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Environmental Assessment

Peñas Negras, Ojito Frio, Palomas, and Vacas Range Allotment Analysis

**Cuba Ranger District, Santa Fe National Forest
Sandoval and Rio Arriba County, New Mexico**

Township 20 North, Range 1 East, Sections 1-4, 9-15, 22-27
Township 20 North, Range 2 East, Sections 1-10, 15-21, 28-30
Township 20 North, Range 3 East, Sections 5 and 6
Township 21 North, Range 1 East, Sections 12-14, 23-25, 33-36
Township 21 North, Range 2 East, Sections 7-9, 15-36
Township 21 North, Range 3 East, Sections 19, 28-33

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1.0 PURPOSE OF AND NEED FOR ACTION

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from implementation of the proposed action and alternatives. Supporting documentation, including more detailed analyses of project-area resources and interdisciplinary team meeting notes, are on file in the project planning record at the Jemez Ranger District Office in Jemez Springs, New Mexico.

1.1 Purpose & Need and Proposed Action

The Cuba Ranger District, Santa Fe National Forest, proposes to continue authorizing grazing while incorporating improvements outlined in Table 1, on the Peñas Negras, Ojito Frio, Palomas, and Vacas Range Allotments (Maps 1 and 2). The purpose and need for revising the grazing programs (i.e., proposed improvement projects) is to implement changes that would improve National Forest System land and resource conditions and help promote the attainment of desired conditions within the allotments. The proposed projects would be consistent with the Santa Fe National Forest Land and Resource Management Plan (Forest Plan) for the affected Management Areas.

Table 1 outlines the purpose and need, the actions proposed to achieve the purpose and need, and allotment management objectives. Because this Environmental Assessment includes four allotments, a column is included to indicate in which allotment the actions are being proposed. Maps 3-6 display the locations of proposed improvements.

Table 1. Purpose and Need and Proposed Action

Allotment	Proposed Action	Need	Purpose (Objective)
Peñas Negras	Construct ~ 1 mile of new allotment boundary fence along the northwest corner, between the San Pedro and Peñas Negras allotments in Township 21 North, Range 2 East, Section 8 and 17.	Cattle from the adjacent San Pedro allotment occasionally drift onto the Peñas Negras Allotment resulting in excess forage use by livestock.	<u>Prevent excess grazing</u> on the Peñas Negras Allotment from the adjacent San Pedro Allotment. Improve agency administration of the allotments.
Peñas Negras	Reconstruct ~ 1 mile of allotment boundary fence along the northern boundary of the Lodine pasture of the Peñas Negras Allotment, (between Peñas Negras and Jarosa allotments) in T 21 N, R 2 E, Section 23.	Cattle from the adjacent Jarosa allotment occasionally drift onto the Peñas Negras Allotment resulting in excess forage use by livestock.	<u>Prevent excess grazing</u> on the Peñas Negras Allotment from the adjacent Jarosa Allotment. Improve agency administration of the allotments.
Peñas Negras	Construct a new corral in the South Café Pasture in T 21 N, R 2 E, Section 27.	A corral in this allotment was stolen four years ago. The remaining corral is in poor condition and does not function well for gathering cattle.	<u>Provide for more efficient permittee management of cattle</u> and minimize the need to drive cattle through other pastures when moving cattle off or onto the allotment.

Allotment	Proposed Action	Need	Purpose (Objective)
Ojito Frio	Construct ~ 4 miles of new fence, dividing two existing pastures into a total of four pastures. Designate two pastures as riparian pastures and adjust management to protect riparian resources. Fence segments will be constructed in T 20 N, R 1 E, Section 1 and 12, and T 21 N, R 2 E, Section 31.	Cattle grazing (combined with recreation and road impacts) along stream banks leads to trampling of riparian vegetation and degrades water quality along Rock Creek and American Creek.	<u>Promote recovery of stream and riparian area conditions, and improve water quality</u> along Rock Creek and American Creek.
Ojito Frio	Construct a new corral adjacent to FR (forest road) 20 and outside of the Rio de las Vacas riparian area in T 20 N, R 1 E, Section 25.	A corral located adjacent to the Rio de las Vacas in Amedeo Pasture was removed in 1998 to improve riparian conditions. A centralized replacement corral is needed for moving, managing, and gathering cattle on the four allotments.	<u>Provide for more efficient permittee management of cattle</u> in the Vacas, Ojito Frio, Peñas Negras, and Palomas allotments.
Palomas	Construct ~1 mile new boundary fence in two segments along northwest portion of Rincon Pasture, between Palomas and San Pedro Allotments. Install a gate where the fence crosses Trail 50 to allow horseback and hiking access into the wilderness. Fence segments will be constructed in T 21 N, R 1 E, Section 13 and 14, and T 21 N, R 1 E, Section 23	Cattle from the adjacent San Pedro allotment occasionally drift onto Palomas allotment resulting in excess forage use by livestock.	<u>Prevent excess grazing</u> on the Palomas Allotment from the adjacent San Pedro Allotment. Improve agency administration of the allotments.
Vacas	Create a sixth pasture by constructing ~½-mile of fence from the Vacas Campground north to the boundary fence between the Vacas and Señorito allotments in T 21 N, R 1 E, Section 35.	Cattle concentrate and exceed utilization standards in the “old saw mill” area along State Road 126, while other capable areas are underused.	<u>Improve cattle distribution</u> throughout the Vacas Allotment.
Vacas	Construct ~½-mile fence of to split Turkey pasture into two pastures in T 20 N, R 1 E, Section 24.	Portions of the Turkey pasture are not grazed.	<u>Improve cattle distribution</u> throughout the Vacas Allotment.
Peñas Negras Ojito Frio Palomas Vacas	Continue to graze cattle on these allotments with changes in timing and duration as shown in Table 3, Section 2.2.2.	Allotment permittees depend on this traditional land use to meet their economic and cultural needs in this economically depressed rural area.	<u>Contribute to the social and economic needs</u> associated with grazing in northern New Mexico, in accordance with FS policy (FSM 2202.1) and the Forest Plan (pp. 17, 82).

1.2 Existing Situation

The four allotments have common boundaries and combined encompass 38,423 acres. Steep mountain slopes dissected by numerous drainages characterize the topography of the area. The San Pedro Parks Wilderness is located immediately to the north of the allotments. Blue Bird Mesa is adjacent to the western boundary. Elevations range between 10,800 feet above sea level along the eastern portion of the San Pedro Mountains to 7,920 along the southern portion of the area where Turkey Canyon meets the Rio de las Vacas. State Highway 126 and forest roads 20, 69, and 103 access large portions of the allotments.

Current Grazing Management:

The four allotments encompass 38,423 acres and the combined term grazing permits authorize grazing for a total of 812 cattle (cow/calf). Table 2 notes the size of each allotment and number of pastures. Various range facilities including fences and water developments are displayed. The current grazing management system and the number of cattle permitted for each allotment is also shown. Finally, the season of use and the total number of head months¹ is also shown.

¹ Range managers commonly use the term head month. A head month is calculated by multiplying the number of cows by the number of grazing days and dividing that total by 30.41667.

Table 2. Current Grazing Management

	Peñas Negras	Ojito Frio	Palomas	Vacas
TOTAL ACRES	15568	9768	5297	7790
PASTURES *Not grazed ** Forest Service horse pasture	9 Calaveras North Café Lodin Porter South Café Valle Coyote Red Fern Holding Schroyer *Peñas Negras Riparian 2	7 Mining Ojito Frio Holding Rock Creek Moon *Amedeo *Ojito Frio Riparian *Peñas Negras Riparian 1	4 Los Sacatales Minas Rincon Palomas Holding	5 Eureka Turkey Windy / Horse Vacas Holding **Las Vacas Admin
GRAZING SYSTEM	8 pasture rest deferred rotation ²	4 pasture deferred rotation	4 pasture deferred rotation	4 pasture deferred rotation
FACILITIES				
Spring Developments (each)	12	10	7	10
Earthen Tanks (each)	10	3	0	1
Corrals (each)	2	2	1	2
Fences				
Exterior Boundary	38 miles			
Interior Pasture	25 miles			
ON/OFF DATES (# CATTLE)	6/1 to 10/15 (260) 6/1 to 10/31 (43)	6/1 to 10/15 (135) 6/1 to 10/31 (46)	6/1 to 10/31 (109)	6/1 to 10/10 (48) 6/1 to 10/15 (91) 6/1 to 10/31 (15) 6/16 to 10/15 (65)
HEAD MONTHS	1464	839	548	956
TOTAL NUMBER OF PERMITTED CATTLE	303	181	109	219

1.3 Management Direction

The Santa Fe National Forest Plan (Forest Plan) identifies the national forest lands within the four allotments as suitable for domestic livestock grazing. The project proposal and action alternatives were designed to conform to Forest Plan direction, goals, and standards and guidelines, which are incorporated by reference. The allotments are within Forest Plan Management Areas A, D, E, H, and N as described below.

Management Area A:

Approximately 83% of the four allotments fall within this management area. The area consists primarily of those Forest Lands suitable and capable of growing commercial timber. Emphasis is on timber production and enhancement of wildlife habitat diversity consistent with other resource integration. Grazing capacity is *generally* transitory in

² Deferred-rotation is defined as a systematic rotation among pastures to delay or discontinue grazing for an adequate period of time to provide for plant reproduction, establishment of new plants or restoration of vigor of existing plants. A rest rotation leaves at least one pasture out of rotation per year – the rest pasture changes each year.

nature (Forest Plan, pg 98); however, the area encompassed by these allotments contain numerous natural meadows, previously logged areas, and wildfire areas, all of which provide capable lands that support grazing.

Management Area D:

Encompassing about 15% of the allotments (primarily within Ojito Frio and Vacas), this management area consists primarily of transportation corridors normally associated with state highways and high volume roads. These areas provide outstanding opportunities for developed recreation and viewing scenery. Emphasis is on enhancement of visual quality and developed recreation opportunity. Grazing and timber activities occur where consistent with the primarily emphasis of this area (Forest Plan, pg 112). Grazing occurs on a rotational basis within this management area between the months of June – October. However, when construction is completed along State Highway 126 (the major transportation corridor through these allotments) the entire length will be fenced to prevent cattle from drifting onto the road.

Management Area E:

Less than 1% (0.1%) of the Vacas Allotment falls within this management area. Emphasis is on providing dispersed recreation opportunities, maintaining visual quality and timber and firewood production. Emphasis is also on maintenance or enhancement of wildlife habitat diversity. Grazing activities may occur and generally vary in intensity over the area (Forest Plan, pg 117). This management area lies along the boundary of the Vacas Allotment and receives very little grazing use.

Management Area H:

Approximately 1.5% of the Palomas Allotment falls within the San Pedro Parks Wilderness management area but is generally not grazed as it consists of steep slopes. Management emphasis in these areas is to preserve wilderness character and values. They are managed to retain their primeval wild character. Grazing will occur only when consistent with wilderness values and where historically established (Forest Plan, pg 125).

Management Area N:

Less than 1% (0.1%) of the Peñas Negras Allotment falls within this management area. Emphasis in this Management Area is on management that protects and enhances essential wildlife habitat. Grazing may occur when consistent with the emphasis of the area (Forest Plan, pg 152). This management area lies along the boundary of the Peñas Negras Allotment and receives very little grazing use.

1.4 Decision Framework

The Cuba District Ranger will issue a decision(s) that include(s) a determination of the significance of the environmental effects and whether an environmental impact statement will be prepared. The decision(s) will also include a determination of consistency with the Forest Plan, National Forest Management Act, National Environmental Policy Act, and applicable laws, regulations, and executive orders.

If the Cuba District Ranger determines it is not necessary to prepare an environmental impact statement, the District Ranger will decide whether cattle grazing will be allowed to continue on any and/or all of the allotments as proposed or as outlined under another alternative, including the no change and no grazing alternatives. If any alternative other than “no grazing” is selected, the decision(s) will identify the number of cattle permitted, grazing season(s), grazing system(s), utilization levels (intensity), range facilities, implementation schedules, and what monitoring and evaluation will be done. All of these items will be included in new Allotment Management Plans and new ten-year term grazing permits to be issued as part of the implementation of the decision(s).

1.5 Public Involvement

The proposed project was continually listed in the Santa Fe National Forest Schedule of Proposed Actions beginning in April 2000 to the present June 2003 edition. This list is distributed to numerous individuals and can be accessed on the Santa Fe National Forest Website. A detailed project proposal was provided to over 100 individuals, agency representatives, and interested tribes for comment during scoping in March 2000. Five responses were received. The project was subsequently placed on hold following an extreme fire season and other district priorities. An IDT (interdisciplinary team) was reestablished in 2002, and the original project proposal was reassessed and modified as needed. Due to changes to the project proposal, a new scoping letter was sent to the public in February 2003. Six responses were received. Throughout the planning process, numerous meetings have been held with the allotment permittees. This project was also included on a list of proposed activities submitted to interested tribes.

Using the comments from the public and other agencies, the IDT developed a list of issues to address.

1.6 Issues

The Forest Service IDT grouped and sorted comments received into issues and non-issues. Issues are defined as a concern or debate about the effects of the proposal. Issues were further categorized as key issues (used to develop alternatives to the proposed action) and other issues (addressed through mitigation measures common to all alternatives). The effects related to all issues are discussed in Section 3. Comments not considered issues to analyze in this EA were those:

1. Outside the scope of the proposed action/purpose and need, thus irrelevant to the decision being made;
2. Already decided (impacts avoided) by law, regulation, or other higher-level decision; or
3. Conjectural and not supported by scientific or factual evidence.

1.6.1 Key Issues

No key issues were identified.

1.6.2 Other Issues

Three other issues were noted and are discussed below. Mitigation measures (Section 2.3) were developed to address these *other issues*. A list of non-issues and reasons regarding their categorization is in the project record (# 22).

- **Riparian** - Continued cattle grazing within riparian areas may impede riparian recovery or impair proper functioning of the riparian ecosystem.
- **Recreation** - Continued cattle grazing and fresh cattle manure within dispersed recreation sites, specifically in the Rock Creek pasture of the Ojito Frio Allotment, may result in conflicts between cattle and recreation users.
- **Vegetation** - Allowing cattle to continue grazing at current numbers may result in over utilization on some allotments, particularly in view of the on-going drought.

2.0 ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for management of the Peñas Negras, Ojito Frio, Palomas, and Vacas Range Allotments. This section presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. This chapter also identifies mitigation measures.

2.1 Alternatives Eliminated from Detailed Study _____

2.1.1 – No Riparian Grazing

This alternative would be essentially the same as the proposed action with one change. Riparian areas on all four allotments would be fenced and no grazing by permitted cattle would be allowed. This would eliminate cattle grazing in the Rock Creek Pasture (20 days), and in the following allotment holding pastures: Ojito Frio (3 days), Vacas (14 days), Peñas Negras (12-15 days), and Palomas (5 days). This alternative was dropped from further analysis because the proposed action includes activities that would provide a higher level of protection for riparian areas within the allotments. In addition, mitigation measures and monitoring requirements were developed that would be incorporated into management of the allotments to address concerns related to riparian areas and related resources.

2.1.2 – Adjust On/Off Dates

This alternative would be essentially the same as the proposed action as outlined in the Purpose and Need Table, with one change: delay entry on all allotments until June 15th, and create a consistent exit date of October 31st. This alternative was developed to address a concern related to cool season grasses. This alternative was eliminated from further analysis because the proposed action adequately addresses cool season grasses. This alternative would also require adjustments to winter grazing permits on BLM (Bureau of Land Management) lands, which likely would not be able to support winter grazing through mid June. As such, the permittees would be required to find alternative grazing.

2.1.3 – Permittee Alternative

This alternative was submitted by a permittee on the Vacas allotment in response to scoping. It would include developing 12 springs in the Vacas Allotment, allow for flexible and staggered on/off dates beginning as early as May 1, and trade Eureka Pasture in the Vacas Allotment for Blue Bird Pasture on the Señorito Allotment. The alternative was dropped for several reasons. Lack of water rights precludes developing additional springs. On/off dates are already flexible within the season start and end dates established in the term grazing permits and are based on range readiness. It is not feasible to expect the forage to be ready for grazing as early as May 1. Changing pastures between the Señorito Allotment and the Vacas allotment is outside the scope of this project as an analysis of the Señorito Allotment is not included in this environmental

assessment; furthermore, the permittees on the Señorito Allotment have not expressed support for such an exchange.

2.2 Alternatives Considered in Detail

2.2.1 Alternative 1 – No Change from Current Management

There would be no change in current allotment management. The Forest Plan and respective allotment management plans would continue to guide grazing on the allotments. None of the proposed actions would be implemented. Details of this alternative are presented in Table 2 under Section 1.2 (Existing Situation).

2.2.2 Alternative 2 – Proposed Action

Grazing would continue on the four allotments with changes incorporated to address needs previously identified in Table 1. Maps 3-6 display existing and proposed range facilities. This alternative includes:

- Constructing five miles of new interior pasture fences within existing pastures to create two additional pastures in Ojito Frio Allotment, and two new pastures on the Vacas Allotment,
- Constructing two miles of new allotment boundary fence,
- Constructing one corral in Ojito Frio Allotment and reconstructing an existing corral in the Peñas Negras Allotment,
- Adjusting On/Off dates on the Vacas Allotment, and
- Reducing the number of cattle by three on the Vacas allotment; however, the total head months would remain unchanged due to adjustments in on/off dates.

Table 3 displays the proposed grazing management strategy. Changes from the existing situation are highlighted in bold face type.

Table 3. Proposed Grazing Management

	Peñas Negras	Ojito Frio	Palomas	Vacas
TOTAL ACRES	15568	9768	5297	7790
PASTURES *not grazed ** Forest Service horse pasture	9 Calaveras North Café Lodin Porter South Café Valle Coyote Red Fern Holding Schroyer *Peñas Negras Riparian 2	9 (increase of 2) Mining Ojito Frio Holding Rock Creek Moon American Creek Riparian (new) Rock Creek Riparian (new) *Amedeo *Ojito Frio Riparian *Peñas Negras Riparian 1	4 Los Sacatales Minas Rincon Palomas Holding	6 (increase of 2) Eureka Turkey Lovato (new) Windy / Horse Vacas Holding Old Mill (new) **Las Vacas Admin
GRAZING SYSTEM	8 pasture rest deferred rotation	6 pasture deferred rotation	4 pasture deferred rotation	6 pasture deferred rotation
FACILITIES Spring Developments Earthen Tanks Corrals Fences (mi) Exterior Boundary Interior Pasture	12 10 (increase of 1) 3	10 3 (increase of 1) 3	7 0 1	10 1 2
	40 miles (increase of 2 miles) 30 miles (increase of 5 miles)			
ON/OFF DATES (# CATTLE)	6/1 to 10/15 (260) 6/1 to 10/31 (43)	6/1 to 10/15 (135) 6/1 to 10/31 (46)	6/1 to 10/31 (109)	6/1 to 10/15 (136) 6/1 to 10/31 (15) 6/16 to 10/15 (65)
HEAD MONTHS	1464	839	548	956
NUMBER OF CATTLE	303	181	109	(less 3 head) 216

2.2.3. Alternative 3 – Proposed Action with Additional Improvements

This alternative implements the same activities as the proposed action as well as incorporates some of the suggestions provided by a Vacas Allotment permittee in response to scoping. Not all suggestions made by the permittee were included in this alternative for reasons previously described in *Alternatives Dropped From Further Consideration*. The facilities added in this alternative include:

- Two new dirt tanks in the Windy / Horse pasture to improve distribution of cattle within the pasture, and
- Construction of four miles new fence line along State Highway 126 within the Windy / Horse pasture to reduce the amount of time cattle are in a nearby canyon bottom.

2.2.4 Alternative 4 – No Action (No Grazing)

Cattle grazing would no longer be authorized on these allotments. Grazing permittees would be required to remove all cattle from the allotment when their current term grazing

permit expires (Table 4). No new permits would be issued. All range facilities would revert to the Forest Service where they would be evaluated for wildlife, watershed, and soil protection needs. Allotment boundary fences would not be removed, as they would be needed to prevent excess use by livestock from adjacent active allotments.

Table 4. Permit Expiration Date

Name	Permit Expires	Permitted #	Allotment
Casaus Brothers	12/31/2005	25	Penas Negras
Robert Ramirez	12/31/2006	5	Penas Negras
Leo Ramirez	12/31/2006	6	Penas Negras
Adonias Ramirez	12/31/2006	7	Penas Negras
Leo Sandoval	12/31/2009	176	Penas Negras
Harry Casaus	12/31/2010	36	Penas Negras
Eustacio Chavez	12/31/2010	48	Penas Negras
Sombrillo Ranch	12/31/2003	36	Ojito Frio
Betty Jane Curry	12/31/2003	10	Ojito Frio
George Casaus	12/31/2004	11	Ojito Frio
Gurule Grazing	12/31/2008	124	Ojito Frio
Gabriel Maestas & Sons	12/31/2007	60	Palomas
Gabriel Maestas Jr and Christine	12/31/2012	49	Palomas
Val McCoy	12/31/2003	15	Vacas
Sisto Sandoval	12/31/2005	48	Vacas
Johnny Hernandez	12/31/2010	65	Vacas
David Sanchez	12/31/2010	91	Vacas

2.3 Mitigation and Monitoring Requirements

2.3.1 Mitigation Measures

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

Soil and Water Quality – the objective is to mitigate soil and water impacts from cattle grazing and range facility construction.

- Cattle will not be moved onto an allotment or pasture until range readiness and facilities inspections indicate that appropriate conditions exist.
- Cattle will be moved when utilization of key forage species in key use areas approaches established standards (not to exceed 40% utilization³).
- A salting plan will be developed that minimizes impacts to riparian zones, meadow ecosystems, and other forest resources (Forest Plan, pg 68). Salting

³ Forest Service Manual direction for the Southwest Region require management at conservative levels (FSM 2111.1 (R3). Holecheck and Galt (2000) define five levels of use: Light to unused (0-30%), conservatively used (31-40%), moderately used (41-50%), heavily used (51-60%), and severely used (61%+).

locations will vary annually and will not be located within ½-mile of water sources.

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

- Construction of range facilities and maintenance of range improvement projects will be evaluated and executed to have no adverse effect on threatened and endangered species (Forest Plan, pg 68). If any listed or proposed Threatened, Endangered, or Sensitive species are found during project activities, work in the immediate vicinity of the sighting will stop until a Forest Service wildlife biologist has resurveyed the area and any newly recommended mitigation measures have been implemented.
- Allotment fence management will meet wildlife standards to allow easy migration and passage (Forest Plan, pg 67). Fences and loose wires will be removed as they are abandoned (Forest Plan, pg 66).
- Non-game entrance and escape ramps will be provided on water developments intended for livestock and wildlife use (Forest Plan, pg 66). New and reconstructed livestock water developments will include wildlife access, cover, and escape considerations (Forest Plan, pg 67).
- Cattle grazing within riparian pastures that border stream segments containing *Core Conservation Populations* of Rio Grande cutthroat trout will be scheduled to avoid or limit disturbance during spawning season (generally between mid-May and mid-June).
- Construction of improvements (such as corrals, tanks, fences) within potential northern goshawk habitat will not occur during nesting season (March 1 – September 30). However, if a goshawk survey is conducted and there is negative response, construction may occur during this period.

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

- Range structures will be located so as to avoid concentrations of livestock on identified heritage resource sites. No ground disturbing activities will be conducted within known site boundaries.
- No salting will occur within or immediately adjacent to site boundaries.
- If any unrecorded sites are discovered during the course of project implementation, all project activities in the vicinity of the site(s) will cease and the District or Forest Archaeologist will be notified.
- Surveys of proposed corral locations and other areas where proposed ground disturbing activities have the potential to affect heritage resources will be conducted.
- Existing improvements will be inspected prior to maintenance to determine if heritage resources are present.

Recreation – the objective is to reduce encounters between recreation users and cattle and minimize impacts to scenic quality in popular recreation areas and along major travel corridors.

- Cattle will be prohibited along Rock Creek and American Creek between Memorial Day and Labor Day.
- Within Management Area D, naturally appearing materials will be used (where feasible) when constructing range facilities where a high degree of visibility and forest user activities can be expected.

2.3.2 Monitoring

The objective of monitoring is to evaluate the abilities of all parties involved in planning and implementing the grazing program. **Implementation monitoring** will include periodic inspections to ensure compliance with permit terms and conditions. **Effectiveness monitoring** will determine if grazing standards and guidelines, grazing prescriptions, and Allotment Management Plan practices are effective in accomplishing the planned objects. Range readiness will be monitored before the grazing season begins and grazing utilization will be measured (at a minimum) at the midpoint of the grazing season. Vegetation condition and trend will be monitored at five-year intervals. **Validation monitoring** will determine if the stocking rates are appropriate by comparing actual use records and utilization monitoring results.

2.4 Comparison of Alternatives

This section compares the effects of implementing each alternative, to provide decision makers and the public a clear basis for choice. Table 5 summarizes the more detailed effects analysis descriptions contained in Section 3.0.

Table 5. Comparison of Alternatives

Purpose and Need	Alternative 1 No Change	Alternative 2 Proposal	Alternative 3 Additional Improvements	Alternative 4 No Grazing
Prevents excess livestock forage use on Palomas and Peñas Negras Allotments.	Cattle from San Pedro and Jarosa allotments will continue to drift into Palomas and Peñas Negras. This excess use would continue to be a problem.	Construction of new fences will deter excess use from adjacent allotments.	See Alternative 2.	See Alternative 1.
Promotes recovery of stream and riparian area conditions and improved water quality.	Cattle have access to 42% of streams for up to 45 days and to 10% of streams for less than 10 days. No change in existing riparian area recovery rates would occur related to grazing management.	Cattle have access to 33% of streams for up to 45 days and to 19% of streams for less than 10 days. The reduction of use (on American and Rock Creek) will result in more rapid riparian area recovery and improved water quality along these segments.	See Alternative 2.	Cattle access to streams within these four allotments would be reduced, and eventually eliminated as individual permits expire.
Provide more efficient permittee management of cattle.	Management inefficiencies related to lack of corrals would remain.	Construction of two corrals would improve permittee management of cattle.	See Alternative 2.	N/A
Improve cattle distribution.	No improvement in cattle distribution. Cattle would continue to concentrate in localized areas while portions of the allotment remain underutilized.	Construction of fence lines that subdivide existing pastures will result in better cattle distribution and decrease localized areas of concentration.	See Alternative 2. The two additional water developments in the Vacas Allotment will further improve cattle distribution.	N/A
Contribute to Social and economic needs of Northern New Mexico.	Permitted grazing would continue to contribute to social and economic needs of Northern New Mexico.	See Alternative 1.	See Alternative 1.	Would not contribute to social and economic needs of Northern New Mexico.

3.0 ENVIRONMENTAL CONSEQUENCES

This section describes the existing environmental conditions and the probable effects to the physical, biological, social and economic environment of implementing the proposed action and other alternatives. This analysis is organized by resource. Within each section, the affected environment is briefly described followed by the environmental consequences (effects) of implementing each alternative. The no grazing alternative provides a baseline for evaluation and comparison of the action alternatives.

3.1 Past, Present, and Reasonably Foreseeable Future Activities Used for Consideration of Cumulative Effects

Cumulative effects are the incremental and additive effects from other activities that add to the effects of the management alternatives analyzed in this Environmental Assessment. Past, present and reasonably foreseeable future activities and land uses within or in close proximity to the Peñas Negras, Ojito Frio, Palomas, and Vacas grazing allotments are briefly described here. Foreseeable future activities only include those that have been proposed for NEPA analysis in the near future or a NEPA decision has already approved implementation of the action. Other possible future actions were considered too speculative to include in the cumulative effects analysis.

Recreation: In general, these four allotment areas receive a low level of dispersed recreation use. Use that does occur is primarily in the vicinity of streams. Clear Creek and Rio Las Vacas Campgrounds are the only developed recreation sites in the area. These campgrounds are temporarily closed due to reconstruction activities that will increase capacity of the sites and improve existing facilities.

Logging – The Rito, Tusas, Bluebird, San Pablo, and Trail timber sales occurred in the 1980s and 1990s in the vicinity of the allotments. Timber harvesting activities to improve forest health along the Forest Road 103 corridor, primarily south of Rock Creek are in the preliminary stages of analysis.

Riparian restoration – The recent Rito Peñas Negras riparian restoration project consisted of fencing 1.4 miles of riparian area to exclude grazing and recreation vehicle access and closing five miles of Forest Road 264 within the riparian area. Three years later, the riparian area has shown marked improvement. The Respect the Rio project is in the development stage and will place additional focus on controlling recreation impacts in riparian areas, particularly along river banks of Rio de las Vacas.

Fish Management – Rio Grande cutthroat trout is being considered for reintroduction to the middle portion of the Rio de las Vacas watershed, which would include all fish-bearing waters in the four allotments. Activities associated with this project would include the construction of fish migration barriers and the removal of all non-native fish. The action would minimize the need of future mitigations as described in Section 2.3.1.

Fire – In November 1995, the Stuffing wildfire burned about 2,300 acres in the Ojito Frio Allotment, east of State Highway 126. The fire burned late in the fall and stayed

primarily in the understory, mimicking historical fire patterns by burning excess fuels that accumulated on the forest floor. Over the past couple decades, prescribed fires have been implemented throughout the four allotments, primarily within previously logged areas.

Road Management – State Highway 126 is currently being reconstructed from Fenton Lake west to Cuba. The project was documented in an Environmental Impact Statement and a Record of Decision was issued in June 2002. Road construction activities have started on a stretch of road that runs through the Vacas Allotment. In coming years the portion of the road through the Ojito Frio allotment will be paved. As roadwork progresses, some existing fences will be removed and replaced with new right-of-way fencing. Other main forest system roads within the four allotments consist of dirt and gravel roads that are routinely maintained. The Cuba Ranger District will be conducting a roads analysis process in the next year as part of a Santa Fe National Forest forest-wide roads analysis. This process will identify necessary roads and maintenance levels as well as recommend some roads for administrative closure or decommissioning.

3.2 Soil

3.2.1 Affected Environment

The four allotments are located within the Jemez Mountains along the eastern flank of the Nacimiento uplift. Soils in the area are primarily loams derived from mixed alluvium bedrock (within the Vacas, Palomas, western portion of Peñas Negras and Ojito Frio allotments) and sandy loams derived from volcanic parent material (along the east side of Peñas Negras and Ojito Frio allotments). Data from the Terrestrial Ecosystem Survey of the Santa Fe National Forest (USDA-FS, 1993) was used to determine soil condition. Soil condition is normally evaluated by examining properties that reflect past and present soil function. The physical condition of surface soil, a zone of maximum biological activity, has an essential role in nutrient recycling, vegetative productivity and diversity, water storage and movement, and geomorphic stability.

A *satisfactory* soil condition rating indicates past and current management have allowed soil to function properly and retain its inherent productivity. An *impaired* soil condition rating indicates past and/or current conditions or management activities have reduced the soil's ability to function properly, biologically. Impaired soils have an annual soil loss in excess of tolerance (equivalent to the depth of soil generated on an annual basis) but less than potential (the loss predicted to occur following a catastrophic wildfire). Causes of accelerated erosion can include disturbance of vegetative cover or surface soil by humans (such as with road use and maintenance), disturbance by livestock or wildlife, low to moderate severity wildfires, and/or natural factors (such as steep slopes, landslides, or extreme rainfall).

An *unsatisfactory* soil condition rating indicates management activities have resulted in a loss of soil function. Generally these areas have degraded so far that they are not likely to recover in a timely manner, even if rested from use, without substantial restoration measures. Soil condition ratings for the four allotments are presented in Table 6.

Table 6. Soil Condition Rating

	Peñas Negras	Ojito Frio	Palomas	Vacas
Satisfactory	89%	97%	100%	99%
Impaired	11%	3%	0%	1%
Unsatisfactory	0%	0%	0%	0%

For the most part, soils within the four allotments are classified as satisfactory. Steep slopes and inherently unstable soils are the cause of impaired soils within the Peñas Negras allotment. Of the 11% designated as impaired, less than 1% is currently grazed. On the Ojito Frio and Vacas allotments impaired soils occur on steep slopes that are not assigned any capacity. There are no impaired soils on the Palomas Allotment. None of the soils within the four allotments are classified as unsatisfactory.

3.2.2 Environmental Consequences

Alternative 1 – continuing grazing at current levels would not change the status of impaired soils on the Peñas Negras, Ojito Frio and Vacas allotments because the soils have been designated as impaired due to steep slopes, not because of disturbance from grazing. Additionally, impaired soils on the Ojito Frio and Vacas allotment are not assigned grazing capacity because they are unlikely to be grazed by cattle. Less than 1% of the impaired soils on the Peñas Negras Allotment are currently grazed and range management status for the area is rated as satisfactory.

Soil compaction resulting from cattle grazing can occur in localized areas surrounding spring developments, within corrals, and where cattle tend to trail along fence lines. Under this alternative, these localized effects would continue at current levels. Twelve spring developments are located on the Peñas Negras, ten on the Vacas Allotment, ten on the Ojito Frio and seven on the Palomas. Compaction generally occurs in a small area (less than 1/10 acre) surrounding the drinker/trough – the actual springs are fenced to keep cattle out. Compaction also occurs in the vicinity of and within the corrals (encompassing about ¼ acre around a corral). Two corrals are located on the Peñas Negras Allotment, two on the Ojito Frio, two on the Vacas, and one on the Palomas. Compaction in these areas is limited because cattle are only in the vicinity of the corrals for a couple of days in June and a couple of days in October. Between June and October, vegetation (consisting of perennial forbs and grasses) grows back in the area surrounding the corrals and even thrives within some of the corrals. The Cuba Range Staff has observed that trailing is not common along fence lines within these allotments because the fences have been in place for many years and cattle have become accustomed to fence locations. Thus, considering the corrals and water sources, soil compaction caused by cattle grazing would affect only about 0.01% of the soils in these allotments.

Alternative 2 – with respect to soil impairment, the effects of this alternative would be the same as those described in Alternative 1. There would be no change to the soils currently designated as impaired and there would be no additional soil impairment resulting from grazing cattle on these allotments.

There would continue to be isolated, limited soil compaction in the immediate vicinity of existing spring developments and corrals as described previously. The proposed action

includes constructing two additional corrals. Because the spatial extent of disturbance (about ¼ acre surrounding each corral) and duration of disturbance (approximately two days in June and October) is very limited, there would be no measurable change in overall soil condition within the allotments resulting from these actions. The construction of fences would also not result in a significant amount of soil disturbance, because the fence lines will be hand constructed. Also, it is anticipated that cattle will quickly become accustomed to the fence locations, limiting the effects of trailing along fence lines.

Alternative 3 – effects would be similar to those described under Alternative 2. Adding two dirt tanks (in the Vacas Allotment) under this alternative would result in minimal soil disturbance in the vicinity of the tanks. Cattle tend to congregate more in the vicinity of spring developments than surrounding dirt tanks because the spring developments provide more reliable water. As such, heavy use surrounding the proposed dirt tanks in this alternative is not anticipated; rather, they would likely be used by smaller numbers of cattle on an occasional basis. Adding two water developments may have a slight indirect beneficial effect of improving distribution of cattle, thereby reducing concentrations of cattle (reducing localized soil disturbance) in some areas such as near existing spring developments. Construction of an additional fence is not anticipated to result in soil disturbance for reasons similar to those previously described in Alternative 2.

Alternative 4 – this alternative would have the least effect on soil within the four allotments because eventually (as permits expire) no cattle would be permitted in the area. Overall, however, there would be little change in soil condition because water developments would likely be retained and used by wildlife so there would continue to be limited localized disturbance to soil in the vicinity of the water sources. Additionally, some of the corrals would be retained for equestrian use and as such, there would continue to be similar localized soil disturbance in these areas as well.

Cumulative Effects – because there would generally be no change in soil conditions under any of the alternatives and very little localized change in soil (such as increase or decrease in compaction/trampling) surrounding range facilities is anticipated, no significant cumulative effects would occur.

3.3 Water / Riparian

3.3.1 Affected Environment

The four allotments are predominantly within the Rio Guadalupe watershed with just a small portion (about 15 acres) of the Vacas Allotment overlapping the Rio-Puerco / Arroyo Chijuilla watershed. Numerous streams run through the boundaries of the allotments. Some of the major streams include American Creek, Rito de las Palomas, Rio de las Vacas, and Clear Creek, which flow in a southward direction out of the San Pedro Mountains and join together to form the Rio de las Vacas. As the Rio de las Vacas flows southward, it is fed by numerous east/west tributary creeks (including Rito Peñas Negras and Rock Creek) as well as intermittent drainages including Telephone and Moon Canyon, Horse Canyon, and Road Canyon. The eastern portion of the allotments

contains the headwaters of the Rito Peñas Negras and Calaveras Canyon. The Rio Cebolla is located just east of the allotments.

Several of these watercourses are listed on the *State of New Mexico 303(d) List⁴ for Assessed Stream and River Reaches* (New Mexico Environmental Department, 2000-2002, from the Clean Water Act, 1972, as amended by the Water Quality Act of 1987) for partially supporting or not supporting the beneficial use as high quality coldwater fishery for the following reasons:

- Rio de las Vacas from the confluence with Rio Cebolla to Rito de las Palomas is listed as *not supporting* its use as high quality coldwater fishery with probable impairment being elevated temperature. Probable sources of impairment include: removal of riparian vegetation, livestock grazing and associated activities, habitat modification, bank modification/destabilization, and agriculture. Road access and maintenance are also probable contributors to water quality degradation.
- Clear Creek from the confluence with Rio de las Vacas to San Gregorio Reservoir is listed as *not supporting* its use as high quality coldwater fishery due to turbidity (probable cause being stream bank modification/destabilization).
- Rito Peñas Negras from the mouth on the Rio de las Vacas to the headwaters is listed as *partially supporting* its use as high quality coldwater fishery with probable impairment being elevated temperature and fine stream bottom deposits. Probable sources of impairment include: removal of riparian vegetation, livestock grazing and associated activities, highway maintenance and runoff, habitat modification, bank modification/destabilization, and agriculture.
- American Creek from the mouth on the Rio de las Palomas to the headwaters is listed as *partially supporting* its use as high quality coldwater fishery with probable impairment being turbidity, temperature, and fine stream bottom deposits. Probable sources of impairment include: removal of riparian vegetation, livestock grazing and associated activities, habitat modification, bank modification/destabilization, and agriculture.

The Guadalupe Watershed, within which these streams occur, now also has pollutant load allocations set by the New Mexico Environment Department's Surface Water Quality Bureau, and approved by the EPA. These allocations require the Forest Service to follow through with and to monitor all mitigations utilized to protect streams in the watershed.

The Rio de las Vacas, Clear Creek, Rito Peñas Negras, and American Creek are listed as *fully supporting* the following designated uses: livestock watering, wildlife habitat, fish culture, secondary contact, domestic water supply, and irrigation. A total of 33.5 miles of stream occur within the four allotments. The following table displays the miles of stream located within each allotment.

⁴ The 303(d) list fulfills a requirement under the federal Clean Water Act that mandates States to monitor streams to determine if they have been impaired by man-caused activities.

Table 7. Miles of Stream Segments within Allotments

	Peñas Negras	Ojito Frio	Palomas	Vacas	Total
Rito Peñas Negras	6.6	1.9	.0	.0	8.5
Rito Café	4.1	.0	.0	.0	4.1
American Creek	.0	2.4	2.0	.0	4.4
Rock Creek	.0	1.8	.0	.0	1.8
Rio de Las Vacas	.0	5.3	.0	1.4	6.7
Rito de Las Palomas	.0	.4	3.6	1.2	5.2
Clear Creak	.0	.0	.0	2.8	2.8
Total miles stream	10.7	11.8	5.6	5.4	33.5

In assessing the potential effects of grazing to streams and associated riparian areas, it is relevant to identify how much of the stream area is open to grazing and for what duration. In gathering this data, streams were categorized as follows:

- **Not excluded** – these stream segments are within pastures that are grazed under a rotational grazing system between the months of June and October (grazing season). Cattle can be in these pastures for more than 10 days at a time but would not exceed 45 days in a grazing season.
- **Partially excluded** – these stream segments are within pastures that are grazed for less than 10 days in a grazing season.
- **Fully excluded** – these stream segments are fenced; therefore, no grazing is permitted along these stream segments.
- **Private lands** – these stream segments are located on private lands and are not under the jurisdiction of the Forest Service. Forest Service permits for these allotments do not authorize grazing on private land.
- **No capability** – these stream segments are located in areas assigned as no capability for grazing. Because there is no capability, cattle grazing is not likely to occur due to steep terrain or lack of access.

Table 8. Existing Miles of Stream Open to Cattle Grazing

	Not Excluded	Partially Excluded	Fully Excluded	No Capability	Private Lands
Rito Peñas Negras	6.3	.1	.8	.8	.5
Rito Café	2.8	.0	.0	.8	.5
American Creek	2.1	.8	.0	.3	1.2
Rock Creek	1.6	.0	.1	.0	.1
Rio de Las Vacas	.1	.8	2.3	.2	3.3
Rito de Las Palomas	.9	.0	.0	3.9	.4
Clear Creak	.4	1.7	.3	.4	.0
Total Miles	14.2	3.4	3.5	6.4	6.0
Percent	42%	10%	11%	19%	18%

3.3.2 Environmental Consequences

Alternative 1 – grazing is not permitted on 48% of the streams within the allotments and occurs for less than 10 days on an additional 10% of the streams. As such, grazing related effects to approximately 58% of the streams are considered negligible due to the exclusion of cattle or the limited duration of their presence. Cattle have access to 42% of the streams for up to 45-days in a grazing season and there are effects associated with their presence along some stream reaches. Cattle tend to congregate in the vicinity of the

water, trample stream banks, and eat riparian vegetation. Livestock grazing is identified as one of the contributing factors, which led to the Rio de las Vacas, American Creek and Rito Peñas Negras being listed on the 303(d) list. While recent projects have resulted in exclusion of cattle along portions of the Rito Peñas Negras and cattle are administratively restricted from portions of American Creek (due to recreation uses being present) there would continue to be some impacts to riparian area under this alternative. However, under current allotment management plans, cattle are removed from riparian areas when utilization levels are met and mitigation measures are implemented to protect stream zones.

Alternatives 2 and 3 – similar to Alternative 1, mitigation measures would require that cattle to be moved when utilization levels reach established conservative grazing standards (31-40%) in the key areas and riparian zones; cattle would be excluded from American and Rock Creek between Memorial Day and Labor Day; and salting would not be permitted within ½-mile of streams (as cattle tend to congregate around salt sources). Under Alternatives 2 and 3, construction of fences in the Ojito Frio Allotment would reduce access to stream segments along Rock Creek and American Creek (Table 9). Cattle would have access to 33% of the total stream segments for up to 45 days. Cattle would have access to 19% of streams for 10 days, and cattle grazing use would not occur on the remaining 48%. Because of more limited access to streams and implementation of mitigation measures, cattle grazing would have less of an effect on water quality, and would not significantly contribute to increased sedimentation, temperature or turbidity along the 303(d) listed streams.

Table 9. Miles of Stream Open to Cattle Grazing under Alternatives 2 and 3

	Not Excluded	Partially Excluded	Fully Excluded	No Capability	Private Lands
Rito Peñas Negras	6.3	.1	.8	.8	.5
Rito Café	2.8	.0	.0	.8	.5
American Creek	.7	2.2	.0	.3	1.2
Rock Creek	.0	1.6	.1	.0	.1
Rio de Las Vacas	.1	.8	2.3	.2	3.3
Rito de Las Palomas	.9	.0	.0	3.9	.4
Clear Creek	.4	1.7	.3	.4	.0
Total Miles	11.2	6.4	3.5	6.4	6.0
Percent	33%	19%	11%	19%	18%

Alternative 4 – cattle would eventually (as permits expire) be restricted from 100% of the streams within the allotments. This alternative would represent the greatest increase in riparian area recovery related to those effects attributed to cattle grazing. However, the removal of streams from the 303(d) list might not occur because livestock management is only one of the possible factors contributing pollutants.

Cumulative Effects – the 303(d) list identified numerous probable sources of impairment along streams within the project area. Recent fencing along the Rito Peñas Negras combined with implementation of proposed actions and mitigation measures that restrict the amount of stream access and duration of cattle activity would have beneficial cumulative impacts. Paving State Highway 126 over the next several years may result in short term increases in sediment delivery to streams (resulting from construction

activity); however, over the long term there should be a reduction in the amount of soil runoff into nearby watercourses if one were to compare the runoff associated with the soon to be paved road surface to the old dirt/gravel surface. Similarly, there may be short term impacts to soils if the timber harvesting activities to improve forest health along Forest Road 103 corridor occur, but over the long term, it is expected (based on other sales in the local area) that understory vegetation would increase over present and subsequently, less surface run-off would be anticipated because sediment would be captured in ground vegetation. Implementing restoration activities to be identified under the Respect the Rio project such as providing environmental education to recreation visitors would help reduce the amount of damage that occurs in recreation areas due to camping along stream banks and off-road driving in sensitive riparian areas.

3.4 Air

3.4.1 Affected Environment

With the exception of a small portion of the Palomas Allotment that overlaps a Class I (wilderness) air quality management area, the four allotments are within a Class II air quality management area. Both areas are in attainment of air quality requirements.

3.4.2 Environmental Consequences

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

3.5 Vegetation

3.5.1 Affected Environment

Within the four allotments, elevations range between 10,800 feet above sea level along the eastern portion of the San Pedro Mountains to 7,920 along the southern portion of the area where Turkey Canyon meets the Rio de las Vacas. Vegetation is largely defined by elevation with higher elevations exhibiting a spruce dominant, mixed conifer forest that trends toward a ponderosa pine dominant forest as elevation decreases. Aspen stands are found along north facing slopes and in cool drainages; canyon bottoms sport a variety of riparian vegetation. Table 10 displays the general vegetation types that occur on the four allotments.

Table 10. Vegetation Type (percent of allotment)

	Peñas Negras	Ojito Frio	Palomas	Vacas
Riparian	<1 %	1 %	<1 %	1 %
Aspen	3 %	5 %	1 %	4 %
Grassland	6 %	5 %	<1 %	3 %
Oak Woodland	<1 %	1 %	0	1 %
Ponderosa Pine	16 %	53 %	2 %	28 %
Mixed Conifer	74 %	35 %	96 %	63 %

In the middle to late 1980s, timber sales occurred in portions of all four allotments (primarily within mixed conifer stands). These sales resulted in opening up the tree

canopy, which allowed sunlight to penetrate to the forest floor, which encouraged growth of understory herbaceous vegetation. Much of the range capability in the allotments is within the understory of previously logged mixed conifer stands, open ponderosa pine stands, and grasslands. Recent monitoring data shows use in key areas falls within conservative utilization guidelines (31-40%).

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

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

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

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

Table 11 displays acres of full, potential, and no capability on each allotment. Of the full capability areas, 16,011 (91%) acres are considered satisfactory and 1,660 (9%) unsatisfactory. Elements of the proposed action (particularly construction of new pasture fences) were developed to address the unsatisfactory range by alleviating use in these areas through providing better distribution of cattle. Of the potential capability, all 112 acres are considered satisfactory; however, use is not assigned to these areas as grazing is not likely to occur because of poor accessibility.

Table 11. Range Capability (Acres)

	Satisfactory	Unsatisfactory	Total
Peñas Negras			
Full Capability	6,636	314	6,950
Potential Capability	66	0	66
No Capability	N/A	N/A	8,553
Ojito Frio			
Full Capability	3,640	807	4,447
Potential Capability	20	0	20
No Capability	N/A	N/A	5,301
Palomas			
Full Capability	2,291	233	2,524
Potential Capability	26	0	26
No Capability	N/A	N/A	2,747
Vacas			
Full Capability	3,444	306	3,750
Potential Capability	0	0	0
No Capability	N/A	N/A	4,041

The following invasive plants occur within the allotments and consist of the following:

Musk thistle – occurs on the Vacas Allotment adjacent to State Highway 126 and the Rio las Vacas Campground. This population occurrence is confined to about 2 acres. The species occurs in moderate density along with other vegetation, however, its spread potential is considered high due to the proximity State Highway 126, a campground, and a nearby corral. Vehicle use at these locations can contribute to the spread of the species. A second location of musk thistle occurs in the vicinity of Red Fern Cabin along the boundary of the Ojito Frio and Peñas Negras allotments. This population occurs in a 7-acre area, is considered moderately dense, and has a moderate potential to spread through vehicle use associated with recreation and grazing management at a nearby corral. Both areas are currently being treated by clipping seed heads and grubbing first year plants before they produce a thistle. This treatment has been effective in slowing, but has not stopped, the rate spread.

Bull thistle –occurs in all four allotments and can be found in old logging areas. It was likely introduced during logging activities in the 1980s, as the species most commonly is found along roads associated with past timber sales. It occurs in low density and is not out-competing native vegetation. No active treatment is occurring on this species because monitoring indicates the species is contained to its present locations.

Canada thistle – is mainly confined to small, localized areas along graveled roads; however, one large area of concern (about 20-acres) is within the Ojito Frio Allotment in the vicinity of an old corral. This population is considered dense with a severe spread potential because it is located in a popular recreation area as well as adjacent to the Rio de las Vacas. Recreation vehicles and stream action have the potential to spread this species. This area is closed to grazing. No active treatment is occurring because this species thrives on disturbance and the best way to control spread is through chemical application. Because this population occurs along a stream course and near a popular recreation area, careful analysis would be required before applying chemical treatments.

Dalmation toad flax – occurs in a 2-acre area in the vicinity of Red Fern cabin. This area overlaps the 7 acres of musk thistle previously mentioned. Past inhabitants of the cabin introduced the species to the area as an ornamental plant. While the area of occurrence is dense, the spread potential is low. Because this species is contained to the area of occurrence, it does not require active treatment.

The Santa Fe and Carson National Forests are jointly conducting a NEPA analysis and preparing an Environmental Impact Statement for the control of invasive plants.

3.5.2 Environmental Consequences

Alternative 1 – under current management there would be no change to the vegetative structure of the allotments. Capability is expected to remain the same. Invasive species will continue to occur and will be treated to slow their spread using current treatment methods.

Alternatives 2 and 3 – no vegetative management activities are proposed under these alternatives, as such, there would be no change to the vegetative structure within the allotments. There would be very little change in capability resulting from the construction of new facilities; rather, the facility construction would improve distribution within full capability areas. By improving distribution, vegetative conditions in capable areas currently designated as unsatisfactory (9% of the capable acres) would improve as use would be alleviated in these areas through construction of new pasture fences and improved pasture rotation. Similar to Alternative 1, invasive species will continue to occur and be treated to slow their spread.

Alternative 4 – as permits expire, cattle would be removed from the allotments. Eventually, understory vegetation would no longer be grazed by cattle but would continue to be grazed by deer and elk. Because much of the spread of invasive species occurs adjacent to roads and recreation sites, eliminating cattle grazing would not likely reduce the spread or rate of spread of these plants. Removing cattle as permits expire would not affect overstory vegetation. The majority of vegetation within these allotments is designated as mixed conifer and ponderosa pine. As such, removing cattle would not convert these lands to a different type of vegetation.

Cumulative Effects – because there would be no change to overstory vegetation under any of the alternatives, there would be no cumulative effects to overstory vegetation. With respect to riparian vegetation, excluding cattle from portions of streams through fencing, maintaining conservative utilization levels, and implementing mitigation measures combined with past riparian restorations projects (Rito Peñas Negras project) and future projects (Respect the Rio) will have beneficial effects to riparian vegetation because there would be less human and animal disturbance to these areas. No significant changes to general understory vegetation are expected. However, there may be minimal improvement to understory vegetation resulting from better distribution of cattle (through construction of new pasture fences) and this combined with other proposed management activities (such as the Forest Road 103 timber project) and past activities (including past wildfires and timber sales) will result in continued preservation of understory vegetation.

3.6 Wildlife and Fish

3.6.1 Affected Environment

General Wildlife

Riparian areas, ponderosa pine and mixed-conifer forests, high mountain meadows, and scattered stands of aspen within the four allotments provide habitat for a variety of wildlife species. Smaller species include skunks, raccoons, rodents, squirrels, rabbits, and coyotes as well as a variety of game and non-game bird species such as songbirds, turkey, hawks, and owls. Larger species include bobcat, mountain lion, and bear. The area contains limited winter habitat and many species leave the area during winter months when high snow accumulations and cold temperatures drive them to lower elevations. Overall, population levels for all wildlife species are considered stable.

Threatened, Endangered, and Sensitive Species

Endangered Species Act listed/proposed threatened and endangered species and habitats are very limited or do not occur on the allotments. **Bald eagle** (threatened) occurrence is uncommon in the area. The mountains contain no known breeding habitat; however, migrating/wintering eagles could pass through and roost, but it would be on a transient basis. At present time, the only known or documented habitat within the project area is for the threatened **Mexican spotted owl** (threatened). This species is also identified as a management indicator species on the forest. The *Burned Canyon* PAC (protected activity center) is located primarily within the Ojito Frio Allotment, with a small portion in the Peñas Negras Allotment. While this is an officially designated PAC, surveys over the past decade (including as recently as 2002) have found no owls.

A review of the Regional Forester's Sensitive Species List (USDA-FS, 1999) indicates the following sensitive species occur or are likely to occur within the four allotments. Species not addressed do not inhabit and no habitat is present within the four allotments.

- **New Mexican jumping mouse** – while no surveys have been completed, habitat for this species occurs in riparian and wet meadow within the Rio de las Vacas watershed. As such, it is likely that the jumping mouse occupies the area.
- **Northern goshawk** –this species may occur at elevations where stream conditions provide sufficient permanent moisture for emergent plants, or along a narrow band of deciduous trees and shrubs. Goshawks prefer to nest within $\frac{1}{4}$ mile of water and in larger trees (>18 inches in diameter). No surveys have been completed to determine presence of this species.
- **Rio Grande cutthroat trout** –a detailed evaluation of this species is presented in the project record (# 23). Rio Grande cutthroat trout historically occupied the Rio de las Vacas, Clear Creek, American Creek, Rock Creek, Rito de las Palomas, Rito Café, and the Rito Peñas Negras. Today, an unsecure⁵ population persists in the Rito Café and in the Rio de las Vacas; New Mexico Department of Game and Fish are managing these populations as a *Core Conservation Population*. An unsecure population also persists in the Rito de las Palomas; this population is

⁵ Unsecured refers to a population where non-native fish coexist with natives; however, native fish are dominant. Core Conservation Populations have greater than 99 percent genetic purity and are considered the highest priority for long-range conservation management. Reserve Conservation Populations have at least 90 percent genetic purity and have a high priority for long-range management.

being managed as a *Reserve Conservation Population*. A small remnant⁶ population possibly resides in American Creek (managed as a *Core Conservation Population*) and in the Rito Peñas Negras. These rivers are being considered for re-introduction of the species. *Core Conservation Populations* represent the foundation upon which future viable populations will develop, and contain the genetic resources for reintroducing Rio Grande cutthroat trout to formerly occupied waters and for developing fish hatchery broodstocks (New Mexico Department of Game and Fish, 2002).

Management Indicator Species

Management Indicator Species are designated in the Santa Fe National Forest Plan (USDA-FS, 1987). **Mexican spotted owl** and **Rio Grande cutthroat trout** have been previously discussed. **Rocky Mountain bighorn sheep** are not present, nor does suitable habitat exist within the allotments. Habitat does occur within the allotments for the following management indicator species:

- **Merriam's turkey** – turkey habitat is common throughout the forest; encompassing about 1.3 million acres (USDA-FS, 2002) the allotments provide spring-summer habitat for turkeys. Turkeys prefer to roost 20-30 feet off the ground in tall mature or over-mature ponderosa pine within ½ mile of water. They forage in these same areas as well as in grasslands and brush communities. Their population trend in New Mexico is considered stable to increasing, and turkeys are considered common within the lower elevations of the allotment.
- **Hairy woodpecker** – woodpecker habitat is common throughout the forest; encompassing about 976,000 acres. Woodpeckers prefer areas containing large snags and downed woody debris. They prefer to nest in tall trees averaging 17 inches in diameter and 60 feet high and forage in the same type of trees (USDA-FS, 2002). As much of the allotments are within ponderosa pine and mixed conifer vegetation types (Table 10), ample habitat for woodpecker is present. The 1995 Stuffing fire burned pockets of trees and produced some desirable snags for the woodpeckers. These combined with other existing snags attract a variety of insects for woodpeckers to eat. Population is ranked as abundant for the Santa Fe National Forest (10,000 to 100,000 pair) and statewide; woodpecker populations are considered stable or increasing (USDA-FS, 2002).
- **Rocky Mountain elk** – elk habitat is common on the forest; encompassing 1.6 million acres (USDA-FS, 2002). Elk inhabit most forest types that contain good forage and cover. Between 1997 and 1999, elk populations declined, through purposeful increased hunting pressure by New Mexico Department of Game and Fish. The Department is now seeking to increase elk numbers in Unit 6A while decreasing elk numbers in Unit 6C to achieve an average population of 4,000 elk in Unit 6. The allotments are within Big Game Management Unit 6A. Elk migrate through the allotments when moving between summer and winter range. Elk primarily use the area in the summer and fall. While no winter range has been identified in the allotments, during mild winter conditions elk remain in areas of low snow accumulation. Elk calving areas have been identified within the Ojito Frio allotment.

⁶ Remnant refers to a population where only a few native fish survive among dominant non-native fish.

- **Mourning dove** – mourning dove habitat is common throughout the forest; encompassing about 990,000 acres. They are found in most forest types. Within the allotments they are primarily found in the lower elevations, particularly in the Rio de Las Vacas corridor from spring to fall. Population is ranked as common (1,000 – 10,000 individuals) on the forest.
- **Piñon jay** – piñon jay habitat occurs on approximately 465,000 acres of the Santa Fe National Forest. The species mainly nests in open woodlands such as stands of piñon/juniper; this type of habitat is limited to about 1% of the allotments. Population is ranked as common on the forest but few are expected to occur on these allotments due to lack of habitat.

Migratory Birds

New Mexico Partners in Flight lists priority species of concern by vegetation type. The following priority birds could occur in the allotment: northern goshawk, Mexican spotted owl, Williamson's sapsucker, olive-sided flycatcher, dusky flycatcher, flammulated owl, Virginia's warbler, and Grace's warbler.

The closest IBA (important bird area) is the Golondrino Mesa IBA located more than 30 miles away. There are no associations or important links between the bird communities within the allotments and the Golondrino Mesa or any other IBA.

Overwintering areas generally consist of large wetlands. Important overwintering areas recognized on the Santa Fe National Forest include the Rio Chama and the Rio Grande corridors; both are well outside the allotments. The area encompassed by the allotments is not recognized as an important overwintering area because significant concentrations of birds do not occur there nor do unique or a high diversity of birds winter there.

3.6.2 Environmental Consequences

Alternatives 1-3

General Effects Applicable To All Species

The four allotments as well as the surrounding forested lands contain substantial summer range for wildlife. Operations such as tending to livestock (herding or transporting), maintaining or constructing range facilities (fences, corrals, water tanks), and to some degree the presence of cattle can create sound and visual disturbances. Visual and sound stimuli associated with human and livestock presence may cause localized and relatively short-term effects, generally limited to ¼ mile of the ongoing activity. Beyond ¼ mile, disturbances associated with livestock operations and grazing are less likely to occur.

Threatened, Endangered, and Sensitive Species

Livestock grazing within these allotments would have no effect on the **bald eagle** because no known breeding habitat occurs and bald eagle presence in the allotment is infrequent. Grazing would not likely adversely affect the **Mexican spotted owl** because no facilities are proposed under any of the action alternatives within the designated PAC, therefore there would be no human disturbance or construction activities associated with livestock management during breeding season. These effect determinations meet the criteria designated in the USDA guidance criteria (USDA-FS, 2002) for a may affect, not likely to adversely affect determination.

Grazing would not cause a trend to federal listing or decrease the overall population of:

- **New Mexico jumping mouse** – the current grazing management system and grazing alternatives call for conservative (31-40%) utilization. This combined with excluding cattle from approximately 48% of streams zones and limiting access to 10-45 days in the remaining streams zones would provide adequate forage and cover for this species. Fence construction and creation of new pastures under Alternatives 2 and 3 would provide additional control in riparian pastures that would be beneficial to protecting and enhancing jumping mouse habitat.
- **Northern goshawk** – goshawks typically nest in larger/taller trees and cattle grazing through an area would not be likely to create a disturbance to nest sites. Also, goshawks are predators of forest birds and mammals and none of the alternatives propose changing tree density, which is important habitat for goshawk prey species (e.g. tree squirrels, large woodpeckers, and blue grouse). While permittee activity (movement, noise and construction) can disturb nesting hawks, this effect is expected to be low due to the mitigation measure requiring tank and corral construction activities within potential habitat be conducted outside of breeding season. Non-construction type activities would be of short-duration and would likely not have a negative affect on nesting. The construction of two new water tanks proposed under Alternatives 2 and 3 could slightly increase prey species by attracting them to the water source.
- **Rio Grande cutthroat trout** – the Rito Café and Rio de las Vacas contain *Core Conservation Populations*; a *Reserve Conservation Population* occurs in the Rito de las Palomas, and a small remnant population possibly resides in American Creek (managed as a *Core Conservation Population*). Of the *Core Conservation Populations*, the Rio de las Vacas population occurs to the north (outside the boundary) of the allotments. The Rito Café population occurs along 4.1 miles of streams of which 1.3 miles are closed to grazing and the remaining 2.8 miles is accessible for up to 45 days a year. Fence construction in the Ojito Frio Allotment will change access to American Creek – where cattle currently have 45 day access to 2.1 miles, this access will be reduced to 0.7 miles of stream. Remaining access to American Creek will consist of less than 10 days use along 2.2 miles and no use along 1.5 miles. The *Reserve Conservation Population* on the Rito de las Palomas occurs along 4.2 miles of stream, of which 3.3 miles are closed to grazing and 0.9 mile is accessible to cattle for up to 45 days a year.

Limiting the amount and duration of access to stream segments, prohibiting grazing along stream segments containing *Core Conservation Populations* during spawning season (mitigation measure) and maintaining conservative utilization standards in all the allotments will limit disturbance to Rio Grande cutthroat trout currently present in these streams as well as maintain or improve stream bank conditions which will provide for future habitat should trout reintroduction occur.

Management Indicator Species

Grazing under these alternatives is not likely to have a negative impact on the overall population trends for:

- **Merriam's turkey** –turkeys prefer to roost in tall ponderosa pine and none of the action alternatives propose changing the tree density. Adding water developments under Alternatives 3 would provide additional water sources for the turkey.
- **Hairy woodpecker** –woodpeckers nest and forage primarily in the high in canopy of large diameter trees and none of the action alternatives propose changing the tree density.
- **Rocky Mountain elk** –elk populations on the Santa Fe National Forest are stable to increasing. Alternative 1 would represent little change to the elk and their habitat because no changes are proposed. There is no recent documented or anecdotal evidence that cattle grazing is adversely affecting elk on these allotments and there is no evidence of competition between cattle and elk for forage. Actions proposed under Alternatives 2 and 3 would benefit elk because cattle would be better distributed and there would be less concentration of cattle in a given area that could lead to competition for forage. Distribution and forage availability for elk would be further enhanced by developing water sources under Alternative 3 that could be used by elk as well as cattle. Constructing fence lines to meet wildlife standards (mitigation measure) would allow for elk migration and passage to occur.
- **Mourning dove** - mourning doves primarily nest in trees 10-25 feet off the ground and none of the actions proposed would change tree density. The potential for loss of nests due to abandonment from disturbance associated with grazing would not likely be measurable above the normal population fluctuations that occur from year to year, particularly because these allotments are not stocked with cattle until after June 1.
- **Piñon jay** - while grazing can impact individual nests and young present in small trees, this impact is anticipated to be extremely small as less than 1% of the allotments contain woodland vegetation.

Migratory Birds

No significant effects are anticipated because all species identified are either not present or transient and there are no Important Bird Areas or overwintering areas associated with the allotments. Proposed activities such as constructing fences would not result in removal of overstory vegetation, therefore snag retention standards and guidelines in the forest plan would be met. While noise and disturbance impacts to individual birds from grazing associated activities could occur, this impact would be considered minimal and would not be expected to cause declines in overall species population. Alternatives addressing improvements or changes in management are not expected to impact migratory bird species or alter their habitat; rather, water developments may provide a slight beneficial effect by attracting insects as a food source for birds.

Alternative 4 – eliminating grazing is not anticipated to negatively affect any wildlife species. There would likely be both beneficial direct and indirect effects of no grazing to various species due to the increase in ground vegetation, which could result in an increase of cover for small mammals and insects, and ultimately an increase of prey for predatory species. Elimination of grazing would also result in a decrease of associated noise and visual disturbances.

Cumulative Effects - direct and indirect effects of implementing any of the proposed actions are expected to be very minimal; as such they are not expected to result in significant cumulative effects to any wildlife species. Projects such as the reconstruction of State Highway 126 and the proposed timber harvesting activities to improve forest health along Forest Road 103 corridor, primarily south of Rock Creek, would have potential to add temporary noise and visual disturbance; however, being located along well-traveled routes, wildlife are likely already accustomed to disturbances in these areas. Over the long term, improvements in the grazing systems on the four allotment that would result in better distribution of cattle combined with increased understory vegetation that would be expected following the proposed timber harvesting activities to improve forest health would result in increased forage and cover for wildlife species.

3.7 Heritage Resources

3.7.1 Affected Environment

Approximately 30% of the area encompassed by the four allotments has been previously surveyed. These surveys were conducted primarily in areas that are currently grazed. That is, very little survey has been conducted on steep slopes – areas that are generally not grazed. Some of the previous surveys conducted prior to 1985 do not meet current survey standards for the Santa Fe National Forest with respect to transect spacing and qualifications of individuals performing the survey. However, these older surveys did result in documentation of archaeological sites and the surveys provide information related to the types of sites and density of sites that would be expected in the area.

Fifty-two archaeological sites have been identified in the four allotments. The sites range from prehistoric lithic scatters to historic logging related sites (railroad grades, cabins, and logging camps). There have been no reported situations where cattle were congregating on a heritage resource site or trampling artifacts and there are no known standing prehistoric ruins that are at risk of damage by cattle. Currently, there are no known, measurable impacts occurring on sites within the four allotments and no sites are known to be at risk should cattle grazing continue to be permitted at current levels.

3.7.2 Environmental Consequences

Alternatives 1-3 – continuing to permit cattle grazing would likely not have a significant effect on sites. However, because the entire 38,000 acres of the allotments have not been intensively surveyed, it is possible for unrecorded archaeological sites to be present and damaged by cattle. The possibility of this occurring is considered very low due to the low occurrence (density) of sites and the types of sites. For example – known prehistoric sites in these allotments consist of lithic scatters and do not have standing walls or other features that would be affected by cattle rubbing up against them or knocking them down. It is reasonable to predict that unrecorded prehistoric sites would also be lithic scatters without standing walls. Furthermore, should a prehistoric site with standing walls be present in an area where cattle congregate (near a corral, water development, salting area) it would likely have been reported by forest personnel or permittees, as such sites are not common to the area. There may be some minimal surface damage (from trampling) to unrecorded lithic scatters in areas where cattle congregate. Trampling can result in breaking surface artifacts. This type of damage can result in a loss of scientific

information related to the technology of how stone tools would have been manufactured. The potential for this effect to occur; however, would be considered low, as several mitigation measures were developed with the objective of protecting heritage resources from direct or indirect impacts caused by general cattle grazing and by ground disturbing activities associated with the construction and maintenance of range facilities. Mitigation measures include: no ground disturbing activities will be conducted within known site boundaries and no salting will occur within or immediately adjacent to known site boundaries. Furthermore, areas where proposed ground disturbing activities have the potential to affect heritage resources have been surveyed or will be surveyed as specific locations are identified on the ground prior to project initiation (as outlined in the heritage resource clearance report, Skinner 2000). Also, previously unsurveyed existing facilities (water developments, corrals) will be inspected prior to maintenance to determine presence of heritage resources. Implementing mitigation measures will provide protection to archaeological sites within the allotments. Specific proposed activities for each allotment and their potential effect to archaeological sites are discussed in the following paragraphs.

Peñas Negras Allotment – the proposed corral is within an area previously surveyed in 1986 (Elsesser, 1986). No sites are present in the area and as such there would be no effect related to this activity. The proposed fence line occurs at an elevation between 9,700 and 9,800 feet. Hand constructed fence lines generally do not result in damage to archaeological sites and survey of such proposed actions is not mandated. In this case, the potential for a site to be present at this high elevation is extremely low, furthermore, the majority of the proposed fence line falls within a previously surveyed area and no sites were documented in the area. No effects to archaeological sites are anticipated.

Ojito Frio Allotment – two fence line segments are proposed. They occur on slopes ranging between 8,200 and 8,700 feet elevation. Although not as high as the fence proposed in the Peñas Negras Allotment, the potential for sites to be present along this fence line is also considered very low due to slope and high elevation. Approximately half of each fence line has been previously surveyed (Wyatt, 1993; Fortini 1994) with the survey occurring in the more accessible, flatter areas (where archaeological sites would most likely be present). No known sites are present and as such, no effects to archaeological sites are anticipated.

A corral is proposed in a large meadow along the Rio de Las Vacas. Once the location for the corral is formalized, an intensive archaeological survey will be conducted per an agreement with the State Historic Preservation Officer (Skinner, 2000) outlined in the clearance report for authorizing grazing on these allotments. Preliminary inspection of the proposed location revealed that no sites are within the area identified for the corral; however, there is an historic site in the vicinity (old railroad grade or roadbed). Provided the corral location is intensively surveyed and nearby sites are avoided, construction and use of the corral will have no effect on the nearby historic feature or any other archaeological site.

Palomas Allotment – two fence segments are proposed in this allotment. Both traverse high elevation slopes (between 9,400 and 9,700 feet elevation). As described previously, the probability for sites in such a location is considered extremely low. Though no

survey has been conducted in the immediate location of the proposed fence segments, two block surveys in excess of 100 acres were conducted in 1987 (Whatley, 1987) within ¼ to ½ mile of the fence segments and at similar elevation and no sites were identified. Therefore, construction of these fence segments is not anticipated to affect any archaeological resource.

Vacas Allotment – two small fence segments are proposed in this allotment. The fence segment located within the southern portion of the allotment is within an area that was previously surveyed in 1989 (Whatley, 1989) and no sites are present. The northern segment has not been previously surveyed. It is located above 8,300 feet elevation and on steep slopes. Nearby surveys (within ¼ mile) did not result in the documentation of any archaeological sites. The probability for a site to be located in the vicinity of the proposed fence is very low. No effects to archaeological sites are anticipated.

Under Alternative 3, additional improvements are proposed, consisting of two dirt water tanks and an additional four miles of fence. The tank locations have been preliminarily identified and occur at about 8,400 feet elevation where site potential is considered low; however, because construction of the tanks will involve ground disturbance, when the locations for the two dirt water tanks are formalized, an intensive archaeological survey will be conducted prior to construction per an agreement with the State Historic Preservation Officer (Skinner, 2000) outlined in the clearance report for authorizing grazing on these allotments. When the location of the fence is formalized, the District Archaeologist will determine if a survey is required.

Alternative 4 – as permits expire, cattle will be removed from the four allotments and eventually, there would be no potential effects resulting from cattle grazing to archaeological resource within these allotments.

Cumulative Effects – based on the discussion provided above, no significant direct or indirect effects are anticipated related to known archaeological sites. There is very low potential for direct or indirect effects to occur on sites that have not been discovered. As such, no past, present or foreseeable future projects would have a cumulative effect on archaeological sites within these allotments.

3.8 Recreation and Scenery

3.8.1 Affected Environment

Recreation use on these allotments occurs primarily along road and riparian corridors and generally consists of fishing, hunting, car/RV camping, off-road vehicle use, driving for pleasure, and fall foliage viewing. The northern portion of the Palomas Allotment contains the trailhead for Trail 50. The Trail 51 trailhead is located just north (outside of the allotment) of the Vacas Allotment. These trailheads access the San Pedro Parks Wilderness where visitors can fish, hunt, ride horseback, backpack, and/or day hike.

Fencing is used on these allotments to regulate timing and duration of use within various pastures. The fences can impede the ability for users to roam where they please and as a result, some fences are cut by visitors who do not wish to find a way around them.

Peñas Negras Allotment - the Recreation Opportunity Spectrum is designated as Roaded Natural and Semi Primitive Motorized⁷ (USDA-FS 1987 pp 213). The Visual Quality Objective for this allotment is Partial Retention and Modification⁸. The current level of concern for scenery is low⁹ with some areas falling into a moderate concern. Scenic attractiveness for the allotment is considered mostly typical/common, with one section near Rito Peñas Negras being considered distinctive, and a small section just east of Forest Road 103 being described as indistinctive.

This allotment receives dispersed recreation use during hunting season, particularly in the vicinity of the junction of Forest Road 103 and Forest Road 315 where 5-15 people may camp on average of five days at a time during fall and spring hunts. A gate is located off of Forest Road 315. The junction of Forest Road 103 and Forest Road 527 is also popular for hunting camps in addition to being used for day use related to fishing.

The Peñas Negras trailhead is located along the northwest boundary of the allotment, off Forest Road 70. This trail is one of four access points on the Cuba Ranger District leading into the San Pedro Parks Wilderness; however, it is not a popular access point due to its lack of a parking area.

Ojito Frio - this allotment falls mostly within the Roaded Natural Recreation Opportunity Spectrum with a small segment of Semi-primitive Motorized along the southeast boundary of the allotment. The Visual Quality Management areas are designated as Retention, Partial Retention, Modification, and Maximum Modification (where the valued landscape character appears heavily altered). The level of concern for scenery is mostly high intermixed with some moderate and low areas. Scenic attractiveness for the allotment is mostly indistinctive along the southeastern portion of the allotment, with some distinctive scenery in the northwestern portion.

A dispersed recreation area is located along State Highway 126, just south of Forest Road 103. This area receives use every weekend between Memorial Day and Labor Day. Dispersed hunting camps are located along Forest Road 103, just south of Forest Road 69 and at the junction of State Highway 126 and Forest Road 117. These hunting camps are generally used in the spring and fall, receiving between 5-15 people who camp for up to five days at a time. Spring hunts fall outside of the grazing period; fall hunts overlap the grazing period.

An old holding pasture at the junction of State Highway 126 and Forest Road 20 (southwest portion of the allotment) receives some off-road vehicle use. Two gates are located in the southwest boundary of the allotment. There are private land inholdings along State Highway 126 and the highway is a popular route for pleasure driving and for viewing fall foliage.

⁷ Roaded Natural – is characterized by a predominantly natural environment with evidence of moderate permanent resource use. Semi-primitive Motorized – is characterized by moderately dominant alterations by people, with strong evidence of primitive roads or trails.

⁸ Partial Retention – is where the valued landscape character appears slightly altered. Modification – is where the valued landscape character appears moderately altered.

⁹ Level of Concern for Scenery is described as: Level 1 – high concern; Level 2 – moderate concern; Level 3 – low concern.

Palomas Allotment - the Recreation Opportunity Spectrum is designated as Semi-primitive Motorized. The Visual Quality Management areas are mostly Partial Retention with some sections of Modification and one section with Retention (where the valued landscape character appears intact). The level of concern for scenery is mostly high with some moderate. Scenic attractiveness is rated as distinct in half of the allotment and typical/common in the other half.

This allotment receives minimal dispersed camping between Memorial Day and Labor Day and receives some dispersed camping use associated with hunting season. This use occurs along Forest Road 70 and Forest Road 69. The Palomas Trailhead (Trail 50) is a popular trailhead for accessing the San Pedro Parks Wilderness and is used by horseback riders, hunters, and outfitter guides.

Vacas Allotment - this allotment falls within Recreation Opportunity Spectrum of Roaded Natural and Semi-primitive Motorized. The Visual Quality Management areas vary across the allotment. The northern portion of the allotment is designated as Retention and Partial Retention and the southern portion of the allotment is designated Modification. The level of concern for scenery is mostly high along the northern portion of the allotment (State Highway 126 corridor), with some moderate and low areas throughout the rest of the allotment. Scenic attractiveness is mostly typical/common, with a couple areas being considered distinctive.

Two main travel corridors are present. Forest Road 70 is the main road for visitors traveling to the San Pedro Parks Wilderness and numerous dispersed camping sites are present up to and past the Vacas Allotment northern boundary all the way to the San Gregorio Trailhead (outside of the allotment). A small portion of Forest Road 20 is also within this allotment and there is a segment along the road that is a popular spot for recreation users who swim and fish in the Rio de Las Vacas. This area has been fenced to keep vehicles out, but visitors can walk-in and use the area.

There are two developed campgrounds (Rio de Las Vacas and Clear Creek) and a picnic area (Clear Creek) within this allotment. Currently, these sites are closed and are under construction until late summer 2003. When open and functioning, these developed sites are heavily used between Memorial Day and Labor Day, reaching capacity on weekends and holidays during this season. Both campgrounds have a stream that flows next to them making the setting attractive to campers and anglers. The areas are fenced to keep the cows from entering and causing user conflicts.

When construction is complete and the facilities are re-opened, the Clear Creek Campground and Group Area will have 13 camping units and a capacity of 65 people. The adjoining group area will be developed to support up to 50 people. The Clear Creek Picnic Area will have seven camping units. The Rio de Las Vacas campground will have 16 camping units with a capacity of 80 people.

3.8.2 Environmental Consequences

Alternative 1 –

Peñas Negras Allotment - the continuation of current grazing would cause minimal conflicts because recreation use in this allotment is primarily associated with hunting and based on experience, hunters are generally not as concerned with grazing on forestlands as are other recreation users. The permittees on the allotment have expressed concern that recreation users often (once a week) leave the gate located near Forest Road 315 open. This results in extra work for the permittees who have to collect any cattle that may have wandered out of the pasture while the gate was opened.

Ojito Frio Allotment –continuing to graze this allotment would result in continued conflicts between recreation users and cattle grazing in the dispersed camping area located along SR 126 just south of FR 103 (Rock Creek Pasture). The conflict is related to recreation users camping in an area being grazed by cattle and having to deal with smells and other inconveniences associated with cattle manure; however, the mitigation measure to keep cattle out of the Rock Creek pasture between Memorial Day and Labor Day would substantially reduce this conflict related to fresh cattle manure being present in areas used by dispersed campers. Recreation users sometimes leave the two gates located along the southwest boundary of the allotment open. Permittees have reported having to close these gates at least once a week while their cattle are using these pastures, resulting in extra work for the permittees who have to collect cattle should they stray through the open gates.

Palomas Allotment – there are no quantifiable existing conflicts associated with recreation use and cattle on this allotment and as such, there are no anticipated direct or indirect effects associated with continuing current management.

Vacas Allotment – of the four allotments, this allotment receives the most recreation use. Much of the popular developed and dispersed recreation areas and private lands are currently fenced to keep cattle out, as such there are minimal occasions when fresh manure is present within recreation areas during peak recreation use periods.

Alternative 2 -

Peñas Negras Allotment - effects of this alternative would be similar to Alternative 1 with respect to there being minimal conflicts with recreation users in the allotment. Effects associated with facilities proposed under this alternative are as follows:

- Reconstruction of the corral adjacent to Forest Road 70 would not affect the scenic quality of the area because the corral is located in an area designated as maximum modification with a low concern for scenery.
- New fence construction adjacent to the Peñas Negras Trail would not affect recreation movement, but would have a minimal effect to visuals within the immediate foreground (approximately 300-feet from the observer's viewpoint) because the fence would be built in an area designated for partial retention, with a moderate level of concern for scenery. The presence of the fence however, would not result in a change to the visual quality objective of the area.
- Reconstruction of an existing fence would not affect visual quality or alter recreation movement because the fence already exists.

Ojito Frio Allotment –effects associated with this alternative are similar to Alternative 1 related to cattle grazing in general. Effects related to facilities proposed under this alternative are as follows:

- Construction of four miles of new fence along Rock Creek and American Creek would further reduce conflicts between recreation users and cattle by reducing the incidence of cattle and campers being in the same area at the same time.
- Construction of a corral adjacent to State Highway 126 and Forest Road 20 would not affect recreation use. The corral may however, be visible from State Highway 126 and Forest Road 20. These travel corridors are popular among people driving to view scenery. The visual quality objective in these areas is designated as retention with a high concern for scenery. Placing the corral in an area that is not visible from the road should eliminate this visual effect. If the corral cannot be located outside of the visual corridor, the scenery mitigation measure (Section 2.3.1) that requires using naturally appearing materials (where feasible) when constructing range facilities would minimize the visual disturbance.

Palomas Allotment – no effects are anticipated related to general cattle grazing on this allotment. The effects related to proposed facilities are as follows:

- Construction of one mile of new fence would minimally affect the movement of recreation users. The fence would cross Trail 51; however, the proposed action would include a gate so users would not have to climb over the fence. There may be some indirect effect to the permittees if recreation users leave the gate open, as permittees would have to close the gate and retrieve any cattle that may have wandered out of the allotment.

Vacas Allotment - the effects of this alternative would be similar to Alternative 1 with respect to there being minimal conflicts with recreation users in the allotment because much of the private lands and dispersed/developed recreation sites are currently fenced. Effects associated with proposed facilities are as follows:

- Construction of ½ mile new fence in the vicinity of the Rio de Las Vacas campground would have little affect on the movement of recreation users at the campground because the campground itself is currently fenced. Similarly, building the fence would not introduce a new type of visual distraction or change the scenic values of the area because the current fence surrounds the campground and the new short segment of fence would be located well within the tree line and as such would not be visible in the immediate foreground (within 300 feet) of the campground or State Highway 126.
- Construction of ½ mile fence in Turkey pasture would not affect recreation movement. The fence would be located in an area with high concern for scenery, but visual disturbance is anticipated to be minimal based on mitigation measure that would require using natural appearing materials or placing the fence where vegetation and natural topography hide it from view.

Alternative 3 – for the Peñas Negras, Ojito Frio, and Palomas Allotments, the effects under this alternative are the same as those described under Alternative 2, as no additional facilities being proposed in these allotment.

Facilities identified for the Vacas Allotment would result in the following:

- The two new dirt tanks would not affect recreation, as they are not located in high use areas. Similarly, they would not affect visual quality, as they would not be visible from main travel corridors.
- Four miles of new fence construction would not affect recreation movement. The fence would be located in an area with high scenic values but the level of visual disturbance is anticipated to be low and would not alter the scenic values of the area because much of the fence would be hidden from view by vegetation and typography and mitigation measures require that naturally appearing materials be used in the event that a portion of the fence is visible along high scenic travel corridors.

Alternative 4 – for all four allotments, there would be no recreation / grazing conflicts once the grazing permits expired. There may still be some issues with recreation movement and gates being left open due to the allotment boundary fences not being removed.

Cumulative Effects – because direct and indirect effects are considered minimal to both recreation and scenery resources, no significant cumulative effects are anticipated.

3.9 Economics

3.9.1 Affected Environment

Economic efficiency and financial efficiency are defined in FSH 1909.17. Economic efficiency is determined by PNV (present net value) for all partners in the project for the planning period. PNV is the sum of all income sources less all expenses over a given period at current prices (dollars). In this case, the partners are the Forest Service, the grazing permittees and a grantor. Financial efficiency is determined by PNV for the Forest Service. A benefit/cost (B/C) ratio is also determined as part of the analysis process for range management projects.

This analysis is based on a 10-year planning period with the following assumptions.

- The analysis is based only on those values that can have a cash value readily assigned.
- The average number of livestock authorized to graze and the average season of use is reflected by information in the current term grazing permits, unless identified otherwise in a specific alternative description within the environmental assessment.
- Successive permits will be issued with the same permitted numbers, class/type of livestock and season of use as listed in the current term grazing permits, unless identified otherwise in a specific alternative description within the environmental assessment.
- Range inspections, permit administration and range maintenance will only continue so long as there is grazing.

The Forest Service has mandates and management objectives that are not easily quantified for economic analysis. Some of our partners operate under similar

circumstances. Therefore, economic and fiscal analysis results are not a primary determining factor in land management decisions. Alternative 4 – the no grazing alternative was used as the baseline for the analysis of each allotment.

3.9.2 Environmental Consequences

Ojito Frio Allotment - the following information was used in the economic and financial analysis of alternatives displayed in Table 12 for the Ojito Frio Allotment.

Alternative 1 – no new facilities would be constructed. Routine maintenance would occur on existing facilities.

Alternatives 2 and 3 - construction activities would occur in 2005. Permittees would pay all labor costs for corral and fence construction. The Forest Service would provide materials for corral construction (Range Betterment Fund) and grants associated with the *Respect the Rio* project would provide materials for fence construction.

Alternative 4 – as permits expire, cattle would be removed from the allotment. Two permits expire in 2003, one expires in 2004, and one expires in 2008.

Table 12. Economic and Financial Analysis Results – Ojito Frio Allotment

	Alternative 1 Continue Current Management	Alternative 2 Proposed Action	Alternative 3 Add improvements on Vacas Allotment	Alternative 4 No Grazing
Economic Efficiency	-\$75,775	-\$119,428	-\$119,428	-\$5,319
Economic B/C	0.53	0.42	0.42	0.86
Financial Efficiency	-\$41,217	-\$55,870	-\$55,870	-\$14,551
Financial B/C	0.19	0.14	0.14	0.20

Palomas Allotment - the following information was used in the economic and financial analysis of alternatives displayed in Table 13 for the Palomas Allotment.

Alternative 1 – no new facilities would be constructed. Routine maintenance would occur on existing facilities.

Alternatives 2 and 3 - construction activities would occur in 2006. Permittees would pay all labor costs for fence construction and the Forest Service would provide all materials for fence construction (Range Betterment Fund).

Alternative 4 – as permits expire, cattle would be removed from the allotment. One permit expires in 2007 and one permit expires in 2012.

Table 13. Economic and Financial Analysis Results – Palomas Allotment

	Alternative 1 Continue Current Management	Alternative 2 Proposed Action	Alternative 3 Add improvements on Vacas Allotment	Alternative 4 No Grazing
Economic Efficiency	-\$14,691	-\$21,441	-\$21,441	-13,467
Economic B/C	0.77	0.70	0.70	0.77
Financial Efficiency	-\$26,258	-\$28,008	-\$28,008	-\$24,070
Financial B/C	0.17	0.16	0.16	0.17

Peñas Negras Allotment - the following information was used in the economic and financial analysis of alternatives displayed in Table 14 for the Peñas Negras Allotment.

Alternative 1 – no new facilities would be constructed. Routine maintenance would occur on existing facilities.

Alternatives 2 and 3 - construction activities would occur in 2007. Permittees would pay all cost for corral construction. Permittees would pay all labor costs for fence construction and the Forest Service would pay for fence materials (Range Betterment Fund)

Alternative 4 – as permits expire, cattle would be removed from the allotment. One permit expires in 2005, three permits expire in 2006, one permit expires in 2009, and two permits expire in 2010.

Table 14. Economic and Financial Analysis Results – Peñas Negras Allotment

	Alternative 1 Continue Current Management	Alternative 2 Proposed Action	Alternative 3 Add improvements on Vacas Allotment	Alternative 4 No Grazing
Economic Efficiency	-\$171,682	-\$189,182	-\$189,182	-\$95,188
Economic B/C	0.47	0.44	0.44	0.50
Financial Efficiency	-\$84,609	-\$88,109	-\$88,109	-\$60,619
Financial B/C	0.16	0.16	0.16	0.15

Vacas Allotment - the following information was used in the economic and financial analysis of alternatives displayed in Table 15 for the Vacas Allotment.

Alternative 1 – no new facilities would be constructed. Routine maintenance would occur on existing facilities.

Alternative 2 - the number of permitted animals would be reduced by three head and the season of use would be extended by five days for 45 head. Construction activities would occur in 2004. Permittees would pay all labor costs for fence reconstruction and the Forest Service would provide all materials for fence construction (Range Betterment Fund).

Alternative 3 – same as Alternative 2 with the following addition: the Forest Service would also pay all costs for stock pond construction (Range Betterment Fund).

Alternative 4 – as permits expire, cattle would be removed from the allotment. One permit expires in 2003, one permit expires in 2005, and two permits expire in 2010.

Table 15. Economic and Financial Analysis Results – Vacas Allotment

	Alternative 1 Continue Current Management	Alternative 2 Proposed Action	Alternative 3 Add improvements on Vacas Allotment	Alternative 4 No Grazing
Economic Efficiency	-\$59,469	-\$80,129	-\$110,129	-\$20,488
Economic B/C	0.62	0.55	0.47	0.73
Financial Efficiency	-\$39,828	-\$56,015	-\$66,015	-\$23,356
Financial B/C	0.21	0.16	0.14	0.21

Cumulative Effects - No other projects in this area will have an effect on these analyses.

3.10 Environmental Justice

Executive order 12898 (1994) requires federal agencies to address environmental justice of their actions on minority and low-income populations. This analysis considers demographic, economic, and human health risk factors.

3.10.1 Affected Environment

The rural community of Cuba lies to the west of these grazing allotments and numerous small, predominantly Spanish communities as well as Native American pueblos and communities are located in the vicinity of the Jemez Mountains. Native Americans have been present in the area for the past 800 years and the Spanish first arrived in the area about 400 years ago. Many families in the area trace their ancestry back to these original inhabitants. As such, there are strong ties to the land and a reliance on the natural resources of the forest.

3.10.2 Environmental Consequences

Alternatives 1-3 – selection of any one of these alternatives would not result in adverse or disproportionate effects on low income or minority populations. These alternatives are consistent with activities implemented on National Forest lands throughout the United States over the past several decades. As such, the environmental effects are predictable as are the outcomes of implementing mitigation measures that have been refined over the years. There would be no displacement of minorities, changes of land use, or increases in taxes that would constitute an economic hardship. There would be no negative effects on public health.

Alternative 4 – this alternative would impact minority and low-income populations. Eliminating the opportunity to graze cattle on any or all of the allotments would adversely affect local permittees by changing traditional use of the land and causing an economic hardship to those individuals who rely wholly or in part on the income generated from their long-term cattle operations.

4.0 CONSULTATION AND COORDINATION

In February 2003, the Forest Service sent a scoping letter to 141 interested or potentially affected people, groups, organizations, tribes, and state and other federal agencies during the planning process. A complete list of people and organizations consulted with during project scoping is in the project analysis file as is a list of individuals to whom the Environmental Assessment was sent.

Six responses were received in response to scoping in 2003; these comments were reviewed along with scoping responses from the 2000 effort in which five responses were received.

Scoping Responses in 2003

Martha Anne Freeman
John Hernandez
Don Houghton
Navajo Nation
New Mexico Natural History Institute - Roger Peterson
Elaine Gorham and David Strip

Scoping Responses from 2000 scoping letter

Jerry Elson – Resource Consultant
Forest Guardians Kirsten Stade and John Horning
Martha Anne Freeman
Don Houghton
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4.1 List of Key Preparers

Table 16. Key Preparers

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Range, Vegetation, Soil, Water, and Air Analysis, GIS	Jim Eaton, Rangeland Management Specialist, Cuba Ranger District
Recreation and Scenery Analysis	Sherry Gaston, Recreation, Cuba Ranger District
Wildlife Analysis	Ramon Borrego, Wildlife Biologist, Cuba Ranger District
Fisheries Analysis	Sean Ferrell, Forest Fisheries Biologist
Economic Analysis	Barry Imler, Rangeland Management Specialist, Santa Fe National Forest

REFERENCES

- Elsesser, Kathryn. 1986. Rito Timber Sale Heritage Resource Report 1986-10-063. Manuscript on file at the Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.
- Fortini, William. 1994. Rio De Las Vacas Campground Heritage Resource Report 1994-10-062B. Manuscript on file at the Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.
- Holechek, Jerry L. and Dee Galt. 2000. Grazing Intensity Guidelines in Rangelands. June 2000. Pg 11-14.
- New Mexico Department of Game and Fish, Fisheries Management Division. 2002. Long Range Plan for the Management of Rio Grande Cutthroat Trout in New Mexico. Santa Fe, New Mexico.
- New Mexico Department of Game and Fish. 2002. Elk Regional Management Information. Santa Fe, New Mexico.
- New Mexico Environmental Department. 2000-2002. State of New Mexico 303(d) List for Assessed Stream and River Reaches.
- Skinner, Rita. 2000. Penas Negras, Ojito Frio, Palomas, and Vacas Range Allotment Re-issuances Heritage Resource Report 2000-10-012. Manuscript on file at the Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.
- USDA Forest Service. 1987. Santa Fe National Forest Plan, as amended. United States Forest Service, Southwest Region. Albuquerque, New Mexico.
- USDA Forest Service. 1993. Terrestrial Ecosystem Survey of the Santa Fe National Forest. United States Forest Service, Southwest Region. Albuquerque, New Mexico.
- USDA Forest Service. 1995. Landscape Aesthetics: A Handbook for Scenery Management. Washington: GPO. Pp 2-4 – 4-14.
- USDA Forest Service. 1997. Analysis and Management and Training Guide. United States Forest Service, Southwest Region. Albuquerque, New Mexico.
- USDA Forest Service. 1999. Region Three Sensitive Species List. Southwest Region, Albuquerque, New Mexico.
- USDA Forest Service. 2002. Management Indicator Species Assessment, Santa Fe National Forest. March 2002. Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.

Whatley, William. 1987. Deer Mountain Planning Area Heritage Resource Report 1987-10-125. Manuscript on file at the Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.

Whatley, William. 1989. San Pablo Timber Sale Heritage Resource Report 1989-10-011B. Manuscript on file at the Santa Fe National Forest Supervisor's Office, Santa Fe, New Mexico.