	Redtop	6-20%
08/29/17	Peñasco trap	1 electric fence	Outside	Kentucky bluegrass	21-40%
08/29/17	Peñasco trap	1 electric fence	Inside	Redtop	6-20%
08/29/17	Peñasco trap	2 electric fence	Outside	Smooth brome	6-20%
08/29/17	Peñasco trap	2 electric fence	Inside	Redtop	0-5%
08/29/17	Peñasco trap	3 electric fence Boomerang	Outside	Kentucky bluegrass	6-20%
08/29/17	Peñasco trap	3 electric fence Boomerang	Inside	Redtop	6-20%
08/29/17	Peñasco trap	4 electric fence	Outside	Smooth brome	21-40%
08/29/17	Peñasco trap	4 electric fence	Inside	Smooth brome	6-20%
08/29/17	South	Will canyon exclosure – site 5 (electric/permanent)	Outside	Smooth brome	6-20%
08/29/17	South	Will canyon exclosure – site 5 (electric/permanent)	Inside	Smooth brome	6-20%
08/29/17	South	Will canyon exclosure – site 6	Outside	Kentucky bluegrass	6-20%
08/29/17	South	Will canyon exclosure – site 6	Inside	Kentucky bluegrass	0-5%

Date	Pasture	Site	Exclosure	Key species	Utilization Class
08/29/17	South	Will canyon exclosure – site 7	Outside	Kentucky bluegrass	6-20%
08/29/17	South	Will canyon exclosure – site 7	Inside	Kentucky bluegrass	0-5%
08/29/17	South	Will canyon exclosure – site 8	Outside	Kentucky bluegrass	21-40%
08/29/17	South	Will canyon exclosure – site 8	Inside	Redtop	6-20%

The general conditions at the approximate location of each proposed range improvement are as follows:

- Hay Canyon Trap and Corral:** This site is located in the South Pasture, in a large open meadow. The meadow is surrounded by mixed conifer woodlands. The open meadow is composed of multiple perennial grass species. The dominant grass species are alpine timothy, sleepygrass, weeping lovegrass (*Eragrostis curvula*), Kentucky bluegrass, and Brome spp. (*Bromus* L.) The existing corral and trap are highly concentrated with sleepygrass. The appearance of bare ground is minimal and vegetation cover is high.
- Russia Canyon Trap and Corral:** The area can be described as a large open meadow, surrounded by mixed conifer woodland. The vegetation cover is high, less desirable forbs and grasses are present. These less desirable species include sleepygrass, annual forbs, and non-native thistle. The existing corral is constructed of drill stem pipe, and is located in the meadow bottom. There is no permanent road to the corral. Kentucky bluegrass is the dominant perennial grass species.
- Lucas Canyon/Dark Canyon Trick Tank:** The existing trick tank is in disrepair. The tank is rusted and mechanisms on the tank are not functional. The tank is located in a mountain upland inside a mixed conifer woodland. Vegetation in the area is abundant. The majority of the grass appears unutilized and sign of ungulate consumers is scarce.
- Benson Canyon Trap and Corral:** The existing structure is non-functional, constructed of wooden posts and barbed wire. The proposed area for construction is in a valley bottom, surrounded by mixed conifer woodland. The valley bottom is an open meadow vegetated with perennial grasses with annual and perennial forbs. Non-native thistles and other undesirable vegetation are present.
- Dark Canyon Trap:** This site is a narrow meadow with an abundance of undesirable species (sleepygrass and non-native thistle). Kentucky bluegrass, brome spp., and orchardgrass (*Dactylis glomerata*) were observed at this location. Vegetation cover is high. There was no indication of erosion, i.e. cuts or unraveling of the soil surface.
- Dry Canyon Trap and Corral:** The existing corral, trough, storage and pipeline are in functioning condition. The storage tank is littered with patched holes, most likely from gunshots. The location of these facilities is close to an area where public land users recreate. Recreation includes shooting, motorized trail travel, and hiking. This area can be described as a mix between high desert and piñon juniper woodland. The vegetation cover is moderate with abundant bare ground. The soil surface is mostly stable, due to the gravel surface. Erosional effects are observed mostly in the drainage bottoms and along roads.

- **Peñasco Horse Trap:** The horse trap is in functional condition, constructed of wooden and metal T-posts with wooden stays strung together with 5 strands of barbed wire. The vegetation within the horse trap is dominated by less palatable annual and perennial forb species, with few to moderate perennial grass species.
- **Peñasco Trap Extension:** The Peñasco trap is approximately 155 acres in size. The trap encompasses both sides of the Peñasco River, has electric fence enclosures protecting NMMJM critical habitat and includes water lanes for cattle. The habitat in the riparian areas has abundant weeds and undesirable vegetation species. The stream banks show signs of regaining desirable vegetation from past photo observations. The vegetation further upland is dominated by mixed conifers with deciduous trees and shrubs. These areas are relatively open and show mixed species composition in the understory. The dominant grass species consist of Kentucky bluegrass, brome spp., and orchard grass. Musk thistle is widespread throughout the trap and is heavily concentrated in the valley bottoms.
- **Pasture Ridge Trap and Corral:** The Pasture Ridge area can be described as piñon juniper woodland. Vegetation consists of juniper (*Juniperis* L.) piñon pine (*Pinus edulis*), oak (*Quercus* L.), blue grama, wolftail, sideoats grama (*Bouteloua curtipendula*), and piñon ricegrass (*Piptochaetium fimbriatum*). This is a winter pasture that is primarily utilized by livestock from November through May, bare ground does not appear to be an issue.
- **Sacramento River Trap and Corral:** The existing corrals are in disrepair and do not appear to be functional. The corral is constructed of wooden posts with boards and wooden poles running between the posts. The proposed trap is located in a valley bottom with abundant vegetation cover. The species observed are Kentucky bluegrass, with annual and perennial forbs. Undesirable species such as non-native thistle are present, but not abundant.
- **Apache Point Trap and Corral:** The area is located next to a Forest system road. The proposed site is an upland meadow surrounded by mixed conifer woodland. The vegetation cover is high with few spots of bare ground. The soil appears very stable with an abundance of Kentucky bluegrass and rocky surface and subsurface. There are few to moderate amounts of perennial and annual forb species.
- **Deadman Canyon Trap and Corral:** The proposed location is highly vegetated with Kentucky bluegrass with few to moderate forb species. This area can be described as a mountain meadow surrounded by mixed conifer woodland. This area doesn't appear to have non-native thistle. There is no sign of erosion throughout the meadow.
- **Upper Hay Canyon Trap and Corral:** The area is in a mixed conifer woodland, open meadow. The meadow is densely vegetated with perennial grass and forbs. Weedy species such as musk thistle are present. The area is surrounded by steep slopes with dense conifers drawing wildlife and cattle into the meadow.
- **Wills Canyon Corral:** The corral is mended together with old gates, old panels, barbed wire fencing and new cattle panels. Without the new panels the corral is not functional. The corral is in a valley bottom next to Wills Canyon drainage system surrounded by a mixed conifer woodland. The vegetation around the corral is mostly perennial grass species with undesirable species such as sleepygrass and non-native thistle downstream. Vegetation inside of the corral is abundant. The recognized vegetation at the corral was poison hemlock, tall fescue, and Kentucky bluegrass, with annual and perennial forb species.

Effects of Alternative 1 (No Action):

The no action alternative would continue current management for the summer range of the allotment. Currently cattle are dispersed in two large pastures. There are four traps and at least seven corrals. The existing traps and corrals provide multiple uses for handling livestock such as temporary holding facilities, sorting areas, branding, vaccination, and loading sites. The no action alternative would continue use of the existing improvements with none of the proposed improvements being developed to help mitigate seasonal livestock use within sensitive areas for the NMMJM. In addition, the proposed project areas would not be disturbed from heavy machinery, construction, and denuding of vegetation within the newly developed sites.

Effects of Alternative 2 (Proposed Action):

The enclosure fencing areas would be disturbed from heavy equipment, motor vehicles, and foot traffic during the construction process. This may cause additional soil compaction and denuding the surface of vegetation cover. Depending on time of construction, these actions may cause minimal stress to the permitted livestock and impede livestock from utilizing water lanes if construction is being conducted when livestock are present in Rio Peñasco and Wills Canyon. The excluded riparian and critical habitat areas would no longer offer forage and access to water within the enclosures; and would reduce access to forage for livestock by approximately 100 acres. Cattle would be able to access water at water lanes. Most water lanes would be spaced fairly closely (less than 0.5 miles between access points), with one longer area of fencing in Wills that would be just under a mile in length. These areas left unused by domestic livestock may substantially increase riparian and upland vegetation within the enclosures.

The areas proposed for range improvements would be disturbed by heavy equipment, motor vehicles, and foot traffic during the construction process. This may cause additional soil compaction and denude the surface of vegetation cover. These areas would be utilized by the permittee for livestock handling and operational needs during the summer months, the Dry Canyon Trap and Corral and the Pasture Ridge Trap and Corral would be used in the winter months. Use would impact soils and vegetation. Soils may be compacted from concentrated livestock use within the traps and corrals. Bare ground and less desirable species may increase within these sites. The sites at the Dry Canyon Trap and Corral and Pasture Ridge Trap and Corral are more sensitive to disturbance than the other project sites. This is due to the localized climate, soil type, and vegetation composition associated with these more arid areas. The vegetation is less resilient to high and/or continued disturbances. Therefore, it is likely that the Dry Canyon Trap and Corral and Pasture Ridge Trap and Corral sites would show a change in the vegetation composition. This is evident at the Wright Springs trap and corral located in Pasture Ridge pasture of the Sacramento Allotment. Very high concentration of livestock for low to moderate (5-30 days) duration of time can denude the vegetation leaving undesirable vegetation and/or increased bare soil within 1/10 acre of that improvement.

The proposed projects may improve livestock distribution by providing larger areas and more locations to hold livestock. The proposed traps and construction of permanent riparian habitat enclosures may alleviate grazing pressure from livestock in riparian areas and valley bottoms. Reconstruction of the existing trick tank may increase water availability for wildlife and livestock which may improve distribution of ungulate species.

3.3 Heritage Resources

Affected Environment:

The locations of the proposed projects within the Sacramento Allotment and Dry Canyon Allotment make up the study area which would ensure that both direct and indirect effects to cultural resources are considered for the proposed project treatments and activities. For the purposes of this analysis, the affected environment includes all areas within the proposed project areas of potential effect (APE), as well as, zones located in the surrounding area (i.e. adjacent or down slope of the proposed project areas). Areas of potential effects means the geographic area or areas within an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effect is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking. This report will also focus on the specific portions of the project areas containing cultural resources, all archaeologically sensitive areas that have no “known” cultural sites but have the potential for subsurface deposits, and the affected environment, which includes sites located in the surrounding vicinity that may be indirectly affected by project activities.

Cultural resources (including ethnographic and traditional cultural properties and landscape) have been lost or damaged in the National Forests through past and current land management activities (including the development of facilities and infrastructure), visitor use, and natural processes. Many of the activities that have affected or are currently affecting cultural resources were initiated prior to the implementation of National Historic Preservation Act (NHPA) in 1966. For some resources such as historic structures, the lack of maintenance or modern upgrades can alter the historic characteristics of the structure. For other resources such as trails and roads, modern use and maintenance can result in long-term impacts. The destruction or damage of cultural resources on the National Forests means the loss of information important to the understanding of the past (including information that is lost before the development of better research techniques), loss of interpretive opportunities, and the incremental loss of the cultural resource base.

Any activity that causes ground disturbance (disturbance to the soil matrix that contains the cultural deposits) has the potential to adversely affect cultural resources, both directly and indirectly. Ground disturbing activities result in changes to the physical attributes of these sites that, in turn, compromise the integrity and context of the resource. The context (spatial relationship between the various artifacts, features, and site components) is one of the main components for scientific studies. Any change to the resource that affects its scientific importance is irreversible or irreparable and would be considered an adverse effect.

Effects to cultural resources are usually determined by the effects on its eligibility for listing on the National Register of Historic Properties (NRHP). Sites that have not been evaluated for eligibility must also be treated as potentially eligible property and be given the same protection as NRHP listed/eligible properties. This project has been analyzed in terms of how it would affect any cultural resource located within the proposed project locations. If a finding of “adverse effect” is reached regarding historic properties in the treatment area, then consultation with the State Historic Preservation Office (SHPO) would be necessary in order to develop resource protection measures necessary to resolve any adverse effects. The resolution of adverse effects must be documented in a Memorandum of Understanding between the agency and the SHPO prior to project implementation.

Effects of Alternative 1 (No Action):

Under the No Action alternative, the existing Sacramento Grazing Allotment area would stay the same, nothing would change.

Effects of Alternative 2 (Proposed Action):

There would be negligible to minor direct effects to known heritage resources identified within the Proposed Action's treatment areas, as design features to protect sites would be used to avoid impacts during project and subsequent long term maintenance activities.

All known heritage resources would be flagged for avoidance from project actions. Additionally, treatment areas would be monitored during and post project implementation by an archaeologist to determine the effectiveness of the protection measures. The determination of a negligible level of effect to a heritage resource is due to the expected changes in surrounding vegetation and therefore the landscape surrounding the sites, but these changes are not expected to change the important or significant characteristics of the sites. With the required protection measures neither the changes to the surrounding vegetation nor the allowance of hand crew work within portions of the site is expected to change the important or significant characteristics of the site.

Sensitive cultural areas within the project would be monitored by an archaeologist during project implementation to ensure no disturbance to cultural resources. Additionally, an archaeologist should conduct post project monitoring in certain areas to determine the effectiveness of treatments implemented to protect the site.

3.4 Threatened and Endangered Species

Affected Environment:

According to the U.S. Fish and Wildlife Service (USFWS) ([USDI-FWS 2013](#)), the Lincoln National Forest comprises part of the potential range of 7 federally listed and 2 candidate species (Appendix B). Species that are not expected to occur near or within the proposed project area, due to the range of the species or lack of suitable habitat, are assumed to be unaffected by the proposed action, and therefore, will not be carried forward in this analysis. At this time, suitable and occupied habitat exist within the proposed project area for Mexican Spotted Owl (*Strix occidentalis lucida*; threatened), New Mexico meadow jumping mouse (*Zapus hudsonius luteus*; endangered), and Sacramento Mountains thistle (*Cirsium vinaceum*; threatened).

Mexican Spotted Owl (*Strix occidentalis lucida*) and its Critical Habitat:

The entire Lincoln National Forest is currently within the Basin and Range-East Recovery Unit. The Recovery Unit is characterized by numerous parallel mountain ranges separated by alluvial valleys and broad, flat basins. Mexican spotted owl (MSO) on the Sacramento Ranger District primarily use mixed conifer forests where conditions are usually uneven-aged, multi-storied with high canopy closure. These forests are dominated by Douglas-fir and/or White fir, with understory consisting of coniferous species and broad-leafed species such as Gambel oak, maples, box-elder, and New Mexico locust. The Mexican spotted owl nests and roosts primarily in closed canopy larger diameter mixed conifer on the Sacramento Ranger District. Foraging habitat occurs throughout several forest types from pinyon/juniper to spruce/fir. Prey base data derived on the Lincoln National Forest suggest that the owl primarily uses three main food sources: wood rats, deer mice, and voles. Canopy cover and herbaceous ground story materials are important prey habitat conditions.

There is approximately 122 Protected Activity Centers (PAC's; 600 acre areas surrounding nest sites) throughout the Sacramento Ranger District. 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. MSO habitat in the project area is defined as Protected or Restricted habitats. PAC's, and mixed conifer outside of PAC's, on slopes greater than 40% are defined as Protected Habitat. All mixed conifer outside of PAC's and on slopes less than 40% are defined as Restricted Habitat. MSO primarily uses these habitats for nesting, roosting, and foraging. Other forest types like ponderosa pine, and pinyon/juniper forests types are used for foraging.

A designated MSO critical habitat boundary that contains the primary constituent elements (PCE's) required by the MSO overlaps the Sacramento Ranger District and the project area. PCE's are physical and biological features necessary for the species' survival. On the Sacramento Ranger District, the PCE's for MSO are found in mixed conifer forests. These PCE's fall within the Basin-Range East 1 (BR-E-1) critical habitat section. The following PCE's will be addressed in this analysis.

PCEs 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 % to 45 % of which are large trees with a trunk diameter of 12 inches or more when measured at 4.5 feet from the ground (Range of Tree Sizes); A shade canopy created by the tree branches covering 40 % or more of the ground (Canopy Closure); and Large dead trees (snags) with a trunk diameter of at least 12 inches when measured at 4.5 feet from the ground (Large Snags).

The PCEs related to the maintenance of adequate prey species include: High volumes of fallen trees and other woody debris (Dead and Down Woody Debris); a wide range of tree and plant species, including hardwoods (Plant Species Richness); and Adequate levels of residual plant cover to maintain fruits and seeds, and allow plant regeneration (Residual Plant Cover).

New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*) and its Critical Habitat:

The New Mexico meadow jumping mouse has exceptionally specialized habitat requirements characterized by tall (averaging between 24 to 27 inches) and dense herbaceous and woody riparian vegetation ([USFWS 2014](#)). Jumping mouse habitat in New Mexico consists of tall sedges and grasses; whereas it is more associated with alder (*Alnus* spp.) with a tall forb understory than uniform cover of sedges in Arizona ([Frey 2011](#)). The herbaceous vegetation is composed primarily of sedges or bulrush and forbs. These include, but are not limited to, the following herbaceous species: spikerush, beaked sedge, reed canarygrass, rushes (*Juncus* spp.), bulrush, and numerous species of grasses such as bluegrass (*Poa* spp.), slender wheatgrass, brome (*Bromus* spp.), foxtail barley, or Japanese brome, and forbs such as water hemlock (*Circuta douglasii*), field mint (*Mentha arvensis*), asters (*Aster* spp.), or cutleaf coneflower (*Rudbeckia laciniata*). Consequently, suitable microhabitat is composed of forbs and sedges on saturated soils that are in close proximity to flowing water. This habitat should contain sufficient seasonally available flowing waters to support the growth of tall, dense, riparian herbaceous plants that provide a wide variety of food and cover for nesting, movement, and to avoid predation.

The jumping mouse is active only during the warm growing season of the grasses and forbs on which it depends. The jumping mouse is a true hibernator, usually entering hibernation in September or October and emerging the following May or June. The jumping mouse hibernates about 8 or 9 months out of the year, longer than most mammals. Following hibernation, jumping mice must breed, rear their young, and then accumulate sufficient fat reserves to sustain them through hibernation. The subspecies may only be active from about early June to September in high elevation montane areas and mid-May to late-October in the lower elevations, such as along the Rio Grande River Valley. The occupied and unoccupied

critical habitat (CH) within the Sacramento Allotment, can be found within the Wills and Rio Peñasco Canyons. The NMMJM habitat is found within the North and South Pastures of the summer range of the Sacramento Allotment. Wills and Rio Peñasco Canyons have perennial streams that have intermittent stretches during dry periods. The CH subunit (4B) area in the Rio Peñasco Canyon is not known to be occupied by the NMMJM and there are no recent capture sites. There are only two recent capture sites found within an existing enclosure in Wills Canyon. The upper stretches of both canyons consists of broad open areas where the main channels flow and is surrounded by an area that contains largely saturated soils. The lower stretches are more incised with a number of headcuts with less soil saturation. Narrow incised sections have less of a floodplain and fewer riparian plants can become established. Where the channel becomes wider, secondary floodplains occur along with greater numbers of riparian plants. Saturated soils and/or herbaceous wetland vegetation are often not present and streambank erosion is found periodically along the channel, especially in narrow sections of the canyons.

In 2015, Open Range Consulting (ORC) was contracted by the US Forest Service to use advanced reconnaissance and remote sensing techniques to generate quantitative map information and trends analysis on vegetation structure and composition within riparian extents for the NMMJM and its Proposed Critical Habitat. The final outputs include mapping of riparian vegetation structure, a trends assessment based on archive imagery representing past conditions, and an accuracy assessment of products. The change in percent of bare ground, upland vegetation, riparian vegetation, and sedge cover for the CH riparian areas for the Sacramento Allotment was compared using the classifications made from 1m imagery for 1992, 2009, and 2014. The Sacramento Allotment generally showed a decrease of riparian vegetation ([Open Range 2015](#)).

Since 2015 monitoring to determine the presence and distribution of PCE's for CH has taken place in Rio Peñasco and Wills Canyons. Flowing water was evident throughout both canyons. Tall dense herbaceous riparian vegetation with saturated soils were found in riparian enclosures. The tall dense riparian vegetation had a variety of sedges (e.g. *Cyperus* sp. and *Carex* sp.), rushes, associated grasses (e.g. redtop) and forbs (e.g. cutleaf coneflower). The remaining riparian vegetation was found in sporadic populations throughout each canyon but often didn't meet height or density conditions.

Sacramento Mountains Thistle (*Cirsium vinaceum*):

Sacramento Mountains thistle was listed as a threatened species on June 16, 1987 without designated critical habitat ([Federal Register 1987](#)). This species is a narrow endemic biennial plant that develops tall flowering stalks (up to six feet) throughout July and August. It is restricted to wet deposits of travertine (calcium carbonate) in wetlands, meadows, or sub-irrigated areas associated with springs, streams, and seeps at high elevations in the Sacramento Mountains.

Sacramento Mountains thistle was listed as threatened in 1987 due to its limited range and significant threats. At the time of listing, there were 20 known populations or sites, with an estimated 10,000 to 15,000 individuals, occurring within six large canyon drainages ([USDI FWS 1993](#)). Since then, approximately 104 sites have been identified ([USDI FWS 2010](#)) within 10 meta-populations (geographically distinct populations, i.e. canyon drainages), spanning approximately 66 acres of suitable habitat on the Lincoln National Forest ([Roth 2013](#)). It is believed that more than 95 percent of the known populations occur on the Lincoln National Forest. However, it is difficult to accurately assess population numbers because these plants are capable of spreading by adventitious roots. Also, some sites are sporadically occupied by individuals during wet years and unoccupied or dormant during periods of drought. Over the years, numerous accounting techniques have been used in an attempt to assess population numbers; however, the most accurate population data collections were made from 1998 to

the present. These collection efforts utilized a standard method of counting only the number of flowering stems rather than all age classes. These data suggest that thistle population levels are declining (Table 3) (USDI FWS 2010, Roth 2013). In fact, out of 61 previously documented thistle sites, only 43 of those sites still contained live plants (Roth 2013). In 2008, the Lincoln National Forest experienced heavier than average seasonal monsoons, triggered by Hurricane Dolly, which led to severe flooding events within the Scott Able Canyon. As a result of the flooding, most of the thistle populations located in the lower portion of Scott Able Canyon were eliminated (J. Williams, pers. comm.). Additional surveys have been conducted within the Wills and Rio Peñasco Canyons in 2014 and 2015. Potential threats that may affect Sacramento Mountains thistle individuals within the proposed New Mexico meadow jumping mouse habitat improvement project areas on the Sacramento Allotment include: livestock grazing activities, water developments and diversion, non-native invasive species, and recreation activities.

Table 3. Rates of decline in total flowering Sacramento Mountains thistle (*Cirsium vinaceum*) numbers (USFS 2010).

Survey Period*	Percent of Decline (%)
1999 - 2000	12.9
2000 - 2003	12.2
2003 - 2005	7.9
2005 - 2007	14

*Data collection methods were not standardized prior to 1998, which is when the bolted-stem count was adopted.

Effects of Alternative 1 (No Action):

Mexican Spotted Owl:

The No Action Alternative would not construct permanent fencing, handling facilities, and water developments, and a closure order would not be issued under this alternative. This alternative would not directly, indirectly, or cumulatively effect this species or its habitat. Because there is no action, MSO and its critical habitat would remain unchanged. Therefore, no effect to the species and its critical habitat is expected.

New Mexico Meadow Jumping Mouse:

The No Action Alternative would not construct permanent fencing, handling facilities, and water developments would not be constructed, and a closure order would not be issued under this alternative. This alternative would not directly, indirectly, or cumulatively effect this species or its habitat. Because there is no action, NMMJM and its critical habitat would remain unchanged. Therefore, no effect to the species and its critical habitat is expected.

Sacramento Mountains Thistle:

Since there would be no changes to the current management on the Sacramento Grazing Allotment or any other actions associated with the No Action Alternative, there would be no direct, indirect, or cumulative effects to any federally-listed plant species resulting from the No Action Alternative.

Effects of Alternative 2 (Proposed Action):

Mexican Spotted Owl:

The Proposed Action Alternative would allow the construction of permanent fences, handling facilities, water developments, and a closure order would be issued under this alternative. Impacts to MSO and its

critical habitat within the project area are expected. The implementation of the proposed action would have effects to the MSO and its critical habitat because the actions would take place within MSO protected, restricted, and critical habitats. The effects involve human disturbance to MSO and the disturbance to understory and overstory vegetation that the owl and/or its prey base utilize. The design features associated with the project would mitigate noise disturbance to MSO from the construction of projects that may take place in PAC's by only allowing implementation outside of the breeding season which is March 1st through August 30th. However, the long term maintenance of these improvements may well need to be done during the breeding season which may create disturbance to owls during the breeding season. The need for maintenance would vary each year, and the type of activities and time needed for completion would also vary. Heavy equipment, hand tools (e.g. chainsaws) and the people needed for constructing and for long term maintenance of the projects may create disturbance to conifers, shrubs, grass and forbs in either protected, restricted, and critical habitats. The project design features would aid in reducing impacts to MSO.

The construction of permanent enclosure fencing would help protect perennial water sources with the associated riparian and upland habitats. This would help maintain and enhance habitat conditions for the prey base that the MSO utilize. The water developments and handling facilities may allow better distribution of livestock, enabling better chances of meeting conservative use levels throughout the Sacramento Allotment and meeting stubble height requirements needed for MSO prey base. Handling facilities would allow for higher utilization and reduce the amount of forage and cover in those areas. This in return would create conditions where small mammal abundance is reduced while negatively affecting forage availability for MSO. [Hayward et al. \(1997\)](#) found that total abundance of small mammals differed significantly between grazed and ungrazed plots, with the mean abundance of small mammals per census about 50% higher on plots where livestock were excluded. The abundance of small mammals in the diet of spotted owls has been related to reproduction. Ward and Block ([1995](#)) suggested that the owl's reproductive success was not influenced by a single prey species, but by many species in combination. No one single group of prey significantly influenced owl reproductive success; Ward and Block concluded it was more likely that the owl's reproductive success was influenced by total prey biomass consumed in a given year, rather than by a single prey species. More Mexican spotted owl young were produced when moderate to high amounts of the three most common prey groups (woodrats, peromyscid mice, and voles) were consumed.

Determination: Implementation of the proposed action may affect and is likely to adversely affect the Mexican spotted owl and its critical habitat. This determination is based upon a few factors. The design features for the proposed action would prevent adverse human disturbance effects during the breeding season to any nesting or roosting MSO while implementing the proposed projects. However, maintenance of the projects which some are located within PAC's would most likely take place during the breeding season which could potentially adversely affect breeding owls by human disturbance. In addition, the corrals and traps would focus intensive livestock grazing within MSO habitats. The allowed grazing in corrals and traps would not be managed for conservative use levels that provide a wide range of tree and plant species, adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration, and herbaceous vegetation necessary for cover for rodent prey species. This reduces foraging opportunities for the MSO along with prey base bio mass that the MSO needs for survival and reproduction. The PCE's associated with forest structure in critical habitat would be minimally affected however the high use levels from livestock on prey base PCE's would be adversely affected

New Mexico Meadow Jumping Mouse:

The Proposed Action Alternative would allow the construction of permanent fences, handling facilities, water developments, and a closure order would be issued under this alternative. Impacts to NMMJM and its critical habitat within the project area are expected.

High intensity grazing in NMMJM habitat within the Sacramento Allotment has reduced herbaceous plant cover and density, plant litter, plant species composition and structure of riparian habitats. This had reduced the availability of food resources for the NMMJM along with less hiding cover and vegetation needed for building nests. Historically, removal of herbaceous vegetation along with soil compaction and streambank trampling has led to lowering of the water table and fluvial processes through downcutting. All of these effects have led to habitat fragmentation through removal of PCE's or adversely affecting them. Habitat fragmentation has led to poor survivorship conditions which has resulted in reduced population sizes and potential extirpation of others. Currently the only location where NMMJM can be confirmed is in the upper stretch of Wills Canyon in an existing enclosure.

To address these concerns, the proposed action is to construct permanent livestock enclosures in NMMJM habitat. The construction of the permanent enclosure fencing would help protect approximately 100 acres of NMMJM habitat. Of the 100 acres, approximately 40 would take place in Rio Peñasco Canyon and approximately 60 acres in Wills Canyon. The construction of livestock enclosures would help enhance or maintain the PCE's for NMMJM. The increased protection in occupied habitat in Wills Canyon would improve dispersal capabilities potentially reducing some of the stresses that occurs with small isolated populations. It is hoped that the vigor of the population would be maintained or enhanced leading to increased numbers of NMMJM and improving the resiliency of the sites. Ground disturbance associated with fence construction would have some short term effects to NMMJM and its PCEs. Human activity and vegetation disturbance may create effects to NMMJM during the active period or potentially during hibernation. The disturbance to critical habitat would be minor and would not alter the PCEs. Individual mice that may be occupying an area are likely to flee and temporarily change behavior to avoid noise and ground disturbance activities. Mortality is unlikely from work with the exception of working in late July through the middle of August. During this time period, young may be immobile and unable to move from day nests as equipment is moving from site to site and working. The design features associated with constructing the fence are intended to reduce the effects to NMMJM and its critical habitat. The level of maintenance of these fences after implementation would vary every year. The nature of the work is expected to create minor effects to NMMJM and the critical habitat. Effects from maintenance are expected to be insignificant or discountable, and the end results are expected to be wholly beneficial to the critical habitat and the species.

The water developments and handling facilities may allow better distribution of livestock and enabling better chances of meeting conservative use levels throughout the Sacramento Allotment along with reducing pressures in NMMJM habitat. However, some of the handling facilities are located within or adjacent to critical habitat or near historical sites. Some of the handling facilities may have some adverse effects to PCEs by allowing grazing at higher use levels to riparian or upland habitat vegetation. The design features associated with the proposed action would help reduce these effects.

Determination: Implementation of the proposed action may affect and is likely to adversely affect the New Mexico meadow jumping mouse and its critical habitat. Building permanent fencing would have short to long term effects but is designed to improve PCE's. The construction of the fence may take place during the active period which may disturb individual mice through project activities. The likelihood for disturbance may be high (despite the low detections of individuals in this area) and there is also similar likelihood for disrupting foraging and reproductive behavior of individuals. Design features including

surveys and potential timing restrictions would help to lessen the potential impacts. This determination is based on some short term vegetation disturbance by equipment, and the possibility to directly impact individual mice. In the long term, it is anticipated that the implementation of the enclosures would improve habitat conditions and expand critical habitat structural complexity for the mouse within Rio Peñasco and Wills Canyons. The enhancement of the Peñasco horse trap and permitting high use would adversely affect upland PCE's for the NMMJM. Habitat recovery in disturbed areas is expected to occur within a year or two. In any case, these impacts would not prevent the further development of PCEs.

Sacramento Mountains Thistle:

Enclosure Fencing: The direct and indirect effects of installing permanent enclosure fence around New Mexico meadow jumping mouse critical habitat would be similar to those effects previously analyzed for the New Mexico Jumping Mouse Habitat Improvement Projects Decision Memo (signed in April 20, 2016), since the foot print of the permanent fence would be approximately the same as the temporary enclosure fence. This would mean that the intermittent gaps between enclosures that allow livestock access to water (water lanes) within the riparian corridor of Wills and Rio Peñasco Canyons would be placed in the same location. Sacramento Mountains thistle may be directly affected by construction of the permanent fence if individuals were to be run over by the wheeled or tracked equipment used to install the enclosure. However, where possible, Sacramento Mountains thistle individuals would be included within the boundary of the enclosure. In addition, heavy equipment would not be used when soils are saturated to minimize erosion potential (refer to Section 2.3).

As with the temporary enclosures, the permanent enclosures would provide a measure of protection for Sacramento Mountains thistle individuals located within the enclosures. However, construction of the enclosures would concentrate grazing activity within the water lanes, where some Sacramento Mountains thistle individuals may reside. Concentrated grazing activity within the water lanes would likely reduce the cover of riparian vegetation on hillsides and streambanks, which would lead to an increase in the potential for soil erosion and compaction. In fact, a recent report aimed at evaluating the current condition and trend of riparian vegetation in select riparian areas found that sedge and riparian vegetation within the Sacramento Allotment has decreased since 1992, while bare ground has increased ([Open Range Consulting 2015](#)). This is evident during dry years where vegetation inside existing enclosures is more abundant than outside the enclosures, especially within water lanes. Increased soil erosion and compaction lead to decreased soil saturation of water. This leads to a loss of available water within riparian corridors, which indirectly causes adverse effects to Sacramento Mountain thistle individuals and its habitat.

Furthermore, the loss of available water within Sacramento Mountain thistle habitat can lead to retractions of habitat boundaries, habitat fragmentation, a reduction in the numbers of individuals, and in some cases, a loss of all plants at previously occupied sites. [Craddock and Huenneke \(1997\)](#) found that patch discreteness of Sacramento Mountains thistle is mostly a product of habitat degradation and land use along riparian corridors between "patches" or meta-populations ([Roth 2013](#)) rather than any habitat specialization restricting the plant's distribution. In local riparian areas, where habitat conditions have improved, Sacramento Mountains thistle has successfully colonized long stretches between patches, proving dispersal is sufficient to link these discrete patches. This means that isolated plants between patches could provide "stepping stones" for gene flow among discontinuous populations, enhancing inter-patch similarity, and serving in localized recovery of patches ([Craddock and Huenneke 1997](#)).

It is also believed that decreased natural water flows at travertine springs and along riparian corridors creates conditions that create a competitive advantage for introduced non-native invasive species ([Thomson 1991](#)). Non-native invasive plant species have invaded a number of Sacramento Mountains

thistle sites and pose a significant threat to maintenance of resident populations. A plant community's susceptibility to invasion by non-native invasive plant species (invasibility) is amplified by increases in available resources (i.e. light, nutrients, and water) ([Davis et al. 2000](#)) and soil disturbance. Livestock not only increases soil disturbance through hoof action (trampling); they also increase the spread of existing infestation through selective grazing, nitrogen enrichment, and transportation of seeds (endozoochory and epizoochory) ([Belsky and Gelbrand 2000](#) and [Varva et al. 2007](#)). Large populations of musk thistle and teasel (*Dipsacus fullonum*) are found throughout the Sacramento Allotment but are especially prevalent in and around the riparian areas where permanent exclosures are proposed. Throughout the allotment these invasive species are generally avoided, as livestock selectively graze around them. Selective grazing occurs when native plant species are preferentially grazed instead of non-native invasive species, which usually have low palatability due to toxins, spines, and other distasteful secondary compounds (i.e. phenolics and tannins). Subsequently, non-native invasive species, such as musk thistle and teasel, gain a competitive advantage over native species that now have reduced size, density, and overall competitive vigor as a result of grazing activity; making these invasive species more prevalent across the landscape ([Belsky and Gelbrand 2000](#) and [Varva et al. 2007](#)). In addition, livestock increase invasibility of plant communities by redistributing soil nitrogen, creating locally enriched areas or "hotspots" through urine and feces depositions. Such nitrogen hotspots are typically concentrated where livestock congregate near fences, water tanks, salt licks and riparian areas (such as water lanes) ([Belsky and Gelbrand 2000](#) and [Varva et al. 2007](#)). Moreover, while off-road vehicles, mountain bikes, and hikers may be the primary vectors of invasive species near roads, trails, and recreation areas; livestock are more likely to introduce invasive species into non-recreational or remote areas. Their effectiveness as vectors is demonstrated by their ability to transport viable seed in their digestive tracts (endozoochory), in their hair and in mud on their feet (epizoochory).

Livestock Facilities and Water Developments: Construction of additional corrals, traps, storages, troughs, pipelines, and water developments would not lead to any further direct adverse effects to the Sacramento Mountains thistle because these improvements would avoid all federally-listed plant species (refer to *Section 2.3 Design Features*). However, some of these improvements, such as new water developments and especially spring developments may have indirect and adverse effects to the Sacramento Mountains thistle (refer to the description of *Sacramento Mountains thistle* in the *Affected Environment* section). Appropriation of water from springs curtails the natural surface flows, and thus is likely to negatively affect the thistle. An unauthorized 1,900-foot long pipeline and cement spring box constructed at a thistle site near Bluff Springs, negatively impacted nearby plants by impeding water flow and resulted in an 84 percent loss of thistles, from 300 plants in 1984 to 47 plants in 1991 ([USDI FWS 1993](#)). Also, the loss of available water within Sacramento Mountain thistle habitat can lead to retractions of habitat boundaries, habitat fragmentation, a reduction in the numbers of individuals, and in some cases, a loss of all plants at previously occupied sites (refer to the *Exclosure Fencing* section above). In addition, decreased natural water flows at travertine springs and along riparian corridors create conditions that produce a competitive advantage for introduced non-native invasive species ([Thomson 1991](#)). Non-native invasive species are also known to adversely affect Sacramento Mountains thistle individuals and its suitable habitat by altering disturbance regimes, nutrient cycles, and hydrologic cycles (refer to the description of *Sacramento Mountains thistle* in the *Affected Environment* section).

Closure Order: The closure order would not lead to any further direct adverse effects to the Sacramento Mountains thistle but may indirectly benefit this species by preventing forest users from driving and camping within the exclosure areas. As previously stated, recreational impacts have been observed in areas of high visitation, such as Bluff Springs and Water Canyon. Although much of the thistle's habitat has been closed to foot traffic by fenced exclosures, recreationalists have been observed camping and driving ATVs within the exclosures ([USDI FWS 1993](#), [USDA FS 2008](#), [Roth 2013](#)). The closure order may

add some small measure of protection to portions of the Sacramento Mountains thistle habitat and individuals while in effect.

Determination: Sacramento Mountains thistle may be directly affected by construction of the permanent enclosure fence if individuals were to be run over during construction. Furthermore Sacramento Mountains thistle would be indirectly affected by the increased concentration of livestock grazing activity within the water lanes, which would likely lead to the loss of individuals and suitable habitat. Furthermore livestock use of the water lanes may result in the introduction and spread of non-native invasive species, which poses a significant threat to Sacramento Mountains thistle. The proposed range improvements would not have any direct effects to this species because surveys would be conducted prior to implementation and if found, plants would be avoided. However, the construction of these range improvements may also indirectly and adversely affect this species by creating a loci or conduit for non-native invasive species. The proposed closure order would not result in any direct adverse effects but may indirectly benefit this species by reducing the impacts of recreation activities while in effect.

Therefore, based on the analysis above, a determination of “May Affect, Likely to Adversely Affect” was made for the Sacramento Mountains thistle on the Sacramento Allotment, within the proposed project area. The rationale for the determination is that water lanes within the riparian corridor habitat of the Sacramento Mountains thistle, may cause adverse effects to individuals and would cause conditions of habitat degradation and fragmentation. This increased mortality risk to Sacramento Mountains thistle, by loss of individuals and habitat would diminished reproduction as a whole. This species has been in a state of decline since 1999 and many of the management actions and environmental conditions that have contributed to the decline of Sacramento Mountains thistle are still present and are likely to continue into the reasonably foreseeable future.

3.5 Forest Service Region 3 Sensitive Species

Affected Environment:

Regional Forester’s Sensitive Species (RFSS) were designated in 2013 by the Southwest Regional Office, with close input from biologists and botanists throughout the region ([USDA FS 2013](#)). Species designated as RFSS on the Lincoln NF were also determined through coordination with the USFWS, the New Mexico Energy, Mineral, and Natural Resources Department, and other taxonomic experts. This evaluation is to ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant species, or contribute to trends toward federal listing of any species. According to the 2013 RFSS list, there are 25 plants that occur on the Lincoln National Forest and 30 species of wildlife ([USDA FS 2013](#)). From this list of 55 species that occur on the Lincoln National Forest, twelve species may occur or have potential/suitable habitat in the project area and will be carried forward in the analysis. RFSS wildlife species to be analyzed include: Sacramento Mountains salamander (*Aneides hardii*), northern goshawk (*Accipiter gentilis*), Arizona Bell’s vireo (*Vireo bellii arizonae*), gray vireo (*Vireo vicinior*), spotted bat (*Euderma maculatum*), pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), western red bat (*Lasiurus blossevillei*) and the New Mexico shrew (*Sorex neomexicanus*). The gray vireo is analyzed under Priority Migratory Birds. RFSS plant species to be analyzed include: tall milkvetch (*Astragalus altus*), Wooton’s hawthorn (*Crataegus wootoniana*), wood lily (*Lilium philadelphicum*), and Cloudcroft scorpionweed (*Phacelia cloudcroftensis*); and of these species, all but Cloudcroft scorpionweed have been recorded within or adjacent to the proposed project areas. None of the remaining species were considered in the evaluation, because either there is no suitable habitat for the

species in the project area, or the species current distribution does not fall within the project area or surrounding counties (Appendix C).

Sacramento Mountains Salamander (*Aneides hardii*):

Endemic to south-central New Mexico where it is restricted to, but locally common in, the Sierra Blanca, Capitan, and Sacramento mountains in Otero and Lincoln counties ([Painter et al. 2017](#), [NMDGF 2016](#)). It is currently listed by the State of New Mexico as a threatened species ([NMDGF 2016](#)).

Sacramento Mountain salamanders occupy mixed forests, often on north or east-facing slopes, among Douglas fir, Engelmann spruce (*Picea engelmannii*), and white fir, often with an understory of Rocky Mountain maple (*Acer glabrum*). In the Sacramento Mountains, known habitat includes mixed-conifer and aspen forests at elevations from 7,850 to 11,700. Substantial forest canopy and ground surface cover such as rocks, logs, and organic material are key elements of preferred salamander habitat ([Degenhardt et al. 1996](#); [NMDGF 2016](#)). Logs in an advanced state of decomposition are important microhabitat for the salamander. This species can be found under both deciduous and coniferous logs, but they are most often found under coniferous (Douglas-fir) logs ([NMDGF 2016](#); [Ramotnik 1997](#)). This species spends much of the time below the surface, coming out when conditions are humid, occasionally surfacing during rainy conditions in the summer months. In drought conditions, the Sacramento Mountains salamander is most likely to be closely associated with cover objects where humidity is higher ([Haan and Desmond 2004](#)). It is believed that individuals move to subterranean cavities to avoid freezing temperatures. The critical thermal maximum for this species is about 33.25 degrees Celsius ([Whitford 1968](#)).

Northern Goshawk (*Accipiter gentilis*):

Northern goshawks occur in ponderosa pine and mixed conifer forest types in a variety of tree age and size classes, ranging from mature to young forest stands. The principal forest types occupied by the northern goshawk in the Southwest are ponderosa pine, mixed conifer, and spruce-fir ([Reynolds et al. 1992](#)). In general, northern goshawks nest in mature to old forest stands of relatively large trees with closed canopies and an open understory. Goshawks typically prefer forests with a relatively high canopy closure and greater tree density ([Beier and Drennan 1997](#)). The best northern goshawk foraging habitat is believed to consist of forested stands with complex structure having large amounts of downed logs, woody material, and snags. Adequate perches for hunting and flight space for maneuvering are other important characteristics of forested stands used for foraging by northern goshawks. Jays, flickers, and squirrels make up the bulk of their diet. Snags, downed logs, woody debris, and openings with reserve trees are important components of northern goshawk habitat. Breeding habitat is delineated as a nesting area, a post-fledging family area (PFA), and a foraging area. Home range establishments are called PFAs. PFAs are delineated to be approximately 600 acres in size. PFAs include the nest sites and consist of the habitat most likely to be used by the fledglings during their early development. There are approximately 33 PFAs found on the Sacramento Ranger District. Post-fledgling Family Areas are to be managed for as nesting and fledgling habitat. Outside the Post-fledgling Family Areas, mixed-conifer forest is to be managed as northern goshawk foraging habitat.

Gray Vireo (*Vireo vicinior*):

The gray vireo often occupies open piñon-juniper woodland or juniper savannah with a shrub component. Piñon-juniper habitat that is too sparse or too thick may not be utilized. NM gray vireos occupy a variety of vegetation types including desert riparian communities along drainages in southern NM, juniper-oak (*Quercus* spp.) woodland in southeastern NM, juniper woodland and savanna in central and western NM, and piñon-juniper woodland in north and northwestern New Mexico ([Walker and](#)

[Doster 2009](#)). Nests are placed in low trees or shrubs, often in junipers; in southern New Mexico, use of oaks is also prevalent ([NMACP](#)). In the southwest Sacramento Mountains, nests were built in a variety of tree species including two needle piñon, alligator and one-seed juniper, mountain mahogany, fragrant ash (*Fraxinus cuspidata*), evergreen sumac (*Rhus virens*), and Wright's silktassel (*Garrya wrightii*). Occupied territories were primarily in and along narrow to moderately broad, sinuous, limestone canyons ([Britt and Lundblad 2009](#)). They exhibit patchy distributions in the breeding season, with apparently suitable habitat patches left unoccupied ([NMACP](#)). It is a seasonal resident of the Sacramento Ranger District.

Spotted Bat (*Euderma maculatum*):

In New Mexico, the spotted bat occurs in forested areas between 3,900 and 10,600 feet elevation ([NMDGF 2016](#), [BISON 2017](#)). Cracks, crevices, and caves, usually high in fractured rock cliffs, appear to be a necessary feature for roosting ([Texas Parks and Wildlife 2012](#)). They are cliff dwellers that roost during the day in cracks and crevices of canyons and cliffs ([BISON 2017](#)). Cliff faces and rock crevices for roosting are an essential habitat component ([NMDGF 2016](#)). Habitats range from arid, low deserts to high elevation conifer forests. They occupy a wide variety of habitats including riparian communities, open semi-desert shrublands, pinyon-juniper woodland, ponderosa pine (including burned areas of ponderosa pine), mixed coniferous forest, and subalpine coniferous forest. More detailed habitat preferences are not clear. They are generally considered to occupy higher elevation forested areas during the reproductive season and migrate to lower elevations at other times of the year ([NMDGF 2016](#), [BISON 2017](#)). Water and cliff features are critical.

Pale Townsend's Big-Eared Bat (*Corynorhinus townsendii pallescens*):

Pale Townsend's big eared bat ranges from New Mexico to central and eastern Colorado, with the northern limit in northern Colorado or southern Wyoming ([NatureServe 2017](#)). Pale Townsend's big eared bat probably occurs statewide year-round, although there are no records from east of the middle and lower Pecos River or throughout much of the northwestern quarter of the state ([Frey 2004](#)). They hibernate in New Mexico in the winter ([Jones 2016](#)). It is the only species of New Mexican bat that may regularly be found in winter, during which they are typically located in caves and mine shafts ([BISON 2017](#)). There are internal records of a substantial population in at least one cave on Sacramento District. Pale Townsend's big-eared bats use a wide variety of habitats. They may forage primarily over standing water. During the day mostly found in caves or mine tunnels (considered a cave and mine roosting obligate), but may often rest in artificial structures (abandoned buildings) at night ([BISON 2017](#)). They have been found in shelters from low, arid desert up to montane conifer environments.

New Mexico Shrew (*Sorex neomexicanus*):

New Mexico shrew are known only from a small range in south-central New Mexico that includes the Capitan and Sacramento mountains ([NatureServe 2017](#)). Often along streams, meadows, sheltered canyons and moist coniferous (white fir, Douglas fir, and ponderosa pine) and aspen forest, including areas without permanent water ([Bison 2017](#), [NatureServe 2017](#)). It is thought to prefer higher elevation mesic habitats where there is moist vegetation, such as along drainages, canyons bottoms, or headwaters that have been drained. Generally caught under logs, in moist cold woods, along creek banks, about springs, in mountain meadows, or under and among broken rocks. NatureServe categories include Riparian, Forest - Conifer, and Grassland/ herbaceous; the species has been described as inhabiting meadows, and leaf litter, in canyons of coniferous forests, often along streams ([NatureServe 2017](#)). Dispersal distances of shrews are poorly known ([NatureServe 2017](#)). The New Mexico shrew feeds on invertebrates, and uses soil, fallen logs or other forest floor debris for cover and protection.

Tall Milkvetch (*Astragalus altus*):

Tall milkvetch is an early successional, perennial forb in the Pea family (*Fabaceae*) ([NMMNPPAC 1984](#)). Each flowering stalk can produce anywhere from 15 to 45 flowers. These flowers vary in color from pale-cream to yellow and appear May to September ([Martin and Hutchins 1980](#), [NMRPTC 1999](#)). Tall milkvetch is a narrow endemic that typically inhabits limestone soils found among the upper ponderosa pine and lower Douglas fir vegetation types. It is found on steep forest slopes or road cuts, around Cloudcroft at elevations of 1,900 to 2,500 m (6,500-8,200 ft.). It often inhabits road cuts and other sites for some years after disturbance ([NMRPTC 1999](#)).

Threats to this species may include road maintenance and herbicide application along road rights-of-way, residential and recreation development, and occasional browsing by deer and elk. Currently, the effects of forest fire on this species are unknown ([NMRPTC 1999](#)).

No recent surveys have been conducted for this species within the proposed project areas. However, this species has been documented in and around the northern portion of the Sacramento Allotment. Within the allotment, this species is located in Hubbell Canyon, Wills Canyon, Bear Canyon, along Rio Peñasco, and all along Russia Canyon, within ¼ mile of the existing corral.

Wooton's Hawthorn (*Crataegus wootoniana*)

Wooton's hawthorn is a small tree or shrub up to 10 feet (3 m) tall. The branches are spined with 1.2- to 1.6-inches (3-4 cm) long purplish brown thorns. Wooton's hawthorn produces clusters of white flowers from April to June ([NMRPTC 1999](#)). Habitat for this species consists of mid- to high-elevation coniferous forest understories along roadsides or in creek beds and canyon bottoms in moist canyons from 6,500 to 8,000 feet. Threats to this species are unknown but may include any activity that degrades riparian habitat. Several populations of Wooton's hawthorn have been documented on the Smokey Bear and Sacramento Ranger Districts. On the Sacramento Ranger District, several populations occur along Agua Chiquita Road and a few are located along Rio Peñasco, adjacent to the proposed new permanent fencing along Water Canyon.

Wood Lily (*Lilium philadelphicum*)

Wood lily is one of the widest ranging of all true lilies in North America, from Quebec to British Columbia, south to Georgia and New Mexico. Due to its wide distribution throughout North America, the State of New Mexico does not consider this species rare despite its uncommon occurrence within the state ([NMRPTC 1999](#)). Flowers typically appear May through August ([FNA 1993](#)). Typical habitat for this species consists of wetlands and wet meadows associated with open, mature coniferous forests at 7,000-10,000 ft. elevation ([Martin and Hutchins 1980](#), [USDI BLM 2002](#)). Threats to this species are unknown. No recent surveys have been conducted for this species within the proposed project areas. However, this species was previously documented within the Sacramento Allotment near Telephone and Hay Canyons.

Cloudcroft Scorpionweed (*Phacelia cloudcroftensis*)

Cloudcroft scorpionweed is an extremely rare annual that was newly rediscovered in 2007 ([NMRPTC 1999](#)). It is a robust forb with flowers. The flowers are tubular, pale blue to lavender, less than 0.2 inch (0.5 cm) long and develop July through September. This species is found on disturbed sites in arroyo channels or along roads in mixed conifer forests as well as piñon-juniper woodlands from 6,500 to 8,550 feet (1,980-2,600 m) in elevation ([Roth 2013](#)).

Threats to Cloudcroft scorpionweed consist of seasonal flooding, off-road vehicle use, trail maintenance, and road maintenance and construction activities, including herbicide application, mowing, road improvement projects, and removal of debris. In addition, non-native invasive species, such as Siberian elm (*Ulmus pumila*), musk thistle (*Carduus nutans*), and bull thistle (*Cirsium vulgare*), have been observed within occupied habitat and pose a threat to this species.

Cloudcroft scorpionweed was originally known from only three collections made in 1889 and 1891, then was not found again until 1968 ([NMRPTC 1999](#)). No surveys were conducted for Cloudcroft scorpionweed within the proposed project area; however, populations of this species have been identified along the northern boundary of the Sacramento Allotment.

Effects of Alternative 1 (No Action):

Since there would be no changes to the current management on the Sacramento Grazing Allotment or any other actions associated with the No Action Alternative, there would be no direct, indirect, or cumulative effects to any Regional Forester's Sensitive plant or animal species resulting from the No Action Alternative.

Effects of Alternative 2 (Proposed Action):

Sacramento Mountains Salamander:

At least six of the proposed project sites fall within the edge of stands that have been recorded to be occupied by Sacramento Mountains salamanders. Those include Russia Canyon Trap and Corral (rebuild the existing corral and construct a new trap), Lucas Canyon/Dark Canyon Trick Tank (reconstruct the existing trick tank), Benson Canyon Trap and Corrals (new trap and reconstruct the existing corral), Deadman Canyon Corral and trap (new corral and trap), Upper Hay Canyon Corral and Trap (new corral and trap), and Wills Canyon Corral (reconstruct the existing corral). Other high elevation project sites fall near edges of occupied areas. Lower elevation sites (below approximately 7,900 feet) are drier and lack habitat to support Sacramento Mountains salamanders.

To the extent they occur in mixed conifer and aspen forests, activities associated with the project would likely have a direct impact on Sacramento Mountains salamanders and result in some loss of habitat. Sacramento Mountains salamander could experience direct mortality and habitat loss from construction of new facilities. Additional indirect effects to Sacramento Mountains salamander may also occur. Any heavy equipment used to implement the project could lead to an increase in site disturbance, which may lead to the introduction and/or spread of nonnative invasive species. With any management activity that requires use of heavy equipment brought in from off-site or that disturbs the soil and increases sunlight exposure to the ground, there is a risk of transporting and spreading nonnative invasive species into the project area. Nonnative invasive species can compromise habitat quality in the project area.

The proposal may impact individuals but is not likely to cause a trend to federal listing or loss of viability.

Individuals would likely be effected, but it is expected that the project is not likely to cause a trend to federal listing or loss of viability of Sacramento Mountains salamander population or its habitat on the Lincoln National Forest. Few individuals of this species may be impacted or destroyed, but the majority of the species' population would be maintained. Modifications to the project may allow for avoiding impacts. Cover such as rocks, logs, and organic material should be maintained.

Northern Goshawk:

Two of the proposed project sites fall within or near the edge of northern goshawk post-fledgling family areas (PFAs). Those include the Apache Point Trap and Corrals (new corral and trap) proposed along the northwest edge of the Moore PFA. The second is the Dark Canyon Trap (new trap along Dark Canyon Creek), which falls 400 to 500 feet from the south end of the Birdie PFA and the north end of the Robin PFA. Construction of fencing may require the removal of trees 12ft on either side of the fence line and or some mixed conifer stand edge (at the edge of mixed conifer forest and meadow at the project site). Trees removed for implementation and safety reasons may include large diameter trees.

Some activity by northern goshawk could potentially be impacted minimally by the Proposed Action. Noise and other disturbances created during the construction of permanent fencing, water developments, and traps and corrals could cause harassment and disrupt nesting and courtship. However, a breeding season restriction would offset any potential impacts to individuals during the breeding season. Noise and visual disturbance from construction of proposed facilities would not likely substantially impact northern goshawk nesting or reproductive success because all construction of proposed projects would be prohibited within Post-fledgling Family Areas during the breeding season (March 1 to September 30). Noise and visual disturbance from activities outside the Post-fledgling Family Areas and breeding season are not expected to have an adverse impact on the northern goshawks foraging use of the project area, although northern goshawks may temporarily avoid portions of the project area where activities are being conducted.

The proposal may impact individuals but is not likely to cause a trend to federal listing or loss of viability. Individuals may be effected slightly, but it is expected that the project is not likely to cause a trend to federal listing or loss of viability of the northern goshawk population or its habitat on the Lincoln National Forest. Few individuals of this species may be slightly impacted, as well as a small amount of habitat. Modifications to the project may allow for avoiding potential impacts.

Gray Vireo:

Piñon-juniper woodland habitat occurs at Pasture Ridge, where a new trap and corral are proposed. The Proposed Action would result in the removal of trees within the piñon-juniper woodland. Short-term impacts may displace individuals. Incidental take could occur if nest trees were cut during the breeding season (gray vireo breeding season runs from mid-April to mid-August). During implementation of proposed projects, removal of some pinyon-juniper woodland habitat may dislodge nests and or eggs.

Grazing activity itself has the potential to dislodge nests from shrubs as cattle travel through brushy areas. Habitat immediately adjacent to improvements would have habitat that is of lower quality for nesting but still may be used as foraging habitat. Some nesting activity may also be altered by maintenance activities. Considering the above factors, it is determined that the action alternative may impact individuals, but is not likely to result in a trend toward listing.

Spotted Bat:

Habitat for the spotted bat occurs within the general area of proposed actions. Cattle ponds and meadow grasslands may provide foraging habitat for some individuals. However, there are no cliffs associated with project sites. No direct impacts are anticipated. Little or no indirect impacts are anticipated, because roosting habitat is not present and any temporary impacts such as noise from project implementation work would occur during the daytime (thus not even potential foraging in the project areas would be disrupted). Permanent fencing of NMMJM habitat could be slightly beneficial to

any extent that those actions allowed for denser aerial insect abundance due to any potential increases in herbaceous cover.

Potentially, this proposed project may impact spotted bat individuals or habitat in minor ways. Impacts from the proposed action for the spotted bat on the Lincoln National Forest are considered either insignificant or discountable. Very few individuals of this species may be impacted positively or negatively. The proposal may impact individuals but is not likely to cause a trend to federal listing or loss of viability.

Pale Townsend's Big-Eared Bat:

Habitat for pale Townsend's big-eared bat occurs within the general area of proposed actions. Cattle ponds and meadow grasslands may provide foraging habitat for some individuals. However, there are no cliffs associated with project sites. No direct impacts are anticipated. Little or no indirect impacts are anticipated, because roosting habitat is not present and any temporary impacts such as noise from project implementation work would occur during the daytime (thus not even potential foraging in the project areas would be disturbed). Permanent fencing of NMMJM habitat could be slightly beneficial to any extent that those actions allowed for denser aerial insect abundance due to any potential increases in herbaceous cover.

The proposal may impact individuals but is not likely to cause a trend to federal listing or loss of viability. Potentially, this proposed project may impact pale Townsend's big-eared bat individuals or habitat in minor ways. Impacts from the proposed action for pale Townsend's big-eared bat on the Lincoln National Forest are considered either insignificant or discountable. Very few individuals of this species may be impacted positively or negatively.

New Mexico Shrew:

The proposed project sites include high elevation meadow – mixed-conifer forest edge. All such sites are suitable habitat and may be occupied by the species. Direct effects may be associated with timber falling operations and corral and fence construction. Individuals may be harmed during implementation by ground labor and equipment. Additionally, indirect effects may occur, including noise impacts that may disturb New Mexico shrew in the immediate construction area. Vegetation which is used for foraging and cover may be trampled by ground labor and equipment. Tree removal and heavy equipment activity may negatively impact the nesting sites of the species. Heavy equipment used to implement the project could lead to an increase in site disturbance, which may lead to the introduction and/or spread of nonnative invasive species. With any management activity that requires use of heavy equipment brought in from off-site or that disturbs the soil and increases sunlight exposure to the ground, there is a high risk of transporting and spreading nonnative invasive species into the project area. If these nonnative invasive species were allowed to establish, they could compromise habitat quality for shrews and other small mammals.

Permanent fencing of NMMJM meadow habitat may also cause disturbance to New Mexico Shrew habitat during implementation. Permanent fencing for the mouse would better protect shrew habitat as well. The permanent fencing would not protect all of NMMJM habitat. Water and access lanes would be located throughout both stretches of NMMJM habitat in Rio Peñasco and Wills Canyons. Grazing would be concentrated within these areas and the vegetation needed for forage and cover would be limited accordingly. As a result, meadow habitat within these areas would be fragmented which can affect dispersal, recruitment, and survival of the New Mexico shrew within these areas. However, areas with permanent fencing would indirectly improve foraging and nesting habitat for this species by allowing

vegetation to recover from grazing by livestock (and if elk-proof, protection from grazing by elk) within meadows.

This project may impact individuals, but is not likely to cause a trend to federal listing or loss of viability to the species or its habitat. Grazing infrastructure developments may impact individual New Mexico shrews. Permanent fencing components would likely have beneficial effect on New Mexico shrew and its habitat. Few individuals of this species may be impacted or destroyed, but the majority of the species' population would be maintained.

Tall Milkvetch, Wooton's Hawthorn, Wood Lily, and Cloudcroft Scorpionweed

Exclosure Fencing: Tall milkvetch, wood lily, or Cloudcroft scorpionweed are not known to occur in or immediately adjacent to the boundary of the proposed permanent exclosure fence; therefore no direct impacts are anticipated for these species. Conversely, Wooton's hawthorn individuals have been recorded in close proximity to the proposed permanent exclosure along Water Canyon. However, known occurrences of Wooton's hawthorn appear to be further than 12 feet from the proposed fence thereby eliminating the need to remove these individuals. In addition, the foot print of the permanent fence would be approximately the same as the temporary exclosure fence constructed last year, therefore it is unlikely that there would be any additional adverse impacts to this species.

Indirect effects to these four species may result from habitat degradation and fragmentation resulting from heavy grazing pressure in the water lanes. Furthermore livestock use of the water lanes may result in the introduction and spread of non-native invasive species. As described above, heavy livestock use of these areas would increase soil nutrients through waste elimination, create soil disturbance through hoof action thereby removing existing native vegetation, and deposit viable seeds onsite as they pass through the digestive track or dislodge from hair and hoof.

Livestock Facilities and water developments: Construction of additional corrals, traps, storages, troughs, pipelines, and water developments would not have any direct adverse effects to tall milkvetch, Wooton's hawthorn, wood lily, or Cloudcroft scorpionweed because these improvements would avoid all Region 3 sensitive plant species. In addition, areas proposed for range improvement projects would be surveyed and cleared by a biologist or botanist prior to construction (refer to Threatened, Endangered, Region 3 Sensitive Species section of Project Design Features and Mitigation Measures). However, construction of these range improvements may indirectly and adversely affect these species by creating a loci or conduit for non-native invasive species. As previously mentioned, livestock increase the invasibility of plant communities by disturbing vegetation and soils and by altering ecosystem processes such as nutrient cycling. Furthermore, livestock typically congregate near fences, water tanks, salt licks and riparian areas; therefore, it is likely that these areas would experience the greatest degree of disturbance and are most likely to be colonized by non-native invasive species.

Closure Order: The closure order would not have any direct adverse effects to tall milkvetch, Wooton's hawthorn, wood lily, or Cloudcroft scorpionweed individuals but may indirectly benefit these species while in effect by preventing forest users from driving and camping within the exclosure areas, which may have suitable or occupied habitat.

Determination: For tall milkvetch, Wooton's hawthorn, wood lily, and Cloudcroft scorpionweed, the proposed permanent exclosure fencing may indirectly result in habitat degradation and fragmentation from heavy grazing pressure in the water lanes. Furthermore livestock use of the water lanes may result in the introduction and spread of non-native invasive species. The proposed range improvements would not have any direct effects to tall milkvetch, Wooton's hawthorn, wood lily, and Cloudcroft scorpionweed because surveys would be conducted prior to implementation and if found, these species would be

avoided. However, the construction of these range improvements may also indirectly and adversely affect these species by creating a loci or conduit for non-native invasive species. The proposed closure order also would not result in any direct adverse effects but may indirectly benefit these species while in effect. Therefore, the proposed action (including the project design features and mitigation measures) may impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.

3.6 Management Indicator Species

The Forest Service Manual ([FSM 2600](#)) defines management indicators as; “Plant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent.”

FSM 2600 directed the Forest to select management indicators species (MIS), in the Forest Plan for each forest, that best represent the issues, concerns, and opportunities for wildlife on that forest. The selected MIS are intended to reflect general habitat conditions needed by other species with similar habitats. General effects to wildlife species would be determined by using management indicator species that have habitat within the project areas. Management projects must identify and consider factors that may affect population trends of MIS. Use of an indicator species approach to assess impacts of proposed projects is consistent with the direction in the current Forest Plan ([USDA FS 1986](#)).

Ten management indicator species (MIS) are identified in Amendment 1 (May 1987) of the Forest Plan ([USDA FS 1986](#)). MIS were included in this analysis if the species and habitats were likely to be present within the proposed project area and affected. MIS analyzed include hairy woodpecker (*Picoides villosus*), juniper titmouse (*Baeolophus ridgwayi*), pygmy nuthatch (*Sitta pygmaea*), red squirrel (*Tamiasciurus hudsonicus*), Mexican vole (*Microtus mexicanus*), elk (*Cervus elaphus*) and mule deer (*Odocoileus hemionus*). Species not included in the analysis because no effects are expected are rufous crowned sparrow (*Aimophila carpalis*), eastern meadowlark (*Sturnella magna*) and western meadowlark (*Sturnella neglecta*). Rufous-crowned sparrow are an indicator species for desert shrub (brushy mountain slopes) on steep, dry, rocky hillsides with plenty of grasses and a scattering of shrubs and small trees, such as sagebrush or scrub oaks. They tend to avoid areas of dense shrubs, and generally occur on dry, open hillsides covered with grasses, rocks, and scattered shrubs, including coastal sagebrush, open chaparral, scrub oaks, piñon pine, and other woody plants. Key habitat factors, individuals, or populations are not expected to be impacted by proposed project components. Meadowlarks are indicator species for grama galleta grassland (open weedy grasslands) below 7,500 feet. The meadowlark listed in the Forest Plan is not specified to eastern or western species. However, the eastern and western species year-round ranges overlap in this area of New Mexico. Both species prefer grassland and other types of open habitat, so the MIS list is retained as simply meadowlark, and refers to both species. Key habitat factors, individuals, or populations are not expected to be impacted by proposed project components.

Affected Environment:

Hairy Woodpecker (*Picoides villosus*):

Hairy woodpeckers are the indicator species for aspen (mature and snags). They are birds of mature forests across the continent. They're also found in woodlots, suburbs, parks, and cemeteries, as well as forest edges, open woodlands of oak and pine, recently burned forests, and stands infested by bark beetles. They can be found commonly in coniferous forests, deciduous forests, or mixtures. They are also found at forest edges, around beaver ponds, in recently burned forests, southern swamps, open pine,

oak, or birch woodlands, and orchards ([CLO 2018](#)). There is approximately 217,000 acres of habitat forest-wide.

No systematic surveys are conducted specifically for hairy woodpecker on the Lincoln NF; however, it is regularly detected during breeding bird surveys in southeastern New Mexico. Hairy woodpeckers are fairly common to common and widespread. Populations were stable (increased by about 1 percent per year between 1966 and 2010), according to the North American Breeding Bird Survey. They rate a 6 out of 20 on the Partners in Flight (PIF) Continental Concern Score and are not on the 2012 Watch List. Fragmentation of large forest tracts into smaller parcels and competition for nest holes from the European starling could impact numbers ([CLO 2018](#)).

Juniper Titmouse (*Baeolophus ridgwayi*):

The juniper titmouse is the Lincoln NF indicator species for piñon-juniper woodland types (key habitat factor: trees with natural cavities). It may be found in piñon-juniper or pine-oak woodland in foothills throughout New Mexico ([NMACP 2017](#)). No systematic surveys are conducted specifically for juniper titmouse on the Lincoln NF; however, it is regularly detected during breeding bird surveys in southeastern New Mexico. In eBird, there are records scattered throughout the Sacramento Ranger District, at more than 30 locations, mostly in areas below higher elevation forest (below spruce-fir, mixed conifer and ponderosa pine) ([eBird 2017](#)). USGS GAP distribution models predict that substantial portions of the Lincoln NF, particularly the western slopes of the mountain ranges, include habitats that are suitable for occupation ([USGS 2018](#)).

New Mexico Avian Conservation Partners (NMACP) summary of concern is as follows: "Juniper Titmouse is a species of piñon-juniper woodlands of the intermountain region, with New Mexico holding a significant percentage of the species population. It has shown moderate to large population declines, mostly since 1980, particularly in New Mexico and Colorado" ([NMACP 2017](#)). Its New Mexico Partners in Flight (NMPIF) priority category is Species of Conservation Concern, Level 1 (SC1). National Partners in Flight (PIF) estimates that New Mexico holds 28% of the species population, thus New Mexico has a high stewardship responsibility for this species. It receives high PIF vulnerability scores for its relatively small population size and for area importance, and the maximum score of 5 from NMPIF for its declining population trend statewide and regionally. Its NMPIF combined assessment score is 19, out of a maximum of 25. The species rates an 11 out of 20 on the PIF Continental Concern Score (where 20 is given to the most threatened species). It is not on the State of North America's Birds 2016 Watch List.

Juniper titmouse inhabit piñon-juniper communities predominantly, and also juniper woodland in some areas (e.g., northeast California) ([BNA 2017](#), [BISON 2017](#), [NMACP 2017](#)). They are "...Most common where juniper is dominant and where large, mature trees are present to provide natural cavities for nesting" ([BNA 2017](#)). Tree species composition does vary geographically across the range, but few species are so closely tied to a single habitat type (piñon-juniper; [BNA 2017](#)). In the Southwest, occupied piñon-juniper woodland is often mixed with deciduous or evergreen oaks ([BNA 2017](#)). However, its distribution and abundance are independent of presence of oaks ([BNA 2017](#)). They may also use adjacent shrub and riparian (e.g., cottonwood) habitats for foraging ([BNA 2017](#)). Other habitats used include Madrean Pine-Oak Woodland. Depending on location; habitat elements or conditions which may be required, preferred, or for which positive correlations have been reported include: availability of nest cavities (e.g., may impact winter survival in addition to nesting needs); large, mature trees that provide natural or woodpecker-excavated cavities for nesting and roosting (often nests in crevices in twisted trunks of mature junipers); senescent trees; and high overstory cover ([NMACP 2017](#), [CLO 2018](#)). They inhabit elevations from about 2,250-8,000 feet ([CLO 2018](#)).

Juniper titmouse do not excavate their own cavities; they nest in natural cavities or old woodpecker holes ([Scott et al. 1977](#)). As cavities may be a limiting factor, retention of older juniper trees with large, twisted trunks is especially important ([BNA 2017](#)). In the Guadalupe Mountains, West ([2005](#)) asserts that there is heavy competition for the few cavities that occur (there, provided mostly by ladder-backed woodpeckers), which should be considered in snag or dead tree management. Juniper titmouse cache food ([BNA 2017](#)); they eat seeds, particularly piñon pine seeds, plant material, insects, and spiders. Insects in their diet include beetles, caterpillars, flies, leafhoppers, and others ([CLO 2018](#)). Winter diet is large seeds (piñon nuts, juniper berries and acorns) and shifts to more arthropods in the spring and summer, though plant material remains important ([NMACP 2017](#)). Juniper titmouse mate for life and defend territories year-round ([NMACP 2017](#)). Depending on the location in New Mexico, associated species include great horned owl, gray flycatcher, plumbeous vireo, piñon jay, western scrub-jay, mountain chickadee, bushtit, white-breasted nuthatch, mountain bluebird, black-throated gray warbler, black-headed grosbeak ([NMACP 2017](#)).

Threats/stressors to juniper titmouse include habitat alteration, including removal of trees for fuel or conversion of piñon-juniper woodlands to rangeland/pasture (rangeland conversion, including chaining; removal of mature and senescent trees in piñon-juniper habitat; overall decline of this habitat due to drought and beetle infestation; commercial harvesting of piñon nuts) could impact habitat if junipers are removed to increase nut productivity; and excessive firewood and fence post cutting ([NMACP 2017](#), [BNA 2017](#), [CLO 2018](#)). NMACP ([2017](#)) assert that management for the titmouse in New Mexico should focus on the preservation of mature stands of piñon-juniper woodland with structural diversity, including the presence of large and senescent trees ([NMACP 2017](#)). Depending on the specific treatment, thinning or selective fuelwood cutting may have slight positive benefits for the titmouse ([BNA 2017](#)). However, habitat may also be degraded by poorly planned thinning and tree removal treatments, including the removal of all dead or dying trees in areas of beetle infestation and associated die-off ([NMACP 2017](#)).

Pygmy Nuthatch (*Sitta pygmaea*):

This species is the Lincoln NF indicator species for ponderosa pine (key habitat factor: large trees and snags), they especially favor mature ponderosa pine forests. They are typically found at lower and middle elevations where ponderosa pine grows, but also occur up to 10,000 feet in mixed conifer. Their typical forest habitat is open, parklike stands of older, large trees. They also occur in forests of pine mixed with oak, quaking aspen, maple, Douglas-fir, or white fir (mixed conifer). Since they depend upon cavities in old trees (snags) for roosting and nesting, pygmy nuthatches are most abundant in forests that have escaped heavy logging and snag removal ([CLO 2018](#)).

No systematic surveys are conducted specifically for the pygmy nuthatch on the Lincoln National Forest; however, it is regularly detected during breeding bird surveys in southeastern New Mexico. Within their patchy range, populations appear to have stayed relatively stable from 1966 to 2014, though there is some indication of populations experiencing a small decrease every year according to the North American Breeding Bird Survey. The species rates a 10 out of 20 on the Continental Concern Score. Pygmy Nuthatch is not on the 2014 State of the Birds Watch List ([CLO 2018](#)).

Throughout the twentieth century, logging, grazing, and fire suppression converted many ponderosa pine forests—previously parklike woodlands with large, tall trees favored by nuthatches—into mosaics of differently aged trees and dense thickets. The Pygmy nuthatch population has presumably declined as a result, since the nuthatches rely on mature pines and standing dead trees for suitable nest sites and foraging habitat. Forest management that allows dead trees to remain standing can help pygmy nuthatches in mature pine forests—recommendations suggest that at least 7–12 large snags (at least 19 inches in diameter) should be left standing per hectare (2.5 acres) of forest ([CLO 2018](#)).

Red Squirrel (*Tamiasciurus hudsonicus*):

This species is the indicator species for Engelmann spruce (mixed conifer forest with interlocking crowns and trees of cone bearing age). Red squirrels on Lincoln National Forest are limited to relatively high elevation spruce fir and mixed conifer forests. There are approximately 216,769 acres of mixed conifer habitat on the forest. Red squirrels principally use closed canopied mixed conifer forests with a clumped distribution of large, mature, cone-bearing trees ([Reynolds et al. 1992](#)). Large trees with interlocking crowns provide the squirrel with a means of escape, access to foraging habitat, and immigration into new areas. Red squirrel typically nests in stands with less than 100 trees per acre ([Young and Greer 2002](#)). Mixed conifer stands with excessive seedlings, saplings and young white fir trees on the order of hundreds per acre constitute poor habitat. Mixed conifer stands with high densities also lack in ground vegetation ([Denton 2006](#)). Red squirrels prefer to nest in cavities of large snags, but also nest in live trees with thick crowns, and in mistletoe formations ([Hedwall et al. 2006](#)). They also construct nests out of grasses or other materials, and use ground burrows ([NatureServe 2017](#)). The squirrel's diet includes pine cones, fungi, fruit, seeds, sap, acorns, buds, conifer pollen, birds and small mammals. The most important food source is cones, and the best cones are from old Douglas-fir trees. The squirrel stores seeds, cones and acorns in food "caches" to use throughout winter. They place the caches in moist, shady areas, often under dense vegetation, in tree cavities or at the base of large logs in order to help prevent the cones from opening ([Reynolds et al. 1992](#)). A home range for the red squirrel is less than 2.5 acres. Approximately 9 to 25 large, mature, cone-producing trees per territory are required to sustain one red squirrel for a single year. The squirrel is often used as prey by the Northern goshawk ([Reynolds et al. 1992](#)). As opposed to relatively high densities in mature and old spruce-fir and mixed conifer forest, there is a much lower incidence of red squirrels in mature ponderosa pine, indicating that they avoid open, drier forest sites.

No systematic surveys are conducted specifically for Red squirrel on the Lincoln NF; however, they are regularly observed around the forest and southeastern New Mexico mountains. Red squirrel populations are generally secure in New Mexico ([NatureServe 2017](#)). The Ruidoso red squirrel subspecies has been studied on the forest (Smokey Bear RD) as part of a research thesis project ([Frey and Wampler 2005](#)).

Mexican Vole (*Microtus mexicanus*):

The Mexican vole is an indicator species for mesic meadows within mixed conifer forest above 8,000 feet elevation. The Mexican vole inhabits meadows or open forest types with dense ground cover in the ponderosa pine and mixed-conifer forest types. Their primary habitat is mesic mountain meadows, but they will occupy forested edges adjacent to meadows as numbers increase and individuals disperse. The presence of Mexican voles is correlated with the height of herbaceous ground cover. Voles are essentially absent from mountain meadows with herbaceous ground cover height of 2.4 inches or lower. As ground cover height increases, the number of voles per acre increases. At a 4-inch herbaceous ground cover height, approximately 50 voles per acre are expected to be present ([USDA FS 2006](#)). There are no ongoing, systematic surveys conducted specifically for Mexican vole on the Lincoln National Forest.

Elk (*Cervus elaphus*):

This species is the indicator species for mixed conifer (open mixed conifers and mountain meadows; USDA FS 1986). There are approximately 217,000 acres of such habitat forest-wide. Elk inhabit mixed-conifer forests as well as woodlands, chaparral, and grasslands, and can be found in the project area year-long. In general, elk prefer open grassy meadows located less than 0.5 mile from water. Sedges (*carex* sp.) and rushes (*juncus* sp.) are an important food source.

They forage on mid- to late-seral range vegetation. They rely on grasses for most of the year but also consume forbs in the summer and may browse on woody plants where grasses are unavailable, especially during winter months. During the summer, elk spend the majority of their time in subalpine mountain meadows or in stream habitats. On the Lincoln NF, elk generally summer in the high-elevation mixed-conifer-zone above 7,500 feet. During winters, with heavy snowfall, they are found at lower elevations within the piñon-juniper and ponderosa pine habitat. If winters are mild with little to no snowfall, elk will use mixed-conifer habitat at higher elevations.

Thermal and security cover is required year-round by elk and generally consists of mature forest with large amounts of edge along grasslands or meadows. Hiding cover for elk occurs in stands of trees 30 to 60 acres in size and 70% canopy cover. Road density is also an important habitat consideration with optimum road spacing at less than 0.25 mile of primary road per section.

Elk are managed as game by New Mexico Department of Game and Fish (NMDGF), which conducts surveys and sets bag limits on Game Management Units (GMUs) on the Lincoln NF. NMDGF conduct annual winter aerial surveys for elk in the GMUs. Data from these surveys indicate that elk populations in Unit 34, which overlaps the Sacramento Ranger District, have increased over the last 10 years. According to the Elk Harvest Report for 2016, the estimated elk populations for GMU 34 is 6,010-6,262 ([NMDGF 2018](#)). Current management objectives for elk in this unit are to maintain a stable population. Estimated total harvest in 2016 was 663 cows and 556 bulls; sustainable harvest was estimated to be 432-554 cows and 574-598 bulls.

Mule Deer (*Odocoileus hemionus*):

Mule deer is considered an indicator species for piñon-juniper woodland shrub (shrub cover, and browse species) on the Lincoln NF ([USDA FS 1986](#)). There are approximately 526,700 acres of piñon-juniper habitats forest-wide; the Sacramento Ranger District contains approximately 157,751 acres of piñon-juniper habitat, and has conducted habitat improvements for deer on 17,607 acres. However, mule deer on the Lincoln National Forest will utilize all habitat types throughout the year. Mule deer are a year-long resident of the project area. The Sacramento allotment contains piñon-juniper that have varying degrees of forage and cover habitat quality. The allotment currently provides suitable year-round forage and cover habitat.

Mule deer require an average of about 5 to 7 pounds of green forage per day. They rely on early growing grasses and forbs in the spring and forbs in summer. Within the piñon-juniper woodlands, browse species health and vigor are important to mule deer productivity and survival, particularly during the fall and winter months. Key browse species include buck brush (*Ceanothus*) and mountain mahogany (*Cercocarpus*) species. The piñon-juniper habitat type is used as winter range and year-around. Higher elevation sites throughout the Forest, such as ponderosa pine and mixed conifer type, tend to receive use during the hotter spring and summer months.

Mule deer are managed as game by New Mexico Department of Game and Fish (NMDGF), which conducts surveys and sets bag limits on Game Management Units (GMUs) on the Lincoln NF. The Sacramento Ranger District and the Sacramento Allotment are entirely within GMU 34. The overall population trend for mule deer appears to be slightly downward on the Sacramento Ranger District. GMU 34 had a mule deer population of approximately 2,056 individuals in 2002-2003 data. In GMU 34, estimated total harvest in the 2016-2017 hunting season was approximately 637 bucks and 3 does ([NMDGF 2018](#)).

Effects of Alternative 1 (No Action):

The No Action Alternative would not construct permanent fencing or handling facilities, water developments would not be constructed, and a closure order would not be issued. Therefore, no effect to the species is expected. Because there is no action, MIS habitat would remain unchanged. This alternative would not directly, indirectly, or cumulatively effect these species or their habitat.

Effects of Alternative 2 (Proposed Action):

Hairy Woodpecker:

The proposed activities would likely result in short-term displacement due to project activity, especially if treatments were conducted during nesting season. Small areas of habitat margins (mixed conifer edge) may be affected, particularly if large trees and snags are removed in these (limited) areas. Impacts along a small segment of mixed conifer stand edges in several locations would not impact population stability on the Forest. Large diameter trees are managed for on other, much larger, portions of the Forest. Overall, the proposed project is unlikely to result in a loss of population viability for this species since habitat would be retained in the future.

Juniper Titmouse:

The proposed projects would likely result in short-term displacement due to project activity, especially if treatments were conducted during nesting season. Piñon-juniper habitat may be affected by the Pasture Ridge Trap and Corrals (new trap and corral) component of this alternative, particularly if large trees and snags are removed in these areas. Nest parasitism by brown-headed cowbirds would likely be increased locally, and improve conditions for cowbirds in that area. The proposed project is unlikely to result in a loss of population viability for this species.

Pygmy Nuthatch:

The proposed projects would likely result in short-term displacement due to project activity, especially if treatments were conducted during nesting season. Small areas of habitat margins (mixed conifer edge) may be affected, particularly if large trees and snags are removed in these (limited) areas. Impacts along a small segment of mixed conifer stand edges in several locations would not impact population stability on the Forest. Large diameter trees are managed for on other, much larger, portions of mixed conifer and ponderosa pine on the Forest. The proposed project is unlikely to result in a loss of population viability for this species since habitat would be retained in the future.

Red Squirrel:

The proposed projects would likely result in short-term displacement due to project activity, especially if treatments were conducted during breeding season. Small areas of habitat margins (mixed conifer edge) may be affected, particularly if large trees and snags were removed in these limited areas. Impacts along a small segment of mixed conifer stand edges in several locations would not impact population stability on the Forest. Large diameter trees are managed for on other, much larger, portions of the Forest. The proposed project is unlikely to result in a loss of population viability for this species.

Mexican Vole:

During construction of permanent fencing and livestock facilities, suitable habitat may be damaged and individual species harmed by wheeled and tracked vehicles, heavy equipment, mechanized and non-

mechanized equipment, and ground labor. These effects are expected to be short term and would not significantly affect the population as a whole.

There would likely be benefits in the meadow mouse fencing areas (exclosures). Permanently fencing meadow habitat can be beneficial to the Mexican vole. Vegetation would be allowed to recover, from livestock and or elk grazing, which would provide forage and cover which is needed for this species to persist. Elk fencing would not have a negative impact on this species.

In contrast, corral and trap development would reduce cover and concentrate livestock, reducing or precluding vole occupancy within the footprint of those projects. Declines of habitat and local abundance in new livestock facilities, commensurate with the extent of livestock concentrations in those locales. The construction or reconstruction of corrals and/or traps would take place at 11 locations. Nine locations would have brand new corrals and traps which would be located in mountain meadow and desert grassland habitat. The traps could be up to 100 acres in size per trap totaling up to 1,100 acres, and corrals up to 2 acres each (up to 22 acres total); though likely smaller. The implementation of these traps and corrals can damage habitat and harm individual species by heavy equipment, machinery (heavy and light), and ground labor. Indirect effects from livestock use would occur when traps and corrals are completed. Traps and corrals are allowed a higher utilization level, upwards of 70%, than the rest of the allotment. High use in these areas can potentially graze vegetation heights to a height that can negatively affect the presence of Mexican voles in these high use areas. The proposed project is unlikely to result in a loss of population viability for this species.

Elk:

The construction of these developments would cause a short term disturbance to habitat within project areas. Excavation and trenching would be needed to bury storage tanks, install rain aprons and lay underground pipe. These activities would remove potential forage from the area during construction for a short time after in some areas and permanently in others (location of storage tanks and apron). Effects are expected to be minor.

Permanent fencing of NMMJM habitat, which consists of riparian areas, meadows, and upland habitat, with barbed wire or pipe fencing would exclude livestock grazing. Studies have shown that vegetation height and vigor recovers quickly when livestock are excluded, which could lead to an increase in forage, in the limited footprint, that could be used by elk and other wildlife species. In contrast, permanent fencing using elk exclosures would exclude elk from accessing the forage and water within fenced off areas within Rio Peñasco and Wills Canyons. However, the entire proposed area to be fenced constitutes less than 1% of the total acres of the allotment and less than 1% of elk habitat acres on the district. Therefore, potential effects to the habitat and population are expected to be insignificant and discountable.

The implementation of new livestock water developments would be beneficial to elk by providing year round water sources. During drought years these water developments would be a main water source for livestock, elk, and other wildlife. Outside of the footprint of proposed structures, small areas of mixed conifer stand margins may be affected; accordingly, hiding cover would be slightly offset.

Elk are highly mobile and somewhat reclusive. Elk numbers are influenced by sport hunting and depredation removal. The population trend for elk on the Lincoln NF has been stable or increasing since prior to 2006 ([USDA FS 2006](#)). It is unlikely there would be any long or short-term increase or decrease in elk populations as a result of implementation of this project. The construction or reconstruction of traps and corrals may displace elk for a short period of time, however, long-term effects are expected to be

insignificant and discountable. The proposed project is unlikely to result in a loss of population viability for this species.

Mule Deer:

Mule deer may be displaced during treatment operations. Implementation of the project would alter a small number of acres currently typed as piñon-juniper. Specifically, piñon-juniper habitat may be affected by the Pasture Ridge Trap and Corrals (new trap and corral) component of this alternative, particularly to the extent that large trees and snags are removed in these areas. Populations of mule deer, though varying over the years, appear to be relatively stable, with some variability probably due to precipitation levels and lack of fires needed to keep vegetation at the lower successional stages. The observed forest-wide mule deer population trend would not be affected by the Proposed Action. The proposed project is unlikely to result in a loss of population viability for this species.

3.7 Migratory Birds

Affected Environment:

This section analyzes impacts to neo-tropical migratory birds and bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively). Effects to migratory birds that are analyzed include the following: 1) effects to high priority birds listed by U.S. Partners in Flight, 2) effects to Important Bird Areas (IBAs), and 3) effects to important over-wintering areas.

The Migratory Bird Treaty Act ([1918](#)) and the Bald and Golden Eagle Protection Act ([1940](#)) species that occur in or near the project boundary and may be impacted by the project were included in this analysis. Species analyzed in this section include: Cooper's hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), flammulated owl (*Otus flammeolus*), band-tailed pigeon (*Patagioenas fasciata*), common nighthawk (*Chordeiles minor*), Williamson's sapsucker (*Sphyrapicus thyroideus*), olive-sided flycatcher (*Contopus cooperi*), loggerhead shrike (*Lanius ludovicianus*), pinyon jay (*Gymnorhinus cyanocephalus*), Phainopepla (*Phainopepla nitens*), mountain bluebird (*Sialia currucoides*), Western bluebird (*Sialia mexicana*), crissal thrasher (*Toxostoma crissale*), Cassin's finch (*Haemorhous cassinii*), American goldfinch (*Spinus tristis*), Lincoln's sparrow (*Melospiza lincolni*), canyon towhee (*Melospiza fusca*), black-chinned sparrow (*Spizella atrogularis*), Brewer's sparrow (*Spizella breweri*), black-throated sparrow (*Amphispiza bilineata*), Grace's warbler (*Dendroica graciae*), black-throated gray warbler (*Dendroica nigrescens*), yellow warbler (*Setophaga petechia*), Virginia's warbler (*Vermivora virginiae*), Wilson's warbler (*Wilsonia pusilla*), evening grosbeak (*Coccothraustes vespertinus*). All of these species depend on various habitat types that exist in parts or throughout the project area. Suitable habitats within the project area include mixed conifer, ponderosa pine, aspen, and piñon-juniper, pine-oak and oak woodlands; along with riparian, oak scrub, desert scrub and grasslands. Migratory bird species that did not have suitable habitat in the project area and/or were not expected to be affected by the project proposal were not included in the analysis.

Migratory bird species that may be impacted by the proposal and included in other sections of this analysis are Northern goshawk (*Accipiter gentilis*) and gray vireo (*Vireo vicinior*) in the sensitive species section; Mexican spotted owl (*Strix occidentalis lucida*) in the threatened and endangered species section; and pygmy nuthatch (*Sitta pygmaea*), juniper titmouse (*Baeolophus ridgwayi*) and hairy woodpecker (*Picoides villosus*) in the management indicator species section.

The National Audubon Society recognizes areas with important habitat and bird presence as Important Bird Areas (IBA). There is a designated IBA, the Peñasco Canyon IBA ([NAS 2018](#)), within the proposed action area. The Peñasco Canyon IBA starts at Upper Peñasco Road (C17) and ends at Highway 130. The

Peñasco Canyon IBA is a 4,137-acre high mountain canyon area that includes lands managed by the Lincoln National Forest along with private in-holdings. The lower end of this canyon contains a marsh. Mixed conifer or spruce-fir is found at the upper end, grading into ponderosa pine at the lower end. This canyon contains Mexican spotted owls and other high-priority species. This IBA encompasses the southernmost known breeding location for the Lincoln's sparrow in the state. Other high priority PIF species with breeding season populations include yellow-rumped warbler (*Setophaga coronata*), broad-tailed hummingbird (*Selasphorus platycercus*), warbling vireo (*Vireo gilvus*), violet-green swallow (*Tachycineta thalassi*), golden-crowned kinglet (*Regulus satrapa*), and orange-crowned warbler (*Vermivora celata*). Species recorded on the Breeding Bird Survey (BBS) route in this area have also included cordilleran flycatcher (*Empidonax occidentalis*), MacGillivray's warbler (*Geothlypis tolmiei*), olive-sided flycatcher (*Contopus cooperi*), orange-crowned warbler (*Vermivora celata*), golden-crowned kinglet (*Regulus satrapa*), green-tailed towhee (*Pipilo chlorurus*), Lincoln's sparrow (*Melospiza lincolnii*), red-faced warbler (*Cardellina rubrifrons*) and red-naped sapsucker (*Sphyrapicus nuchalis*). The riparian area with perennial waters also provides important stop-over habitat for migrating birds.

Important over-wintering areas have not yet been recognized as occurring in the project areas on the Sacramento Ranger District. The project area does not provide important wintering habitat for unique avian species or a high diversity of wintering birds, or high concentrations of birds; therefore, important over-wintering areas were not included in the analysis.

Effects of Alternative 1 (No Action):

The No Action Alternative would not treat any migratory bird or eagle habitat on the Sacramento Ranger District. Because this alternative proposes no action, this alternative would not directly affect migratory birds or their habitat.

Effects of Alternative 2 (Proposed Action):

Activity near an occupied nesting site could cause nest abandonment if activities are conducted during the nesting season. Vehicle use and associated disturbance from human activity (noise and visual disturbance from heavy equipment use and chainsaws) would increase in the project area, particularly in the short term. During implementation of proposed projects, removal of some habitat could result in nest destruction and clutch mortality if treatment actions are conducted during the nesting season. Unintentional direct mortality of migratory birds could occur from cutting of nest trees. There could also be unintentional disturbance or destruction of ground level nests if activities take place during the breeding season. Species may be displaced for a short time during implementation of permanent fencing along the Rio Peñasco, but not to the extent that these species populations are compromised.

Proposed projects would not result in change to the population size or trend of priority migratory species at the level of the Forest or species range, except possibly in the case of Lincoln's sparrow. Populations of migratory birds dependent on pinyon-juniper and mixed conifer forests would be maintained in the long term because the effects of the proposed action would impact a very small portion of those habitats, mostly along edge. Adjacent to those edges, the open habitats (i.e., meadows) would be expanded in size commensurately. However, those areas would facilitate livestock concentrations that may be extensive during part of the year. Accordingly, beneficial effects are not likely for most species (western and or mountain bluebirds [which benefit from open habitats or openings] may be an exception). Alternatively, overall expansion of the distribution of livestock facilities may impact several species, if opportunities for brown-headed cowbird parasitism expand accordingly. Similarly, at the lower elevation project site (Dry Canyon), disturbance of arid brush-land habitats would

occur, whereas the resulting clearing for pasture is not likely to benefit most species (loggerhead shrike, which benefit from open habitats or openings may be an exception).

Meadow areas in the Rio Peñasco drainage comprise the far southern edge of known breeding range of the Lincoln’s sparrow in New Mexico. This species contributes to the substance and significance of the Rio Peñasco Important Bird Area ([NAS 2018](#)). Willow and riparian shrub habitats, especially, in these and other drainages could harbor Lincoln’s sparrow. Impacts to such meadow or riparian habitats, particularly where willow is present, could displace breeding territories, which could be detrimental to the species already rare status, and increase its vulnerability, on the Forest. The Lincoln’s sparrow is also a known host to brown-headed cowbird nest parasitism ([Lowther 2013](#)).

3.8 Soils

Affected Environment:

The Proposed Infrastructure Improvements are located within the Dry Canyon, Sacramento North, Sacramento South and Pasture Ridge Pastures. The Terrestrial Ecosystem Survey (TES) was completed by the Soil and Water West for the Forest Service in 1996 ([USDA FS 1996](#)). There is a total of 35 TES soil map units represented in the Sacramento Allotment (Table 4). The infrastructure improvements would be placed in potentially 7 of the 35 Map units. These map units are MU 6, 13, 181, 283, 290, 291, and 292.

The soil map units which occur within this project area are located on rolling terrain with moderate to steep slope; about 41% of the allotment is steep, 36% is moderate, and 23% is nearly level. The geology underlying the allotment is primarily Yeso and San Andres Formations. Geology consists of limestone, sandstone and some alluvium. Elevation includes a wide variety of terrain and elevations (4,500 feet to 9,500 feet above mean sea level). Soils on the Lincoln NF have predominantly dry moisture regimes and mild temperatures regimes at the lower elevations and humid to sub-humid moisture regimes and cold temperature regimes at the higher elevations. Soils range from fine (< 35 percent clay) to loamy, and skeletal (> 35 percent rock fragments) to non-skeletal in nature. They occur on slopes ranging from 0-80 percent, with flat and vertical rock outcrops present in some areas. Soil texture varies with parent material. Four of the twelve soil orders are represented in this analysis; Alfisols, Entisols, Inceptisols, and Mollisols.

Table 4 describes some of the soil characteristics and properties of each representative TES used in this analysis. The following describes adjustments made to previous mapping efforts. It is recognized that many of these maps units were mapped in other areas within the Lincoln National Forest. These adjustments may be unique only to the Sacramento Allotment and not to the Lincoln National Forest as a whole.

Table 4. Soil Map Units and characteristics within the Sacramento Allotment

Soil Map Units	Soil Taxonomy Names	Slope %	Erosion Hazard	Vegetation	Soil Depth
6	PACHIC UDIC ARGIBOROLL	0-10	Slight	Kentucky bluegrass	Very deep
7	ARGIC PACHIC CRYOBOROLL	0-15	Moderate	Kentucky bluegrass, oatgrass, fescue	Deep
10	PACHIC ARGJUSTOLL	0-10	Slight	Blue grama, piñon pine, juniper	Very deep
13	USTOCHREPTIC CALCIORTHENT	0-10	Slight	mesquite, tarbush, creosote, black grama	Very deep

Soil Map Units	Soil Taxonomy Names	Slope %	Erosion Hazard	Vegetation	Soil Depth
158	CALCIORTHIDIC USTOCHREPT	16-40	Moderate	Mesquite, blue grama, black grama	Moderate
169	LITHIC HAPLUSTALF	41-80	Moderate	Piñon pine, juniper, oak	Shallow
170	CALCIC USTOCHREPT	16-40	Slight	Piñon pine, juniper, oak	Deep
171	TYPIC ARGIBOROLL	41-80	Severe	Piñon pine, juniper, oak	Deep
175	TYPIC ARGIBOROLL	0-15	Slight	Douglas fir, ponderosa pine, piñon pine, oak	Deep
176	TYPIC ARGIBOROLL	16-40	Slight	Douglas fir, ponderosa pine, piñon pine, oak	Deep
178	TYPIC ARGIUUSTOLL	0-15	Slight	Blue grama, piñon pine, juniper	Deep
181	TYPIC HAPLUSTALF	0-15	Slight	Piñon pine, juniper, oak	Moderate
182	TYPIC HAPLUSTALF	16-40	Moderate	Piñon pine, juniper, oak	Moderate
183	LITHIC ARGIBOROLL	41-80	Moderate	ponderosa pine, piñon pine, juniper, oak	Shallow
186	TYPIC ARGIBOROLL	41-80	Slight	Mountain mahogany, oak, New Mexico locust	Moderate
270	PACHIC UDIC ARGIBOROLL	16-40	Slight	White fir, Douglas fir, aspen	Deep
271	PACHIC UDIC ARGIBOROLL	41-80	Moderate	White fir, Douglas fir, aspen	Moderately deep
283	TYPIC ARGIBOROLL	16-40	Slight	Douglas fir, ponderosa pine, piñon pine, oak	Moderate
285	TYPIC ARGIBOROLL	41-80	Severe	Douglas fir, ponderosa pine, piñon pine, oak	Moderately deep
288	TYPIC ARGIUUSTOLL	0-15	Slight	Piñon pine, juniper, oak	Moderate
289	PACHIC UDIC ARGIBOROLL	0-15	Slight	White fir, Douglas fir, ponderosa pine, oak	Moderately deep
290	PACHIC UDIC ARGIBOROLL	0-15	Slight	White fir, Douglas fir, aspen	Moderately deep
291	PACHIC UDIC ARGIBOROLL	16-40	Slight	Douglas fir, ponderosa pine, piñon pine, oak	Moderately deep
292	PACHIC UDIC ARGIBOROLL	41-80	Slight	Douglas fir, ponderosa pine, piñon pine, oak	Deep
293	LITHIC ARGIUUSTOLL	0-15	Slight	Piñon pine, juniper, oak	Shallow
294	LITHIC ARGIUUSTOLL	16-40	Slight	Piñon pine, juniper, oak	Shallow
295	LITHIC ARGIUUSTOLL	41-80	Moderate	Piñon pine, juniper, oak	Shallow
602	USTOCHREPTIC CALCIORTHID	0-15	Slight	Black grama, creosote, ocotillo	Moderate
603	USTOCHREPTIC CALCIORTHID	41-80	Slight	Black grama, creosote,	Moderate
604	ROCK OUTCROP	41-80	Null	Black grama, ocotillo	Null
710	PACHIC ARGIBOROLL	0-15	*	Western wheatgrass, Kentucky bluegrass	Very deep
785	TYPIC ARGIBOROLL	41-80	*	Douglas fir, ponderosa pine, piñon pine, oak	Moderate

Soil Map Units	Soil Taxonomy Names	Slope %	Erosion Hazard	Vegetation	Soil Depth
789	LITHIC ARGIBOROLL	0-15	*	Douglas fir, ponderosa pine, oak	Shallow
791	PACHIC UDIC ARGIBOROLL	16-40	*	Douglas fir, ponderosa pine, oak	Moderate
792	UDIC ARGIBOROLL	41-80	*	Douglas fir, ponderosa pine, oak	Moderate

Areas of continuously saturated soils tend to be concentrated in narrow strips within the bank full stage. There are areas of continuously saturated soils on wider floodplain positions directly adjacent to stream channels. Soil textures are coarse loamy, loamy-skeletal to clayey-skeletal. Soil depth to bedrock varies from a few inches to many feet. A common pattern of occurrence is shallow soils on ridgetops and upper sideslopes, moderately deep or deep soils on the middle and lower sideslopes and deep or very deep soils in valleys terraces and toeslopes.

Effects of Alternative 1 (No Action):

The Enclosure fencing on the Sacramento Allotment would not be constructed along portions of NMMJM critical habitat within Wills Canyon (Figure 2) and the Rio Peñasco drainage including an area bordering critical habitat in Water Canyon where it flows into the Rio Peñasco (Figure 3). Approximately 100 acres would not be fenced; 60 acres in Wills Canyon and 40 acres in Rio Peñasco. Without the fencing, livestock could continue to cross the stream channel causing defoliation and trampling. [Hart and Hart, 1993](#) states that livestock grazing can influence infiltration rates through defoliation and trampling. Vegetative cover protects the soil surface from raindrop impact, slows runoff, and enhances infiltration rate ([Hart and Hart 1993](#)). Vegetative ground cover generally decreases and bare soil increases where livestock trail or congregate.

The corrals, traps, storages, troughs, pipelines and water developments would not be developed. If these projects are not implemented, livestock have the potential to increase soil compaction inside the critical habitat and riparian areas. Troughs and storages would not be located at all traps and/or corrals to provide water for livestock. This would encourage livestock to seek existing water in areas like the stream and riparian locations. Existing corrals would not be relocated, nor newly constructed corrals established. If these improvements are not established. Livestock grazing patterns would remain the same. This can negatively impact the total cover and spatial distribution of herbaceous cover. The shift of vegetation composition usually favors the establishment and regeneration of less preferred plants ([Pieper and Heitschmidt 1988](#)). As grazing intensities increase protective surface cover, herbage and root biomass, organic matter content, and aggregate stability have been repeatedly shown to decline ([Hart and Hart 1993](#)).

Effects of Alternative 2 (Proposed Action):

The Proposed Action would construct and maintain enclosure fencing, handling facilities, and water developments, and issue a temporary closure order. The fencing in Rio Peñasco would all be within a livestock trap. Approximately 3 miles of fencing would be constructed within Rio Peñasco. Approximately 4.5 miles of fencing would be constructed within Wills Canyon. The fencing would follow the approximate footprint of the temporary fencing from the 2016 grazing season. Approximately 100 acres would be fenced; 60 acres in Wills Canyon and 40 acres in Rio Peñasco. There is the potential for short term impacts to occur from the excavation of the surface and in the subsoil during construction. Short term effects have the potential to change the vegetation composition, litter and soil condition. Livestock

trailing along fence lines can result in soil compaction, channelization of overland flow and a reduction in vegetative cover. An increase in sheet erosion and soil compaction can reduce soil productivity. Soil compaction has important hydrologic implications in terms of reduced infiltration rates, impacts on plant growth, and increases in runoff and erosion ([Van Haveren 1983](#)). Compaction reduces soil water holding capacities and water movement through the soil which can limit available water for plant growth and nutrient cycling ([USDA NRCS 2001](#)). Negative alterations of soil aeration, soil temperature, nutrient cycling, and physically restricting root growth are also products of soil compaction ([USDA NRCS 2001](#)). In order to reduce these impacts, design features outlined in Section 2.3 would be followed.

Water lanes would be reinforced with rock or other materials where necessary to reduce erosion and would be located in areas that are naturally resistant to erosion when possible. These areas could potentially experience heavy disturbance; decreasing vegetation ground cover and increasing erosion through soil compaction created by repeated hoof action. Other areas that would experience heavy disturbance and soil compaction would occur along the trail leading to/from the water lanes. However, these areas would be localized to the trailway. Changes to bulk density and total soil porosity would result from the hoof compression, which impedes root growth, and the decreased pore continuity, which restricts water and air movement. Pore continuity is more sensitive to compaction than is either air-filled porosity or bulk density. Studies also have shown that natural processes such as soil wetting and drying cycles and grazing recovery periods can restore the physical condition of soil ([Greenwood and McKenzie 2001](#); [Heady and Child 1994](#); [Weltz and Wood 1986](#); [Wheeler et al. 2002](#)). In order to minimize these effects, design features outlined in Section 2.3 would be followed.

Troughs and storages would be located within all traps and/or corrals to provide water for livestock. Areas where troughs and storages are placed would be bladed flat using a wheeled or tracked vehicle. The trough location would disturb an area of 14 feet by 6 feet; storage locations would disturb an area of approximately 20 feet by 20 feet. Pipelines would be placed below ground whenever feasible (18 to 24 inches deep). Pipelines would be ripped in using two passes with a wheeled or tracked vehicles disturbing an approximately 12-18 inch wide area to lay the pipeline underground. Hand trenchers or shovels may be used to install pipelines in sensitive locations or in areas that are not accessible by vehicle. These areas would experience heavy disturbance. Soil compaction and displacement is expected to occur. Short term disturbance would occur from excavation. Vegetative ground cover would be lost, but these effects are localized to these areas. To help reduce negative impacts for these disturbed sites, design features outlined in Section 2.3 would be followed.

The proposed Infrastructure improvements listed above would be localized short term effects but would not have any undesirable effects in the long term. Soils are very deep to moderate and cobbly, stony and gravelly. Erosion hazard in these soil map units are slight. The effects would occur within and immediately adjacent to the proposed projects. These areas would experience disturbance effects in the short term under construction and implementation, but the effects would be localized. Design features (Section 2.3) would be implemented under this action, therefore there would be no substantial impacts to soil productivity and stability. Monitoring would be conducted periodically to determine if changes are warranted for livestock management.

3.9 Hydrology, Watersheds, and Riparian Habitat

Affected Environment:

The upper part of Wills Canyon and the upper part of the Rio Peñasco constitute the critical habitat for the NMMJM. The stream channel along these sections of stream as well as the stream banks, the adjacent riparian areas and wetlands, and the local ground water aquifers constitute the affected

environment. Also included are the areas immediately surrounding the corrals and traps, the watering troughs and associated pipelines, trick tanks, and the drainages (ephemeral, intermittent, or perennial) that they are located in. These drainages include Hay Canyon, Aqua Chiquita, Russia Canyon, Cox Canyon, Lucas Canyon, Dark Canyon, Benson Canyon, Dry Canyon, Wright Canyon, Rock Waterhole Canyon, Bug Scuffle Canyon, Sacramento River, Deadman Canyon, and Water Canyon.

A majority of the uppermost portion of the Rio Peñasco and Wills Canyon drainages consist of a stream bed that is considerably lower in elevation than the surrounding valley floor. The original floodplain is now an abandoned floodplain, or terrace. In many places along the upper part of the Rio Peñasco and Wills Canyon where critical habitat occur, the channel is downcut at least eight feet or more. The lower water table also leads to diminished water availability due to decreased base flow. There are numerous headcuts along both sections of stream. Headcuts are areas where there is a sudden drop in the elevation of the stream in relation to the adjacent valley floor. Headcuts range from small, being only a foot or two high, to very large, being 6-8 feet high

Disturbance of the streambanks is present along much of the Upper Rio Peñasco and Wills Canyon. Many of the streambanks have limited vegetation and some lack any vegetation at all. Some streambanks are slumping and/or have hoof shear, which is an indication of streambank instability, other areas have stable streambanks

Springs and wetlands also exist along the Upper Rio Peñasco and Wills Canyon, where soils are saturated for at least a portion of the year. Sedges are dominant and in some places willows and other woody riparian vegetation are present. In some areas the wetlands have a defined channel that branches out into several channels that convey water. Headcutting may be present in these areas as they are along much of the stream channels. Some wetland stringer meadows range from just 10 feet on either side of the channel to over a hundred feet wide in some places.

Streamflow along the Upper Rio Peñasco and Wills Canyon comes largely from the numerous springs found both along the hillsides and canyon floors. Most springs discharge from perched aquifers in fractured limestone beds. Perched aquifers are local zones of saturation above the main body of groundwater, or above the regional aquifer. Many springs discharge water into stream channels that convey water for some distance while others discharge water that almost immediately infiltrates into the stream bed downstream ([Newton et al. 2012](#)).

The Sacramento Mountains Hydrogeology Study ([Newton et al. 2012](#)) describes a common scenario for how water is conveyed through the system of high elevation perched aquifers. It is common for water in a perched aquifer to discharge onto the land surface via springs and seeps. These springs and seeps discharge water into stream beds that may convey water for some distance before infiltrating into the subsurface while other springs discharge water into stream channels that convey water for only a short distance before infiltrating into the subsurface. In either case, this infiltration recharges another perched aquifer that conveys groundwater for a distance before again discharging onto the surface via another spring or seep downgradient and providing flow in another section of channel downstream, which subsequently recharges another perched aquifer at some point downgradient. The largest density of springs in the Southern Sacramento Mountains are located along the upper Rio Peñasco and in Wills Canyon ([Newton et al. 2012](#)).

An example of this groundwater-surface water interaction is found at the head of Wills Canyon, starting at Mauldin Spring. Water is discharged at Mauldin Spring from a high elevation perched aquifer, which subsequently provides water for flow in the stream channel. About ½ mile downstream, on the downstream side of a patch of conifers, the stream channel is sometimes dry, indicating infiltration into

the subsurface. During times of higher precipitation, the channel in this area would continue to convey water downstream. When dry, perennial flow would usually pick up again at the confluence with Hubbell Canyon. The authors' observations since 2014 has been that Wills Canyon has flowed perennially most of the distance downstream from this confluence for the next few miles. There are areas where no flow is observed for sections of the stream channel for various distances, which indicates infiltration into the subsurface which in turn recharges the localized perched aquifers. This phenomenon is driven largely by the local geology as well as precipitation patterns.

Precipitation is the primary source of groundwater recharge within the project area. The highest rainfall is associated with the North American Monsoon and typically occurs during the months of July through September. These months account for approximately half of the annual precipitation. Tropical disturbances in the Gulf of Mexico and Eastern Pacific may add significant amounts of rain. During the winter months, frontal storms are the primary source of precipitation in the project area. Annual average precipitation as recorded at the Cloudcroft Weather Station is about 26-30 inches per year.

It is the extreme events, such as the heavy rains during the early 1940s, as well as high precipitation events, such as occurred during the summers of 2006 and 2008 that caused unstable stream channels and riparian areas to become even more unstable due to further downcutting and channel widening. Additionally, accelerated sediment conveyance through these channels during high flow events has led to debris being deposited downstream, many times onto private property.

The proposed range improvement projects occur in various locations which are described below.

Hay Canyon Trap and Corral: the approximate proposed location of these structures is adjacent to an ephemeral drainage in Hay Canyon. This ephemeral drainage runs about 5 ½ miles before connecting with the Aqua Chiquita about 2 ½ miles upstream from the town of Sacramento. Aqua Chiquita is an impaired stream listed for turbidity in its perennial sections. The Lincoln National Forest GIS layer shows the sections of stream above and below this confluence as being ephemeral, but the author has observed flow in this area persistently over most of the past year.

Russia Canyon Trap and Corral: the approximate proposed location of these structures is close to an ephemeral drainage that drains about five miles to its confluence with Cox Canyon. From there Cox Canyon, an ephemeral drainage, runs another five miles before its confluence with the Rio Peñasco, which is perennial at this point.

Lucas Canyon/Dark Canyon Trick Tank: from the location on Benson Ridge where reconstruction of the trick tank is proposed, the ephemeral drainage is directed about two miles down into the Rio Peñasco.

Benson Canyon Trap and Corrals: the approximate proposed location of these structures is adjacent to an ephemeral drainage that runs about one mile before meeting it's confluence with the Rio Peñasco.

Dark Canyon Trap: the approximate proposed location of this structure is close to an ephemeral drainage that drains about three miles to its confluence with Cox Canyon. Cox Canyon subsequently drains into the Rio Peñasco about 1 ¾ miles downstream from the Dark Canyon/Cox Canyon confluence.

Dry Canyon Trap and Corral: this is next to an ephemeral drainage that flows west about five miles down Dry Canyon and drains into the lower elevation areas immediately north of Alamogordo.

Peñasco Horse Trap: immediately adjacent to the Rio Peñasco.

Peñasco Trap Extension: immediately adjacent to the Rio Peñasco.

Pasture Ridge Trap and Corrals: the approximate proposed location of this structure is near the top of three ephemeral drainages that that could convey overland flow down into the lower elevation areas to the west. These areas are south of White Sands National Monument.

Sacramento River Trap and Corrals: these proposed structures are immediately adjacent to the Sacramento River, which runs perennially along this section.

Apache Point Trap and Corrals: the approximate proposed location is less than a mile east of Sunspot, this structure is near the top of the Sacramento River drainage. Overland flow from where these structures are proposed would flow into the upper portions of this drainage, which is ephemeral at the top and then begins to pick up perennial flow about two miles downstream.

Deadman Canyon Corral and trap: the proposed structures are located in an ephemeral drainage that joins up with perennial flow in Water Canyon about 1 ¼ miles downstream.

Upper Hay Canyon Corral and Trap: the approximate proposed location of these structures is adjacent to an ephemeral drainage in Hay Canyon. This ephemeral drainage runs about 8 ¼ miles before connecting with the Aqua Chiquita about 2 ½ miles upstream from the town of Sacramento. Aqua Chiquita is an impaired stream listed for turbidity in its perennial sections. The Lincoln National Forest GIS layer shows the sections of stream above and below this confluence as being ephemeral but the author has observed flow in this area persistently over most of the past year.

Wills Canyon Corral: the site of this proposed reconstruction is immediately adjacent to the confluence of Hubbell Canyon and the upper part of Wills Canyon. Hubbell Canyon usually conveys flow while Wills Canyon at this point may become dry and not convey flow during certain times of the year.

The resource indicators and measures for success used to complete the analysis are outlined in Table 5 below.

Table 5. Resource indicators and measures for assessing effects.

Resource Element	Resource Indicator (Quantify if possible)	Measure (Quantify if possible)
Water quality	Water quality parameters as measured by New Mexico Environment Department (NMED)	Units of measure for each respective water quality constituent (mg/L, colonies/100 mL, etc.)
Water quantity	Water yield	Streamflow in cubic feet per second and water levels in feet below ground surface; photo points to observe presence or absence of surface water in wetlands
Riparian and Wetland Function, and Channel Stability	Number and size of headcuts and channel incision	Number and size of headcuts observed per mile of stream; length of stream with incised channel
Riparian and Wetland Function, and Channel Stability	Streambank Stability/Bank Erosion	PFC or other method of measuring bank stability (% bare banks)
Wetland Health	Acres Wetland Restored (where potential exists)	Area of wetland soils and vegetation

Resource Indicator # 1 Water Quality: Water quality parameters from previous samplings have not exceeded state water quality standards within the project area. Therefore, the upper Rio Peñasco and Wills Canyon are not listed as impaired. The goal is for these waters to retain that status. Fecal coliform loads collected in 1997 were high in one sample along the upper Rio Peñasco ([NMED 1997](#)). Desired conditions would be to have low or absent fecal coliform loads.

Resource Indicator # 2 Water Quantity: Some sections of stream are dry for portions of the year or only flow during significant rain events or heavy spring runoff. This may be due to the geology and soils of a stream or stream reach. It can also be driven largely by precipitation patterns. There may be some areas where dry sections of stream could be restored to become perennial through restoration of riparian vegetation and wetland characteristics. Desired condition would be to restore these dry sections to perennial where potential exists. Some former wetland areas now have dryland soil and vegetation characteristics as well as lowered ground-water levels. Desired conditions would be to have saturated soils and surface water or near surface water where potential exists. Ground water levels in the riparian and wetland areas have not been measured.

Resource Indicator # 3 Riparian and Wetland Function, and Channel Stability- Number and Size of Headcuts and Incised Channels: There are a number of headcuts along the perennial streams in the project area ranging from small (1-2 feet) to large (6-8 feet). Desired conditions would be for the stream channel to have the width-depth ratio that is within the normal range for this type of stream. This would occur when stream stability is achieved. Desired conditions would also be an improving trend of decreasing the number and size of headcuts; the stream channel would begin to become more elevated in relation to the surrounding valley floor. As this occurs, water from high flows would begin to flow out onto the surrounding floodplain and proper hydrologic function would begin to be restored. An upward trend in improvement after 130 years of degradation is all that can reasonably be expected.

Resource Indicator # 4 Riparian and Wetland Function, and Channel Stability- Streambank Stability/Bank Erosion: Streambank stability and bank erosion are good indicators of stream channel and riparian conditions. Many streambanks are presently void of vegetation and many other banks have sparse amounts of vegetation. Many of these banks, especially those adjacent to deeply incised channels, are lacking in riparian types of vegetation. Desired conditions would be to restore riparian vegetation to these streambanks. Streambanks would be stable and streambank and channel erosion would be within normal parameters for this type of stream in this environment. Streambank measurements have not been made. Many photos have been taken.

Resource Indicator # 5 Wetland Health: Areas of former wetlands along the upper Rio Peñasco and Wills Canyon have been reduced due to disturbance from channelization and subsequent drainage of water from these areas. These areas no longer have saturated soil conditions, wetland vegetation, or wetland hydrology (standing water or water close to the surface). Desired conditions would be to have these wetland characteristics restored where the potential exists.

Effects of Alternative 1 (No Action):

The no action would result in no changes to the current management; no new fences, handling facilities, or water developments would be constructed and a temporary closure order would not be issued.

Resource Indicator # 1 Water Quality: Over time, water quality would continue to degrade. Sediment loads in Wills Canyon and Rio Peñasco would increase due to continued disturbance of riparian areas and streambanks. Although this would be the overall trend, the timing and quantity of specific sediment conveyances downstream would be dependent upon weather patterns.

Resource Indicator # 2 Water Quantity: Over time, there would be a slow, overall decreasing trend in water quantity. As riparian areas and wetlands continue to degrade and become smaller in size, the water holding capacity of these areas would decline. This would result in less water being released to the stream channel from these areas and a subsequent decrease in streamflow over time. As wetland areas continue to drain due to channelization, water levels within the wetlands would also decline. These patterns would be the overall trend, but the timing and degree of this trend would be dependent upon weather patterns, as well as the degree and speed of resource degradation.

Resource Indicator # 3 Riparian and Wetland Function, and Channel Stability- Number and Size of Headcuts and Stream Incision: There would continue to be an overall trend of gradual increased headcutting and stream channel incision as continued soil compaction, streambank disturbance, and denuding of riparian and streamside vegetation continues. This would be the overall trend, but the timing and degree of this trend would be dependent upon weather patterns as well as the degree and speed of resource degradation.

Resource Indicator # 4 Riparian and Wetland Function, and Channel Stability- Streambank Stability/Bank Erosion: There would continue to be an overall trend of gradually decreasing streambank stability and increased bank erosion as continued soil compaction, streambank disturbance, and denuding of riparian and streamside vegetation continues. This would be the overall trend, but the timing and degree of this trend would be dependent upon weather patterns as well as the degree and speed of resource degradation.

Resource Indicator # 5 Wetland Health: There would continue to be an overall trend of gradually decreasing wetland health as continued soil compaction, streambank disturbance, and denuding of riparian/wetland vegetation continues. This would be the overall trend, but the timing and degree of this trend would be dependent upon weather patterns, as well as the degree and speed of resource degradation.

Effects of Alternative 2 (Proposed Action):

Fencing of much of the riparian area would protect these zones from further disturbances from livestock. Elk fences, when and where they are constructed, would lower the number of elk that graze in these zones. Upland water sources would be available for both domestic livestock and elk at the proposed range improvements which would further diminish disturbances in the riparian zones. The closure order would prevent other uses in these areas while in place. All these measures would contribute to increases in riparian vegetation in some areas, but not all. Steep bare banks with little or no riparian vegetation would likely continue to have little or no riparian vegetation without active restoration efforts.

Resource Indicator # 1 Water Quality: Implementation of the proposed action would result in an increase in water quality over time. In areas where riparian vegetation does increase, the improved vegetation would increase the filtering of pollutants that would otherwise reach the stream, as well as catching sediment that may be conveyed downstream. Sediment is one of the largest water quality problems in natural waters. Other water quality constituents attach themselves to sediment particles and contribute to water quality problems. The proposed action would increase the chances of preventing the upper Rio Peñasco and Wills Canyon from becoming water quality impaired under the Clean Water Act. Improvements of water quality over time for downstream users would also be a benefit from this action. Construction and reconstruction of proposed corrals, traps, and trick tanks would not result in any adverse impacts to water quality but would contribute to its improvement. Improved water quality would benefit the livestock that use this water for drinking.

Resource Indicator # 2 Water Quantity: Implementation of the proposed action would result in an increase in water quantity over time. As the amount of riparian vegetation increases, water infiltration into the soil would increase and soil organic matter would also increase. This would result in a corresponding increase in the soils' water holding capacity. As this occurs, water in the riparian areas and wetlands would be slowly released to the stream channel. This has been shown to restore perennial flow in areas previously having only intermittent or ephemeral flow ([USDA FS 2012](#)). For the full potential of restoring water quantity in the project area to be realized, active stream and riparian area restoration would need to be implemented in conjunction with the proposed action. Water quantity would also be influenced by climatic factors, such as yearly variations in snowpack, amount and timing of snowmelt runoff, and the timing and quantity of summer rain as a result of the southwest monsoon.

As the amount of water increases due to increases in soil storage capacity, not only would chances of perennial flow increase where there is presently no perennial flow, but areas having wetland potential would expand. This would aid in enhancing and protecting the habitat for the NMMJM. More on wetland expansions is discussed under "resource indicator # 5—Wetland Health". Proposed construction or reconstruction of traps, corrals, or trick tanks would not have any adverse impacts on water quantity.

Resource Indicator # 3 Riparian and Wetland Function, and Channel Stability- Number and Size of Headcuts and Stream Incision: Implementation of the proposed action would, over time, either result in a decrease in the amount of headcutting and stream channel incision or would in the least slow the rate of headcutting and incision. The results would be more noticeable in areas where the channel is only slightly incised and headcuts are small. As headcutting and incision decreases in certain areas, some areas would experience an increase in riparian and wetland vegetation. This would be site-specific and would also depend on climatic patterns and moisture availability. A majority of sites along the stream channel in the upper Rio Peñasco and Wills Canyon have stream channels that are too incised for even the highest flows to access the original floodplain. High energy flows would continue in these areas and continued incision and channel widening would continue to occur unless active stream restoration is implemented to stabilize the headcuts, control the channel grade, and aid in stabilizing the adjacent banks.

In areas that do show improvement, the habitat for the NMMJM would improve and expand. Riparian vegetation would be greater in some years and less in others. This would concurrently lead to an increase in the amount of forage available for livestock in areas outside of the fences. Proposed construction or reconstruction of traps, corrals, or trick tanks would not have any adverse impacts on headcutting and stream incision.

Resource Indicator # 4 Riparian and Wetland Function, and Channel Stability- Streambank Stability/Bank Erosion: Implementation of the proposed action would lead to an improving trend in achieving streambank stability and decreasing streambank erosion. Again, this would be site specific as areas having higher and steeper banks where it is more difficult for vegetation to establish would see little if any improvement. Various soil types would also influence vegetation growth along the streambanks. Although the proposed action alone would result in some improvements, further action would be needed by way of active stream restoration in many areas to begin showing an upward trend. This is because many of the banks would not establish sufficient vegetation without activities such as planting, reshaping banks, and stabilizing banks using bioengineering techniques.

In areas that experience upward trends, increased streambank stability would result in increases in riparian vegetation. Proposed construction or reconstruction of traps, corrals, or trick tanks would not have any adverse impacts on streambank stability and bank erosion. There are a few proposed

structures close to perennial streams, but not in the riparian zones. Therefore, there would be no adverse impacts.

Resource Indicator # 5 Wetland Health: Implementation of the proposed action would lead to an upward trend of wetland health in some areas that have the potential for wetland characteristics that do not have deeply incised channels. Incised channels flowing through former wetlands have drained and continue to drain the wetlands. Areas showing an upward trend would show an increase in riparian and wetland vegetation, increases in soil moisture, and increases in the elevation of the water table. This results in water closer to or at the land surface during the wet times of the year or perhaps all year long. This also would contribute to increased perennial flow during dry times of the year and mitigation of flooding and accelerated sediment delivery in streams that affect downstream users.

Proposed construction or reconstruction of traps, corrals, or trick tanks would not have any adverse impacts on wetland health. There are a few proposed structures close to perennial streams, but not in the riparian zones. Therefore, there would be no adverse impacts.

3.10 Cumulative Effects

Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes the action (40 CFR 1508.7). The baseline used for cumulative effects analysis is the current condition. By looking at current conditions, we are able to capture residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Projects included in this analysis of cumulative effects have occurred in the past, are in the planning stages or are presently occurring within the Sacramento Allotment or nearby within the Sacramento Ranger District of the Lincoln National Forest (Table 6).

Past, Present and Reasonably Foreseeable Future Actions

Table 6. List of projects on the Sacramento Ranger District considered for cumulative effects

Project	Brief Description	Project Proponent
Westside Sacramento Mountains Watershed Restoration Project - Priority Areas 1 and 2	The proposed action uses a combination of mechanical thinning and prescribed fire on approximately 3,206 acres of National Forest lands in order to reduce the threat of high intensity wildfires and promote healthy watersheds.	City of Alamogordo
Westside Sacramento Mountains Watershed Restoration Project - Priority Area 3	The proposed action uses a combination of mechanical thinning and prescribed fire on approximately 3,439 acres of National Forest and City of Alamogordo lands in order to reduce the threat of high intensity wildfires and promote healthy watersheds.	City of Alamogordo
High Altitude Mountain Environment Training Strategy (HAMETS) Helicopter Operations Project	The Lincoln National Forest is proposing to authorize the Fort Bliss to conduct High Altitude Mountain Environment Training Strategy (HAMETS) helicopter operations, including helicopter landings on the Lincoln National Forest.	Fort Bliss

Project	Brief Description	Project Proponent
Otero County Electric Cooperative Power Line Improvement	Replace ~12 miles of overhead line with overhead and buried line. Minimal trees to cut (none over 18 inches DBH). Upgrade would better serve customers and provide more reliable, economical, and safe power. The power line starts near Cloudcroft and continues south to Sunspot.	Otero County Electric Cooperative
Scott Able Allotment Management	Analysis of continuation of grazing authorization for Scott Able allotment. The allotment is adjacent to the Sacramento Allotment.	Sacramento Ranger District
Escondido Allotment Management	Analysis of continuation of grazing authorization for Escondido allotment. The allotment is adjacent to the Sacramento Allotment.	Lincoln National Forest, Sacramento Ranger District
San Andres Allotment Management	Analysis of continuation of grazing authorization for San Andres allotment. The allotment is adjacent to the Sacramento Allotment.	Lincoln National Forest, Sacramento Ranger District
Bluff Springs New Mexico Meadow Jumping Mouse Habitat Improvement Project	Plan to improve recreation use at Bluff Springs to reduce the amount of recreational impacts at the site and improve NMMJM critical habitat.	Lincoln National Forest, Sacramento Ranger District
Integrated Non-native Invasive Plant Management Project	The forest is developing a proposal to manage the existence of non-native invasive plants within the Lincoln National Forest's boundaries. Adaptive management would be incorporated into the analysis.	Lincoln National Forest
Lincoln National Forest Plan Revision	The Forest Plan is a comprehensive document that addresses many activities including hunting, hiking, camping, skiing, grazing, and firewood collection. As a management goal, the Forest Service aims to balance public uses with the land's health and capacity. While the Forest Plan does not authorize specific actions, once approved, all projects and proposals must comply with it, or the plan must be amended to allow the actions.	Lincoln National Forest
South Sacramento Restoration Project	Restore forest health on approximately 140,000-acre planning area in the southern Sacramento Mountains. Project is designed to meet restoration objectives at a landscape-scale, primarily in mixed conifer and ponderosa pine forest.	Lincoln National Forest

Project	Brief Description	Project Proponent
New Mexico Meadow Jumping Mouse Habitat Improvement Projects on the Agua Chiquita Grazing Allotment	The Sacramento Ranger District of the Lincoln National Forest is proposing to construct habitat improvement projects on the Agua Chiquita Grazing Allotment to aid in the protection of New Mexico meadow jumping mouse (NMMJM) critical habitat.	Lincoln National Forest, Sacramento Ranger District
Rio Peñasco Wetland Restoration and Road Stabilization	The Lincoln National Forest is proposing to restore a wetland that has been modified and is no longer functioning and improve a road crossing to improve water quality and wildlife habitat for a variety of species including federally listed species.	Lincoln National Forest, Sacramento Ranger District
Hornbuckle Salvage Project CE	The Sacramento Ranger District of the Lincoln National Forest decided to salvage fallen trees from a 14 acre area in Hornbuckle Canyon. The trees fell as a result of a wind event in early 2016.	Lincoln National Forest, Sacramento Ranger District
Special Use Permitting	Permitting special uses on the Forest including ongoing or new activities.	Lincoln National Forest, Sacramento Ranger District
Ongoing Grazing	Ongoing grazing on the Sacramento Allotment and the surrounding allotments has occurred in the past, present and would continue as part of a permitted grazing system.	Lincoln National Forest, Sacramento Ranger District

Cumulative Environmental Consequences

Range, Vegetation and Invasive Species: Actions that are currently or may take place on the Sacramento Ranger District include restoration projects, special uses, and grazing management (Table 6). All of these actions would work towards directly improving vegetative conditions on the forest or would contain design features to reduce impacts to vegetation and minimize the introduction of weeds. Some projects would include disturbances to vegetation in the short term, but benefits would be expected in the long term. Livestock grazing would be expected to continue. Small amounts of acreage would be fenced off in this proposal and the proposal for NMMJM habitat improvement of Agua Chiquita, but the overall fenced acreage would be small, and the fencing would allow for continued use by livestock in pastures with NMMJM critical habitat. No adverse cumulative effects would be expected by present or reasonably foreseeable future actions because the disturbances would be short term or include a minimal amount of acreage. Overall, past, current and reasonably foreseeable projects would be expected to improve forage and vegetative conditions on the forest.

Heritage Resources: Adverse cumulative effects result from natural processes occurring over time, inadequate or inappropriate maintenance or management, outright destruction, and the steady loss of cultural resources through repeated mitigation of adverse effects rather than intact preservation. These effects may lead to loss of certain types of cultural sites prior to comprehensive scientific studies and could further lead to misinterpretation of past use of this area. The design features included such as

avoiding eligible sites should avoid any adverse cumulative effects from this project when combined with the impacts of the other projects listed in Table 6. Other actions on the Forest would also contain design features to reduce or eliminate adverse impacts to cultural sites to minimize any cumulative impacts.

Threatened, Endangered and Region 3 Sensitive Species: A few of the projects listed in Table 6 might produce a short-term negative effect on one or more of the threatened, endangered and sensitive (TES) species, but may also have a subsequent beneficial effect. For instance the Bluff Springs Recreation Area, which happens to be a one of the largest travertine seeps on the Forest and home to one of the largest populations of Sacramento Mountains thistle and within critical habitat for the NMMJM, is heavily impacted by recreational activities. The purpose of the *Bluff Springs New Mexico Meadow Jumping Mouse Habitat Improvement Project* would be to alleviate the impacts of recreation by re-designing the site to protect sensitive habitat for federally-listed species (wildlife and plants).

In addition the *Rio Peñasco Wetland Restoration and Road Stabilization Project* aims to restore hydrologic function to a wetland situated along the Rio Peñasco. If restored, this wetland could provide improved habitat for TES. Furthermore, construction activities along the road may create suitable habitat for tall milkvetch, which seems to require lightly disturbed habitats for colonization and is known to occur directly adjacent to the wetland restoration project area.

The purpose of the *Otero County Electric Cooperative Power Line Project* is to replace approximately 12 miles of overhead line (much of which currently resides in occupied Sacramento Mountains thistle habitat and NMMJM critical habitat) with buried line or new overhead line. The buried line would be placed within the footprint of existing roads and would largely avoid Sacramento Mountains thistle individuals and suitable habitat for the NMMJM. The replacement line would eliminate the need to operate vehicles and heavy equipment in occupied Sacramento Mountains thistle habitat and critical habitat for the NMMJM for powerline repair and maintenance purposes; and similar to the wetland restoration project, construction activities along the roads may create suitable habitat for tall milkvetch.

On a somewhat different note, the Forest Plan is a comprehensive document that addresses many activities including hunting, hiking, camping, skiing, grazing, firewood collection and management of wildlife and rare plant habitat. As a management goal, the Forest Service aims to balance public uses with the land's health and capacity. While the Forest Plan does not authorize specific actions, once approved, all projects and proposals must comply with it, or the plan must be amended to allow the actions. Although this is an administrative process, the Forest Plan Revision process may result in changes to the current Forest Plan that would affect the way threatened, endangered, and sensitive plant species and their habitat are managed. At present it is unknown what changes, if any, may occur. However, any changes made would likely benefit threatened, endangered, and sensitive plants as dictated by law, regulation, and policy.

For many of the projects listed in Table 6, the most substantial cumulative effect to all of the TES species listed in this analysis would be a landscape-scale increase in the presence of non-native invasive plant species. Even though most, if not all, of these projects include a project design feature that requires all equipment and vehicles to be cleaned (devoid of all soil and plant material, including seeds, roots, and vegetative components) prior to entering National Forest System lands so as not to introduce non-native invasive plants, many of these project areas are already infested. For example, the *Westside Sacramento Watershed Restoration Project* (Priority Areas 1, 2 and 3) already contains Siberian elm, salt cedar, Russian knapweed, and musk thistle, which may continue to spread throughout the project area as heavy equipment moves through creating openings in the canopy. Likewise, some areas of the *HAMETS Helicopter Operations*

Project are infested with musk thistle, the seeds of which are dispersed by wind. The proposed project would authorize helicopters to touch-down and take-off from designated landing areas but in the course of doing so, the wash-down, or change in direction of air deflected by the aerodynamic action of the helicopter rotor blade in motion, is likely to act as vector, further spreading musk thistle seed across the landscape.

The effects of the *New Mexico Meadow Jumping Mouse Habitat Improvement Projects on the Agua Chiquita Grazing Allotment* would be very similar to the effects analyzed in this project. Again, the area would be surveyed prior to implementation and all federally-listed and Region 3 sensitive plant species would be avoided. Thus, the most significant cumulative effects would result from construction of multiple range improvements and the subsequent spread of non-native invasive species through livestock use of said improvements (as described in the *Environmental Consequences, Sacramento Mountains thistle* section). However, in this case, the only plant species likely to be affected by the proposed action in the Agua Chiquita Allotment is Wootton's hawthorn. This project would have similar effects to TES wildlife species with some beneficial and some adverse, but overall should improve habitat for the NMMJM and protect other species through the design features to reduce adverse cumulative effects.

While the proposed *Integrated Non-native Invasive Plant Management Project* would enable the Forest to treat existing or new populations of invasive plants, which could curtail some of the smaller infestations; most of the invasive plant populations are spreading at a rate faster than can be effectively treated or managed (estimated increase of 11,000 acres between 2002 and 2015, [USDA FS 2015](#)). This is partially due to the need for an innovative adaptive management approach, which the new *Integrated Non-native Invasive Plant Management Project* would provide but it is also largely the result of a lack of funding. For such a situation, it is worth noting Executive Order 13112 ([Federal Register 1999](#)), which directs federal agencies to identify actions that may affect the status of an invasive species. E.O. 13112 requires federal agencies whose actions may affect the status of invasive species to, among other things, respond to and control populations of invasive species and provide for restoration of native species and habitat conditions in ecosystems that have been invaded by non-native invasive species. It also directs federal agencies to not authorize, fund, or carry out actions likely to cause the introduction or spread of invasive species unless the benefits of the action clearly outweigh the harm and the agencies take steps to minimize the harm.

Some adverse cumulative effects would likely result from the *South Sacramento Restoration Project* and the *Scott Able Allotment Management Project*. The *South Sacramento Restoration Project* consists of 140,000 acres, which is a significant portion of the Sacramento Ranger District. Suitable and occupied habitat exists within the project area for the TES species previously described in this analysis. The purpose of this project is to address forest health issues, hazardous fuels, and declining wildlife habitat quality on the Sacramento Ranger District at a landscape scale. At any given time, one or more proposed management actions would be implemented over large portions of this project area and would be done so with an adaptive management approach. The idea is that subsequent monitoring would inform future management decisions and corrections would be made if the desired conditions were not being met. However, the time-scale at which management is implemented may not align with the time it may take to detect issues and for a plant that is not motile, such a misalignment could be detrimental. While, resource protection measures would offer some measure of protection, especially for Sacramento Mountains thistle, the greater concern is that with numerous management activities potentially occurring within the same area and over a large portion of the project area, these plants may not be able to keep pace with changes in their habitat. Also, with the amount of disturbance occurring throughout the project area, invasive plant populations may continue to spread beyond our ability to effectively treat and manage

them. The projects would also have beneficial effects by improving and protecting habitat for TES and design features would help to reduce adverse cumulative effects.

The *Scott Able Allotment Management Project* would reauthorize livestock grazing activities on the Scott Able Allotment. This allotment has suitable habitat for many of the TES species. Adverse effects to Sacramento Mountains thistle would consist of trampling and herbivory of individuals, as well as trampling damage to the occupied travertine spring and soft substrate located within the allotment, which may subsequently alter water flow of the spring. While drift fences would be installed to discourage livestock presence in occupied Sacramento Mountains thistle habitat, the main livestock driveway cuts directly above and partially across the travertine spring. Soil erosion and compaction may result in construction of new range improvements (especially if heavy equipment is used), along livestock driveways and around seeps, springs, and riparian areas where livestock typically congregate. Furthermore, soil erosion and compaction may be exacerbated by continued livestock use and could result in changes to the soil structure, organic content, and soil moisture, which would reduce the quality of suitable habitat for TES plant species, including Sacramento Mountains thistle. Some areas within the allotment exhibit visible signs of compacted soils and reduced nutrient cycling. These areas also show evidence of pedestalled vegetative ground cover and the soil condition of a portion of these areas is impaired ([USDA FS 2016](#)). Furthermore, habitat disturbance and degradation through livestock grazing would likely result in the spread of non-native invasive species (as previously described), which would only serve to perpetuate poor habitat conditions ([Caldwell et al. 1981](#)).

These actions would have an adverse cumulative effect on the Sacramento Mountains thistle. The Sacramento Mountains thistle was listed as threatened in 1987 due to its limited range and significant threats. At the time of listing, population numbers were estimated at 10,000 to 15,000 individuals. Based on the decreasing trend in the number of flowering stocks from 1999 to 2007 (Table 3, *Affected Environment, Sacramento Mountains thistle* section), a regression analysis of predicted trends estimate that the number of flowering stocks would further decrease to 14,264 by 2013 ([USDA FS 2008](#), [USDI FWS 2010](#)). Although no data was collected in 2013, many of the management actions and environmental conditions that have contributed to the decline of Sacramento Mountains thistle are still present and are likely to continue into the reasonably foreseeable future.

The activities are expected to cumulatively affect TES species, with varying degrees of both adverse and beneficial impacts. Effects would generally be largely minimal or beneficial, with the resource protection measures in place. When these effects are coupled with the effects described above there could be small cumulative effects (if invasive plant treatment is not immediate and infestations increase); design features and best management practices are in place for each project and activity to reduce adverse cumulative effects to TES species and to not cause a downward trend.

Management Indicator Species: Overall, the effects of this proposal and other actions that have occurred or are reasonably foreseeable are not likely to have an adverse cumulative effect on management indicator species. All of the present and foreseeable future activities listed above have the potential to affect management indicator species, with varying degrees of both adverse and beneficial impacts. However, management direction is designed to eliminate or reduce negative cumulative impacts by lessening direct and indirect impacts to species.

Migratory Birds: The permanent NMMJM enclosures are anticipated to provide small scale, localized benefits to any migrant birds for which meadow habitat is important. This outcome could increase prospects locally for maintaining Lincoln's sparrows and species with similar habitat requirements within the allotment and District, should appropriate habitat components develop in the affected areas.

Additionally, proposed watershed improvements (i.e. *Rio Peñasco Wetland Restoration and Road Stabilization Project*) would restore a wetland that has been modified and is no longer functioning and improve a road crossing to improve water quality and wildlife habitat. In contrast, continuation of grazing on this and adjacent allotments would continue to impact habitat in the stream, meadow and riparian setting required by Lincoln's sparrows and species with similar habitat requirements, and continue to restrict prospects for maintaining such species on the District. Another cumulative effect of the proposed project, in conjunction with ongoing grazing in the project and adjacent allotments, is enhanced potential for brown-headed cowbird brood parasitism or potential for increasing the spatial extent of it. Following resource protection measures would help minimize these impacts.

Soils: Past, present and reasonably foreseeable future actions include construction, dispersed recreation, land and special uses, noxious weed management, timber sales, and habitat improvement projects. Wildfire suppression and historic grazing practices dating back to the turn of the century have contributed to the vegetative component currently found on the allotment. Gradual closing of the canopy by woody species is both directly and indirectly related to the removal of fire from the ecosystem and the historic grazing practices that occurred in the early 1900's.

There are no other ongoing treatments occurring at this time, however the South Sacramento Restoration Project is currently in the planning stage. This project aims to restore forest health on the approximately 140,000-acre planning area in the southern Sacramento Mountains. The project is designed to meet restoration objectives at a landscape-scale, primarily in mixed conifer and ponderosa pine forest. Any future commercial timber sales or vegetation projects that have been identified or may be identified would aid in the reduction in canopy cover and provide beneficial opportunity for herbaceous and woody browse species. The expected results include improved forage production, increased species diversity, improved plant vigor, and soil cover. Range condition and trend and subsequently overall watershed health are expected to improve.

In summary, no significant cumulative impacts on watershed and soil resources would be sustained from past, present, and reasonably foreseeable future actions in combination with the effects of the Proposed Action or any of the alternatives considered in this assessment. The Proposed Action represents no significant unavoidable adverse impacts on long-term productivity and represents no irreversible and irretrievable commitment of resources.

Hydrology, Watersheds Riparian Areas: The cumulative effects analysis for hydrology, watersheds and riparian areas has been broken down into 5 resource indicators as utilized in the environmental consequences section.

Resource Indicator # 1 Water Quality-Cumulative impacts would be similar to the direct and indirect impacts with the exception that the Rio Peñasco Wetland Restoration Project would improve water quality even more than would be the case with only the direct and indirect impacts that would result from this projects' implementation of the proposed action. This is due to the fact that as stream channels are more stable, there would be less bank erosion and less sediment being conveyed down the stream channel. Filtration of nutrients and other pollutants would be enhanced with riparian/wetland restoration.

The *South Sacramento Restoration Project* would also lead to an upward trend in water quality over time because roads would be improved, timbered areas would be opened up for increases in forage in upland areas that can be utilized by livestock, and wet meadows would be restored contributing to greater water holding and filtration capacity in the soils. Restoration of ephemeral drainages and arroyos in

upland areas would, over time, contribute to less sediment being conveyed overland and possibly into perennial stream channels.

The *Bluff Springs New Mexico Jumping Mouse Habitat Improvement Project* would aid in restoring proper hydrologic function to a small portion of the project area, also contributing to an overall upward trend in water quality over time. This would contribute to benefitting downstream users as less sediment would be deposited onto properties, irrigation water quality would be enhanced, fisheries would be maintained, and cleaner drinking water would be available.

The *Integrated Non-Native Invasive Plant Management Project* would contribute to more riparian/wetland vegetation being established as non-native invasive vegetation species were better managed.

Resource Indicator # 2 Water Quantity-Cumulative impacts would be similar to the direct and indirect impacts with the exception that the *Rio Peñasco Wetland Restoration Project* would improve water quantity even more than would be the case with only direct and indirect impacts that would result from this projects' implementation of the proposed action. This is due to the fact that as stream channels and the adjacent riparian areas and wetlands are restored, there would be greater infiltration of water into the soil profile and greater water holding capacity, making water more available for slow release into the stream channel and helping to sustain perennial flow during dry times of the year.

The *South Sacramento Restoration Project* may contribute to site specific trends of increases in water quantity over time if thinning specific areas results in greater groundwater recharge to small, shallow aquifers (perched aquifers). As wet meadows are restored and expanded, infiltration and water holding capacity in the soil would increase, resulting in water quantity increases over time.

The *Bluff Springs New Mexico Jumping Mouse Habitat Improvement Project* would aid in restoring proper hydrologic function to a small portion of the project area, also contributing to an overall upward trend in water quantity.

The *Integrated Non-Native Invasive Plant Management Project* would allow for reestablishment and growth of riparian and wetland vegetation in site-specific areas. These increases in water quantity would be incremental and take place over long periods of time. The amount of water quantity increase would also depend upon moisture patterns, which vary on an annual basis. The *Integrated Non-Native Invasive Plant Management Project* would contribute to more riparian/wetland vegetation being established as non-native invasive vegetation were better managed.

Resource Indicator # 3 Riparian and Wetland Function, and Channel Stability-Number and Size of Headcuts and Stream Channel Incision- Cumulative impacts would be similar to the direct and indirect impacts with the exception that the *Rio Peñasco Wetland Restoration Project* would begin to stabilize headcuts, and channel incision would begin to move in an upward trend at a faster pace than with just the direct and indirect impacts of the proposed action.

The *Integrated Non-Native Invasive Plant Management Project* would contribute to more riparian/wetland vegetation being established as non-native invasive vegetation is better managed.

Resource Indicator # 4 Riparian and Wetland Function, and Channel Stability-Streambank Stability/Bank Erosion- Cumulative impacts would be similar to the direct and indirect impacts with the exception that the *Rio Peñasco Wetland Restoration Project* would begin to move streambank stability in an upward trend more quickly and bank erosion would begin to decrease more quickly than with just the direct and indirect impacts of the proposed action.

The *Integrated Non-Native Invasive Plant Management Project* would aid in the management of invasive plants that presently may be curtailing establishment and growth of native riparian and wetland vegetation. In an indirect way this would aid in beginning an upward trend in curtailing streambank erosion and establishing greater bank stability. Results would vary in time and space. Improved habitat for the NMMJM and increased forage for livestock are just a few of the benefits derived from these cumulative impacts.

Resource Indicator # 5 Wetland Health-Cumulative impacts would be similar to the direct and indirect impacts with the exception that the *Rio Peñasco Wetland Restoration Project* would improve wetland health even more than would be case with only direct and indirect impacts resulting from implementation of this projects' proposed action. This is due to the fact that treatments would be geared towards restoring wetland areas.

The *Bluff Springs New Mexico Jumping Mouse Habitat Improvement Project* would aid in restoring wetlands in a small portion of the project area, also contributing to an overall upward trend in wetland health.

The *Integrated Non-Native Invasive Plant Management Project* would contribute to aiding in the reestablishment and growth of riparian and wetland vegetation in areas where non-native invasive vegetation has crowded out the riparian/wetland species. These improvements in wetland health would be incremental and take place over long periods of time (years to decades). The degree of upward trend would also depend upon moisture patterns, which vary on an annual basis.

Chapter 4 – Consultation and Coordination

The Forest Service consulted the following federal, state, and local agency personnel; tribes; and other contributors during development of this analysis.

Interdisciplinary Team Members

Ciara Cusack, NEPA Planner
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Federal, State, and Local Agencies

U.S. Department of Agriculture, Forest Service, Lincoln National Forest
U.S. Fish and Wildlife Service
Army Corps of Engineers
Ft. Bliss Army
White Sands Missile Range
Holloman Air Force Base
U.S. Park Service
Natural Resources Conservation Service
New Mexico State Historic Preservation Office
City of Alamogordo
Otero County
Village of Cloudcroft
Otero Soil and Water Conservation District
New Mexico Department of Agriculture
New Mexico Environment Department
New Mexico State University-Range Improvement Task Force
New Mexico Department of Game and Fish
New Mexico Surface Water Quality Bureau
New Mexico Energy, Minerals and Natural Resources Department
Local Fire Departments
Bureau of Land Management
Office of the State Engineer
New Mexico State Land Office
New Mexico State Forestry
New Mexico Department of Transportation
Federal and State Representatives

Native American Tribes

Mescalero Apache Tribe
Hopi Tribe
Pueblo of Zuni
Ysleta Del Sur Pueblo
Pueblo of Isleta
Fort Sill Apache
Kiowa Tribe of Oklahoma
White Mountain Apache
Yavapai-Apache Nation
Tonto Apache Tribe
San Carlos Apache Tribe
Salt River Pima-Maricopa Indian Community
Gila River Indian Community
Comanche Nation

Other: The following non-governmental organizations were contacted during the scoping period and are on the project mailing list to receive updates specific to the Proposed Action: Sacramento Grazing Association, New Mexico Cattle Growers Association, Otero County Cattleman’s Association, Otero County Grazing Advisory Board, Otero County Farm and Livestock Bureau, Southwest Consolidated Sportsman, National Wild Turkey Federation, Rocky Mountain Elk Foundation, New Mexico Wildlife Foundation, Utility Companies, recreation groups, community groups, Chamber of Commerce, Defenders of Wildlife, Center for Biological Diversity, Western Watersheds Project, WildEarth Guardians, Audubon New Mexico, Sierra Club, Southwest Environmental Center, South Central Mountain Resource Conservation & Development Council, and New Mexico Forest Industry. Many other organizations and individuals were contacted during the scoping period and are on the project mailing list to receive updates. Notices were published in the Alamogordo Daily News and News Releases were sent out to encourage public involvement.

Chapter 5 – Literature Cited

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Appendix A- Comments received during scoping

Twelve comment letters were received in response to scoping, the comments received and responses are included in the table below. The scoping period was from March 6, 2017- April 4, 2017.

Comment Number	Commenter	Comment	Forest Service Response to Comment
1	State of New Mexico- Energy, Mineral and Natural Resources Department, Daniela Roth March 20, 2017	Survey for sensitive and listed plants in all project areas, if found avoid or mitigate and monitor construction near sensitive/listed plants.	See Section 2.3 in the EA for design features regarding sensitive and listed plant species.
2	State of New Mexico- Energy, Mineral and Natural Resources Department, Daniela Roth March 20, 2017	Sacramento Mountains Thistle should be included in the exclosures, if all thistles can't be, included, the excluded thistles should be monitored for livestock impacts, The FS should consider planting Sacramento Mountains thistle within the exclosures or to augment the existing population	The Sacramento Mountains thistle would be included in exclosures whenever possible, see Section 2.3 of the EA for design features. The analysis will include expected effects from grazing on the Sacramento Mountains thistle (Section 3.4) and any monitoring requirements in Section 2.3 of the EA. Consultation will be completed with the U.S. Fish and Wildlife Service for the Sacramento Mountains thistle. Planting of Sacramento Mountains thistle is not included in this analysis.
3	Peñasco Valley Telephone-Mitch Hibbard March 20, 2017	Peñasco Valley Telephone facilities should not be impacted by these projects, but if the project areas are expanded nearby facilities could be impacted.	Peñasco Valley Telephone will continue to be included in the NEPA process and on the mailing list to be made aware of final project locations and any changes.

Comment Number	Commenter	Comment	Forest Service Response to Comment
4	Hopi Tribe-Leigh Kuwanwisiwma March 20, 2017	The Hopi Tribe is interested in consulting on any project that may have an adverse effect to prehistoric sites, please provide copies of the report and proposed plans for comment if prehistoric sites may be adversely affected.	The Hopi Tribe will be consulted if adverse effects are expected to prehistoric sites. See Design Features in Section 2.3 for avoiding adverse effects to archaeological sites.
5	Hopi Tribe-Leigh Kuwanwisiwma March 20, 2017	If uninventoried sites are encountered or Native American remains or funerary objects are encountered work must cease and the proper regulations must be followed.	See Section 2.3, Design Features
6	White Mountain Apache Tribe- Mark Altaha March 24, 2017	The project will not have an impact on White Mountain Apache Tribe's historic properties and/or cultural properties.	No response needed, comment noted
7	White Mountain Apache Tribe- Mark Altaha March 24, 2017	Any/all ground disturbing activities should be monitored "if" there are reasons to believe that there are human remains and/or funerary objects present, and if such remains are encountered they shall be treated with respect and handled accordingly until such remains are repatriated to the affiliated tribe(s).	See Section 2.3, Design Features.
8	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	NMDA maintains a strategic goal to promote the responsible and effective use and management of natural resources in support of agriculture. Our comments focus on aspects of the PA that are unjustified and will negatively impact livestock producers while providing little or no benefit to the NMMJM.	No address necessary, introductory statement

Comment Number	Commenter	Comment	Forest Service Response to Comment
9	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	NMDA supports sustainably managed livestock grazing as a congressionally mandated use of federal lands that is vital to the ranching industry and beneficial to wildlife and associated natural resources. The importance of consistent access to forage and water on the LNF cannot be overstated for the ranching industry in New Mexico. Livestock grazing on LNF allotments has a large role in maintaining economic viability for producers and rural communities.	No address necessary, statement on the importance of continued livestock grazing.
10	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	In response to comments received regarding NMMJM proposed activities on the Sacramento Ranger District of the LNF (dated April 20, 2016), the LNF stated that “The Forest Service will collect monitoring data and analyze the data to determine if the fences are meeting the desired objectives.” Moreover, “Further analysis will be completed to determine what needs to be protected before more long term decisions are made to protect habitat.” Since the LNF is proposing to replace temporary fences with permanent fences, what “further” analysis has been conducted to support this decision? NMDA requests any data and analysis that is relevant to the PA.	See Section 3.2 in the EA for discussions on monitoring. This environmental assessment is the further analysis that is being completed prior to a decision on permanent fencing.

Comment Number	Commenter	Comment	Forest Service Response to Comment
11	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	Furthermore, NMDA notes that the LNF has set criteria for constructing fences, but has not identified measures that would allow the fences to be removed if objectives related to the NMMJM have been met. Enclosures should be removed once objectives are achieved to relieve the hardships placed on the allotment owners associated with altered management of livestock and increased maintenance costs of additional fencing.	The proposed action does not include removing the fences. Removing the fences does not meet the purpose and need to protect and maintain the NMMJM habitat. If fences were considered to be removed at a later time, a separate NEPA analysis would be completed at that time.
12	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	NMDA understands the legal obligation that LNF has under Section 7(a)(2) of the Endangered Species Act to, “insure that any action authorized...is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat which is determined by the Secretary...to be critical...” Regulations germane to this obligation at 50 CFR §17.94(c) state that “Critical Habitat management focuses only on the biological or physical constituent elements within the defined area of Critical Habitat that are essential to the conservation of the species.”	No address necessary, statement about the Endangered Species Act.

Comment Number	Commenter	Comment	Forest Service Response to Comment
13	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	According to the PA, permanent fences will follow the footprint of temporary fencing from the 2016 grazing season. This is concerning because exclosure areas constructed in 2016 were chosen based on the presence of primary constituent elements (PCEs), restoration potential, and possible future connectivity to other high-quality habitat. Exclosures should only include areas where all PCEs currently exist and are threatened by current management. Including areas that have restoration potential and possible future connectivity is outside the focus for critical habitat management provided by regulation.	The reasons and importance of fencing areas of critical habitat are discussed in the EA in Section 3.4- Threatened and Endangered Species under the New Mexico meadow jumping mouse section.

Comment Number	Commenter	Comment	Forest Service Response to Comment
14	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	<p>Further, the lack of peer-reviewed science used in determining the exclosures is of concern. According to the Species Status Assessment Report for the NMMJM:</p> <p>“It is important to recognize that there are substantial areas of uncertainty associated with this assessment. The main areas of uncertainty include the amount of suitable habitat needed to support resilient populations and the number of redundant populations needed to provide for adequate redundancy and representation. There is also uncertainty in some of the natural history information such as the location of hibernation sites relative to riparian areas and population sizes of localities found since 2005. We base our assumptions in these areas on the best available information, which is admittedly limited in these areas of science.” (U.S. Fish and Wildlife Service, 2014).</p> <p>Therefore, building permanent exclosures around the areas in question are indefensible based on the current understanding of NMMJM habitat needs.</p>	<p>The US Fish and Wildlife Service used the best scientific and commercial data available to designate critical habitat for the jumping mouse (Federal Register 2016). It published a species status assessment (USDI FWS 2014) report that included the most recent research and an exhaustive review of the scientific information available about the species at the time. The Forest Service recognizes there are uncertainties and is basing the proposal on the best available science. The proposal is meant to not jeopardize the survival of the NMMJM, while allowing for continued livestock grazing. Section 3.4-New Mexico meadow jumping mouse of the EA discusses effects of the fencing to the NMMJM.</p>

Comment Number	Commenter	Comment	Forest Service Response to Comment
15	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	The statement within the PA that “Approximately 100 acres would be fenced, which is less than 1% of the 111,484 acre Sacramento Grazing Allotment” is misleading. Although a small portion of the overall allotment would be excluded, it is worth noting that those areas are of key importance to the management of the allotment due to the location of the proposed exclosures. NMDA recognizes the efforts of the LNF to build additional corrals and watering facilities to improve management flexibility on the allotment and its commitment to follow the allotment owner’s preferences for placement, design, and construction of the new facilities. However, increased costs to permittees associated with altered management of livestock and increased maintenance costs of these new facilities should also be considered. NMDA encourage LNF to continue seeking input from the affected allotment owners at every step in this process.	The statement in the scoping letter that less than 1% of the allotment would be fenced was to illustrate that forage and access to most of the allotment would remain available. The FS acknowledges the importance of the areas being fenced to the permit holder. The permittee will still be allowed to use all facilities for working livestock, and the fencing allows for the permittee to continue to use the affected pastures and to follow a similar management scenario from years past. The permit holder will continue to be included in the process and the FS will work towards maintaining a cooperative relationship.

Comment Number	Commenter	Comment	Forest Service Response to Comment
16	New Mexico Department of Agriculture, Jeff M. Witte April 3, 2017	Moreover, the construction of new water facilities in the PA is useless without water rights to put them to use. Are there any assurances that allotment owners will be able to use these watering facilities subject to valid existing rights in place of their lost access to the surface water in the exclosures?	The new watering facilities are meant to enhance management and improve livestock distribution and would be located in various areas across the allotment as discussed in Section 2.2.2 of the EA. Any necessary water rights would be obtained or verified prior to development. To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected.
17	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	The Otero County Farm and Livestock Bureau represents farmers and ranchers across Otero County. Our members are concerned that the USFS managers are violating both State and Federal Laws as you try to create areas for a non-existent mouse. The USFS has not presented us with any evidence that any meadow jumping mouse is known to exist in the upper Peñasco watershed.	The proposal includes areas that are designated critical habitat for the NMMJM.
18	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	We have discussed the situation in our Board meetings and we know of no known and documented meadow jumping mice ever being actually seen or found on the upper Peñasco. Our members own water rights and grazing allotments on the Peñasco from the upper end where you have placed temporary fences and are now proposing to build permanent fences which will restrict our cattle off of waters owned by the grazing allotment owners.	See Section 2.2.2; water lanes are included as part of the proposal for livestock to access water.

Comment Number	Commenter	Comment	Forest Service Response to Comment
19	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	In addition our members own both pre-1907 water rights and irrigation rights. If your fences allow the buildup of vegetation which restricts or hinders the flow of water it affects every water rights owner downstream all the way to the Pecos River including those who live in Texas. We believe your actions could have an adverse effect the Pecos River Compact between New Mexico and Texas so the legal implications are huge.	To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected. No dams or barriers to obstruct the flow of water will be constructed within the stream channels. The hydrology section of the EA (Section 3.9) further discusses the hydrological effects of the proposal.
20	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	We request that you stop this project until we have ample time to follow up with our attorneys to review the legal implications and until you can show us proof that the US Forest Service has any water rights in New Mexico. We want to know how and when you obtained those rights and who authorized it. Our attorney reviewed NM and federal water laws and assured us that you do not have the legal right to any water from the National Forests in New Mexico.	The analysis is an on-going process and comments will continue to be considered until a decision is reached. There will be an opportunity to review and comment on the draft EA, as well as the final EA and draft decision prior to a final decision being reached. Any necessary water rights will be verified or obtained prior to construction of a water development.
21	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	We request that you review the NM vs US water case that was heard before the US Supreme court in 1978. We plan to continue to pursue our case before the New Mexico State Engineers office, the State legislature, and federal agencies and courts as is necessary to protect the rights of our members.	To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected.

Comment Number	Commenter	Comment	Forest Service Response to Comment
22	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	We are looking at all our options which include filing personal Bevin's Actions against any federal managers and employees who are TAKING our water or private property rights without our agreement and just compensation.	To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected.
23	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	Please understand that we prefer to come to an agreement on this matter without having to pursue legal options but we will do whatever is necessary to protect the rights of our members. We request that this project be put on hold until the new administration is able to have the new Agriculture Secretary and the new head of the US Forest Service confirmed by the Senate.	The FS will follow current direction which includes the analysis for this proposal. There will be further opportunities to comment and provide input as outlined in the response to comment #20.
24	Otero County Farm and Livestock Bureau, Jim Ellet April 3, 2017	Please cease and desist until we have more time to work with you and the forest legal team to work out the legal details.	See the response to comment #20 for timelines and further opportunities to comment.

Comment Number	Commenter	Comment	Forest Service Response to Comment
25	Sylvia Bell April 3, 2017	<p>I would like to know how the designation for not only proposed permanent fencing, but existing fencing was determined. According to the maps which you enclosed with your letter, it appears as if long corridors of unoccupied (by mice) and therefore unutilized land has been or will be fenced off for the New Mexico Jumping Mouse. For example, the map titled Proposed Permanent Fencing for the upper Rio Peñasco, shows areas currently fenced, proposed permanent fence areas, and enclosures which are not occupied. In fact, according to this map, no area on the map is designated as occupied by NMJM. Likewise, the other map titled Proposed Permanent Fencing Wills Canyon has three areas along the stream bank which are designated for permanent fencing even though they are not occupied by NMJM. There appears to be no scientific data to warrant this extreme action in these specific areas.</p>	<p>Review Section 3.4 of the EA under the New Mexico meadow jumping mouse section for a discussion on how fencing would improve NMMJM habitat.</p>

Comment Number	Commenter	Comment	Forest Service Response to Comment
26	Sylvia Bell April 3, 2017	I realize you have a responsibility to "protect" endangered species and their environment, but it is an extreme overreach to designate vast areas of land for elimination of all or most other multiple uses when there is absolutely no proof that endangered species even exist or ever existed in these areas. You are limiting or eliminating recreational and grazing uses (which are the main use of these areas) for a non-existent mouse without regard to the imposition of the recreationalist or the water and grazing rights of the ranchers or the economic and aesthetic effect it will have. Do you not have at least an equal responsibility to these forest users? We can easily measure the number and quantity both historically and currently of this use.	The fencing would include small areas of the allotment (less than 1%) and the majority of the allotment would remain available to livestock grazing and for recreation. To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected. The proposals intent is to balance the needs of protecting the species with other uses on the forest.
27	Sylvia Bell April 3, 2017	With regards to the grazing, water, and right-of-way rights of the allotment owners, these fences are definitely a violation of their property rights. These pre 1907 water rights predate the creation of the US Forest Service and the State of New Mexico.	To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected.

Comment Number	Commenter	Comment	Forest Service Response to Comment
28	Sylvia Bell April 3, 2017	This project directly violates New Mexico State Supreme Court decision in which the State Engineer, Steve Reynolds, upheld the previously recognized state water rights from a power grab from the USFS. This decision was upheld by the US Supreme Court which established that federal bureaucrats were required to recognize the authority of state issued water rights over their attempt to engineer the use of water without regard to previously established and legal holdings of private individuals. (Please refer to Miembras vs Salapek and New Mexico vs United States 1978).	To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected.
29	Sylvia Bell April 3, 2017	Judge Vern Payne who wrote the Mimbres decision while a justice of the NM Supreme Court has reviewed this issue and has represented the interest of water right owners and downstream water users of this allotment. He issued a plea to the State Engineer to uphold the rights of New Mexico water right holders. Judge Payne's decision was upheld by the U.S. Supreme Court and is the binding law of the land and should be recognized. The federal government's attempts to circumvent this decision are illegal and a complete disregard of the law.	To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected.

Comment Number	Commenter	Comment	Forest Service Response to Comment
30	Sylvia Bell April 3, 2017	I was interested in your summary of the importance of maintaining a riparian area. While I don't disagree with many of the reasons for maintaining vegetation to protect water sources, I do question the veracity of fencing off areas and spreading out water to prevent water loss. One of the areas affected by this proposal, Mauldin Springs, is a case in point. This area has been fenced off and the healthy stream flow at the top of the fenced area is completely nonexistent at the bottom of the fenced area. This is not only an illegal diversion of the water rights of the allotment owner, but also of all the downstream users and water right owners. When I asked your hydrologist about water loss, he said, "It comes out downstream and is not lost" I disagree.	Review the hydrology section 3.9 in the EA for a discussion about effects to water quantity.
31	Sylvia Bell April 3, 2017	When I spoke with Supervisor, Travis Mosley, in 2014 about the permanent fencing project which was taking place on the Agua Chiquita, I asked him how long the stream had been fenced off and for what reason. He replied 17 years and for water retention and erosion. When I asked how successful it had been, he said, "Not very." I asked, "Why would you spend money to permanently fence off a "not very" successful project and make no effort or monetary allotment to pursue successful practices such as terracing, thinning, gabions etc.?" He replied, "Now we have the mouse to deal with."	The EA analyzes the effects of the fencing which is proposed to improve and protect NMMJM habitat.

Comment Number	Commenter	Comment	Forest Service Response to Comment
32	Sylvia Bell April 3, 2017	I now ask you the same question. If water retention, improvement, clarification, reduction of transpiration, and mouse protection are the goals of this project, why are you discriminating on only one use--cattle to correct the problem? Your entire Description of Proposed Actions focused on cattle exclusions with a slight mention of limited elk exclusions. Why aren't you addressing thinning, elk reduction, and impact by mouse predators, such as wild hogs, catastrophic wildfires caused by dense undergrowth, birds (such as hawks, turkeys and even spotted owls), bobcats, foxes, coyotes etc.? Couldn't these monies be better spent for a more comprehensive and effective solution?	Federal agencies are required to protect all critical habitat under Section 7 of the Endangered Species Act and ensure, in consultation with the US Fish and Wildlife Service that any action they authorize, fund, or carry out, such as livestock grazing, is not likely to result in the destruction or adverse modification of critical habitat (ESA 1973). Effects by wildlife are not federal actions subject to Section 7 consultation. The South Sacramento Restoration project is under analysis and involves vegetation treatments across approximately 140,000 acres to improve forest health and reduce the risk of wildfire in the area.
33	Sylvia Bell April 3, 2017	I also felt that your representation of cooperating with the allotment owner were not very forthright. It implied that the allotment owner was in complete agreement with changes and was being constantly consulted. I spoke with the allotment holder, and asked if his preferences were being considered. His response was negative.	The FS has worked toward having a cooperative relationship with the permit holder and encourages input. The permit holder may not always be in favor of proposals on the allotment, but cooperation and input is encouraged.
34	Sylvia Bell April 3, 2017	I would hope you would reconsider and revise this project before proceeding.	The FS will take all comments into consideration and will provide further opportunities to comment on the draft EA when it is available.

Comment Number	Commenter	Comment	Forest Service Response to Comment
35	Sacramento Grazing Association, Michael J. Van Zandt April 4, 2017	SGA owns private property rights inside the fenced enclosure areas described in the project proposal. Those rights include pre-existing water rights, range rights, and right-of-way rights granted to SGA's predecessors by the United States. SGA is also entitled to have its economic interests protected, along with its investment-backed expectations in purchasing the allotment. SGA's rights that will be adversely impacted by the proposed project were granted by various Congressional Acts passed over time.	To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected. No major management changes are being proposed. The proposal aims to allow for continued grazing while protecting critical habitat and riparian areas.

Comment Number	Commenter	Comment	Forest Service Response to Comment
36	Sacramento Grazing Association, Michael J. Van Zandt April 4, 2017	SGA requires sufficient water from its vested water rights for its cattle operations, and it needs sufficient space to hold its cattle while they are being processed. Your February 28 letter states that "fencing would allow livestock access to water, or to neighboring pastures, through the use of strategically placed water/access lanes where the livestock could cross the stream channel." However, based on past experience, SGA is concerned that the water access lanes constructed by the Forest Service will not be sufficient to ensure access to SGA's water rights required to provide a secure and stable supply of water available for SGA's cattle. Specifically, SGA is concerned that in frequent dry years all of the water access lanes will become dry. Moreover, as the water flow slows inside the exclosures and vegetation continues to consume larger quantities of water, the water available to SGA's cattle will be further reduced. SGA is also concerned about additional stress to its cattle from having to travel long distances to access water sources.	During dry years methods can be used through permit administration to ensure adequate water is available. The hydrology section of the EA (Section 3.9) discusses the hydrological effects of the proposal. The range section (Section 3.2) in the EA discusses the distance between water lanes.

Comment Number	Commenter	Comment	Forest Service Response to Comment
37	Sacramento Grazing Association, Michael J. Van Zandt April 4, 2017	SGA appreciates the Forest Service's recognition of the role elk play in destroying NMMJM habitat. However, the proposed project includes only a portion of the enclosure fencing designed to keep elk out, while elk will likely be able to access other excluded areas, which SGA cattle will not. As SGA has previously stated, the Forest Service's efforts to lay the burden of protecting the NMMJM entirely at the feet of SGA unfairly targets SGA's family business and its livelihood, in a misguided attempt to solve a problem that is not of SGA's making.	Section 3.2 of the EA discusses the monitoring results of the temporary and existing enclosure fencing. Section 3.4 discusses the reasons fencing would be beneficial to the NMMJM.

Comment Number	Commenter	Comment	Forest Service Response to Comment
38	Sacramento Grazing Association, Michael J. Van Zandt April 4, 2017	SGA has significant problems with the designation of critical habitat in the Rio Peñasco and Wills Canyon areas of SGA's allotment and the BO's conclusions that seemingly all of the problems with the NMMJM are caused by cattle grazing. Not only has the U.S. Fish and Wildlife Service ("USFWS") and the Forest Service fenced off significant portions of the pre-1907 water rights that belong to SGA under New Mexico law, they have also fenced off almost the entire area where SGA must hold its cattle while they are being branded and while they are being processed for shipment. SGA has holding areas or traps both in Wills Canyon and in Rio Peñasco. The traps have now been fenced off with electric fences that are incapable of preventing cattle and elk from entering the enclosures. This situation is intolerable and completely in violation of SGA's rights to its water, to its range, to its allotment, and to its rights under the grazing permit.	New handling facilities have been built and more are included as a part of this proposal to provide alternative areas for the permit holders to use. The existing handling facilities will still be authorized for use. Under this proposal the fencing would be improved and be more effective at keeping livestock out of the enclosures. To the extent that permittees possess water rights under New Mexico state law, those rights are being, and will continue to be respected.

Comment Number	Commenter	Comment	Forest Service Response to Comment
39	Sacramento Grazing Association, Michael J. Van Zandt April 4, 2017	Moreover, the proposed area designated for permanent fenced enclosures is over-inclusive for the purposes of protecting NMMJM habitat, particularly in light of the adverse impact on SGA's operations and private property rights. Your February 28 letter states: "the fencing would focus on areas known to be occupied by the NMMJM and areas that were previously fenced with temporary fencing and showed improvement after being fenced off." However, according to the maps included with your letter, permanent fencing is proposed around large swaths of the allotment <i>not</i> occupied by the NMMJM, as well as areas where there is no existing fence.	Fencing is proposed within occupied critical habitat and unoccupied critical habitat. The statements "the fencing would focus on areas known to be occupied by the NMMJM and areas that were previously fenced with temporary fencing and showed improvement after being fenced off" were meant to be separate and that fencing would focus on occupied critical habitat as well as unoccupied critical habitat that showed improvement after being fenced off with the temporary fencing.
40	Sacramento Grazing Association, Michael J. Van Zandt April 4, 2017	The U.S. Constitution requires the Forest Service to protect SGA's private property rights as vigorously as it seeks to protect the NMMJM and its habitat. SGA expects the Forest Service to refrain from infringing upon or attempting to diminish SGA's rights as it proceeds with the proposed NMMJM habitat improvement project.	To the extent that permittees possess rights under New Mexico state law, those rights are being, and will continue to be respected.

Comment Number	Commenter	Comment	Forest Service Response to Comment
41	Natural Resources Conservation Service, Amalia Montoya April 4, 2017	The proposal for this project aims to protect critical habitat, improve riparian condition and improve water quality within the Sacramento Grazing Allotment by constructing exclosure fencing and construct additional water developments for livestock and wildlife. These structural developments should aid in improving resource conditions on the allotment over time. However, are there other projects that will look at the allotment as a whole or watershed scale type projects to aid in what this project aims to achieve? Are there treatments (erosion control, headcut stabilization) in the adjacent tributaries to the Rio Peñasco and Wills Canyon that will be considered in this project or another project? Will invasive species be considered in the development of this project?	This analysis will focus on the effects of the proposed fencing and additional range improvements. A landscape restoration project that includes much of the Sacramento Allotment summer range has been proposed and will be analyzed separately (South Sacramento Restoration Project). Stream restoration in the Rio Peñasco and Wills Canyon drainages would be analyzed in a separate analysis and is being considered at this time. Invasive species will be a consideration in this project and mitigation measures will be in place to prevent the introduction of invasive species. Treatment of invasive species is currently under analysis in a separate forest wide analysis.
42	Natural Resources Conservation Service, Amalia Montoya April 4, 2017	To protect critical habitat: exclosure fencing and development of additional water for livestock and wildlife should aid in the protection of critical and occupied habitat for the NMMJM. Will there be a reference condition or benchmark that will be used to measure improvements or degradation of habitat after the fences and water developments have been installed? Will adjustments be made accordingly? Will all exclosure fences become permanent?	See Section 2.3.2 of the EA for monitoring requirements. The proposed action includes permanent fencing. A separate analysis to remove fences would be completed at a later time if removing the fences was considered.

Comment Number	Commenter	Comment	Forest Service Response to Comment
43	Natural Resources Conservation Service, Amalia Montoya April 4, 2017	To improve riparian condition: will access points within the enclosure fencing be strategically placed to allow for ease of livestock and wildlife crossing and access to water? Access points should be strategically placed and be in sufficient size to allow livestock and wildlife to cross stream channel and should not be in boggy areas or in areas with very steep slopes.	See Section 2.3 for project design features regarding the water lanes.
44	Natural Resources Conservation Service, Amalia Montoya April 4, 2017	The construction of additional livestock handling facilities and water should increase the distribution of livestock and wildlife. The livestock handling facilities should aid in livestock management and allow for more management flexibility. To maximize the use of these livestock handling facilities, water developments should be developed within or in close proximity to these facilities. The facilities and water developments should be prioritized according to the maximum benefit for livestock, NMMJM, and other wildlife.	See the proposed action description Section 2.2.2 of the EA for a description of the handling facilities and water developments.
45	Natural Resources Conservation Service, Amalia Montoya April 4, 2017	To improve water quality: will the access areas within the enclosure fencing have hardened access to minimize sedimentation and further resource damage? What will be used to measure an improvement in water quality?	See the project design features Section 2.3 of the EA for design features related to the water lanes. Review the Hydrology Section 3.9 in the EA for information regarding effects to water quality.

Comment Number	Commenter	Comment	Forest Service Response to Comment
46	Otero County Soil and Water Conservation District, Victoria Milne April 4, 2017	The proposal states that its aim is to protect critical habitat, improve riparian condition, and improve water quality. The only projects described in this proposal are fencing, handling facilities and water developments. We are concerned that there is no indication in the proposal of any planned treatments in the adjacent drainages to reduce flows into the habitat area that would meet those objectives.	Stream restoration in the Rio Peñasco and Wills Canyon drainages would be analyzed in a separate analysis and is being considered at this time. A landscape restoration analysis has been proposed (South Sacramento Restoration Project) and will encompass much of the Sacramento Allotment.
47	Otero County Soil and Water Conservation District, Victoria Milne April 4, 2017	Exclosure fencing - Will the livestock areas have hardened access lanes to reduce sedimentation into the stream channel and provide ease of access for livestock and wildlife? Will these areas be monitored? If so, what type of monitoring methods will be used? How long will these areas be excluded from livestock and elk? Is there a plan to re-assess the locations if there is a shown improvement or degradation of critical habitat over a 5-10 year period? Who will be responsible for maintenance of these fences?	See Section 2.3 of the EA for design features and monitoring requirements. The fences are proposed as permanent, a separate analysis would need to be completed if removing the fences was considered at a later time or other significant changes were necessary. The fence maintenance responsibility for the exclosure fences would be assigned administratively through the permit process.
48	Otero County Soil and Water Conservation District, Victoria Milne April 4, 2017	Handling facilities and water developments - Will the new facilities be strategically placed to provide the greatest benefit to livestock management needs and NMMJM needs? Will the new water developments be dual use (livestock and wildlife) and placed near or within the new handling facilities to maximize management flexibility?	Review the Proposed Action Section 2.2.2 in the EA for information regarding the water developments and handling facilities.

Comment Number	Commenter	Comment	Forest Service Response to Comment
49	Otero County Soil and Water Conservation District, Victoria Milne April 4, 2017	Based on the size of the Sacramento Grazing Allotment this proposal is lacking watershed scale projects (erosion control structures, grade control structures, headcut stabilization, and invasive species control of plants and animals) that would provide a measurable improvement to the habitat of the NM meadow jumping mouse.	A landscape restoration project is under analysis and includes much of the Sacramento Allotment summer range (South Sacramento Restoration Project). Vegetative invasive species control is currently under analysis for the forest. Animal invasives are not under the jurisdiction of the Forest Service, but collaboration has been done with other agencies. Stream restoration in the Rio Peñasco and Wills Canyon drainages would be analyzed in a separate analysis and is being considered at this time.
50	Defenders of Wildlife, Laura Eaton April 4, 2017	The Forest Service proposes to replace temporary enclosure fencing with permanent fencing with slight modification. Defenders supports replacing the fencing but with wildlife friendly fencing, such as smooth wire or rail for the top and smooth wire for the bottom wire. Fences should be low enough for adult deer and other large animals to jump over and high enough for animals to crawl under to minimize the chance of tangling.	See the Design Features Section 2.3 of the EA for the fencing specifications.
51	Defenders of Wildlife, Laura Eaton April 4, 2017	The Forest Service proposes enclosure fencing include gates for removal of livestock. The proposal should explicitly state and/or provide maps of the location, size and type of gates for the removal of livestock.	See the Design Features Section 2.3 of the EA for the fencing specifications.

Comment Number	Commenter	Comment	Forest Service Response to Comment
52	Defenders of Wildlife, Laura Eaton April 4, 2017	The Forest Service proposes that not all critical habitat will be fenced -- the fencing would focus on approximately 100 acres known to be occupied by the NMMJM. Defenders recommends protecting larger areas of critical habitat because it would improve NMMJM survivability and continued health of the riparian habitat.	Fencing is proposed for both occupied critical habitat and unoccupied critical habitat. Review Section 3.4 under New Mexico meadow jumping mouse for effects of the proposed action to the mouse.
53	Defenders of Wildlife, Laura Eaton April 4, 2017	Defenders strongly recommends that the Forest Service expand fencing throughout the NMMJM designated critical habitat regardless of whether or not it is occupied. Fencing all areas upstream and downstream including highly degraded areas will not only help the recovery of the NMMJM but improve the health of the riparian habitat and watershed health.	Fencing is proposed for both occupied critical habitat and unoccupied critical habitat. Review Section 3.4 under New Mexico meadow jumping mouse for effects of the proposed action to the mouse.

Comment Number	Commenter	Comment	Forest Service Response to Comment
54	Defenders of Wildlife, Laura Eaton April 4, 2017	Construction Activities. The Forest Service proposes constructing more livestock handling facilities and additional water developments for livestock and wildlife. The grazing permit holder gave the Forest Service a proposal for desired projects for handling facilities and water developments. These desired projects were not included in this proposal. Defenders is supportive of the collaboration between the grazing permit holder and the Forest Service, and asks the Forest Service to also involve other stakeholders and the general public in these decisions. At a minimum, Defenders recommends the proposal should explicitly state the desired projects and/or provide maps showing the location, size and number of these handling facilities and water developments.	Review Section 2.2.2 of the EA for details regarding the proposed range improvements.
55	Defenders of Wildlife, Laura Eaton April 4, 2017	The Forest Service proposes removing trees within the fence line or livestock handling facility, or to reduce hazards during construction. The proposal should explicitly describe the process for removing trees from selection through removal process, and identify NMMJM critical habitat locations affected.	See Section 2.3 for design features. Tree removal would be accomplished using methods to minimize impacts and be appropriate for the site.

Comment Number	Commenter	Comment	Forest Service Response to Comment
56	Defenders of Wildlife, Laura Eaton April 4, 2017	The Forest Service proposes participation from the grazing permit holder and his/her preference will be taken into consideration during water development and handling facility construction. Defenders asks the Forest Service to publish information on water developments, facility placement and design specifications for public comment. Defenders recommends the Forest Service recruit erosion control specialists, riparian recovery experts and environmental professionals to provide best practice recommendations for construction in riparian habitats. Building construction could harm riparian health, designated NMMJM critical habitat and the NMMJM, itself.	Review Section 2.2.2 of the EA for the proposed action and Section 2.3 for design features.

Comment Number	Commenter	Comment	Forest Service Response to Comment
57	Defenders of Wildlife, Laura Eaton April 4, 2017	The Endangered Species Act (ESA) Section 7 consultation process requires federal agencies to consult with the U.S. Fish and Wildlife Service to conserve listed species and ensure that any activity they fund, authorize or carry out will not jeopardize the continued survival and recovery of the listed species. How will the Forest Service guarantee construction will be done during a time least likely to disrupt behavior, such as breeding, nesting, raising young, etc. Will there be take of NMMJM during construction? If so, how will Forest Service mitigate? Will the Forest Service seek an ESA Section 10 take permit? The proposal should say when (dates) construction will take place, how the Forest Service will mitigate takes of NMMJM and if the Forest Service will seek a take permit.	Effects of the proposal on the NMMJM are analyzed in Section 3.4 of the EA. Consultation will be completed with the U.S. Fish and Wildlife Service prior to a decision to determine necessary terms and conditions. See Section 2.3 for project design features to reduce impacts of the proposal.

Comment Number	Commenter	Comment	Forest Service Response to Comment
58	Defenders of Wildlife, Laura Eaton April 4, 2017	The Forest Service proposes strategically placed water/access lanes where livestock could cross the stream channel, and that some large areas of NMMJM critical habitat would remain open in Wills Canyon. Allowing livestock to cross the stream channel can result in degradation of the riparian habitat including destabilizing the streambank, trampling and grazing of vegetation and impairing water quality. Water/access lanes can exist for livestock to cross if properly placed where the crossings have the least impact along the stream's path. Water/access lanes should not be included in all of the NMMJM enclosure areas. What would the Forest Service base their decision on for water/access lane locations? Where does the Forest Service propose to place these lanes? The proposal should explicitly state criteria and/or provide maps showing the location of the water/access lanes.	Maps display water lane locations where there are breaks in the proposed fencing along and more specifics on placement are included in Section 2.2.2 of the EA. The project Design Features in Section 2.3 also discuss water lanes.
59	Defenders of Wildlife, Laura Eaton April 4, 2017	To address the current status of the NMMJM and work toward long-term viability and recovery of the NMMJM, the Forest Service's recovery efforts should preferentially focus on restoring habitats and increasing the connectivity of suitable areas.	See Section 3.4 of the EA for effects of this proposal to the NMMJM.

Comment Number	Commenter	Comment	Forest Service Response to Comment
60	Defenders of Wildlife, Laura Eaton April 4, 2017	The decline of the NMMJM is mainly due to habitat loss and fragmentation across its range. A majority of the remaining mouse habitat is on federal land. The NMMJM already has fragmented habitat along the riparian reaches making it difficult for its long term survival. Fragmentation prevents the NMMJM from migrating to upland reaches of the riparian habitat to breed and raise its young. Upland habitat is crucial for the long term survivability of the species.	See Section 3.4 of the EA for effects of this proposal to the NMMJM.
61	Defenders of Wildlife, Laura Eaton April 4, 2017	Also, the NMMJM habitat require tall, dense herbaceous riparian vegetation of sedge and forbs with flowing water. It is important that the mice have these food sources available during summer so they accumulate sufficient fat reserves to survive hibernation. They also need intact upland areas adjacent to the riparian wetland for nesting and raising young. Riparian vegetation provides cover for the mice to travel along the stream bank.	See Section 3.4 of the EA for effects of this proposal to the NMMJM.

Comment Number	Commenter	Comment	Forest Service Response to Comment
62	Defenders of Wildlife, Laura Eaton April 4, 2017	The NMMJM is closely associated with riparian ecosystems. To protect and improve the riparian habitat the NMMJM relies upon, activities such as grazing, camping and recreational vehicles use should be excluded from the stream, on and along the streambanks, recreational vehicles should be routed to pre-existing roads and trails. Highly degraded areas can be treated and recovered using proven restoration and management techniques such as planting native seedlings. Preventing cattle grazing in riparian zones through exclusion fencing can allow riparian vegetation to rapidly increase in robustness and cover, and also shift to a more natural community composition	The proposed enclosure fencing will exclude cattle and vehicles. Stream restoration in the Rio Peñasco and Wills Canyon drainages would be analyzed in a separate analysis and is being considered at this time. See Section 3.4 of the EA for effects of this proposal to the NMMJM.
63	Defenders of Wildlife, Laura Eaton April 4, 2017	The Lincoln National Forest must provide for conservation of listed species in its forest plan implementation. The Endangered Species Act (ESA) mandates under § 7(a)(1) that federal agencies carry out programs that further the recovery of endangered and threatened species in consultation with the appropriate consulting agencies, in this case the U.S. Fish and Wildlife Service. Without fencing all of the NMMJM critical habitat, it is not clear that the Forest Service is carrying out its duty to conserve and recover the species. Please address how excluding livestock only from occupied critical habitat meets that duty.	See Section 3.4 of the EA for effects of this proposal to the NMMJM. Consultation will be completed with the U.S. Fish and Wildlife Service. Fencing is proposed in occupied critical habitat as well and unoccupied critical habitat.

Comment Number	Commenter	Comment	Forest Service Response to Comment
64	Defenders of Wildlife, Laura Eaton April 4, 2017	In conclusion, Defenders believes in the inherent values of wildlife and their habitats. We envision diverse wildlife populations in North American are secure and thriving, sustained by a network of healthy lands and waters. The Forest Service NMMJM Habitat Improvement Projects Proposal upholds these values. Through understanding the benefits of a healthy riparian ecosystem to protecting the habitat the NMMJM relies upon (riparian habitat) to collaboration with permit holders and the public - all will contribute to saving the NMMJM from extinction.	General comment, no address needed.

Comment Number	Commenter	Comment	Forest Service Response to Comment
65	Wild Earth Guardians, Greg Dyson April 5, 2017	<p>While we appreciate the projects that are proposed, we believe they do not go far enough to adequately protect the New Mexico meadow jumping mouse (NMMJM) and its critical habitat. Approximately 100 acres of occupied NMMJM habitat are proposed for fenced exclosures. We would like to see a full analysis (with maps) in the NEPA analysis prepared for this project of all the NMMJM critical habitat within the Sacramento allotment, along with a full explanation of why not all of it is being protected with exclosures. These two quotes from the Biological Opinion from the U.S. Fish & Wildlife Service, dated October 20, 2016 (“Oct. 26, 2016 Bi-Op”), at 30, are instrumental to our concerns:</p> <p><i>Areas designated as critical habitat for the jumping mouse in this unit incorporate the only habitat known to be occupied by the species since 2005 within the Sacramento Mountains with the capability to support the breeding and reproduction of the species. Within the action area, there are 31 hectares (77 acres) of occupied designated critical habitat and 183 hectares (453 acres) of unoccupied designated critical habitat on the Forest Service excluding private land inholdings that is deemed suitable for jumping mouse and that contains the PCEs.</i></p>	<p>See section 2.2.2 for further details on the proposed action as well as Section 2/3 for design features. See Section 3.4 of the EA for effects of this proposal to the NMMJM. Consultation will be completed with the U.S. Fish and Wildlife Service. Fencing is proposed in occupied critical habitat as well and unoccupied critical habitat.</p>

Comment Number	Commenter	Comment	Forest Service Response to Comment
66	Wild Earth Guardians, Greg Dyson April 5, 2017	We also expect that any NMMJM habitat projects and ongoing livestock use on the Sacramento allotment will be in full compliance with the Oct. 26, 2016 Bi-Op, including utilization standards, compliance checks, monitoring and all limitations on stocking and movement. In addition, we expect any habitat projects planned and livestock use permitted on the allotment will fully comply with the Incidental Take Statement, Reasonable and Prudent Measures, Terms and Conditions, and Conservation Recommendations from the Oct. 26, 2016 Bi-Op.	Consultation specific to this proposal will be completed with the US Fish and Wildlife Service prior to a decision being reached. Mandatory elements from the Biological Opinion and are expected to be followed.
67	Wild Earth Guardians, Greg Dyson April 5, 2017	The U.S. Fish and Wildlife Service notes that the NMMJM needs patches of suitable habitat of at least 68 to 181 acres to support resilient and viable populations of NMMJM. Recovery Outline, New Mexico Meadow Jumping Mouse, U.S. Fish & Wildlife Service, June 2014, at 4. How does this project address this habitat size need of the NMMJM?	See Section 3.4 of the EA for effects of this proposal to the NMMJM. Consultation will be completed with the U.S. Fish and Wildlife Service. Fencing is proposed in occupied critical habitat as well and unoccupied critical habitat.

Appendix B- Federally Listed Species on the Lincoln National Forest.

Species	Status	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 -Proposed Action Alternative)
Mexican Spotted Owl (<i>Strix occidentalis lucida</i>)	T	Mixed conifer forest between 8,000 and 9,400 feet.	Yes	May affect, likely to adversely affect the Mexican spotted owl and its critical habitat; refer to Environmental Consequences sections (3.4) for details
New Mexico Meadow Jumping Mouse (<i>Zapus hudsonius luteus</i>)	E	Dense riparian herbaceous and woody vegetation associated with perennial (persistent) flowing water and adjacent uplands.	Yes	May affect, likely to adversely affect the New Mexico meadow jumping mouse and its critical habitat; refer to Environmental Consequences sections (3.4) for details
Peñasco Least Chipmunk (<i>Neotamias minimus atristriatus</i>)	C	High elevation alpine and sub-alpine open meadows, talus slopes, open montane grassy areas.	No	No Effect- Habitat lacking and not known to occur in the project area.
Kuenzler's Hedgehog Cactus (<i>Echinocereus fendleri</i> var. <i>kuenzleri</i>)	E	Limestone ledges and hills of coniferous and mixed woodlands at 5,200-6,900 ft. elevation.	No	No Effect - Suitable habitat is not present where habitat improvement projects are proposed.
Sacramento Prickly Poppy (<i>Argemone pleiacantha</i> ssp. <i>pinnatisecta</i>)	E	Canyon bottoms and slopes of Chihuahuan desert scrub, and coniferous and mixed woodlands at 4,800-7,000 ft., in the Sacramento Mts.	No	No Effect – Sacramento prickly poppy individuals were once located adjacent to the proposed Dry Canyon Trap and Corral however it is now thought to be extirpated from Dry Canyon.
Sacramento Mountains Thistle (<i>Cirsium vinaceum</i>)	T	Travertine deposits and outflows of natural springs within montane coniferous forest habitats and riparian areas at 7,400-9,000 ft., in the Sacramento Mts.	Yes	May affect, likely to adversely affect – refer to Environmental Consequences sections (3.4) for details.
Todsen's Pennyroyal (<i>Hedeoma todsenii</i>)	E	Endemic to the loose, gypseous-limestone soils associated with the Permian Yeso Formation found in the San Andres and Sacramento Mountains. Found on north-facing slopes at elevations of 6,200-7,400 ft.	No	No Effect - Suitable habitat is not present where habitat improvement projects are proposed.
Lee Pincushion Cactus (<i>Coryphantha sneedii</i> var. <i>leei</i>)	T	Associated with Tansil limestone formation at elevations of 3,900-4,900 ft., generally on north facing ledges of the Guadalupe Mountains.	No	No Effect - Suitable habitat is not present where habitat improvement projects are proposed.

Species	Status	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 -Proposed Action Alternative)
Wright's marsh thistle (<i>Cirsium wrightii</i>)	C	Wet, alkaline soils in spring seeps and marshy edges of streams and ponds at elevations of 3,450-8,500 ft.	Yes	No Effect – Suitable habitat exists where habitat improvement projects are proposed; however, this species is only known to occur on the Lincoln National Forest in two areas located outside of the Sacramento and Dry Canyon Grazing Allotments.

Appendix C- 2013 Regional Forester Sensitive Species list for the Lincoln National Forest

Species	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 - Proposed Action Alternative)
Sacramento Mountains Checkerspot (<i>Euphydryas anicia cloudcrofti</i>)	Restricted to montane meadows within the mixed conifer forest at elevations between roughly 7,800 and 9,000 feet in the vicinity of the village of Cloudcroft.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Sacramento mountain salamander (<i>Aneides hardii</i>)	Found above 7,900 feet in mixed conifer and aspen forest, particularly on north or east-facing slopes. Occupied stands include Douglas fir, Engelmann spruce, and white fir, often with an understory of Rocky Mountain maple.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Northern goshawk (<i>Accipiter gentilis</i>)	Ponderosa pine and mixed conifer forest types, with a variety of age and size classes, are suitable goshawk habitat.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Typically associated with water, though may use tall, forest trees for winter roosting and foraging.	Yes	No effect- Not expected to occur in the project area due to the lack of water (also a lack of prairie dog colonies). Roosting sites not known in the vicinity of project sites.
American Peregrine Falcon (<i>Falco peregrinus anatum</i>)	Wide range of habitats used overall. Occupied breeding habitats typically contain cliffs for nesting, and unconfined, generally open landscapes for foraging. Occupied areas are often associated with water in much of North America.	Yes	No effect- unlikely to occur in the project area due to the lack of appropriate wetland habitat, or breeding habitat
Gray Vireo (<i>Vireo vicinior</i>)	Open, mature piñon-juniper woodland or juniper savannah with a shrubby understory. Most often found in open, mature juniper savannah on foothills and mesas between 5,500 to 7,000 feet, with a shrubby understory and well-developed grass component.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Peñasco Least Chipmunk (<i>Neotamias minimus atristriatus</i>)	Endemic to forests in the White and Sacramento Mountains. It appears to be extirpated from the Sacramento Mountains, with the remaining known distribution restricted to the Sierra Blanca area of the White Mountains.	No	No effect- Habitat lacking and not known to occur in the project area.

Species	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 - Proposed Action Alternative)
New Mexico Shrew (<i>Sorex neomexicanus</i>)	Habitat includes meadows and in leaf litter in canyons of coniferous forests, often along streams, as well as mesic conifer-aspen forest in sheltered canyons.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Pale Townsend's Big-eared Bat; Pale Lump-nosed Bat (<i>Corynorhinus townsendii pallescens</i>)	This bat has been found roosting in caves, rock shelters, and mines at all elevations in New Mexico; however, it is most common in evergreen forests and least common in xeric shrub grasslands. This species is strongly correlated to the availability of caves or cave-like habitat, but it also uses abandoned buildings and rock crevices on cliffs.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Spotted Bat (<i>Euderma maculatum</i>)	This species is a cliff dweller that roosts in cracks and crevices in rock in forested areas near open water.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Arizona bell's vireo (<i>Vireo bellii arizonae</i>)	Open grasslands and pinon-juniper savannah below 5,000 feet, often associated with intermittent streams. Nearest occurrence greater than 5 miles from Guadalupe and Sacramento RD boundaries	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Western Burrowing owl (<i>Athene cunicularia hypugaea</i>)	Open grasslands and pinon-juniper savannahs below 5,000 feet Associated with prairie dog colonies. Nearest occurrence less than 1 mile from Smokey Bear RD boundary.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Varied bunting (<i>Passerina versicolor</i>)	Thorn brush at riparian edges, arid scrublands, scrubby woodland, and overgrown clearings, desert scrub in lower elevations. Nearest occurrence in Carlsbad Caverns National Park.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Baird's sparrow (<i>Ammodramus bairdii</i>)	Open grasslands, pinon-juniper savannah. Nearest occurrence greater than 5 miles from Sacramento RD boundary.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.

Species	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 - Proposed Action Alternative)
Guadalupe pocket gopher (<i>Thomomys bottae guadalupensis</i>)	Sycamore, cottonwood and rabbit-brush riparian habitats. Loose soils, open grassy pine bottoms. Largely restricted to the poorer, thinner soils on the dry, rocky flats and the lower slopes of the Guadalupe Mountains; may be absent in the deeper soils at the bases of the mountains. Known in McKittrick Canyon.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Western red bat (<i>Lasiurus blossevillii</i>)	Prefer riparian habitat, roosting in trees--cottonwood, sycamore, oak, and walnut.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Arid land ribbonsnake (<i>Thamnophis proximus diabolicus</i>)	Semi-aquatic species. Streams, ponds, marshes, stock tanks. Riparian and emergent vegetation, including willows, cattails and bulrushes. Foraging in wetland and water.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Mottled rock rattlesnake (<i>Crotalus lepidus lepidus</i>)	Sky island mountain ranges, from 4000-8000 feet elevation. Large rock outcroppings, canyon walls, rock overhangs, rocky stream beds, talus slopes. Rocky canyons or hillsides, cave openings, rock houses.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Rio Grande chub (<i>Gila pandora</i>)	Cold clear water with aquatic vegetation or overhanging trees for shading.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Headwater catfish (<i>Ictalurus lupus</i>)	Sandy and rocky riffles, runs, and pools of clear creeks and small rivers; springs; clear temperate waters generally with a moderate gradient. Sitting Bull Falls and other permanent waters in the Guadalupe Mountains.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Rio Grande cutthroat trout (<i>Oncorhynchus clarki virginalis</i>)	Clear and cold (higher elevation) fast flowing waters with high oxygen content. Reintroduced population in Pine Lodge Creek.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
A fairy shrimp (no common name) (<i>Streptocephalus</i> sp.)	Permanent to intermittent isolated wetlands, ponds, or vernal pools at elevations about 6000 feet and above.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
A caddisfly (no common name) (<i>Psychoronia brooksi</i>)	Flowing water and seepage spring habitats. Found in the North Fork of the Rio Ruidoso, near entrance to Ski Apache.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Bonita diving beetle (<i>Stictotarusus neomexicana</i>)	Permanent to intermittent ponded wetlands or high elevation pools.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.

Species	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 - Proposed Action Alternative)
Rio Grande snaggletooth (<i>Gastrocopta riograndensis</i>)	Thin soil accumulations on small ledges of xeric south-facing limestone cliffs in the Sacramento Mountains where organic litter is generated from grasses and shrubs. Known at Sacramento Canyon Falls	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Ruidoso snaggletooth (<i>Gastrocopta ruidosensis</i>)	Found on bare soil, under stones, and in thin accumulations of grass thatch and juniper litter on mid-elevation carbonate cliffs and xeric limestone grasslands along the eastern slopes in the Sacramento Mountain range.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Vagabond holospira (<i>Holospira montivaga</i>)	Fairly exposed, arid western slopes of the Guadalupe Mountains. Cliff sides of wooded canyons. Rocky ledges of cliffs, canyon walls and outcrops at 7,000 feet elevation in Ponderosa/gambel oak/pinyon/live oak. Black Canyon and southwestern edge of the Guadalupe Mountains.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Northern threeband (<i>Humboltiana ultima</i>)	In or around seeps and springs of deep canyons, at the base of steep cliffs, often under deciduous trees with moist soils and leaf litter. Also in rock rubble and leaf litter, but not talus slopes	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
A snail (no common name) (<i>Oreohelix nogalensis</i>)	Sierra Blanca and Nogal Peak mountain complex. Canyon habitat above 7,000 feet elevation. Steep leafy slopes with very little rock, above the canyon bed. Overstory maples, aspen. On Nogal Peak, pine-oak woodlands in mesic areas.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Capitan woodlandsail (<i>Ashmunella pseudodonta</i>)	Terrestrial. Talus slopes or rock glaciers. East end of Capitan, talus slope about 6,200 feet elevation. Ranges lower and higher in elevation. Lone and Carrizo Peaks, Patos Mountains, White Oaks, and near Baldonado Springs.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.

Species	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 - Proposed Action Alternative)
Goodding's onion (<i>Allium gooddingii</i>)	Occurring in moist shaded canyons at 8,000-9,500 ft. throughout its range (AZ & NM) but is found on north-facing, partially-shaded slopes among the montane and subalpine coniferous forest habitats (9,300-11,250 ft.) of the Smokey Bear District, LNF.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Chapline's columbine (<i>Aquilegia chaplinei</i>)	Endemic to the limestone canyon seeps and springs in the Chihuahuan desert scrub of the Sacramento and Guadalupe Mountains.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Tall milkvetch (<i>Astragalus altus</i>)	Endemic species found in limestone soils on steep slopes, openings and road cuts in lower montane coniferous forest habitats (6,500-8,200 ft.) of the Sacramento Mountains.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Kerr's milkvetch (<i>Astragalus kerrii</i>)	Sandy soils within drainages and along roadsides at about 5,420 – 7,520 ft. elevation.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Sierra Blanca kittentails (<i>Synthyris oblongifolia</i>)	Endemic to the alpine meadows of the Sacramento Mountains (11,000-12,000 ft.)	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Wooton's hawthorn (<i>Crataegus wootoniana</i>)	Canyon bottoms and forest understory at elevations of 6,500-8,000 ft.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Yellow lady's-slipper (<i>Cypripedium parviflorum</i> var. <i>pubescens</i>)	Full sun to partial-shade in bogs, meadows, stream banks, drainages, seepages, and damp woods or higher elevations (8,000-11,000 ft.).	Yes	No Effect – The Lincoln National Forest is at the edge of this species range and this species is now thought to be extirpated.
Guadalupe rabbitbrush (<i>Ericameria nauseosa</i> var. <i>texensis</i>)	Crevice of limestone cliffs and huge boulders in canyon woodland, and open gravel alluvium of stream beds in piñon-juniper woodlands and Chihuahuan desert scrub of the Guadalupe Mountains (4,900-7,000 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Villard's pincushion cactus (<i>Escobaria villardii</i>)	Loamy soils of desert grassland on broad limestone benches in the western slopes of the Sacramento Mountains (4,500-6,500 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Shootingstar geranium (<i>Geranium dodecatheoides</i>)	Andesitic boulders and outcrops near the edge of canyon-bottom riparian forest at elevations of 7,550-9,900 ft.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Capitan Peak alumroot (<i>Heuchera woodsiaephila</i>)	Moist soil pockets in stable granitic talus on north and northeastern slopes in montane coniferous forest at elevations of 8,370-9,510 ft.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.

Species	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 - Proposed Action Alternative)
Wooton's alumroot (<i>Heuchera wootonii</i>)	Mountain slopes and, typically, north-facing rock outcrops, or Gamble oak thickets in piñon-juniper woodland and montane coniferous forest in the White and Sacramento Mountains (7,000-12,000 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Chisos Mountain crested coralroot (<i>Hexalectris revoluta</i>)	Under canopy of trees and shrubs at the edge of canyon bottoms and in heavy leaf litter under oaks or in thin humus soils among rock outcrops at elevations of 4,100-8,000 ft. (6,400 in Eddy Co.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Arizona coralroot (<i>Hexalectris spicata</i> var. <i>arizonica</i>)	Oak woodlands, wooded side canyons, and canyon bottoms of lower elevation range (5,400 ft.). Hidden along the drip-line of oaks, pine, and companion shrubs at higher elevation range (6,500 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Sierra Blanca cliff daisy (<i>Ionactis elegans</i>)	Igneous rock faces/cliffs in montane coniferous forest habitat at 7,600-9,500 ft. Endemic to Sierra Blanca.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Wood lily (<i>Lilium philadelphicum</i>)	Wetlands and wet meadows associated with open, mature coniferous forests at 7,000-10,000 ft. elevation.	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Ladies'-tresses (<i>Microthelys rubrocallosa</i>)	General habitat includes moist gravelly soils in light-to-moderately wooded south facing pine, fir, or oak forests at 6,000-9,800 ft. elevation.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Alamo penstemon (<i>Penstemon alamosensis</i>)	Rocky, limestone bottoms and cool aspect slopes of canyons along the western slopes of the Sacramento Mountains (4,500-6,300 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Guadalupe penstemon (<i>Penstemon cardinalis</i> ssp. <i>regalis</i>)	Limestone slopes and canyon bottoms in montane scrub, piñon-juniper woodland, and lower montane coniferous forest of the Guadalupe Mountains (4,500-6,000 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Cloudcroft scorpionweed (<i>Phacelia cloudcroftensis</i>)	Disturbed sites arroyo channels or along roads, in mixed conifer forest down to upper piñon-juniper woodlands in the Sacramento Mountains (6,500-7,700 ft.).	Yes	May impact individuals or habitat, but is not likely to result in a trend toward federal listing or loss of viability.
Sierra Blanca cinquefoil (<i>Potentilla sierrae-blancae</i>)	Found on windswept areas with thin soil or rocky outcrops in subalpine-montane grassland habitats of the Sacramento Mountains (8,100-11,975 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.

Species	Required Habitat	Suitable Habitat Present?	Determination (Alternative 2 - Proposed Action Alternative)
New Mexican stonecrop (<i>Sedum integrifolium</i> ssp. <i>neomexicana</i>)	Igneous soils in alpine tundra, scree-slopes and rocky openings in sub-alpine forest of Sierra Blanca (9,900-11,800 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Guadalupe Mountains goldenrod (<i>Solidago wrightii</i> var. <i>guadalupensis</i>)	Limestone outcrops and substrate, most commonly associated with acacia-juniperus-dasyliirion-lechuguilla, oak, oak-maple, and yellow pine-maple-hophornbeam-madrone habitats at elevations of 4,300-7,100 ft.	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Guadalupe mescal bean (<i>Sophora gypsophila</i> var. <i>guadalupensis</i>)	Outcrops of pink, limy, fine-grained sandstone that is 1-2% gypsum in Chihuahuan desert scrub and juniper savanna of the Guadalupe Mountains (5,000-6,650 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.
Guadalupe jewelflower (<i>Streptanthus sparsiflorus</i>)	Endemic to the limestone gravel and boulders, found in the canyon bottoms and montane scrub of the Guadalupe Mountains (4,000-5,000 ft.).	No	No Effect – Suitable habitat for this species is not present within the proposed project areas.