



United States
Department of
Agriculture

Forest
Service

Southwestern
Region



Environmental Assessment for San Cristobal Allotment

Carson National Forest



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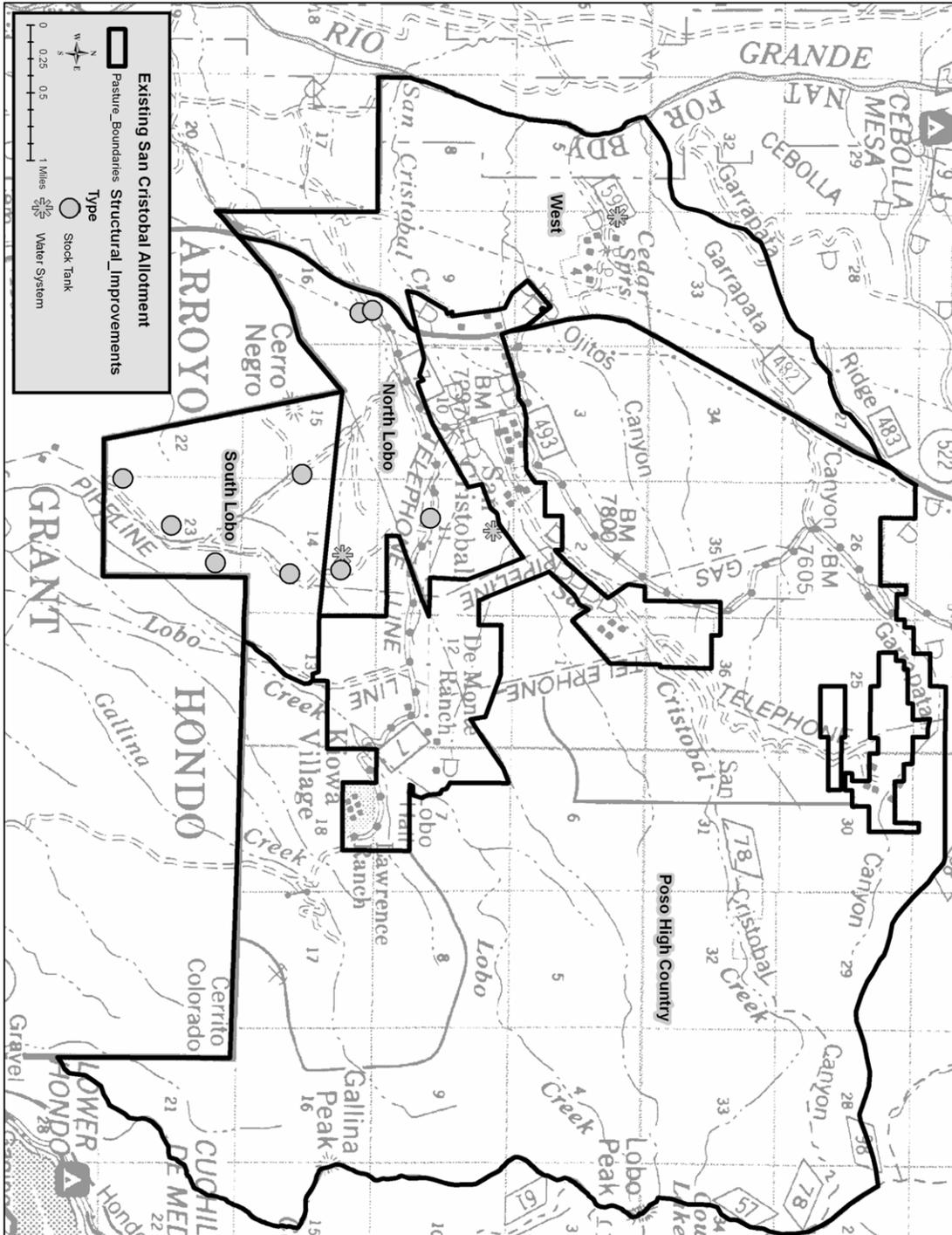


Figure 1. San Cristobal Allotment boundary with existing pasture boundaries and water sources.

Chapter 1 – Purpose and Need

The Forest Service has prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) of 1969 and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the implementation of the proposed action and the no action alternative. This analysis was developed in consideration of the best available science and is consistent with the Carson National Forest Land and Resource Management Plan, as amended. An interdisciplinary analysis on the proposed action is documented in a project record. This EA summarizes the project record to make the analysis results as clear as possible. Additionally, comments received during a 30-day comment period (as required by the Forest Service's 36 CFR 215 notice, comment, and appeal regulations) were considered by the specialists in their effects analyses.

Background

The San Cristobal Allotment is located 6 miles south of the town of Questa, along Highway 522 (figure 1). It is within the Questa Ranger District of the Carson National Forest in Taos County. Of the allotment's 21,367 acres, only 3,121 acres are considered grazable. There are 2,814 acres of private land within the allotment boundaries not included in the total allotment acreage. San Cristobal allotment overlaps a portion of the area where the Hondo Wildfire burned in 1996.

Currently, the allotment is managed through five 10-year permits for a total of 124 cow-calf pairs, permitted to graze from May 15 to October 31. The allotment is made up of three pastures: South Lobo, North Lobo, and Poso High Country (figure 1). There is a fourth pasture, the West Pasture, which has not been grazed for over 20 years due to limited available forage and poor fence condition. Grazing management is a deferred rotation system where all pastures are grazed yearly but some are grazed early while others are deferred until later in the season. Deferred rotation does not allow a pasture to rest from grazing for one full year. For the past 5 years, due to allotment conditions, the permittees have voluntarily reduced the number of livestock to between 35 and 90 head grazing from June 1 to October 15. Livestock are typically trailed along San Cristobal Creek in the Poso High Country Pasture for 3-4 days annually to access grazing areas in upper San Cristobal Canyon.

Purpose and Need for Action

San Cristobal Allotment contains land that is considered suitable for grazing in the Carson National Forest Land and Resource Management Plan (forest plan, USDA 1986). When continued use is consistent with the goals, objectives, standards, and guidelines of the forest plan, it is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing (Forest Service Manual (FSM) 2203.1.6). The purpose of the proposed action is to authorize livestock grazing in a manner that balances permitted use with Forest Plan objectives and desired conditions for rangeland vegetation, soil, watershed, and wildlife habitat.

There is a need for improving rangeland conditions on the North and South Lobo pastures and to better utilize the Poso High Country Pasture. There is a need for allowing forage to set seed and to improve plant vigor and forage production prior to the winter in North and South Lobo pastures. There is a need for maintaining or improving the riparian conditions along San Cristobal Creek.

Proposed Action

The Questa Ranger District proposes to continue authorizing livestock grazing on the San Cristobal Allotment to meet the purpose and need. The proposed action is designed to maintain or improve range conditions, such as forage production, relative to livestock grazing. The proposed action would permit 60-90 cow-calf pairs under a 4-pasture rest-rotation grazing system. The number of cattle authorized to graze on the allotment would vary each season depending on resource conditions. The season of use would also vary each year depending on the number of cattle authorized to graze, but would occur within the period of June 1 to September 30. The Poso High Country Pasture would be divided into two pastures (El Poso Pasture and Hondo Burn Pasture) by a 2 mile fence and water developments would be constructed in the Hondo Burn Pasture.

Distribution of livestock would be adjusted to achieve a light to conservative grazing management guideline of 10 to 40 percent forage utilization used to maintain or improve rangeland vegetation condition¹ and stay within the capacity of the allotment. Livestock would be trailed along San Cristobal Creek in the El Poso Pasture for 3-4 days once every three years. A minimum 4-inch stubble height of forage species would be maintained within San Cristobal Canyon. Monitoring would occur using a variety of methods. Additional details of the proposed action can be found in chapter 2.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action and the other alternatives. The Questa District Ranger is the responsible official for this proposal. For authorizing livestock grazing on the San Cristobal Allotment, there is a two-part decision at the project level to be made:

- Determine whether livestock grazing will be authorized on all, part, or none of the San Cristobal allotment.
- If the decision is to authorize some level of livestock grazing, then identify what management criteria will be applied (including guidelines, grazing management system, and monitoring) and incorporated into the allotment management plan. Ensure that desired range condition objectives are met, or movement occurs toward those objectives within the duration of the permit.

Public Involvement

The proposal was listed in the Carson National Forest Schedule of Proposed Actions since April 2007. The proposal was provided to the public and other agencies for comment during a 30-day scoping period beginning on December 20, 2007. A total of 5 comment letters were received. Permittees participated in the planning process by attending meetings with the district. Using public responses, issues were identified and an alternative was developed to address these issues. The proposed action was provided to the public during a 30-day notice and comment period, beginning July 31, 2008. A legal notice of availability was published in *The Taos News* in accordance with 36 CFR 215.5(b). A total of 10 comment letters were received.

¹ FSH 2209.13, Chapter 90, Region 3 Supplement

Issues

Public involvement is used to identify issues to be addressed in the proposed action. Comments received during the scoping process were examined by the Forest Service specialists for issues to address. The Forest Service separates issues into two groups: significant and non-significant issues.

Significant issues are defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council for Environmental Quality (CEQ) NEPA regulations require this delineation in 40 CFR 1501.7 "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project record. Initially, the Forest Service identified one significant issue raised by the permittees during scoping:

- The grazing public is an integral part of the traditional use of the lands of the Carson National Forest. Reduction in the number of livestock authorized to graze, could affect the permittees economically.

A third alternative was generated to address this issue. During effects analysis it became evident the alternative would not meet the purpose and need of the proposed action; therefore alternative 3 was dropped from further analysis. Documentation of its consideration is included in the project record. Following the 30-day comment period, a fourth alternative was generated to address the permittees' issue and still meet the purpose and need. Alternative 4 is described in detail in chapter 2 and is analyzed in detail in chapter 3.

Chapter 2 - Alternatives

This chapter describes and compares the alternatives considered for the San Cristobal analysis. The alternative comparison defines the differences between each alternative and provides a clear basis for choice among options by the decision maker and the public. The information used to compare the alternatives is based upon the environmental, social, and economic effects of implementing each alternative. The no action alternative of no grazing must be addressed in the analysis as required by the CEQ regulations for implementing NEPA (40 CFR 1502.14).

Alternatives Considered, but Eliminated from Detailed Analysis

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). In developing the proposed action the interdisciplinary team (IDT) considered a number of alternative ways to manage San Cristobal Allotment. In addition, public comments received in response to the proposed action provided suggestions for alternate methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of the need to improve rangeland condition; therefore a number of alternatives were considered but eliminated from detailed analysis. Five of the thirteen alternatives considered are listed below. A complete list can be found in the project record.

Manage Livestock Grazing for Drought Conditions

This alternative would have addressed the need to adjust stocking levels during periods of drought, including adjusting the timing of grazing based on range readiness, available forage, and utilization levels. Adjusting management to specific conditions is part of the proposed action, so a separate alternative would be redundant.

Authorize a Fixed Number of Livestock

A fixed number of livestock would not be responsive to unforeseen changes in conditions, such as drought and wildfire. For this reason, it was not analyzed in detail.

Combining San Cristobal and La Lama Allotments

An alternative was considered which would administratively combine the livestock grazing management of the San Cristobal and La Lama allotments into one operation. After discussing this alternative with permittees, it was eliminated from detailed analysis due to the increased frequency of livestock rotation that would be required.

Building a fence to divide Hondo Burn Pasture from North Lobo Pasture

An alternative was considered, similar to the proposed action, with the addition of a 2 mile fence along the north side of Forest Road 493. It is possible that cattle might move between the two pastures. It was decided that the construction and position of this fence be considered in the future, if appropriate, after the pattern of livestock movement is established in the Hondo Burn Pasture.

Current permitted management

An alternative was considered and released to the public during the 30-day comment period that reflected what is currently authorized on San Cristobal Allotment without improvements. This alternative would have permitted 124 cow-calf pairs from May 15 to October 31 through a 4-pasture deferred-rotation grazing system. After analyzing effects of this alternative, it was determined this alternative would not meet the purpose and need.

Alternatives

Alternative 1 - No Action

Under the no action alternative, domestic livestock grazing would not be permitted on San Cristobal Allotment. All maintenance of range facilities would revert to the Forest Service, where they would be evaluated for wildlife, watershed, and soil protection needs. Allotment boundary and interior fences would not be removed, as they would be needed to prevent use by livestock from adjacent active allotments (La Lama, Arroyo Hondo, and Columbine).

Alternative 2 - Proposed Action

This alternative (figure 2) is the proposed action and would:

- Permit 60 to 90 cow-calf pairs. The actual number of animals authorized each grazing season would depend on the rotation schedule and the capacity of the pastures to be used that year (table 1).
- Allow a season of use between June 1 and September 30, depending on the pastures used and the number of cattle authorized to graze each year (table 1).
- Manage a 5-pasture allotment (West, South Lobo, North Lobo, El Poso, Hondo Burn) as a 4-pasture rest-rotation grazing system once water and fence improvements are in place. It would be managed as a deferred rotation system until improvements are in place. The West Pasture would not be included in rotation due to lack of forage and fences, but is available for limited use. Poso High Country Pasture would be managed as two pastures (El Poso and Hondo Burn) (table 1).
- Graze El Poso Pasture including San Cristobal Canyon one year out of three, with no more than 25 cow-calf pairs for 30-45 days. Rest the remaining three pastures once every three years.
- Construct five earthen water tanks in the Hondo Burn Pasture.
- Construct two miles of fence in two locations roughly along the telephone line north of San Cristobal Canyon dividing the Poso High Country Pasture into two pastures. Install a cattle guard where the fence intersects the road.
- Graze no more than 60 cow-calf pairs until the fence and water improvements have been constructed. Once improvements are in place the permitted number would be no more than 90.
- Distribution of livestock and forage use would be adjusted to achieve a light to conservative grazing intensity of 10-40% utilization, meeting guidelines.² Utilization would not exceed 35% in key forage areas where past vegetation treatments occurred (North and South Lobo pastures). In all other vegetation types, utilization would not exceed 40%. A 4-inch stubble height on grasses and forbs would be maintained in all riparian zones.
- Stocking levels and the on and off dates would be adjusted annually through the annual operating instructions (AOI's), based on previous years' monitoring and anticipated forage as

² FSH 2209.13, Chapter 90, Region 3 Supplement

measured by range readiness inspections. The AOI's allow for a flexible management approach to respond to short-term resource conditions such as forage and water availability.

- **Additional mitigation measures:** In managing the allotment, best management practices would be applied. These address administrative requirements for compliance with the terms of the grazing permit found in FSH 2509.22 Chapter 22 (BMP 22.1 thru 22.16).

Table 1. Number of livestock and season of use based on capacity with an allowable use of 35-40%.

No. Cow-Calf pairs	Allotment-wide use	South Lobo Pasture capacity	North Lobo Pasture capacity	Hondo Burn Pasture capacity	El Poso Pasture capacity
90	38 days if Hondo Burn Pasture rested 112-120 days if North or South Lobo pastures rested	15 days	23 days	97 days	25 cow calf pairs for 30-45 days
60	68 days if Hondo Burn Pasture rested 121 days* if North or South Lobo pastures rested	26 days	42 days	122 days	

*Under alternative 2, the season of use would not exceed the 121 days between June 1-September 30.

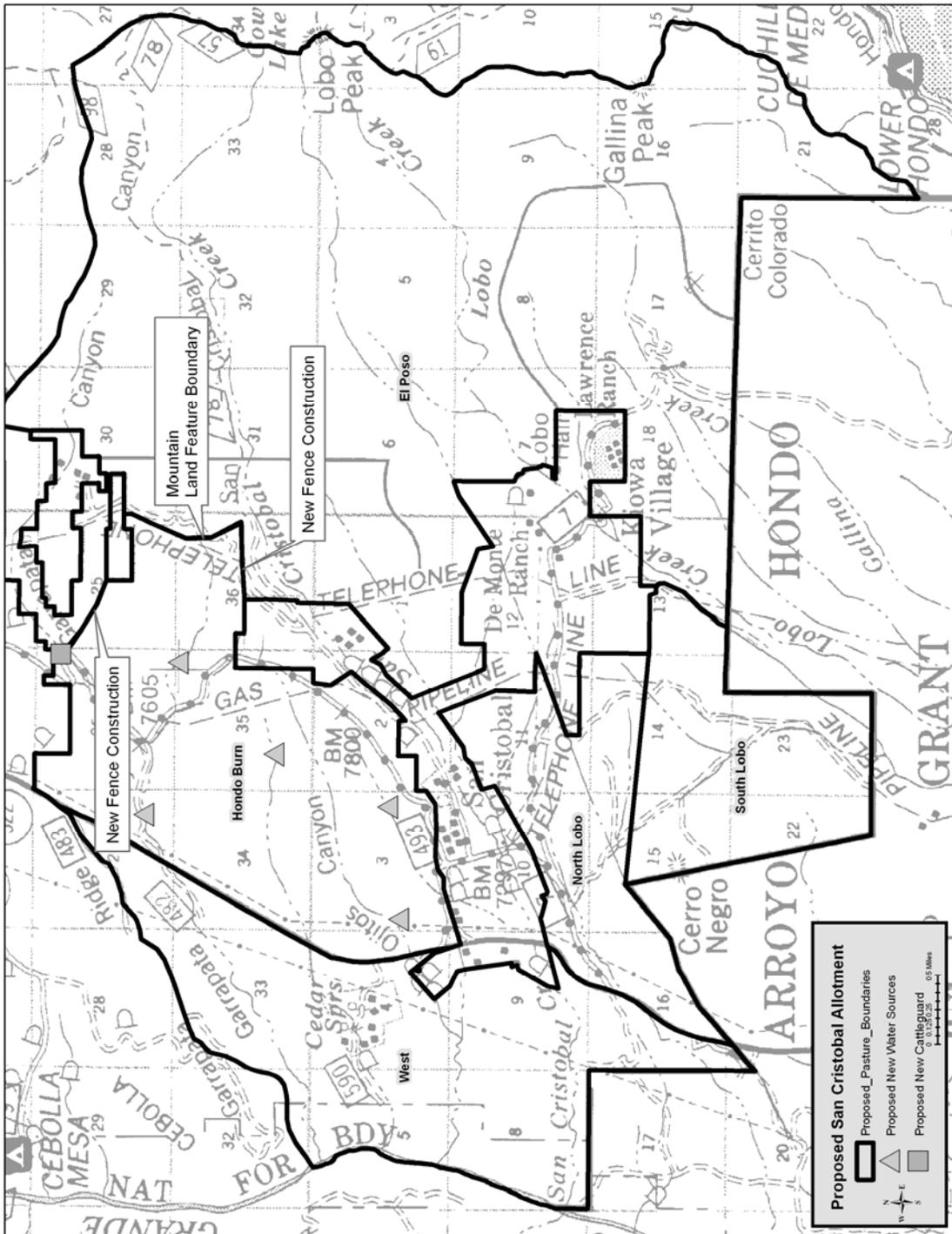


Figure 2. San Cristobal Allotment boundary with proposed pasture boundaries and water sources as described in Alternative 2.

Alternative 4 – Vegetation Treatments

This alternative (figure 3) addresses the issue raised by the permittees of the allotment concerning the economic impacts they would bear if their numbers and season of use were reduced as proposed in alternative 2:

- Permit 60 to 124 cow-calf pairs. The actual number of animals authorized each grazing season would depend on resource conditions at the time of entry, rotation schedule, and the capacity of the pastures to be used for the season of use. Each year, the Forest Service would conduct an assessment around September 1, to determine whether conditions are appropriate to allow grazing during the month of October (table 2).
- Allow a season of use between May 15 and October 31, depending on the pastures used and the number of cattle authorized to graze each year (table 2).
- Manage a 5-pasture allotment (West, South Lobo, North Lobo, El Poso, Hondo Burn) as a 4-pasture rest-rotation grazing system once water and fence improvements are in place. It would be managed as a deferred rotation system until improvements are in place. The West Pasture would not be included in rotation due to lack of forage and fences, but is available for limited use. Poso High Country Pasture would be managed as two pastures (El Poso and Hondo Burn) (table 2).
- Graze El Poso Pasture including San Cristobal Canyon one year out of three, with no more than 25 cow-calf pairs for 30-45 days. Rest the remaining three pastures once every three years.
- Construct five earthen water tanks in the Hondo Burn Pasture.
- Following construction of the water tanks, construct two miles of fence in two locations roughly along the telephone line north of San Cristobal Canyon dividing the Poso High Country Pasture into two pastures. Install one cattle guard at a road crossing.
- Graze no more than 60 cow-calf pairs until the fence and water improvements have been constructed. Once improvements are in place the permitted number would be no more than 124.
- Following construction of water tanks and the division fences, implement vegetation treatments on 603 acres: 336 acres in North Lobo Pasture; 267 acres in South Lobo Pasture (figure 3). The mechanical treatment methods would include drilling, brush hogging, contour ripping, and disking within both the North and South Lobo pastures.
- Reseed the treated areas with a mixture that includes cool and warm season grasses and forbs to provide better seasonal forage production, ground cover, and plant diversity. Livestock would not be allowed to graze the treated areas for at least two growing seasons to allow for seed set and root establishment. Reentry would be dependent on plant establishment and development.
- Construct a sediment trap dam and a drift fence below Tank #709005 in South Lobo Pasture.
- Construct gully plugs in an active headcut in the northeast corner of section 23 in South Lobo Pasture.
- Distribution of livestock and forage use would be adjusted to achieve a light to conservative grazing intensity of 10-40% utilization, meeting guidelines. Utilization would not exceed 35% in key forage areas where past vegetation treatments occurred (North and South Lobo

pastures) per Forest Plan guidelines. In all other vegetation types, utilization would not exceed 40%. A 4-inch stubble height on grasses and forbs would be maintained in all riparian zones.

- Stocking levels and the on and off dates would be adjusted annually through the annual operating instructions (AOI's), based on previous years' monitoring and anticipated forage as measured by range readiness inspections. The AOI's allow for a flexible management approach to respond to short-term resource conditions such as forage and water availability.

Mitigation measures:

- In managing the allotment, best management practices would be applied. These address administrative requirements for compliance with the terms of the grazing permit found in FSH 2509.22 Chapter 22 (BMP 22.1 thru 22.16).
- Well in advance of implementing any vegetation treatment, an on-site consultation would be coordinated between permittees, the district range specialist, and the district archeologist. This on-site consultation must be completed to ensure known archeological sites in proposed treatment areas are avoided.

Table 2. Number of livestock and season of use based on estimated capacity following establishment of vegetation treatments with an allowable use of 35-40%

No. Cow-Calf pairs	Allotment-wide use	South Lobo Pasture capacity	North Lobo Pasture capacity	Hondo Burn Pasture capacity	El Poso Pasture capacity
124	130 days if Hondo Burn Pasture rested 134-144 days if North or South Lobo pastures rested	60 days	70 days	74 days	25 cow calf pairs for 30-45 days
90	169 days* if Hondo Burn Pasture rested 169 days* if North or South Lobo pastures rested	82 days	96 days	97 days	
60	169 days* if Hondo Burn Pasture rested 169 days* if North or South Lobo pastures rested	123 days	144 days	122 days	

*Under alternative 4, the season of use would not exceed the 169 days between May 15-October 31.

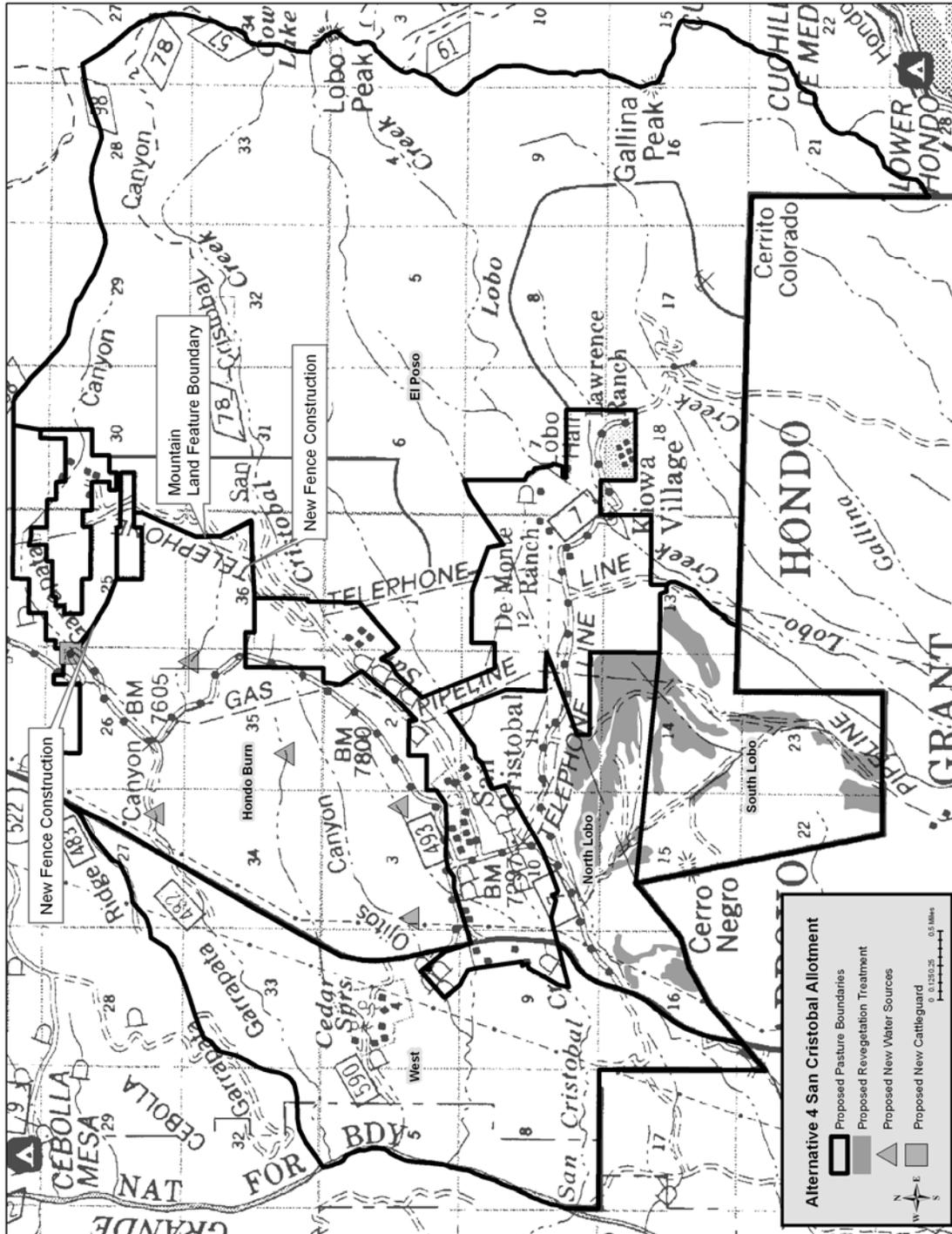


Figure 3. San Cristobal Allotment boundary with proposed pasture boundaries, water sources, and vegetation treatments as described in Alternative 4.

Monitoring

Monitoring informs the decision maker, specialists, and interested public of progress towards the goals and objectives during the implementation of a project. By monitoring the effects of actions and evaluating the results, appropriate modifications in management practices can be made, resource trends can be analyzed, and new knowledge can be applied to similar projects in the future. The following monitoring would apply to alternatives 2 and 4, if implemented:

- range readiness every year before grazing season
- Parker 3-step and rapid assessment methodology (RAM) every 10 years
- forage utilization rate measured throughout each grazing season and at the end of each grazing season
- permit compliance, including stocking levels, pastures grazed, and season of use monitored throughout the grazing season
- 4” residual stubble height within riparian areas every year the El Poso Pasture is grazed (one year out of three)
- review NMED 303d list every two years, as required by the Water Quality Act, to monitor water quality in San Cristobal Creek
- under alternative 4, following completion of vegetation treatments and at least two growing seasons of rest, plant establishment and vigor would be monitored in the treatment areas using range readiness guidelines and Parker 3-step or rapid assessment methodology (RAM).

Summary of Effects by Alternative

This section provides a summary of the effects of implementing each alternative. Information in the table is focused where effects can be distinguished quantitatively or qualitatively between alternatives. Further discussion of effects on resources by alternative can be found in Chapter 3.

Table 3. Comparison of Effects by Alternative

Resource	Alternative 1	Alternative 2	Alternative 4*
Range condition and trend	Overall range condition and trend would improve in all pastures.	Maintain good condition and move from stable to upward trend.	Maintain good condition and move from stable to upward trend. Increased forage production and improved composition in North and South Lobo Pastures.
Soils	Soil nutrient retention, vegetation growth, and soil stability would improve.	Gradual improvement to soils in North and South Lobo pastures. Increase or maintain vegetation growth and soil nutrient retention.	Short term impacts to soil stability in North and South Lobo pastures. Long term, vegetative cover would increase, resulting in an increase of soil

Resource	Alternative 1	Alternative 2	Alternative 4*
			stability, decreased erosion loss and increased nutrient retention. Gully treatments would retain existing soil loss on site, provide for reduced levels of sediment delivery to ephemeral and intermittent channels and reduce erosion.
Riparian areas, water quality, and wetlands	Riparian vegetation and stream sediment improve. Designated uses supported and water quality status maintained. Wetland function improved.	Riparian vegetation and stream sediment improve. Designated uses supported and water quality status maintained. Wetland function maintained.	Riparian vegetation and stream sediment improve. Designated uses supported and water quality status maintained. Wetland function maintained.
Floodplains	Floodplain function maintained.	Floodplain function maintained.	Floodplain function maintained.
Air Quality	Attainment status maintained.	Attainment status maintained.	Attainment status maintained.
Mexican spotted owl	No effect to population.	No effect to population.	No effect to population.
American Peregrine Falcon	No impact to population or prey, and habitat quality improved.	No impact to population. Prey species diversity and habitat quality maintained or improved.	No impact to population. Prey species diversity and habitat quality maintained or improved.
Northern Goshawk	No impact to population or prey, and habitat quality improved.	No impact to population. Prey species diversity and habitat quality maintained or improved.	No impact to population. Prey species diversity and habitat quality maintained or improved.
Sensitive Animals – ermine, dwarf shrew, long-tailed vole, western heather vole (riparian and upland meadow habitat)	No impact to population and foraging habitat quality improved.	No impact to population. Foraging habitat quality improved.	No impact to population. Foraging habitat quality improved.
Sensitive Plants – alpine larkspur, robust larkspur, yellow lady-slipper (riparian and upland meadow habitat)	Positive impact to population and habitat improved.	Positive impact to population. Habitat quality improved.	Positive impact to population. Habitat quality improved.

Resource	Alternative 1	Alternative 2	Alternative 4*
Sensitive Plants – Ripley Milkvetch (open woodlands habitat)	No impact to population, but increase in individuals. Habitat quality improved.	No impact to population, but possible increase in individuals. Habitat quality improved.	No impact to population, but possible increase in individuals. Habitat quality improved.
Sensitive Animals – western burrowing owl, Gunnison prairie dog, white-tailed jackrabbit (arid sagebrush and grasslands habitat)	No impact to populations, but individuals (except burrowing owls) may increase. Foraging habitat improved (except burrowing owls). Increased vegetation heights (over 4 inches) may lead to burrowing owl habitat abandonment due to less sight distance to detect predators.	No impact to populations, but individuals may increase. Foraging habitat for prairie dog and jackrabbit is expected to improve. Suitable habitat for burrowing owls would be maintained in the moderately grazed pastures.	There would be a possible increase to individuals due to habitat and forage improvements, but no impact to the populations.
Elk	No change to population or habitat trends across the forest. Foraging habitat quality improved.	No change to population or habitat trends across the forest. Temporary displacement of some elk. Foraging habitat quality improved.	No change to population or habitat trends across the forest. Temporary displacement of some elk. Foraging habitat quality improved.
Brewer’s Sparrow	No change to population or habitat trends across the forest. Habitat quality improved.	No change to population or habitat trends across the forest. Temporary displacement of some individuals. Habitat quality improved.	No change to population or habitat trends across the forest. Temporary displacement of some individuals. Habitat quality improved. Vegetation treatment would remove 603 acres of shrub habitat.
Migratory Birds – ferruginous hawk	No impact to populations. Habitat quality and prey availability improved.	No impact to populations, but individuals may increase. Habitat quality and prey availability improved.	No impact to populations, but individuals may increase. Habitat quality and prey availability improved, especially in the vegetation treatment areas.
Migratory Birds – Virginia’s warbler and blue grouse	No impact to populations. Foraging habitat improved.	No impact to populations. Individuals may increase in rested pastures, but may be	No impact to populations. Individuals may increase in rested pastures, but may be

Resource	Alternative 1	Alternative 2	Alternative 4*
		temporarily displaced in grazed pastures. Foraging habitat quality improved.	temporarily displaced in grazed pastures. Foraging habitat quality improved.
Cultural Resources	No effect on sensitive and non-sensitive cultural sites.	No adverse effect on sensitive cultural sites. Possible livestock trampling on non-sensitive sites is not likely to cause adverse effects.	No adverse effect on sensitive cultural sites. Possible livestock trampling on non-sensitive sites is not likely to cause adverse effects. Eligible sites would be avoided during ground-disturbing treatments.
Wilderness	Wilderness characteristics would be maintained.	Wilderness characteristics would be maintained.	Wilderness characteristics would be maintained.
Wild and Scenic Rivers	No effect on the Rio Grande wild and scenic river values. Eligibility values of San Cristobal Creek would be maintained.	No effect on the Rio Grande wild and scenic river values. Eligibility values of San Cristobal Creek would be maintained.	No effect on the Rio Grande wild and scenic river values. Eligibility values of San Cristobal Creek would be maintained.
Economics	No income generated by permittees from livestock operations.	\$8,800-\$13,200 generated by permittees from livestock business on allotment.	\$12,100-\$25,000 generated by permittees from livestock business on allotment, once all improvements implemented.
Social Environment	Permittees would find alternate grazing location, may have to reduce numbers, or cease operations.	Existing traditions of livestock management would continue for permittees.	Existing traditions of livestock management would continue for permittees.

*Alternative 3 was removed from detailed analysis after it was determined that it would not meet the purpose and need for the project.

Chapter 3 – Environmental Consequences

Chapter 3 summarizes the physical, biological, social, and economic environments of the allotment and the potential changes (direct or indirect) to these environments if the alternatives were implemented. Chapter 3 also presents the scientific and analytical basis for the comparison of alternatives, as presented in table 3. Chapter 3 complies with the implementing regulations (40 CFR 1500-1508) of the National Environmental Policy Act (NEPA) for analytic and concise environmental documents (40 CFR 1502.2). This analysis was developed in consideration of the best available science and is consistent with the Carson National Forest Land and Resource Management Plan, as amended. The project record contains copies of the effects analyses for the resources analyzed. An index to the project record can be found in Appendix A. The analysis of effects for alternatives 2 and 4 under each resource takes into consideration the mitigation measures described in chapter 2.

Cumulative Effects Analysis

A cumulative effect is the effect on the environment that results from the incremental effect of the action when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions and regardless of land ownership on which the other actions occur (40 CFR 1508.7). An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other actions, the effects may be significant.

Cumulative effects were assessed in terms of how the alternatives would add to the past, present, and reasonably foreseeable future activities, within and around the allotment (table 4). Existing conditions by resource reflect the effects of past and present actions that have occurred on the allotment. The natural resource specialists identified reasonably foreseeable future activities that overlap in time and location of each alternative. The incremental effect of the action when added to the alternative was then analyzed.

Table 4. Past and present activities in and around San Cristobal Allotment

Past and Current Activity Name	Timeframe	Location	Comments
Historic grazing by cattle, sheep, goats, and wild horses	1840s to 1950s	San Cristobal Allotment	Allotment was grazed intensively during these years. In 1956, the allotment was converted to cattle grazing only.
Mechanical vegetation treatments and revegetation	1950s to 1980s	San Cristobal Allotment	To increase forage production, pinyon pine, juniper, and sagebrush were removed over large areas and re-seeded with grass.
Hondo Fire	1996	Poso High Country Pasture in the San Cristobal Allotment	Part of the 8,530 acre wildfire burned a large portion of this pasture.
Post Hondo Fire treatments	1996-2000	Poso High Country Pasture in the San Cristobal Allotment	Re-seeding with native grass, ponderosa pine fuelwood gathering, salvage logging, viga removal, and fire line soil stabilization contributed to providing vegetation growth after the fire.
Bark beetle	2005-2007	San Cristobal	Fuelwood gathering of many dead

Past and Current Activity Name	Timeframe	Location	Comments
infestation		Allotment	pinyon pine trees resulted in an increase in understory vegetation growth.
Allotment improvements for cattle management	1990s to present	San Cristobal Allotment	Water sources developed and maintained. Allotment and pasture boundary fences maintained.
Unauthorized public use	1990s to present	San Cristobal Allotment	Ground disturbance from off-road driving and fence cutting is visible on the allotment.
Effects of drought	1990s to present	San Cristobal Allotment	Loss of grass cover, encroachment of pinyon pine, juniper, snakeweed, sagebrush and invasive non-native plants has occurred due to lack of precipitation.
Development on adjacent private lands	1990s to present	Deer Mesa and areas around San Cristobal Allotment	Homes are being built and livestock grazing occurs on private lands adjacent to the allotment boundary.
Livestock grazing on adjacent allotments	1950s to present	La Lama, Columbine, Arroyo Hondo allotments	Adjacent Forest Service allotments are managed to meet forage utilization standards which includes elk and deer use.
Wildland Urban Interface (WUI) tree removal	2005-to present	Highway 522 corridor, Questa, and San Cristobal, including San Cristobal Allotment	WUI projects include thinning, fuelwood gathering, and dead pinyon pine removal.

Cumulative Effects of Reasonably Foreseeable Future Activities

Proposed Management of Motorized Use on the Questa Ranger District

The Carson National Forest is in the process of designating roads and trails open to motorized travel and prohibiting cross-country travel by motorized vehicles. This project was first listed on the schedule of proposed actions (SOPA) on July 1, 2008. This activity is going through the NEPA process and a decision is expected in May 2009. Implementation of the decision will begin in October 2009 and may include closing some roads and seasonal road use restrictions on San Cristobal Allotment.

Closing roads would be beneficial to soils, vegetation, and potentially cultural resources. If vehicles were no longer authorized on a road, erosion would lessen, vegetation would grow in the roadbed over time, and there would be less impact to any nearby cultural resources. There are no cumulative effects of the seasonal road closure on any resource since it would be during the winter months when cattle are not on the allotment.

Wildfire management response

In the event that a wildfire would occur on the allotment, the response would be determined on an individual basis due to a variety of physical and social variables.

Noxious weeds

The Carson and Santa Fe National Forests are in the process of completing an environmental impact statement (EIS) and making a decision on controlling invasive plants on National Forest System (NFS) lands. A decision is expected in the coming year.

Once a decision is made, treatment may be authorized to control the Canada thistle, yellow toadflax, hoary cress and bull thistle on San Cristobal Allotment. It is estimated that 12 acres are currently infested with these species. This is a relatively small acreage of invasive plants and is not having an impact on various resources at this scale. The cumulative effect of the anticipated invasive plant control project would be a reduction in the potential for the invasive plant populations to expand to the extent that they do start creating resource impacts such as erosion, wildlife displacement, habitat degradation, and declining forage production.

Affected Environment

San Cristobal Allotment is located 6 miles south of the village of Questa in northern New Mexico. The allotment surrounds the community of San Cristobal. To the east of the allotment is Lobo Peak where the allotment boundary goes to the top of the ridge, with an elevation of 12,115 feet. Poso High Country Pasture is in the eastern part of the allotment. To the west, is the Rio Grande gorge, where the allotment boundary goes up to the rim without including the gorge or the river, which sits 800 feet below the rim. The rim of the gorge is the west boundary of the West Pasture. The community of La Lama is located to the north of the allotment. To the north is the La Lama Allotment and east are the Columbine and Arroyo Hondo Allotments. The community of Arroyo Hondo is located to the south of the allotment.

The western part of the allotment is split by Highway 522, separating the West Pasture from the others. Poso High Country, North Lobo, and South Lobo pastures are all on the eastern side of the highway. Fences along the highway manage livestock.

The forest plan provides the overall direction to meet desired conditions for the Carson National Forest. San Cristobal Allotment falls within seven management areas (MA): MA 3-Mixed Conifer <40% (slopes), MA 4-Ponderosa Pine <40%, MA 8- Pinyon pine/Juniper, MA 11- Revegetation Areas, MA 14- Riparian, MA 17- Wilderness, and MA 18- Wild and Scenic River.

San Cristobal Allotment was heavily grazed by sheep and goats from the 1920's to the 1950's. The area became part of the Carson National Forest in 1954 and was converted from a sheep allotment to cattle in 1956. Beginning in the 1960's the Forest Service implemented a series of mechanical vegetation treatments that lasted through the 1980's, in an effort to provide sustainable forage for livestock. Trees and shrubs were cleared and reseeded with grass in large areas of the North and South Lobo pastures.

Of the 21,367 acres of the allotment, 3,121 are considered to have the capacity for livestock grazing. The 8,530-acre 1996 Hondo Fire burned a large portion (2,513 acres) of the Poso High Country Pasture (figure 3). Of the area burned in the Poso High Country Pasture, 1,383 acres are considered grazable.

The vegetation types present across the entire allotment include the following: low and high elevation grasslands, pinyon pine, juniper, sagebrush, ponderosa pine, riparian vegetation, aspen, and smaller areas of spruce and fir. The effects analysis focuses on the vegetation present

primarily within the grazable acres where livestock would graze. Elk and deer primarily use the pinyon juniper and sagebrush areas (North and South Lobo pastures) during the winter months.

The allotment is situated within two 6th code watersheds, the Arroyo Hondo-Rio Grande and Outlet Arroyo Hondo. San Cristobal Creek in the Poso High Country Pasture is the only perennial stream with riparian vegetation on the allotment. Small subalpine open meadows and wetlands are found at the top of San Cristobal Canyon.

A trail runs up San Cristobal Canyon to Lobo Peak, partially following San Cristobal Creek. The Columbine-Hondo Wilderness Study Area is located on a portion of the Poso High Country Pasture.

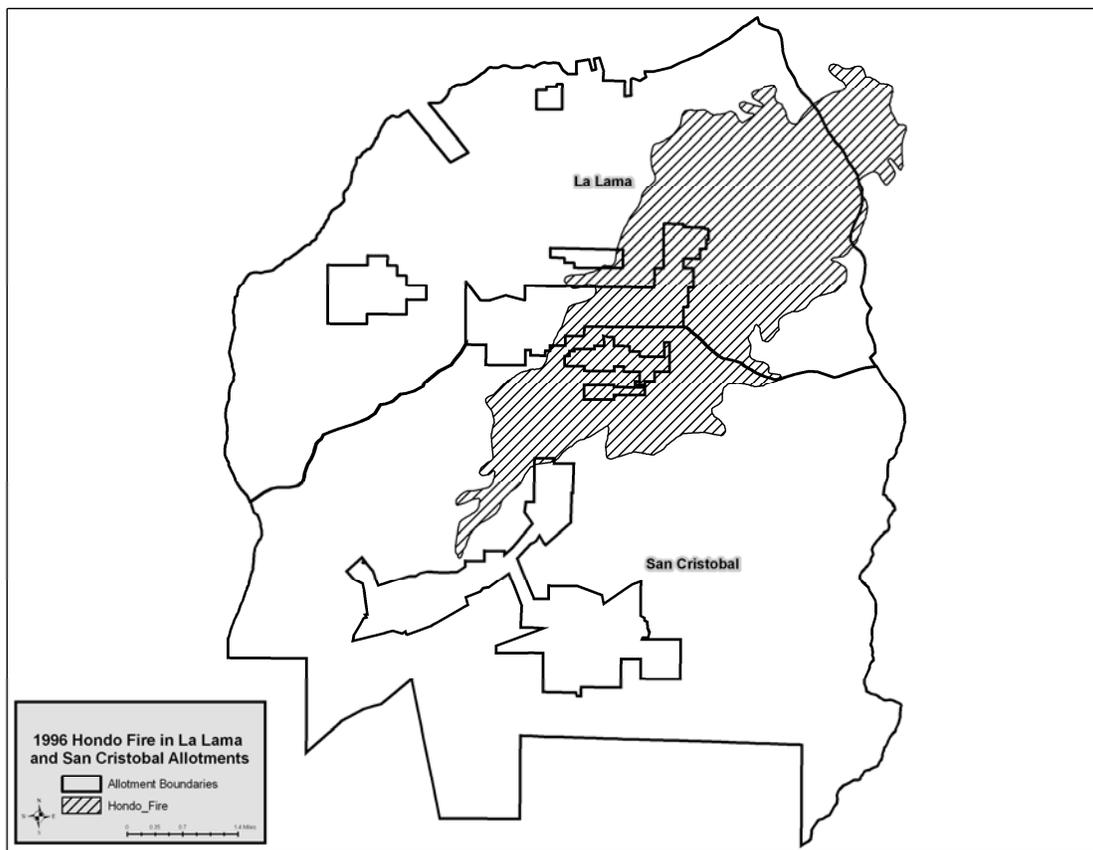


Figure 3. Location of the 1996 Hondo Fire on the San Cristobal and La Lama allotments.

Effects of Each Alternative by Resource

The following resources were analyzed by natural resource specialists in relation to the effects on each resource anticipated with the implementation of each alternative: range condition and trend, soils, riparian areas, water quality, wetlands, floodplains, air quality, wildlife, cultural resources, wilderness, wild and scenic rivers, economics, and social environment.

The resource effects analyses of the no action alternative are based on no livestock grazing for a ten year period. The resource effects analyses of alternative 2 are based on all improvements in place within 1-2 years of permit issuance. The resource effects analyses of alternative 4 are based on water and fence improvements in place within 1-2 years of permit issuance and vegetation treatments being implemented within 3-5 years. The resource effects analyses under alternatives 2 and 4 related to San Cristobal Canyon, the only source of riparian areas and a perennial stream, are based on livestock trailing through the canyon once every three years for 3-4 days.

Range Condition and Trend

Range condition and trend of San Cristobal Allotment has been measured since the 1960's. Range condition is a combination of an overall rating for plant composition, forage density based on vegetation type, plant vigor, and cool season grass density. These four components are the key indicators of range condition. The condition rating is an estimate of the relative effects of grazing on vegetation. Grazing by livestock may impact vegetation by changing the mix of species in the plant communities being grazed; the density and frequency of perennial forage plants; and the vigor of the grazed plants. These effects are reflected by the following range condition classes: excellent, good, fair, poor, and very poor. For example, a reduction in desirable forage plant species results in a lower range condition rating.

Range trend shows whether vegetation conditions are improving or declining in relation to plant composition, forage density, vegetation type, plant vigor and cool season grass density. Range trend expresses the direction of change (if any) in range condition in response to past and existing livestock management practices or other land use activities, in combination with other environmental factors (FSH 2209.21 CH 40.5-2). A downward trend indicates a reduction in forage available for livestock and wildlife, which may reduce grazing capacity on the allotment. It is important to note that a downward trend may not necessarily be the result of livestock grazing. For example: the encroachment of trees and woody shrubs may indicate a downward trend in forage species. The new vegetation type, however, may provide hiding cover and browse for wildlife.

Existing range condition and trend for the San Cristobal Allotment is determined to be on the low end of good condition, with a stable trend (table 5). This was determined through a review of both historical and recent monitoring records. Recent data was collected through ocular inspections, photos, vegetation sampling, soil type analysis, rapid assessment methodology (RAM), Parker 3-Step method, and range readiness inspections.

On the North and South Lobo pastures, where the past vegetation treatments occurred, pinyon pine, juniper, sagebrush, and snakeweed have reestablished, decreasing the production of grasses for use by livestock. Poso High Country Pasture is in good range condition due to the positive effects of the Hondo Fire on forage and only limited grazing in the upper meadows.

Effects by Alternative

The existing as well as anticipated condition and trend for each alternative is summarized in table 5, followed by a more detailed explanation.

Table 5. Comparison of the effects on range condition and trend by alternative

Pasture	Existing (condition/trend)	Alternative 1 (condition/trend)	Alternative 2 (condition/trend)	Alternative 4 (condition/trend)
North Lobo	good/stable	good/upward	good/upward	good/upward
South Lobo	good/stable	good/upward	good/upward	good/upward
Poso High Country	good/stable	good/upward	good/upward	good/upward

Alternative 1

With no livestock grazing on the allotment, it is anticipated that overall range condition and trend would improve in all pastures. Range trend would change from stable to upward across the allotment. Plant composition (including cool season grass density) would improve from the impacts of no grazing, especially early in the summer when plants are most vulnerable. Without trampling and grazing impacts, plants would have the opportunity to grow and set seed, improving forage cover, plant vigor, and forage production. Wildlife use primarily occurs during the winter, and is not expected to affect range condition and trend under this alternative.

Alternative 2

With improvements under this alternative it is anticipated that overall range condition and trend would improve in all pastures. Range condition is expected to be maintained as good. Trend would change from stable to upward across the allotment. An entrance date of June 1 would allow adequate time for cool season grasses to become more abundant on the North and South Lobo pastures. The earlier exit date of September 30 would allow enough time for plants to set seed before winter, improving plant composition and plant vigor. Shortening the grazing season by 1 ½ months would also provide rest and recovery periods for forage.

Authorizing 60 head instead of the existing 80-90 head, until fence and water improvements are in place on Poso High Country Pasture would begin to improve forage cover and forage production on the North and South Lobo pastures. Following installation of improvements, the available forage in the El Poso and Hondo Burn pastures would be more effectively grazed. Impacts from cattle would be better distributed between pastures and vegetation would experience additional rest recovery periods. The pasture division would also alleviate grazing pressure on the North and South Lobo pastures by adding another pasture to the rest-rotation schedule.

This alternative changes the grazing management from a deferred-rotation system to a rest-rotation system. The rest-rotation system would incorporate rest to one pasture annually from grazing. In the pasture that is rested there would be longer rest and recovery periods for forage plant species, which improves plant vigor, forage production, and allows for plant life cycles to occur. Due to the presence of livestock in alternative 2, the amount of improvement is expected to be less than alternative 1.

Alternative 4

With improvements under this alternative it is anticipated that overall range condition and trend would improve in all pastures. Range condition is expected to be maintained as good. Trend would change from stable to upward across the allotment. Range readiness guidelines would be used to insure that livestock are not turned onto the allotment too early in the spring, allowing

cool season grasses to develop. Meeting light to conservative utilization levels in each pasture would maintain or improve plant species composition and plant vigor.

Authorizing 60 head instead of the existing 80-90 head until fence and water improvements are in place on Poso High Country Pasture would begin to improve forage cover and forage production on the North and South Lobo pastures. Following installation of water and fence improvements, the available forage in the El Poso and Hondo Burn pastures would be more effectively grazed. Vegetation treatment within the North and South Lobo pastures, once implemented and established, would increase species diversity and forage production. Impacts from cattle would be better distributed between pastures and vegetation would experience additional rest recovery periods. The pasture division would also alleviate grazing pressure on the North and South Lobo pastures by adding another pasture to the rest-rotation schedule.

This alternative changes the grazing management from a deferred-rotation system to a rest-rotation system. The rest-rotation system would incorporate rest to one pasture annually from grazing. In the pasture that is rested there would be longer rest and recovery periods for forage plant species, which improves plant vigor, forage production, and allows for plant life cycles to occur. While there would still be livestock use in alternative 4, with mechanical vegetation treatments and seeding in North and South Lobo pastures, improvement is expected to be the greatest under this alternative.

Cumulative Effects on Range Condition and Trend

The cumulative effects of past and present activities, such as the areas mechanically treated in the past on North and South Lobo pastures and the Hondo Fire, are reflected in the discussion of range condition and trend by alternative. Under all three alternatives, any proposed road closures would have a beneficial effect on range condition and trend due to vegetation growth in the road bed over time.

It is estimated that 12 acres of San Cristobal Allotment are currently infested with Canada thistle, yellow toadflax, hoary cress and bull thistle. This is a relatively small acreage of invasive plants and is not having an impact on various resources at this scale. If treatment of these species does not occur there is potential for invasive plant populations to expand impacting forage production and could cause a decrease in range condition and trend. Future treatment of this infestation, combined with light to conservative grazing practices, would cumulatively result in fewer invasive plants.

Rangeland Capacity

Capacity acres were determined for the allotment through the use of the Terrestrial Ecosystem Survey (TES) of the Carson National Forest (USDA 1987), on-site evaluation, and a review of historical data. The TES divides the forest into discrete units, called terrestrial ecosystem units (TEU) based on soil and vegetation characteristics. Overall, there are 3,121 acres of grazable land on the allotment. That area is broken out by full capacity and transitory capacity acres, which are then used to calculate carrying capacity for livestock.

The allotment is first assessed for full capacity; areas with the capacity to sustain most of the livestock grazing impacts. There is a maximum level of soil loss for each TEU, while still maintaining vegetation productivity. In the full capacity range areas, the soil loss is assessed to determine the capacity of those areas to sustain livestock grazing. These areas are relatively flat

terrain, with low overstory vegetation, allowing for conditions to support forage. San Cristobal Allotment has 2,752 acres of full capacity areas.

The allotment is also assessed for transitory capacity; areas with low capacity for livestock grazing impacts. These areas are isolated and dispersed across the allotment and are generally not used by livestock. Transitory capacity areas are away from water or on steep slopes with dense overstory vegetation, where livestock do not tend to graze. Livestock may trail through these areas moving from one grazing area to the next. San Cristobal Allotment has 369 acres of transitory capacity areas. Carrying capacity was used to determine the range of livestock numbers and season of use set forth in the proposed action (table 1) and the vegetation treatment alternative (table 2).

Within the full capacity areas, the allotment is assessed for carrying capacity; the number of cattle and the number of days those cattle can be sustained with forage. Carrying capacity is determined through a set of calculations outlined in the Region 3 Rangeland Analysis and Management Training Guide (USDA 1997). The pounds per acre of forage produced in the full capacity areas is measured by clipping and weighing the grasses and is then averaged across each pasture. The carrying capacity is then calculated by pasture and across the allotment. Table 1 in chapter 2 outlines the number of head that can be grazed and number of days at 35-40% allowable use on San Cristobal Allotment under alternative 2. For alternative 4, the pounds per acre of forage produced within the treated acres of North and South Lobo pastures was estimated to increase to 1,000 pounds per acre, once the vegetation treatments establish. Table 2 in chapter 2 outlines the number of head that can be grazed and number of days at 35-40% allowable use on San Cristobal Allotment under alternative 4.

Soils

Surface soil properties include soil productivity and stability. Soil productivity is the ability of soils to support vegetation growth. Surface soil stability can be dependent upon vegetation cover to prevent erosion. Soil nutrients in the form of organic matter are an important component in soil stability and productivity.

Map unit interpretations and data from the Terrestrial Ecosystem Survey of the Carson National Forest (USDA 1987) were reviewed to determine which soil types exist on the allotment. Field surveys, including Parker 3-step and rapid assessment methods (RAM), were conducted and used to determine surface soil properties in key use monitoring locations on the allotment. Based on a review of this data, soil productivity and stability are being maintained on the majority of grazable acres on the allotment. Soil nutrients and surface soil stability are adequate to maintain vegetation growth and cover. However, in some portions of the arid sagebrush and pinyon-juniper woodlands of North and South Lobo pastures, soil nutrients and surface soil stability show signs of degradation and there is a loss of vegetation cover.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment, soil nutrient retention and vegetation growth would improve. Surface soil stability would also improve resulting in less erosion.

Alternative 2

Fewer cattle and more pastures under alternative 2 would reduce grazing intensity from current management of the allotment and improve soil productivity. Pasture rest-rotation and a shorter grazing season would provide rest and recovery periods for forage, increasing or maintaining vegetation cover and soil nutrients. This alternative would also maintain soil stability, preventing excessive erosion. Once Hondo Burn Pasture is included in the rotation there would be less impact on the North and South Lobo pastures and vegetation cover and soil stability would gradually improve.

Alternative 4

More pastures under alternative 4 would reduce grazing intensity from current management of the allotment and improve soil productivity. Pasture rest-rotation would provide rest and recovery periods for forage, increasing or maintaining vegetation cover and soil nutrients. This alternative would also maintain soil stability, preventing excessive erosion. Once the Hondo Burn Pasture is included in the rotation there would be less impact on the North and South Lobo pastures and vegetation cover and soil stability would gradually improve.

There would be short term impacts to soil stability as ground is disturbed for vegetation treatments (2-4 years) within North and South Lobo pastures. Over the long term, vegetative cover would increase, resulting in an increase of surface soil stability, decreased erosion loss and increased nutrient retention (5 years +). Gully treatments in South Lobo Pasture would retain existing soil loss on site, provide for reduced levels of sediment delivery to ephemeral and intermittent channels, and reduce erosion.

Cumulative Effects on Soils

The cumulative effects of past and present activities, such as the effects of the Hondo Fire and post fire treatments, are reflected in the above discussion of soils by alternative. Any proposed road closures would have a beneficial cumulative effect on soils by decreasing erosion in the road bed. By not treating areas with invasive plants there is likely to be a cumulative effect on soils due to increased erosion. Treatment of this infestation is proposed in the upcoming invasive plants EIS. Future treatment of this infestation, combined with light to conservative grazing practices, would cumulatively result in fewer invasive plants.

Riparian Areas, Water Quality, and Wetlands

Water quality depends on the condition of riparian vegetation. Good riparian vegetation along stream banks prevents soils from eroding into streams and creating excess sediment in the water. Riparian condition translates into effects to water quality and aquatic habitat. Livestock grazing and trampling in riparian areas can degrade riparian vegetation and destabilize streambanks. A properly functioning wetland provides a means for filtering water while slowly allowing it to dissipate for use by vegetation. Vegetation composition (sedges and rushes) and soil moisture are key components to wetland function.

Riparian condition data collected in 1989 using the riparian area survey and evaluation system (RASES) and general aquatic wildlife system (GAWS), as well as current field surveys, were reviewed and compared to the desired condition found in the Carson forest plan (USDA 1986). The 1989 data showed the riparian areas were meeting all forest plan criteria at that time, except for shade over water and woody plant composition in some sections of the creek. Current surveys

show vegetation composition and stream sediment in San Cristobal Creek are currently meeting forest plan criteria.

The terrestrial ecosystem inventory (USDA 1987), 1989 RASES data, and ocular field surveys of the allotment were used to identify wetland areas. Wetlands exist in the form of wet meadows in San Cristobal Canyon and also occur in isolated upland meadows associated with springs and seeps. Past and present livestock grazing has resulted in a decrease in wetland function on the allotment. Grazing in wetlands has changed the vegetation composition by reducing rushes and sedges and increasing Kentucky blue grass. Trampling by livestock has compacted soils and reduced soil moisture in wetland areas.

San Cristobal Creek (4.6 miles on the allotment), the only perennial stream within the allotment, is listed on the 2006-2008 State of New Mexico integrated list for surface waters (NMED 2006). The list identifies the creek as fully supporting all designated uses (water supply, fish culture, high quality aquatic life, irrigation, and wildlife habitat). Field surveys on San Cristobal Creek were used to determine if there are specific areas of concern for water quality and did not identify any areas of concern.

Effects by Alternative

Alternative 1

With no livestock grazing in San Cristobal Canyon, riparian vegetation would persist, providing stable conditions and minimizing stream sediment. As a result, all designated uses would continue to be fully supported and current water quality status would be maintained. Without livestock grazing, wetland conditions would improve; therefore, wetland function would also improve.

Alternatives 2 and 4

Alternatives 2 and 4 would allow livestock trailing in San Cristobal Canyon once every three years for 3-4 days under the rest rotation system. This short amount of time would keep grazing impacts, such as streambank trampling and foraging to a minimum and would have little impact on riparian vegetation and sediment into the creek. Riparian vegetation and stream sediment would be expected to improve over existing conditions under this alternative.

These alternatives would meet forest plan direction by maintaining good riparian condition. With very limited grazing in San Cristobal Canyon, under these alternatives, all designated uses would continue to be fully supported and the current water quality status would be maintained. Limited livestock trailing in San Cristobal Canyon and grazing (5-10% forage use once every three years) in the upland meadows would also allow sedges and rushes to reestablish and limit soil compaction within wetland areas. Wetland function under these alternatives would be maintained.

Cumulative Effects on Riparian Areas, Water Quality, and Wetlands

The cumulative effects of past and present activities such as past grazing practices on San Cristobal Allotment are reflected in the discussion of riparian areas and water quality by alternative. There are no reasonably foreseeable activities within San Cristobal Canyon; therefore, no cumulative effects would occur on riparian areas, water quality, and wetlands.

Floodplains

Floodplains reduce the risk of loss due to floods by minimizing the impacts on human safety, health and welfare. Executive Order 11988 requires agencies to restore and preserve the beneficial values served by floodplains. Since San Cristobal Allotment is not mapped for floodplains on the Flood Insurance Rate Maps for Taos County, a field survey was conducted. San Cristobal Creek has a floodplain which functions to disperse excess water flow under normal seasonal conditions and is adequately vegetated to disperse excess water. Under all three alternatives, floodplain function of San Cristobal Creek would be maintained.

Air Quality

Air quality attainment is dependent on the absence of dust and other pollutants. Livestock management activities that could produce dust include herding, gathering, trailing, and vehicle emissions. Taos County is currently considered to be in attainment of all New Mexico and National Ambient Air Quality Standards (NMED 2008).

No dust would be generated under alternative 1 from livestock grazing activities. Under alternatives 2 and 3, prevailing winds and normal ventilation would act to quickly disperse any dust generated from grazing and vegetation treatment activities. Since scale, scope, and duration of dust generating activities would be small and intermittent, air quality attainment status would not be lost under any alternative.

Wildlife

Federally Listed Species

The U.S. Dept. of Interior (USDI) Fish and Wildlife Service (FWS) provided a list of threatened and endangered species that occur in Taos County for consideration in analysis (USDI 2008). Of the three federally listed species, only the Mexican spotted owl (*Strix occidentalis lucida*) warranted further analysis. The southwestern willow flycatcher (*Empidonax traillii extimus*) and black-footed ferret (*Mustela nigripes*) did not warrant further analysis, due to the absence of habitat or critical habitat units.

Protocol surveys for MSO have not been conducted; therefore, presence of MSO is unknown and implied based on suitable habitat. San Cristobal Canyon has 1,470 acres of mixed conifer, which qualifies as restricted or protected Mexican spotted owl (MSO) habitat. Under alternative 1 no livestock management activities would take place so there would be no effect to MSO. Under alternatives 2 and 4 livestock trailing activities would be short term (3-4 days for one year out of three) and occur in less than 1% of restricted and protected habitats on the allotment so there would be no effect to MSO. Under alternative 4, improvements made in vegetation treatment areas and changes in season of use would have no measurable impact on MSO prey species habitats.

Forest Service Sensitive Species

There are 47 species on the Southwestern Regional Forester's Sensitive Species 2007 list that occur on the Carson National Forest. Fourteen of these species are found on San Cristobal Allotment and warranted further analysis:

- American peregrine falcon
- Northern goshawk
- Ermine
- Dwarf shrew
- Long-tailed vole
- Western heather vole
- Alpine larkspur
- Robust larkspur
- Yellow lady-slipper
- Ripley milkvetch
- Western burrowing owl
- Gunnison's prairie dog
- White-tailed jackrabbit
- Rio Grande cutthroat trout (analyzed under Management Indicator Species Section)

American Peregrine Falcon

Preferred foraging areas for falcon occur in riparian areas or adjacent wetlands (USDI 1977); however, some prey species are not associated with riparian habitats. Peregrine falcon may forage as far as 19 miles from their nest sites (USDI 1977). Falcons prey on other birds including seedeaters. The effects of grazing upon seed production could impact the availability and abundance of prey species.

Forest inventory data was used to determine peregrine sites. San Cristobal Canyon is within the foraging area of two known peregrine nest sites and a breeding pair of birds may be present at each site. Possible foraging areas were identified using a 7 to 12.4 mile radius from each nest site. Peregrine foraging habitat also exists over the entire allotment for prey species not tied to riparian habitats.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment this alternative would have no impact to the peregrine falcon population. There would be no loss of prey species availability since all pastures, including falcon foraging habitat quality would improve in condition.

Alternative 2

Following installation of improvements, the available forage in the El Poso and Hondo Burn pastures would be more effectively grazed. Impacts from cattle would be distributed between pastures and vegetation would experience additional rest recovery periods. The rest-rotation system under this alternative would incorporate rest to one pasture annually from grazing. In the pasture that is rested there would be longer rest and recovery periods for forage plant species, which would improve vegetation conditions and seed head availability for peregrine prey. Prey species diversity would be maintained or improved with higher quality habitat conditions;

therefore no impact to falcon individuals, populations, or its prey species would occur under alternative 2.

Alternative 4

Following installation of improvements, the available forage in the El Poso and Hondo Burn pastures would be more effectively grazed. Impacts from cattle would be distributed between pastures and vegetation would experience additional rest recovery periods. The rest-rotation system under this alternative would incorporate rest to one pasture annually from grazing. In the pasture that is rested there would be longer rest and recovery periods for forage plant species, which would improve vegetation conditions and seed head availability for peregrine prey. Vegetation conditions and seed head availability for peregrine prey would improve, especially in the vegetation treatment areas. The changes in entry and exit date would have no impact to peregrine prey species in its principal foraging area in San Cristobal Canyon of the El Poso Pasture. Prey species diversity would be maintained or improved with higher quality habitat conditions; therefore, no impact to falcon individuals, populations, or its prey species would occur under alternative 4.

Northern Goshawk

Suitable foraging habitat for goshawk is associated with mixed conifer and ponderosa pine forests. Goshawks rely on a diversity of prey species, including rabbits, hares, squirrels, and grouse (Hoover and Wills 1987). These animals depend on plant species diversity, plant vigor, ground cover, and availability of seeds. Goshawks will hunt along forest edges and in openings and timber stands adjacent to riparian areas. It is important to maintain prey base species habitats in good to excellent condition to maintain goshawk populations.

The forest vegetation maps were used to delineate potential goshawk nesting and foraging habitat in the allotment. There are 3,459 acres of mixed conifer and ponderosa pine on the allotment for use by goshawks. Field inspections for northern goshawk were conducted on the allotment, and no goshawks were found. For this analysis the presence of goshawks is implied, based upon available suitable habitat which occurs in the mixed conifer and ponderosa pine stands of Poso High Country Pasture.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment this alternative would have no impact to the goshawk population. There would be no loss of prey species availability since all pastures, including goshawk foraging habitat, would improve in condition.

Alternatives 2 and 4

Following installation of improvements, the available forage in El Poso and Hondo Burn pastures would be more effectively grazed. Impacts from cattle would be distributed between pastures and vegetation would experience additional rest recovery periods. The rest-rotation system under these alternatives would incorporate rest to one pasture annually from grazing. In the pasture that is rested there would be longer rest and recovery periods for forage plant species, which would improve vegetation conditions and seed head availability for goshawk prey. Prey species diversity would be maintained or improved with higher quality habitat conditions; therefore no impact to goshawk individuals, populations, or its prey species would occur under alternatives 2 or 4.

Under these alternatives, distribution of livestock and forage use would be adjusted to achieve a light to conservative grazing intensity of 10-40% utilization, meeting guidelines. Utilization would not exceed 35% in key forage areas where vegetation treatments have occurred. In all other vegetation types, utilization would not exceed 40%. A 4-inch stubble height on grasses and forbs will be maintained in all riparian zones. With these mitigation measures, alternatives 2 and 4 would be consistent with the forest plan as related to goshawk.

In addition, under alternative 4, prey species diversity would be maintained or improved with higher quality habitat conditions, especially for rabbits in the vegetation treatment areas. The changes in entry and exit date (compared to the proposed action) would have no impact to goshawk prey species in its foraging areas of the El Poso Pasture.

Sensitive Animal Species Associated with Riparian and Upland Meadow Habitat

Ermine, dwarf shrew, long-tailed vole, and western heather vole are dependant upon a variety of riparian and upland meadow habitats found on San Cristobal Allotment. Each species requires grasses and shrubs for cover and a nearby source of water. Both the long-tailed and heather voles forage on plants including bark, berries, forbs, seeds and shrubs. The dwarf shrew feeds on insects. The ermine's prey includes rabbits, mice and voles which have habitats in burrows and tall grasses. Reductions in forage cover from grazing may result in a decrease in total small mammal and insect biomass (Rickel 2005). Presence of these species on the allotment is unknown and implied, based upon available suitable habitat in San Cristobal Canyon and Poso High Country Pasture. There are 415 acres of suitable riparian and upland meadow habitat for use by these species.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment, riparian and upper meadow vegetation would increase in productivity and cover. Foraging habitat for ermine, dwarf shrew, long-tailed vole and western heather vole would improve in San Cristobal Canyon and Poso High Country Pasture. This alternative would have no impact to the populations of these sensitive species.

Alternatives 2 and 4

Alternatives 2 and 4 would allow livestock trailing in San Cristobal Canyon once every three years for 3-4 days. This short amount of time would keep grazing impacts on riparian vegetation to a minimum and foraging habitat would be expected to improve over existing conditions. El Poso Pasture would be rested two years out of three improving habitats by increasing forage production, cover, and grass heights in the upland meadows. Therefore no impact to ermine, dwarf shrew, long-tailed vole and western heather vole individuals or populations would occur under alternatives 2 or 4.

Under alternative 4, improvements made in vegetation treatment areas does not overlap with habitats for these species and changes in season of use (compared with the proposed action) would not impact the habitat of these species in the El Poso Pasture due to the rest this pasture would receive under alternative 4.

Sensitive Plant Species Associated with Riparian and Upland Meadow Habitat

Alpine larkspur, robust larkspur, and yellow lady-slipper are dependant upon a variety of riparian and upland meadow habitats found on San Cristobal Allotment. Alpine larkspur habitat is in alpine tundra and open meadows of subalpine coniferous forests. Robust larkspur habitat is in

subalpine meadows, riparian woodlands, and canyon bottoms. Under good forage conditions, larkspur is not generally grazed since it is acutely toxic to livestock, however during extreme drought conditions larkspur may be grazed (Ralphs and Pfister 1992). Yellow lady-slipper habitat is in moist soil types on northeast to east facing slopes and in shady canyons. Where found in New Mexico, occurrences of yellow lady-slipper populations are typically 14 plants or less within the general area. Given the low number of individual plants in an area, excess livestock grazing could remove a local population of yellow lady-slipper quickly (Mergen 2006).

A Review of New Mexico Rare Plants was conducted to define suitable habitats. Field surveys were not done for determination of presence or absence of these species. Presence of larkspur and yellow lady-slipper is unknown and implied based upon available suitable habitat in San Cristobal Canyon. There are 2,488 acres of open meadows and subalpine coniferous forests in Poso High Country Pasture where larkspur could be found, and 57 acres of suitable habitat for yellow lady-slipper in San Cristobal Canyon.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment, riparian and upper meadow vegetation would increase in productivity. Habitats for alpine larkspur, robust larkspur, and yellow lady-slipper would improve in San Cristobal Canyon and Poso High Country Pasture. This alternative may have a positive impact to the populations of these sensitive species.

Alternatives 2 and 4

Alternatives 2 and 4 would allow livestock trailing in San Cristobal Canyon once every three years for 3-4 days. This short amount of time would keep grazing and trampling impacts on riparian vegetation to a minimum and habitat would be expected to improve over existing conditions. El Poso Pasture would be rested two years out of three improving habitats by increasing vegetation growth in the upland meadows. This period of rest would allow alpine and robust larkspur and yellow lady-slipper to set seed and remain persistent over time. Their populations may increase under alternatives 2 or 4.

Under alternative 4, improvements made in vegetation treatment areas does not overlap with habitats for these species and changes in season of use (compared with the proposed action) would not impact the habitat of these species in the El Poso Pasture due to the rest this pasture would receive under alternative 4.

Sensitive Plant Species Associated with Open Woodlands

Ripley milkvetch habitat is in open woodlands including ponderosa pine and pinyon juniper forest edges, and shrub dominated areas. Livestock grazing has been suggested as being a significant threat due to the high palatability of the stems and observed grazing activity (Naumann 1990, Lightfoot 1995). Field observations have noted that this plant is often grazed to ground level. In a review of grazing impacts upon similar species Ladyman (2003) indicated that high livestock stocking rates and repeated spring grazing would have a detrimental effect on populations other than just seed loss. Rest-rotation grazing systems in which spring grazing occurs only one in three years and deferring grazing until after seed set appear to have a positive impact on milkvetch populations by allowing time to recover from forage removal, trampling, and seed dispersal.

Reviews of available scientific literature were used to identify effects of livestock grazing on milkvetch. On San Cristobal Allotment, milkvetch is not found in open grasslands due to grazing pressures, but is found in protected areas under shrubs. Field surveys were not done for determination of presence or absence of milkvetch within this allotment, but it has been observed in Poso High Country Pasture. Presence of milkvetch is unknown but implied in the North and South Lobo pastures. Estimated suitable habitat for milkvetch occurs on 2,179 acres of the allotment.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment this alternative would have no impact to the Ripley milkvetch population but individuals would increase because vegetation growth would increase and plants would be able to set seed annually.

Alternative 2

Following installation of improvements, the available forage in El Poso and Hondo Burn pastures would be more effectively grazed. Impacts from cattle would be distributed between pastures and vegetation would experience rest-rotation and a shorter season of use. The rest-rotation system under this alternative would incorporate rest to one pasture annually from grazing. In the pasture that is rested there would be longer rest and recovery periods for Ripley milkvetch from livestock foraging and trampling, which would improve the ability to set seed annually and result in a possible increase to individuals under this alternative.

Alternative 4

Following installation of improvements, the available forage in El Poso and Hondo Burn pastures would be more effectively grazed. Impacts from cattle would be distributed between pastures and vegetation would experience rest-rotation and a shorter season of use. The rest-rotation system under this alternative would incorporate rest to one pasture annually from grazing. In the pasture that is rested there would be longer rest and recovery periods for Ripley milkvetch from livestock foraging and trampling, which would improve the ability to set seed annually and result in a possible increase to individuals under this alternative.

Vegetation treatments would improve habitat conditions on an additional 603 acres. However, increasing the season of use and increasing livestock numbers above the levels of Alternative 2 would increase the opportunity for livestock to graze these plants and reduce this species' ability to set seed. In this regard, alternative 2 is better than alternative 4 for this species due to its palatability.

Sensitive Animal Species Associated with Arid Sagebrush and Grasslands Habitat

Western burrowing owl, Gunnison prairie dog, and white-tailed jackrabbit are dependant upon arid sagebrush and grassland habitats found on San Cristobal Allotment. Suitable habitat for these species depends on ground cover, plant vigor, and plant species diversity. Prey species availability depends on ground cover and seed and insect availability. Burrowing owls depend on small mammal burrows and sparse vegetation for nesting and visibility of approaching predators and feed on insects (Johnson and Anderson 2002). Burrowing owls prefer burrows that have been moderately to heavily grazed by livestock, however they have been documented using foraging habitat with tall grass cover if prey is abundant but are at an increased risk of predation due to decreased visibility (McDonald et al. 2004 and Kantrud and Kologiski 1983).

Habitat for prairie dogs and jackrabbits is open grassland and sagebrush plains in well drained deep soils associated with short, sparse vegetation for visibility of approaching predators (Wagner and Drikamer 2004). Prairie dogs and jackrabbits forage on native grasses, forbs, sedges, and seeds. Overgrazing and over stocking of livestock would alter native plant species composition, negatively impacting habitat suitability for prairie dogs and jackrabbits by decreasing forage availability during critical periods in their lifecycles.

Forest vegetation maps were used to delineate potential sagebrush and grassland habitats for these species on San Cristobal Allotment. Surveys for these species have not been conducted; therefore their presence is unknown and implied based upon available suitable habitat. White-tailed jackrabbit is known to exist in the upper Rio Grande Valley where this allotment is located (NMDGF 2008). There are 756 acres of suitable sagebrush and grassland habitat on the allotment for possible use by these species.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment this alternative would have no impact to the population but individuals may increase (except burrowing owls) because foraging habitat and prey species availability would increase. Increased vegetation heights (over 4 inches) may lead to burrowing owl habitat abandonment due to less sight distance to detect predators.

Alternatives 2 and 4

Following installation of improvements, the available forage in El Poso and Hondo Burn pastures would be more effectively grazed. Impacts from cattle would be distributed between pastures and vegetation would experience rest-rotation and a shorter season of use. The rest-rotation system under these alternatives would incorporate rest to one pasture annually from grazing. Foraging habitat for prairie dog and jackrabbit is expected to improve. Suitable habitat for burrowing owls would be maintained in the moderately grazed pastures. There would be a possible increase to individuals due to habitat and forage improvements, but no impact to the populations.

In addition, under alternative 4, improvements made in vegetation treatment areas and changes in season of use would improve grassland habitat conditions for burrowing owl, prairie dog and white-tailed jackrabbits. Changes in the season of use (compared to alternative 2) would not impact these species since livestock vegetation disturbances are compatible with the life histories of these species.

Forest Management Indicator Species

The Carson Forest Plan identified eleven wildlife species as management indicator species (MIS) to monitor the conditions of the forest's ecosystems. The forest plan provides direction on managing quality habitat for MIS by management area. These MIS are considered to be representative for a variety of other species with similar life requirements and were determined to reflect the habitat needs for the majority of the forest's species. MIS were selected because population changes are believed to indicate the effects of management activities that occur on the forest.

All 11 MIS or species groups were considered for San Cristobal Allotment. Elk, brewer's sparrow, resident trout, and aquatic macroinvertebrates are found to have the potential of being affected by the alternatives and were evaluated in detail. The remaining MIS that are not

evaluated in detail are listed in table 6 with reasons why there are no effects under either alternative.

Table 6. Management indicator species not affected by livestock grazing on San Cristobal Allotment.

MIS	Key Habitat Component	Reasons for No Effect
Juniper Titmouse	Pinyon juniper canopies	Cattle do not generally graze within this habitat on this allotment and they have no effect on the tree canopies.
Abert's Squirrel	Interlocking canopies (ponderosa pine)	Cattle do not generally graze within this habitat on this allotment and they have no effect on interlocking tree canopies.
Hairy Woodpecker	Snags	Cattle have no effect on snags.
Red Squirrel	Mixed conifer	Cattle do not generally graze within this habitat due to a lack of understory forage and they have no effect on mixed conifer.
Turkey	Old growth ponderosa pine (roost trees)	Cattle have no effect on old growth ponderosa pine roost trees.
Bighorn Sheep	Alpine, subalpine tundra mountain meadow grassland	No overlapping use of cattle with seasonal bighorn sheep use in limited subalpine ranges therefore cattle would have no effect.
White-Tailed Ptarmigan	Alpine tundra, subalpine deciduous shrub	No grazable area for cattle near or adjacent to alpine tundra therefore cattle would have no effect.

Elk (general forest)

The Carson Forest Plan EIS identifies elk as an indicator of general forest habitat type (USDA 1986). Elk habitat from 1986 to 2005 increased from 1,362,760 acres to 1,424,074 acres of habitat due to inclusion of sagebrush as habitat for the elk (USDA 2007). The population and habitat trends for elk are stable on the forest (USDA 2007). From 1999-2003, the population was estimated to range from 300-500 head within the game management unit 53, which covers most of the Questa Ranger District excluding the Valle Vidal. It is estimated that up to 75 elk use San Cristobal Allotment at any one time. Elk utilize all pastures of San Cristobal Allotment including areas that overlap livestock key use areas. Site inspections of the pastures on these allotments show elk are using a variety of habitats found on these allotments. Field inspections of the allotment were used to show elk utilization of pastures.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment elk populations would not be impacted by cattle. There would be improved habitat due to increased forage production, but the total acres of available habitat would remain unchanged. There would be no change in forest-wide habitat and population trends for elk under this alternative.

Alternatives 2 and 4

Temporary displacement of up to 75 elk may occur due to the occasional presence of cattle in all pastures of the allotment. This would not result in a change of elk population. The habitat would improve due to increased forage production, but the total acres of available habitat would remain unchanged. There would be no change in forest-wide habitat and population trends for elk under these alternatives.

In addition, under alternative 4, improvements made in vegetation treatment areas would improve elk habitat diversity and condition on 603 acres, but total acres of available habitat would remain unchanged. Temporary displacement of up to 75 elk due to varied cattle presence throughout the grazing season may occur and would last longer due to the 47 day increase in season of use (compared with the proposed action). Less forage would be available for elk due to displacement by livestock.

Brewer's Sparrow (sagebrush)

Brewer's sparrow is an indicator species for sagebrush on the Carson National Forest (USDA 1986). The habitat trend for Brewer's sparrow is up by about 55 percent or 29,152 acres on the forest.). The forest has over 73,000 acres of sagebrush. The vegetation treatment areas fall within Forest Management Area 11, which directs for the maintenance of grasses and forbs (not sagebrush) within these treatment areas. The effects analysis for the forest plan EIS took into account the maintenance of MA 11 in grasses by stating, "...Brewer's sparrow populations may decrease over time in specific areas impacted by management activities, but populations will be maintained at levels greatly exceeding minimum viable populations" (USDA 1986, p. 238). Based on its current distribution throughout New Mexico and past habitat alterations, as well as, current management practices, the population trend for the Brewer's sparrow on the Carson National Forest is considered to be stable.

Brewer's sparrow habitat is sagebrush and understory grasses where nests are on the ground concealed by vegetation. Nests on the ground near sagebrush are susceptible to occasional trampling from livestock. Forage for the Brewer's sparrow is insects and seeds.

Suitable habitat for Brewer's sparrow exists across all pastures on San Cristobal Allotment. Forest Service specialists reviewed vegetation type maps and inspected the project area to identify 756 acres of sagebrush on the allotment available for use by this species. Forest Service staff reviewed the Carson National Forest bird monitoring reports (Beason et al. 2005 and 2006) for possible occurrences of Brewer's sparrow on the allotment; however, none of the point transects in the two reports indicated finding this species on the allotment.

Effects by Alternative**Alternative 1**

With no livestock grazing on the allotment Brewer's sparrow populations would not be impacted by cattle. Due to increased vegetation growth the habitat quality would improve and the total acres of available habitat would remain unchanged. There would be no change in forest-wide habitat and population trends for Brewer's sparrow under this alternative.

Alternative 2

This alternative would not result in a change of Brewer's sparrow population across the forest. Individuals may be displaced due to possible cattle trampling of ground nest sites. Implementation of a rest rotation grazing system would improve Brewer's sparrow habitat with

improved vegetation growth, available forage and increased seed availability; total acres of available habitat would remain unchanged. There would be no change in forest-wide habitat and population trends for Brewer's sparrow under this alternative.

Alternative 4

This alternative would not result in a change of Brewer's sparrow population across the forest. Individuals may be displaced due to possible cattle trampling of ground nest sites. Implementation of a rest rotation grazing system would improve Brewer's sparrow habitat with improved vegetation growth, available forage and increased seed availability; total acres of available habitat would remain unchanged.

Vegetation treatment areas would remove 603 acres (80%) of the 756 acres of shrub habitat. Displacement of individuals may occur within 603 acres of the vegetation treatment areas as shrub cover needed by this species is removed, which would expose more nest sites to trampling. Extending the grazing season and increasing livestock numbers (compared to the proposed action) would increase the incident of livestock trampling of nest sites where sagebrush habitat remains. In this regard Alternative 2 has less impact on this species than Alternative 4.

There would be no change in forest-wide habitat and population trends for Brewer's sparrow under this alternative.

Resident Trout (Rio Grande Cutthroat Trout) and Aquatic Macroinvertebrates (perennial stream and riparian)

Resident trout and aquatic macroinvertebrates (aquatic insects) are indicator species for perennial stream and riparian habitat on the Carson National Forest (USDA 1986). Rio Grande cutthroat trout are the only resident trout in San Cristobal Creek. The habitat trend for both cutthroat trout and aquatic insects is stable on the forest (USDA 2007). Based on its current distribution throughout New Mexico, past habitat alterations, and current management practices, the population trend for these species on the Carson National Forest is considered to be stable (USDA 2007).

Cutthroat trout and aquatic insect habitat is clear, cold, perennial streams with consistent water flow. Stream bottom substrate needs to consist of gravel with low sedimentation to allow for aquatic insect reproduction. Overhanging stream bank vegetation and large woody debris provide deep pools for overwintering trout survival and for maintaining cool water temperatures. Livestock trailing along the creek could cause streambank trampling and forage removal; therefore adding sedimentation and removing overhanging vegetation.

San Cristobal Creek has 2.6 miles of suitable habitat for these species. The current condition of the creek and riparian areas is good with stable populations of cutthroat trout and aquatic insects. Surveys by New Mexico Department of Game and Fish found San Cristobal Creek to contain pure populations of Rio Grande cutthroat trout. Native Rio Grande cutthroat trout are the only resident trout present in San Cristobal Creek.

Effects by Alternative

Alternative 1

With no livestock grazing on the allotment, Rio Grande cutthroat trout and aquatic macroinvertebrate populations would not be impacted by cattle. Due to increased vegetation growth the habitat quality would improve, stream sediments would be minimal, and the total

miles of available habitat would remain unchanged. There would be no change in forest-wide habitat and population trends for cutthroat trout or aquatic insects under this alternative.

Alternatives 2 and 4

These alternatives would not result in a change of Rio Grande cutthroat trout and aquatic macroinvertebrate populations. Alternatives 2 and 4 would allow livestock trailing in San Cristobal Canyon once every three years for 3-4 days. This short amount of time would keep grazing impacts, such as streambank trampling and foraging to a minimum and would have little impact on riparian vegetation and sediment into the creek. Riparian vegetation and stream sediment would be expected to improve over existing conditions under these alternatives. Due to improved vegetation growth, available forage and habitat quality would increase and total miles of available habitat would remain unchanged. There would be no change in forest-wide habitat and population trends for cutthroat trout or aquatic insects under these alternatives.

Under alternative 4, improvements made in vegetation treatment areas does not overlap with habitats for these species and changes in season of use would not impact the habitat of these species in the El Poso Pasture due to the rest this pasture would receive under Alternative 4.

Migratory Birds

Partners in Flight (PIF) identifies physiographic areas and high priority migratory bird species by broad habitat types. They also developed a list of priority breeding bird species by habitat type. Information from the PIF website was reviewed for this analysis (PIF 2003).

In February 2003, the U.S. Fish and Wildlife Service released its birds of conservation concern 2002 report (USDI 2002). Table 7 identifies migratory birds that were reviewed but no effects were identified.

Table 7. Migratory bird species not affected by livestock grazing on San Cristobal Allotment.

Species	Habitat Type	Reasons for No Effect
gray flycatcher, pinyon jay, black throated gray warbler	pinyon juniper woodland	Cattle do not generally graze within this habitat on this allotment due to a lack of understory forage and they have no effect on these species.
flamulated owl, Grace's warbler	ponderosa pine woodland	Cattle do not generally graze within this habitat on this allotment due to a lack of understory forage and they have no effect on these species.
William's sapsucker, olive-sided flycatcher, dusky flycatcher	mixed conifer forest	Cattle do not generally graze within this habitat due to a lack of understory forage and they have no effect on these species.
boreal owl	spruce-fir subalpine forest	Cattle do not generally graze within this habitat due to a lack of understory forage and they have no effect on these species.
green-tailed towhee, MacGillivray's warbler	montane shrub	Cattle do not generally graze within this habitat on this allotment due to a lack of understory forage and they have no effect on these species.
white-tailed ptarmigan, brown-capped rosy	alpine tundra	Cattle do not generally graze within this habitat on this allotment due to a lack of forage within, near, or

Species	Habitat Type	Reasons for No Effect
finch		adjacent to alpine tundra.

Table 8 summarizes the effects of livestock grazing on priority species and birds of conservation concern. Brewer’s sparrow is a priority migratory bird with possible habitat on the allotment, but has been analyzed under the MIS section.

Table 8. Effects of activities on migratory birds and their habitat types on San Cristobal Allotment.

Species	Key Habitat Component	Effects
Ferruginous Hawk	<ul style="list-style-type: none"> • Close proximity to high quality grasslands or irrigated agricultural lands. • Prefers forest edge or mature isolated flat top junipers with thick support branches for nests. • Prey is small to medium sized mammals. 	<p>Alternative 1: No impact to populations. Improved habitat conditions would result in increased prey species availability.</p> <p>Alternatives 2 and 4: Possible increase in individuals and their prey species. No impact to the population. Increase in vegetation growth in rested pastures would improve habitat and availability of prey species. Under alternative 4, vegetation conditions and seed head availability for prey species would improve in the vegetation treatment areas.</p>
Virginia’s Warbler	<ul style="list-style-type: none"> • Habitat is ponderosa pine and pinyon juniper forests with an understory of thick shrubs or herbaceous vegetation, including areas adjacent to ponderosa pine forests. • Nests on the ground at the base of shrubs concealed by vegetation cover. • Forages on the ground for insects in thick brush or captures insects in flight (Nature Serve 2008). 	<p>Alternative 1: No impact to populations. Improved habitat conditions would result in increased insect prey species availability.</p> <p>Alternative 2: Possible increase in individuals in rested pastures. Displacement of individuals due to possible trampling of ground nest sites in pastures that are grazed. Available forage and habitat quality would improve in rested pastures. No impact to the population.</p> <p>Alternative 4: Similar to effect of alternative 2; however, a longer season and higher livestock numbers would increase the incident of livestock trampling of nest sites.</p>
Blue Grouse	<ul style="list-style-type: none"> • Shrub areas adjacent to spruce fir and ponderosa pine forests (within 1.2 miles). • Nests on the ground at the base of shrubs, logs, and rock overhangs concealed with vegetation cover. • Forages for seeds, plants, and insects. 	Same effects as Virginia’s warbler.

Cumulative Effects on Wildlife

The cumulative effects of past and present activities such as Hondo Fire, past mechanical treatments, and grazing on adjacent allotments, are reflected in the previous effects discussions of this document of federally listed, Forest Service sensitive, management indicator, and migratory

bird species. Current conditions reflect these past and present activities. Under any of the alternatives any proposed road closures would have a beneficial cumulative effect on wildlife in general due to less disturbance from the presence of vehicles and vegetation growth in the roadbed over time.

It is estimated that 12 acres of San Cristobal Allotment are currently infested with Canada thistle, yellow toadflax, hoary cress and bull thistle. This is a relatively small acreage of invasive plants and is not having an impact on various resources at this scale. If treatment of these species does not occur there is potential for invasive plant populations to expand and impact forage production and habitats. Treatment of this infestation is proposed in the upcoming invasive plants EIS. Future treatment of this infestation, combined with light to conservative grazing practices, would cumulatively result in fewer invasive plants.

Cultural Resources

About 1,500 acres or 14 percent of the total allotment has been surveyed for heritage resources, which included 40% of the grazable acres. Archaeologists completed surveys of the open areas in pastures, fence lines, stock tanks, access roads, and areas where past range improvements were done such as ripping, chaining, bulldozer tree-push, mowing and seeding. There were 155 archaeological sites recorded, the majority being prehistoric chipped stone scatters. No Traditional Cultural Properties, sensitive cultural sites, or National Register Historic Properties were identified or recorded on San Cristobal Allotment.

In addition to field surveys, the site atlas, literature, GLO maps, Taos County mining records, mineral surveys, and survey plats were reviewed. The district archaeologist had personal communication with range and other resource specialists who visited the allotment. An archaeological clearance and inventory standards and accounting (IS&A) report has been completed based on a no adverse effect to cultural resources determination.

The Southwestern Region First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities (Grazing Protocol) (USDA 2003) was followed. Any future ground-disturbing improvements on the allotment not covered in this EA or previous archaeological clearance would be subject to separate Section 106 consultation prior to implementation.

Effects of All Alternatives

Under alternative 1 with no livestock grazing on the allotment, no adverse effect to non-sensitive cultural sites would occur. Alternatives 2 and 4 would have the possibility of livestock trampling on non-sensitive cultural sites, which may make individual sites vulnerable to erosion. Some of these non-sensitive cultural sites were disturbed during historical mechanical vegetation treatments. Field observations show effects of cattle trampling would not impact the sites further than they have already been disturbed and would not result in adverse effects to any sites. Under Alternative 4, eligible sites would be avoided during implementation of ground-disturbing vegetation treatments.

Cumulative Effects on Cultural Resources

The cumulative effects of past and present activities such as past mechanical vegetation treatments, are reflected in the previous discussion on non-sensitive sites. Under either alternative any proposed road closures, resulting in less access to sites would have a beneficial cumulative

effect on sites. It is estimated that 12 acres of San Cristobal Allotment are currently infested with Canada thistle, yellow toadflax, hoary cress and bull thistle. This is a relatively small acreage of invasive plants and is not having an impact on various resources at this scale. Invasive weed treatments will be subject to review by the archaeologist prior to implementation.

Wilderness

A portion (8,313 acres) of the Columbine-Hondo Wilderness Study Area (WSA) is within Poso High Country Pasture. The Wilderness Act allows livestock grazing to occur within wilderness areas and WSA's. There are 292 acres of grazable areas in the WSA in the Poso High Country Pasture. The Columbine-Hondo WSA is managed for the wilderness characteristics of solitude, and primitive unconfined recreation and a visual quality objective of preservation. The visual quality objective is to preserve the natural landscape absent of man-made developments. Under any alternative no fence or water developments or vegetation treatments would occur within the WSA; therefore, the wilderness characteristics would be retained.

Wild and Scenic Rivers

The rim of the Rio Grande Gorge is the western boundary of San Cristobal Allotment (3 miles along allotment boundary). Because of its wild and scenic values, the Rio Grande has been congressionally designated as a Wild and Scenic River. Livestock grazing is an accepted use within a wild and scenic river corridor. Grazing within the pastures occasionally occurs up to the rim of the gorge.

San Cristobal Creek has been deemed eligible as a Wild and Scenic River by the Forest Service for the outstandingly remarkable values of fish, wildlife, and riparian. Short-term, periodic livestock trailing through San Cristobal Canyon do not have impacts on the eligibility values in San Cristobal Creek.

Alternative 1 would have no effect on the Rio Grande Wild and Scenic River. Livestock grazing management activities under alternatives 2 and 4 would be consistent with the BLM river management plan for the Rio Grande Wild and Scenic River Corridor and would not compromise its wild and scenic river values. Under all alternatives the eligibility values of fish, wildlife, and riparian would be maintained along San Cristobal Creek. There would be no fence or water developments or vegetation treatments under any alternative within the designated or eligible wild and scenic river corridors.

Economics

For the past 5 years the permittees have been stocking the allotment with 35-90 head of cattle for 4.25 months. This would generate an estimated \$5,454 to \$14,025 gross annual income from the time livestock would spend on the allotment. This is a very general estimate of income, not profit, and doesn't include the various expenses that normal livestock operations require, such as veterinarian fees, equipment maintenance (trucks and trailers) etc., which can be extremely variable between operations. It gives a general idea of income being generated from the livestock operation on the allotment and is a basis for comparison of alternatives.

A cow-calf income spreadsheet was used to estimate the total gross income an operator could attribute to their livestock operation on the grazing allotment. The number of cows to be stocked

was multiplied by the percent calf crop to estimate how many calves are born. It was assumed that all of the steers, culled cows, and remaining heifers would be sold. The calculations take into account an estimate of the operation's calf crop percentage, cull rate, and weight of animals sold. The value per animal sold yearly (cow, calf, steer) is estimated from weekly livestock auction reports by the USDA Agriculture Marketing Service. These figures change daily or weekly and are a point-in-time estimate for comparison of alternatives.

The cow-calf income spreadsheet factors in the portion of the year attributed to time spent on the allotment, with the remainder of the year being attributed to time elsewhere (private land, etc). For example, the season of use proposed on San Cristobal Allotment is 4 months out of 12 months, so only 4/12ths of the total gross income is attributed to time spent on the allotment.

Effects by Alternative

Alternative 1

Under alternative 1, with no permitted livestock no income would be generated from use of the allotment. This alternative would have the largest impact on the permittees.

Alternative 2

Under Alternative 2, an estimated \$8,800-\$13,200 would be the portion generated from the time livestock would spend on the allotment (4 months would be 1/3 of their operation), if 60-90 cow-calf pairs are stocked. The shortened season of use may have an impact on the permittees' overall livestock operations if they have to hold cattle longer on hay producing fields before putting them on the allotment. This may cause increased expenses with having to purchase hay due to an extended presence of cattle on the hay producing fields.

Alternative 4

Under alternative 4, once the Hondo Burn Pasture is usable and the vegetation treatments are established, an estimated \$12,100-\$25,000 would be the portion generated from the time livestock would spend on the allotment (5.5 months would be almost 1/2 of their operation), if 60-124 cow-calf pairs are stocked. Prior to completion of all of the improvements, the actual numbers are likely to be similar to what is currently being stocked. Thus, in the short term, there would not be much actual change to the income generated from operation of the San Cristobal permits. In the longer term, there would be an increase from what is currently being generated.

Social Environment

The grazing operation for San Cristobal Allotment is a "community allotment" operation. The permittees use private lands to graze their livestock when they are not on the allotment. Small-scale producers stress the importance of the quality of life that ranching provides them and their families. Owning livestock is an important way of reaffirming ties to their ancestral lands and heritage. Preserving this working relationship with the land so it can be passed on to their children along with a feeling of self-sufficiency is a cornerstone of their values. Generally speaking, the more rural and remote the community, ranching becomes more important.

Effects of All Alternatives

Under alternative 1, the effect on the permittees would depend on how well they could adjust their operations. The permittees would have to find alternate sources for the placement of their livestock, reduce the numbers of animals in their herds, or completely cease operations.

Eliminating grazing completely may also create the impression of unfairness or "taking" by the Federal government.

Continued grazing under alternatives 2 and 4 would allow existing traditions, sense of community and personal identity to continue. The permittees would continue to have responsibility for checking up on their grazing animals and maintaining improvements on the allotment, but this investment of time and cost would generally be considered worthwhile in order to retain authorization for grazing the same numbers of livestock for the same season in the same location. Alternatives 2 and 4 would meet the purpose and need of contributing to the social well-being of affected livestock operators and their families.

Chapter 4 - Consultation and Coordination

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

Federal and State Officials and Agencies

New Mexico State Historical Preservation Office (NM SHPO)
State of New Mexico Department of Game and Fish
State of New Mexico Environment Department
US Department of the Interior, Fish and Wildlife Service

Local Government

Organized Village of Questa

Tribes

Pueblo of Jemez	Pueblo of Taos
Jicarilla Apache Nation	Pueblo of Tesuque
Pueblo of Nambe	Pueblo of Zuni
Pueblo of Picuris	The Hopi Tribe
Pueblo of Pojoaque	The Navajo Nation
Pueblo of San Ildefonso	Southern Ute Tribe
Pueblo of San Juan	Ute Mountain Ute Tribe
Pueblo of Santa Clara	Comanche Tribe

Organizations

Forest Guardians	Northern New Mexico Stockman's Association
Center for Biological Diversity	Carson Forest Watch
Wild Watershed	Forest Conservation Council
Sierra Club Santa Fe Group	New Mexico Cattle Grower's Association
Forest Trust	Amigos Bravos
La Lama Neighborhood Association	

Individuals

Crestina Armstrong	Erik Ryberg
Larry Mondragon	Michael Ortiz
Favian Marquez	Annabelle Cordova
Andres Gallegos	Carlos Benavidez
Larry and Patti Matschke	

Chapter 5 - References

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Chapter 6 – List of Preparers

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Tami Conner	Interdisciplinary Team Leader
Jack Carpenter	Interim Interdisciplinary Team Leader
Michael Casados	Questa District Range Staff (Rangeland Vegetation)
George Long	Questa District Wildlife Biologist (Wildlife, Fisheries)
Alyssa Radcliff	Questa District Range Technician (Soils, Water, Air, GIS, Wildlife)
Carrie Leven	Questa District Archaeologist (Heritage)
Paul Mondragon	Questa District Assistant Fire Management Officer
Rob Deyerberg	Questa District Recreation Technician (Recreation)
Donna Storch	Forest Fisheries Staff (Fisheries Review)
Greg Miller	Forest Watershed Program Manager (Soils, Water, Air Review)
Chirre Keckler	Forest Wildlife Program Manager (Wildlife Review)

Appendix A. Project Record Index

DOC #	DATE	DOCUMENT	AUTHOR	RECIPIENT
VOLUME 1:				
01	1972.03.06	Region 3 Policy on Managing National Forest Land in Northern New Mexico	USDA Forest Service	Public
02	1986.09.30	Final Environmental Impact Statement, Carson National Forest Plan	USDA Forest Service	Public
03	1986.10.31	Carson National Forest Plan Record of Decision	USDA Forest Service	Public
04	1986.10.31	Carson National Forest Plan	USDA Forest Service	Public
05	1987	Terrestrial Ecosystems Survey of the Carson National Forest	USDA Forest Service	Public
06	1988.04	Forest Service Handbook (FSH), Chapter 40 - Range Analysis and Management Handbook	USDA Forest Service	Public
07	1995.07.27	Summary of the Rescission Act in reference to grazing on NFS lands		
08	2004.12.01	Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands	USDA Forest Service, Region 3 Regional Forester	Forest Supervisors
09	2005.09.09	FSH 2209.13 Grazing Permit Administration Handbook, Chapter 90 – Rangeland Management Decisionmaking	USDA Forest Service	Public
10	2006.09.22	NEPA notification letters (5) to permittees	District Ranger	San Cristobal Allotment permittees
11	2006.11.15	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
12	2006.12.18	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
13	2007.02.06	Letter (5) to permittees calling a meeting on 2007.02.23	Acting District Ranger	San Cristobal Allotment permittees
14	2007.03.15	2007 Annual Operating Instructions (AOI's) with cover letters (5)	Acting District Ranger	San Cristobal Allotment permittees
15	2007.05.01	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File

DOC #	DATE	DOCUMENT	AUTHOR	RECIPIENT
16	2007.05.02	Letter (5) to permittees calling a meeting on 2007.05.16	Acting District Ranger	San Cristobal Allotment permittees
17	2007.05.16	Notes on meeting with permittees	ID Team Leader	File
18	2007.05	Principles of Obtaining and Interpreting Utilization Data on Rangelands	Smith, Lamar, et al.	File
19	2007.06	Management Indicator Species Assessment on CD	USDA Forest Service	Carson National Forest
20	2007.07.22	Letter from Center of Biological Diversity requesting to be placed on mailing list	Greta Anderson	Carson National Forest
21	2007.09.08	Region 3 Supplement to Forest Service Handbook Grazing Permit Administration 2209.13 Ch. 90	USDA Forest Service	Public
22	2007.10.01	ID Team field trip notes	ID Team Leader	File
23	2007.10.12	Presentation (Powerpoint slides) on San Cristobal Allotment range analysis for the past 16 years	District Range Technician	ID Team and San Cristobal Allotment permittees
24	2007.10.19	ID Team field trip notes with photos	ID Team Leader	File
25	2007.10.19	Field data sheets for Parker 3 Step analysis dated from 2006.09.24 through 2007.10.19	District Range Technician	File
26	2007.10.19	Field photos from range monitoring dated from 2006.09.27 through 2007.10.19	District Range Technician	File
27	2007.10.25	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
28	2007.11.29	Pre-scoping letter from State of New Mexico Dept. of Game and Fish on allotment analysis	Matthew Wunder, Chief Conservation Services Division	District Ranger
29	2007.12.05	Project initiation letter	District Ranger	ID Team
30	2007.12.07	Letter (5) to permittees calling a meeting on 2007.12.13	Acting District Ranger	San Cristobal Allotment permittees
31	2007.12.10	List of allotment range improvements	District Range Technician	File
32	2007.12.13	Notes on meeting with permittees	ID Team Leader	File

DOC #	DATE	DOCUMENT	AUTHOR	RECIPIENT
33	2007.12.20	Scoping letter and mailing list	District Ranger	Public, environmental groups, agencies
34	2008.01.04	Response to scoping letter from State of New Mexico Dept. of Game and Fish	Matthew Wunder, Chief Conservation Services Division	District Ranger
35	2008.01.08	Scoping letter to tribal contacts with mailing list attached	District Ranger	33 tribal contacts
36	2008.01.11	Response to scoping letter from permittee	Favian Marquez	District Ranger
37	2008.01.14	Response to scoping letter from Western Watersheds Project	Erik Ryberg, Attorney for Western Watersheds Project	District Ranger
38	2008.01.24	Response to scoping letter from permittee	Andres Gallegos	District Ranger
39	2008.01.30	Letter requesting to be placed on mailing list	Erik Ryberg, Attorney	Carson National Forest
40	2008.02.06	Range monitoring details from 2001-2007	District Range Technician	File
41	2008.02.26	Note from range specialist to IDT leader regarding alternatives	District Range Staff	File
42	2008.02.27	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
43	2008.03.05	Response to scoping letter from The Navajo Nation	Tony Joe	District Ranger
44	2008.03.07	Notes on meeting with permittees on AOIs	ID Team Leader	File
45	2008.03.14	Notes on meeting with permittees on alternatives	ID Team Leader	File
46	2008.03.14	Noxious weed risk assessment	District Range Technician	File
47	2008.03.16	Letter from permittees in response to meeting on 2008.03.14	Favian Marquez	District Ranger
48	2008.03.18	2008 Annual Operating Instructions (AOI's) with cover letters (5)	Acting District Ranger	San Cristobal Allotment permittees
49	2008.05.07	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File

DOC #	DATE	DOCUMENT	AUTHOR	RECIPIENT
50	2008.05.29	Signed issues determination letter	District Ranger	ID Team
51	2008.05.29	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
52	2008.06.03	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
53	2008.06.06	Signed alternatives letter	District Ranger	ID Team
VOLUME 2:				
54	2008.07.01	SOPA Quarterly from 2007.04.01 through 2008.07.01 with mailing list	Carson S.O.	Public
55	2008.07.28	30-day notice and comment document with cover letter and mailing list	District Ranger	Public
56	2008.07.31	Taos News legal notice for 30-day notice and comment document	ID Team Leader	The Taos News
57	2008.08.05	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
58	2008.08.07	The Taos News – article on 30-day notice and comment period	The Taos News	Public
59	2008.08.11	Carson NF public website with 30-day notice and comment document posted	ID Team Leader	Public
60	2008.08.22	Biological Evaluation – alts 1, 2, and 3	District Wildlife Biologist	File
61	2008.08.27	Biological Assessment – alt 2	District Wildlife Biologist	File
62	2008.08.28	Notes on meeting with permittees on proposed action	Dan Rael, Carson NF Resource Staff Officer	File
63	2008.08.28	Letters (10) received during 30-day notice and comment period dated from 2008.08.05 through 2008.08.28	10 commenters, see index in project record for list of names	District Ranger
64	2008.08.29	Effects analyses of alts 1, 2 and 3 by resource with citations	Resource specialists	File
65	2008.08.29	GIS maps (7) of allotment: vegetation, forest plan management areas, TEU, WSA, general location, range improvements, key areas	GIS Specialist	File

DOC #	DATE	DOCUMENT	AUTHOR	RECIPIENT
66	2008.09.05	Interdisciplinary (ID) Team meeting notes	ID Team Leader	File
67	2008.09.05	Content analysis on comments received during 30-day notice and comment period	ID Team Leader	File
68	2008.09.08	Carrying capacity report	District Range Specialist	File
69	2008.09.08	Interdisciplinary (ID) Team meeting notes in reference to range capacity and permittee meeting on 2008.08.28	ID Team Leader	File
70	2008.09.23	Notes on meeting with permittees on proposed action	ID Team Leader	File
71	2008.09.25	Letter to IDT from District Ranger, removing Alt 3 from detailed analysis	District Ranger	IDT
72	2008.09.26	Heritage Report NMCRIS No: 111404; No Adverse Effect with Concurrence from State Historic Preservation Officer	District Archaeologist	Forest Supervisor
73	2008.10.16	IDT meeting – discussion of new alternative	ID Team Leader	File
74	2008.10.16	Carrying capacity report with new alternative capacity calculations	District Range Specialist	File
75	2008.10.17	Cow/calf income worksheet	ID Team Leader	File
76	2008.10.21	Letter to IDT from District Ranger, directing analysis of Alternative 4	District Ranger	IDT
77	2008.10.22	Noxious Weed Risk Assessment – alts 1, 2, and 4	District Range Technician	File
78	2008.11.07	Biological Evaluation – alts 1, 2, and 4	District Wildlife Biologist	File
79	2008.11.07	Biological Assessment – alt 4	District Wildlife Biologist	File
80	2008.11.17	Effects analyses by resource of alts 1, 2, and 4 (see [64] for citations)	ID Team	File
81	2008.11.17	List of individuals, groups, and organizations who commented during the NEPA analysis process for the San Cristobal Livestock Grazing Allotment EA	IDT Leader	File

DOC #	DATE	DOCUMENT	AUTHOR	RECIPIENT
82	2008.11.18	Environmental Assessment	IDT	Public