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Forest Service



Santa Fe  
National Forest,  
Region 3

September 2008

# ENVIRONMENTAL ASSESSMENT

## RIO DE LA CASA GRAZING ALLOTMENT

Project Number: 25901  
Pecos/Las Vegas Ranger District  
Santa Fe National Forest  
Mora County, New Mexico

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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

SOUTHWESTERN REGION

SANTA FE NATIONAL FOREST

PECOS/LAS VEGAS RANGER DISTRICT

MORA COUNTY, NEW MEXICO

RIO DE LA CASA GRAZING ALLOTMENT

ENVIRONMENTAL ASSESSMENT

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## CHAPTER 1 PURPOSE AND NEED FOR ACTION

### INTRODUCTION

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (40 CFR, Parts 1500 - 1508) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. It also provides the supporting information for a determination to prepare either an Environmental Impact Statement or a Finding of No Significant Impact.

Additional documentation, including more detailed analyses of project-area resources, can be found in the project planning record located at the Pecos/Las Vegas Ranger District Office.

The EA is organized into four chapters:

**Chapter 1. Purpose and Need for Action:** The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency’s proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

**Chapter 2. Alternatives Considered:** This chapter provides a more detailed description of the agency’s proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on issues raised by the interdisciplinary team, public, and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

**Chapter 3. Environmental Effects:** This chapter describes the environmental effects of implementing the proposed action and other alternatives. Each resource discussion will include short-term uses, long-term productivity, and cumulative effects of each alternative proposed for implementation.

**Chapter 4. Consultation and Coordination:** This brief section provides a list of prepares and agencies consulted during the development of the environmental assessment.

**Appendices:** The appendices provide more detailed information to support the analysis presented in the preliminary assessment.

### PURPOSE AND NEED FOR THE PROPOSED ACTION

In compliance with the National Environmental Policy Act (NEPA) and 1995 Rescissions Act, the purpose of this project is to authorize livestock grazing on the Grass Mountain Grazing Allotment because:

1. There is Congressional intent to allow grazing on suitable lands (Multiple Use and Sustained Yield Act of 1960, Forest and Rangeland Renewable Resource Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976).
2. The NFS lands within the Rio de la Casa Allotment have been identified as suitable for domestic livestock grazing in the Forest Plan. It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing consistent with land management plans (FSM 2203.1; 36 CFR 222.2).

3. It is Forest Service policy to contribute to the economic and social well being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood (FSM 2202.1).

Under current grazing management the allotment is meeting or moving towards the Forest –wide goals and objectives (see page 3) in a desired timeframe. In order to continue towards these objectives there is a need to:

- Improve range infrastructure to improve rotational grazing;
- Improve exiting water developments to enhance livestock distribution;
- Improve upland range condition within existing key grazing areas.
- Reduce Larkspur population in the Vega Quemada pasture

## THE PROPOSED ACTION

The Pecos/Las Vegas Ranger District, Santa Fe National Forest proposes to continue to permit 95 cow/calf pairs from June 16<sup>th</sup> to September 30<sup>th</sup> under a ten year term grazing permit and construct a new earthen water tank and, if monitoring indicates a need to further enhance livestock distribution, construction of 0.25 miles of new pasture fence. The proposed action follows current guidance from Forest Service Handbook 2209.13, Chapter 90 (Grazing Permit Administration; Rangeland Management Decisionmaking). A detailed description of the proposed action is found in Chapter 2.

## LOCATION, SETTING AND BACKGROUND

The Rio de la Casa Allotment comprises approximately 16,364 acres of National Forest System lands located in T. 20 & 21 N., R. 13 & 14 W, Mora County and is approximately 5 air miles northwest from Mora, New Mexico. The allotment is administered by the Pecos/Las Vegas Ranger District. The Forest Plan identifies the allotment as being in Management Areas B (Wildlife-Timber) and H (Wilderness). Refer to map at the end of Chapter 2.

There are currently seven term grazing permits issued on the allotment totaling 95 Cow/calf pairs from June 16<sup>th</sup> to September 30<sup>th</sup>. The grazing management is a “querencia” system. The allotment has seven separate pastures. There are numerous existing range facilities within the allotment including six developed springs and two corrals.

The allotment is located in the South Central Highlands Section of the Steppe - Open Woodland - Coniferous Forest - Alpine Meadow Province of the Southern Rock Mountain Ecoregion. The landscape has steeply sloping, sharp-crested mountains dissected by many narrow stream valleys; high plateaus with steep-walled canyons are common. Soils formed about equally in areas of volcanic ash flows, lavas, sandstones, siltstones, shale, and carbonates (McNabb et al 2007). Vegetative community types consist largely of spruce-fir (43%), mixed conifer (24%), Ponderosa pine (7%), Aspen (9%), and open grasslands (15%).

The allotment falls primarily within the Rio la Casa-Mora River and Rio la Casa Watersheds (HUC 110800040305 & 110800040304). There is approximately 23 miles of perennial streams and 16 miles of intermittent drainages within the allotment. The North, Middle, South Fork of the Rio la Casa, and Aqua Fria Creek are the major drainage features within the allotment. The allotment drains into the Mora River located approximately five miles to the east. There is approximately 635 acres of riparian habitat within the allotment.

## EXISTING AND DESIRED CONDITIONS

An interdisciplinary team (IDT) has identified the existing and desired conditions for this allotment based on information contained in the Santa Fe National Forest Plan, historical and current range inventories and the Terrestrial Ecosystem Survey (TES) of the Santa Fe National Forest.

Rangeland inventory and analysis on the Santa Fe National Forest begins with identifying TES mapping units for the landscape. The TES map unit is the standard ecological unit that provides basic information for range management planning. TES provides the hierarchical framework of ecological units from which resource conditions (existing and natural conditions) can be assessed. Information on soils, climate, vegetation, geology, and landform is provided by TES.

In 2007, species composition, canopy cover and frequency data was collected on several areas within the allotment. This information is used to compare current vegetation against the Potential Natural Communities (PNC) for each TES map unit. PNC is the potential of a plant community as described in TES. It defines the range of variability for each TES map unit. PNC is used as a yardstick from which to determine the ecological status of existing vegetation, and as a baseline to establish the desired conditions for a landscape and/or allotment (Range Analysis and Management Guide 1997). The desired condition should represent full range of variation (seral stages) and biodiversity necessary for a sustainable ecosystem.

### Role of the Forest Plan

The 1987 Santa Fe Forest Plan, as amended (Forest Plan) sets the goals and objectives for the management of the Santa Fe National Forest. Goals describe the desired resource condition sometime in the future and are the bases for project-level planning. The standards, guidelines, and management direction contained in the 1986 Forest Plan set parameters with which the project must take place. Approval of any management activity, such as livestock grazing, must be consistent with these parameters (16 U.S.C. 160(i)). The Forest Plan can be found at: <http://www.fs.fed.us/r3/sfe/projects/plansReports/index.html>

Grazing activities will be authorized in a manner such that the landscape meets or moves towards goals and objectives in the Forest Plan.

Forest-wide Goals related to this project:

- Emphasize high quality range forage (Forest Plan, p. 19);
- Have the permitted use be in balance with its capacity (Forest Plan, p. 19);
- Maintain [riparian] areas that are currently in good condition (Forest Plan, p. 20);
- Manage Forest activities and programs within the capability of the land while recognizing the value of maintaining the traditional cultures of northern New Mexico (Forest Plan, p. 22); and
- Protect the productivity and diversity of riparian-dependent resources (Forest Plan, p. 79).

Forest Plan Standard and Guidelines are permissions or limitations that apply to on-the-ground implementation of management activities. Forest-wide Standard and Guidelines related to grazing can be found on pages 66 – 68 of the Forest Plan. Additional Standards and Guidelines are also applied to specific Management Areas.

Management prescriptions are applied to geographical units on the ground, which are called Management Areas (MA). Each MA has a specific management direction that highlights some of the most important direction. The Rio del la Casa Allotment is located following Management Areas:

**Table 1 Forest Plan Management Areas Descriptions**

Management Area	Acres	Emphasis
MA B (Wildlife-Timber)	10,009	The emphasis in this area is on wildlife habitat improvement and key species habitat protection. Grazing and timber harvest activities occur where compatible with the primary emphasis of this area. Recreation is mostly of a dispersed roaded nature. Timber activity slash will be provided for wildlife and firewood purposes.

Management Area	Acres	Emphasis
MA H (Wilderness)	7,874	Management emphasis in these areas is to preserve wilderness character and values. They will be managed to retain their “primeval wild character and influence, without permanent improvements or habitation and protected ... to preserve [their] natural conditions.” Primitive recreation opportunities, wildlife habitat management, grazing, and fire management will occur only when consistent with these values and where historically established.

## Desired Conditions

Desired conditions are desired characteristics and conditions expected because of prescribed management. They provide a snapshot of what the resource would look like when goals, objectives, standards, and guidelines are met. Desired conditions can apply to the present or future. As previously discussed, an IDT identified the desired resource conditions based on the PNC as described in TES. The desired conditions for the Rio de la Casa Allotment are listed below. A description of the PNC, existing conditions, and desired conditions for each full capacity TES unit can be found in Appendix B.

- Full capacity range sites should be within its range of natural variability, exhibit the biodiversity necessary for a sustainable ecosystem, and be in fully functioning range condition.
- Maintain or move herbaceous species composition and surface components, such as litter and basal vegetative percentages toward site potential.
- Forage species composition should exhibit a suite of species that are appropriate for the site based on the PNC description.
- Satisfactory range conditions with a mid to high similarity to PNC with an upward or static trend.
- Improve livestock distribution and follow rotation schedule to minimize overuse in certain areas. Do not exceed 40% utilization on forage species.
- Control or eliminate non-native and invasive plant populations within the allotment.

## PUBLIC INVOLVEMENT

This project was initiated on November 19, 2007. Scoping letters were sent to 42 interested parties and adjacent land owners on March 17, 2008 to invite comment on the proposed action. The District received four responses to the scoping letter. All comments received were reviewed by the District Ranger and the IDT.

The IDT developed the preliminary alternatives and issues that will be addressed in the EA based on scoping comments received and internal and external issues. Issues identified during the scoping period did not support the need to formulate new alternatives to the proposed action. New alternatives and issues that are identified during the 30-Day Comment Period will be evaluated by the District Ranger and the IDT and used to enhance the project analysis by modifying the preliminary alternatives, developing new alternative and identify additional issues that may need to be addressed.

Per 36 CFR 215.5(a) the Responsible Official has the discretion in determining the most effective time to provide notice under 36 CFR 215.5(b). This project is available for meaningful public comment. The notification and request for comment for the scoping period resulted in five responses. All comments were evaluated and

responded to collectively and individually by the IDT and District Ranger. Detailed responses to these comments can be found in the project record and are available by request. The Forest Service response to some of the more meaningful Scoping comments is summarized below:

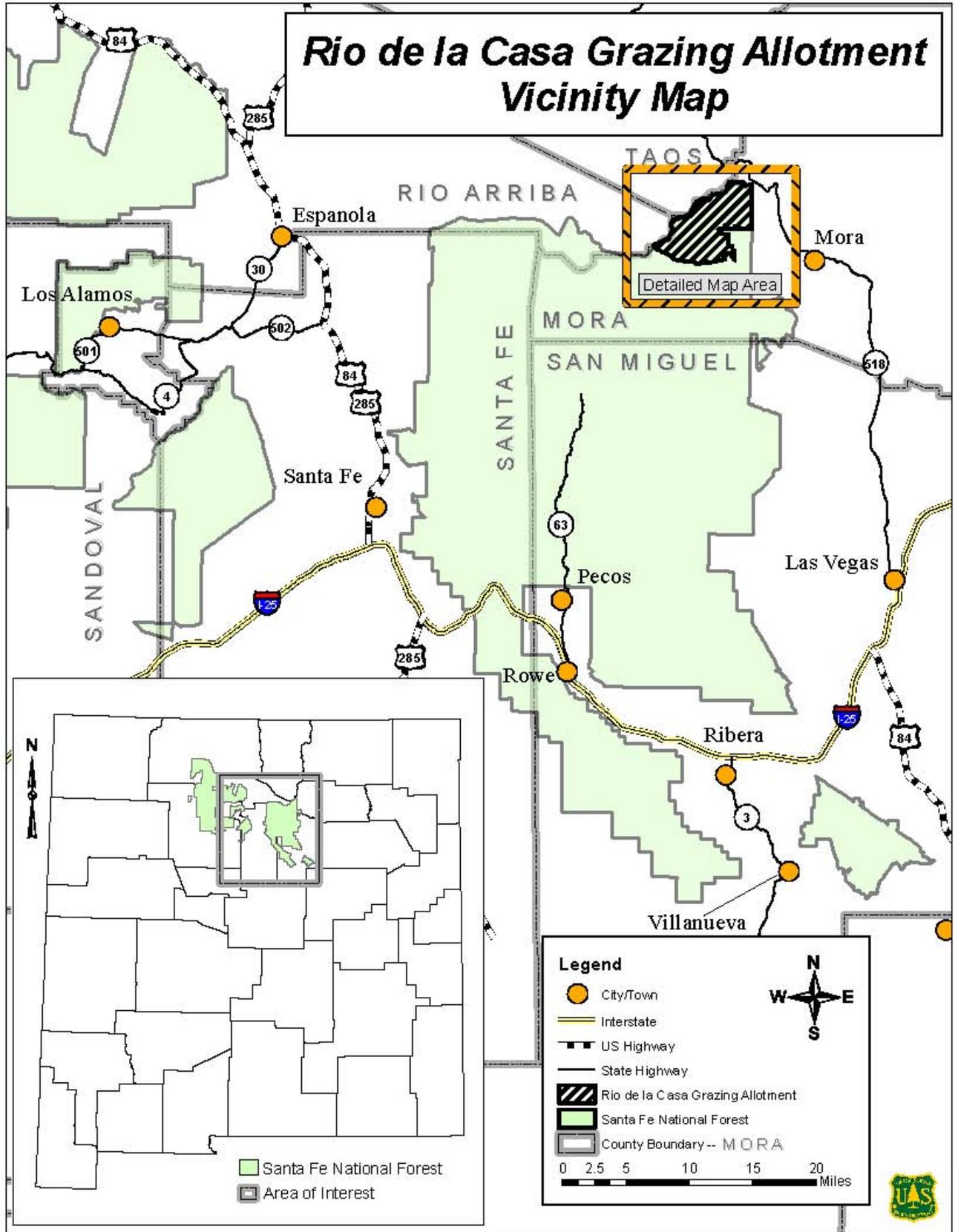
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## **DECISION FRAMEWORK**

The District Ranger of the Pecos/Las Vegas Ranger District is the responsible official for selecting an alternative for the Rio de la Casa Grazing Allotment. Based on the environmental analysis, Forest Plan direction, and results of public involvement, the Deciding Official must decide whether to proceed with a specific action. If an action alternative is selected, the decision will include application of mitigation measures in addition to the Forest Plan Standard and Guidelines. There is a two-part decision to be made for authorizing livestock grazing.

1. Whether livestock grazing should be authorized on all, part, or none of the project area.
2. If the decision is to authorize some level of livestock grazing, then what management prescriptions will be applied (including standards, guidelines, grazing management, and monitoring) to ensure that desired condition objectives are met or that movement occurs toward those objectives in an acceptable timeframe.





Santa Fe National Forest

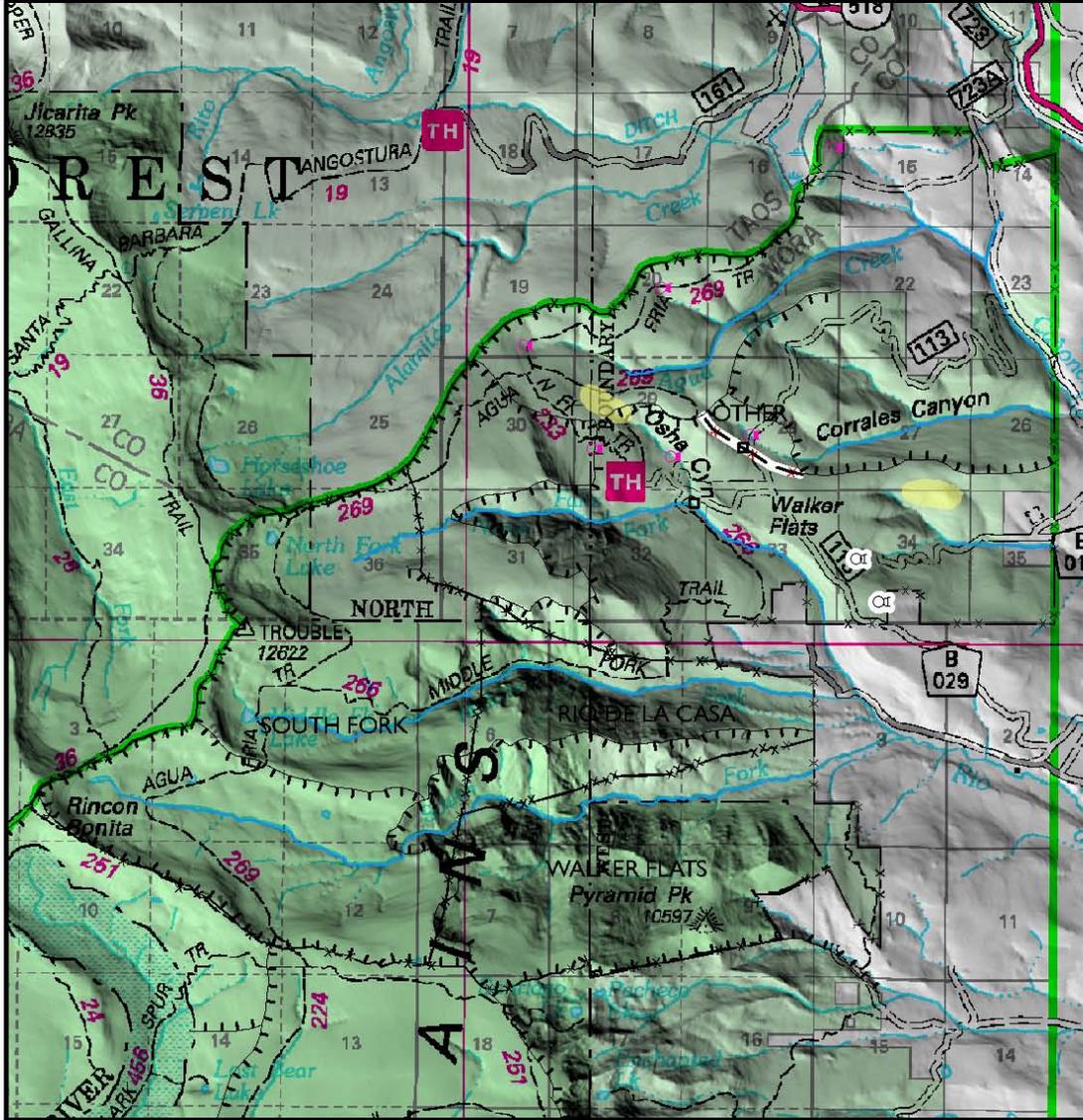


Rio de la Casa Allotment  
Proposed Action

bld 9/5/08

Legend

- Pasture Fence
- Handling Facility
- Livestock Water
- Proposed Earthtank Locations
- Proposed New Fence
- Natural Barrier



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## CHAPTER 2 – ALTERNATIVES CONSIDERED

### FORMALATION OF ALTERNATIVES

The IDT analyzed both internal comments and comments received from the public during the scoping period. No significant issues were identified during the scoping period for this Allotment. Analysis of alternatives requires consideration of a range of reasonable alternatives (40 CFR 1505.1). The range of reasonable alternative includes both alternatives that warrant detailed analysis, and alternatives that are considered by eliminated from detailed study. In cases where the design and configuration of the proposed action can mitigate resource concerns to acceptable levels, the proposed action may be the only viable action alternative. When there is a significant issue with the proposed action, an alternative to the proposed action shall be developed and analyzed in detail (FSH 1909.15, sec 14). At this time, no significant issues have been identified during the scoping period for this proposed action.

In addition to the proposed action, a “no action” alternative has been developed and analyzed in detail. “No action” is synonymous with “no grazing” and means that livestock grazing would not be authorized within the project area. This “no action” alternative provides point-of-reference for describing the environmental effects of the proposed action.

### Descriptions of Alternatives Considered in Detail

The following is a description of alternatives analyzed in detail by the IDT. After an alternative has been selected and as the project is implemented, actual amounts of activities on the ground (measured in acres or miles) may vary. All changes would be evaluated to ensure that any effects are within the parameters of effects analyzed in this document and would be documented in the project record. Pertinent Forest Plan Standards and Guidelines designed to mitigate affects of alternative treatments are also listed. All acres and mileage listed are approximate. Maps for each alternative can be found at the end of this chapter.

#### Alternative 1 – No Action (No Grazing)

No new grazing permits would be issued for the allotment and livestock grazing would not be permitted on the allotment. Range facilities would be evaluated for wildlife, watershed, and soil protection needs. This alternative provides a baseline or reference point against which to describe environmental effects of the action alternatives. This alternative responds to the concerns of those who want no livestock grazing. Options for future management in this area would not be foreclosed.

#### Alternative 2 - Proposed Action

The following Proposed Action has been developed to meet the project’s purpose and need. The Proposed Action consists of four components: Permitted Livestock, Range Improvements, Adaptive Management, and Monitoring. The proposed action follows current guidance from Forest Service Handbook 2209.13, Chapter 90 (Grazing Permit Administration; Rangeland Management Decisionmaking).

The Pecos/Las Vegas Ranger District, Santa Fe National Forest proposes to continue to authorize livestock grazing on the Rio de la Casa Grazing Allotment under the following terms:

**Permitted Livestock:** Permitted livestock numbers would be authorized up to 333 AUMs<sup>1</sup> (95 Cow/calf pairs June 16<sup>th</sup> to September 30<sup>th</sup>) under a one or two herd deferred rotational grazing system. This is the number of AUMs that can be supported during times of favorable climate and resource conditions. The exact number of AUMs “authorized to graze”<sup>2</sup> on an annual basis would depend upon such things as the ecological condition of the allotment, available water, and forage, functional structural facilities, range readiness, and predicted forage production for the year. A utilization guideline of conservative use (40% forage utilization as measured at the end of the growing season) would be employed to maintain or improve rangeland vegetation and long term soil productivity.

**Range Facilities:** In consultation with the grazing permittees, construction of a new earthen tank has been identified in the Walker Flats pasture (Refer to Map) as the most effective, feasible and practical method of improving livestock distribution in the Walker Flats pasture. One of the two earthen tanks identified during the scoping period have been eliminated from consideration due to the inadequacy of the site to support an earthen tank.

In addition, approximately 0.25 miles of new interior pasture fence has been identified that will further enhance livestock management on the allotment. This fence would be constructed, as part of adaptive management, only if monitoring consistently shows livestock distribution and utilization does not improve with the construction of new earthen tank and the implementation of a one or two herd deferred rotation system in the Walker Flats.

**Adaptive Management:** The Proposed Action is adaptive; allowing the Forest Service and permittees to adjust the timing, intensity, frequency and duration of grazing, the grazing management system, and livestock numbers according to resource conditions. The exact number of AUMs authorized to graze on an annual basis would depend upon such things as the ecological condition of the allotment, available water, and forage production, condition of structural facilities, range readiness, and predicted forage production for the year. Anything less than the full permitted livestock numbers represents a condition in which capable acres and other integral components of the range management (such as water) are producing less than normal.

**Monitoring:** Monitoring would determine whether the project-level decision is being implemented as planned (implementation monitoring) and, if so, whether the objectives identified in the Forest Plan, Annual Operating Instructions (AOI) and Allotment Management Plan (AMP) are being achieved in a timely manner (effectiveness monitoring). Allotment monitoring would be open, cooperative, and inclusive process with the permittees. Implementation and effectiveness monitoring are critical to determine when or if adaptive management changes should be made and to guide the direction that those changes take.

If monitoring indicates that desired conditions are not being achieved, management would be modified in consultation with the permittee. Adjustments to the annual authorized livestock numbers (an increase or decrease) may occur during the grazing year, based on conditions and/or range inspections. An example of a situation that could call for adaptive management adjustments is drought conditions. If adjustments are needed, they are implemented through AOIs. This proposal meets the Forestwide standards and guidelines as well as those specific to the Management Areas in the Forest Plan. Monitoring protocols would follow the Interagency Monitoring Technical References (FSM 2206).

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<sup>1</sup> An AUM is the amount of oven-dry forage required by one animal unit for a standardized period of 30 animal unit days. An animal unit is considered one mature cow approximately 1,000 pounds, either dry or with calf up to six months of age, or their equivalent. The average value for animal month is 780 pounds of oven dry forage.

<sup>2</sup> Permitted livestock indicates the permitted livestock that are permitted by the Term Grazing Permit. Authorized livestock is the number of livestock that are authorized annually and billed for grazing on NFS lands.

## MITIGATION MEASURES

To mitigate resource impacts from the proposed action, the following measures will be implemented. The mitigation measures included here are required and limited to those for which the Forest Service has authority. These mitigation measures have been used on previous projects and are considered to be effective in reducing environmental impacts. With full implementation of applicable Forest Plan standards and guidelines, project design criteria, and all prescribed mitigation measures, no potentially significant adverse environmental impacts would be expected to occur.

**Soil, Water and Vegetation** – the objective is to mitigate soil, water, and vegetation impacts from cattle grazing and range facility construction.

- Cattle will not be moved onto an allotment or allotment pastures until range readiness and facility inspections indicate that appropriate conditions exist;
- Key herbaceous riparian vegetation, will have a minimum stubble height of four inches on the stream bank, along the green line, after the growing season and during spring runoff;
- Key riparian browse vegetation will not be used at levels exceeding 50 percent of the current annual twig growth that is within reach of the animals;
- Key herbaceous riparian vegetation on riparian areas, other than the stream banks, will not be grazed more than 30 percent during the growing season or 40 percent during the dormant season;
- Stream bank instability attributable to grazing livestock will be less than ten percent on a stream segment.
- Upland range resource values will be protected from unacceptable grazing effects as determined through monitoring (see above). Livestock grazing will be managed at a level corresponding to conservative intensity. Minimum acceptable stubble heights have been developed by the Forest Service for certain species. Residual plant material should not be reduced below those levels. Cattle will be moved when utilization of key forage species in key use areas approaches established standards.
- Salt will be placed so as to minimize impacts to riparian zones, meadow ecosystems, and other forest resources. Salting locations will vary annually and will not be located within ½ mile of water sources when possible.

**Wildlife** – the objective is to mitigate impacts to wildlife from continued cattle grazing and from disturbance associated with the location and construction of range facilities.

- Construction and maintenance of range facilities will be evaluated and executed to have no adverse effect on threatened and endangered species (USDA-FS 1996, pg 68). If any listed or proposed Threatened, Endangered, or Sensitive species are found during project activities, work in the immediate vicinity of the sighting will stop until a Forest Service wildlife biologist has resurveyed the area and any newly recommended mitigation measures have been implemented.
- Allotment fence management will meet wildlife standards that allow easy migration and passage. All fences should be built to wildlife specifications (USDA-FS 1996, pg 66 and 67):
  - height – 40-42 inches,
  - spacing between top wire and second wire equals at least 12 inches,
  - bottom wire should be 16 inches from the ground,
  - all new fence sections should be marked with flagging to alert wildlife of new barrier, and

- fences and loose wires will be removed as they are abandoned.
- Non-game entrance and escape ramps will be provided on water developments intended for livestock and wildlife use (USDA-FS 1996, pg 66). New and reconstructed livestock water developments will include wildlife access, cover, and escape considerations (USDA-FS 1996, pg 67).
- Cattleguards should be designed to prevent small animal entrapment.

**Heritage Resources** – the objective is to protect heritage resources (archaeological sites) from direct or indirect impacts caused by ground disturbing activities associated with the construction of range facilities.

- Range structures will be located so as to avoid concentrations of livestock on identified heritage resource sites. No ground disturbing activities will be conducted within known site boundaries.
- No salting will occur within or immediately adjacent to site boundaries.
- If any unrecorded sites are discovered during the course of project implementation, all project activities in the vicinity of the site(s) will cease and the District or Forest Archaeologist will be notified.
- The Forest will conduct a program of monitoring in the area as part of this project to determine the extent of grazing impacts on heritage resources. At a minimum, monitoring will occur halfway through the life of permit reissuance and just prior to reissuance in the future.
- Any additional range improvements not covered by this report will require additional heritage resource survey and/or clearance prior to construction.

## MONITORING

The objective of monitoring is to evaluate the abilities of all parties involved in planning and implementing the grazing program.

**Implementation monitoring** will include periodic inspections to ensure compliance with permit terms and conditions such as salting locations, seasonal restrictions, utilization, and any mitigation measures that are approved in the project decision. Stock checks will also be conducted to assure that only permitted livestock enter the allotment, the allotment is occupied only within the permitted periods, and use occurs only within the approved areas within each allotment.

**Effectiveness monitoring** will determine if grazing standards and guidelines, grazing prescriptions, and Allotment Management Plan practices are effective in accomplishing the planned objects. Effectiveness monitoring is essential for determining the annual amount of authorized AUMs according to an adaptive management framework where each permit includes a range of authorized AUMs.

**Range readiness** will be monitored before permitted livestock enter the allotment at the beginning of the season to assess whether the soil is too wet and that sufficient forage growth has occurred.

**Utilization monitoring** measures forage utilization, riparian vegetation impacts, and condition of stream banks at the end of the season to assess whether standards and guidelines set in the Forest Plan are attained. Stubble heights of forage species may be measured during the grazing season for these same purposes. Stubble height measurements usually occur in the middle and end of the grazing season, unless resource conditions require more regular monitoring. These measurements will occur in key areas.

A key area is a portion of range which, because of its location, grazing or browsing value, and/or use, serves as an indicative sample of range conditions, trend or degree of seasonal use. It guides the general management of the

entire area of which it is part. Key area locations are evaluated annually during development of the Annual Operating Instructions. Changes in management actions (installation or removal of range facilities, season of use, number of animals, etc) can alter grazing patterns within a pasture and the degree to which a previously selected key area is representative of the current years planned use. Likewise, non-grazing management related changes in land use may also affect grazing patterns.

If deemed necessary, key area locations may be modified. Reconsideration of key area locations identified by the Forest Service and the permittees will adhere to the following guidelines:

- They are between 0.25 and 1.00 mile from livestock water sources, on slopes less than 15 percent, on satisfactory or impaired soils, and are greater than five acres in size.
- The key area must provide an indicative sample of range conditions, trend or degree of seasonal use.
- Potential key areas are not low production sites (< 100 pounds/acre), within 100-yards of roads or fences, nor on land controlled by another entity.

## EFFECTS SUMMARY

This section compares the effects of implementing each alternative relative to key issues and associated tradeoffs in meeting purpose and need. Information is quantified where possible; otherwise a brief qualitative description is included. This section includes criteria that may be important to the decision, but are not necessarily issues around which alternatives are generated. Information in this matrix relative to tradeoffs in meeting purpose and need is supported by information contained in the description of the proposed action and alternatives.

**Table 2 Effect Summary by Alternative**

Attribute/Resource	Alternative 1 (No Action)	Alternative 2 (Proposed Action)
Meets Laws, Regulations, Policy and the Purpose and Need for the Proposed Action.	Does not authorize grazing, but achieves Forest Plan resource objectives. Complies with Rescission Act.	Meets the requirements of MUSY, NFMA, PRIA, FLMA and is consistent with the 1987 Santa Fe National Forest Plan. Authorizes grazing on suitable lands, balances use with capacity, and achieves Forest Plan objectives (FSM 2203.1; 36 CFR 222.2). Complies with Rescission Act. Provides for adaptive management to respond to changing conditions or to meet management objectives.
Effects on Soil and Watershed	There would be little change in riparian condition along the Rio Mora since the permitted cattle can not access these areas due to terrain anyway. Soils are currently in satisfactory condition and would remain so without permitting 95 head of cattle. Soil productivity and vegetative cover would improve slightly on full capacity range site and currently disturbed areas around spring developments.	There would be little change in riparian condition along the Rio Mora since the permitted head of cattle can not access these areas due to terrain. Soils are currently in satisfactory condition and would remain so with light to conservative use of herbaceous forage. Soil loss would be minimal and below soil loss tolerances (< 2.71 t/ac/yr) on full capacity range sites.
Effects on Air Quality	No Effect	No Effect
Effects on Vegetation	The effects of not permitting 95 head of cattle on the allotment would not result in significant increases in species	Vegetative condition will remain at 90 % of the potential natural community. Under light to conservative use levels, full capacity

Attribute/Resource	Alternative 1 (No Action)	Alternative 2 (Proposed Action)
	composition, productivity, or plant vigor. There would be an increase in the amount of sheep’s fescue, mountain muhly and timber oatgrass in disturbed areas in full capacity range sites. Vegetative conditions are 90% similar to the site potential.	range sites will continue to show improvement in species composition and plant densities. One to two herd deferred rotation will reduce the amount of moderate to heavy use in lower pastures and smaller meadows.
Effects on Threaten, Endangered Species and Sensitive Wildlife Species.	No impacts on federally listed species of sensitive species know to occur or has habitat within the allotment.	Grazing 95 head of cattle from June 16 <sup>th</sup> to September 30 <sup>th</sup> would have "no effect" on the Mexican spotted owl.
Effects on Migratory Birds	No Effect	No effect on high priority migratory birds or their habitat.
Effects on MIS	No Effect. Current trends for Rocky Mountain Elk, Merriam’s Turkey, Hairy Woodpecker, and Rocky Mountain Bighorn Sheep.	Permitting 95 head of cattle under a term grazing permit would not result in population changes for Rocky Mountain Elk, Merriam’s Turkey, Hairy Woodpecker, and Rocky Mountain Big Horn Sheep. Habitat changes for Rocky Mountain Elk, Merriam’s Turkey, or Rocky Mountain Bighorn Sheep would be improved by construction of range infrastructure. Habitat changes for the Hairy Woodpecker would not change.
Effects on Fisheries	No Effect	No Effect to Rio Grande Cutthroat Trout are not currently found within the streams running through the allotment.
Effects on Wilderness and Recreation	The authorizations of 95 head of cattle on the Rio de la Casa allotment would not have a measurable effect on wilderness attributes or dispersed recreation.	The authorizations of 95 head of cattle on the Rio de la Casa allotment would not have a measurable effect on wilderness attributes or dispersed recreation.
Effects on Heritage	No Effect	

Attribute/Resource	Alternative 1 (No Action)	Alternative 2 (Proposed Action)
Effects on Social-Economics	No Effect	Implementation of either of the alternatives evaluated in this EA would not result in adverse impacts to environmental resources and socioeconomic conditions. Therefore, disproportionate direct, indirect, or cumulative adverse impacts on low income or minority populations would not occur.

## CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

### INTRODUCTION

This chapter summarizes the physical and biological, social and economic environments of the affected project area and the cause and effect relationship of implementing each alternative on that environment. It also presents the scientific and analytical basis for comparison of alternatives presented in the previous charts. Resource specialists analyze the magnitude of direct, indirect, and cumulative effects of the proposed activities on both short and long-term productivity. Only information necessary to understand the environmental consequences is included in this document. The project record contains all project-specific information, including specialist reports and results of the public participation. The project record is located at the Supervisor’s Office. Information from the record is available upon request.

The following are definitions of terms used in discussing the environmental effects of proposed activities.

**Affected environment** (40 CFR 1502.15) is a brief description of the area(s) to be affected by the proposed activities. The description shall be no longer than is necessary to understand the effects of the alternatives. **Direct effects** (40 CFR 1508.8) are those occurring at the same time and place as the triggering action (e.g. Current authorized livestock grazing on riparian areas). **Indirect effects** (40 CFR 1508.8) are those caused by the action, but occur later, or at a distance from the triggering action (e.g. Sediment input into streams due to a loss of vegetative cover from grazing activities). **Cumulative effects** (40 CFR 1508.7) are the effects on the environment that results from incremental effect of the action added to the effects of other past, present, and reasonably foreseeable future actions, regardless of whether or not the agency or person undertakes them and regardless of land ownership on which other actions occur. An individual action when considered alone may not have a significant effect, but when its effects are considered in addition to effects of other past, present, and reasonably foreseeable future actions, the effects may be significant (e.g. The effects of catastrophic wildfire on a grazing allotment and the watershed as a whole).

The cumulative effects analysis for each alternative is evaluated separately for each resource and may have different spatial and temporal boundaries. Agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions combined. The analysis of cumulative effects begins with consideration of the direct and indirect effects on the environment that are expected or likely to result from the alternative proposals for agency action. Agencies then look for present effects of past actions that are, in the judgment of the agency, relevant and useful because they have a significant cause-and-effect relationship with the direct and indirect effects of the proposal for agency action and its alternatives.

The USDA-Forest Service uses the best available science and most reliable and timely data available. Accuracy from the Combined Data Systems, Geographical Information Systems (GIS), Natural Resource Information System, Forest Inventory, and Analysis Database, Infrastructures Database and other databases vary in accuracy. All attempts to verify and update this information have been made where possible.

### BACKGROUND

Herbivory (grazing) is an influential and nearly universal process that is simply defined as the consumption of forage by herbivores (Valentine 2001). Herbivores are comprised of wild ungulates (hoofed animals, including ruminants, but also horses, elk and deer), domestic livestock, some small mammals, and insects. Some Herbivores

are considered generalist, such as domestic livestock, graze a wide variety of plants, while others are considered specialist, such as deer and antelope, and are specific in what they consume.

Grazing has a variety of direct and indirect effects to plant communities in the southwest. Depending on the intensity, grazing affects species composition, species abundance, primary production, physical properties of soils, and other belowground attributes. The effects of livestock grazing can be positive or negative depending on duration, extent, and magnitude. The impact of grazing to southwestern ecosystems has a long history, which has a bearing on the existing conditions of New Mexico’s grassland communities.

Native herbivores in New Mexico consisted on deer, antelope, elk, and bison. Most of the grassland communities in New Mexico were not subject to a long-evolutionary history of grazing. Elk populations were limited in only a few mountain ranges, and only comprised half of today’s range. Large bison herd were historically documented only occupying the Great Plains region of the state. Very little evidence suggests that bison occupied the areas west of the Rio Grande Valley or the mountain ranges (Milchunas 2006).

The Spanish were the first Europeans to graze domesticated livestock in New Mexico beginning in the late 1500’s. During both the Spanish Colonial and Mexican periods (1598 to 1846), ranching and farming activities occurred primarily in and around land grants and Puebloan settlements. Livestock grazing was moderate and was practiced more for subsistence rather than extensive economic markets. Sheep were grazed more extensively than cattle or horses in the early years. In the 1800s, the amount of sheep production increased as Spanish populations moved eastward into the plains around present-day Las Vegas, across the Sandi and Manzano Mountains and westward for the Rio Grand Valley. Although concentration of sheep and cattle near settlements created areas of overuse during colonial times, herds were generally small and there were vast amounts of rangelands that were not significantly grazed by sheep and cattle. In northern New Mexico, loss of land grant lands limits the grazing areas open to small, local communities, many of which are surrounded by National Forest (Raish 2004).

Large-scale commercial livestock ranching began in the mid 1800’s and lasted until the turn of the century. Exceedingly large numbers of both sheep and cattle were grazed on rangelands in attempts to achieve maximum economic gain. At its peak in the late 1890’s and estimated 9 million animal units were grazed in New Mexico. The native grasslands could not sustain these large numbers of animals and cattle populations crashed after severe drought in the summer of 1891 and 1892. The combination of drought and overgrazing led to soil cover loss from wind and water erosion. Fire suppression activities which began at the turn of the century in combination with reduced herbaceous plant cover due to overgrazing resulted in increases in woody shrubs and plants with low grazing preference across the landscape (Raish 2004).

The Forest Service began the surveying NFS lands and adjudicating individual permits to conform to range capacity in 1910. Through out the early part of the 20<sup>th</sup> century, the Forest Service began address degraded rangelands through grazing improvement programs and grazing permit reductions. Beginning in the 1920s and continuing throughout the 1960s, there was a continuously decline in the number of permitted numbers of livestock (Raish and McSweeney, 2003).

## GRAZING MANAGEMENT

The allotment encompasses approximately 17,882 acres, of which 1,518 acres are privately owned. Of the approximate 16,364 acres on National Forest System lands, about 2% (4,284 acres) are considered “capable” range. The existing grazing permit authorizes 95 cow/calf pairs to graze. The current grazing management system for the allotment is detailed below. The current grazing strategy on the allotment is a “querencia” system, in which each permittee within the allotment grazes their livestock independently in traditional areas seasonal long. The table below summarizes the use and facilities located on the Rio de la Casa Allotment.

Based on the inspections and the monitoring conducted, less than one percent (approximately 50 acres) of the total grazed acres on the allotment is in “unsatisfactory range management status.” This term describes the situation where the existing vegetation is not desired and where short-term objectives are not being achieved.

Rangeland is considered to be in “satisfactory range management status” when the existing vegetation is similar to the desired condition or the short-term objectives are being achieved to move the rangeland toward the desired condition. The existing condition of the allotment is described below.

**Table 3 Allotment use and range facilities**

<b><u>Rio de la Casa Allotment</u></b>	
Allotment Acres	17,882
NFS Lands	16,364
Number of Permits	7
Season of Use	6/16 to 9/30
Number of Cattle	95 Cow/calf
Animal Use Months (AUM)	333
Grazing System	querencia
<b><u>Range Facilities</u></b>	
Spring Developments (each)	6
Earthen tanks	2
Corrals	2
Fences (miles)	6.5

Very few areas (approximately 50 acres) of the allotment are classified as being in unsatisfactory range management status. On this area, increasing densities of species such as iris, fleabane, cinquefoil, and Kentucky bluegrass are gradually displacing desired species such as fescue and timber oatgrass. Uneven distribution of livestock contributes to lower vigor and composition of desired plants. Grazing on the “querencia” system does not provide a rest period or deferment period in which herbaceous vegetation is able to recover from precious grazing periods or is allowed adequate time to produce a seed bank for future vegetative establishment. Over time, the lack of fully implementing a grazing strategy, such as rest rotation or deferred rotation, could cause a shift towards less desirable plant communities, such as iris, cinquefoil, and Kentucky bluegrass.

Annual utilization monitoring is conducted on the allotment key areas and key species have been identified on the allotment and have been included in the AOI for several years. Key forage species for the Rio de la Casa allotment are Arizona fescue, mountain muhly, timber oatgrass, Kentucky bluegrass, and western wheat. Grazing intensity guidelines developed by Holecheck and Galt (2000) for mountain grasslands range types are followed:

**Table 4 Grazing intensity guidelines**

Grazing intensity guide for shortgrass-pinyon/juniper rangeland in New Mexico (Holechek & Galt, 6/00, Rangelands).						
Qualitative Grazing Intensity Category	Use of Forage by Percentage	Stubble Height Indicators of Grazing Intensity				
		Arizona Fescue	Western Wheatgrass	Bluegrass	Mountain Muhly	Timber Oatgrass
	(%)	----- Average height of vegetation (Inches)-----				
Light to non-use	0-30	8.0+	7.0+	5.5+	5.0+	8.0+
Conservative	31-40	6.0-7.0	4.0-5.0	4.0-5.0	4.0-5.0	6.0-7.0

The number of authorized cattle has fluctuated from year to year along with resource conditions, available forage and water, range readiness, predicted weather patterns. If reductions in authorized numbers are needed, a consensus will be made between the U.S. Forest Service and grazing permittees. The table below shows the number of Authorized cow/calf pairs to graze the Rio de la Casa Allotment since 2000.

**Table 5 Authorized use 2000 - 2008**

Grazing Year	Authorized Use
2000	95
2001	91
2002	54
2003	77
2004	77
2005	113
2006	78
2007	95
2008	95

## SOILS AND WATERSHED

### AFFECTED ENVIRONMENT

#### SOILS

**Landscape and Geology:** The Rio del la Casa grazing allotment is situated at the southern end of the Sangre de Cristo Mountains. This high-elevation mountain range trends north-northeasterly in north central New Mexico, and hosts the second highest peak, South Truchas Peak, at an elevation of 13,102 feet. The mountains are formed of a complex core of metamorphosed Precambrian granite, partially overlain by Paleozoic seafloor sediments and Cenozoic volcanic and fluvial deposits. At least four major periods of structural deformation have contributed to the landscape seen today. The mountain chain parallels the Rio Grande, which flows from north to south through the rift basin depression to the west (Miller et al, pgs 1-9, 1963). On the east side of the mountains, the Rio de la Casa allotment is located on the northeastern edge of the Santa Fe National Forest, adjacent to the southern boundary of the Carson National Forest. It faces the edge of the Great Plains to the east. This allotment has a eastern aspect, and climbs from a lower elevation of 7,600 feet to the high mountain ridgeline at 12,826 ft with slope steepness in the range of 50-120%. The area sustains between 16 and 24 inches of precipitation per year (National Weather Service), chiefly in a bi-modal distribution of winter snow and summer thunderstorm delivery.

At the uppermost ridgeline, the granite core is visible. Allotment soils at high elevation are derived from the Precambrian Embudo Granite, and soils at lower and mid-elevations are derived from Paleozoic limestone. The ecosystem is defined as a low-sun/cold environment in the lower allotment elevations and high-sun/cold in the higher elevations. This distinction indicates the time of year of greatest precipitation, and that here, snowfall dominates at the mountaintops (Terrestrial Ecosystem Survey (TES), Santa Fe National Forest, pg 3, 1993). Dominant vegetation ranges from Ponderosa pine and mixed conifer to spruce/fir and aspen at higher elevations. Upland meadow grasslands are grazed at different locations in the allotment. Bare rock is exposed at the ridgelines. Perennial (23 miles) and intermittent (16 miles) streams dissect the mountain front (headwater tributaries to the Mora River), and these are bordered by some 600 acres of riparian vegetation.

**Soil Condition:** Soil condition is primarily determined by evaluating surface soil properties. This is the critical area where plant and animal organic matter accumulate, begin to decompose and eventually become incorporated into soil. It is also the zone of maximum biological activity and nutrient release. The physical condition of this zone plays a significant role in soil stability, nutrient cycling, water infiltration and energy flows. The presence and distribution of the surface soil is critically important to productivity. The soil condition rating procedure

evaluates soil quality based on an interpretation of factors that affect three primary soil functions. The primary soil functions evaluated are soil stability, soil hydrology and nutrient cycling which are all interrelated (FSH 25 09 R3 SUPPLEMENT).

The satisfactory soil condition class covers 91% of the allotment. These soils are functioning properly and retain their inherent productivity. The unsatisfactory soil condition class covers 9 % of the allotment acreage. These soils have a reduced ability to function properly. Unsatisfactory soils are located where bedrock is exposed and little soil structure has developed on this allotment; therefore the condition is inherent to the geology. There are also some unsatisfactory soils along the trail from the upper elevations down to Walker flats. Slopes are steep there and no erosion control is implemented. The soils in Rio de la Casa allotment are on the whole, in stable, satisfactory condition.

## **RIPARIAN, WETLANDS, STREAMS, WATER QUALITY**

This allotment is located within the headwaters of the Mora River (1108000403) 5<sup>th</sup> code watershed. The allotment acres within the watershed are approximately 16,364 acres. Flow data and other flow information can be found at the US Geological Survey National Water Information System Website <http://waterdata.usgs.gov/nwis>.

**Riparian and Wetlands:** Riparian areas are basic to the hydrologic function of watersheds. Ground cover promotes infiltration and conserves water, soil, and nutrients on-site. Influent soil moisture recharges ground water and base flows. Trees and shrubs regulate floods by dissipating flow energies, control water temperature by shading streams, improve channel structure by adding debris, and supply food to aquatic fauna. Watershed conditions upstream affect riparian areas by influencing the size, frequency, duration, and water quality of floods and base flows.

**Streams:** Most of the named drainages within the analysis are considered perennial. In addition, some intermittent drainage's have seeps and springs which are identified as wet areas by water-dependent vegetation, and thus have subsurface flow. Flood flows or baseflows sustain riparian vegetation, except during periods of extreme drought, when there may be occasional reliance on groundwater flow.

Two types of riparian zones exist on this allotment, both narrow canyon/classical stream type and high mountain wet meadows. Dominant riparian vegetation includes Narrowleaf cottonwood, Bebb willow, coyote willow, alder, Englemann spruce in the high mountain type, rushes and sedges. Forbs include horsetail and cow parsnip (Riparian GIS query, formulated by Wayne Robbie, pers.communication, 2003).

**Water Quality:** Water quality has been assessed within perennial streams of the analysis area and none has been determined to be impaired.

## **DIRECT AND INDIRECT EFFECTS ON SOILS AND WATERSHED**

Impact to soils and watershed (rangeland hydrology) vary from allotment to allotment depending on the type of livestock, livestock management, vegetative types, precipitation levels and other climatic and geological factors. The general direct impacts from livestock grazing include reduction in vegetative cover and trampling. Depending on the intensity of livestock grazing, increases in overland water flow; reductions in soil water content; increase in erosion; and decreases in infiltration rates may occur (Gifford and Hawkins 1979). Key factors most likely to affect soil loss on allotment are grazing intensity and frequency. Utilization levels provide the best measure of intensity. Grazing intensity is more directly associated with ungulate distribution patterns than overall stocking numbers.

The impacts of grazing on riparian areas, fish habitat and water quality are of particular concern in the southwest. Heavy grazing on riparian areas causes soil compaction, loss of vegetation and increased sedimentation. This can indirectly result in widening of stream channels, warmer water temperatures, increases in turbidity, and increases

in nutrients and bacteria (Meehan 1991). Livestock grazing on public lands can also be a source of non-point pollution. While sediment is the major source of pollution from grazing activities, bacterial coliform levels are also a concern. This is not just isolated to the lands being grazed, but extends to areas downstream outside of the grazing allotments.

Data from these sources were compared to standards in the Santa Fe National Forest Land and Resource Management Plan (1987). Watershed condition was analyzed strictly on the basis of the effects from grazing, relative to existing base conditions, and regardless of outside variables. Modeled soil loss was compared to the TEU soil loss tolerance levels in tons per acre. (Tolerance levels were set by Forest Service soil scientists during forest-wide mapping in the 1970's and 1980's. One ton of soil loss is approximately equal in weight to a uniform depth of 0.007 inches of soil over one acre). It should be noted that any model-predicted runoff or erosion value by any model, will be within only plus or minus 50 percent of the true values. Erosion rates are highly variable, and most models can only predict a single value. Replicated research has shown that observed values vary widely for identical plots, or the same plot from year to year. (Elliot et al, 1994, 1995).

Water quality is assessed by comparing existing conditions with desired conditions that are set by the States under the authority of the Clean Water Act (CWA, Sections, 303(d) and 305(b)). As delegated by the U.S. Environmental Protection Agency (EPA), the New Mexico Environment Department, Surface Water Quality Bureau (NMED SWQB) is the regulating authority for water quality in New Mexico. The general classifications used for surface water quality are “attaining” or “impaired” for all uses specified, and those not yet assessed. For impaired streams, the SWQB calculates allowable pollutant load (Total Maximum Daily Load, TMDL) based on certain formulas.

**Alternative 1 – No Action (No Grazing):** This alternative would likely result in the most beneficial effect to the soils and hydrology resources. Soil condition and hydrologic improvement or recovery would likely occur over many decades.

Streams having a departure from their Rosgen classification type could evolve to their historical stream-type and channel dimensions, although those in the Rio de la Casa allotment are not highly departed from their historical condition. Under a no-grazing alternative, stronger and deeper roots could filter more sediment and support bank-building processes at some locations. This would result in decreased channel width-to-depth ratios, or narrower and deeper streams, and it would increase streambank stability and sinuosity. Scour-resistant woody root systems expand and invigorate, and help to withstand flood-level runoff events. Less sediment is delivered under these conditions. Proper riparian function already exists on the Rio de la Casa allotment.

Soils in this allotment are already in satisfactory condition. Even with no livestock grazing, wildlife would continue to forage and vegetative conditions would remain functional as they are at this time. Density of ground cover and species diversity of upland, riparian, and wetland native perennials could increase over several decades under this alternative. Existing willow populations would remain and be represented in all age classes. A big factor that serves as natural protection of the streams on the Rio de la Casa allotment is that access is limited due to the steepness of the terrain. Ungulates cannot readily access most miles of stream channel.

**Alternative 2: Proposed Action:** The magnitude of such change can be measured as to its extent, duration, speed and direction. For example, erosion can be estimated as soil loss in tons per acre.

As discussed, input variables to the WEPP model include type and amount of vegetative cover, slope, (determined from topographic map quads and TEU unit descriptions), and 50-year storm precipitation (determined from a random number generator based on real climate data within the model). The WEPP predicted no soil loss and sedimentation due to livestock grazing on TEU units 212 and 213. The soil loss tolerance for these TEU units ranges from 2.71 to 3.64 tons per acres per year.

Soil map units were selected from the more likely areas of cattle concentration where they intersect unsatisfactory soils, if such intersection exists, and their characteristics were run to generate soil loss numbers for any typical year. On Rio de la Casa there is no grazing capacity at the two locations at ridgelines where unsatisfactory soils are located. Thus soil loss modeling was run for an area of higher use at Walker Flats.

The trend in usage is that the few acres of unsatisfactory soil are located are in an area of unlikely use, and soil loss is estimated to continue to be below the tolerance level of 3 1/2 tons per acre per year. A local static to downward trend/ is occurring at the meadows. Other areas are static to upward. Ocular surveys of Agua Fria Creek and North Fork Rio de la Casa in the fall of 2007, and observed them to be functional (Rosgen, 1996, pg. 5-72,) “B4” channel types.

With the current permitted number and adaptive management (new structures, control of timing, duration and frequency) and based on monitoring of resource conditions, it is expected that range condition would continue in a slow, upward trend over the next ten years.

It is important to note that the actual soil condition class is not expected to change due to livestock use within the ten-year analysis period, because improved change in soil condition class is a long-term process with many influences.

Frequency and timing of grazing is important. Alternating rest and use of a pasture annually and or seasonally can help riparian species recover from the prescribed intensity. The important consideration for riparian plants is residual plant material, and the potential for plants to re-grow prior to precipitation events. Plants grazed late in the fall or early winter generally do not re-grow in time for winter utilization, where it occurs. Plants grazed in the spring need re-growth time before summer monsoons. Implementing a one or two herd deferred rotational grazing system would also improve the riparian and upland condition by controlling the duration and timing of livestock use as compared to the “querencia” which is similar to a season long grazing (Elmore and Kauffman 1994)

Best Management Practices for cattle grazing limit turbidity in the surface water by limiting their access. As discussed above, this may occur by controlling timing or by distribution, implementation of a deferred rotation grazing system, construction of the earthen tank and if necessary construction of an additional 0.25 miles of fence. In the Rio de la Casa allotment, turbidity from erosion or sedimentation specifically due to livestock grazing is not a known problem, by field observation nor by modeled effects discussed above. Construction of the proposed earthen tank would not directly affect riparian zones. The Proposed Action is designed to implement properly managed grazing, and thus will not contribute effects that would adversely change the ecological or watershed conditions of the allotment.

## **CUMULATIVE EFFECTS ON SOILS AND WATERSHED**

The geographic area considered for cumulative effects is the headwater of the Upper Mora River 5th-code watershed (HUC 110800040), situated at the northeast edge of the Santa Fe National Forest. Two 6th code HUCs overlay the larger 5th code HUC: Rio La Casa and Rio La Casa-Mora River, and perennial streams drain through each. Alternative 1 would not incur cumulative effects from the grazing of livestock. The Proposed Action (Alternative 2) recommends a one or two-herd rotation of area of up to total 333 head of livestock. The grazing influence from is from the mountain ridgeline down through high meadows and along three forks of the Rio Casa, and also Canoncito and Encinal Creeks. Below the forest boundary, allotment streams confluence to become the Mora River. Altogether, a little over 30,000 acres would be affected, including approximately 360 acres of NFS lands and 13,826 acres of private land. This area represents the geographic extent in which permitted livestock and other Forest Service activities result in modification of vegetation and soil properties that would impact the area downstream. No other grazing allotments would contribute effects to this area.

Onsite current and historical activity includes forest fuels treatment, dispersed recreation, and grazing utilization. Coniferous vegetation in the forested areas includes Englemann Spruce, aspen, and Douglas fir. The cover

provides sufficient shade to inhibit the productivity of forage species over about 20% of the allotment. Wooded areas on south and west aspects support oak woodland and ponderosa pine. In the meadows, forage species include Mountain brome, Arizona fescue, and mountain muhly and prairie junegrass.

Livestock use monitoring indicates impacts are principally to high mountain meadows in the allotment. In some of the more accessible locations, species diversity is reduced, and iris, cinquefoil, and erigeron are present. Overuse occurred in 2003 in the Walker Flats pasture. In 2005, an enclosure was constructed to control livestock access to the meadow there. Historic timber harvesting is documented on about 1,300 acres within the allotment, between 1988 and 1995. This opening of overstory cover increased forage availability during that time. However, fuels activity within the last 10 years is expected to affect the present analysis of grazing permit renewal. 415 acres in lower Walker flat pasture were thinned with a Collaborative Forest Restoration Grant and FS funds between 2005 and 2007. Half of those acres were then broadcast burned and pile-burned. Another 160 acres are anticipated to be treated by the end of 2009. Cumulatively these 575 acres will provide improved forage and better distribution for cattle in this pasture, which has better capacity than other portions of the allotment. No recent wildfire is documented in this area.

Approximately 23 miles of perennial streams flow through the allotment. No water quality impairment is alleged to occur on forest, due to livestock grazing or other uses in this area, according to The New Mexico Environmental Department (<http://www.nmenv.state.nm.us/swqb/303d-305b>), although the Mora River is listed as impaired several miles below the forest boundary for non-support of high-quality cold-water fishery due to sedimentation/siltation. The impairment allegedly begins upstream of its confluence with streams draining this allotment, with sources cited due to diversions and septic systems. Thus grazing uses are not the cause.

Riparian species along forest streams include willow, sedges, yarrow, and bluegrass. Most of the terrain to flowing water is steep and inaccessible by large animals in the uppermost reaches of Rio Casa allotment. Lower Rio Casa and the spring developments that receive use near water, and the surrounding soils receive compaction from cattle and wildlife. A new tank is included in the Proposed Action. Nevertheless, in this allotment, 91 percent of the soil is in satisfactory condition, or everywhere except at two ridgetop locations. Soil texture is moderate to deep cobbly loam (derived from Mississippian & Pennsylvanian sedimentary and old granitic rock) and generally provides appropriate moisture and nutrient function. Inherent productivity is maintained. Light to conservative grazing on NFS lands along with BMPs (Best Management Practices) and adaptive management strategies would not contribute to impairment of the Rio Casa or Mora River in this effects area.

In conclusion, the activities proposed in this project would not incrementally add to the effects of past, present and foreseeable activities. Adherence to standard and guidelines, best management practices and mitigation measures will minimize any detrimental effects to long term soil productivity

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## **AIR QUALITY**

### **AFFECTED ENVIRONMENT**

Ambient air quality is regulated according to the Clean Air Act, Section 163; which requires Prevention of Significant Deterioration (PSD) according to the class of the air quality management area. The Rio de la Casa Allotment is within a Class I air quality management area that is in attainment of all air quality requirements.

### **DIRECT AND INDIRECT EFFECTS ON QUALITY**

None of the alternatives being considered would have any measurable direct or indirect effect on air quality in this area. Because this project would have no direct or indirect effect, there would be no associated cumulative effects.

## VEGETATION

### AFFECTED ENVIRONMENT

The allotment is located in the South Central Highlands Section of the Steppe - Open Woodland - Coniferous Forest - Alpine Meadow Province of the Southern Rock Mountain Ecoregion. The landscape has steeply sloping, sharp-crested mountains dissected by many narrow stream valleys; high plateaus with steep-walled canyons are common. Soils formed about equally in areas of volcanic ash flows, lavas, sandstones, siltstones, shale, and carbonates (McNabb et al 2007). Within the allotment, elevations range between 8,000 and 12,300 feet above sea level along the Sangre de Cristo Mountains. Vegetation is largely defined by elevation, with higher elevations exhibiting a spruce-fir forest, middle elevations having a mixed conifer forest, and lower elevations trending towards a ponderosa pine forest. Aspen stands are found along north facing slopes, and in cool drainages; canyon bottoms support a variety of riparian vegetation. Vegetative community types consist largely of spruce-fir (43%), mixed conifer (24%), Ponderosa pine (7%), Aspen (9%), and open grasslands (15%).

The Santa Fe National Forest Terrestrial Ecosystem Survey (TES) provides a critical link for inventorying rangeland vegetation. The TES maps units provide the basic information for natural resource planning, management and monitoring. Each TES map unit is provided with a narrative description of the potential natural community. TES map units are also used to determine which lands will contribute to the forage base for livestock grazing based on the capability of each TES unit.

Grazing capability is a qualitative expression of the inherent ability of an ecosystem to support grazing use by various classes of livestock on a sustained yield basis; that is, maintaining the stability and productivity of the site. Soil stability determinations and site productivity evaluations are used in combination to determine and assign one of three capability classes:

Full capability - are those areas that can be used by grazing animals under proper management without long-term damage to the soil resource or plant communities. Full capability areas exhibiting fair, good, or excellent range condition, are considered stable or improving (upward trend), and are designated as satisfactory. Full capability areas exhibiting poor range condition are considered to be on a downward trend and are designated as unsatisfactory.

Potential capability – are those areas that could be used by grazing animals under proper management but where soil stability is impaired, or range facilities are not adequate under existing conditions to obtain necessary grazing animal distribution. These areas are not included when calculating the amount of forage available for cattle.

No capability – are those areas that cannot be used by grazing animals without long-term damage to the soil resource or plant community, or are barren or unproductive naturally. These areas are not included when calculating the amount of forage available for cattle and a designation of satisfactory or unsatisfactory is not applicable.

Capable areas comprise about 26 % (4,172 acres) of the allotment. Non-capable acres comprise 74 % (12,183 acres) of the allotment.. Of the capable areas, about 4,122 acres (99%) are considered satisfactory and less than fifty acres (<1%) unsatisfactory. Elements of the proposed action (particularly construction of new fence and earthen tank) were developed to address the unsatisfactory range by providing better distribution of livestock. Current permitted forage needs are 259,350 lbs. Depending on spring and summer precipitation and site productivity, estimated available forage ranges between 198,676 lbs to 332,744 lbs. A detailed table of the productions estimates for capable and non-capable range sites can be found in Appendix C.

A range analysis was conducted by the Forest Service in 1969 and again in 1997. According to past range analysis the upper elevation grassland areas received light (0-20%) cattle use; and some of the lower elevation grassland areas receive moderate/heavy (45% +/-) forage use. Analysis of the transect points in 1997 showed that the range conditions reflects this use. The lower elevation transects ranged in condition from poor to good. Range conditions in the upper elevations ranged from fair to excellent.

The allotment has range monitoring data from 1950-1972 and 1997. Utilization monitoring conducted by the Forest Service between 2002 and 2007 showed conservative use levels (< 40% of annual forage production) across the majority of the allotment. This monitoring also indicated some localized overuse (moderate 41% -50 %) within the Walker Flats area. This has been addressed by constructing a pasture fence around the Walker Flats meadow.

In 2007, Rapid Assessments (RAM) and cover/frequency inventories were conducted by the Forest Service over much of the full capacity TES sites within the key areas. This information was used to determine use patterns, species composition, ground cover, and species frequency. This information is further used to compare current vegetation against the Potential Natural Communities (PNC) for each TES map unit or ecological site description. PNC is the potential of a plant community as described in TES. It defines the range of variability for each map unit. PNC is used as a yardstick from which to determine the ecological status of existing vegetation, and as a baseline to establish the desired conditions for a landscape and/or allotment (Range Analysis and Management Guide 1997). The desired condition should represent a full range of variation (seral stages) and biodiversity necessary for a sustainable ecosystem. The data shows that current vegetative cover has a mid to high similarity to the PNC. This means that the majority of species that should be on the site occur within the inventoried areas. A detailed description of the full capacity TES unit is found in Appendix B.

## DIRECT AND INDIRECT EFFECTS ON VEGETATION

**No Grazing (Alternative 1):** When the term grazing permit expires, livestock would be removed from the allotment. No new permits would be issued. All range facilities would revert to the Forest Service and be evaluated for their value as protection to soil, wildlife, and watersheds. Allotment boundary fences would not be removed as they would be needed to prevent unauthorized use from cattle on neighboring areas.

Palatable grasses, forbs and shrubs would not be grazed by cattle, but would continue to be grazed by deer and elk. In areas where biodiversity and plant densities that are similar to the site potential there would be an improvement in the current condition.

The short-term (next five years) direct effects of removing livestock grazing on the Rio de la Casa allotment would result in slight increases in species composition, primary production, and plant vigor on areas currently grazed by the permitted livestock. (see Milchunas 2006 and Lauenroth et al.). Within the allotment there would be a slight increase in the amount in abundance of those forage species that cattle prefer such as of sheep's fescue, mountain muhly, and timber oatgrass especially in disturbed areas. In disturbed areas with high densities of species such as iris, fleabane, cinquefoil, and Kentucky bluegrass there would be an improvement in the growth, vigor, and overall health of Kentucky bluegrass. Significant improvement of the diversity of desirable species within the allotment would not be expected within the next ten years.

**Proposed Action (Alternative 2):** The proposed action would permit 95 head of cattle (333 AUMs) from June 16th to September 30th. Annual authorized use would be based on resource conditions. If drought conditions exists and forage production is below potential, then adjustments in the amount of authorized livestock would be made to maintain conservative use levels.

Grazing has a variety of direct and indirect effects to plant communities in the southwest. Depending on the intensity, grazing affects species composition, species abundance, primary production, physical properties of soils, and other belowground attributes. The permitted cattle primarily graze in the open meadows, ponderosa, and

aspen communities. The cattle favor the open meadows the most. Little to no grazing occurs in dense mix conifer due to a lack of herbaceous understory because of dense canopy closure in the overstory.

Maintaining a consistent conservative use (31 to 40%) of available forage would result in slight improvement in species composition and plant densities within the next ten years. Maintaining better control of the timing, duration, and frequency of livestock with a one or two herd deferred rotation on the allotment would reduce the amount of moderate to heavy use that has occurred in lower pastures (Walker Flats) and the smaller isolated open meadows. If the new water development and deferred rotational grazing does not result in adequate improvement in livestock distribution and utilization, then construction of 0.25 miles of interior fence may be needed.

## CUMULATIVE EFFECTS ON VEGETATION

The area considered for cumulative effects is the 6<sup>th</sup> code hydrological unit (Rio Mora). Approximately half of the Rio de la Casa Allotment is contained by this watershed. This cumulative effects area was selected because the 6<sup>th</sup> code watershed represents the extent in which permitted livestock grazing and other Forest Service activities result in modification of vegetative types and would cause an impact to watersheds. This area covers approximately 30,221 acres (47 square miles) approximately 12,819 acres are in private ownership. The effects of past, present and foreseeable actions are for the past ten years and those likely to occur in the next ten years. This timeframe would allow vegetation enough time to show change with the proposed management activities.

All permitted livestock grazing, wildfire, prescribed fire, timber harvesting, and other vegetative management activities conducted in the past and next ten years are the relevant federal actions that have a cause and effect relationship with the direct and indirect effects of permitting 95 head of cattle on the Rio de la Casa Allotment.

The cumulative effects area contains the entire Rio de la Casa Allotment, including 6,861 acres within the Pecos wilderness and adjacent privately owned land. Livestock grazing occurs on the adjacent private land although it is unknown to what extent. Minimal impacts to riparian or upland rangelands have been identified from permitted livestock grazing within the cumulative effects area. Permitting of 95 head of cattle over the next ten years under conservative use guidelines and adaptive management on the Rio de la Casa allotment would not incrementally add to the effects of grazing on adjacent privately owned land. The effects of grazing on private land would not incrementally add to the effects of permitted grazing on the Rio de la Casa Allotment.

La Jicarita Enterprise Community has been implementing a CFRP project since 2003 and will continue through 2009. Project implementation has concentrated around the Walker Flats pasture. Removal of overstory will encourage an increase in herbaceous understory.

## THREATENED, ENDANGERED, AND SENSITIVE SPECIES

### AFFECTED ENVIRONMENT

#### Federally Listed Species

Six species/ one critical habitat were excluded from further analysis for the following reasons:

- Holy Ghost Ipomopsis (*Ipomopsis sancti-spiritus*)-Endangered- Suitable habitat for this species does not exist in the project area.
- Southwestern willow flycatcher (*Empidonax traillii extimus*), Endangered - Suitable habitat for this species does not exist in the project area.

- Black-footed ferret (*Mustela nigripes*), Endangered - The black-footed ferret has been extirpated from the project area without feasibility for reintroduction.
- Rio Grande silvery minnow (*Hybognathus amarus*), Endangered - Suitable habitat for this species does not exist in the project area.
- Arkansas River Shiner (*Notropis girardi*), Threatened - Suitable habitat for this species does not exist in the project area.
- Mexican Spotted Owl (MSO)-(*Strix occidentalis lucida*)-Threatened- Habitat for this species does not exist in the project area.

Mexican Spotted Owl Critical Habitat- Critical habitat for this species does not exist in the project area.

Threatened - Mexican Spotted Owl (MSO)-(*Strix occidentalis lucida*)

Suitable habitat for the MSO is usually defined by a multi-layered, moderately closed or closed canopy comprised of mixed conifer and hardwood trees and shrubs. Large trees, 12 inches in diameter or greater that are mid-aged and older, or of late-successional stage make up the bulk of the stand, which also has standing dead trees, shrubs, and downed logs. Spruce fir, pure aspen and piñon-juniper habitats are rarely used by the MSO. The Forest Service establishes Protected Activity Centers (PACs) to protect territories of individual MSO.

The Forest Plan specifies three levels of habitat management: protected areas, restricted areas, and other forest and woodland types (Forest Plan, Appendix D, p. 1). Restricted habitat can be described as (USFWS 1995):

Areas having at least 25% mixed conifer habitat and riparian areas (perennial streams) outside of protected areas

- At least 20 trees per acre averaging 18 dbh
- Stand density index by size class- 10 % of trees must be at least 12-18”
- Stand density index by size class-10 % of trees must be at least 18-24”
- Stand density index by size class-10 % of trees must be at least 24” +

The total acreage of mixed conifer habitat is approximately 3,379 acres (21 % of allotment) for the entire project area. There are no MSO PACs located on the allotment.

MSO habitat on the allotment consists of; gentle to steep slopes, pockets of high densities of small diameter trees interspersed with some small meadows, few large diameter trees, 20 miles of streams, approximately 116 acres of riparian habitat and a high amount of small diameter dead and down material.

Regardless of the fact that MSO have not been detected on the allotment, livestock grazing and livestock management activities will be managed for levels that provides the woody and herbaceous vegetation necessary for cover for rodent prey species. The residual biomass will support prescribed natural and ignited fires that would reduce the risk of catastrophic wildfire in the Forest, and regeneration of riparian trees. Key areas in the allotments will be monitored in the fall to assure proper levels of woody and herbaceous vegetation is maintained for prey species.

MSO inventories took place through out the district in mixed conifer habitat in 2001-2003 which included the Rio de la Casa allotment (Lovato pers. Comm.). Surveys on this allotment yielded no detection of MSO. The surveyed areas on the allotment does not contain quality nesting/roosting habitat as compared to areas having established PACs outside the allotment. This allotment does not contain any designated MSO critical habitat.

The allotment is in good condition. Livestock grazing is moderate in most places yet heavier use occurs in some areas. Monitoring of key use areas yielded conservative grazing practices within the allotment. Livestock do not graze on steep slopes/steep canyons which is considered MSO nest/roost/foraging habitat. Although MSO are not known to occur on the allotment, grazing levels are conservative, and livestock will need to leave the allotment at their exit date or when grass/forage utilization has reached conservative grazing levels (31%-40% utilization).

### Sensitive Species

The following table displays species that are known to occur or have habitat on the Santa Fe National Forest. Species are identified as occurring or are likely to occur on the allotment. Species were eliminated from evaluation based upon: lack of potential habitat: area not included in historic or current range of the species; or extirpation of the species without current feasibility for reintroduction.

**Table 6 Regional Forester Sensitive Species List 2007**

Common Name	Occurrence on Rio de la Casa allotment	Habitat on Rio de la Casa allotment	Comments
Northern Goshawk	No	Yes	Forested areas with moderate space between trees (for foraging) such as ponderosa pine, aspen, white and Douglas fir. See discussion below.
Boreal owl	Unknown	Yes	Spruce-fir forest. See discussion below
White-tailed Ptarmigan	Unknown	Yes	High elevation alpine tundra. Habitat. See discussion below.
Peregrine Falcon	Yes	Yes	Steep cliffs and rock outcrops. See discussion below
Pale Townsend's big-eared bat	Unknown	Yes	Xeric to mesic habitats, including desert scrub, deciduous and coniferous forests (including spruce-fir, mixed conifer, and oak woodlands). See discussion below.
Snowshoe hare	Unknown	Yes	Inhabitant of dense spruce-fir forest. See discussion below
Pika	Unknown	Yes	Alpine tundra habitat, occupies rocky talus slopes. See discussion below.
Yellow bellied marmot	Unknown	Yes	Alpine tundra habitat-occupies rocky talus slopes, and high elevation meadows/valleys
Southern red-backed vole	Unknown	Yes	Good indicator of cool, mesic sites with high elevation old growth, spruce fir forests; requires abundance of surface litter including stumps and logs. See discussion below.
Western heather vole	Unknown	Yes	Occurs at high elevations in the Sangre de Cristo mountains. They occupy stands of spruce-fir, aspen, grassy meadows in montane forests, Subalpine forests and alpine tundra. Eats grasses and forbs. See discussion below.
Long tailed vole	Unknown	Yes	Occurs in high elevation mixed forest on sheltered slopes and in riparian spruce, willow and alder communities. Usually associated with meadows and forest edge. See discussion below.
Masked shrew	Unknown	Yes	Confined primarily to riparian habitats in subalpine coniferous forest in the Sangre de Cristo, Jemez and San Juan Mountains, usually above 9,500'. See discussion below.
Water shrew	Unknown	Yes	Water shrews are confined to the Sangre de Cristo, San Juan and Jemez Mountains. They occur near permanent streams, seldom descending below 8,000' in altitude. See discussion below.
Dwarf shrew	Unknown	Yes	This shrew lives in white fir-Douglas fir zone from about 7,000' to 9,000'. Preferred habitats are rocky areas primarily in subalpine coniferous forest. See discussion below.

Common Name	Occurrence on Rio de la Casa allotment	Habitat on Rio de la Casa allotment	Comments
American marten	Unknown	Yes	Optimum habitat- mature old-growth spruce-fir with more than 30% canopy cover, abundant fallen logs and stumps, and lush shrub and forb vegetation to support prey species. See discussion below.
Ermine	Unknown	Yes	Habitat includes forest-edge, grassland, shrub, wet meadows, and riparian areas. See discussion below.
Mink	Unknown	Yes	Obligate riparian animals, never found far from permanent streams, wetlands, or other surface water. See discussion below.
Northern leopard frog	Unknown	Yes	Riparian areas such as slow moving streams, marshy areas, wet meadows. See discussion above.
<b>Sensitive Plant Species</b>			
Greater yellow lady's-slipper	Unknown	Yes	Grows in boggy areas, swamps, damp woods (decaying leaf litter), and near rivers/streams. Also associated with rocky wooded hillsides on north or east facing slopes in spruce-fir habitats (Kershaw et al 1998, NatureServe 2007). See discussion below.
Wood lily	Unknown	Yes	Occurs in the understory of mixed-conifer forests out of direct sunlight. Wooded sites in foothills in montane-subalpine habitats (Kershaw et al 1998). Also occurs in facultative wetlands in the southwest (USDA NRCS 2007). See discussion below.
Pecos Mariposa lily	Unknown	Yes	Habitat consists of meadows and aspen glades in upper montane coniferous forest; 9,500-11,200 ft. See discussion below.
Arizona Willow	Yes	Yes	Grows along riparian corridors, sedge meadows and wet drainage ways in subalpine coniferous forest; 10,000-11,200 fet in elevation. In NM, it occurs in Toas, Rio Arriba and Mora Counties. See discussion below.

**Northern Goshawk:** The goshawk is a forest habitat generalist, utilizing a variety of forest types, forest ages, structural conditions and successional stages. The principal forest types occupied by the goshawk are ponderosa pine, mixed-species and spruce fir (Reynolds et al. 1992). Nesting habitat consists of older age forests with variable tree species. The most consistent vegetation characteristic of goshawk nest sites is a high percent of canopy closure. Goshawk prey (forest birds and mammals) occupy ground-shrub, shrub-canopy, and canopy layers.

The mature and over-mature forests in the analysis area provide potential nesting and post-fledgling areas. The analysis area also provides good foraging habitat (field notes PR#). Vegetation structural stages (VSS) defined by the *Management Recommendations for the Northern Goshawk* (USDA 1992) throughout the analysis area would be considered; VSS 1-areas dominated by grasses, forbs, and shrubs; VSS 3, and VSS 4-mid-aged forest.

Goshawks have never been detected on the Rio de la Casa allotment, yet habitat is present. The ponderosa pine canopy within some areas on the allotment has recently been opened up due to a thinning project in the area and currently allows for sufficient grasses to grow. There are very few large ponderosa pine trees that would provide nesting habitat and plucking posts since they were enclosed in dense patches of smaller diameters of white and Douglas fir. There are many large aspens on the allotment that are adjacent to perennial water, which would provide good nesting habitat for the goshawk (Lujan, pers. Com., Nelson, field visit). Foraging habitat is available where there are tall grasses within the recently opened ponderosa pine canopies and along forest edges and meadows.

**Boreal Owl:** The boreal owl occupies subalpine forests with fir and Engelmann spruce. They are an obligate cavity nester, located in mature or older forests, sometimes in aspen cavities, sometimes in snags. They occupy cool microsites with higher canopy cover, higher basal coverage and greater tree density than random sites which produce uncrusted snow conditions in winter.

Boreal owls have not been detected on the allotment yet 7,600 acres of spruce-fir habitat is present for the owl. Many large trees with dbh ranging from 18-22” and few large snags are present at upper elevations and within riparian zones in the allotment which provide nesting habitat for the owl. There are a lot of small dead and down logs within portions of the allotment (such as the fuelwood areas) which provide habitat for prey species. Conservative to moderate (in few areas) grazing occurs within meadows and forest edges on the allotment. Forage consumption by livestock is considered to be at conservative levels (range monitoring, PR#), and has not reduced boreal owl habitat.

**White tailed ptarmigan:** The ptarmigan occupies alpine tundra habitat having rocky slopes and high elevation meadows with vegetation such as willows, grasses and scattered shrubs. Proximity to water is very important for breeding purposes. It nests in rocky areas that are sparsely vegetated with grassy slopes. Flocks sometimes occupy sites with abundant boulders, while brooding hens sometimes use moist meadows. Winter diets consist of willow buds, twigs, and needles from spruces, firs and pines. Summer diet includes leaves and flowers of herbaceous plants, willow buds, seeds, berries, and insects (NatureServe 2007)

Ptarmigans have not been detected on the allotment yet alpine tundra habitat is present. Higher elevations of the allotment contain alpine tundra habitat such as; high densities of spruce-fir trees, high elevation meadows with shrubs and grasses, and rocky talus slopes and hillsides (Lujan pers. Comm.) Water availability for the ptarmigan at high elevations would include Lost Lake, Spirit Lake and Santiago Lake. Grazing rarely occurs within ptarmigan habitat. Livestock have difficulty reaching higher elevations due to physical barriers or the fact that travel is arduous and forage at lower elevations is easier to access. Although grazing occurs at lower elevations, forage consumption is at conservative levels (range monitoring, PR#), and has not reduce ptarmigan habitat because livestock do not or rarely occupy alpine tundra habitat.

**Peregrine Falcon:** The peregrine falcon lives at 6,500 to 9,000 feet in mixed conifer, ponderosa pine, and spruce-fir. They nest on high cliffs near water, and forage over a very large area. They forage in a variety of habitats, including riparian woodlands, coniferous and deciduous forests, scrublands, and prairies. A nesting cliff site exists adjacent to but *outside* the project area. There are no other suitable nesting cliffs in the project area.

A site plan for the peregrine falcon (Johnson 1994) was written to address the conservation of the falcon. Within the site plan, protective zones of sensitivity (A-D) are established in roughly concentric circles around nesting areas. The A-zone is closest to the nesting cliff and therefore the most sensitive, and the outermost D-zone the least sensitive. The site located within the Rio de la Casa allotment contains zones A-D which is about 95% of the entire peregrine falcon site.

**Pale Townsend’s Big-Eared Bat:** The Pale Townsend’s big-eared bat occurs in a variety of xeric to mesic habitats, including desert scrub, deciduous and coniferous forests (including spruce-fir, mixed conifer, and oak woodlands). They have shown preference for edge habitats between streams and mountain slopes. It is frequently associated with caves and abandoned mines for day roosts and hibernacula but will also use abandoned buildings and crevices on rock cliffs for refuge. They are known to glean insects from vegetation and to forage within tree canopies (Perkins and Schommer 1992 and Nowak 1994). Bats are known to forage on some species of insects that occupy riparian vegetation (NMGF 2007).

Pale Townsend’s big-eared bats have not been detected on the allotment yet their habitat (ponderosa pine coniferous forest) is present. However, caves and abandoned buildings occur on the allotment that provides roosts and hibernacula. Perennial water is present which provides habitat for some species of insects.

The current grazing strategy does not disturb trees, caves or abandoned buildings where bats would roost. Grazing occurs within some bat foraging habitat (such as riparian areas, ponderosa pine, spruce-fir forests). Forage consumption is conservative in bat foraging habitat and has not reduced insect habitat.

**Snowshoe Hare:** This hare is an inhabitant of dense spruce-fir forest with a dense understory of shrubs and small trees (Findley 1987). Their diet consists of various vegetative parts of plants such as cambial layers of small trees. They do not appear to venture further than 60 to 120 meters into clearings. Nearly every plant that is important to snowshoe hares is fire dependent.

Snowshoe hares have not been detected on the allotment yet their habitat (mixed conifer, spruce-fir) is present. Abundant forbs are present on the allotment that provide foraging habitat for the hare.

The current grazing strategy does not disturb dense stands of trees where hares could occupy. Grazing occurs within some hare foraging habitat yet forage consumption is conservative, and has not reduced its habitat.

**Pika:** The pika is an inhabitant of alpine tundra habitat and occupies rocky talus slopes, primarily in the talus-meadow interface (NatureServe 2007). Their diet consists of grasses, sedges, flowering plants, and root shoots.

Pikas have not been detected on the allotment yet their habitat (alpine tundra) is present. Abundant forbs and grasses are present along the tree line that provide foraging habitat for the pika.

The current grazing strategy would rarely disturb alpine tundra habitat the pikas would occupy. Grazing would rarely occur within pika foraging or denning habitat because forage is not available for cows within talus slopes but is available along the tree line.

**Yellow-Bellied Marmot:** The marmot is an inhabitant of alpine tundra habitat and occupies rocky talus slopes, and high elevation meadows/valleys (NatureServe 2007). Their diet consists of grasses and forbs. They burrow under rocks in areas of well drained talus, rock outcrops, of scattered boulders.

Marmots have not been detected on the allotment yet their habitat (alpine tundra) is present. Abundant forbs and grasses are present at high elevations that provide foraging habitat for the marmot.

The current grazing strategy has not disturbed rocky talus slopes where the marmots could occur. Grazing may occur within the lower reaches of marmot foraging habitat and may remove minimal vegetation yet forage consumption is conservative (range monitoring, PR#), and has not reduced its habitat.

**Rocky Mountain Bighorn Sheep:** See management indicator species section.

**Southern Red-Backed Vole:** The red-backed vole occurs in cool mesic sites within spruce-fir forest with components of downed logs, mixed-spruce fir forests with good cone production and abundant surface litter, grassy meadows, willow riparian areas all in elevations above 10,000 ft. They feed on fungi, seeds, leaves, and stems. These voles sometimes use the squirrel middens for cover and as a food source. They eat invertebrates and small plants.

The southern red-backed vole has not been detected on the allotment yet their habitat (spruce-fir, dead and down logs, high mountain meadows) is present (Lujan pers. Comm., Nelson field visit 2007). In portions of the allotment, grasses are tall and abundant as well as spruce-fir, which provide seeds and cones for the voles. .

Current grazing rarely occurs on the steeper slopes/high elevation in the spruce-fir forest on the allotment because tree densities are high and make it difficult for livestock to maneuver through. Although grazing is limited at the high elevations where the voles could occur, forage consumption within the allotment is at conservative levels, and has not reduced vole habitat.

**Western Heather Vole:** Heather voles occupy stands of spruce-fir, lodgepole, aspens, ponderosa pine, grassy meadows in montane forests, sub-alpine forests, and alpine tundra. In New Mexico, their elevation range is 7,000 ft. (Santa Fe) to 12,500 (Pecos Baldy). These voles are herbivores; they eat grasses, forbs, leaves, pine needles, and flowers.

This species occurs on the Santa Fe National Forest: specimens from Mora (Pecos Baldy),-It also occurs in San Miguel Co NMGF 2007). The Western heather vole has not been detected on the allotment yet their habitat (spruce-fir, grassy meadows) is present. In portions of the allotment, there are various grasses, lots of forbs and shrubs, which provide seeds for the voles (field notes, PR#?).

Conservative grazing occurs over the majority of the allotment while more moderate grazing has occurred in other areas in the past. Grazing occurs in meadows, forested areas with grasses in the understory and forest edges on the allotment. Although grazing occurs at lower elevations, forage consumption on the allotment is at conservative levels, and has not reduced vole habitat.

**Long-Tailed Vole:** This vole occurs in high elevation mixed forest on sheltered slopes and in riparian spruce, willow and alder communities. This species is a good indicator of permanent water. They are most abundant where there is some grassy vegetation on the forest floor (NatureServe 2007). They are usually associated with meadows and forest edge, and sometimes living in forest itself. It is most common in mixed conifer and spruce-fir forest. Because this species is largely dependent on well-developed mesic meadows, excessive grazing is considered a potential threat to habitat. General diet includes grasses, bark, fungi, seeds and berries.

The long-tailed vole has not been detected on the allotment yet their habitat is present.

Conservative grazing occurs over the majority of the allotment while more moderate grazing has occurred in other areas in the past. Grazing occurs in meadows, forested areas with grasses in the understory and forest edges on the allotment. Although grazing occurs at lower elevations, forage consumption on the allotment is at conservative levels, and has not reduced long tailed vole habitat.

**Cinereus (masked) Shrew:** In New Mexico, these shrews are confined primarily to riparian habitats in subalpine coniferous forest in the Sangre de Cristo, Jemez and San Juan Mountains, usually above 9,500'. It has been found along the banks of cold streams, in springy meadows, or under logs in the cold spruce woods.

The shrew has not been detected on the allotment yet their habitat is present (Rio de la Casa, Corrales and Cañonicto creeks). Conservative grazing occurs in meadows, adjacent to some riparian areas, forest edges, and forested areas having grasses and forbs in the understory. Although grazing occurs through out the allotment at previously described areas, forage consumption on the allotment is at conservative levels, and has not reduced shrew habitat.

**Water Shrew:** In New Mexico water shrews are confined to the Sangre de Cristo, San Juan and Jemez Mountains. They occur near permanent streams, seldom descending below 8,000' in altitude. The water shrew can swim with great facility, diving under water to pursue aquatic organisms and can run across the surface of the water for a short distance (Findley 1987). They eat large quantities of invertebrates on a daily basis such as earthworms and spiders.

The water shrew has not been detected on the allotment but habitat is present (Rio de la Casa, Corrales and Cañonicto creeks). Conservative grazing occurs in meadows, adjacent to some riparian areas, forest edges, and forested areas having grasses and forbs in the understory. Although grazing occurs through out the allotment at previously described areas, forage consumption on the allotment is at conservative levels, and has not reduced shrew habitat.

**Dwarf Shrew:** This shrew lives in the white-fir/Douglas fir zone from about 7,000' to 9,000'. The preferred habitat is talus and other rocky areas primarily in subalpine coniferous forest. Management practices in BISON note, dwarf shrew are “tolerant” of clearcutting and grazing (NMGF 2007). Some captures have been made at sites where there is no free water.

Dwarf shrews have not been detected on the allotment yet their habitat (talus and rocky area) is present. Abundant forbs and grasses are present at high elevations that provide foraging habitat for the shrew.

The current grazing strategy has not disturbed the rocky talus slopes where the shrews could occur. Grazing may occur within the lower reaches of shrew foraging habitat and may remove minimal vegetation yet forage consumption is conservative (range monitoring, PR#), and has not reduced its habitat.

**American Marten:** Martens prefer late successional stands of mesic, conifer-dominated forest. They occur between 7,000 to 13,000 feet, most above 9,000 feet. Optimum habitat appears to be mature old-growth spruce-fir with more than 30% canopy cover, abundant fallen logs and stumps, and lush shrubs and forbs to support prey species. Prey species include mice, voles, insects, red squirrels, and snowshoe hare. They also feed on carrion, birds and bird eggs. During certain times of the year, a significant portion of their diet is comprised of berries. They den in tree cavities, logs, rock piles and burrows. Northern New Mexico is in the southern limit of this species range.

The marten has not been detected on the allotment yet their habitat (spruce-fir) is present on the allotment. The current grazing strategy does not remove trees, downed logs, or canopy cover which is important habitat for the marten. Grazing may occur within some marten foraging habitat at lower elevations yet forage consumption is conservative (range monitoring, PR#), and has not reduced prey species habitat.

**Ermine:** This weasel lives in mixed conifer at high altitudes (7,800' to 11,000') in northern New Mexico in association with small rodent populations in montane meadows. Habitat includes forest-edge, grassland, shrub, wet meadows, and riparian areas. They feed on insects, mice, birds and eggs.

The ermine has not been detected on the allotment yet their habitat is present on the allotment. Conservative grazing occurs in meadows, forest edges, adjacent to riparian areas and forested areas having grasses in the understory. Although grazing occurs at the previously described locations, forage consumption on the allotment is at conservative levels, and has not reduced prey base habitat.

**Mink:** Mink are obligate riparian animals, never found far from permanent streams, wetlands, or other surface water. Den sites, such as abandoned beaver lodges and muskrat dens, are very important habitat features. Other habitat features include development of shoreline vegetation including willows and emergent vegetation (Marshall 1936), crayfish abundance, availability of logjams for fall and winter hunting sites, and abundance of muskrats. Reaches of stream where banks have been degraded by livestock are avoided as are ephemeral streams and streams of high gradient (Fitzgerald, Meaney, and Armstrong, 1994).

Minks are excellent swimmers and are capable of catching fish, which make up a significant part of its diet. Other foods include insects, small mammals, birds, eggs, crayfish, and frogs. Records of occurrence include: Mora County (Watrous) and San Miguel County (Las Vegas). Watershed occurrences include the Pecos and Canadian river drainages (Hubbard et al., 1979).

The mink has not been detected on the allotment yet perennial water (Rio de la Casa and Corrales creek) is found on the allotment. Conservative grazing occurs along riparian areas and meadows near water on the allotment. Although grazing occurs on the allotment along riparian areas, forage consumption is at conservative levels and has not reduced mink habitat or its prey base habitat.

**Northern Leopard Frog:** This leopard frog ranges in a wide variety of habitats (springs, marshes, wet meadows, riparian areas, vegetated irrigation canals, streams, rivers, ponds, and reservoirs) but require a high degree of vegetative cover for concealment (NatureServe Explore 2002, McAllister et al. 1999, Corkran and Thomas 1996). They prefer quiet or slowly flowing waters and avoid areas without cover (McAllister et al. 1999, Csuti et al. 1997). In New Mexico they are known from about 3600-10,000 feet and they breed in ponds or lake edges with fairly, dense aquatic emergent vegetation from April-July and September-October (Degenhardt et al 1996). Juveniles and adults live in aquatic vegetation in ponds, and in adjacent grass, sedge, weeds or brush (Corkran and Thomas 1996). They occur in San Miguel and Mora Counties.

Leopard frogs have not been detected on the allotment, yet habitat is present along the Rio de la Casa, Canoncito and Corrales creeks where low lying riparian vegetation is abundant and in good condition. The riparian vegetation provides foraging habitat and hiding cover for the leopard frog. Conservative grazing occurs adjacent to riparian areas. Although grazing occurs in riparian zones, forage consumption is at conservative levels and has not reduced leopard frog habitat.

**Greater Yellow Lady's Slipper:** An 8-16 inch perennial deciduous forb that grows as a single plant or in a colony, roots are rhizomatous (Mergen 2006 and Coleman 2002). The large flower is a bright yellow pouch that blooms as early as the last week in May and is over by the first week in July (Coleman 2002). *Cypripedium* is most often found on or confined to predominately calcareous soils (Mergen 2006). The slipper grows in moderate shade to nearly full sun in fir, pine and aspen forests from 6,000 to 9,500 feet in elevation (Mergen 2006 and Coleman 2002). It most often grows just above the banks of streams, usually 50-100 yards from water. Grows on mesic slopes up to 60 degrees; facing east to northeast and covered with lush growth less than a foot tall. It is often associated with blue berries (*Vaccinium* spp.), shooting stars (*Dodecatheon* spp.) and several species of daises. *Lilium* spp are often found in the same area (Coleman 2002). *Cypripedium* habitat also includes dripping seeps on steep to moderate sloped canyon walls where the soil is saturated (Coleman 2002). The seeps are surrounded by pine and fir but the plants are in full sun much of the day.

The lady's slipper has not been detected on the allotment yet their habitat (riparian areas, wooded hillsides in spruce-fir) is present. Perennial water is present which would provide mesic habitat for the lady's slipper. Conservative grazing occurs adjacent to riparian areas and forested areas having grasses in the understory. Although grazing occurs in riparian zones and forested areas, forage consumption is at conservative levels and has not reduced lady's slipper habitat.

**Wood Lily:** The wood lily is a perennial herb with at 1-3 foot stalk topped with a red-orange funnel shaped flower. The plant flowers late June through July. Soils are humus rich and well-drained. Little is know about habitat characteristic of the species. (NMRPTC 1999)

The wood lily has not been detected on the allotment yet their habitat (mixed conifer, shady understory) is present. Perennial water is present which would provide mesic habitat for the lilies. Conservative grazing occurs adjacent to riparian areas and forested areas having grasses in the understory. Although grazing occurs in riparian zones and forested areas, forage consumption is at conservative levels and has not reduced the wood lily's habitat.

**Pecos Mariposa Lily:** *Calochortus gunnisonii* is the only species of mariposa lily in the Sangre de Cristo Mountains. Habitat consists of meadows and aspen glades in upper montane coniferous forest; 9,500-11,200 ft. The mariposa lily is very difficult to find. Attempts to relocate the historical population on Hermit's Peak have been unsuccessful.

Areas of occurrence: southwestern Mora and northwestern San Miguel counties.

The mariposa lily has not been detected on the allotment yet their habitat (mixed conifer, aspens) is present. Nothing is known of this species' response to livestock grazing and forest fire. Conservative grazing occurs in

meadows and forested areas having understory grasses. Although grazing occurs in meadows and forested areas, forage consumption is at conservative levels and has not reduced Pecos Mariposa Lily's habitat.

**Arizona Willow:** This shrub is associated with sedge meadow and wet drainages in subalpine coniferous forest from 10,000 – 11,200 feet in elevation. It forms a prostrate mat, large hedge or thicket several inches to 9 feet tall and flowers from late May to June. Habitat often occurs as a narrow, linear strip associated with perennial water in seeps, springs, streams sides and wet meadows. Plants are also sometimes found in drier sites adjacent to forest edges or within the riparian zone where subsurface channels provide moisture. The willow is frequently associated with substrates of volcanic origin, and it appears to favor coarse-texture and well-watered soils, including those associated with alluvial deposits. Aspects are variable but slopes are generally flat to moderate (less than 5- 9 percent). On the Santa Fe NF, the species is documented on the Pecos/Las Vegas Ranger District.

## DIRECT AND INDIRECT EFFECTS ON THREATENED, ENDANGERED AND SENSITIVE SPECIES

### Federally Listed Species

**Mexican spotted owl (MSO):** Upon visiting the Rio de la Casa allotment there has been moderate to heavy use (in few areas) by cattle. Livestock have difficulty maneuvering through portions of the allotment with heavily forested areas and steep slopes. Some areas have limited grasses/forbs due to high canopy cover, thus heavy utilization occurred in some small meadows where forage was lacking.

The grazing activities occur in areas that are not considered nesting/foraging habitat for MSO such as meadows without canopy cover and dense patches of small diameter mixed conifer. Field reconnaissance of the allotment showed that current livestock grazing occurs in meadows, forest edges, and moderate slopes (Lujan, pers. Comm., E. Nelson field notes).

The mixed conifer habitat does not meet the minimum criteria for restricted habitat based on the following:

- Only 21% of the allotment contains mixed conifer habitat. At least 25% of the allotment must have mixed conifer in order to qualify for MSO restricted habitat.
- Determination: Cattle grazing would have no effect on the Mexican spotted owl. This determination meets the criteria designated in the USDA guidance criteria (USDA 2005) and is based on the following:

Mexican spotted owls are not present within the action area.

In the action area, no livestock grazing or livestock management activities will occur within protected and restricted habitats, as defined by the species' recovery plan.

### Sensitive Species

#### Alternative 1- No Action (No Grazing)

**Northern Goshawk:** Eliminating livestock grazing would not affect individual goshawks because the absence of cows would not disturb them. Alternative 1 would not reduce the amount of goshawk habitat because no reduction in tree density or canopy closure would occur. There would be an incremental increase in the amount of ground cover for prey because there would be no livestock on the allotment. These effects would result in a “no impact” determination.

**Boreal Owl:** Eliminating grazing would not affect individual boreal owls because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of owl habitat because no reduction in large

tree/snag density or nest cavities would occur. There would be an incremental increase in the amount of ground cover for prey because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**White Tailed Ptarmigan:** Eliminating grazing would not affect individual ptarmigans because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of ptarmigan habitat because no reduction in alpine habitat would occur. There would be an incremental increase in the amount of ground cover for the ptarmigan because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Peregrine Falcon:** Eliminating grazing would not affect individual falcons because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of peregrine falcon habitat because no reduction in cliffs would occur. There would be an incremental increase in the amount of ground cover for prey because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Pale Townsend’s Big-Eared Bat:** Eliminating grazing would not affect individual bats because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of bat habitat because no reduction in roosting or nesting habitat such as mines, caves, and rock outcrops would occur. There would be an incremental increase in the amount of ground cover for prey such as insects because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Snowshoe Hare:** Eliminating grazing would not affect individual hares because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of snowshoe hare habitat because no reduction in shrubs, forbs and spruce-fir trees would occur. Livestock grazing would not reduce spruce-fir trees which provide cover for the hare. There would be an incremental increase in the amount of ground cover for the hare because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Pika:** Eliminating grazing would not affect individual pikas because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of pika habitat because no reduction in talus slopes, rock piles or alpine habitat would occur all of which provide cover for the pika. There would be an incremental increase in the amount of ground cover for the pika because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Yellow Bellied Marmot:** Eliminating grazing would not affect individual marmots because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of marmot habitat because no reduction in rock piles or alpine habitat would occur. There would be an incremental increase in the amount of ground cover for the marmot because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Southern Red-Backed Vole:** Eliminating grazing would not affect individual voles because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of vole habitat because no reduction in downed logs, mixed-spruce fir forests, abundant surface litter, grassy meadows and willow riparian areas would occur. There would be an incremental increase in the amount of ground cover which would increase the amount of food (seeds, forbs, grasses) for the vole because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Western Heather Vole:** Eliminating grazing would not affect individual voles because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of vole habitat because no reduction in dense cover, shrubs, high mountain meadows, and riparian mixed-spruce fir forests, abundant surface litter, grassy meadows and willow riparian areas would occur. There would be an incremental increase in the amount of ground cover which would increase the amount of food (seeds, forbs, grasses) for the vole because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Long Tailed Vole:** Eliminating grazing would not affect individual voles because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of vole habitat because no reduction in meadows and grasses in forest edges would occur. There would be an incremental increase in the amount of ground cover which would increase the amount of food (seeds, forbs, grasses) for the vole because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Cinereus (masked) Shrew:** Eliminating grazing would not affect individual shrews because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of shrew habitat because no reduction in grasses and forbs would occur. There would be an incremental increase in the amount of ground cover throughout the allotment which would increase the amount of food (seeds, forbs, grasses) for the shrew because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Water Shrew:** Eliminating grazing would not affect individual shrews because the absence of cows would not disturb them. Alternative 1 would not reduce the amount of shrew habitat because no reduction in riparian habitat adjacent to permanent water would occur. There would be an incremental increase in the amount of ground cover near perennial water which would increase the amount of food (seeds, forbs, grasses) for the shrew because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Dwarf Shrew:** Eliminating grazing would not affect individual shrews because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of shrew habitat because no reduction in talus/rock slopes would occur. There would be an incremental increase in the amount of ground cover throughout the allotment which would increase the amount of food (seeds, forbs, grasses) for the shrew because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**American Marten:** Eliminating grazing would not affect individual martens because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of marten habitat because no reduction in mature old-growth spruce-fir with high canopy cover and abundant fallen logs would occur. There would be an incremental increase in the amount of ground cover throughout the allotment which would increase the amount of food (seeds, forbs, grasses) for the marten’s prey because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Ermine:** Eliminating grazing would not affect individual ermines because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of ermine habitat because no reduction in forest-edge, grassland, shrub, wet meadows, and riparian areas would occur. There would be an incremental increase in the amount of ground cover throughout the allotment which would increase the amount of food (seeds, forbs, grasses) for the ermine’s prey because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Mink:** Eliminating grazing would not affect individual mink because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of mink habitat because no reduction in perennial riparian habitat would occur. There would be an incremental increase in the amount of ground cover throughout the allotment which would increase the amount of food (seeds, forbs, grasses) for the mink’s prey because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Northern Leopard Frog:** Eliminating grazing would not affect individual frogs because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount of frog habitat because no reduction in riparian habitat adjacent to permanent or ephemeral water would occur. There would be an incremental increase in the amount of ground cover near riparian areas which would increase the amount of prey base habitat for the frog because there would be no cows on the allotment. These effects would result in a “no impact” determination.

**Greater Yellow Lady’s Slipper:** Eliminating grazing would not affect individual ladies slippers because the absence of cows would not disturb them. Alternative 1 would not reduce the amount of ladies’ slipper habitat

because no reduction in riparian habitat or wooded hillsides would occur. There would not be alteration of water resources or soils because there would be no livestock present. These effects would result in a “no impact” determination.

**Wood Lily:** Eliminating grazing would not affect individual wood lilies because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount wood lilies habitat because no reduction in riparian habitat or trees providing shade would occur. There would not be alteration of water resources or soils because there would be no cows present. These effects would result in a “no impact” determination.

**Pecos Mariposa Lily:** Eliminating grazing would not affect individual Mariposa lilies because the absence of cows would not disturb them. Alternative 1 would not reduce the amount Mariposa lilies habitat because no reduction in aspen or spruce fir trees providing shade would occur. There would not be no trampling of plants because there would be no livestock present. These effects would result in a “no impact” determination.

**Arizona Willow:** Eliminating grazing would not affect individual Arizona willows because the absence of livestock would not disturb them. Alternative 1 would not reduce the amount willow habitat because no reduction in riparian habitat, seeps, or wet meadows would occur. There would not be alteration of water resources or soils because there would be no cows present. These effects would result in a “no impact” determination.

## Sensitive Species

### Alternative 2- Proposed Action

**Northern Goshawk:** Alternative 2 would not reduce the amount of goshawk nesting habitat because no overall reduction in tree density or canopy closure would occur, though a few incidental trees would be removed during fence construction. Because cows would be not be allowed more than 40% utilization, consumption of forage would be light to moderate and would not greatly reduce the habitat of prey species. Further, constructing a fence and an earthen tank to improve distribution of cows would incrementally improve ground cover by forcing cows to graze more evenly across the allotment. An increase in ground cover would provide additional habitat and cover for the goshawk’s prey. Cows would remove grass where they graze, resulting in a very minimal decrease of prey base habitat from when cows leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cows would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual goshawks, but is not likely to result in a trend toward federal listing or loss of viability.

**Boreal Owl:** Grazing at conservative levels would not reduce the amount of owl nesting habitat because no reduction in large tree density or nest cavities would occur. Grazing at proposed levels would maintain forage used by the owl’s prey. Alternative 2 would not reduce the amount of owl habitat because no overall reduction in tree density or nesting cavities would occur, though a few incidental trees would be removed during fence construction. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover of prey species by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of prey base habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual owls, but is not likely to result in a trend toward federal listing or loss of viability.

**White Tailed Ptarmigan:** Grazing at conservative levels would not reduce the amount of ptarmigan nesting habitat because no reduction in rocky areas near snowfields would occur. Grazing at proposed levels would maintain forage used by the ptarmigan. Alternative 2 would not reduce the amount of ptarmigan habitat because

no overall reduction in rock outcrops, high willow densities and stream courses at high elevations would occur. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for ptarmigan by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual ptarmigans, but is not likely to result in a trend toward federal listing or loss of viability.

**Peregrine Falcon:** Grazing at conservative levels would not modify peregrine falcon habitat such as cliffs and steep slopes. Livestock do not occupy areas where falcons nest because of inaccessible areas such as cliffs and ledges. Foraging areas, such as mixed conifer and ponderosa pine habitats, would not be grazed where desirable forage is available. Implementing a rotational grazing system and constructing an earthen tank and a pasture fence would incrementally improve wetland/riparian habitat by increasing livestock distribution across the allotment. Proposed livestock grazing would be at a conservative level and would not remove large quantities of forage that are necessary for the falcon's prey. Grazing would not remove important nesting habitat such as cliffs or eyries. Therefore, re-authorizing grazing permits may impact individual falcons, but is not likely to result in a trend toward federal listing or loss of viability.

**Pale Townsend's Big-Eared Bat:** Roost disturbance is the primary threat to this species. Grazing by livestock would not remove nesting or roosting habitat such as mines, caves and rock outcrops. Grazing on this allotment would not exceed 40% utilization and would not remove large quantities of riparian prey base habitat. Implementing a rotational grazing system, constructing an earthen tank and a pasture fence would incrementally improve wetland/riparian habitat by increasing livestock distribution across the allotment. Proposed livestock grazing would be at a conservative level and would not remove large quantities of prey base habitat that are necessary for the bat's prey. Therefore, re-authorizing grazing permits may impact individual bats, but is not likely to result in a trend toward federal listing or loss of viability.

**Snowshoe Hare:** Grazing at conservative levels would not reduce the amount of snowshoe hare habitat because no reduction in high densities of spruce-fir trees or shrubs and forbs would occur. Grazing at proposed levels would maintain forage used by the hare. Alternative 2 would not reduce the amount of hare habitat because no overall reduction in high densities of trees and shrubs at high elevations would occur. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for the hare by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual hares, but is not likely to result in a trend toward federal listing or loss of viability.

**Pika:** Grazing at conservative levels would not modify pika habitat such as rocky talus slopes above tree line in alpine sub-alpine areas. Livestock rarely occupy areas where pikas occur because of inaccessible areas such as talus slopes. Therefore, re-authorizing grazing permits may impact individual pikas, but is not likely to result in a trend toward federal listing or loss of viability.

**Yellow Bellied Marmot:** Grazing at conservative levels would not reduce the amount of marmot habitat because no reduction in alpine tundra, subalpine and montane meadows would occur. Foraging areas, such as steep mountain meadows with adjacent talus slopes, would rarely be grazed where desirable forage is available. Grazing at proposed levels would maintain forage used by the marmot. Alternative 2 would not reduce the amount of marmot habitat because no overall reduction in alpine tundra, subalpine and montane meadows would occur. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the

movement of livestock would incrementally improve ground cover for the marmots by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual marmots, but is not likely to result in a trend toward federal listing or loss of viability.

**Southern Red-Backed Vole:** Grazing rarely occurs on the steeper slopes in the mesic forest where the vole occurs. Even though cows occupy meadows and forest edges of this allotment, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of vole habitat. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for the vole by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual voles, but is not likely to result in a trend toward federal listing or loss of viability.

**Western Heather Vole:** Grazing occurs in primarily in the meadows and along forest edge on the allotment where the vole occurs. Even though cows occupy meadows and forest edges of this allotment, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of vole habitat. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for the vole by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual voles, but is not likely to result in a trend toward federal listing or loss of viability.

**Long Tailed Vole:** Grazing occurs in meadows and forest edges on the allotment where the vole occurs. Even though cows occupy meadows and forest edges of this allotment, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of vole habitat. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for the vole by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual voles, but is not likely to result in a trend toward federal listing or loss of viability.

**Cinereus (masked) Shrew:** Grazing occurs along perennial water such as the Rio de la Casa where the masked shrew occurs. Cows may remove grassy vegetation along natural springs in spruce-fir habitat that the shrew uses for cover and foraging. Even though cows occupy riparian areas in this allotment, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of shrew habitat. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for the shrew by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual shrews, but is not likely to result in a trend toward federal listing or loss of viability.

**Water Shrew:** Grazing occurs along perennial water such as the Rio de la Casa where the water shrew occurs. Cows may remove grassy vegetation along natural springs in spruce-fir habitat that the shrew uses for cover and foraging. Even though cows occupy riparian areas in this allotment, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of shrew habitat. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for the shrew by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual shrews, but is not likely to result in a trend toward federal listing or loss of viability.

**Dwarf Shrew:** Grazing does not occur on the talus/rock slopes at higher elevation in the spruce-fir forest where the dwarf shrew occurs. Grazing at conservative levels would not modify dwarf shrew habitat such as rocky talus slopes in spruce-fir habitats. Livestock do not occupy areas where the dwarf shrew occurs because of inaccessible areas such as talus slopes. Therefore, re-authorizing grazing permits would not impact dwarf shrews or their habitat.

**American Marten:** Grazing occurs along forest edges and meadows on the allotment whereas the marten occurs where there is mature old-growth spruce-fir with high canopy cover, and abundant fallen logs. Cows may remove grasses and shrubs that the marten's prey uses for cover and foraging. Even though cows rarely graze where marten habitat is present, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of the martens prey habitat. Re-authorizing grazing permits may impact individual martens, but is not likely to result in a trend toward federal listing or loss of viability because the martens occupy habitats with high tree densities on the allotment that cows rarely occupy. The construction of a new fence would remove only a few incidental trees which would not remove habitat for the marten. Implementation a rotational grazing system and constructing an earthen water tank would help to increase the distribution of livestock throughout the allotment. In addition, conservative grazing practices would not greatly reduce habitat for the martens prey. Given the small number of livestock that would occupy this habitat type and the high density of dead and down wood the martens prefer, this habitat would prohibit livestock movement. Therefore, re-authorizing grazing permits would have no impact on the American marten or their habitat.

**Ermine:** Grazing occurs along forest edges and meadows on the allotment where the ermine occurs where there is forest-edge, grassland, shrub, wet meadows, and riparian areas. Cows may remove grasses and shrubs that the ermine's prey uses for cover and foraging. Even though cows graze where ermine habitat is present, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of the ermines habitat or its prey habitat. Re-authorizing grazing permits may impact individual ermines, but is not likely to result in a trend toward federal listing or loss of viability because conservative grazing practices would not greatly reduce habitat for the ermine's prey. In addition, the construction of a new fence would help to increase the distribution of cows to minimize excessive grazing. Implementation a rotational grazing system and constructing an earthen water tank would help to increase the distribution of livestock throughout the allotment. Therefore, re-authorizing grazing permits may impact individual ermines, but is not likely to result in a trend toward federal listing or loss of viability.

**Mink:** Grazing occurs along perennial water such as the Rio de la Casa where the mink occurs. Cows may remove grassy vegetation along natural springs in spruce-fir habitat that the mink uses for cover and foraging. Even though cows occupy riparian areas in this allotment, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of shrew habitat. Further, implementing a rotational grazing system, constructing a fence and an earthen tank to manage the movement of livestock would incrementally improve ground cover for the shrew by forcing the cows to graze more evenly across the allotment. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover,

because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual mink, but is not likely to result in a trend toward federal listing or loss of viability.

**Northern Leopard Frog:** Leopard frogs have not been detected on the allotment, yet habitat is present along the riparian areas. Tall grasses on the allotment and sedges, and carex spp along riparian areas provide hiding cover, and foraging areas for the frog. Grazing may occur within some frog hiding cover and foraging habitat and within riparian areas yet forage consumption is conservative and would remove a small portion of these habitats. Re-authorizing grazing permits would reduce a small amount of frog hiding cover and foraging habitat because cows would graze grass adjacent to riparian areas. Because cows would be not be allowed more than 40% utilization, consumption of forage would be conservative and would not greatly reduce the frog's habitat. Cows would remove grass where they graze, resulting in a very minimal decrease in habitat from when cows leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover for the frog, because grasses and forbs (sedges) continue to grow during the growing season and because cows would be removed when utilization standards were met. The construction a fence, an earthen water tank and the implementation of a rotational grazing system would help to increase livestock distribution throughout the allotment. Therefore, re-authorizing grazing permits may impact individual frogs, but is not likely to result in a trend toward federal listing or loss of viability.

**Greater Yellow Lady's Slipper:** Grazing occurs along forest edges, riparian areas and meadows on the allotment. Lady's slippers occur on wooded hillsides in spruce-fir habitats, and riparian zones typically at higher elevation. Even though cows graze along riparian areas on this allotment, consumption of forage would not exceed 40% utilization and would not remove canopy cover such as spruce-fir and mixed conifer habitat. Re-authorizing grazing permits may impact individual lady's slippers, but is not likely to result in a trend toward federal listing or loss of viability because the plant occurs in spruce-fir habitats which are at high elevations on the allotment. Although conservative grazing practices would not remove the plant's habitat, trampling of individual plants may occur. New fence construction (would remove few incidental trees), construction of an earthen water tank, and implementation of a rotational grazing system would help to improve livestock distribution, eliminate excessive grazing, and reduce the chance of trampling plants. Therefore, re-authorizing grazing permits may impact individual plants, but is not likely to result in a trend toward federal listing or loss of viability.

**Wood Lily:** Grazing occurs along forest edges, meadows, and adjacent to riparian areas. Even though cows occupy the previously described habitats in this allotment, grazing on this allotment would not exceed 40% utilization and would not remove mixed conifer canopies that the wood lily depends upon for shading. Further, implementing a rotational grazing system, constructing a fence and an earthen tank would force the cows to graze more evenly across the allotment and minimize excessive grazing and reduce the chance of trampling of plants. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual wood lilies, but is not likely to result in a trend toward federal listing or loss of viability.

**Pecos Mariposa Lily:** Grazing occurs along forest edges, meadows, and adjacent to riparian areas. Even though cows occupy the previously described habitats in this allotment, grazing on this allotment would not exceed 40% utilization and would not remove mixed conifer and aspen canopies that the lily depends upon for shading. Further, implementing a rotational grazing system, constructing a fence and an earthen tank would force the cows to graze more evenly across the allotment and minimize excessive grazing and reduce the chance of trampling of plants. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual Mariposa lilies, but is not likely to result in a trend toward federal listing or loss of viability.

**Arizona Willow:** Grazing occurs along perennial water such as the Rio de la Casa where Arizona willow habitat occurs. Cows may remove grassy vegetation and shrubs such as the willow along the Rio de la Casa. Even though cows occupy riparian areas in this allotment, grazing on this allotment would not exceed 40% utilization and would not remove large quantities of willows. Further, implementing a rotational grazing system, constructing a fence and an earthen tank would force the cows to graze more evenly across the allotment and minimize excessive grazing and reduce the chance of trampling of plants. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Therefore, re-authorizing grazing permits may impact individual willows, but is not likely to result in a trend toward federal listing or loss of viability.

**CUMULATIVE EFFECTS ON THREATENED, ENDANGERED AND SENSITIVE SPECIES**

Alternative 2 would remove moderate amounts of vegetation while cattle are grazing in these areas, and also for a month or two afterwards until the vegetation has time to grow back. The cumulative effects would apply to the following species’ habitats because they have are known to occur in the Rio de la Casa allotment: northern goshawk, Rocky Mountain Elk, Hairy woodpecker and Merriam’s turkey.

The temporal boundary of this analysis is from 10 years ago to the projects listed on the Santa Fe National Forest’s Schedule of Proposed Actions or other projects in official planning status. The reason for the temporal boundary is that activities that occur in the allotment will remove moderate to conservative amounts of vegetation. This vegetation will recover on an annual basis, so cumulative effects are relatively short-lived and going back 10 years would capture changes. The geographical area is listed below for each species.

**Table 7 Cumulative effects on MIS**

<b>Management indicator Species known to occur on allotment-CE boundary/Size of area</b>	<b>Activities having potential to affect species</b>	<b>Direct/Indirect Effect of Action</b>
Rocky Mountain Elk Middle and Upper Pecos Canyon, Lower Pecos Wilderness. Approximate 60 mile radius.	Stand replacing fire. One time occurrence.	Removal of thermal/hiding cover, calving areas, foraging areas. Area would not provide suitable habitat for the elk in the short term. Foraging habitat would recover the year after a fire.
	Dispersed camping and hunter camps with stock and hunting. Annual activity occurring for up to 8 months.	Loss of some localized vegetation, minimizing forage for elk to consume. A reduction in foraging habitat would minimize food availability for elk. Disturbance to elk by campers occupying elk habitat. Elk would be forced to occupy other areas of suitable habitat. Direct harvest of elk by hunters. Elk numbers slightly reduced till following year when elk calves are born.
	Drought. One time occurrence or series of months to years of occurrence.	Lack of tall grasses which provides food for elk. Reduces food source for elk.
	Grazing by horses. Annual activity occurring for up to 5 months.	Minimal reduction in forage due to horses grazing on allotment. Minimally reduces foraging habitat and food source for elk.
Merriam’s Turkey Middle and Upper Pecos Canyon. Approximate 30 mile radius.	Stand replacing fire. One time occurrence.	Removal of roosting/nesting trees, foraging areas. Area would not provide suitable habitat for the turkey in the short term. Foraging habitat would recover the year after a fire.
	Dispersed camping	Denuded vegetation, minimizing cover for insects that

	and hunter camps with stock and hunting. Annual activity occurring for up to 8 months.	turkeys consume. A reduction in foraging habitat would minimize food availability for turkeys. Disturbance to turkeys by campers occupying turkey habitat. Turkeys would be forced to occupy other areas of suitable habitat. Direct harvest of turkey by hunters. Turkey numbers slightly reduced till following year when turkey poults are born.
	Drought. One time occurrence or series of months to years of occurrence.	Lack of tall grasses which provides habitat for insects. Reduces food source for turkeys.
	Grazing by horses. Annual activity occurring for up to 5 months.	Minimal reduction in forage due to horses grazing on allotment. Minimally reduces foraging habitat and food source for turkeys.
Hairy Woodpecker 25 acres-includes foraging areas, non-migratory birds	Stand replacing fire. One time occurrence.	Removal of roosting/nesting trees, foraging areas. Area would not provide suitable habitat for the turkey in the short term. Foraging habitat would recover the year after a fire.
	Drought. One time occurrence or series of months to years of occurrence.	Lack of moisture would cause stress on trees and increase numbers of insects that forage upon trees. Increases food source and nesting/ foraging areas for hairy woodpeckers.

## MIGRATORY BIRDS

### AFFECTED ENVIRONMENT

On January 10, 2001, President Clinton signed Executive Order 13186 placing emphasis on conservation of migratory birds. The Forest Service, Southwestern Region, analyzes effects in the following manner: (1) effects to “Highest Priority” species as identified by New Mexico Partners in Flight, (2) effects to Important Bird Areas (IBAs), and (3) effects to important overwintering areas.

**Species of Concern:** New Mexico Partners in Flight considers eight risk factors in identifying conservation priority species: Global Abundance, NM Breeding Abundance, Global Breeding Distribution, NM Breeding Abundance, Threats to Breeding in NM, Importance of NM to Breeding, Global Winter Distribution, and threats on Wintering Grounds. Species with the highest risk factors are classified as “highest priority” for conservation action. This evaluation addresses general effects to migratory birds, and specific effects to highest priority species for the main habitat types found in the project area.

New Mexico Partners in Flight lists priority species of concern by vegetation type. I reviewed all species of concern for vegetation types found in this project area mixed conifer, Douglas-fir, ponderosa pine, high elevation riparian and montane shrub. The table below displays the species that may occur in or near the project area.

**Table 8 High priority migratory birds**

Vegetation type	Species	Habitat
Ponderosa pine	Flammulated Owl	Open ponderosa pine forest; Douglas- or white fir and blue spruce; aspen or larger shrub oaks, and clearings
Ponderosa pine	Grace’s Warbler	Ponderosa pine sometimes with an oak component
Mixed conifer	Williamson's Sapsucker	<ul style="list-style-type: none"> <li>Mid- to high-elevation coniferous forests and mixed deciduous/conifer forests</li> <li>live conifers preferred over snags and aspen; ponderosa pine and</li> </ul>

Vegetation type	Species	Habitat
		Douglas-fir preferred over other conifers preferring snags or cavities in live aspen, aspen snags preferred over conifer snags
Mixed conifer	Olive-sided Flycatcher	<ul style="list-style-type: none"> <li>• Subalpine forest with Englemann's spruce, ponderosa pine, Douglas-fir and aspen</li> <li>• Need forest edges for foraging</li> <li>• Needs snags or tree tops near open areas or above canopy</li> <li>• Nests in coniferous trees</li> </ul>
Mixed conifer	Dusky Flycatcher	<ul style="list-style-type: none"> <li>• Uses mixed conifer or ponderosa pine forest with a shrubby understory</li> <li>• Tends to choose shrubs with denser foliage for nesting</li> <li>• Openings near shrubs needed for foraging</li> </ul>
Montane Shrub	MacGillivray's Warbler	Found in both montane riparian areas with low shrubs and in coniferous or deciduous forests with shrubby understory, often oaks
Spruce-fir	Blue Grouse	<ul style="list-style-type: none"> <li>• Nests in virtually all montane forest communities with relatively open tree canopies; prefer forests dominated by ponderosa pine or Douglas-fir.</li> <li>• Nests almost always on ground with some overhead cover usually under shrubs, rock overhangs, logs or stumps;</li> <li>• Density of birds decreases as tree canopy increases.</li> </ul>
Spruce-fir	Boreal Owl	See sensitive species write up.
High elevation riparian woodland	Hammond's flycatcher	Prefers spruce-fir, and mixed conifer forests, but also in ponderosa pine and aspen forests; generally with limited understory. They are mainly aerial foragers staying primarily in middle canopy.
Wet meadow	Wilson's Phalarope	Prefers wet grasslands, salt playas, flooded fields and marshes. Nests on the ground in taller, denser more heterogeneous vegetation than surrounding areas.
Wet meadow	Bobolink	Prefers grass-sedge meadows, hay fields, irrigated fields and riparian bottomlands. Nesting areas have higher vertical density than surrounding areas. Nests in transition zone between poorly drained areas and drier ones.

The following species were not consider because they have not been detected, are not found in the analysis area, do not have adequate habitat, or their habitat is not affected by grazing: red-headed woodpecker, Lewis' woodpecker, yellow-billed cuckoo, loggerhead shrike or other priority species of concern.

## DIRECT, INDIRECT, AND CUMMULATIVE EFFECTS ON MIGRATORY BIRD SPECIES

**Alternative 1 (No Grazing):** Implementation of Alternative 1 would not allow for domestic livestock grazing on the allotment. If livestock were not allowed to graze on the allotment there would be an increase in diversity of vegetative species such as grasses and forbs and would improve habitat for migratory birds. This alternative would maintain numbers of live trees and snags within the analysis area. Improving habitat for migratory birds by eliminating livestock grazing would help to follow the recommended conservation strategies for the blue grouse, boreal owl, Williamson's sapsucker, olive-sided flycatcher, Grace's warbler, McGillivray's warbler, flammulated owl, dusky flycatcher, Wilson's phalarope, boblink, and the Hammond's flycatcher within the spruce-fir, mixed conifer, montane shrub, ponderosa pine, wet meadow, and high elevation riparian habitat types.

**Alternative 2 (Proposed Action):** Implementation of Alternative 2 would improve range conditions by constructing a pasture fence, an earthen water tank, and a rotational grazing system to improve distribution of livestock throughout the allotment. The construction of fences would remove a few incidental trees, but there would be more than enough remaining to serve as habitat for the blue grouse, boreal owl, Williamson's sapsucker, olive-sided flycatcher, Grace's warbler, McGillivray's warbler, flammulated owl, dusky flycatcher, Wilson's phalarope, bobolink, and the Hammond's flycatcher. Important habitat features such as downed logs and large snags would remain. Cows would remove grass where they graze, resulting in a very minimal decrease of habitat

from when cows leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cows would be removed on mid-October or when utilization standards were met.

The current spruce-fir, mixed conifer, montane shrub, ponderosa pine, wet meadow and high elevation riparian habitats would not be reduced. Since there will be very little activity in the previously described habitat type this would follow the recommended conservation strategies such as improving or maintaining good habitat for migratory birds within the spruce-fir, mixed conifer, montane shrub, ponderosa pin, wet meadow and high elevation riparian habitats.

**Important Bird Areas:** There is no designated Important Bird Area (IBA) affected by the project. The IBA on the Santa Fe National Forest are the Chama River Gorge and the Caja del Rio including the Santa Fe River Canyon below the Caja del Rio on both BLM and FS lands. There is no association or important link between the bird communities within the two allotments and these IBAs. Therefore, no IBA is affected by the project.

**Overwintering Areas:** Many important over wintering areas are large wetlands. Important overwintering areas recognized on the Forest include: the Pecos River, the Rio Chama and Rio Grande corridor. Since these areas are not within the allotment, there will be no effects to overwintering areas.

## MANAGEMENT INDICATOR SPECIES (MIS)

### AFFECTED ENVIRONMENT

The Land and Resource Management Plan for the Santa Fe National Forest, adopted in 1987, identified 8 Management Indicator Species (MIS). These species are Bighorn sheep, Rocky mountain elk, Mexican spotted owl, Merriam's turkey, Rio Grande cutthroat trout, Hairy woodpecker, Piñon Jay and the Mourning Dove.

The reason these species were selected as MIS species is described in the Environmental Impact Statement, Santa Fe National Forest Plan, 1987. The objective was to select species that would indicate possible wildlife effects of changing plant communities and associated seral habitats. These species were selected for their association with plant communities or seral stages which management activities are expected to affect. Other factors considered in the selection of these species were monitoring feasibility, migratory habits and habitat versatility. (LMP EIS page 96).

This document considered the Management Indicator Species (MIS) list (Final Environmental Impact Statement, Santa Fe National Forest, 1987, 146-148). Management Indicator Species designated in the Santa Fe National Forest Plan EIS, that have the probability of occurring on the Rio de la Casa allotment are; Rocky Mountain elk, Rocky mountain bighorn sheep, Merriam's turkey, and the Hairy woodpecker. The Mexican spotted owl has been discussed previously in this document.

The Mexican spotted owl, piñon jay, and the mourning dove were eliminated from evaluation in this document based upon lack of potential habitat within the analysis area. The Rio Grande cutthroat trout is discussed in the fisheries portion of the EA. Information pertinent to the management indicator species that have the probability of occurring within the allotment is described as follows:

**Merriam's Turkey:** Merrriam's turkeys are an indicator of ponderosa pine, which is an essential component of its permanent habitat, while surface water is a range requirement. A good healthy ponderosa pine understory provides the turkey cover, as well as, forage. Turkeys forage in grasslands, brush communities, deciduous trees and in ponderosa pine. Turkey habitat is common throughout the forest, encompassing about 1.3 million acres (USDA 2006). Approximately 3,702 acres of habitat as previously described are available for the turkey on the allotment. Reconnaissance surveys of the allotment indicate that suitable habitat is present for the turkey within

various habitat types. Surveys conducted by the USGS between 1968 and 1998 indicate an increasing population of wild turkeys within New Mexico (USGS 2004). Turkey habitat is abundant in the mid-elevation portions of the Santa Fe National Forest.

**Rocky Mountain Elk:** Elk inhabit most forest types with good forage and cover. These ungulates utilize a variety of habitat types, during the course of their life. They appear to be extremely adaptable to both secondary successional and specific successional vegetation types. Elk habitat is common throughout the forest, encompassing about 1.6 million acres (USDA 2006). Approximately 16,364 acres of habitat as previously described are available for the Rocky mountain elk on the allotment. Reconnaissance surveys of the allotment indicate that habitat suitable for elk is present (project record). In general, there is more than enough habitat to support the current population of elk on the forest, and the trend for habitat is considered stable. The population trend for the Rocky Mountain elk is ranked as increasing on the forest (USDA 2006).

**Hairy Woodpecker:** The hairy woodpecker is an indicator species for the presence of snags and down logs. The species is a forest generalist, keying in on available snags and live aspens. Across the forest, habitat is abundant, encompassing about 976,000 acres (USDA 2006). Approximately 12,648 acres of habitat as previously described are available for the hairy woodpecker on the allotment. Reconnaissance surveys of the allotment indicate that suitable habitat is present for the hairy woodpecker (field notes, PR #). The population of hairy woodpeckers on the Santa Fe National Forest is considered stable to increasing based on trends seen within the State of New Mexico, observations during breeding bird surveys in or adjacent to the Forest, and habitat conditions within the Forest (SFNF June 2006, [USGS 2004](#)).

**Rocky Mountain Bighorn Sheep:** Bighorn sheep serve as a management indicator for alpine meadow habitat. On the Santa Fe NF, Rocky Mountain bighorn sheep inhabit the highest alpine areas of the Sangre de Cristo Mountains within the Pecos Wilderness. This includes the cliffs, crags or other extremely rocky areas around the mountain peaks and open alpine meadow areas down to the edge areas of the spruce / fir type. The total range within the Pecos Wilderness encompasses approximately 17,500 acres, but they are generally found in the alpine areas between Pecos Baldy and Jicarita Peak. Approximately 2,500 acres of habitat as previously described are available for the Rocky mountain bighorn sheep on the allotment. Reconnaissance surveys of the allotment indicate that habitat suitable for sheep is present (Nelson, 2007 field visit).

The Santa Fe Forest Plan estimated habitat capability for bighorn sheep habitat based on the health of alpine and meadow areas and effects of encroaching canopy closure. Habitat conditions in the Pecos Wilderness Area are generally fair to good, but the limiting factor is severe winter conditions where quality and quantity of forage can fluctuate significantly. Cattle grazing can and does occur, but typically cattle use is minimal in the alpine areas and non-existent on the steeper terrain.

The habitat trend for bighorn sheep on the Santa Fe Forest is considered stable based on the small amount of change that has occurred in the alpine habitat since implementation of the Forest Plan. The bighorn sheep population is ranked as uncommon for the Santa Fe NF. This population is intensively managed by the NMDGF and continues to grow. With this on-going effort, the bighorn sheep population on the Santa Fe NF is considered stable.

## DIRECT, INDIRECT, AND CUMMULATIVE EFFECTS ON MIS SPECIES

### Alternative 1 – No Grazing

**Rocky Mountain Elk:** Under Alternative 1 the risk that livestock would deplete forage enough to reduce the elk population and habitat would be eliminated. There would be no change in the amount of cover since no trees would be removed. The amount of forage would likely increase over time, maintaining the current forest wide trends for elk populations or habitat.

**Merriam's Turkey:** Under Alternative 1, the risk that livestock would deplete forage enough to reduce the turkey population and habitat would be eliminated. There would be no change in the number of nesting and roosting trees. The amount of forage would likely increase, maintaining the current forest wide trends for increasing turkey populations or habitat.

**Hairy Woodpecker:** Under Alternative 1, there would be no change to woodpecker populations and habitat because this species relies primarily on dead and down logs, snags, and trees greater than 11 inches in diameter. Neither the quantity nor quality of these features would change by removing livestock. Thus, this alternative would maintain forest trends for the woodpecker and its habitat.

**Rocky Mountain Bighorn Sheep:** Under Alternative 1, there would be no change to bighorn sheep populations and habitat because this species relies primarily on; open areas with unobstructed visibility, near escape cover, relatively high amount of grass and rock cover, and where forage quality is high, all at high elevations on the allotment. Neither the quantity nor quality of these features would change by removing livestock. Thus, this alternative would maintain forest trends for the bighorn sheep and its habitat.

### **Proposed Action- Alternative 2**

**Merriam's Turkey:** Alternative 2 would improve the quality of turkey habitat on this allotment by constructing a pasture fence, an earthen water tank, and implementing a rotational grazing system to improve distribution of livestock throughout the allotment. This would improve ground cover and turkey foraging areas by forcing cattle to graze more evenly across the allotment and reducing grazing pressure. Though the construction of fences would remove a few incidental trees, there would be more than enough remaining trees to serve as nesting and roosting habitat, which are important components for the turkey. Because cattle would not be allowed to use more than 40% of the forage, grazing would be light to moderate and would not greatly reduce the amount foraging habitat. Cattle would remove grass where they graze, resulting in a very minimal decrease of habitat from when cattle leave the allotment until the following spring when the grass grows back. There would not be a complete lack of cover, because grasses and forbs continue to grow during the growing season and because cattle would be removed when utilization standards were met. Because this alternative would not change habitat or populations on the allotment, it would not change forestwide trends. Alternative 2 would disturb or displace turkeys during the construction of fences and the earthen tank, but this would only last the duration of the construction activities, no more than 1 month, and would be in the immediate vicinity of construction only.

**Rocky Mountain Elk:** Alternative 2 would improve the quality of elk foraging habitat on this allotment by constructing pasture fence, an earthen water tank, and implementing a rotational grazing system to improve distribution of livestock throughout the allotment. This would improve ground cover by forcing cattle to graze more evenly across the allotment and reducing grazing pressure. Because cattle would be not be allowed to use more than 40% of the forage, grazing would be conservative and would not greatly reduce the amount foraging habitat. Alternative 2 would not change the quality or quantity of elk cover habitat. Though the construction of a fence and the earthen water tank would remove a few incidental trees, there would be more than enough remaining trees to serve as thermal and hiding cover and calving and resting areas. Because this alternative would not change habitat or populations on the allotment, it would not change forestwide trends. Elk would avoid areas where and when construction of fences and water developments were taking place. Alternative 2 may disturb elk during the construction of fences and water developments, but this would only last the duration of the construction activities, no more than 1 month, and would be in the immediate vicinity of construction only.

**Hairy Woodpecker:** Alternative 2 would not change the quantity or quality of woodpecker habitat on this allotment because no dead or down logs, trees greater than 11 inches in diameter, or snags, would be removed or added. Though the construction of a fence and earthen water tank would remove a few incidental trees or snags, there would be more than enough remaining to serve as nesting, roosting, and foraging habitat. Thus, this alternative would not change the current forest trends for woodpecker populations or habitat. Alternative 2 would disturb or displace woodpeckers during the construction of fences and the water tank, but this would only last the

duration of the construction activities, no more than 1 month, and would be in the immediate vicinity of construction only.

**Rocky Mountain Bighorn Sheep:** Alternative 2 would improve the quality of bighorn sheep foraging habitat on this allotment by constructing a pasture fence, an earthen water tank, and implementing a rotational grazing system to improve distribution of livestock throughout the allotment. This would improve ground cover by forcing cattle to graze more evenly across the allotment and reducing grazing pressure. Because cattle would be not be allowed to use more than 40% of the forage, grazing would be conservative and would not greatly reduce the amount foraging habitat. Alternative 2 would not change the quality or quantity of bighorn sheep cover habitat. Though the construction of a fence and the earthen water tank would remove a few incidental trees, there would be more than enough remaining trees to serve as thermal and hiding cover and calving and resting areas. Because this alternative would not change habitat or populations on the allotment, it would not change forestwide trends. Bighorn sheep would avoid areas where and when construction of fences and water developments were taking place. Alternative 2 may disturb sheep during the construction of fences and water developments, but this would only last the duration of the construction activities, no more than 1 month, and would be in the immediate vicinity of construction only.

### CUMULATIVE EFFECTS ON MANAGEMENT INDICATOR SPECIES

**Alternative 2:** The proposed action would remove light to moderate amounts of vegetation while horses are grazing in these areas, and for a month or two afterwards until the vegetation has time to grow back. The cumulative effects would apply to the following species’ habitats because they have are known to occur in the Rio de la Casa allotment: northern goshawk, Rocky Mountain Elk, Hairy woodpecker and Merriam’s turkey.

The temporal boundary of this analysis is from 10 years ago to the projects listed on the Santa Fe National Forest’s Schedule of Proposed Actions or other projects in official planning status. The reason for the temporal boundary is that activities that occur in the allotment will remove moderate to conservative amounts of vegetation. This vegetation will recover on an annual basis, so cumulative effects are relatively short-lived, and going back 10 years would capture changes. The geographical area is listed below for each species.

**Table 9 Cumulative effects on MIS**

Management indicator Species known to occur on allotment-CE boundary/Size of area	Activities having potential to affect species	Direct/Indirect Effect of Action
Rocky Mountain Elk Middle and Upper Pecos Canyon, Lower Pecos Wilderness. Approximate 60 mile radius.	Stand replacing fire. One time occurrence.	Removal of thermal/hiding cover, calving areas, foraging areas. Area would not provide suitable habitat for the elk in the short term. Foraging habitat would recover the year after a fire.
	Dispersed camping and hunter camps with stock and hunting. Annual activity occurring for up to 8 months.	Denuded vegetation, minimizing forage for elk to consume. A reduction in foraging habitat would minimize food availability for elk. Disturbance to elk by campers occupying elk habitat. Elk would be forced to occupy other areas of suitable habitat. Direct harvest of elk by hunters. Elk numbers slightly reduced till following year when elk calves are born.
	Drought. One time occurrence or series of months to years of occurrence.	Lack of tall grasses which provides food for elk. Reduces food source for elk.
	Grazing by horses. Annual activity occurring for up to 5 months.	Minimal reduction in forage due to horses grazing on allotment. Minimally reduces foraging habitat and food source for elk.

Management indicator Species known to occur on allotment-CE boundary/Size of area	Activities having potential to affect species	Direct/Indirect Effect of Action
Merriam’s Turkey Middle and Upper Pecos Canyon. Approximate 30 mile radius.	Stand replacing fire. One time occurrence.	Removal of roosting/nesting trees, foraging areas. Area would not provide suitable habitat for the turkey in the short term. Foraging habitat would recover the year after a fire.
	Dispersed camping and hunter camps with stock and hunting. Annual activity occurring for up to 8 months.	Denuded vegetation, minimizing cover for insects that turkeys consume. A reduction in foraging habitat would minimize food availability for turkeys. Disturbance to turkeys by campers occupying turkey habitat. Turkeys would be forced to occupy other areas of suitable habitat. Direct harvest of turkey by hunters. Turkey numbers slightly reduced till following year when turkey poults are born.
	Drought. One time occurrence or series of months to years of occurrence.	Lack of tall grasses which provides habitat for insects. Reduces food source for turkeys.
	Grazing by horses. Annual activity occurring for up to 5 months.	Minimal reduction in forage due to horses grazing on allotment. Minimally reduces foraging habitat and food source for turkeys.
Hairy Woodpecker 25 acres-includes foraging areas, non-migratory birds	Stand replacing fire. One time occurrence.	Removal of roosting/nesting trees, foraging areas. Area would not provide suitable habitat for the turkey in the short term. Foraging habitat would recover the year after a fire.
	Drought. One time occurrence or series of months to years of occurrence.	Lack of moisture would cause stress on trees and increase numbers of insects that forage upon trees. Increases food source and nesting/ foraging areas for hairy woodpeckers.

## FISHERIES

### AFFECTED ENVIRONMENT

There are five perennial streams within the Rio de la Casa allotment: Agua Fria Creek, Canoncito Creek, North Fork Rio de la Casa, Middle Fork Rio de la Casa, and South Fork Rio de la Casa. The current habitat condition for the all the live streams within the allotment is in good condition. There appeared to be some fine sediment within the streams, but nothing beyond the natural variability of these streams. Sediment delivery is occurring from road crossings. The riparian areas are largely tight forested canyons with very little access from livestock.

The Rio Grande cutthroat trout is a Regional Forester’s Sensitive Species and a Management Indicator Species for the Santa Fe National Forest. Rio Grande cutthroat trout (RGCT) is one of 14 subspecies of cutthroat trout native to the western United States (Behnke 2002). All the perennial streams within the allotment are within the historic range of the Rio Grande cutthroat trout. However, Rio Grande cutthroat trout are not currently found within the streams running through the allotment. Only non-native fish remain in these streams. Rio Grande cutthroat trout do not occur in the Rio de la Casa allotment or immediately down stream from the allotment. Therefore, no further evaluation or analysis will occur for the Rio Grande cutthroat trout because the species and habitat for the species does not occur in the allotment.

## RECREATION

### AFFECTED ENVIRONMENT

The Rio de la Casa Allotment contains approximately 6,861 acres of the Pecos Wilderness. Congress designated 165,000 acres of the Pecos Wilderness in 1964 under “The Wilderness Act”; the New Mexico Wilderness Act added 55,000 acres to the Pecos Wilderness in 1980. Today the Pecos Wilderness totals 223,333 acres. The Allotments contain approximately one percent of the Wilderness.

#### Wilderness Attributes - Existing Condition

**Natural Integrity:** The Rio de la Casa Allotment receives both moderate to high recreation use. High recreation use is received due to its multiple recreation opportunities and primary access points into the Pecos Wilderness through the Walker Flats Trailhead. Moderate recreation use is received due to its proximity being in the northeast corner of the District and of the Pecos Wilderness, access proves to be difficult for some recreationalist. Designated system trails criss-cross throughout allotments. Pressure from backpacking and horseback riding do exist. Considering, human activity has minimal affect of the natural ecological process in the area.

The Rio de la Casa Allotment experiences recreation activities such as hiking, camping, hunting, horseback riding, and limited cross country skiing. The natural integrity is not affected substantially by recreation use.

**Apparent Naturalness:** Human-caused visible modifications of the environment, such as widened trails, some trash, fire rings, and campsites, are present on both allotments. The moderate to high recreation use in the allotments have minimal human affects to the naturalness of these areas.

**Remoteness and Solitude:** Due to its proximity, this allotment is particularly used for access points into the Pecos Wilderness. Sights and sounds of civilization are minimal. The opportunity to experience solitude does exist within these allotments, specifically in wilderness.

**Opportunities for Primitive Recreation:** Ample opportunity for primitive recreation, such as camping, hunting, hiking/backpacking, horseback riding, and orienteering exist. There are developed recreational facilities in close proximity to the allotments, thus providing recreation opportunities.

**Special features:** Walker Flats Trailhead, Pyramid Peak, Rincon Bonito, South Fork Rio, Middle Fork Rio, North Fork Rio, Middle Fork Lake, Agua Fria Creek, Corrales Canyon and Encinal Canyon are located in the allotments. Features are popular recreation designation points.

**Manageability:** The Pecos Wilderness is comprised of one contiguous land area; no peninsulas or islands exist. The northern portion of the Wilderness is managed by the Carson National Forest. Because of its intactness, and because it is managed by one federal agency, manageability of the Pecos Wilderness is relatively straightforward.

#### Recreation - Existing Condition

The allotments are encompassed within the Pecos/Las Vegas Ranger District. Recreation uses within these allotments are moderate to high use. The allotments receive such recreation use due to private land in-holdings and villages in close proximity. Identified villages are: Pecos, Las Vegas, Sapello, Gallinas, Ledoux, Mora, Cleveland and Holman.

Recreational activities in the project areas include hiking/backpacking, limited cross country skiing dispersed camping, hunting, and horseback riding.

There are numerous Special Use Outfitter and Guide permits approved in the project areas, primarily for hunting and horse riding related activities illustrated in the table below:

**Table 10 Recreational Activities on the allotment**

Action(s)	Date of Action	Area	Comments
Hiking/Backpacking	May thru Nov.	Throughout project areas	Hiking and backpacking use is light, and the primarily focused of recreation use of allotments is passing through to get to the core of the Pecos Wilderness.
Cross-Country Skiing	Oct. thru Feb.	Throughout project areas	There is little cross country skiing activity in these allotments. Since cross-country skiing occurs only when there is sufficient snow cover it is unlikely this activity results in cumulative impacts to soil resources, water resources, or other resources in the allotment. Recreational snow-shoeing may be considered a related activity.
Dispersed Camping	May thru Dec.	Throughout project areas	Dispersed camping does occurs throughout allotments
Hunting	Aug thru April	Throughout project areas	All allotments are hunted for big game in the fall, as well as spring turkey and lion, as per Game and Fish Dept. regulations.
Horseback Riding	May thru Jan	Throughout project areas	All allotments are popular areas for horseback riding.

There have been no recent substantial past actions such as trail construction or campground development within the project areas.

## DIRECT AND INDIRECT EFFECTS ON RECREATION

### Wilderness Attributes – Direct & Indirect Environmental Effects

**Natural Integrity:** As described in the existing condition, the natural integrity of the Wilderness has minimal affect from recreational use. Livestock grazing is not expected to additionally alter the natural integrity of the allotments because the numbers of cattle grazing and the grazing intensity is too small compared to the size of the allotments.

**Apparent Naturalness:** The presence of livestock would not affect the apparent naturalness of the allotments because livestock grazing is a use authorized by the Wilderness Act. Grazing of sheep and cattle in the Pecos Wilderness has occurred for at least 100 years. With the introduction of managed grazing, the apparent naturalness has improved since the beginning of the century.

**Remoteness and Solitude:** The presence of cattle would not affect the remoteness of the allotments because it would not change how Wilderness is managed. The presence of cattle could affect the solitude of people recreating if they encountered cattle. The interaction between cattle and humans is expected to be infrequent because of the low number of cattle, the large acreage available for grazing, and the fact that cattle graze for 2 to 5 months maximum depending on the allowable prescription per allotment.

**Opportunities for Primitive Recreation:** The presence of livestock grazing would not change the opportunities for primitive recreation described in the existing condition because the presence of cattle would not preclude any of the activities listed.

**Special Features:** Cattle would possibly be seen on the above mentioned features but most do not lend themselves to optimal grazing areas by livestock.

**Manageability:** The presence of livestock grazing would not change the size, boundary, shape, or access to the allotments so it would not affect the manageability.

### **Recreation – Direct & Indirect Environmental Effects**

The proposed action to continue livestock grazing under current management would not affect hiking/backpacking, limited cross country skiing dispersed camping, hunting, and horseback riding or recreational special uses because these uses have continued concurrently with the presence of cattle for years. The encounters between livestock and humans have been low in these allotments because of its large size and the small numbers permitted.

In sum, no measurable direct and indirect effects to wilderness attribute or recreation use is expected.

## **CUMULATIVE EFFECTS ON RECREATION**

Since current management is expected to result in very little direct or indirect effects to recreational use of the proposed project area, there are no cumulative effects from the proposed action.

The proposal to continue current grazing management on these allotments is consistent with agency policy concerning extraordinary circumstances. Though Wilderness is present, the degree of effect is expected to be immeasurable in terms of extent, direction, duration, and speed. There is no change in the extent of the effect since livestock grazing would continue as currently managed; no new areas to be grazed are proposed. The direction of the effect on wilderness would remain the same because the current management is not causing measurable effects to the wilderness attributes described above. There would be no duration or speed of change associated with the proposal to continue grazing under current management because little change is expected.

## **CULTURAL RESOURCES**

Twenty cultural resource sites had been located by previous cultural resource surveys within the allotment. One site was located and recorded during reconnaissance of High and/or Moderate Cattle Congregation areas and proposed ground disturbing improvements within the allotment. The newly recorded site is eligible for the National Register. Of the twenty previously recorded sites, fifteen are eligible for the National Register, two are of undetermined eligibility, two have never been evaluated for National Register eligibility, and the remaining one site is not eligible for the National Register. Seven of the previously recorded sites within the allotment had previous documentation of presence and/or impacts from grazing (e.g. presence of dung, trailing, hoof prints, trampling, etc.) and/or are located within High and/or Moderate Cattle Congregation areas. The one newly recorded site also showed evidence of grazing presence. However, grazing does not appear to be adversely affecting those qualities of the sites that may make them eligible for inclusion in the National Register of Historic Places. The sites will be periodically monitored over the next ten years or until the Allotment Management Plan is revised. Disturbance to cultural resource sites related to livestock grazing on the allotment is not significant.

Letters were sent to 26 Native American tribes as part of the NEPA scoping and Section 106 consultation processes on April 8th, 2008. One tribe, the Navajo Nation responded to the scoping/consultation letter on April 16th, 2008. The tribe stated that the proposed re-issuance of the Rio de la Casa Grazing Permits would not impact

any Navajo traditional cultural properties or historical properties. No other tribes responded to the scoping/consultation letter with concerns regarding re-issuance of the grazing permit. No historic properties or properties with traditional importance to Native Americans have been identified within the allotment. If tribal concerns are raised later, the Forest will initiate further consultation.

The Forest Plan requires the survey and protection of cultural resources, the assessment of effects on cultural resources, and consultation with Native American tribes. The latest listing of the National Register of Historic Places was consulted. No sites on the Register and no sites that have been nominated to the Register occur within the allotment. The heritage resources evaluation report meets all requirements of Section 106 of the National Historic Preservation Act of 1966, as amended, 36 CFR 800 Regulations, Executive Order 11593, FSM 2360, FSH 2309.24 guidelines and Appendix H (Standard Consultation Protocol for Rangeland Management) of the Region 3 First Amended Programmatic Agreement Regarding Cultural Property Protection and Responsibilities. The State Historic Preservation Officer (SHPO) concurred with a No Adverse Effect determination on September 23, 2008 for re-issuance of the Rio de la Casa Allotment grazing permits. The full text and rationale of the heritage resources evaluation report is on file with the project record at the Santa Fe National Forest Supervisor's Office in Santa Fe.

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## **ENVIRONMENTAL JUSTICE AND SOCIAL ECONOMICS**

### **Environmental Justice**

Presidential Executive Order 12898 requires Federal agencies to respond to the issue of environmental justice by “identifying and addressing disproportionately high and adverse human activities on minority and low income populations.” The effects of the propose management activities are to encompass both human health and environmental effects, and are to include the cumulative and indirect effects on a community.

The Rio de la Casa allotment is located in Mora County, New Mexico, of which, 8% percent is Forest Service ownership. In 2006, the population of San Miguel County was estimated at 29,325 and consisted of approximately, 78.9% Hispanic, 19.8% White (Non-Hispanic), and 1.4% Native American. Approximately 81% of the population is minority (U.S. Census Bureau Quick Facts). The median household income in 2004 was \$25,743 with 19.6% of the population in Mora County is below the poverty level (U.S. Census Bureau Quick Facts).

Implementation of either of the alternatives evaluated in this EA would not result in adverse impacts to environmental resources and socioeconomic conditions. Therefore, disproportionate direct, indirect, or cumulative adverse impacts on low income or minority populations would not occur.

### **Economics**

The Rio de la Casa allotment is located entirely within Mora County, New Mexico. Mora County contains approximately 410 farms (down 8% since 1997) which total approximately 954,572 acres with average farm size of 2,328 acres. Livestock sales in Mora County accounted for \$13,664,000 of the total market value of agricultural production and ranked 20<sup>th</sup> in the state in cattle and calf production (National Agricultural Statistics Service 2002). Ranching operations in the area tend to be characterized by small profit margins with the need for off-ranch supplemental income to continue operations. Farming and ranching are traditional uses in the county. In 2000, farming and forestry occupations accounted for 6.5% of total employment in Mora County (U.S. Census Bureau 2002).

The economic effects of the proposal were not identified as a key issue for the analysis. Nevertheless, the economic considerations of the alternatives can be compared in terms of the costs of implementation, the costs and revenues to the permittee's and the return to the Federal government through grazing permit receipts. Costs and benefits are incurred by both the Federal government and the permittee's, and not all participants recover their

costs. Specific operating costs and revenue estimates are not available for the allotments, and weather, market conditions, business, and management decisions will affect net revenue on an annual basis.

The analysis does not include certain costs or benefits incurred by the alternatives, such as costs and benefits relating to recreation opportunities, environmental quality, etc. Data to analyze these costs and benefits are not available at the allotment level; analysis at the District or Forest level is beyond the scope of the decision.

Decisions relative to livestock grazing on individual allotments primarily affect: 1) the permittee's, who pay grazing fees and receive economic returns on their investments in livestock grazing and who contribute funds for the construction of range improvements; and 2) the Forest Service, which collects grazing fees and expends grazing receipts and appropriated tax dollars to construct improvements and to administer the allotments. Local communities may also benefit indirectly from the sale of goods and services associated with ranch operations.

**Costs:** Costs associated with the project include the costs of proposed improvements and ongoing administrative costs associated with permit administration. Alternative 1 would have the lowest cost as no new improvements would be authorized and only limited maintenance would occur. There would still be a costs associated with management of the allotments. Maintenance or removal of existing structural improvements may become necessary and costs would be borne by the Forest Service. Allotment boundary fence maintenance would be shifted from the permittee's to the Forest Service. In addition, at least on monitoring trip would be conducted to verify that unauthorized livestock from adjacent allotment are not present Under Alternative 2, there would be costs associated with the construction of new improvements. Improvements have been identified as possible practices as part of an adaptive management strategy. Based on the results of monitoring, some improvements may be determined to be unnecessary. Therefore specific costs are difficult to predict. Typically, improvements are constructed on a cost-share basis between the Forest Service and the permittee. The projected cost for permit administration, range inspections, and construction of new range facilities over the next ten years is estimated at \$20,680.

**Revenues:** Net ranch income represents gross returns minus operating costs. Specific operating costs and revenue estimates are not available for each ranch, and weather, market conditions, and management decisions will affect net revenue on an annual basis. Thus the use of permitted numbers may overestimate net income on the Forest allotments. Nevertheless, termination of the grazing authorizations under Alternative 1 is likely to have significant economic effects on the individual permittee's. Although they would no longer pay grazing fees or expend money to maintain the allotments or construct improvements, the permittee's would not have access to forage on federal lands with which to generate income from livestock production.

Under Alternative 1, the Forest Service would not receive annual grazing fee payments. The Forest Service would continue to collect grazing fee payments under Alternative 2, but would vary based on annual stocking levels. If full permitted livestock are authorized annually under the current grazing fee, approximately \$3,950 would be collected over the next ten years.

Money generated within a community by permittee's purchasing goods and services continues to circulate and accounts for indirect contributions to the local economy. Under Alternative 1, these economic contributions are likely to be reduced. These expenditures would continue at current levels under Alternative 2.

**Economic Viability:** The economic viability of individual ranches or the ranching community at large is subject to a variety of influences. Market fluctuations, weather, rancher management decisions, ranch expenses, and the availability of other sources of income could all affect the economic viability of individual ranches. These factors are beyond the control of the Forest Service and beyond the scope of the decision being contemplated. On ranches where the Forest Service lease comprises a significant proportion of the forage base, Alternative 1 could affect the economic viability of the ranch. Under Alternative 2, no significant changes in permitted use are proposed and actual use is expected to remain similar to recent past use; therefore the proposed action is unlikely to affect the

economic viability of individual ranches. The moderate stocking and utilization rates proposed are consistent with existing research that indicates that such practices can optimize financial return over the long term.

## CHAPTER 4 – CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, Federal, state and local agencies and non-Forest Service persons during development of this environmental assessment.

### LIST OF IDT MEMBERS

Name	Title	Responsibility and Expertise
Alicia Gallegos	Rangeland Management Specialist	Range Management
Anne Baldwin	Archeologist	Cultural Resources
Brent Abel	Archeologist	Cultural Resources
Brian Davidson	Range Program Manager	IDT Leader
Carlos Lovato	Watershed Technician	Range Management
Carol Van Dorn	Hydrologist	Soil and Watershed
Chantel Cook	Fisheries Biologist	Fisheries
Donald Serrano	Rangeland Management Specialist	Range Management
Esther Nelson	Wildlife Biologist	Wildlife
James Munoz	Recreation Specialist	Recreation
Mary Orr	Wildlife Biologist	Wildlife
Michael Lujan	Rangeland Management Specialist	Range Management
William Eaton	Rangeland Management Specialist	Range Management, GIS
James Simino	Fisheries Biologist	Fisheries

### LIST OF OTHER AGENCIES CONSULTED

Name of Agency
New Mexico Game and Fish Department
New Mexico State Historical Preservation Office

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## APPENDIX A – REFERENCES CITED

- Behnke, R.J. 2002. Trout and Salmon of North America. Illustrated by Joseph R. Tomelleri; foreword by Thomas McGuane. 1st Edition. Free Press. New York City, New York. 360 pp.
- Corkran, C. and C.R. Thomas, 1996. Amphibians of Oregon, Washington, and British Columbia. Lone Pine Publishing, Renton, WA.
- Degenhardt, William, C. Painter, A. Price. 1996. Amphibians and Reptiles of New
- Elmore, Wayne., Kauffman, Boone. 1994. Riparian and Watershed Systems; Degradation and Restoration. Ecological Implications of Livestock Herbivory in the West. Society of Range Management.
- Fitzgerald, J. P., C. A. Meaney, and D. M. Armstrong. 1994. Mammals of Colorado. Denver Museum of Natural History and University Press of Colorado, 467 pp.
- Holechek, Jerry L. and Dee Galt. 2000. Grazing Intensity Guidelines *in* Rangelands 22 (3). June 2000. pp 11-14.
- Holechek, Jerry L., Rex D. Piper, and Carlton H. Herbal. 1989. Range Management Principles and Practices. Prentice-Hall, Inc. Englewood Cliffs, NJ.
- Hubbard, J.P., Conway, M.C., Campbell, H., Schmitt, G., and Hatch, M.D. 1979. Handbook of Species Endangered in New Mexico. New Mexico Department of Game and Fish.
- Kershaw, Linda, A. MacKinnin, and J. Pojar. Plants of the Rocky Mountains. 1998. Lone Pine Publishing, Edmonton, AB, Canada
- Lujan, Michael. 2007 Natural Resources Staff. Pecos-Las Vegas District, Santa Fe National Forest.
- Marshall, W.H. 1936. A study of the winter activities of the mink. J. Mamm., 17- 382-392.
- McNab, W.H.; Cleland, D.T.; Freeouf, J.A.; Keys, Jr., J.E.; Nowacki, G.J.; Carpenter, C.A., comps. 2007. Descriptions of ecological subregions; senction of the conterminous United States [CD-ROM]. Gen. Tech. Report WO-76B. Washington, DC: U.S. Department of Agriculture, Forest Service, 80p.
- Mexico. University of New Mexico Press, Albuquerque, New Mexico.
- Milchunas, Daniel G. 2006. Response of Plant Communities to Grazing in the Southwestern United States. USDA Forest Service. RMRS-GTR-169.
- NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available: <http://www.natureserve.org/explorer>. Accessed: June 2007.
- Nelson, E. Unpublished field notes (project record). 2007.
- New Mexico Department of Game and Fish. 2007. BISON-M (Biota InformationSystem of New Mexico): Biological database for New Mexico. <http://www.bison-m.org> Accessed May 04, 2007
- New Mexico Environment Department, Surface Water Quality Bureau. 2004. 2004 State of New Mexico Integrated Clean Water Act §303(d)/§305(b) Report.
- New Mexico Environment Department, Surface Water Quality Bureau. 2005. State of New Mexico Standards for Interstate and Intrastate Surface Waters 20.6.4 NMAC (as amended through July 17, 2005).

- New Mexico Rare Plant Technical Council. 1999. New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page. <http://nmrareplants.unm.edu> (Latest update: 19 April 2007).
- New Mexico Natural Heritage. Botany website, <http://nhnm.unm.edu/botany/index.html>
- New Mexico Natural Heritage. Organism and Ecosystem website, <http://nhnm.unm.edu/botany/index.html>
- Raish, Carol. 2004. Assessment of grassland ecosystem conditions in the Southwestern United States. Volume 1. Gen. Tech. Rep. RMRS-GTR-135-vol. 1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 86-119
- Raish, Carol; McSweeney, Alice M. 2003. Economic, Social, and Cultural Aspects of Livestock Ranching on the Española and Canjilon Ranger Districts of the Santa Fe and Carson National Forests: A Pilot Study. Gen. Tech. Rep. RMRS-GTR-113. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 89 p.
- Reynolds, R.T., Graham, R. T., Reiser, M. H. and others. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-217. Ft. Collins, CO: U. S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 90 p.
- Stahlecker, Dale, and J. J. Rawinski. 1990. First Records for the Boreal Owl in New Mexico. *The Condor*. 95:517-519.
- United States Geological Survey. 2004. Patuxent Bird Population Studies. <http://www.mbr-pwrc.usgs.gov/>.
- USDA Forest Service. 1987. Environmental Impact Statement, Santa Fe National Forest Plan. Santa Fe National Forest: Santa Fe, NM.
- USDA Forest Service. 1992. Management Recommendations for the Northern Goshawk in the Southwestern United States. GTR RM-217.
- USDA Forest Service. 2003. Santa Fe National Forest, Management Indicator Species Assessment, with Dec. 2004 update for the Rio Grande cutthroat trout. Santa Fe National Forest: Santa Fe, NM.
- USDA Forest Service. 2004. Draft Supplement to the Final Environmental Impact Statement for Amendement of Forest Plans. USDA Forest Service, Southwestern Region, Arizona and New Mexico. Southwestern Regional Office, Albuquerque, New Mexico. Pp15-28.
- USDA Forest Service. 2005. Framework for Streamlining Informal Consultation for Livestock Grazing Activities. USDA Forest Service Southwestern Region. March 15, 2005. U.S. Region 3 Office, Albuquerque, NM.
- USDA Forest Service. 2006. Management Indicator Species Assessment, Santa Fe National Forest. June 2006. Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.
- USDA Natural Resource Conservation Service. Plants Database. July 2007. <http://plants.usda.gov/>.
- USDI, Fish and Wildlife Service. 1993. Rule to list the Mexican spotted owl as a threatened species. Federal Register, Volume 58, Number 49. March 16, 1993. Rules and Regulations: 50 CFR Part 17. RIN 1018-AB 56. Washington DC: US Department of Interior, Fish and Wildlife Service: 14248-14271.
- USDI, Fish and Wildlife Service. 1995. Recovery Plan for the Mexican Spotted Owl (*Strix occidentalis lucida*): Volumes I and II. Albuquerque, NM: US Department of Interior, Fish and Wildlife Service. Volume I, 172 p. and Volume II 145 p.
- Valentine, John F. 2001. Grazing Management, 2<sup>nd</sup> Edition. Academic Press, San Diego, California.

## APPENDIX B – TEU POTENTIAL AND DESIRED CONDITIONS

Rio de La Casa Allotment TEU -6				
Designated Area - TES Unit 6- Valley plains, 2% slope				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	Grasses	Forbs	Shrubs	Bare soil 5
	5 species	15 species	7species	Rock 25
	4% c. cover	14.% c. cover	41% c. cover	Litter 45
	Agrop 1%	Hela 5%	Sabe 25%	Vegetation 40
	Calam 1%	Hesp 3%	Sasc 10%	
	Elymu 1%		Samo 5%	
<b>Desired Condition</b>	Grasses	Forbs	Shrubs	Bare soil0-25
	0-7 species	2-20 species	0-10 species	Rock 15-35
	4 - 15% c.cover	0 - 20% c. cover	15-45% c. cover	Litter 20-55
	various species	Hela 2-10%	Sabe 10-30%	Vegetation 25-65
		Hesp 1-10%	Sasc 2-15%	
<b>Existing Condition</b>	Grasses	Forbs	Shrubs	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>	N/A			
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>	Continued monitoring of the frequency and ground cover plots at the long term sites will determine trend.			

Rio de La Casa Allotment TEU - 212					
Designated Area - TES Unit 212- Kentucky bluegrass grassland located on the elevated plains on the Rio de la Casa Allotment with an 8% slope.					
	Vegetation			Soils (Ground Cover %)	
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	0
	6 species	20 species	13 species	Rock	25
	2% c. cover	15.2% c. cover	18% c. cover	Litter	90
	Carex 1.5%	Erex 5%	Quga 8%	Vegetation	10
	Brci 0.5%	Arfr 2%	Bere 3%		
		Frov 2%			
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	0-10
	5-6 species	2-20 species	0-13 species	Rock	1-30
	2 or greater c. cover	15-25% c.cover	0-18% c. cover	Litter	15 - 90
	Carex 1-4%	various species		Vegetation	5 - 60
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	6
	5 species	2 species		Rock	1
	71.1% c. cover	25% c.cover		Litter	15
	Popr 37%	Acla 7.4%		Vegetation	55 - 73
	Care 3.85%	Pote 17%			
<b>Rangeland Management Status</b>	Low similarity				
<b>Rangeland Capacity Rating</b>	Full Capability				
<b>Soil Condition Rating</b>	N/A				
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.				
<b>Monitoring</b>	Continued monitoring of the frequency and ground cover plots at the long term sites will determine trend.				

Rio de La Casa Allotment TEU - 213					
Designated Area - TES Unit 213- Hills, mountains, 26% slope					
	Vegetation			Soils (Ground Cover %)	
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	0
	6 species	20 species	13 species	Rock	25
	2% c. cover	15.2% c. cover	18% c. cover	Litter	90
	Carex 1.5%	Erex 5%	Quga 8%	Vegetation	10
	Brci 0.5%	Arfr 2%	Bere 3%		
		Frov 2%			
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0-10	
	5-10 species	5-20 species	3-13 species	Rock	15-30
	2-15% c. cover	10-20% c.cover	7-18% c. cover	Litter	50-90
			various species	Vegetation	5-30
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	
				Rock	
				Litter	
				Vegetation	
<b>Rangeland Management Status</b>					
<b>Rangeland Capacity Rating</b>	Full Capability				
<b>Soil Condition Rating</b>	N/A				
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.				
<b>Monitoring</b>					

Rio de la Casa Allotment TEU - 221					
Designated Area - TES Unit 221- Hills, mountains, 55% slope					
	Vegetation			Soils (Ground Cover %)	
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	10
	8 species	14 species	6 species	Rock	40
	7% c. cover	3% c. cover	70% c. cover	Litter	80
	Pofe 4%	Acmil 3%	Quga 55%	Vegetation	15
	Mumo 1%				
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soi	10-10
	5-10 species	5-14 species	5-6species	Rock	25-40
	2-15% c. cover	10-20% c.cover	7-18% c. cover	Litter	70-90
				Vegetation	5-20
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	
				Rock	
				Litter	
				Vegetation	
<b>Rangeland Management Status</b>					
<b>Rangeland Capacity Rating</b>	Full Capability				
<b>Soil Condition Rating</b>	N/A				
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.				
<b>Monitoring</b>					

Rio de La Casa Allotment TEU - 224				
Designated Area - TES Unit 224- Hills, mountains, 26%				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 10
	4 species	20 species	7 species	Rock 5
	0.3% c. cover	4.2% c. cover	13 % c. cover	Litter 85
	Brci 0.1%	Erex 2%	Vamy 10%	Vegetation 5
	Cabe 0.1%		Juco 1%	
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 5-15
	3-4 species	16-20 species	5-7 species	Rock 20-45
	0-5% c. cover	0-5% c.cover	10-13% c. cover	Litter 80-90
			various species	Vegetation 5-10
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>				
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>	Continued monitoring of the frequency and ground cover plots at the long term sites will determine trend.			

Rio de la Casa Allotment TEU - 228				
Designated Area - TES Unit 228- Hills, Mountains, 60% slope				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 10
	6 species	20 species	13 species	Rock 35
	1.5% c. cover	14.7% c. cover	18% c. cover	Litte 85
	Carex 1.5%	Arfr 2%	Quga 8%	Vegetation 5
		Orpa 2%	Bere 3%	
		Vica 2%	Pamy 2%	
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0-10
	5-6 species	16-20 species	10-13 species	Rock 20-40
	0-5% c. cover	10-15% c. cover	15-18% c. cover	Litter 75-90
	Carex 1-5%	various species	various species	Vegetation 5-10
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>	N/A			
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>				

Rio de La Casa Allotment TEU - 234				
Designated Area - TES Unit 234- Valley plains, 2%				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare 0
	9 species	13 species	3species	Rock 5
	34% c. cover	36% c. cover	51% c. cover	Litter 60
	Caaq 15%	Cale 20%	Sapl 40%	Vegetation 40
	Judr 7%	Setr 5%	Sasu 10%	
		Veca 5%	Pofe 1%	
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil0-5
	8-10 species	10-13 species	0-5 species	Rock 5-10
	25-45% c. cover	30-40% c.cover	45-55% c. cover	Litter55-65
	Caaq 15%	Cale 18-25%	various species	Vegetation35-45
	Judr 7%	Setr 3-10%		
		Veca 3-10%		
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>	N/A			
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>	Continued monitoring of the frequency and ground cover plots at the long term sites will determine trend.			

Grass Mountain Allotment TEU - 236				
Designated Area - TES Unit 236- Hills, Mountains, 26% slope				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0
	5 species	20 species	14 species	Rock 25
	<0.5% c. cover	10.6% c. cover	17% c. cover	Litter 85
	Carex 0.2%	Erex 4%	Vamy 12%	Vegetation 10
	Brci 0.2%	Pera 2%	Juco 2%	
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soi 0-10
	3-8 species	16-20 species	10-14 species	Rock 20-40
	5% c. cover	5-15% c. cover	15-20% c. cover	Litter 75-90
	Carex 0.2%	various species	various species	Vegetation 5-15
	Brci 0.2%			
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>	N/A			
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>				

Rio de La Casa Allotment TEU - 237				
Designated Area - TES Unit 237- Mountains, hills, 50% slope				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0
	5 species	20 species	14 species	Rock 35
	0.5% c. cover	11.5% c. cover	16 % c. cover	Litter 85
	Brci 0.2%	Erex 4%	Vamy 12%	Vegetation 5
	Carex 0.2%	Orpa 1.5%	Juco 6%	
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0-5
	5-10 species	18-20 species	12-14 species	Rock 20-45
	0.1-5% c. cover	12-15% c.cover	12-16% c. cover	Litter 80-90
	Brci 0.2%	Erex 4%	Vamy 12%	Vegetation 5-10
	Carex 0.2%	Orpa 1.5%	Juco 6%	
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>	N/A			
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>	Continued monitoring of the frequency and ground cover plots at the long term sites will determine trend.			

Grass Mountain Allotment TEU - 252				
Designated Area - TES Unit 252- Hills, Mountains, 45% slope				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0
	12 species	8 species	1 species	Rock 20
	75% c. cover	6% c. cover	<0.1% c. cover	Litter 45
	Feov 25%	Poan 3%	Pofr <0.1%	Vegetation 50
	Feth 25%	Laar 1%		
	Dain 15%			
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0-5
	10-15 species	7-8 species	1 species	Rock 15-20
	70-85% c. cover	0-10% c. cover	0-3% c. cover	Litter 40-50
	Feov 25%	various species	various species	Vegetation 45-55
	Feth 25%			
	Dain 15%			
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>	N/A			
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>				

Rio de La Casa Allotment TEU - 261				
Designated Area - TES Unit 261- Mountains, 26% slope				
	Vegetation			Soils (Ground Cover %)
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0
	1 species	10 species	4species	Rock 25
	<0.1% c. cover	8.4% c. cover	10% c. cover	Litter 90
	Trmo <0.1%	Pode 5%	Vamy 10%	Vegetation 5
		Erex 2%		
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil 0-5
	1-5 species	8-10 species	3-4 species	Rock 20-30
	>0.1% c. cover	5-10% c.cover	5-10% c. cover	Litter 85-95
	Trmo <0.1%	Pode 5%	Vamy 10%	Vegetation 5-10
		Erex 2%		
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil
				Rock
				Litter
				Vegetation
<b>Rangeland Management Status</b>				
<b>Rangeland Capacity Rating</b>	Full Capability			
<b>Soil Condition Rating</b>	N/A			
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.			
<b>Monitoring</b>	Continued monitoring of the frequency and ground cover plots at the long term sites will determine trend.			

Rio de La Casa Allotment TEU - 262					
Designated Area - TES Unit 262- Mountains, hills, 60% slope					
	Vegetation			Soils (Ground Cover %)	
<b>Potential</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	0
	1 species	10 species	4species	Rock	25
	<0.1% c. cover	7.4% c. cover	10% c. cover	Litter	90
	Trmo <0.1%	Pode 5%	Vamy 10%	Vegetation	5
		Erex 2%			
<b>Desired Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	0-5
	1-5 species	8-10 species	3-4 species	Rock	20-30
	>0.1% c. cover	5-10% c.cover	5-10% c. cover	Litter	85-95
	Trmo <0.1%	Pode 5%	Vamy 10%	Vegetation	5-10
		Erex 2%			
<b>Existing Condition</b>	<u>Grasses</u>	<u>Forbs</u>	<u>Shrubs</u>	Bare soil	
				Rock	
				Litter	
				Vegetation	
<b>Rangeland Management Status</b>					
<b>Rangeland Capacity Rating</b>	Full Capability				
<b>Soil Condition Rating</b>	N/A				
<b>Objectives</b>	Maintain or improve existing conditions while grazing cattle.				
<b>Monitoring</b>	Continued monitoring of the frequency and ground cover plots at the long term sites will determine trend.				

## APPENDIX C – PASTURE DATA SUMMARY

Pasture	TEU Soil #	Acres	Fully Capable Acres	Non Capable Acres	Available Forage High (lbs)	Available Forage Low (lbs)	AU High	Au Low
Agua Fria	91	2.18	0	2.18	0	0	0.00	0.00
Agua Fria	221	75.85	75.85	0	7,281	4,223	9.33	5.41
Agua Fria	224	300.78	168.15	132.64	28,248	16,384	36.22	21.01
Agua Fria	228	212.74	0	212.74	0	0	0.00	0.00
Agua Fria	230	64.84	0	64.84	0	0	0.00	0.00
Agua Fria	236	426.98	89.15	337.84	5,543	3,215	7.11	4.12
Agua Fria	237	394.4	211.54	182.86	6,769	3,926	8.68	5.03
Agua Fria	252	7.17	7.17	0	688	399	0.88	0.51
Agua Fria	261	10.06	0	10.06	0	0	0.00	0.00
<b>Agua Fria</b>		<b>1495</b>	<b>551.86</b>	<b>943.16</b>	<b>48,529</b>	<b>28,147</b>	<b>62.22</b>	<b>36.09</b>
Corrales	6	17.67	17.67	0	5,300	3,180	6.80	3.94
Corrales	212	266.23	266.23	0	25,314	15,188	32.45	18.82
Corrales	213	93.88	52.06	41.83	3,643	2,186	4.67	2.71
Corrales	221	190.26	190.26	0	14,519	8,711	18.61	10.79
Corrales	228	1092.63	389.29	703.33	15,571	9,343	19.96	11.58
Corrales	236	4.63	0	4.63	0	0	0.00	0.00
Corrales	237	23.32	0	23.32	0	0	0.00	0.00
Corrales	252	8.71	8.71	0	836	502	1.07	0.62
<b>Corrales Pasture</b>		<b>1697.33</b>	<b>924.22</b>	<b>773.11</b>	<b>65,183</b>	<b>39,110</b>	<b>83.56</b>	<b>48.46</b>
Lakes	91	754.18	0	754.18	0	0	0.00	0.00
Lakes	234	914.8	597.72	317.08	43,826	26,296	56.19	32.59
Lakes	260	83.08	0	83.08	0	0	0.00	0.00
Lakes	261	563.93	0	563.93	0	0	0.00	0.00
Lakes	262	299.28	20.87	278.41	1,669	1,001	2.14	1.24
Lakes	340	164.85	0	164.85	0	0	0.00	0.00
Lakes	341	292.18	0	292.18	0	0	0.00	0.00
<b>Lakes</b>		<b>3072.3</b>	<b>618.59</b>	<b>2453.71</b>	<b>45,495</b>	<b>27,297</b>	<b>58.33</b>	<b>33.83</b>
Pyramid	6	38.69	0	38.69	0	0	0.00	0.00
Pyramid	91	1796.94	0	1796.94	0	0	0.00	0.00
Pyramid	212	88.35	0	88.35	0	0	0.00	0.00
Pyramid	213	160.33	38.18	122.15	3,207	1,924	4.11	2.38
Pyramid	228	47.85	0	47.85	0	0	0.00	0.00
Pyramid	237	144.12	0	144.12	0	0	0.00	0.00
Pyramid	261	151.77	0	151.77	0	0	0.00	0.00
Pyramid	337	751.62	0	751.62	0	0	0.00	0.00
Pyramid	340	41.49	0	41.49	0	0	0.00	0.00
Pyramid	353	38.73	0	38.73	0	0	0.00	0.00
<b>Pyramid</b>		<b>7652.43</b>	<b>677.64</b>	<b>6974.79</b>	<b>50,371</b>	<b>30,223</b>	<b>64.58</b>	<b>37.46</b>
Rincon Bonito	91	49.53	0	49.53	0	0	0.00	0.00
Rincon Bonito	234	956.15	614.23	341.93	68,131	40,879	87.35	50.66
Rincon Bonito	260	119.55	0	119.55	0	0	0.00	0.00
Rincon Bonito	261	296.08	0	296.08	0	0	0.00	0.00
Rincon Bonito	262	425.79	135.49	290.29	10,839	6,503	13.90	8.06
Rincon Bonito	340	127.83	0	127.83	0	0	0.00	0.00
Rincon Bonito	341	107.53	0	107.53	0	0	0.00	0.00
<b>Rincon Bonito</b>		<b>2082.46</b>	<b>749.72</b>	<b>1332.74</b>	<b>78,970</b>	<b>47,382</b>	<b>101.25</b>	<b>58.73</b>
Twelve Hundred	6	52.16	0	52.16	0	0	0.00	0.00
Twelve Hundred	91	242.73	0	242.73	0	0	0.00	0.00

Pasture	TEU Soil #	Acres	Fully Capable Acres	Non Capable Acres	Available Forage High (lbs)	Available Forage Low (lbs)	AU High	Au Low
Twelve Hundred	213	74.06	56.06	18	2,594	1,556	3.33	1.93
Twelve Hundred	228	77.13	0	77.13	0	0	0.00	0.00
Twelve Hundred	337	134.51	0	134.51	0	0	0.00	0.00
Twelve Hundred	353	60.34	0	60.34	0	0	0.00	0.00
<b>Twelve Hundred</b>		<b>640.93</b>	<b>56.06</b>	<b>584.87</b>	<b>2,594</b>	<b>1,556</b>	<b>3.33</b>	<b>1.93</b>
Vega Quemada	91	104.24	0	104.24	0	0	0.00	0.00
Vega Quemada	224	36.99	0	36.99	0	0	0.00	0.00
Vega Quemada	234	82.3	22.76	59.54	3,186	1,912	4.09	2.37
Vega Quemada	236	62.48	0	62.48	0	0	0.00	0.00
Vega Quemada	260	83.89	0	83.89	0	0	0.00	0.00
Vega Quemada	261	567.58	35.91	531.67	5,831	3,499	12.89	7.48
Vega Quemada	262	71.19	0	71.19	0	0	0.00	0.00
<b>Vega Quemada</b>		<b>1008.67</b>	<b>58.67</b>	<b>950</b>	<b>9,017</b>	<b>5,410</b>	<b>16.98</b>	<b>9.85</b>
Walker Flats	6	7.38	7.38	0	1,033	620	1.33	0.77
Walker Flats	91	475.22	0	475.22	0	0	0.00	0.00
Walker Flats	212	592.02	592.02	0	39,692	23,815	87.74	50.89
Walker Flats	213	949.33	245.55	694.77	18,907	11,344	24.24	14.06
Walker Flats	224	3.26	0	3.26	0	0	0.00	0.00
Walker Flats	228	555.07	33.82	521.26	2,705	1,623	3.47	2.01
Walker Flats	236	105.93	11.98	93.96	486	292	1.07	0.62
Walker Flats	237	61.95	61.95	0	2,478	1,487	3.18	1.84
Walker Flats	252	208.35	208.35	0	13,334	8,000	17.10	9.92
Walker Flats	337	135.43	0	135.43	0	0	0.00	0.00
<b>Walker Flats Pasture</b>		<b>3093.94</b>	<b>1161.05</b>	<b>1923.9</b>	<b>78,635</b>	<b>47,181</b>	<b>138.13</b>	<b>80.12</b>
Walker Flats Holding	212	13.93	13.93	0	1,114	668	1.43	0.83
<b>Walker Flats Holding</b>		<b>13.93</b>	<b>13.93</b>	<b>0</b>	<b>1,114</b>	<b>668</b>	<b>1.43</b>	<b>0.83</b>
<b>Allotment Totals</b>		<b>3999.9</b>	<b>1402.66</b>	<b>2597.23</b>	<b>105631</b>	<b>63,243.22</b>	<b>135.43</b>	<b>78.549</b>