Domestic sheep at the base of Baldy Cinco on the Snow Mesa Allotment.
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Environmental Assessment
Snow Mesa and Wishbone Sheep Allotments

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Abstract: This environmental assessment is a public document that provides sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It reveals the direct, indirect, and cumulative effects of a proposed action and alternative actions for permitted domestic livestock grazing management within the Snow Mesa and Wishbone Sheep Allotments.

This document follows the format established in the Council on Environmental Quality regulations (40 Code of Federal Regulations (CFR) Parts 1500–1508). It includes a discussion of the need for the proposal, alternatives to the proposal, the impacts of the proposed action and alternatives, and a listing of agencies and persons consulted. It is tiered to the 1996 Revised Land and Resource Management Plan, as amended (Forest Plan) for the Rio Grande National Forest and the Final Environmental Impact Statement and Record of Decision issued for the Forest Plan.
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Project history

The Multiple Use Sustained Yield Act of 1960 directs the Forest Service to administer National Forest System (NFS) lands for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. Although the act allows that “some of the land will be used for less than all of the resources,” ideally, grazing by domestic sheep on NFS lands can continue while managing for viable populations of bighorn sheep.

To this end, national direction provided by Deputy Chief Holtrop in 2011 (USDA Forest Service 2011a) identified:

*The relationship between bighorn sheep population viability and domestic sheep grazing on National Forest System lands continues to be an important wildlife and range management issue (...). Where management objectives include maintenance or enhancement of bighorn sheep populations, the potential for disease transmission from domestic sheep/goats to bighorn sheep must be addressed.*

*Where viability assessments indicate a high likelihood of disease transmission and a resulting risk to bighorn sheep population viability across the forest, the goal of spatial and/or temporal separation between domestic sheep/goats is the most prudent action we can use to manage risk of disease transmission.*

Further direction provided by Deputy Chief Weldon in 2014 (USDA Forest Service 2014a) further directed line officers:

*Best management practices to maintain separation [between domestic sheep/goats and bighorn] need to be applied to the extent they are effective in supporting both uses. When a line officer determines that the potential risk for contact is at an unacceptable level, those officers need to identify and analyze potential replacement allotments when developing management alternatives. The analysis for alternatives for replacement allotments should be part of a single decision-making process as part of ongoing efforts to develop site-specific solutions.*

The Snow Mesa and Wishbone sheep allotments project embodies this direction.

The Snow Mesa sheep allotments include four individual allotments – Snow Mesa, Miners, Table, and Ouray (currently vacant) – and are about 5 miles northwest of Creede, Colorado, in Mineral and Hinsdale Counties. Livestock grazing has occurred in this area since the early 1920s. The current permittees, permitted on the Snow Mesa, Miners and Table sheep allotments since 1998, are authorized to graze up to a combined 1,000 ewes (each with one or more lambs) from July 11 to September 15 for a total of 667 animal unit months (AUMs).

This project was initiated in 2012 because the Snow Mesa sheep allotments did not have a current environmental analysis. The previous range management plan/environmental analysis was completed in 1977, and conditions had changed since then. While resource conditions on the allotments were generally within desired condition, concerns for
contact between domestic and bighorn sheep had increased. The drive to address the potential for contact came from four primary sources:

- Rocky Mountain bighorn sheep being added to the US Forest Service Rocky Mountain Region Sensitive Species list in 2007
- 2011 USFS Washington Office direction required the potential for disease transmission from domestic sheep/goats to bighorn sheep to be addressed
- Colorado Parks and Wildlife (CPW) publishing the management plan for the affected bighorn herd in 2013 and identifying the Central San Juan Herd as Tier 2
- Monitoring by both the Forest Service and CPW that indicated spatial and temporal overlap between domestic and bighorn sheep in the areas on or adjacent to the northern boundaries of the allotment.

These indicated that there was a need to assess the risk of contact on the Snow Mesa sheep allotments and ensure that risk was at an acceptable level.

When initiated in 2012, the analysis for the Snow Mesa allotments was going to be combined with that for the Fisher, Ivy and Goose sheep allotments. After public scoping in 2012, the Divide district determined that the Fisher, Ivy, and Goose allotments were a higher priority. The analysis for those moved ahead and the Snow Mesa analysis was deferred.

Public scoping on the stand-alone Snow Mesa sheep allotments environmental analysis began in January of 2014. Three alternatives were initially considered for the Snow Mesa analysis. These were disclosed to the public on August 11, 2015, in a draft Environmental Assessment (EA) for comment. At that time, the Proposed Action was Alternative 1 due to a high and un-mitigatable risk of contact between domestic and bighorn sheep on the Snow Mesa sheep allotments. The three alternatives analyzed in the draft EA were:

1) Alternative 1 – *No authorized grazing (2015 Proposed Action).* Grazing by domestic sheep would not be reauthorized and the allotments would become vacant.

2) Alternative 2 – *Continued current grazing.* Grazing by domestic sheep would be reauthorized on the Snow Mesa sheep allotments with no change in allotment boundaries or grazing patterns.

3) Alternative 3 – *Allotment boundary reconfiguration.* Grazing by domestic sheep would be reauthorized; however, Snow Mesa sheep allotments’ boundaries would be reconfigured. The intent of boundary reconfiguration was to create a buffer and exclude those areas of highest contact concern between bighorn and domestic sheep. Portions of the vacant Ouray Allotment would be added to the Snow Mesa sheep allotments and made available for domestic sheep grazing.

Comments received on the draft EA indicated that simply vacating the Snow Mesa sheep allotments was not an adequate proposed action. As a result of reviewing comments on the draft EA, the Divide District embraced the challenge presented by the 2014 Weldon direction to identify and analyze replacement allotments as part of a single decision when the risk for contact was unacceptable. The Divide District worked with the
interdisciplinary team, the Snow Mesa sheep allotments’ permittees, cattle permittees, and Colorado Parks and Wildlife (CPW) to develop a revised proposed action.

This revised proposed action, the Wishbone allotment, creates a replacement sheep allotment and vacates the Snow Mesa ones. The public was invited an opportunity to comment on this proposed action in March of 2017. This EA fully describes the revised proposed action and describes the environmental consequences of four alternatives considered in detail:


2) Alternative 2 – Continued current grazing. Grazing by domestic sheep would be reauthorized on the Snow Mesa sheep allotments (Snow Mesa, Table, Miners) with no change in allotment boundaries or grazing patterns.

3) Alternative 3 – Allotment boundary reconfiguration. Grazing by domestic sheep would be reauthorized; however, Snow Mesa Sheep Allotment boundaries would be reconfigured. Areas north of Forest System Trail 787 (the Continental Divide National Scenic Trail) and north of the Miners Creek Trail (Trail 803) would be excluded. The intent of boundary reconfiguration is to create a buffer and exclude those areas of highest contact concern between bighorn and domestic sheep. Portions of the vacant Ouray Allotment would be added to the Snow Mesa Sheep Allotments and made available for domestic sheep grazing.

4) Alternative 4 – Permittee proposed allotment boundary reconfiguration and shift to the south. This alternative was proposed by the Snow Mesa permittees in response to the 2015 draft EA for comment. Grazing by domestic sheep would be reauthorized; however, Snow Mesa Sheep Allotment boundaries would be changed to exclude the Snow Mesa Allotment. The vacant Ouray Allotment would be added to the Snow Mesa Sheep Allotments and made available for domestic sheep grazing. This alternative was not analyzed in detail, as described in Section 2.7.

5) Alternative 5 – Wishbone Allotment (Proposed Action) This alternative modifies the original proposed action. It would create a new domestic sheep grazing allotment, called Wishbone, from seven pastures and vacate the Snow Mesa sheep allotments. Grazing by domestic sheep may be authorized on the Wishbone allotment between June 15 and September 15 based on forage availability. Currently permitted numbers would stay the same. Domestic sheep grazing on the Coller State Wildlife Area is considered a connected action, despite that being CPW jurisdiction, and grazing may occur on Coller later than September 15.

**Analysis emphasis**

Internal and public scoping indicated that the risk of contact between domestic and bighorn sheep, and subsequent potential disease transmission, is the main source of controversy. The two points of contention are the impacts from domestic sheep grazing on bighorn sheep viability and the social and economic impacts of emphasizing one of these two uses of NFS lands over the other. These are identified as issues in this analysis.
(Section 1.9) and provide the means for distinguishing the tradeoffs between the different alternatives.

**Other concerns raised by agencies and the public**

In addition to the issue of risk of contact between domestic and bighorn sheep, other concerns were raised through the internal and public scoping process. These included potential impacts from livestock grazing on plant communities, other species of wildlife, hunting, other recreational experiences such as hiking the Continental Divide National Scenic Trail, soils and water. The EA discloses the anticipated impacts to these resources. All alternatives, as modified by project design features, resolve these resource conflicts.

**Chapter 1. Purpose of and Need for Action**

**1.1 Introduction**

The Forest Service has prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EA discloses the possible direct, indirect, and cumulative environmental impacts that may result from the proposed action and alternatives to the proposed action. It provides the responsible official with the information necessary to make an informed decision.

This chapter describes the proposed action, the area and scope of analysis, the purpose of and need for action, and direction from the Rio Grande National Forest Revised Land and Resource Management Plan, as amended (hereafter referred to as the Forest Plan [USDA Forest Service 1996a]). It also describes the public involvement process, the issues associated with the proposed action, other environmental and social concerns, and decisions to be made.

Additional documentation, including more detailed analyses of project-area resources, is available in the project record located at the Divide Ranger District Office in Del Norte, Colorado.

**1.2 Proposed Action**

The proposed action is to create a new domestic sheep allotment, Wishbone, from seven pastures, authorize domestic sheep grazing on this allotment, and vacate the three Snow Mesa Sheep Allotments (Snow Mesa, Table, Miners). The seven pastures in the Wishbone Allotment include Colorado Parks and Wildlife jurisdiction lands, portions of one active and one forage reserve Rio Grande National Forest cattle allotments, a portion of the currently-vacant Ouray Allotment, and other Rio Grande National Forest System lands.

Project design features described in Table 2-3 and monitoring measures described in Tables 2-4 and 2-5 are incorporated into the proposed action.

The proposed action reduces the risk of contact between domestic sheep and bighorn sheep and subsequent potential disease transmission by providing for improved spatial...
and temporal separation between the two species. This alternative would result in no overlap between bighorn core herd home range (CHHR) and the domestic sheep allotment. In addition, topographical barriers -- such as the Rio Grande River, Highway 149, and several subdivisions—temporal differences in bighorn migration and the domestic sheep grazing season, as well as project design features described in Table 2-3 improve the ability to manage for separation between the species. Increased accessibility of each of the pastures within the Wishbone Allotment would also improve the ease of monitoring and management of the domestic sheep.

1.3 Area and Scope

The Snow Mesa Sheep Allotments are about 5 miles northwest of Creede, Colorado in Mineral and Hinsdale Counties, and cover approximately 34,558 acres (Fig. 1-1).
Figure 1-1. The Snow Mesa Sheep Allotments analysis area relative to the Rio Grande National Forest.

The Wishbone Allotment is made up of seven pastures located within 10 miles of Creede, Colorado, and covers approximately 10,480 acres in Mineral County (Fig. 1-2).
Figure 1-2. The Wishbone Sheep Allotments analysis area relative to the Rio Grande National Forest.
1.4 Purpose of Action

The purpose of the proposed action is to reduce the risk of contact between domestic and bighorn sheep on the allotments to an acceptable level in order to minimize potential interspecies disease transmission, manage for healthy bighorn sheep populations, and sustain an economically viable domestic sheep industry in Colorado.

Research has demonstrated that strains of Pasteurellaceae can be transmitted from domestic sheep to bighorn sheep, leading to pneumonia and death (Lawrence et al. 2010). In some cases, exposure has led to large-scale bighorn sheep mortality affecting all age and sex classes, followed by a long period of depressed lamb recruitment (George et al. 2009).

There are different viewpoints regarding the degree of threat of disease transmission; these viewpoints are contentious and can be divisive.

This analysis uses the best available science and models, and the most current information regarding the Central San Juan Bighorn Sheep Herd, and addresses the most recent Forest Service direction regarding spatial and/or temporal separation of the two species. More information on disease transmission is available in the project record.

Although there are gaps and disagreement in the knowledge base on the causes and mechanisms of bighorn sheep die-offs and disease transmission between these species, a large volume of literature supports the potential for disease transmission between the species, documents bighorn sheep die-offs near domestic sheep, and supports management to keep these species separate to prevent disease transmission. There is no peer-reviewed literature that suggests bighorn sheep can be grazed with domestic sheep without concern for disease transmission between the species. Scientists from both sides of the issue also recommend that the species be kept separate until the disease transmission science is better understood.

1.5 Need for Action

Livestock grazing is a discretionary action by the Forest Service. There is a need to analyze the possible effects on the Forest’s resources in order to reauthorize grazing. There is a need to clarify the importance of balancing multiple-use demands with the management practices to support viable populations of bighorn sheep and a healthy domestic sheep industry. Although the Multiple Use and Sustained Yield Act of 1960 (MUSYA) provides the agency with its multiple-use mandate, it does not require the agency to accommodate every use on every acre.

The interdisciplinary team reviewed each of the applicable Forest-wide desired conditions from the Forest Plan to see if a change in livestock management was needed or if a change in conditions has occurred since 1977 (date of the last EA completed for the Snow Mesa Allotments). These conditions were evaluated on a site-specific basis by an interdisciplinary team (see Chapters 3 and 4) composed of cultural, wildlife, hydrology, soils, fisheries, recreation, forestry, plant, and range management personnel, and the Divide District Ranger, the responsible official from Rio Grande National Forest.
In summary, with minor exceptions, grazing on the Snow Mesa Sheep Allotments is not resulting in unacceptable resource conditions. As previously mentioned, contact with bighorn sheep and potential subsequent disease transmission, is the biggest concern regarding continued grazing on the allotments. Specific current resource conditions are discussed in Chapter 3.

**Why the Concern Regarding Bighorn Sheep Now?**

The main concern brought forth during internal and external scoping for this analysis is the potential for disease transmission given the risk of contact between domestic and bighorn sheep. Concerns regarding contact between domestic and bighorn sheep on the allotments have been expressed to the Rio Grande National Forest by Colorado Parks and Wildlife and the Gunnison National Forest for a number of years. These concerns have been especially elevated in recent years due to a variety of factors, including:

1. Rocky Mountain bighorn sheep were designated as a Forest Service Rocky Mountain Region Sensitive Species on June 8, 2007. Although habitat degradation from fire suppression, highways, livestock grazing, and human disturbance is of concern in some herds, the susceptibility of herds to extirpation as a result of diseases that may be transmitted by domestic sheep or goats appears to be the greatest threat. The long history and continued substantial risk of disease epizootics, combined with small size and high degree of isolation of most herds, led to the conclusion that sensitive status was warranted in the Forest Service Rocky Mountain Region (Beecham et al. 2007).
   
   a. Sensitive species require a more in-depth analysis regarding species viability during planning. This includes thorough reviews and analyses of management actions that could affect populations of bighorn sheep or their habitat to ensure species viability and to preclude demographic trends that would result in the need for Federal listing.

2. Direction from the USDA Forest Service Washington Office (USDA Forest Service 2011b) instructs Forests to conduct bighorn sheep risk assessments using a suggested four-step viability analysis outline. This analysis follows that outline, which includes: 1) Gather Applicable data and information from appropriate sources; 2) Assess spatial and temporal overlap of bighorn sheep CHHRs with domestic sheep allotments, use areas, and driveways; 3) Assess likelihood and rate of contact based on spatial and temporal overlap between allotments and bighorn sheep herds; and 4) Identify management practices with the goal of separation between domestic and bighorn sheep where necessary to provide for Forest-wide bighorn sheep viability. A follow-up letter from the Forest Service Rocky Mountain Regional Office containing additional information regarding bighorn sheep analysis for National Environmental Policy Act (NEPA) documents was also released (USDA Forest Service 2011c).
3. The Snow Mesa Allotment NEPA is outdated; the last analysis was completed in 1977 through an Environmental Analysis Report.

4. Three out of four of the subpopulations making up the Central San Juan Sheep Herd appear to be either relatively stagnant or decreasing in size due to low recruitment and high lamb mortality (Colorado Parks and Wildlife 2013).* Note: Estimated bighorn sheep numbers for each herd were recently modified by CPW 12/26/2016.

5. A greater awareness and emphasis by agencies and the public regarding potential disease transmission.

6. The Final Bighorn Sheep Management Plan for the herd identifies it as a Tier 2, primary population in Colorado. More information on what defines a Tier 2 primary population is discussed in the history of the Central San Juan Bighorn Herd section of Volume II.

7. Improved survey work by both Colorado Parks and Wildlife and the Rio Grande National Forest including radio collars, which has resulted in updated information regarding domestic sheep use of the allotments, more accurate information on the number of bighorn sheep in the area and their use of the allotments, and more accurate depictions of current bighorn sheep CHHRs.

8. Bighorn sheep are documented immediately adjacent to and within the northern portion of the Snow Mesa Allotments, primarily along the Continental Divide.

9. The presence of adult ewe groups, groups of bachelor rams in the summer/fall, rams harvested in the fall immediately north of the Snow Mesa Allotments and recent radio collaring information (Colorado Parks and Wildlife 2017), indicate that at least the northern portion of the allotments are used year-round by bighorn sheep. These use patterns were used in the identification of the CHHR.

10. There is a lack of spatial and/or temporal separation between the two species, particularly in the northern portion of the Snow Mesa Allotments. The two species graze within the same area (spatially) at the same time (temporally) during the summer, particularly in the Baldy Cinco, Baldy Chato, head of Miners Creek, and Oso Creek areas, all of which are along the Continental Divide.

11. There are no effective landscape barriers preventing contact on the Snow Mesa Allotments.

12. There is suitable but currently unoccupied bighorn sheep habitat in the Snow Mesa Allotments with adequate connectivity existing throughout.
13. The RBS-22 herd as a whole, has been experiencing relatively low lamb recruitment in recent years.

Peak commonly referred to as Baldy Cinco East at the headwaters of Miners Creek and north end of the Snow Mesa allotments. This location is an area of direct overlap between domestic and bighorn sheep.
1.6 Management Direction

All land management decisions are governed by an array of law and policy that directs or provides bounds for those decisions. While some laws and policies provide constraints, others provide intent and direction for certain actions to occur.


Specific management direction for Rio Grande National Forest, including desired conditions and objectives, is provided in the Forest Plan and its accompanying record of decision. Within this plan, lands are delineated and managed for a particular emphasis or theme known as a management area prescription. Each management area prescription in the Forest Plan has a description of the theme and physical setting for the area, a description of the desired future conditions for the area, and a list of standards and guidelines that apply. Management area prescriptions for the Snow Mesa and Wishbone Sheep Allotment analysis areas are shown in Table 1-1. Livestock grazing is appropriate and authorized within all management prescriptions.

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Snow Mesa (acres)</th>
<th>Wishbone (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 – Backcountry</td>
<td>23,347</td>
<td>4,325</td>
</tr>
<tr>
<td>4.21 – Scenic Rivers and Byways</td>
<td>0</td>
<td>906</td>
</tr>
<tr>
<td>5.11 – General Forest &amp; Intermingled Rangelands</td>
<td>10,817</td>
<td>1,263</td>
</tr>
<tr>
<td>5.13 – Forest Products</td>
<td>0</td>
<td>116</td>
</tr>
<tr>
<td>5.41 – Deer &amp; Elk Winter Range</td>
<td>394</td>
<td>3,321</td>
</tr>
<tr>
<td>State Lands</td>
<td>0</td>
<td>549</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>34,558</strong></td>
<td><strong>10,480</strong></td>
</tr>
</tbody>
</table>

Desired conditions are the attributes toward which management of the land and resources are to be directed (36 CFR 219.7(a) (2) (i)). The Snow Mesa and Wishbone Sheep Allotment analysis areas’ desired conditions are guided by management area prescriptions described as follows:

**MAP 3.3–Backcountry.** These areas are managed to maintain plant and animal habitats that are shaped primarily through natural processes, and to provide backcountry experiences to the public in areas where there is little evidence of human activities.

The landscape is predominantly natural appearing and relatively undisturbed by humans. Natural processes within the context of the range of natural variability (such as insects, disease, and fire) are generally allowed to occur with minimal human intervention.
Facilities are minimal and exist primarily for site protection. Trails provide a full range of challenging recreation opportunities including biking, horseback riding, mountain biking, and motorized travel on designated trails.

These areas make up the majority of acres grazed by domestic sheep. Livestock grazing is appropriate and authorized within this management prescription.

Snow Mesa with Baldy Cinco and the Continental Divide in the background.

MAP 4.21 – Scenic Byways and Scenic Railroads. The intent of this prescription is to protect or preserve the scenic and recreation values while managing the multiple-use values of the landscape. Visitors can expect frequent contact with others, and to see developments that appear to be in harmony with the natural environment. Many of the multiple uses of the Forest and their interactions may be interpreted for the visitor. Livestock grazing is appropriate and authorized within this management prescription.

MAP 5.11–General Forest and Rangelands, Forest Vegetation Emphasis. The intent of this prescription is to allow a variety of management options, such as livestock grazing, wildlife habitat, dispersed recreation, exploration, and/or development of minerals and energy sources, and timber harvest. MAP 5.11 areas generally have a well-developed transportation system. Visitors can expect to see managed but natural-appearing stands of trees. Management emphasis is on a balance of resource uses. Livestock grazing is appropriate and authorized within this management prescription. This management area prescription is within the scope of the desired conditions defined in the Forest Plan.

The main drainages within the allotments (Willow and Miners Creeks) are within this prescription area. These areas are typically not grazed by domestic sheep with the exception of the uppermost headwaters of Willow Creek.
Headwaters of Willow Creek.

MAP 5.13 – Forest Products. The intent of this prescription is to allow a full range of activities, with an emphasis on the production of commercial wood products. Visitors to the Forest can expect to see managed stands of trees and evidence of management. Livestock grazing is appropriate and authorized within this Management Prescription.

MAP 5.41–Deer and Elk Winter Range. These areas are managed to supply adequate amounts of quality forage, cover, and solitude for deer, elk, and other species while on winter range. Livestock grazing is appropriate and authorized within this management prescription.

1.6.1 Guidance and Recommendation Documents

The following documents were used as sources of information and guidance in developing alternatives and project design features. Additional documents are contained within the project record and provided examples of the risk assessment analysis process and examples of general design features.

2) **USDA Forest Service. 2011b. Bighorn Sheep Analysis for NEPA Documents, Region 2 Regional Office Letter. September 14, 2011. Glenn Casamassa, Acting Deputy Regional Forester, Resources.** Letter re-emphasizes the importance of conducting risk assessments in accordance with the viability analysis outlined in the Washington Office letter where management objectives include maintenance or enhancement of bighorn sheep populations. The letter also provides information on GIS products available for analyses.


4) **Memorandum of Understanding (MOU) signed April 2014 by the Forest Service Rocky Mountain Region, Bureau of Land Management Colorado State Office, Colorado Division of Wildlife, Colorado Department of Agriculture, and Colorado Woolgrowers Association.** The purpose of the memorandum “is to provide general guidance for cooperation in reducing contact between domestic and bighorn sheep in order to minimize potential interspecies disease transmission and to ensure healthy bighorn sheep populations while sustaining an economically viable domestic sheep industry in Colorado.” The MOU has six sections: I Purpose, II Statement of mutual benefits and interest, III Authority, IV All parties’ agreements, V CPW and Colorado Wool Growers Association (CWGA) agreements, and VI Mutual agreement and understanding by all parties. Under Section IV, All Parties Agree, the Forest Service agrees that the “goal is to minimize contact by decreasing the opportunities for domestic/bighorn sheep interaction.” The Forest Service is not bound by sections explicitly restricted to CPW and CWGA.


6) **USDA Forest Service. 2010a. Supplement to the Forest Plan Biological Evaluation and Conservation Assessment for Rocky Mountain Bighorn Sheep. 2010. Rio Grande National Forest (R. Ghormley).** Bighorn sheep were designated as a Forest Service Rocky Mountain Region Sensitive Species on June 8, 2007, and were not addressed as a sensitive species in the Forest Plan biological evaluation. This document updated the Rio Grande National Forest biological evaluation and determined that although some herds remain at risk and may not fully recover, segments of the bighorn sheep population on the Rio Grande National Forest were most likely viable with some herds expected to persist into the future. It also determined that those segments, representing secure herds, met the population viability responsibilities of the Forest as defined by the 1982 Implementing Regulations for the National Forest Management Act (CFR 219.19). This document identified that the issue of potential contact and disease transmission between domestic and bighorn sheep was currently being addressed through risk analysis and adaptive management procedures being implemented at the project level. The analysis
concluded that Forest Plan Alternative G “may adversely impact individuals but is not likely to result in a loss of viability in the Planning Area nor result in a trend toward federal listing”.

7) **Rocky Mountain Bighorn Sheep: A Technical Conservation Assessment. 2007. Prepared for the USDA Forest Service Rocky Mountain Region, Species Conservation Project (Beecham et al. 2007).** This report was designed to provide land managers, biologists, and the public with a thorough discussion of the biology, ecology, conservation status, and management of target species based on current scientific knowledge. It discusses management approaches used or recommended in Western States and provinces.

8) **Colorado Parks and Wildlife. 2013. Bighorn Sheep Management Plan for RBS-22, Central San Juan Sheep Herd (Data Analysis Unit 22 and Game Management Units S-22, S-36, S-52, & S-53).** Provides management direction for an extended period of time (typically 10 years) for the Central San Juan Bighorn Sheep Herd. Identifies the herd as a Tier 2 primary core population. The plan establishes objectives for herd size, hunting success rates, and average age of rams harvested. The plan also provides information on habitat, herd history, and primary concerns for the population. The report specifically mentions domestic sheep grazing on the Snow Mesa Sheep Allotments as a primary concern.

9) **Colorado Parks and Wildlife. 2009. Colorado Bighorn Sheep Management Plan, 2009–2019. Special Report Number 81. (George et al. 2009):** Directs Colorado Division of Wildlife to, among other things, prioritize conservation of bighorn sheep herds in Colorado on the basis of herd size, native status, management history, and potential for interaction with domestic sheep. State management goals for the bighorn sheep herds affected by this project were considered by local Colorado Division of Wildlife staff that provided information regarding effects this project might have on bighorn sheep.

10) **Wild Sheep Working Group. 2012. Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat. Western Association of Fish and Wildlife Agencies.** A report published by a collection of state and provincial wildlife management agencies that seek to work collaboratively with the livestock industry to reduce the potential for wild sheep die-offs. This report articulates concerns about potential disease transmission between domestic livestock and wildlife, and suggests an array of management approaches to minimize such risks. This report advocates, among other things, that effective separation (both temporal and/or spatial) of wild and domestic sheep should be a primary management goal.

11) **A Process for Finding Management Solutions to the Incompatibility between Domestic and Bighorn Sheep. 2001. (Schommer and Woolever 2001).** Provides Forest Service staff with recommendations for using a collaborative approach to find management solutions to reduce or eliminate contact between wild sheep and domestic sheep.
1.7 Decisions to be Made Based on this Analysis

This EA discloses the environmental consequences of implementing the proposed action and alternatives to that action. A separate decision notice will explain the management and environmental reasons for selecting an alternative to be implemented. The notice will disclose the rationale for choosing the selected alternative.

The decision that the responsible official will make in the decision notice is whether or not to authorize some level of livestock grazing on all, part, or none of the analysis area given considerations of current issues and concerns, Forest Plan goals and objectives, rangeland conditions, and public input.

1.8 Public Review and Comment

Public involvement is a key component in the planning process. The Rio Grande National Forest invited public comment and participation regarding this proposal through a variety of scoping methods prior to the release of the EA for Comment. These methods included:

- Original Snow Mesa Sheep Allotment scoping letter combined with the Fisher/Ivy/Goose Allotment on March 19, 2012. Following scoping, it was decided to complete two separate analyses with Fisher/Ivy/Goose being the higher priority of the two. That analysis was completed on September 25, 2013.
- Listing in the Forest’s schedule of proposed actions in 2012 (jointly with the Fisher/Ivy/Goose Allotment).
- Public notice in the Valley Courier (published March 27, 2012), the newspaper of record (jointly with the Fisher/Ivy/Goose Allotment).
- A second scoping letter, specifically for the Snow Mesa Sheep Allotments, and scoping packet was mailed to the public on January 8, 2014, and was made available on the Rio Grande National Forest website.
- Public notice in the Valley Courier (published January 9, 2014), the newspaper of record.
- News article printed in the Valley Courier on January 9, 2014 requesting written comments.
- The draft EA for Comment (EA) was made available on August 7, 2015.
- The legal notice initiating a 30-day comment period on the EA was published on August 11, 2015, in the Valley Courier, the newspaper of record.
- An article seeking public input was also published in the Valley Courier on August 12, 2015.
- The draft EA was made available on the Rio Grande National Forest website at http://www.fs.fed.us/r2/riogr...
The majority of comments concerned the risk of contact and the potential for subsequent disease transmission from domestic to bighorn sheep. Other concerns included potential grazing impacts upon plant communities, impacts upon several other species of wildlife, hunting and other recreational experiences including hiking the Continental Divide National Scenic Trail (CDNST), impacts to soils and water, and economics. These issues were evaluated to determine whether the concern was already resolved through land use designations, implementation of Forest Plan standards and guidelines and best management practices (BMPs), project-specific design features, through processes or analyses routinely conducted by the interdisciplinary team, or were beyond the scope of the project. All concerns that fell within these categories were considered resolved.

Seventeen comments were received in response to the draft EA during the 30-day comment period that started on August 11, 2015. All of the comments received revolved around the controversy of the potential for disease transmission between domestic sheep and bighorn sheep or on the potential impacts upon the permittees and the domestic sheep industry. The comments and Forest Service responses are also summarized in Volume III.

Comments received on the draft EA indicated that simply vacating the Snow Mesa sheep allotments was not an adequate proposed action. As a result of reviewing comments on the draft EA, the Divide District embraced the challenge presented by the 2014 Weldon direction to identify and analyze replacement allotments as part of a single decision when the risk for contact was unacceptable. The Divide District worked with the interdisciplinary team, the Snow Mesa sheep allotments permittees, cattle permittees, and Colorado Parks and Wildlife (CPW) to develop a new proposed action. Subsequent opportunities for public involvement included:

- The legal notice initiating a 30-day comment period on the proposed action was published on March 8, 2017, in the Valley Courier, the newspaper of record.
- A press release inviting public input was issued on March 8, 2017.

Thirteen comments were received on the new proposed action. This Final EA incorporates the Forest Service response to the comments on the new proposed action.

1.9 Issues

Issues serve to highlight effects or unintended consequences that may occur from the proposed action and alternatives, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the decision maker and public to understand.

1.9.1 Issue 1 – Risk of Contact between Domestic and Bighorn Sheep

Without adequate spatial and temporal separation, contact between domestic and bighorn sheep could potentially lead to disease transmission and herd die-offs.
**Indicator:** Risk rating, described as high, moderate, or low.

This indicator is intended to provide a qualitative measure of comparison between alternatives in regards to degree of risk.

### 1.9.2 Issue 2 – Social and Economic Resources

Issue 2 has two components: the potential social and economic impacts of the proposed action and alternatives on the local shepherding industry and on the RBS-22 bighorn sheep population.

1. **Livestock-based agriculture**, including the shepherding industry, is historically and culturally important in the San Luis Valley. Forage on public lands contributes to the economic viability of individual ranching operations.

**Indicator:** Amount of forage available on National Forest System land, measured in animal unit months (AUMs)

2. **Bighorn sheep provide social and economic value.**

   **Indicator:** Likelihood of Central San Juan herd (RBS-22) population persistence over time, described as high, moderate, or low based on Volume II, Risk Assessment

These indicators are intended to provide quantitative and qualitative measures of comparison between alternatives in regards to domestic sheep grazing and bighorn sheep economic value.

### 1.10 Other Environmental/Social Concerns

Other environmental and social concerns were identified through scoping. Many comments received during the public comment period were not considered issues because they have been already regulated by Forest Plan standards and guidelines, were not significantly affected by any alternative, or were outside the jurisdiction of the Forest Service. Other resources, while not issues, are addressed in Chapter 3.

### 1.11 Concerns outside the Scope of this Analysis

Several comments expressed concerns regarding domestic sheep grazing and potential impacts to users of the Continental Divide National Scenic Trail. Specifically these concerns involve the presence of livestock protection dogs, soil erosion, non-point water pollution, and decreased trail user experience resulting from the presence of domestic sheep. In addition, two comments expressed concern over the potential impacts to Off-Highway Vehicle access to National Forest System lands. While these concerns are valid, no instances of these particular issues on the Snow Mesa Sheep Allotments are known. These concerns are best addressed through project design features and can be included as part of the AOI (for Alternatives 2 and 3) if determined appropriate at a later point in time.
Chapter 2. Alternatives including the Proposed Action

2.1 Introduction

This chapter describes and compares the alternatives developed to meet the purpose of and need for action and address the issues identified in Chapter 1. This chapter also provides a summary of the environmental consequences of the alternatives upon resources as measured in Chapter 3. A summary of how each alternative affects each issue is contained in Chapter 3, Section 3.3.

2.2 The Process Used to Develop the Alternatives

An interdisciplinary team (listed in Chapter 4) considered the elements listed below to develop the alternatives for this analysis:

- The purpose of and the need for this project identified in Chapter 1 (Section 1.4).
- Issues identified in Chapter 1 (Section 1.9).
- The goals, objectives, and desired conditions for the analysis area as described in the Forest Plan for the Rio Grande National Forest.
- Comments and suggestions made by the public, the State of Colorado, and other agencies during the scoping process.
- The laws, regulations, and policies that govern land management on national forests.
- Site-specific resource information from office and field reviews.
- The most recent literature, guidance, and recommendation documents and risk assessment examples listed in Chapter 1, Section 1.6.

2.3 Alternatives Considered in Detail

Four alternatives were developed in detail for this environmental analysis process. Additional potential alternatives were considered, but not analyzed. These are presented in Section 2.7 with the rationale for not pursuing them in detail.

The alternatives presented below represent a range of alternatives, given the purpose and need and issues for the proposed action. Three alternatives are described and analyzed in Table 2-1 and Table 2-2 and as follows.

1) **Alternative 1 – No Authorized Grazing.** Grazing by domestic sheep would not be reauthorized and the allotments would become vacant.

2) **Alternative 2 – Continued Current Grazing.** Grazing by domestic sheep would be reauthorized and there will be no change in allotment boundaries.

3) **Alternative 3 – Allotment Boundary Reconfiguration.** The allotment boundaries would be reconfigured to exclude those areas north of the CDNST
(Forest System Trail 787) and north of the Miners Creek Trail (Trail 803). The intent of boundary reconfiguration is to create a buffer and avoid grazing those areas of highest contact concern between bighorn and domestic sheep. A portion of the vacant Ouray Allotment would be added to the available allotments to offset areas excluded from grazing.

4) **Alternative 4** – Not included in this list because it was not considered in detail.

5) **Alternative 5** – Wishbone Allotment (Proposed Action). This alternative would authorize grazing with project design features on the new allotment and would vacate the Snow Mesa Allotments. Grazing by domestic sheep would continue to be authorized, but would be relocated to a new allotment that would result in no overlap between bighorn Core Herd Home Range (CHHR) and domestic sheep.

### 2.3.1 Alternative 1 – No authorized grazing

This alternative proposes to discontinue permitted domestic sheep grazing within the analysis area. The allotments would become vacant. A vacant allotment does not preclude grazing by livestock at some point in the future. The allotments may be restocked with domestic sheep at a later date; in this instance, if current conditions change (i.e., a proven vaccine is developed). Regardless, a new analysis and NEPA decision would be required prior to consideration of restocking the allotment. Similarly, if deemed appropriate at a future time, a separate decision signed by the authorized officer could permanently close the allotment.

Grazing would continue to be authorized for two grazing seasons following the authorized officer’s decision to vacate the allotments, in accordance with 36 CFR 222.4(a)(1):

> Grazing permits may be cancelled in whole or in part where a decision has been made to devote certain National Forest Systems lands to another public purpose that precludes grazing by permitted livestock. Except in an emergency, do not cancel a permit without a two-year notification (36 CFR 222.4(a)(1)).

The Forest Service’s Washington Office provides national direction to identify and analyze potential replacement allotments when developing management alternatives, and to continue ongoing collaborative efforts to identify and develop site-specific solutions (USDA Forest Service (2014a): Bighorn Sheep Analysis for NEPA Documents, Washington Office letter, July 31, 2014, Leslie A.C. Weldon, Deputy Chief, National Forest System; and USDA Forest Service (2014b): Bighorn Sheep Analysis for NEPA Documents letter, Jacqueline A. Buchanan, August 29, 2014). During the two-year notification period, the Forest Service has an additional opportunity to identify other grazing and forage options and analyze replacement allotments. Potential replacement domestic sheep allotments are listed later, in the *Eliminated Alternatives and/or Options* section (Table 2-6).
In the long term, there would be a low risk of contact between domestic sheep on the Snow Mesa Sheep Allotments and the Central San Juan Bighorn Sheep Herd. During the two-year notification period, the Forest Service would continue to work with the permittees to best follow the established project design features. However, during this period of time, the risk of contact would continue to be high.

It is important to note that throughout this document, Alternative 1 is referred to as low risk. This is long-term risk. The reader must keep in mind the potential short-term high risk that will exist during the up to two-year notification period in which grazing may occur on the allotments.

2.3.2 Alternative 2 - Continued current grazing

This alternative would maintain current livestock grazing, rotations, and allotment configuration. The currently vacant Ouray Allotment would not be considered in the grazing rotations. Grazing would continue to be authorized under two term grazing permits. There would be no changes in permitted numbers of livestock, permitted season of use, kind or class of livestock, or grazing system (other than minor changes made annually in the AOI planning process). Project design features addressing herding and stray management requirements are incorporated into this alternative and are addressed in Table 2-3.

The alternative would continue to support the domestic sheep grazing industry by authorizing domestic sheep grazing on Snow Mesa Sheep Allotments.

The risk of contact between domestic and bighorn sheep in the Snow Mesa Sheep Allotments would be “High” for the Central San Juan Bighorn Sheep Herd. The risk would be high due to overlap between the two species while on the allotments.

2.3.3 Alternative 3 – Allotment boundary reconfiguration

Alternative 3 would reconfigure the allotment boundaries to exclude those areas north of the CDNST (Trail 787) and north of Miners Creek Trail (Trail 803). Boundary configurations for Alternatives 2 and 3 are shown in Figure 2-1. The intent of boundary reconfiguration is to create a buffer and no longer graze those areas of highest contact concern between bighorn sheep and domestic sheep. A portion of the currently vacant Ouray Allotment would be added to the available allotments to offset areas removed from grazing. Boundary changes, revised domestic sheep trailing routes, and project design features would be included in the AOI planning process. Permitted numbers of livestock, permitted season of use, class of livestock, and grazing rotations would remain unchanged.

Enhanced and strengthened project design features, in particular herding and stray management criteria, are components of this alternative and are addressed in Table 2-3. The effectiveness and success of Alternative 3 depends upon the permittees and their herders adhering to the herding and stray management project design features.
The alternative would continue to support the domestic sheep grazing industry by authorizing domestic sheep grazing on the Snow Mesa Sheep Allotments.

The risk of contact between domestic and bighorn sheep in the Snow Mesa Sheep Allotments would be “High” for the Central San Juan Bighorn Sheep Herd. The level of risk of contact would be lower for this alternative due to no longer grazing those areas of greatest concern of overlap and with enhanced project design features. However, the allotments will continue to be in relatively close proximity to known bighorn sheep use areas where bighorn sheep forays onto the allotment are possible.
2.3.4 Alternative 5 – Wishbone Allotment (Proposed Action)

This alternative would create a new allotment—the Wishbone Allotment—and would vacate the Snow Mesa Allotment and relocate the livestock currently permitted under two term grazing permits to the new allotment. The Wishbone Allotment is a combination of seven new pastures that include Colorado Parks and Wildlife jurisdiction lands, portions of two active Rio Grande National Forest cattle allotments, a portion of the vacant Ouray Allotment, and other Rio Grande National Forest lands within Forest Plan Management Area 4.21.

Figure 2-2. Wishbone allotment pasture configuration
The Wishbone Allotment includes the seven following pastures:

1. **Crystal Pasture** is a small portion of the Ouray Allotment that includes the basin below Crystal Lake and the upper headwaters of Shallow Creek.

2. **Shallow Pasture** consists of the northern end of the Shallow Cattle Forage Reserve Allotment that was reanalyzed for grazing in 2013. It is an allotment on which there is no current term permit obligation, and a determination was made to use the available forage on the allotment to enhance management flexibility for authorized livestock use. Parts of this pasture have been used to overnight domestic sheep trailing to and from the Snow Mesa area.

3. **Sixmile Flats Pasture** sits in the middle of the Wishbone Allotment and is located approximately six miles south of Creede, adjacent to Highway 149. It has not been part of a grazing allotment in recent history, but is intersected by the Middle Creek Livestock Driveway and has been grazed by trailing domestic livestock for many years.

4. **The South River Pasture** is made up of non-forested portions of the Rio Grande and Red Mountain pastures of the South River Cattle Allotment. The South River Allotment was analyzed for grazing in 2008 and is currently permitted for cattle grazing. To accommodate the capacity needed on South River Allotment for domestic sheep, some of the cattle currently permitted on the South River Allotment will be authorized to graze on the remaining portion of the Shallow Forage Reserve Allotment that is not being used under the Proposed Action for domestic sheep.

5. **Deep Creek Road Pasture** is a small, 40-acre parcel of the Rio Grande National Forest adjacent to Deep Creek Road that sits between Sixmile Flats Pasture and East Bench Pasture. The purpose of this small pasture would be to rest or overnight domestic sheep as they trail between other pastures. This small parcel is isolated from other public lands and currently receives little use.

6. **East Bench Pasture** consists of a long narrow bench located between Deep Creek and McKinney Gulch. The east end of this pasture was analyzed for grazing in 2009 as part of the Roaring Fork Allotment, but it has not been utilized due to location relative to other Roaring Fork pastures and lack of water. The west end of East Bench has been used in the past as a resting or overnight area for domestic sheep being trailed to and from the high country.

7. **Coller Pasture** is located along the Rio Grande River about three miles above South Fork. It consists of a portion of the Coller State Wildlife Area and adjacent Rio Grande National Forest lands. The Coller State Wildlife Area is managed for day use recreation and winter deer and elk habitat. This pasture contains a railroad corridor, and portions of it are irrigated annually by Colorado Parks and Wildlife. Domestic sheep grazing on the Coller State Wildlife Area is considered a connected action, despite that being CPW jurisdiction.
Grazing System under Alternative 5

Sheep would be trucked from the San Luis Valley to the first pasture of the grazing season, trailed between subsequent pastures, and trailed back to the San Luis Valley at the end of the grazing season. Trailing will occur along highway right of ways, roads, and existing stock driveways that connect Wishbone pastures. Trailing duration can vary from as little as a few hours for close pastures up to a day to reach Crystal pasture. Project design features for trailing will be followed. Hwy 149 and its right of ways will be used to trail between East Bench and Coller pastures. Deep Creek Rd will be used to trail between East Bench, Deep Creek Rd, and Sixmile pasture. FSR 523 will be used to trail between Sixmile and South River pastures. Trailing to Shallow pasture will occur on Deep Creek Rd, Hwy 149 and its right of ways, FSR 507, and FSR 508. Trailing to Crystal pasture will occur on the McKenzie stock driveway. Lower elevation pastures would be utilized during the beginning and end of the grazing season, while Shallow and Crystal Pastures would be utilized during the middle of the grazing season. Elevations vary from 8,200 feet to 12,500 feet on the Wishbone Allotment. This variation provides a long growing season, early range readiness, and increases opportunity for deferred rotation. Timing and duration would be adjusted to coincide with annual fluctuations in grazing season, available forage, and land and livestock management objectives. Grazing season will fall within the dates of June 15 and September 15 for all pastures except Coller. Coller may be used later. Rotation can be modified to increase temporal separation between domestic sheep and BHS if necessary. In larger pastures, camp/bedding location would be moved every 7–10 days, and in smaller pastures that are used for less than 10 days, one camp location would be utilized. These locations will vary from year to year to prevent long-term impacts to vegetation. Herders, pack stock, herding dogs, and livestock protection dogs would be utilized to manage the flock. Water improvement projects would need to be implemented in the Sixmile and East Bench pastures to provide livestock water and improve livestock distribution. These projects would consist of developing a spring and piping water to a series of livestock troughs in a suitable location within each pasture.

The Wishbone Allotment contains about 10,480 total acres; 7,100 acres (68 percent) are determined to be capable/suitable for grazing of domestic sheep. Using 2016 measured annual forage production data and information from the Soil Resource Inventory (SRI) layers, USDA Forest Service (1996b) a conservative estimate of 2,240 AUMs are available on the Wishbone Allotment.

Implications for risk of contact under Alternative 5:

This alternative would result in no overlap between bighorn CHHR and the domestic sheep allotment. The Risk of Contact model was run on this alternative. Due to relatively close proximity to known bighorn sheep herds, results from the model demonstrated a high risk rating. However, consideration of the results from the Risk of Contact model combined with on-the-ground local specific and relevant information supports a moderate risk for Alternative 5. In this case, a moderate risk outcome indicates that potential contact rates between bighorn sheep and the pastures associated with domestic sheep grazing on the Wishbone Allotment are expected to be lower than those on the existing Snow Mesa allotments, or any configuration of them. At the same time, the moderate risk rating recognizes that some uncertainty still exists. Bighorn sheep habitat
fragmentation from Colorado Highway 149, the Rio Grande river, and several subdivisions; project design features; an improved ability to monitor due to more accessible and visible pastures; and a decreased effort to manage livestock all improve spatial and temporal separation under Alternative 5 and support a moderate risk of contact.

Table 2-1. Comparison of features from the alternatives

<table>
<thead>
<tr>
<th>Feature</th>
<th>Alternative 1 No Authorized Grazing</th>
<th>Alternative 2 Continued Grazing</th>
<th>Alternative 3 Boundary Reconfiguration</th>
<th>Alternative 5 Wishbone Allotment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grazing System</td>
<td>N/A</td>
<td>Rotational Grazing</td>
<td>Rotational Grazing</td>
<td>Rotational Grazing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with management strategies</td>
<td>with management strategies</td>
<td>with management strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and project design</td>
<td>and project design</td>
<td>and project design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>features included in the AOI</td>
<td>features included in the AOI</td>
<td>features included in the AOI</td>
</tr>
<tr>
<td>Kind of Animal</td>
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<td>Sheep</td>
<td>Sheep</td>
</tr>
<tr>
<td>Class of Animal</td>
<td>N/A</td>
<td>Ewes/lambs</td>
<td>Ewes/lambs</td>
<td>Ewes/lambs</td>
</tr>
<tr>
<td>Season</td>
<td>N/A</td>
<td>July 11 to September 15 (66 days)</td>
<td>July 11 to September 15 (66 days)</td>
<td>Season may vary and is dependent on available forage and range readiness. Will fall within dates of June 15 - September 15 for all pastures except Coller. Coller may be used later</td>
</tr>
<tr>
<td>Number of Livestock</td>
<td>N/A</td>
<td>1,000 ewes with lambs</td>
<td>1,000 ewes with lambs</td>
<td>1,000 ewes with lambs</td>
</tr>
</tbody>
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## 2.4 Comparison of Resource Effects by Alternative

### Table 2.2. Comparison of effects on other resources by alternative

<table>
<thead>
<tr>
<th>Resource and Unit of Measurement&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Alternative 1 No Authorized Grazing</th>
<th>Alternative 2 Continued Grazing</th>
<th>Alternative 3 Allotment Boundary Reconfiguration</th>
<th>Alternative 5 Wishbone Allotment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rangeland Resources&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Individual permit holder: High impact Agricultural community: Low impact</td>
<td>Individual permit holder: No impact Agricultural community: No impact</td>
<td>Individual permit holder: No impact Agricultural community: No impact</td>
<td>Individual permit holder: No impact Agricultural community: No impact</td>
</tr>
<tr>
<td>Bighorn Sheep&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Risk rating: Low</td>
<td>Risk rating: High</td>
<td>Risk rating: High</td>
<td>Risk rating: Moderate</td>
</tr>
<tr>
<td>Wildlife (not including bighorn sheep)</td>
<td>No loss of species viability</td>
<td>No loss of species viability</td>
<td>No loss of species viability</td>
<td>No loss of species viability</td>
</tr>
<tr>
<td>Recreation and Travel Management</td>
<td>No impact upon recreation and travel management experiences</td>
<td>Minor impact upon recreation and travel management experiences</td>
<td>Minor impact upon recreation and travel management experiences</td>
<td>Minor impact upon recreation and travel management experiences</td>
</tr>
<tr>
<td>Social and Economic Resources&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Forage availability on public land: 0 AUM Likelihood of RBS-22 population persistence over time: High</td>
<td>Forage availability on public land: 8286 available, 667 AUMs permitted Likelihood of RBS-22 population persistence over time: Low</td>
<td>Forage availability on public land: 8286 available, 667 AUMs permitted Likelihood of RBS-22 population persistence over time: Low</td>
<td>Forage availability on public land: 2240 available, 667 AUMs permitted Likelihood of RBS-22 population persistence over time: Moderate</td>
</tr>
<tr>
<td>Watershed and Soils</td>
<td>Eventual recovery where livestock is the contributing factor</td>
<td>No impacts upon soil or watershed conditions with implementation of project design features</td>
<td>No impacts upon soil or watershed conditions with implementation of project design features</td>
<td>No impacts upon soil or watershed conditions with implementation of project design features</td>
</tr>
<tr>
<td>Heritage</td>
<td>No probability of damage to cultural sites due to sheep grazing; historic stock driveway may become less recognizable on the ground</td>
<td>Low probability of damage to cultural sites due to domestic sheep grazing.</td>
<td>Low probability of damage to cultural sites due to domestic sheep grazing.</td>
<td>Low probability of damage to cultural sites due to domestic sheep grazing.</td>
</tr>
<tr>
<td>Forest Condition</td>
<td>No impacts upon forest condition or potential future management</td>
<td>No impacts upon forest condition or potential future management</td>
<td>No impacts upon forest condition or potential future management</td>
<td>No impacts upon forest condition or potential future management</td>
</tr>
<tr>
<td>TES Plants</td>
<td>No loss of species viability</td>
<td>No loss of species viability</td>
<td>No loss of species viability</td>
<td>No loss of species viability</td>
</tr>
<tr>
<td>Resource and Unit of Measurement¹</td>
<td>Alternative 1 No Authorized Grazing</td>
<td>Alternative 2 Continued Grazing</td>
<td>Alternative 3 Allotment Boundary Reconfiguration</td>
<td>Alternative 5 Wishbone Allotment</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Fisheries</td>
<td>Trout populations would remain viable and self-sustaining</td>
<td>Trout populations would remain viable and self-sustaining</td>
<td>Trout populations would remain viable and self-sustaining</td>
<td>Trout populations would remain viable and self-sustaining</td>
</tr>
<tr>
<td>Invasive Plant Species</td>
<td>No concerns</td>
<td>Minor concerns of weed establishment or increases in existing populations</td>
<td>Minor concerns of weed establishment or increases in existing populations</td>
<td>Minor concerns of weed establishment or increases in existing populations</td>
</tr>
</tbody>
</table>

¹ Denotes issue.

2.5 Project Design Features

The Forest Service uses many measures to reduce or prevent negative impacts to the environment in the planning and implementation of management activities. The application of these measures begins at the planning and design phase of a project. The Forest Plan standards and guidelines and the direction contained in the Watershed Conservation Practices Handbook (FSH 2509.25) are the first protection measures to be applied to a project. Both of these sources are incorporated by reference. Other project design features are then developed as needed. The elements in Table 2-3 can be effective in reducing potential impacts in some cases. These features have been organized into logical categories. Each project design feature bullet statement applies to a specific alternative as indicated by the symbol “✓”.

Issues with herding, herd accountability, and domestic sheep trailing have been documented in relation to domestic sheep management on the Snow Mesa Sheep Allotments. Compliance with these project design features is of extreme importance to minimize potential contact with bighorn sheep and yet the Forest Service recognizes that creating impossibly stringent design features does not translate to perfect outcomes in a wild environment. Repeated non-compliance with domestic sheep stray management and trailing project design features will result in appropriate permit actions against the term grazing permits. Standard protocol measures could include suspension in grazing season or numbers, or permit cancellation if non-compliance with these project design features is demonstrated.
2.5.1 Project Design Feature Categories

- Herding, Herd Accountability (Stray Management), and Domestic Sheep Trailing
- Additional Project Design Features Related to Domestic and Bighorn Sheep
- Salting
- Herder Education
- Permittee Monitoring
- Livestock Grazing Management and Herd Dogs
- Livestock Bedding
- Herder Camps
- Disposal of Dead Livestock
- Soils and Wetlands
- Animal Damage Control
- Noxious Plants/Invasive Species
- Access and Travel Management
- Heritage Resources

<table>
<thead>
<tr>
<th>Project Design Features</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 2-3. Project design features for Alternatives 1, 2, 3, and 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Herding, Herd Accountability (Stray Management), and Domestic Sheep Trailing</td>
<td>N/A</td>
</tr>
<tr>
<td>Two herders are required.</td>
<td>N/A</td>
</tr>
<tr>
<td>The flock should not be left unattended, except in the event of an emergency. A herder must remain in the camp during the night.</td>
<td>N/A</td>
</tr>
<tr>
<td>Herders must understand allotment/pasture boundaries and management instructions. This is the permittee’s responsibility.</td>
<td>N/A</td>
</tr>
<tr>
<td>Sheep will not be herded or allowed to graze north of Trails 787 and 803 (Continental Divide National Scenic Trail and Miners Creek Trail) or south of Forest System Road 532 (Crystal Lake Road). Some initial difficulties with herd management can be expected due to previously learned grazing pattern habits of, and prior utilization by, domestic sheep.</td>
<td>N/A</td>
</tr>
<tr>
<td>Permittees will notify the Forest Service of the exact date and approximate time when domestic sheep will be entering and leaving the allotment/pastures.</td>
<td>N/A</td>
</tr>
<tr>
<td>Extensive efforts will be made by the permittees to remove every authorized domestic sheep from the allotments/pastures following pasture moves and at the end of the grazing season.</td>
<td>N/A</td>
</tr>
</tbody>
</table>
**Project Design Features**

<table>
<thead>
<tr>
<th>Prevention and Mitigation Features</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>All domestic sheep shall be accounted for (dead or alive). Special attention should be given to accounting for domestic sheep at all times. If sheep are unaccounted for, diligent efforts will be made to locate them as quickly as possible.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>Permittees will count sheep at the start of the grazing season; following the use of the Crystal Basin pasture; and before leaving NFS pasture.</td>
<td>N/A N/A N/A ✓</td>
</tr>
<tr>
<td>A reconnaissance of just-grazed pastures will be done within 48 hours of each move in order to locate and retrieve any strays. Special emphasis is on the Crystal Basin and East Bench pastures.</td>
<td>N/A N/A N/A ✓</td>
</tr>
<tr>
<td>Permittees will be required to respond to reports of stray domestic sheep within 24 hours. The Snow Mesa/Wishbone domestic sheep are the only permitted domestic sheep trailing from Creede to South Fork. Within four days of stray notification, a full report (verbal or written) will be provided to the Forest Service that includes the time, date, and action taken to resolve the matter.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>When trailing domestic sheep on/off the McKenzie stock driveway or on main pasture moves, the permittees/herders will make a sweep over the route traveled to locate any strays that may have been left behind. This trailing route sweep will be conducted within 48 hours of the move.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>Domestic sheep will be kept in a tight group during trailing on and off the allotment/pastures. The main area of concern is from the Crystal Lake Basin to Shallow/Miners Creeks and trailing through Wagon Wheel Gap.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>Domestic sheep should not overnight in the Wagon Wheel Gap area.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>A reconnaissance of the area between the Pool Table Road down to the Palisade Campground will occur immediately before domestic sheep are trailed through. Any bighorn in this area will be hazed away from the road and trailing domestic sheep.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
</tbody>
</table>

**Additional Project Design Features Related to Domestic and Bighorn Sheep**

<table>
<thead>
<tr>
<th>Additional Measures</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any bighorn sheep having the potential to come in contact with domestic sheep will be hazed to prevent contact from occurring. Special emphasis will be taken while trailing in the Wagon Wheel Gap – Palisade Campground area.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>The permittees will contact Colorado Parks and Wildlife and the Forest Service as soon as possible if bighorn sheep come into contact with domestic sheep, as outlined in Appendix A: Notification Protocol.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>Sick bighorn sheep or carcasses must be reported immediately to the district office.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
<tr>
<td>Appendix A: Notification Protocol is developed between the Forest Service, Colorado Parks and Wildlife, and the permittees in the instance of pending or confirmed contact between bighorn and domestic sheep.</td>
<td>N/A ✓ ✓ ✓</td>
</tr>
</tbody>
</table>
### Project Design Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salting</td>
<td></td>
</tr>
<tr>
<td>Every effort will be made to prevent bighorn sheep access to the domestic sheep salting locations. Leaving available salt or excess salt residue in the soil or on rocks or tubs presents a salt source that may attract bighorn.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>It is preferred that only block salt be used. If salt blocks are used, they must be kept with the domestic sheep at all times. Salt blocks will not be left behind when the domestic sheep are moved. If loose salt is used, it will be kept in a container and kept with the domestics at all times.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>See Heritage Resources in this same table for additional salting information.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Salt blocks and loose salt in containers will be placed on rocky knolls, well-drained sites, or in timber where excessive trampling will not destroy plant growth. Salt or supplement will not be placed closer than ¼ mile to designated trails, streams, springs, water developments, or other wetlands without prior approval of the Forest Service.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Herder Education</td>
<td></td>
</tr>
<tr>
<td>It is of utmost importance that the permittees spend as much time as necessary teaching the herders the requirements attached to the grazing permit, AOI, and all of the applicable project design features included here. AOI and Project Design Features may be provided in English and in Spanish concerning proper management practices, so that this information can be passed on to Spanish-speaking herders (if applicable). Ultimately, it is the permittees responsibility to ensure that compliance is being achieved.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Permittee Monitoring</td>
<td></td>
</tr>
<tr>
<td>Permittees are responsible for monitoring the following: livestock numbers, pasture entry and exit dates, and allotment entry and exit dates. This information will be kept in written format and will be made available to the Forest Officer upon request. The Forest Officer may provide a reporting form for the permittee’s use and may specify a due date for its return to the Ranger District Office.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Livestock Grazing Management and Herding Dogs</td>
<td></td>
</tr>
<tr>
<td>Livestock will be herded and distributed across the allotment/pastures in order to achieve proper grazing utilization of key forage species.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>Livestock protection dogs and herding dogs are used at the discretion of the livestock owner under appropriate State and county laws and regulations.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>The Forest Service will post signs at trailheads (where practical) giving public notice of the presence of livestock protection dogs and working dogs in the analysis area.</td>
<td>N/A  ✓  ✓  ✓</td>
</tr>
<tr>
<td>The Forest Service will reach out to residents adjacent to pastures to inform and educate about sheep and livestock protection dogs.</td>
<td>N/A  N/A  N/A  ✓</td>
</tr>
<tr>
<td>Project Design Features</td>
<td>Alternative</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Sheep Bedding</strong></td>
<td></td>
</tr>
<tr>
<td>Sheep bed grounds should be relocated every 5 to 10 days.</td>
<td>N/A</td>
</tr>
<tr>
<td>Sheep bedding will not be allowed within 300 feet of any running stream, spring, lake, or designated trail. There may be some exceptions due to topography on the allotment, but these will be approved in advance by the Forest Officer.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Herder Camps</strong></td>
<td></td>
</tr>
<tr>
<td>Sheep herder camps will be moved every 5 to 10 days and regularly rotated on an annual basis. By changing camps each year, bed grounds will be used only once every several years.</td>
<td>N/A</td>
</tr>
<tr>
<td>Camps will be placed at least 200 feet from live water and designated trails.</td>
<td>N/A</td>
</tr>
<tr>
<td>Camps will be kept clean and garbage packed out.</td>
<td>N/A</td>
</tr>
<tr>
<td>All fires built for any purpose by the permittee and/or herder will not be left unattended and will be completely extinguished. Each camp must be equipped with a serviceable shovel and axe. Other restrictions may be required during periods when the Forest enacts “fire restrictions.” Those restrictions will be identified in the particular “fire restriction order.”</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Disposal of Dead Livestock</strong></td>
<td></td>
</tr>
<tr>
<td><em>Death by Illness or Unknown Causes.</em> When permitted sheep die from disease, or any other cause, the carcass must be moved to a location greater than 200 feet from water, out of view of trails, away from any areas of substantial public use, and away from herder camps within 24 hours of discovery or notification by Forest Service personnel.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Soils and Wetlands</strong></td>
<td></td>
</tr>
<tr>
<td>Minimize livestock concentrations on sensitive soils, wetlands, and riparian areas through herding, and salt or supplement placement.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Animal Damage Control</strong></td>
<td></td>
</tr>
<tr>
<td>Predator control (i.e., black bears, mountain lions, bobcats, and coyotes) will be conducted following the correct State, Wildlife Services, and Forest Service procedures.</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Noxious Plants/Invasive Species</strong></td>
<td></td>
</tr>
<tr>
<td>Any hay, straw, or other feeds used on the allotment will be either certified as being free of noxious plants (also called noxious weeds), or will consist of heat-treated pelletized feeds.</td>
<td>N/A</td>
</tr>
<tr>
<td>Permittees will make every effort to ensure that livestock do not contribute to the transport of noxious plants onto the allotment(s).</td>
<td>N/A</td>
</tr>
</tbody>
</table>
2.6 Monitoring Measures

The techniques and protocols listed in the Rangeland Analysis and Management Training Guide (USDA Forest Service 1996c) would be used as the basis for monitoring vegetation. Techniques for evaluating streambank stability and alteration would follow the Watershed Conservation Practices Handbook (FSH 2509.25). Standard wildlife monitoring protocols would be used as the basis for monitoring wildlife populations, specifically bighorn sheep.

The administrative structure under which monitoring is conducted is as follows:
1) Decision is made under NEPA; if an action alternative is selected, then:

2) Grazing permit (legal authorization to graze livestock) is issued with contents reflecting decision:
   a) Allotment management plan tiered to grazing permit and reflecting decision including details.
   b) AOI tiered to allotment management plan and grazing permit, drafted annually to reflect decision and current resource conditions.
   c) Grazing permit compliance enforcement as needed.

3) Feedback from monitoring the analysis area and adjustment of actions made, as needed, in order to ensure conditions are meeting or moving toward Forest Plan desired conditions.

4) “Implementation” and “effectiveness” monitoring, discussed as follows, are expected to occur on the analysis area.

2.6.1 Implementation Monitoring

Implementation monitoring is short term and evaluates whether livestock management is being applied as prescribed. The Forest Service conducts this type of monitoring through administration of the grazing authorization (permit), which includes inspection of the analysis area.

If either Alternative 2, 3, or 5 is selected, the Forest Service would evaluate whether livestock management was in compliance with the grazing authorization, including the allotment management plan and AOI, which are part of the authorization. The permittee is also required to perform certain aspects of this monitoring as described in Table 2-4.

Monitoring emphasis will also be focused upon bighorn sheep in coordination and conjunction with CPW. Conducting annual post-season/winter population surveys, preferably during the month of December, is a monitoring item identified within the Finalized Bighorn Sheep Management Plan for Data Analysis Unit RBS-22, Central San Juan Bighorn Sheep Herd.

Feedback from monitoring, and any resultant adjustments of management actions, would be dependent on the specific action alternative selected. Minor management adjustments could be made annually through the AOI. Changes that cannot be done through the AOI may require new NEPA analysis. Compliance success means the monitoring elements meet the requirements outlined in Table 2-4.

2.6.2 Effectiveness Monitoring

Effectiveness monitoring is long term and focuses on determining whether the analysis area is meeting or moving toward desired conditions, and if the rate of change is acceptable. This level of monitoring is intended to ensure that all resource areas are meeting or moving toward desired conditions (within the scope of this analysis). The rate of acceptable change is determined by the responsible official unless expressly directed otherwise in the Forest Plan.
Project-level monitoring would specifically focus on maintaining resource conditions if an alternative other than Alternative 1 is selected. The effectiveness monitoring schedule that would be followed if Alternative 2, 3, or 5 is selected (Table 2-5) focuses on long-term trends for: (1) overall permittee compliance, (2) meeting or moving toward Forest Plan standards and guidelines relative to upland and riparian vegetation conditions, (3) maintaining separation between bighorn sheep and domestic sheep, and (4) overall compliance with the Forest Plan Chapter V monitoring elements to ensure that overall stocking levels are appropriate relative to other resource values.

The feedback and any resulting management actions from monitoring would depend on the specific action alternative selected. Minor management adjustments could be made, by exception, in the AOI. Compliance success means the monitoring elements are meeting or moving toward the desired conditions as outlined in Table 2-5.
## Table 2-4. Implementation monitoring item, method, and frequency

<table>
<thead>
<tr>
<th>Monitoring Item</th>
<th>Method</th>
<th>Frequency</th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>Alt 3</th>
<th>Alt 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance checks (meeting project design feature requirements AOI/allotment management plan/term grazing permit; see the requirements in section 2.5)</td>
<td>■ Site visits</td>
<td>Annual and as need indicates¹</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Upland forage utilization (Forest Plan, Range, page III-14) and riparian residual stubble height (Forest Plan, Riparian Areas, page III-5; Range, page III-14)</td>
<td>■ RAMTG²</td>
<td>Variable³</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Permittees are responsible for monitoring the following: livestock numbers; pasture entry and exit dates; allotment entry and exit dates</td>
<td>Written format made available to the Forest officer upon request</td>
<td>Weekly</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Permittees and Forest Service are responsible for monitoring for stray domestic sheep, keeping a log of locations/occurrences, reason for occurrence, and action taken to correct the situation</td>
<td>Written format made available to the Forest officer upon request</td>
<td>Daily</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

### Monitoring items for Bighorn Sheep for a Tier 2 Population (CPW and USFS responsibility)

<table>
<thead>
<tr>
<th>Monitoring Item</th>
<th>Method</th>
<th>Frequency</th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>Alt 3</th>
<th>Alt 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population statistics (age class and sex ratios)</td>
<td>■ Aerial flights</td>
<td>Minimum of every other year in late summer and winter; ground counts early to mid-summer</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Occupied habitat and distribution will provide information on occupied habitat and bighorn distribution throughout the herd unit</td>
<td>■ Aerial flights</td>
<td>Minimum of every other year in late summer and winter; ground counts early to mid-summer</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>General herd health: lamb production, lamb:ewe ratios, age of rams harvested, hunter success rate, and number of rams observed</td>
<td>■ Aerial flights late summer and winter</td>
<td>Minimum of every other year</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pack goat use and recreational impacts in key bighorn sheep habitat use</td>
<td>■ Colorado Parks and Wildlife harvest database</td>
<td>Annually</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
1 Permittees are responsible for compliance with all relevant terms and conditions associated with the grazing authorization. The Forest Service would make annual compliance checks and report the results to the responsible official for action, if necessary.


3 The Forest Service may vary the frequency of inspections on a case-by-case basis for this monitoring item depending on such factors as annual weather fluctuations, past permittee compliance history, and changes in current resource and/or social issues. Non-compliance would dictate annual monitoring until satisfactory compliance is attained. Relevant Forest Plan standards and guidelines are available online at: http://www.fs.fed.us/r2/riogrande/projects/plan/documents/planchap3.pdf
### Table 2-5. Effectiveness monitoring schedule, frequency, and method

<table>
<thead>
<tr>
<th>Monitoring Item</th>
<th>Method</th>
<th>Frequency</th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>Alt 3</th>
<th>Alt 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend in overall compliance with AOI, allotment management plan, and term grazing permit (must be static or improving)</td>
<td>■ Site visits</td>
<td>Annually</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Vegetation cover and frequency by plant species, ground cover, and production by life form on benchmark sites (must be static or improving)</td>
<td>■ RAMTG 1996</td>
<td>5–8 years¹</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Riparian trend on benchmark sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Plan Chapter V monitoring compliance to ensure proper stocking relative to other resource values in the analysis area (must be static or improving)</td>
<td>■ RAMTG 1996</td>
<td>5–8 years¹</td>
<td>N/A</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Monitoring items for Bighorn Sheep for a Tier 2 Population (CPW and USFS responsibility)**

<table>
<thead>
<tr>
<th>Monitoring Item</th>
<th>Method</th>
<th>Frequency</th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>Alt 3</th>
<th>Alt 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population statistics (age class and sex ratios)</td>
<td>■ Aerial flights</td>
<td>Minimum of every other year in late summer and winter; ground counts early to mid-summer</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>■ Coordinated ground counts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied habitat and distribution will provide information on occupied habitat and bighorn distribution throughout the herd unit</td>
<td>■ Aerial flights</td>
<td>Minimum of every other year in late summer and winter; ground counts early to mid-summer</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>■ Coordinated ground counts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General herd health: lamb production, lamb:ewe ratios, age of rams harvested, hunter success rate, and number of rams observed</td>
<td>■ Aerial flights late summer and winter</td>
<td>Minimum of every other year</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>■ Coordinated ground counts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>■ Colorado Parks and Wildlife harvest database</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ The responsible official would decide if trends are acceptable, whether conditions are moving toward or meeting Forest Plan desired conditions, and whether changes are occurring at an appropriate rate of change. Forest-wide desired conditions are available online at: [http://www.fs.fed.us/r2/riogrande/projects/plan/documents/planchap1.pdf](http://www.fs.fed.us/r2/riogrande/projects/plan/documents/planchap1.pdf)

2.7 Eliminated Alternatives and/or Options

As this analysis progressed, other alternatives, ideas, and/or options were considered but eliminated from further analysis. These included the following:

1. **Permittee suggested alternative (i.e., Alternative 4) would completely remove the Snow Mesa Allotment from the analysis area but would add more acres of the vacant southern Ouray Allotment to form a new allotment boundary.** This option would slightly reduce the risk to the S-22 bighorn herd to the north but increases the risk to the S-53 bighorn herd to the south. The Risk of Contact Model was run on this alternative. Due to overlap with the S-53 Core Herd Home Range (occupied by bighorn sheep), this alternative has a high risk rating that is not expected to result in an acceptable contact rate. Because of this high risk rating, the lack of topographical barriers separating the two species, and the need to not rely solely on project design features to reduce the risk of species association, this alternative was not considered feasible for achieving the purpose and need and was not evaluated further. However, the risk ratings for each allotment in this alternative are included in summary Table 3-4 and within the risk assessment for comparison with the other alternatives.

2. **Move the permittees to vacant domestic sheep allotments on the District/Forest.** There are 34 vacant domestic sheep allotments on the Rio Grande National Forest, 21 of which are on the Divide Ranger District. Most of the allotments have not been stocked with sheep for several decades, while others are currently vacant as solutions for reducing risk of contact in occupied bighorn sheep habitat are explored. Evaluation of these allotments shows that many share at least one boundary with the location of known bighorn sheep herds and have a high probability of overlap and risk of contact of domestic sheep with bighorn sheep. Placing domestic sheep in closer proximity to existing bighorn herds does not comply with existing direction. Many of these allotments are located within the La Garita and Weminuche Wilderness areas; therefore, access issues, trucking distances, and the probability of conflicts with other user groups make these vacant allotments unsuitable for domestic sheep grazing at this time. Details about the issues are contained in Table 2-6.

There are 13 sheep allotments on the Conejos Peak Ranger District that are vacant due to known high risk of contact with bighorn sheep. The Conejos Peak Ranger District is working with the affected operators by authorizing non-use for resource protection, consolidating permits to low risk allotments, searching for alternate summer forage in the interim, and exploring long-term options.
### Table 2-6. Vacant allotments on the Divide Ranger District considered as replacement allotments

<table>
<thead>
<tr>
<th>Allotment name</th>
<th>Last year grazed</th>
<th>Comments regarding Wilderness, bighorn sheep Data Analysis Unit, and other resource issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cimarron</td>
<td>1988</td>
<td>Weminuche Wilderness. S-16 Bighorn sheep occur on the southern end of the allotment. Adjacent allotments on the San Juan National Forest were closed due to overlap with bighorn sheep. Conflicts with recreation and Continental Divide National Scenic Trail users likely.</td>
</tr>
<tr>
<td>Halfmoon/Monument</td>
<td>1986</td>
<td>La Garita Wilderness. Within S-36 Bighorn sheep Core Herd Home Range.</td>
</tr>
<tr>
<td>Kite Lake</td>
<td>1984</td>
<td>Access issues from the Rio Grande side; there is potential to use in conjunction with the active Stoney Allotment.</td>
</tr>
<tr>
<td>Kitty</td>
<td>1992</td>
<td>S-33 Bighorn sheep are present on the northern end of the allotment.</td>
</tr>
<tr>
<td>Lost Trail/Carson</td>
<td>1991</td>
<td>Within S-33 Bighorn Sheep Core Herd Home Range.</td>
</tr>
<tr>
<td>Middle Pole</td>
<td>1997</td>
<td>S-33 Bighorn sheep present on the northern end of the allotment.</td>
</tr>
<tr>
<td>Officer</td>
<td>1985</td>
<td>Weminuche Wilderness. Half of the allotment burned in the 2013 Papoose Fire; adjacent allotments on the San Juan National Forest closed due to bighorn sheep issues.</td>
</tr>
<tr>
<td>Ruby</td>
<td>1992</td>
<td>S-33 Bighorn sheep present on the northern end of the allotment.</td>
</tr>
<tr>
<td>San Luis</td>
<td>1964</td>
<td>Within S-22 Bighorn Sheep Core Herd Home Range.</td>
</tr>
<tr>
<td>Texas</td>
<td>1985</td>
<td>Weminuche Wilderness. Impacted by the 2013 Papoose Fire. This allotment was reviewed with the permittees in the fall of 2015 along with portions of the adjacent Cimarron and Office Allotments. The Risk of Contact Model suggested a rating of high. Further on-the-ground time would be necessary to explore effective existing topographic boundaries before exploring this option further.</td>
</tr>
<tr>
<td>Trout/Middle Trout</td>
<td>1973</td>
<td>Weminuche Wilderness. S-16 bighorn sheep present on the southern end of the allotment. Adjacent allotments on the San Juan National Forest closed due to bighorn sheep issues. Conflicts with recreation and Continental Divide National Scenic Trail users likely.</td>
</tr>
</tbody>
</table>
### 3. Change livestock class from domestic sheep to cattle on the Snow Mesa Allotments.

The allotments are not suitable for cattle grazing due to the sensitivity of alpine vegetation types to cattle grazing, limited water availability, access difficulty, potential recreational conflicts along the Continental Divide National Scenic Trail, and the increased probability of high elevation-related illness, specifically big brisket disease. For these reasons, this alternative would have limited success for implementation under current or future permittees.

### 4. Vacate the Snow Mesa Allotments in exchange for converting domestic sheep Animal Unit Months (AUMs) to cattle AUMs on the adjacent vacant Ouray Allotment.

The permittees were not interested in this option for similar reasons to those discussed in option 3.

### 5. Pursue grazing opportunities to provide weed control and vegetation management with domestic sheep/livestock on lands managed by/under other agencies and ownerships, such as the National Wildlife Refuges on the valley floor, to replace the Snow Mesa Allotments.

The permittees have provided domestic sheep for National Wildlife Refuge weed control efforts in the past. There is no current long-term commitment from other agencies; adequate forage at critical times of the year is not always available due to drought or other resource management objectives on the refuges, and these areas are outside Forest Service jurisdiction.

### 6. Consider a change in livestock class from sheep to cattle, and combining a portion of the adjacent Park Cattle Allotment with the Ouray Allotment.

This option is unfeasible due to the Ouray Allotment being marginally suitable for cattle grazing: the Park allotment is currently at capacity, and the current permittees are not interested in increasing their cattle herds as a substitute for their sheep numbers.
Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction
This chapter describes the present conditions of the environment in and around the analysis area. This chapter also discloses the probable consequences (impacts and effects) of implementing each alternative presented in Chapter 2 on selected environmental resources. It provides the analytical basis to compare the alternatives.

This chapter begins by briefly describing the location of the analysis area. This is followed by a brief analysis of how each alternative responds to the issues identified in Chapter 1 (Section 1.9). Then, the chapter is organized by selected environmental and social resources.

Each resource discussion addresses the following components:

1) Scope of the analysis,
2) Past activities that have affected the existing condition,
3) Existing condition, and
4) Direct, indirect, and cumulative effects.

A list of terms and definitions used in the analysis is contained in the glossary.

3.2 General Description of the Analysis Area
The Snow Mesa Sheep Allotments are about 5 miles northwest of Creede, Colorado, within Mineral and Hinsdale counties, and encompass approximately 34,558 acres. Of these acres, about 12,000 are considered capable for domestic sheep grazing. This area includes portions of Townships 42 and 43, and Ranges 1, 2, and 3W, New Mexico Principal Meridian.

The Wishbone Allotment covers 10,480 acres, also near Creede, Colorado in Mineral County. Of these acres, approximately 7,100 are capable for domestic sheep grazing. This area includes portions of Townships 40–42N, Ranges 2W - 2E, New Mexico Principal Meridian.

3.3 Effects of Alternatives on Issues
This section summarizes how each alternative affects each issue. Issues are discussed in Chapter 1, Section 1.9. Effects on other resources are summarized in Table 2-2, and the response to issues by alternative is listed in Table 3-1.
Table 3-1. Response to issues by Alternatives 1, 2, 3, and 5

<table>
<thead>
<tr>
<th>Issue/Indicators</th>
<th>Alternative 1 – No Authorized Grazing</th>
<th>Alternative 2 – Continued Grazing</th>
<th>Alternative 3 – Boundary Reconfiguration</th>
<th>Alternative 5 – Wishbone Allotment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk rating</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Forage availability on public land (AUMs)</td>
<td>0</td>
<td>8286 available, 667 permitted</td>
<td>8286 available, 667 permitted</td>
<td>2240 available, 667 permitted</td>
</tr>
<tr>
<td>Likelihood of Central San Juan Herd (RBS-22) population persistence over time</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

3.3.1 Alternative 1 (No Authorized Grazing)

3.3.1.1 Issue 1

**Risk of contact between domestic and bighorn sheep.** This alternative would remove the risk of contact between domestic and bighorn sheep within the Snow Mesa Sheep Allotments and the Central San Juan Bighorn Sheep Herd after the two-year notification period. This alternative addresses Issue 1.

3.3.1.2 Issue 2

**Forage availability on public land provides an economic value to the San Luis Valley sheepherding industry.** The discontinuation of grazing on the Snow Mesa Allotments would no longer provide domestic sheep forage on public land. This alternative does not address Issue 2.1.

**Bighorn sheep provide social and economic value.** Decreasing the risk of contact between domestic and bighorn sheep would lead to a high likelihood of RBS-22 population persistence over time and therefore would maintain the social and economic value of bighorn sheep. This alternative addresses Issue 2.2.

3.3.2 Alternative 2 (Continued Current Grazing)

3.3.2.1 Issue 1

**Risk of contact between domestic and bighorn sheep.** This alternative would result in a risk rating of “High” within the Snow Mesa Allotments regarding contact between domestic and bighorn sheep. This alternative would not address Issue 1.
3.3.2.2 Issue 2

Forage availability on public land provides an economic value to the San Luis Valley shepherding industry. Alternative 2 would provide 667 AUMs of domestic sheep forage on public land. This alternative addresses Issue 2.1.

Bighorn sheep provide social and economic value. The likelihood of RBS-22 bighorn sheep population persistence over time for Alternative 2 is low. This has a negative impact on the social and economic value of bighorn sheep. This alternative does not address Issue 2.2.

3.3.3 Alternative 3 (Allotment Boundary Reconfiguration)

3.3.3.1 Issue 1

Risk of contact between domestic and bighorn sheep. Although this alternative results in domestic sheep not grazing those areas of highest concern, the risk rating is still high. Alternative 3 does not address Issue 1.

3.3.3.2 Issue 2

Forage availability on public land provides an economic value to the San Luis Valley shepherding industry. Alternative 3 would provide 667 AUMs of domestic sheep forage on public land. This alternative addresses Issue 2.1.

Bighorn sheep provide social and economic value. The likelihood of RBS-22 bighorn sheep population persistence over time for Alternative 3 is low. This has a negative impact on the social and economic value of bighorn sheep. This alternative does not address Issue 2.2.

3.3.4 Alternative 4 (Permittee-suggested Allotment Boundary Reconfiguration)

3.3.4.1 Issue 1

Risk of contact between domestic and bighorn sheep. Although Alternative 4 would eliminate the Snow Mesa Allotment, the additional use on the Ouray Allotment would overlap with bighorn sheep CHHR. This alternative would result in a risk rating of “High” and would not address Issue 1.

3.3.4.2 Issue 2

Alternative 4 was not analyzed any further since it failed to address Issue 1.
3.3.5 Alternative 5 (Wishbone Allotment - Proposed Action)

3.3.5.1 Issue 1

Risk of contact between domestic and bighorn sheep. Consideration of the results from the Risk of Contact model combined with on-the-ground local specific and relevant information supports a moderate risk for Alternative 5. In this case, a moderate risk outcome indicates that potential contact rates between bighorn sheep and the pastures associated with domestic sheep grazing on the Wishbone Allotment are expected to be lower than those on the existing Snow Mesa allotments, or any configuration of them. At the same time, the moderate risk rating recognizes that some uncertainty still exists. Bighorn sheep habitat fragmentation from Colorado Highway 149, the Rio Grande river, and several subdivisions; project design features; an improved ability to monitor due to more accessible and visible pastures; and a decreased effort to manage livestock all improve spatial and temporal separation under Alternative 5 and support a moderate risk of contact.

Given the improved temporal and spatial separation, Alternative 5 addresses Issue 1.

3.3.5.2 Issue 2

Forage availability on public land provides an economic value to the San Luis Valley sheepherding industry. Alternative 5 is capable of a minimum of 2,240 AUMs of domestic sheep forage on public land. This alternative addresses Issue 2.1.

Bighorn sheep provide social and economic value. A moderate risk outcome indicates that potential contact rates between bighorn sheep and the pastures associated with domestic sheep grazing on the Wishbone Allotment are expected to be much lower than those of Alternatives 2 or 3. Based on a moderate risk of contact between bighorn sheep and the Wishbone allotment, the likelihood of RBS-22 bighorn sheep population persistence over time for Alternative 5 is moderate. With the ability to improve the temporal and spatial separation between domestic and bighorn sheep it is likely that Alternative 5 will maintain the social and economic value of bighorn sheep. This alternative addresses Issue 2.2.

3.4 Environmental Consequences

3.4.1 Rangeland Resources

3.4.1.1 Scope of Analysis

The scope of the analysis is the analysis area for the Miners, Snow Mesa, Table, and Ouray allotments, and the areas analyzed for Alternative 5 Wishbone Allotment as described in Chapter 1, Section 1.3 and shown in Figures 1-1 and 1-2.
3.4.1.2 Past Actions that have affected the Existing Condition

The current boundaries of the Ouray, Miners, Snow Mesa, and Table allotments are the result of allotment boundary revisions and consolidations over time. Forest Service records document grazing since the early 1920s, but grazing likely occurred prior to this date. Historic use consisted of individual bands with varied numbers, with each permittee assigned a separate area for the grazing season. Each band typically consisted of 800 to 1,000 sheep, with an occasional band of 2,000 ewe/lambs from July 1 to September 30. The same bed grounds were used repeatedly with very little open herding. Permanent bed grounds, camps, and lambing grounds on the allotments were common. Allotment records from the 1920s to 1940s indicate heavily used rangeland on accessible areas and poor grazing practices. Multiple bands of sheep trailed through the Miners and Snow Mesa Allotments on the La Garita Stock Driveway twice each grazing season to access allotments along the Continental Divide, and to return to home pastures. Management plans were modified in the 1960s to prevent overuse of previous concentration areas.

![Domestic sheep trailing out of the high country on the McKenzie Stock Driveway near Creede.](image)

The Ouray Allotment has been vacant since 1988, and was historically used in combination with the Miners and Snow Mesa allotments. The adjacent Bristol Allotment was used with Snow Mesa and Table allotments, and was last stocked in 1993. An opportunity to consolidate grazing units, and to provide a buffer between domestic sheep and the bighorn sheep herd reintroduced to Bristol Head during 1983–84, led to the current Miners, Snow Mesa, and Table allotment combination.

Boundary adjustments were finalized in the late 1980s and early 1990s, and bands used two or more of the available allotments (Miners, Snow Mesa, and Table) in a three-year rotation. Wayne Brown and Jerry Brown have held term grazing permits on the allotments since 1998 and were previously permittees on the Conejos Peak Ranger District. A mutually agreed upon allotment exchange occurred, with the Snow Mesa permittees relocating to Conejos Peak allotments, and the Browns relocating to the Snow Mesa Allotments. The grazing season has remained July 11 to September 15, with minor yearly variations. Yearly band numbers varied from 2003 to 2011 (500–800 ewes/lambs), with full numbers on the allotments from 2011 to 2014.
Analyzed for Alternative 5, the Wishbone Allotment is a combination of seven new pastures that include lands under Colorado Parks and Wildlife jurisdiction, portions of two active Rio Grande National Forest cattle allotments, a portion of the vacant Ouray Allotment, and other Rio Grande National Forest lands within Forest Plan Management Area 4.21.

Crystal Pasture is a small portion of the Ouray Allotment that includes the basin below Crystal Lake and the upper headwaters of Shallow Creek.

Shallow Pasture consists of the northern end of the Shallow cattle forage reserve allotment that was reanalyzed for grazing in 2013. It is an allotment on which there is no current term permit obligation, and a determination was made to use the available forage on the allotment to enhance management flexibility for authorized livestock use. Parts of this pasture have been used to overnight domestic sheep trailing to and from the Snow Mesa area.

Sixmile Flats Pasture sits in the middle of the Wishbone Allotment and is located approximately 6 miles south of Creede, adjacent to Highway 149. It has not been part of a grazing allotment in recent history, but is intersected by the Middle Creek Livestock Driveway and has been grazed by trailing domestic livestock for many years.

The South River Pasture is made up of non-forested portions of the Rio Grande and Red Mountain pastures of the South River cattle allotment. The South River allotment was analyzed for grazing in 2008 and is currently permitted for cattle grazing. To accommodate the capacity needed on South River Allotment for domestic sheep, some of the cattle currently permitted on the South River Allotment will be authorized to graze on the remaining portion of the Shallow forage reserve allotment that is not being utilized under Alternative 5 for domestic sheep.

Deep Creek Road Pasture is a small, 40-acre parcel of the Rio Grande National Forest adjacent to Deep Creek Road that sits between Sixmile Flats Pasture and East Bench Pasture. The purpose of this small pasture would be to rest or overnight domestic sheep as they trail between other pastures. This small parcel is isolated from other public lands and currently receives little use.

East Bench Pasture consists of a long narrow bench located between Deep Creek and McKinney Gulch. The east end of this pasture was analyzed for grazing in 2009 as part of the Roaring Fork Allotment, but it has not been utilized due to location relative to other Roaring Fork pastures and lack of water. The west end of East Bench has been used in the past as a resting or overnight area for domestic sheep being trailed to and from the high country.

Coller Pasture is located along the Rio Grande River about 3 miles above South Fork. It consists of a portion of the Coller State Wildlife Area and adjacent Rio Grande National Forest lands. The Coller State Wildlife Area is managed for day use recreation and winter deer and elk habitat. This pasture contains a railroad corridor, and portions of it are irrigated annually by Colorado Parks and Wildlife.
3.4.1.3 Existing Condition

Grazing System
The permittees are authorized to graze one band of sheep (1,000 ewes with one or more lambs) on the Divide Ranger District. Daily sheep care is the responsibility of shepherder(s) employed by the Browns. Numbers of pack stock, herding dogs, and livestock protection dogs vary with the grazing season. Camps are moved every 7–10 days when Browns resupply camp provisions.

At the beginning of the grazing season, sheep are trucked from private pasture on the Valley floor to the McKenzie Stock Driveway. The sheep, herders, and horses overnight on the Shallow C&H Allotment, and are then trailed up the McKenzie Stock Driveway, through portions of the Ouray Allotment, and onto the Table Allotment. In 2013 and 2014, a portion of the vacant Ouray Allotment southeast of Crystal Lakes was used for 7–10 days prior to sheep being trailed to the Table Allotment. Sheep are trailed to the Miners Allotment with several camps located on the Miners Allotment, then to the Snow Mesa Allotment, and the rotation is reversed later in the season back through Table and down the McKenzie Stock Driveway, with an overnight on the Shallow C&H Allotment. The sheep are then trailed to the Deep Creek Road, down Highway 149 with an overnight near Wagon Wheel Gap, and continue down Highway 149. Sheep then trail eastward to private pastures on the Valley floor (fall barley stubble and other crop aftermath are important forage sources), with primary domestic sheep trailing routes located on Rio Grande and Saguache county roads. Depending on private pasture locations, fall trailing distances can be as far as 70 miles from the allotments.

Increased monitoring throughout the grazing season has improved Forest Service knowledge of band management, trailing routes, camp locations, salting locations, bed ground conditions, and domestic sheep distribution on the landscape. The sheep are managed under the “once-over” strategy, meaning they graze each area one time over the grazing season. There is minor regrazing late in the season as sheep are trailed through areas previously grazed early in the season. Sheep are grazed in an open fashion and are scattered as they graze across the landscape. The herders stay with the sheep during the day, and sheep are bedded near the camp at night to minimize predation loss and straying.

Allotment monitoring has provided better information about bighorn sheep distribution within and adjacent to the allotments. Due to the concern of potential contact between domestic and bighorn sheep, AOI were modified to exclude those portions of the Miners and Snow Mesa allotments adjacent to the CDNST on a trial basis. Areas excluded were Oso Creek, the headwaters of Miners Creek, and areas north of the CDNST on Snow Mesa. These areas were offset by including portions of the vacant Ouray Allotment for the 2013 and 2014 grazing seasons.

The Wishbone Allotment would provide a series of pastures for the Snow Mesa permittees to relocate their band of sheep. Sheep would be hauled from the San Luis Valley to the first pasture of the grazing season, trailed between subsequent pastures, and trailed back to the San Luis Valley at the end of the grazing season. Trailing will occur along highway rights of way, roads, and existing stock driveways that connect Wishbone pastures. Project design features for trailing will be followed. Trailing duration can vary
from as little as a few hours for close pastures up to a day to reach farther pastures. Hwy 149 and its rights of way will be used to trail between East Bench and Coller pastures at the end of the grazing season and can require 6 to 8 hours of trailing time. This move requires increased awareness and monitoring to make sure bighorn sheep are not in the Wagon Wheel Gap area and that no domestic sheep are left behind. Lead persons monitor in front of the domestic sheep and a truck and trailer follow to collect any slow or injured sheep that cannot keep up. Deep Creek Road will be used to trail between East Bench, Deep Creek Road, and Sixmile pasture. FSR 523 will be used to trail between Sixmile and South River pastures. Trailing to Shallow pasture will occur on Deep Creek Road, Hwy 149 and its rights of way, FSR 507, and FSR 508. Trailing to Crystal pasture will occur on the McKenzie stock driveway. The frequent trailing and distance between pastures on Wishbone will require more time, effort, and personnel than was needed to move livestock on and around Snow Mesa allotments. Lower elevation pastures would be utilized during the beginning and end of the grazing season, while Shallow and Crystal Pastures would be utilized during the middle of the grazing season. Elevations vary from 8,200 feet to 12,500 feet on the Wishbone Allotment. This variation provides a longer growing season than Snow Mesa Allotments, provides earlier range readiness, and increases opportunity for deferred rotation. Timing and duration would be adjusted to coincide with annual fluctuation in grazing season, available forage, and land and livestock management objectives. In larger pastures, camp/bedding location would be moved every 7–10 days, and in smaller pastures that are used for less than 10 days, one camp location would be utilized. These locations will vary from year to year to prevent long-term impacts to vegetation. Herders, pack stock, herding dogs, and livestock protection dogs would be utilized to manage the flock. Water improvement projects would need to be implemented in the Sixmile and East Bench pastures to provide livestock water and improve livestock distribution. These projects would consist of developing a spring and piping water to a series of livestock troughs in a suitable location within the pasture.

Rangeland Condition

Current rangeland conditions within the analysis area have improved over the years. Livestock management and sheep herder practices have greatly improved since the 1960s. Restrictions on sheep herder camps locations, camp movements, salting practices, sheep bedding areas, and livestock on-off dates have notably improved the vegetation condition of the rangeland compared to the conditions found through the 1940s and later. This reflects a significant improvement in conditions as early stocking caused major and lasting impacts. These allotments are high elevation with a short growing season and shallow soils. Even in the total absence of livestock, recovery from the early conditions noted would have been a long and slow process. The recovery noted reflects significant changes in management.

At the present time, there are no obvious signs of current rangeland degradation. The current rangeland condition is classified as satisfactory. Factors that led toward this determination are based on plant community composition, density of vegetation, vigor of vegetation, soil condition, and condition of the riparian areas.
As outlined in the past actions above, the analysis area has been used for domestic sheep summer grazing continuously since the early 1900s. Because of this long-term use and overuse in the early days, it would not be expected that climax conditions would exist in most of the key areas.

Along with past and present domestic sheep grazing, other factors have played a natural part in the current state of plant succession. The major suitable grazing areas within the analysis area occur mostly in the alpine zone and the sub-alpine areas. These high country areas have been heavily influenced by physical and environmental conditions that are unique and severe in some respects. Some of those physical and environmental conditions are high velocity winds that cause high transpiration rates and snow-blast to plants; snow pockets or areas with lingering snow banks caused by deposition on the lee side of slopes; snow slides or avalanche areas; rock fields, talus fields, talus slides, scree fields, and scree slides; high intensity sunlight; high annual precipitation, heavy snows in the winter, and large amounts of rain in the summer; heavy spring runoff; slow decomposition of organic matter due to the colder temperatures; a short growing season with the possibility of frost even in the summer months; areas where elk herds migrate for the summer months; and other conditions unique to the analysis area.

Along with the past and present domestic sheep grazing, all of these factors have shaped the current vegetation condition into a mosaic of different plant communities in different seral stages. The plant communities, with the exception of a few localized areas, are primarily in mid- to high-seral stages of the climax community. This meets the desired conditions as set forth in the Forest Plan (USDA Forest Service 1996a), which states “Vegetation is managed for a mixture of seral stages, with most of the rangelands in mid to high seral stages.” Not only is the vegetation in a desired seral stage, but the vegetation is exhibiting high vigor over the analysis area. This high vigor of the plant communities is the most obvious factor of the much improved rangeland conditions. The allotments have continuous dense ground cover with only minor areas of soil exposure (see section 3.4.5 for further discussion on the current soil conditions).

Overall, current rangeland condition, plant community composition, density and vigor of vegetation, soil condition, and riparian condition is satisfactory for most of the Wishbone Allotment. Many parts of the Wishbone Allotment have been rested or have received light to moderate utilization from domestic livestock and wildlife grazing in the past. Some areas have accumulated high amounts of plant litter and would benefit from increased utilization and hoof action to increase litter breakdown and litter/soil contact, thereby aiding nutrient cycling.

Some isolated areas have higher than desired amounts of bare ground, decreased plant vigor, decreased species diversity, or exhibit lower seral stages of the climax community. These conditions are likely a result of historical disturbance and/or by habitation by an expanding population of prairie dogs. These areas can be avoided by domestic sheep with herding practices to limit additional impacts to vegetation or soils. Somewhat different from the Snow Mesa Allotments that primarily consist of alpine and subalpine plant communities, the Wishbone Allotment contains plant communities ranging from lower elevation herbaceous and shrub dominated uplands in the ponderosa pine/bunchgrass vegetation type, to sub-alpine herbaceous and shrub dominated uplands and forest, all the way to a high-elevation herbaceous and shrub dominated alpine zone with alpine:
grass, grass-likes, forbs, and shrubs. As with most grazing systems the forage quality and quantity on Wishbone can vary seasonally depending on air and soil temperature and timing and amount of precipitation. In comparison to the alpine zone dominated Snow Mesa Allotments that receive more consistent precipitation, Wishbone forage quality and quantity, will most likely have more frequent variation and cannot be expected to consistently have as high of quality or quantity of forage. The Wishbone Allotment is also smaller in size than Snow Mesa Allotments resulting in less management flexibility and available acres to utilize.

**Rangeland Suitability/Capability**

The capability of National Forest System lands to produce forage and the suitability (or appropriateness) of allocating it to livestock are determined in the analysis for the Forest Plan. Rangeland suitability is defined as the appropriateness of applying certain (range) resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses forgone (36 CFR 219.3 and FSM 1905).

The Snow Mesa allotments analysis area (which includes the three active allotments and one vacant allotment) contains approximately 34,556 total acres; 12,430 acres (35%) are determined to be suitable for the grazing of domestic sheep through the Forest Plan suitability determination process (USDA Forest Service 2003). It was determined that the Forest Plan suitability/capability analysis was appropriate to utilize as a site-specific suitability/capability analysis. As with transitory rangeland, non-suitable acres are not used in stocking calculations.

The Wishbone Allotment contains about 10,480 total acres; 7,100 acres (68 percent) are determined to be capable/suitable for grazing of domestic sheep. Site-specific measurements and Forest Plan suitability/capability analyses were utilized to determine these acres and carrying capacity.

**Livestock Carrying Capacity**

The domestic sheep carrying capacity estimate within the Snow Mesa allotments analysis area is approximately 2,485 sheep (ewes with lambs) or 8,286 AUMs (animal unit months). This carrying capacity estimate was derived by overlaying capable rangeland GIS layers with Soil Resource Inventory (SRI) layers (USDA Forest Service 1996b). SRI descriptions include estimated pounds of air-dry forage production per acre, and recommended stocking rates. Daily animal forage consumption and allowable forage use are calculated. The estimated carrying capacity considers the forage needed for recreation livestock and wildlife. The current level of stocking (1,000 sheep [ewes with one or more lambs] or 667 AUMs) is conservative in relation to the actual suitable rangeland available for grazing.

Using 2016 measured annual forage production data and information from the Soil Resource Inventory (SRI) layers, USDA Forest Service 1996b) a conservative estimate of 2,240 AUMs are available on the Wishbone Allotment. This value came from comparing 2016 forage production measurements and SRI range production data and using the lower
production rate for capacity calculations. According to SRI data on years of favorable precipitation, available AUMs have potential to reach 4,110.

Livestock capacity could vary from season to season. If grazing areas become unavailable for domestic sheep use due to managing the separation issue, correspondingly, AUMs tied to those unavailable areas would be subtracted from the capacity.

3.4.1.4 Direct, Indirect, and Cumulative Effects

None of the alternatives would be expected to result in significant direct, indirect, or cumulative effects. None of the alternatives would be expected to produce irreversible or irretrievable commitments of the rangeland resources.

**Alternative 1 – No Authorized Grazing**

*Direct and Indirect Effects*

**Permitted Livestock Grazing.** Alternative 1 would not authorize permitted domestic sheep grazing and its related practices. Alternative 1 also eliminates the possibility of converting to other kinds of permitted livestock, such as cattle.

**Suitable Rangeland, Season of Use, Grazing System, and Carrying Capacity.** The entire analysis area would be vacant; therefore, there would be no suitable rangeland, season of use, grazing system, or carrying capacity available for permitted livestock grazing in the analysis area.

**Rangeland Management to Maintain Separation between Bighorn Sheep and Permitted Domestic Sheep.** This alternative would reduce the risk of direct contact between bighorn and domestic sheep on the allotments. This alternative does not forgo the opportunity to restock the allotments at some point in the future if an effective vaccination is manufactured or an effective management method discovered, to prevent contact and/or disease transmission between bighorn and domestic sheep.

**Rangeland Vegetation.** Rangeland would remain in satisfactory condition. Cessation of permitted livestock grazing would be expected to result in gradual plant community change over time. Generally, the plant communities most likely to be influenced would be those with the following characteristics: (1) gentle, accessible slopes; (2) areas in close proximity to water; (3) livestock driveways; and (4) those areas grazed early in the season when vegetation is the most palatable. Changes may occur as increases in cover or composition of those plant species most preferred by sheep. Conversely, over many decades, there could be a gradual decrease in relatively unpalatable forbs. Plant community changes in high subalpine and alpine environments occur very slowly (on a time-scale magnitude of decades).

*Cumulative Effects*

There are no rangeland cumulative effects from Alternative 1.
Summary

Overall, this alternative would be expected to meet Forest Plan standards and guidelines and the Forest Plan desired conditions for rangeland resources. This alternative would reduce the need for rangeland managers to provide separation between bighorn sheep and permitted domestic sheep in the analysis area.

Alternative 2 – Continued Current Grazing

Direct and Indirect Effects

Permitted Livestock Grazing. Alternative 2 would maintain permitted domestic sheep grazing and its related practices. Alternative 2 does not include the possibility of converting to other kinds of permitted livestock such as cattle, due to the high elevations and alpine vegetation types (see Section 2.7 for other alternatives considered).

Suitable Rangeland, Season of Use, Grazing System, and Carrying Capacity. Suitable rangeland acres available for permitted livestock would be 12,430 acres. The grazing season would be somewhat flexible from year to year within the following dates: July 11–September 15.

Grazing would occur under a deferred rotation grazing system. Herders would continue to be utilized to distribute sheep throughout the analysis area.

Overall, this alternative would be expected to meet Forest Plan standards and guidelines and the Forest Plan desired conditions for rangeland resources.

Rangeland Management to Maintain Separation between Bighorn Sheep and Permitted Domestic Sheep. The risk of physical contact occurring between permitted domestic sheep and bighorn sheep has been assessed in this alternative through a risk assessment (see Volume II of this EA).

Project design features (Chapter 2, Section 2.5) were developed for this alternative to address the risk of contact. The risk assessment would be updated as information becomes available; therefore, the high risk areas may expand or decline in the future.

Rangeland Vegetation. Rangeland would remain in satisfactory condition. Existing rangeland plant community composition and conditions would be expected to stay relatively similar to existing conditions for the foreseeable future (next two decades).

Overall, this alternative would be expected to meet Forest Plan standards and guidelines and the Forest Plan desired conditions for rangeland resources.

Alternative 3 – Allotment Boundary Reconfiguration

Direct and Indirect Effects

Permitted Livestock Grazing. Alternative 3 would maintain permitted domestic sheep grazing and its related practices. Alternative 3 does not include the possibility of converting to other kinds of permitted livestock such as cattle, due to the high elevations and alpine vegetation types (see Section 2.7 for other alternatives considered).
Suitable Rangeland, Season of Use, Grazing System, and Carrying Capacity.
Suitable rangeland acres available for permitted livestock would be 11,303 acres; with the band using different areas in a logical sequence for camp relocation and available forage. There is a minor loss of 1,127 acres of suitable rangeland with the allotment boundary reconfiguration; however, available forage across the analysis area far exceeds current permitted demand. The grazing season would be somewhat flexible from year to year within the following dates: July 11–September 15. Grazing would occur under a once-over rotation grazing system. Camps and herders would continue to be utilized, and project design features would provide for higher success in managing strays and domestic sheep distribution.

Overall, this alternative would be expected to meet Forest Plan standards and guidelines and the Forest Plan desired conditions for rangeland resources.

Rangeland Management to Maintain Separation between Bighorn Sheep and Permitted Domestic Sheep. The risk of physical contact occurring between permitted domestic sheep and bighorn sheep has been assessed in this alternative through a risk assessment (see Volume II).

Project design features (Chapter 2, Section 2.5), were developed for this alternative to address the risk of contact. The risk assessment would be updated as information becomes available; therefore, the high risk areas may expand or decline in the future.

Some initial adjustments and difficulties with herd management can be expected due to domestic sheep learned grazing patterns and trailing routes. Permittee and herder communication/education regarding areas available for grazing and areas excluded from domestic sheep are critical to the success of this alternative to provide for continued domestic sheep grazing.

Rangeland Vegetation. Rangeland would remain in satisfactory condition. Existing rangeland plant community composition and conditions would be expected to stay relatively similar to existing conditions for the foreseeable future (next two decades).

Overall, this alternative would be expected to meet Forest Plan standards and guidelines and the Forest Plan desired conditions for rangeland resources.

Cumulative Effects
Cumulatively, grazing by wild ungulates, permitted outfitter and guide riding and pack stock, recreational user riding and pack stock, in addition to permitted domestic sheep grazing, constitutes a cumulative effect to rangeland vegetation. The proposed stocking levels are conservative. There are no known areas where competition for forage between permitted domestic sheep and grazing wildlife occurs. There may be minor, highly scattered areas where multiple vegetation uses have created areas of higher utilization, such as near outfitter/guide camps and temporary concentration sites by wildlife.

Stock driveways and other trails used as trailing routes for permitted domestic sheep are not used exclusively for permitted domestic sheep trailing. Most of these trails were originally created as stock driveways, and have, over time, become system trails for the recreating public. The past, present, and reasonably foreseeable future use of these trails by permitted livestock and recreational users (foot and horse) constitute a cumulative
effect to the stock driveways and trails used as trailing routes. Trail management and maintenance efforts have been taking place to keep up with the increased use of these trails.

**Alternative 5 – Wishbone Allotment**

*Direct and Indirect Effects*

**Permitted Livestock Grazing.** Alternative 5 would maintain permitted domestic sheep grazing and its related practices. Alternative 5 does not eliminate the possibility of converting to other kinds of permitted livestock such as cattle, although it was not analyzed at this time.

**Suitable Rangeland, Season of Use, Grazing System, and Carrying Capacity.** The Wishbone Allotment is comprised of about 10,480 acres, of which 7,100 are considered suitable rangelands. Using 2016 measured annual forage production data and information from the SRI layers (USDA Forest Service 1996b) an estimate of 2,240 AUMs are available of which 667 are needed to maintain the current permitted numbers for the Snow Mesa Allotment. This leaves a considerable amount of vegetation for wildlife, recreational livestock use, and grazing management flexibility, while still providing for a healthy and sustainable vegetative community. The grazing season would be more flexible than previous due to a broader range of elevation across pastures within the Wishbone Allotment. The addition of pastures at lower elevations results in increased species diversity and a longer growing season, resulting in earlier range readiness and later onset of vegetation dormancy in most years. The actual grazing season on National Forest System lands would be dependent on conditions on the ground due to current weather, range readiness, and any impacts from prior grazing and would fall within the following dates: June 15 to September 15.

Overall, this alternative would be expected to meet Forest Plan standards and guidelines and the Forest Plan desired conditions for rangeland resources.

**Rangeland Management to Maintain Separation between Bighorn Sheep and Permitted Domestic Sheep.** This alternative would reduce the amount of risk of direct contact between bighorn and domestic sheep on the allotment by vacating the Snow Mesa Allotment and relocating domestic sheep grazing to the Wishbone Allotment, which has no overlap with bighorn CHHR, and implementing project design features (Chapter 2, Section 2.5). The risk of physical contact occurring between permitted domestic sheep and bighorn sheep has been assessed in this alternative through a risk assessment (see Volume II).

**Rangeland Vegetation.** Rangeland would remain in satisfactory condition. Existing rangeland plant community composition and conditions would be expected to stay relatively similar to existing conditions for the foreseeable future (next two decades).

**Cumulative Effects**

Cumulatively, grazing by wild ungulates, permitted outfitter and guide riding and pack stock, recreational user riding and pack stock, in addition to permitted domestic sheep grazing, constitutes a cumulative effect to rangeland vegetation. The proposed stocking
levels are conservative. There are no known areas where competition for forage between permitted domestic sheep and grazing wildlife occurs. There may be minor, highly scattered areas where multiple vegetation uses have created areas of higher utilization, such as near outfitter/guide camps and temporary concentration sites by wildlife.

Stock driveways and other trails used as trailing routes for permitted domestic sheep are not used exclusively for permitted domestic sheep trailing. Most of these trails were originally created as stock driveways, and have, over time, become system trails for the recreating public. The past, present, and reasonably foreseeable future use of these trails by permitted livestock and recreational users (foot and horse) constitute a cumulative effect to the stock driveways and trails used as trailing routes. Trail management and maintenance efforts have been taking place to keep up with the increased use of these trails.

3.4.2 Wildlife

3.4.2.1 Scope of Analysis

This analysis briefly summarizes the potential impacts of the alternatives on Threatened and Endangered Species; Sensitive Species; Management Indicator Species; and Migratory Birds and their habitat.

The Wildlife Report prepared for this EA contains an analysis of wildlife species and the potential impacts of the alternatives. The reader is encouraged to review the report for more information.

Bighorn sheep are not discussed in great detail in this section. The potential impacts of each alternative upon bighorn are summarized here. Volume II: Assessment of Risk of Physical Contact between Rocky Mountain Bighorn Sheep and Domestic Sheep in the Snow Mesa and Wishbone Sheep Allotment Grazing Landscape, describes the direct and indirect effects of each alternative on the Central San Juan Bighorn Sheep Herds in detail.

3.4.2.2 Past Actions that have affected the Existing Condition

The existing habitat conditions for wildlife are the result of natural disturbances and past management activities within the allotments. The majority of the currently grazed areas, (Snow Mesa and Table Mountain) are within backcountry and have had few vegetative management activities occurring during the past several decades. The main use is by hikers/backpackers on the CDNST and Colorado Trail (CT), which pass through the area. This area has characteristics similar to wilderness, but motorized and mechanized use is allowed on existing trails. The area is also used by snowmobiles in the winter.

The General Forest and Rangelands areas consist mainly of the draws and slopes within Mesa Creek, Willow Creek, and Bennett Creek. Limited public and commercial firewood cutting occurs along the existing road system, with several small-scale timber sales occurring within the last two decades.

The various pastures included as part of Alternative 5 occur within a variety of management area prescriptions. Due to their closer proximity to transportation corridors
and human occupation, all of these pastures have had a moderate amount of disturbances which has shaped their value and importance to wildlife.

3.4.2.3 Existing Condition

Existing habitat conditions for wildlife are generally good within the Snow Mesa allotments. Areas offering seclusion for those wildlife species not tolerant of human activities exist. Occasional disturbance by motorized/mechanized users, backpackers, and domestic sheep management exists but is not significant enough to preclude use of the allotments by most species of wildlife.

The existing habitat conditions for wildlife in the pastures involved with Alternative 5 are generally fair. With the exception of the Crystal Lakes pasture, which is more similar to the Snow Mesa Allotments, the other pastures consist of grass and shrub land habitat with existing roads and trails in place. The pastures do not offer seclusion for those species requiring remote areas. Wildlife use is more limited to those species more adapted to human presence and for winter range for big game.

3.4.2.4 Direct, Indirect, and Cumulative Effects

Threatened and Endangered Species

The potential effects determination for Threatened and Endangered wildlife species is summarized in Table 3-1. The reader is referred to the Wildlife Report for more specific information regarding the direct and indirect effects of each alternative. Those species either not present or without habitat in the analysis area are not listed below or discussed in this section. There will be No Effect from any alternative upon these species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1 No Authorized Grazing</th>
<th>Alternative 2 Continued Grazing</th>
<th>Alternative 3 Boundary Reconfiguration</th>
<th>Alternative 5 Wishbone Allotment</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;E wildlife species present or with at least limited habitat in the analysis area, and effects determination</td>
<td>No Effect</td>
<td>May Affect, Not Likely to Adversely Affect</td>
<td>May Affect, Not Likely to Adversely Affect</td>
<td>May Affect, Not Likely to Adversely Affect</td>
</tr>
</tbody>
</table>

**Canada Lynx**

There are no documented reports of lynx on the allotments based off of previous and recent lynx tracking and monitoring efforts. It is doubtful that the allotments/pastures are used by any great extent by lynx. Lands used by domestic sheep are in general either
above timberline (Snow Mesa Allotments) or on the valley floor (Wishbone). Grazing by
domestic sheep occurs in non-lynx habitat in all of the involved allotments.

**Alternative 1 – No Authorized Grazing**

Under this alternative, there will be no potential for
direct or indirect effects upon Canada lynx (*Lynx canadensis*) by domestic sheep grazing on the

**Alternatives 2 and 3 – Continued Current Grazing or
Allotment Boundary Reconfiguration**

The potential impacts of domestic sheep grazing for both
alternatives are similar. Under both alternatives, there is a small chance of direct or
indirect effects upon lynx from domestic sheep grazing on the allotment and sheep
management activities. Short-term disturbance from human activities associated with
sheep herding could occur, displacing lynx in the short term. The majority of the
allotment grazed by domestic sheep is non-lynx habitat. For both alternatives, domestic
sheep grazing on the Snow Mesa Allotments May Affect, but is Not Likely to Adversely
Affect, lynx or lynx habitat.

**Alternative 5 – Wishbone Allotment**

The majority of the pastures involved with the Wishbone Allotment are not within lynx
habitat. Portions of the Shallow and Crystal Lakes pastures contain limited amounts of
lynx habitat. Short-term disturbance from human activities associated with sheep herding
could occur, displacing lynx in the short term. Domestic sheep grazing on the Wishbone
Allotment May Affect, but is Not Likely to Adversely Affect, lynx or lynx habitat.

**North American Wolverine**

There are no documented reports of wolverine within the Analysis Area. Wolverines are
most likely extirpated in Colorado. However if, wolverine were found in Colorado, there
is a chance that they may utilize the allotments on occasion.

**Alternative 1 – No Authorized Grazing**

Under this alternative, there will be no potential for direct or indirect effects upon
wolverine by domestic sheep grazing on the allotments.

**Alternatives 2, 3 and 5 – Grazing Alternatives**

The effects of the grazing alternatives on wolverine and their habitat, is virtually the same
for all grazing alternatives. There is a remote chance that grazing could disturb wolverine
or that grazing along forested edges could impact wolverine hunting success but this
likelihood is so low that the differences between the alternatives is negligible and any
impacts upon wolverine are Not Likely to Jeopardize wolverine.
**Sensitive Species**

In this section, a tabular summary of the potential effects determination is presented (Table 3-2), but the reader is referred to the Wildlife Report for more specific information regarding direct and indirect effects of each alternative upon species listed as Sensitive. Those species either not present or without habitat in the analysis area are not listed below or discussed in this section. There will be No Impact from any alternative upon these species.

**Table 3-3. Sensitive wildlife species present or with habitat in the analysis area**

<table>
<thead>
<tr>
<th>Species</th>
<th>Alternative 1 No Authorized Grazing</th>
<th>Alternative 2 Continued Grazing</th>
<th>Alternative 3 Boundary Reconfiguration</th>
<th>Alternative 5 Wishbone Allotment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western bumblebee</td>
<td>NI</td>
<td>MAII</td>
<td>MAII</td>
<td>MAII</td>
</tr>
<tr>
<td>Boreal owl</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
</tr>
<tr>
<td>Burrowing owl</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
</tr>
<tr>
<td>Northern goshawk</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
</tr>
<tr>
<td>Olive-sided flycatcher</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
</tr>
<tr>
<td>American marten</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
</tr>
<tr>
<td><strong>1</strong> White-tailed ptarmigan</td>
<td>NI</td>
<td>MAII</td>
<td>MAII</td>
<td>NI</td>
</tr>
<tr>
<td><strong>2</strong> Gunnison’s prairie dog</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
<td>NI</td>
</tr>
<tr>
<td><strong>1</strong> Rocky Mountain bighorn sheep</td>
<td>NI</td>
<td>MAII</td>
<td>MAII</td>
<td>MAII</td>
</tr>
</tbody>
</table>

NI = No Impact

MAII = May adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend towards federal listing or a loss of species viability range wide.

1 Documented on the Snow Mesa allotments.

2 Documented on the Wishbone allotment.

Planning Area is the Rio Grande National Forest.

At the project level (RBS-22), the likelihood of population persistence over time is higher for Alternative 5 than for Alternatives 2 and 3.
### Western Bumblebee

**Alternative 1 – No Authorized Grazing**

Under this alternative, there will be no potential for direct or indirect effects upon Western Bumblebee by domestic sheep grazing on the allotments.

**Alternatives 2, 3 and 5 – Grazing Alternatives**

Directly there is some potential for trampling of underground cavities by domestic sheep. Indirectly, domestic sheep appear to focus their grazing on forbs including flowers. Potential exists for there to be an impact on flowers resulting in fewer feeding areas and food resources, especially insects, for bumblebees which may impact individuals.

### Boreal Owl, Northern Goshawk, Olive-Sided Flycatcher and American Marten

**Alternative 1 – No Authorized Grazing**

Under this alternative, there will be no potential for direct or indirect effects upon sensitive species that are present or with habitat on the allotment. The alternative should have no impact upon the boreal owl (*Aegolius funereus*), northern goshawk (*Accipiter gentilis*), olive-sided flycatcher (*Contopus cooperi*) and American marten (*Martes Americana*).

**Alternatives 2 and 3 – Continued Current Grazing and Allotment Boundary Reconfiguration**

The potential impacts of domestic sheep grazing for both alternatives are similar for these species. Under both alternatives, there will be little to no direct or indirect impact upon these four species. Habitat for these species is present on the allotments; however, grazing by domestic sheep is not expected to impact these species or their habitat. This alternative should have no impact upon these species.

**Alternative 5 – Wishbone Allotment**

The majority of the pastures involved with the Wishbone Allotment do not contain habitat for these species. Portions of the Shallow and Crystal Lakes pastures contain a limited amount of habitat; however, grazing by domestic sheep is not expected to impact these species or their habitat. The alternative should have no impact upon these species.

### White-tailed Ptarmigan

**Alternative 1 – No Authorized Grazing**

Under this alternative, there will be no potential for direct or indirect effects upon white-tailed ptarmigan (*Lagopus leucura*) on the allotments. The alternative should have no impact upon white-tailed ptarmigan. *Photo: White-tailed Ptarmigan on Snow Mesa.*
**Alternative 2 – Continued Current Grazing**

This alternative may impact individual white-tailed ptarmigan due mainly to trampling injury to nests and fledglings. Ptarmigan are present on the allotment and are at risk of trampling due to either their slow reaction to danger and/or tame nature. This alternative May Impact Individuals but will not likely contribute to a loss of viability in the planning area, nor cause a trend toward Federal listing.

**Alternative 3 – Allotment Boundary Reconfiguration**

This alternative is similar to Alternative 2 in potential effects but does reduce the overall risk to ptarmigan by reducing the area grazed by domestic sheep where ptarmigan occur. This alternative also May Impact Individuals, but will have a beneficial impact over Alternative 2.

**Alternative 5 – Wishbone Allotment**

The pastures involved with the Wishbone Allotment do not contain habitat for white-tailed ptarmigan. There will be No Impact on ptarmigan by this alternative.

**Gunnison Prairie Dog and Burrowing Owl**

**Alternative 1 – No Authorized Grazing**

Under this alternative, there will be no potential for direct or indirect effects upon Gunnison prairie dog or burrowing owl by domestic sheep grazing on the allotments.

**Alternatives 2 and 3 – Continued Current Grazing or Allotment Boundary Reconfiguration**

There is no habitat for Gunnison’s prairie dog or burrowing owl under these alternatives. These alternatives will have No Impact upon these species.

**Alternative 5 – Wishbone Allotment**

Several pastures within the Wishbone Allotment contain habitat for these two species. Prairie Dogs are known to occur on both the East Bench and Six-Mile Flats Pastures. Both pastures are grazed for less than two weeks apiece. It is doubtful that domestic sheep grazing, particularly for this short duration, will have any impact upon Gunnison prairie dogs or burrowing owls.

**Bighorn Sheep**

As part of this analysis process, the Risk of Contact Tool Users Guide, prepared by the USDA Forest Service Bighorn Sheep Working Group (USDA Forest Service 2013), and the related Wildlife Society Bulletin article, *Incorporating Foray Behavior Into Models Estimating Contact Risk Between Bighorn Sheep and Areas Occupied by Domestic Sheep* (O’Brien et al. 2014), were used to help evaluate bighorn sheep movements outside of their Core Herd Home Range (CHHR), and assess the potential for risk of contact.
between bighorn sheep and domestic sheep allotments in the Snow Mesa and Wishbone landscapes.

The risk of contact between foraging bighorn sheep (*Ovis canadensis*) and domestic sheep allotments corresponds to the number of bighorn sheep in a herd, proximity of domestic sheep allotments, distribution of bighorn sheep source habitats (suitable habitat) across the landscape, and distance and frequency of bighorn sheep forays outside of their CHHR.

The presence of bighorn sheep on a domestic sheep allotment increases the likelihood of comingling between domestic and bighorn sheep, thereby increasing the likelihood of transmission of infectious disease agents.

This analysis evaluated the risk of physical contact between bighorn sheep and domestic sheep allotments on an individual allotment basis for each of the three individual bighorn sub-herds considered part of the larger RBS-Central San Juan Bighorn Sheep Herd. Examining each individual allotment provides an objective look at the risk for physical contact and disease transmission events with potential for subsequent bighorn mortality on an individual allotment and sub-herd basis. More detailed information is contained in Volume II of the EA: *Assessment of Risk of Physical Contact between Rocky Mountain Bighorn Sheep and Domestic Sheep Allotments on the Snow Mesa and Wishbone Sheep Grazing Landscape*.

**Alternative 1 – No Authorized Grazing**

Under Alternative 1 (No Grazing), there will be No Impact upon bighorn sheep as grazing will no longer occur on the allotments. The likelihood of RBS-22 Central San Juan Bighorn Herd persistence over time is the highest under this alternative.

**Alternative 2 – Continued Current Grazing**

Under current conditions, direct overlap between bighorn and domestic sheep on the allotments is occurring. This Alternative May Adversely Impact Individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend towards federal listing or a loss of species viability range wide. The likelihood of persistence of the RBS-22 Central San Juan Bighorn Herd over time is the lowest under this alternative.

**Alternative 3 – Allotment Boundary Reconfiguration**

Alternative 3 provides for a lower risk of contact between the two species on the allotments than Alternative 2. However, the risk remains high. This Alternative May Adversely Impact Individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend towards federal listing or a loss of species viability range wide. The likelihood of RBS-22 Central San Juan Bighorn Herd persistence over time is improved over Alternative 2 but remains low in the long term.
Alternative 5 – Wishbone Allotment

Alternative 5 (Vacate the Snow Mesa Allotments and graze the Wishbone Allotment) provides for continued domestic sheep grazing while also providing for the best opportunity of any of the grazing alternatives for reducing the risk of contact between bighorn and domestic sheep allotments. Due to several pastures being in relatively close proximity to known bighorn sheep CHHR, results from the model demonstrated a high risk rating. This Alternative May Adversely Impact Individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend towards federal listing or a loss of species viability range wide.

However, considering the results from the Risk of Contact model combined with on-the-ground, local specific and relevant information supports a rank of Moderate risk for Alternative 5. In particular:

- There is no direct overlap between the Wishbone Allotment and bighorn sheep Core Herd Home Ranges for any of the three bighorn sub herds. This is supported at this time by recent collared data from bighorn sheep in S36, S53 and S22 (Colorado Parks and Wildlife 2017). This alternative improves spatial separation over any of the other grazing alternatives.

- The majority of the bighorn herds typically move higher in elevation (move closer to the Snow Mesa Allotments and away from the Wishbone Allotment) during grazing season. This alternative provides better temporal separation than any of the other grazing alternatives. Elevational movements of bighorn sheep have been observed for many years and add to a local knowledge base that is not reflected in modeled outcomes associated with this analysis. The forest recognizes that all bighorn sheep behavior cannot be specifically known through observation. *Photo: S-36 bighorn sheep lamb, February 2016.*

- The Wishbone Allotment contains a smaller percentage of overlap between bighorn habitat and acres capable for domestic sheep grazing than any of the other grazing alternatives.

- The length of grazing season associated with the various pastures within the Wishbone Allotment is less than that assumed in the model. The proportion of rams and ewes used as defaults in the model and the subsequent foray probabilities are therefore expected to be greater than those associated with the Wishbone Allotment. At this time however, there is not enough information from local GPS collars to inform how this might be adjusted for this analysis.

- The Wishbone Allotment provides for the best opportunity of any of the grazing alternatives for successful implementation of project design features. Moving the domestic sheep from the current high alpine landscape that comprises the Snow Mesa allotments to an area where they are more accessible and visible will result...
in improved monitoring and management, making adherence to the project design features more effective.

- Existing habitat fragmentation from features such as the Rio Grande River, Highway 149 and several subdivisions will help increase the success of both temporal and spatial separation than any of the other grazing alternatives. These features are not necessarily reflected in the modeled outcome associated with this analysis.

- The development of the Wishbone Allotment has been a collaborative effort. Colorado Parks and Wildlife concurs that the Wishbone Allotment will help create separation between domestic and bighorn sheep, while continuing to provide public grazing opportunities for local livestock producers.

In this case, a moderate risk outcome indicates that potential contact rates between bighorn sheep and the pastures associated with domestic sheep grazing on the Wishbone Allotment are expected to be much less than the alternatives associated with retention of the existing Snow Mesa allotments, or any configuration of them. The likelihood of RBS-22 Central San Juan Bighorn Herd persistence over time is moderate.

Management Indicator Species

The scale and extent of this project is such that it would not have a discernible effect on any of the population trends of the Forest’s Management Indicator Species (MIS). Grazing by domestic sheep on the allotments does not occur in the habitat types represented for the majority of MIS species described in Table 3-3. Rather, it is the cumulative effects of multiple projects that are expected to impact the quality and quantity of MIS habitats, their spatial distribution over the Forest, and, consequently, population trends. Accordingly, Forest-level monitoring is deemed to be more

<table>
<thead>
<tr>
<th>Management Indicator Species</th>
<th>Habitat Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rio Grande cutthroat trout (or proxies: brook, rainbow, or brown trout)</td>
<td>Indicator of the health of montane aquatic ecosystems. Sensitive to management activities that increase sediment, reduce stream cover, create barriers to movement, or impact stream flows or water quality. Grazing by domestic sheep does not occur within this habitat type on the allotment.</td>
</tr>
</tbody>
</table>
### Management Indicator Species

<table>
<thead>
<tr>
<th>Management Indicator Species</th>
<th>Habitat Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilson’s warbler</td>
<td>Indicator of the health of willows and riparian communities. Riparian species tied to different structural elements susceptible to grazing and other activities within riparian areas. Grazing by domestic sheep does not occur to any great degree within this habitat type on the allotment.</td>
</tr>
<tr>
<td>Lincoln’s sparrow</td>
<td>Indicator of the health of willows and riparian communities. Riparian species tied to different structural elements susceptible to grazing and other activities within riparian areas. Grazing by domestic sheep does not occur to any great degree within this habitat type on the allotment.</td>
</tr>
<tr>
<td>Vesper sparrow</td>
<td>Indicator of the health of upland bunchgrass and shrub communities. Utilizes a narrow set of habitat conditions for nesting, such as sparsely or patchily distributed shrubs with abundant grass cover. Grazing by domestic sheep does not occur to any great degree within this habitat type on the allotment.</td>
</tr>
<tr>
<td>Elk</td>
<td>Indicator of road density and other related forest disturbances. Standards and guidelines for grazing on the allotment are being met.</td>
</tr>
<tr>
<td>Mule deer</td>
<td>Indicator of the health of early successional vegetative communities. Standards and guidelines for grazing on the allotment are being met.</td>
</tr>
<tr>
<td>Brown creeper</td>
<td>Indicator of older forest conditions, mainly in spruce-fir and mixed conifer. Indicator of the larger tree and older snag component. Grazing by domestic sheep does not occur within this habitat type on the allotment.</td>
</tr>
<tr>
<td>Hermit thrush</td>
<td>Tied to complex structural forest elements. Indicator of the mature to late successional forest floor characteristics in spruce-fir and mixed conifer. Grazing by domestic sheep does not occur within this habitat type on the allotment.</td>
</tr>
<tr>
<td>Pygmy nuthatch</td>
<td>Indicator of mature to late successional ponderosa pine forests. Indicator for other primary and secondary cavity nesters and snags. Grazing by domestic sheep does not occur within this habitat type on the allotment.</td>
</tr>
</tbody>
</table>

### Alternatives 1 – 5

As long as existing Forest standards and guidelines for grazing are being met, these alternatives should not result in a negative change in habitat conditions or population trend for forest management indicator species.

### Migratory Birds

Current Forest Service Region 2 guidance for landbird conservation is to coordinate with the State and Bird Conservation Region working groups for actions and objectives to pursue migratory bird conservation. For the purpose of this analysis, migratory birds were analyzed within the analysis area by tiering to the Forest’s migratory bird report and referencing the Colorado Landbird Conservation Plan.

None of the grazing alternatives would be expected to have any direct, indirect, or cumulative effects on the migratory birds assessed for this analysis. The analysis was completed and contains the necessary design criteria and conservation measures to minimize site-specific impacts. Forest-level monitoring of TES and MIS species and their habitats should be sufficient to determine if undesirable cumulative effects are occurring. A more complete description of the Birds of Conservation Concern, along with priority habitats of the Southern Rocky Mountains and potential impacts and habitat needs, is detailed in the Migratory Bird Report completed as part of this analysis.
Cumulative Effects

The Cumulative Effects discussion is the same for TES, MIS, and migratory birds. In many cases, the combined effects of several projects are more substantial, and of a different nature, than the incremental impact of each project viewed separately. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

Potential sources of cumulative effects are:

**Natural Trends** – these are naturally occurring changes in existing physical and biological systems. Natural trends may have the effect of compounding the effects caused by the proposed action and may include, for example, vegetative changes (wildfire, spruce beetle impacts, etc.).

**Proposed Federal Actions** – Federal actions are analyzed according to the appropriate level of risk by NEPA. Direct, indirect, and cumulative potential impacts are analyzed to help determine management actions.

**Reasonably Foreseeable Future Private Actions** – there are no reasonably foreseeable private actions expected in the near future that would have a cumulative impact upon wildlife.

Within the analysis area, the combination of natural trends, proposed Federal actions, and foreseeable future private actions, when analyzed as a whole, is not expected to exceed Forest Plan Standards and Guidelines for wildlife.
3.4.3 Social and Economic Resources

3.4.3.1 Scope of Analysis

Internal and external input into this project identified social and economic resources as an issue to be addressed in this EA. This issue has two aspects: the shepherding industry and bighorn sheep. Livestock-based agriculture, including sheepherding, is historically and culturally important in the San Luis Valley. Forage on public lands contributes to the economic viability of individual ranching operations. At the same time, bighorn sheep have intrinsic value as a native wildlife species. In addition, they have economic value as a limited-draw big game species and as the subject of wildlife viewers and photographers. As identified in Section 1.9, Issues, the effect of each alternative on this issue will be measured by the following indicators:

1. Amount of sheep forage available on public land (measured in AUMs). This indicator was chosen to assess the effects on the shepherding industry.

2. Likelihood of Central San Juan herd (RBS-22) population persistence over time (high, moderate, or low, based on Volume II, Risk Assessment). This indicator was chosen to assess the effects on bighorn sheep social and economic value.

These indicators define the extent of the social and economic resource analysis.

The San Luis Valley defines the spatial scope of this analysis. Six counties make up the San Luis Valley: Alamosa, Conejos, Costilla, Mineral, Rio Grande, and Saguache. While the allotments discussed in this analysis are predominantly in Mineral County (141 acres are in Hinsdale County), the two permitted sheep ranchers live in Alamosa County and graze their herds in Alamosa and Saguache counties.

3.4.3.2 Past Actions that Have Affected the Existing Condition

The United States has experienced a steady decline in sheep and lamb production and consumption since the 1940s. The industry continues to experience fluctuations in supply and demand for lambs and wool. In addition, finding qualified herders, changes in visa requirements, and an increase in wage rates for sheepherding jobs contribute to a decline in sheep and lamb operations. These changes have challenged many sheep operators to remain economically viable, especially in remote locations.

Historically, multiple bands of domestic sheep were a common sight on the Rio Grande National Forest. Spring and fall trailing to and from summer allotments, and activities associated with summer sheep camps, were accepted practices. Trucking sheep to summer allotments became a more common practice; many historic trailing routes are no longer used as stock driveways. Of the 34 vacant allotments on the Forest, many were last used by domestic sheep in the late 1980s.

Bighorn sheep numbers declined dramatically with the settling of the West and are currently estimated at less than 10% of historic numbers. It is surmised that this was influenced by overharvest of bighorn sheep from unregulated hunting, habitat loss,
competition for forage with domestic livestock, and disease introduced by livestock. Reports published by Colorado Parks and Wildlife state that bighorn populations reached a low of about 2,200 animals in the early 1970s. Through habitat management and recovery efforts, the population began to recover. Colorado’s 2013 bighorn population is estimated at about 7,000 animals (George et al. 2009). The Central San Juan Bighorn Sheep Herd (RBS-22) was extirpated throughout most of its range in the late 1800s and early 1900s due in part to overharvest, competition for forage with domestic livestock, and probably disease introduced by livestock. The trend for the overall RBS-22 population has been stable to decreasing over the last 5 years. In three of the four Game Management Units making up the herd, population reintroductions and augmentation have occurred dating back to the late 1970s. These augmentations were intended to restore wild sheep to their historic ranges.

3.4.3.3 Existing Condition

San Luis Valley Sheepherding Industry

Agriculture, particularly farming and ranching, is an important industry in the San Luis Valley. Agriculture is the San Luis Valley’s largest supplier of basic income and the largest source of basic employment (27%). Of the base income driving the Valley economy in 2010, agricultural activities contributed an estimated 31% (SLVDRG 2013). Sources attribute 18 jobs directly or indirectly related per band of 1,000 sheep (Livestock Weekly News, September 18, 2014). Crops and livestock production—including contributions from the sheep and lamb industry—are responsible for about $71.7 million (43.3%) of the agricultural base income.

There are 82 farms in the six-county area with ewes 1 year or older (USDA–NASS 2014). In 2012, the six counties within the San Luis Valley had an inventory of 12,711 sheep and lambs. Livestock sales for each county account for 11–16% of total market value of agricultural product sales, with the exception of Conejos County (38%). Production income is derived from the direct sale of sheep and lambs for feeding or slaughter, and wool. Sheep and lamb sales account for about 1.8% of the total market value of livestock sales in the six-county area, for a value of $1,167,000. Sheep and lambs sold in 2012 yielded an average price of $135 per animal. Wool production accounted for an additional value of $81,000 (USDA–NASS 2014).

The 2012 USDA Census of Agriculture (USDA–NASS 2014) compiled farm production expense information at the State level. For a typical sheep and lamb operation, the total annual farm production expense was $90,250. These costs include herder’s wages and care (7%), trucking costs, vehicle expenses, feed purchases, and pasture leases (36%), and other production expenses. In addition to farm production expenses, the 2012 USDA Census of Agriculture collected net cash farm income data for sheep and goat farming operations. Of the 1,232 sheep and goat farming operations, 988 operations reported negative annual cash income in 2012, with an average net loss of $21,230 (USDA–NASS 2014).

Private pasture lease rates for sheep grazing are varied and differ per acre, per head, and per AUM basis among regions. In 2013, the average lease rate for privately owned, non-
irrigated pasture in Colorado’s Southwest region was $14.67/head month (Tranel et al. 2013).

In 2012, there were nine sheep permittees on the Rio Grande National Forest. Seven of these permittees are San Luis Valley ranchers and two are based out of Montrose. The seven valley sheep permittees grazed a total of 9,418 ewe/lambs in 2012—which is 74% of the San Luis Valley sheep inventory—at a cost of $0.42/ head month. The preponderance of the valley sheep inventory grazing on the Rio Grande and the significant cost difference between public and private land leases indicate the economic value to the San Luis Valley of forage availability on public land.

**Bighorn Sheep**

Many values associated with wildlife in general, and bighorn sheep in particular, are intrinsic and therefore difficult, if not impossible, to determine accurately with a dollar figure. Rocky Mountain bighorn sheep are a premier wildlife species in Colorado, in part due to their high economic value for wildlife viewing and hunting opportunities. To a large degree, the commercial value of bighorn sheep involves hunting, which in addition to the intrinsic hunting/commercial value, also encompasses the recreational, aesthetic, educational, biological values associated with bighorn sheep.

**Recreational Value.** People enjoy the opportunity to observe wild, native bighorn sheep in their natural environment. Observing bighorn sheep in a remote area while backpacking or horse packing is a positive and memorable experience for most visitors. Bighorn sheep enthusiasts have funded the herd restoration efforts and conservation management through hunting licenses, tags, and habitat stamps, as well as through purchasing hunting and wildlife viewing gear and supplies. Funding is coordinated with CPW and is used to continue to support management of bighorn sheep in Colorado.

**Aesthetic Value.** Bighorn sheep are known as a symbol of the wilderness and the State of Colorado. Like hunting and fishing, wildlife viewing is an important pastime in Colorado. In 2006, wildlife viewing generated more than $1.2 billion in economic activity, supporting 12,800 jobs statewide (BBC Research and Consulting 2008).

**Educational Value.** There are many information gaps for bighorn sheep in southwestern Colorado, especially regarding movements and habitat use. Monitoring and research can provide both State and Federal managers with valuable information to help make future management decisions.

**Biological Value.** The unique niche that bighorn sheep fill in the ecosystem is important and difficult to measure. Bighorn can be prey for mountain lions, golden eagles, and other predators. Bighorn graze the alpine environment along with elk and mule deer.

**Hunting/commercial Value.** Bighorn sheep hunts are unique and are considered to be a once-in-a-lifetime opportunity due to the remote likelihood of drawing a tag. Bighorn sheep tags in Colorado are limited in number and are managed by a draw system. An average wait period of 7 to 15 years to draw a tag is typical. As of 2014, three of the four Game Management Units within the Central San Juan Bighorn Sheep Herd are hunted. Within the Data Analysis Unit there are five permits for rams and two permits for ewes. Due to limited permits available within the Data Analysis Unit, permits are for residents...
only. Resident tags cost $254 in 2014, for a total of $1,708 for the seven RBS-22 permits. Hunters brought additional dollars into the local economies by purchasing lodging, meals, and incidental equipment. Due to the general accessibility of RBS-22, typically only one in seven permitted hunters will hire a guide. A guided bighorn sheep hunt costs an average of $5,000.

The yearly auctioned statewide bighorn sheep permit, and a raffle draw permit, contribute to the significant commercial value of bighorn sheep. Auction costs of bighorn sheep permits provide insight into the unique value of these hunts. The cost of the auctioned State of Colorado bighorn tag in 2012 was $130,000. The Colorado statewide raffle license generated $60,200 in 2012. These licenses are offered by participating wildlife conservation organizations that return at least 75% of the proceeds to CPW for research, management, and education.

Environmental Justice: Executive Order 12898 for Minority and Low-Income Populations

Executive Order (EO) 12898 directs all Federal agencies to focus attention on the human health and environmental condition in minority and low-income populations surrounding Federal projects or activities. The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority or low-income populations. Demographic and low income statistics were summarized, and all statistics are contained within the project record.

Some counties within the southern San Luis Valley in southern Colorado have historically lower income levels and higher minority populations than the rest of Colorado. Five of the six counties within the study area (Alamosa, Conejos, Costilla, Rio Grande, and Saguache) have large populations of Hispanic and/or Latinos that should be considered within an environmental justice analysis. In addition to minority populations, environmental justice also addresses low income populations.

Almost 13% of the total State of Colorado population lived below the poverty level in 2009. Within the study area, five of the six counties (Alamosa, Conejos, Costilla, Rio Grande, and Saguache) had poverty levels of 19%, greater than the State average. These same five counties were highlighted as containing high minority populations.

3.4.3.4 Direct, Indirect, and Cumulative Effects

The effects of the alternatives on the social and economic values associated with the San Luis Valley sheepherding industry and with bighorn sheep are summarized in Table 3-6.

Table 3-6. Effects of Alternatives 1, 2, 3, and 5 on forage and bighorn sheep in the San Luis Valley

<table>
<thead>
<tr>
<th>Issue and indicator</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Luis Valley sheepherding industry; Forage available on public land (AUMs)</td>
<td>0</td>
<td>8,286 available, 667 permitted</td>
<td>8,286 available, 667 permitted</td>
<td>2,240 available, 667 permitted</td>
</tr>
</tbody>
</table>
### Issue and indicator

<table>
<thead>
<tr>
<th>Bighorn sheep; Likelihood of RBS-22 population persistence over time</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td></td>
<td>Moderate</td>
</tr>
</tbody>
</table>

### Effects Common to All Alternatives

**Environmental Justice: Executive Order 12898 for Minority and Low Income Populations**

It is unlikely that the alternatives for this project would have a disproportionately high or adverse impact on any environmental justice population in the study area. No specific mitigation measures have been considered for this project as no environmental justice issues were brought forward during public comment periods.

Social groups would not be made vulnerable by Forest Service actions related to the issuance or non-issuance of livestock grazing permits on the Snow Mesa Sheep Allotments. Participation by the permittees and others in the ranching business in a variety of community, charitable, social, church, and school groups, etc., would be expected to remain stable. Finally, the actions proposed in the alternatives of this EA would have no effect on public health and safety.

#### Alternative 1 – No Authorized Grazing

**San Luis Valley Sheepherding Industry**

Alternative 1 would eliminate 667 permitted AUMs from public land. Although replacement forage may be available on private land, the cost would be 35 times higher than the cost of forage on public land. This cost increase could be sufficient to force a reduction in the herd size of the two permittees, possibly forcing them out of the sheepherding business. This alternative would directly impact two of the 82 sheep ranches in the San Luis Valley, and two of the smaller operations permitted on the Rio Grande National Forest. That is unlikely to have a direct impact on the valley’s sheep industry as a whole. However, when added to the impact of herder wage increases and visa challenges, and the potential for future overlap with bighorn sheep on other allotments, there may be a cumulative negative impact to the sheepherding industry in the San Luis Valley.

**Bighorn Sheep**

The risk assessment (Volume II) estimates the lowest risk of contact under this alternative, which translates to the highest likelihood of RBS-22 population persistence, if not increase, over time. Central San Juan herd population persistence or increase retains the intrinsic value as well as the recreational, aesthetic, educational, and biological value of the species. Should the population increase to the point of a CPW determination that additional hunting permits may be issued, the hunting value (which is captured by license fees, meals/lodging/equipment, and guide services) may increase as well.
Alternative 2 – Continued Current Grazing

San Luis Valley Sheepherding Industry
This alternative would retain the current number of permitted AUMs on public land. There would be no immediate impacts to the permittees or to the San Luis Valley sheepherding industry. Impacts to the industry due to the cost of managing the allotments in accordance with the strict project design features are speculative.

Bighorn Sheep
The risk assessment (Volume II) estimates a high risk of contact and direct overlap between two allotments and the bighorn sheep CHHR under this alternative. This high risk of contact translates to a low likelihood of RBS-22 bighorn sheep population persistence over time. Although some may argue that scarcity increases value, a population that does not persist over time does not ensure the continued intrinsic, recreational, aesthetic, educational, biological, or hunting/commercial value of the bighorn sheep.

Alternative 3 – Allotment Boundary Reconfiguration

San Luis Valley Sheepherding Industry
Alternative 3 has effects similar to those of Alternative 2: the current number of permitted AUMs on the Forest are retained. As with Alternative 2, there would be no immediate impacts to the permittees or to the San Luis Valley sheepherding industry, and impacts due to the cost of following strict project design features are speculative.

Bighorn Sheep
Similar to the effects on the sheepherding industry in the San Luis Valley, the impacts of Alternative 3 on the social and economic value of bighorn sheep are nearly identical to those of Alternative 2. The risk of contact is high, although only one allotment directly overlaps bighorn sheep CHHR. The likelihood of RBS-22 population persistence over time is low, which brings with it the accompanying negative impact on the social and economic values of the wild sheep.

Alternative 5 – Wishbone Allotment

San Luis Valley Sheepherding Industry
This alternative would make 2,240 AUMs available on public land. This forage would be available, though not necessarily permitted. The current permittees would retain their existing 667 permitted AUMs. As with Alternatives 2 and 3, the cost impact of managing the new allotment with dis-contiguous pastures and equally strict project design features is speculative, it may be offset by the primarily road-side accessibility of the Wishbone pastures. Costs to truck sheep to the Wishbone allotment would be identical to those for trucking under Alternatives 2 and 3.
Bighorn Sheep

Alternative 5 has a moderate risk of contact, with no CHHRs overlapping the allotment, and a correspondingly moderate likelihood of RBS-22 population persistence over time. Although there is the possibility of contact, subsequent disease transmission, and negative impacts to the RBS-22 herds, which would have a negative effect on the bighorn sheep’s social and economic values, there is a higher chance that the population will retain its current value.

3.4.4 Backcountry, Recreation, and Travel Management

3.4.4.1 Scope of Analysis

This analysis focuses on any direct, indirect, and/or cumulative effects to backcountry, recreation, and travel management from domestic sheep grazing within the Snow Mesa analysis area.

3.4.4.2 Past Actions that have affected the Existing Condition

Past actions most likely to have affected the existing condition in the analysis area include designation of portions of the La Garita Stock Driveway as the Continental Divide National Scenic Trail (CDNST), and as a portion of the Colorado Trail (CT). Designation of the Silver Thread Scenic Byway also has affected the existing condition, though to a lesser degree.

3.4.4.3 Existing Condition

Three classes of the recreational opportunity spectrum (also known as ROS) are located within the analysis area. The recreational opportunity spectrum is an inventory process that results in an allocation that identifies and categorizes a variety of recreation experiences by class. Each class is defined in terms of (1) the degree to which it satisfies certain recreation needs, (2) the extent to which the natural environment has been modified, (3) the type of facilities provided, (4) the degree of outdoor skills needed, and (5) the relative density of recreation use. The recreation classes associated with this process are identified and described in Table 3-7.

Table 3-7. Recreation opportunity spectrum

<table>
<thead>
<tr>
<th>Class</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPNM</td>
<td>Semi-Primitive Non-Motorized</td>
<td>High, but not extremely high, probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance in an environment that offers a high degree of challenge and risk.</td>
</tr>
<tr>
<td>SPM</td>
<td>Semi-Primitive Motorized</td>
<td>Moderate probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance in an environment that offers challenge and risk. Opportunity to have a high degree of interaction with the natural environment and use motorized equipment while in the area</td>
</tr>
</tbody>
</table>
Class | Name | Description
--- | --- | ---
RM | Roaded Modified | Area where there is an opportunity to get away from others, but with easy access. Some self-reliance in building own campsite and use of motorized equipment. Feeling of independence and freedom. Little challenge and risk.

Numerous forest system roads occur throughout the analysis area, along with several trailheads and trails that include the CDNST and CT. Recreational special uses include a recreational residence and outfitting guiding. Highway 149 has been designated as a Scenic Byway.

A wide range of recreational activities occur within the analysis area, such as but not limited to hiking/backpacking, sightseeing, off-highway vehicle riding, four-wheeling, and hunting.

3.4.4.4 Direct, Indirect, and Cumulative Effects

**Alternative 1 – No Authorized Grazing**

*Direct and Indirect Effects*

This alternative eliminates or minimizes the effects to backcountry, recreation, and travel management through minimizing user conflicts associated with sheep grazing activities within the analysis area. Recreationists, particularly those traveling along the CDNST/CT would not be exposed to negative interactions with herding dogs, parallel trailing of livestock along system routes would be minimized, and the need to use the stock driveway for non-recreational livestock would be eliminated.

Scarcity of drinking water can be a concern for recreationists; however, concerns about the potability of water obtained from streams, lakes, and springs exist whether there is active grazing or not. Water obtained from such sources should always be treated, regardless of livestock grazing.

There would be no opportunity to view traditional livestock grazing within the analysis area under this alternative. Contrarily, the opportunity to view this area without grazing would exist. A user’s personal perception of the overall experience may or may not be affected by this alternative.

Travel management restrictions and regulations would not change under this alternative. Livestock trailing along the Silver Thread Scenic Byway would not occur.

*Cumulative Effects*

No past, present, or reasonably future activities have been identified that could affect backcountry, recreation, or travel management with this alternative.
Alternative 2 – Continued Current Grazing

Direct and Indirect Effects

Grazing levels would not change under this alternative. Interaction between users and herding dogs may increase due to increasing numbers of recreationists; however, this is addressed through project design features and AOI. Livestock grazing and trailing would continue adjacent to and along the CDNST/CT, both to the north and south of the trails, and use of both the McKenzie and La Garita Stock Driveway would occur. The timing and duration of grazing throughout the allotment are addressed through either project design features and/or the AOI.

Although under this alternative the effects associated with the use of the La Garita Stock Driveway are addressed through project design features and/or AOI, the use would still exist. The La Garita Stock Driveway overlaps with the CDNST/CT.

All water should be treated while traveling in the backcountry whether active grazing is occurring or not. This cannot be mitigated. Effects do not vary between alternatives.

The effects of grazing on viewing and experience are varied. Grazing in this analysis area is historic; vegetation use is monitored and managed through project design features and the AOI. Grazing management addresses movement and timing of sheep use, resulting in changing and temporary view patterns.

Response to observing grazing activities and effects to a recreationist’s experience varies. Some enjoy the opportunity to see shepherders with the flock and working herd dogs, and the thoughts it instills in them as an individual, while others are negatively affected by the view and activity.

Travel management restrictions and regulations would not change under this alternative.

Activities along the Silver Thread Scenic Byway would continue to occur as they have historically.

Cumulative Effects

Impacts between livestock use, travel management, recreation resources, and recreation users within the analysis area occur mainly within and immediately adjacent to travel corridors. Implementation of both forest-wide and management-area recreation standards and guidelines would both mitigate and reduce impacts. There are no cumulative impacts to the recreation resources within the analysis area.

Alternative 3 – Allotment Boundary Reconfiguration

Direct and Indirect Effects

Grazing levels would not change under this alternative, but location and allotment boundaries would change. Alternative 3 adjusts the northern portion of the allotment boundary, closest to the CDNST/CT, to the south of these trails. The boundary reconfiguration further minimizes opportunities for recreationist/herding dog interaction, and the effects to the recreating resources are minimized due to the shift in the allotment...
boundary. The boundary change, along with project design features and use of the AOI, reduces the risk of interactions with herd dogs, parallel trailing, and overlap between the La Garita Stock Driveway and the CDNST/CT.

All water should be treated while traveling in the backcountry whether active grazing is occurring or not. This cannot be mitigated. Effects do not vary between alternatives.

The effects of grazing on vistas and experiences are varied. Grazing in this analysis area is historic. Vegetation use is monitored and managed through project design features and the AOI. Grazing management addresses movement and timing of sheep use, resulting in changing and temporary view patterns.

Response to observing grazing activities and effects to a recreationist’s experience varies. Some enjoy the opportunity to see sheepherders with the flock and working herd dogs, and the thoughts it instills in them as an individual, while others are negatively affected by the view and activity.

Travel management restrictions and regulations would not change under this alternative. Activities along the Silver Thread Scenic Byway would continue to occur as they have historically.

**Cumulative Effects**

Impacts between livestock use, travel management, recreation resources, and recreation users within the analysis area occur mainly within and immediately adjacent to travel corridors. Implementation of both forest-wide and management-area recreation standards and guidelines would both mitigate and reduce impacts. There are no cumulative impacts to the recreation resources or to users within the analysis area.

**Alternative 5 – Wishbone Allotment**

**Direct and Indirect Effects**

Alternative 5 relocates the majority of the allotment to new locations. The location of the allotment boundaries eliminates all use near the CDNST and CT, and in doing so, greatly reduces the risk of interaction between recreationists, particularly hikers, and guard dogs.

All water should be treated while traveling in the backcountry whether active grazing is occurring or not. This cannot be mitigated. Effects do not vary between alternatives.

The effects of grazing on vistas and experiences are varied. Grazing, to varied degrees, has occurred within the majority of the Alternative 5 boundaries. Vegetation use is monitored and managed through project design features and the AOI. Grazing management addresses movement and timing of sheep use, resulting in changing and temporary view patterns.

Response to observing grazing activities and effects to a recreationist’s experience varies. Some enjoy the opportunity to see sheepherders with the flock and working herd dogs, and the thoughts it instills in them as an individual, while others are negatively affected by the view and activity.
Travel management restrictions and regulations would not change under this alternative. Activities along the Silver Thread Scenic Byway would increase under this alternative. Livestock trailing would not occur in the early summer but would continue at the end of the season. Effects may be considered neutral, as public opinion regarding the opportunity to view sheep grazing is mixed with some appreciating and even looking forward to seeing this activity while others do not appreciate the wait or viewing sheep on public lands.

**Cumulative Effects**

Impacts between livestock use, travel management, recreation resources, and recreation users within the analysis area occur mainly within and immediately adjacent to travel corridors. Implementation of both forest-wide and management-area recreation standards and guidelines would both mitigate and reduce impacts. There are no cumulative effects to the recreation resources or users within the analysis area.

The direct, indirect, and cumulative effects of Alternatives 1, 2, 3, and 5 on backcountry, recreation, and travel management are summarized in Table 3-8.

**Table 3-8. Effects of Alternatives 1, 2, 3, and 5 on backcountry, recreation, and travel management**

<table>
<thead>
<tr>
<th>Effect</th>
<th>ALT 1</th>
<th>ALT 2</th>
<th>ALT 3</th>
<th>ALT 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction with herding dogs</td>
<td>Eliminates interaction</td>
<td>Reduces effects through PDC and AOI</td>
<td>Minor boundary reconfiguration, PDC, and AOI reduce effects greater than Alt 2</td>
<td>Extensive boundary reconfiguration, PDC, and AOI, reduces effects along CDT greater than Alt 1 and 2. Increases potential for interactions near subdivisions.</td>
</tr>
<tr>
<td>Protect water sources for recreationists</td>
<td>No difference – treat all water</td>
<td>No difference – treat all water</td>
<td>No difference – treat all water</td>
<td>No difference – treat all water</td>
</tr>
<tr>
<td>CDNST/CT Protection</td>
<td>Fully addresses trail concerns as tied to sheep grazing</td>
<td>Reduces effects through PDC and AOI</td>
<td>Boundary reconfiguration, PDC, and AOI reduce effects greater than Alt 2</td>
<td>Eliminates impacts, CDNST/CT not located within this alternative</td>
</tr>
<tr>
<td>CDNST/CT overlap with Stock Driveway</td>
<td>Eliminates overlap</td>
<td>Does not address overlap</td>
<td>Minimizes but does not eliminate</td>
<td>Eliminates impacts, CDNST/CT not located within this alternative</td>
</tr>
<tr>
<td>Visual and experience</td>
<td>All alternatives may positively or negatively affect based on user preference. Some recreationists may appreciate opportunity to experience a scene that is historic and resembles perceptions of the old west. Others would prefer not to view any sheep grazing on public lands.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.4.5 Soils and Watershed

3.4.5.1 Scope of Analysis
This analysis will focus on the effects of sheep grazing on soil and water resources within the Snow Mesa analysis area. Soil and watershed conditions were assessed primarily for the areas to be grazed, which included grassland vegetation types and primarily excluded forested sites.

Soil and watershed analysis was accomplished using onsite visits, photographic monitoring, and aerial photography. Onsite visits were made where possible. Photographs of areas around the allotment were assessed for soil and watershed condition. Aerial photography was used to help assess overall conditions of watersheds and soil conditions. In addition, soils information was also obtained from the soil resource inventory (USDA Forest Service 1996b).

3.4.5.2 Past Actions that have affected the Existing Condition
Grazing can impact the condition of soil and water resources. Effects typically include trampling, compaction, streambank instability, and riparian degradation. Some effects are evident in analysis area but generally these resource issues are minor in scope.

3.4.5.3 Existing Condition
Eight sixth-level (HUC 12) watersheds are represented in the analysis area. The majority of Snow Mesa, Table and Miner’s allotments fall within two watersheds. Spring Creek and Headwaters of Miners Creek make up 92.9% of the allotments. When considering the proposed boundary change, these two watersheds make up 76.7%, while the Outlet of Clear Creek and Shallow Creek increase to a combined 11%, from 2.3%. In Alternative 5, the Headwaters of Miners Creek accounts for 11% of the area while Shallow Creek comprises 51% of the new Wishbone Allotment. In addition, three additional watersheds are affected: Seven-mile Creek – Rio Grande, Farmers Creek – Rio Grande, and Blue Creek – Rio Grande; these make up 17% of the Wishbone Allotment.

Waterways and riparian areas within the analysis area are in good condition. No major concerns of streambank instability or contamination resulting from sheep grazing have been observed. Some soil and water concerns associated with the motorized section of the CDNST (Trail 787) that runs along Miners Creek have been observed. The motorized use is causing detrimental disturbance where the trail crosses small streams, springs, and wet areas. Sheep are not currently trailed through this area and are not contributing to this disturbance.

The headwaters of Miners, Willow, Mesa, Shallow, Bennett, and Boulder creeks begin, at least in part, within the Snow Mesa, Table, Miner’s, and Ouray allotments, which also include many unnamed tributaries, including perennial and intermittent streams that supply these creeks.

When considering all alternatives, 21 soil resource units are represented, ranging from less than 1% of the analysis area (map units 126, 134, 149, 169, and Water) to 28% (map
The majority of the analysis area, about 84%, contains soils that have moderate to low erosion hazard risk and currently do not show signs of degradation or detrimental disturbance. The other approximately 16% has soils with high erosion potential. A complete discussion of soil and watershed conditions is contained in the specialist report, which is contained in the project record.

Soils range from shallow, rocky upland soils to moderately deep and deep, wet soils. The majority of the area contains dry, moderately deep and shallow soils. These soils are generally in good to excellent condition. No direct observations were made of any soil issues present in the area. Possible issues with other resource areas were observed, but these areas are isolated and make up only a small percentage of the total area.

The following photos show existing conditions near the headwaters of Willow Creek, near the location along the trail where Snow Mesa, Miners, and Table allotments converge. An overview of the riparian area is shown in Figure 3-1. An upland area with shallow and moderately deep rocky soils that constitute the majority of the area is shown in Figure 3-2; rock outcrops or talus areas are common. A closer view of an unnamed Willow Creek headwaters tributary is shown in Figure 3-3. Localized soil disturbances occur in locations where sheep trail and obtain water. Less than 1% of the analysis area is estimated to have detrimental soil disturbance caused by sheep grazing.

Figure 3-1. Representative riparian area for Snow Mesa, Table, and Miners Creek Allotments at high elevation.
Figure 3-2. Representative terrain of the majority of the area with the Snow Mesa grazing allotments.

Figure 3-3. Stream and riparian area on an unnamed tributary, headwaters of Willow Creek.
3.4.5.4 Direct, Indirect, and Cumulative Effects

It is important to protect sites with current disturbance so that they have a chance to recover, as well as to protect all areas from being detrimentally disturbed.

**Alternative 1 – No Authorized Grazing**

Domestic sheep grazing would cease under this alternative. Soil conditions would remain at fairly consistent levels. Areas of disturbance would slowly begin to progress toward desired conditions. Areas of disturbance would begin to return to pre-grazing conditions. Vegetation would return and evidence of trailing would be covered. Due to the shallowness of the soil and the elevation, this is likely to take many years. Wildlife would continue to use the snow fields and water they provide and the effects of would be similar to domestic sheep impacts, (trampling, shearing, and grazing), but at a lower intensity.

Under this alternative, domestic sheep will not be allowed to graze, so contact with water resources within the allotment will cease. Watershed condition will remain essentially the same with influences by wildlife and recreation throughout the watersheds. This activity is anticipated to have little effect on overall watershed health and condition.

**Alternative 2 – Continued Current Grazing**

Grazing can lead to soil and water effects including trampling, compaction, streambank instability, and riparian degradation. The climate and growing season do not allow for quick recovery of a site once it has been disturbed. Current grazing management allows for domestic sheep grazing across the allotment. The sheep move across the area while they are grazing or being herded. When grazing they tend to spread out and move slowly across the landscape. Sheep bunch up and follow each other when being herded or while trailing between water sources and grazing areas. This pattern creates the most risk for soil areas of concern.

Under current grazing management, a shepherder is always present with each band of sheep and works to keep the sheep dispersed across the landscape. Shepherders also work to minimize the contact of sheep with wet soils and riparian areas. Water resources are well protected under current management practices. Sheep are not allowed to linger around lakes, and interaction with streams is limited.

Indirectly, soil erosion, depleted soil water, and loss of vegetation are potential indirect effects of this alternative. Sedimentation and reduced water quality are possible indirect effects of reduced soil quality within the allotment boundaries; however, it is likely that the current condition will be maintained.

It is anticipated that current conditions will remain constant as the current management regime continues, and that current levels of disturbance will remain constant and improve over time.

**Alternative 3 – Allotment Boundary Reconfiguration**

Under Alternative 3, the areas north of the CDNST and Miners Creek Trail (Forest Service Trails 787 and 803) would be taken out of use to provide a buffer with bighorn sheep habitat. To maintain the same approximate amount of grazing acreage, meadows of...
the currently vacant Ouray Allotment would be added to the allotment. These areas would be north of FSR 532 and include areas around Crystal Lakes.

Similar to Alternative 2, grazing is not anticipated to increase detrimental effects overall. Trailing to and from these newly included southern meadows may have some minor detrimental effects on areas where trailing occurs, but these trailing areas have been utilized in the past to access the other allotments. These effects may increase localized erosion and sedimentation to streams. These effects are expected to be minimal. The boundary reconfiguration is not anticipated to significantly affect soil or watershed health because best management practices, which are currently protecting resources, will be applied.

**Alternative 5 – Wishbone Allotment**

Alternative 5 creates separation from bighorn sheep by grazing domestic sheep at lower elevations, which are more removed from areas that have had conflict in the past. Although the suite of soils is somewhat different from that of the other alternatives, the effects are expected to be similar to those of the other alternatives. The new pastures within the Wishbone Allotment may be impacted by grazing activities, with noticeable impacts at concentrated areas (bedding and watering areas). Proper adherence to project design features will minimize these impacts. In addition, lower elevations provide longer growing seasons, which will provide more recovery time after grazing ceases over what higher elevation meadows provide. Trailing would primarily occur along roads and railroad right of ways, which will limit impacts due to trailing. Sensitive soils in this alternative make up a large portion of this alternative (about 63%); however, about 47% of those soils are either non-vegetated or are spruce/fir areas. Although the sensitive soils make up a large portion of this alternative, only about 16% are likely to be grazed.

It is anticipated that Alternative 5 may result in localized disturbance. Watershed resources are not anticipated to be adversely affected. Watering areas, small streams, and ponds within the Shallow and Crystal Basin pastures may see some localized impacts, but longer lasting or widespread impacts are not anticipated to occur.

**3.4.5.5 Cumulative Effects**

Wildlife will continue to use the area for summer habitat. Recreational activities including hiking and camping will continue, but have little impact. The lower, southern meadows will continue to see some elevated recreational use as compared to the current boundary of the grazing allotments, due to the presence of Forest Service roads within the area. The change in grazing will not increase the recreational use in the area, though it may increase traffic associated with the grazing operation, but effects will be minimal. Effects upon soil and water resources associated with sheep grazing in this area are expected to be non-significant.
3.4.6 Heritage Resources

3.4.6.1 Scope of Analysis

The scope of this analysis includes the examination of potential direct, indirect, and cumulative effects of reauthorizing (Alternatives 2 and 3) or authorizing for the first time (Alternative 5) for domestic sheep grazing within the analysis area upon heritage resources. The Area of Potential Effect for heritage resources is defined as those areas of overlap between “high use” for grazing and areas having a high probability of containing historic or prehistoric sites. Forest Service policy (FSM 2361.3) requires that all areas slated for ground-disturbing activities be surveyed for heritage resources in order to comply with 36 CFR 800; the National Historic Preservation Act of 1966, as amended; the Archeological Resources Protection Act of 1979; the American Indian Religious Freedom Act (1979); and the Native American Graves Protection and Repatriation Act (1992). A detailed report for Alternatives 1, 2, and 3 was sent to the Colorado State Historic Preservation Office for concurrence with a recommendation of no historic properties affected. Full concurrence was received April 6, 2015. An addendum for the newly proposed Alternative 5 Wishbone Allotment was sent to the Colorado State Historic Preservation Office for concurrence on October 25, 2017, along with a recommendation of no historic properties affected if all design features are implemented.

3.4.6.2 Past Actions that have affected the Existing Condition

The most notable past action that has affected heritage resources within the analysis area is the historic livestock grazing that has occurred since the late 1800s. Large numbers of sheep were formerly trailed along the La Garita Stock Driveway up Miners Creek and across Snow Mesa, likely impacting archaeological sites in high potential areas over time. Sheepherders and later recreationalists along the CDNST (Trail 803) have likely collected easily visible artifacts, diminishing the ability to research the area’s chronology. Cattle grazing has largely occurred within the Alternative 5 boundaries. It is possible that motorized use (legal and illegal), especially within the upper Miners Creek drainage and the top of Snow Mesa, has impacted heritage resources through time. Within the South River Pasture, a gravel pit previously destroyed an unevaluated site (5ML79), a new bridge and highway re-route completed by the Colorado Department of Transportation virtually destroyed site 5ML77, and a newly documented historic irrigation ditch system documented as 5ML731 has been impacted by a re-route of Forest Service Road 523 in the past.

3.4.6.3 Existing Condition

This section analyzes existing condition for Alternatives 2 and 3, which are considered more typical high-elevation land (+/-11,000 feet) as well as the newly proposed Alternative 5, which includes some high-elevation land but is mostly lower, near the Rio Grande River (+/-8,000 feet). Very little previous survey had been done within the Snow Mesa, Miners, Table, and Ouray allotments. High-elevation land within the National Forest System typically contains fewer archaeological resources; however, portions of the Snow Mesa, Miners, Table, and Ouray allotments encompass a unique prehistoric
landscape based around procurement of stone tool material as well as significant remnants of historic sheep grazing. Heritage resource inventories of these allotments from three field seasons resulted in 240 acres of new survey and the documentation or revisit of 15 sites and 10 isolates. Sites 5ML303, 5ML662, 5ML663, 5ML664, 5ML665, 5ML679, 5ML680, 5ML681, 5ML682, 5ML683, and 5ML708 are recommended as eligible to the National Register of Historic Places and could contribute toward a potential Multiple Property Historic District. The prehistoric landscape may represent some of the earliest occupation and exploitation of the high country subsequent to glaciation of the analysis area and the South San Juan Mountains, and the historic sheepherding sites (“sheepscape”) may represent a unique set of sheepherding adaptations to the high country. Site 5ML684.1, a segment of the La Garita Stock Driveway, is recommended as eligible to the National Register of Historic Places. Sites 5ML302, 5ML304, 5ML666, and 5ML707 are recommended as “need data” (unevaluated). Grazing-related impacts were assessed for each potentially eligible historic property. In most cases, no impacts were noted and no additional mitigation or monitoring is recommended. However, grazing impacts were noted on eligible and unevaluated sites 5ML302, 5ML303, and 5ML662. The trail corridor along Miners Creek (Trail 803), where 5ML665 and 5ML666 are located, appears to be especially vulnerable to illegal all-terrain vehicle use. Soil disturbance and compaction due to motorized traffic and artifact collection due to hiking traffic along popular recreation trails are likely impacting 5ML302 and 5ML303.

The existing condition analysis for the newly proposed Alternative 5 includes seven areas (Coller, East Bench, Six Mile, Deep Creek Road, South River, Shallow, and Crystal Lake) that would serve as an alternative to the existing Snow Mesa, Table, Miners, and Ouray allotments. During the 2016 field season, a partial emergency cultural resources inventory was completed in all but two of the seven areas, totaling about 317 acres. The focus was on Coller, East Bench, and Six Mile initially as these had no previous cultural resources analysis/survey. The emergency work centered on surveying a designated bedding and watering site in each of the allotments. Deep Creek Road also has no previous cultural resources analysis/survey; however, the sheep were not bedding within this very small allotment. Shallow Allotment was not surveyed as it had cultural analysis done in 2010. Within these allotments/pastures there are 5 previously recorded sites, 8 new sites, and 10 new isolates.

The Coller Allotment (State land) includes site 5ML273.8, a segment of the Creede Branch of the Denver and Rio Grande Railroad, designated as a National Historic District and listed on the National Register of Historic Places. The allotment would appear to have high potential for heritage resources as it is proximate the Rio Grande River; however, only one isolate was identified in addition to the railroad. Within the Six Mile Allotment a newly documented site consisting of a historic gravel mine, wooden loading dock, and associated artifact scatter was documented and recommended as eligible (5ML725). No sites were located during the emergency survey of the East Bench Allotment, likely because potential for sites is low due to gravelly north-facing slopes. During survey of the South River Allotment, a potentially eligible historic ditch system (5ML731) and a potentially eligible prehistoric lithic scatter were documented (5ML748), and one eligible site (5ML289) was revisited.
The remaining Crystal Lake Allotment has seen sheep grazing in its past and has the highest density of heritage resources of all allotments in Alternative 5, mostly consisting of historic shepherding sites some high-elevation prehistoric sites. These include a prehistoric lithic scatter with possible buried component (5ML726) recommended as eligible; a small lithic scatter that is possibly part of a buried thermal feature (5ML727) recommended as eligible; a small prehistoric lithic scatter (5ML728) recommended as not eligible; large log piles consisting of both fallen trees and cut trees at a mid-1900s campsite, recommended as unevaluated archival research could be done; and sheepherder or hunting camp (5ML730), recommended as not eligible.

3.4.6.4 Direct, Indirect, and Cumulative Effects

The wide range of direct impacts that can occur from grazing-related activities include trailing (sheep paths), damaged soils (often associated with deflation), and the breaking or displacing of stone, bone, and ceramic artifacts. Sheep, if not moved often and correctly, can create soil impacts and deflation by pulling up the roots. These types of impacts and indicators are taken into consideration when evaluating grazing impacts on heritage resources. The potential for significant impacts to heritage sites resulting from grazing is dependent on a number of factors including site type and sensitivity, the time grazers are in an area, and the amount of precipitation for the season; general range conditions. Any heritage resources located near watering areas, sheep camps, salt block areas, along fence lines, and where livestock congregate are considered the most vulnerable to impacts from grazing activities. It is generally recognized that the presence of hoofed animals, whether domestic livestock or wild ungulates, have a potential to disturb heritage resources through trampling and vertical and horizontal artifact displacement.

**Alternative 1 – No Authorized Grazing**

Removal of permitted livestock grazing would eliminate the potential for direct, indirect, and cumulative effects to heritage resources from livestock grazing in the analysis area. There would be no livestock to incur trampling, compaction, obliteration, or displacement of artifacts or features. There would be no new erosion caused by livestock grazing and no potential for the destruction of archaeological contexts due to erosion created from livestock grazing, particularly to unevaluated sites and unidentified sites in unsurveyed areas. In the absence of livestock grazing, cumulative effects would also decrease for the allotment. If there is no Federal action, then there is no undertaking, as defined in 36 CFR 800.2(o), for Section 106 of the National Historic Preservation Act (16 U.S. C. 470f).

**Alternative 2 – Continued Current Grazing**

This alternative would permit grazing on 22,711 acres within the Snow Mesa, Table, Miners, and Ouray sheep and goat allotments. Approximately 35% of Alternative 2 allotments consists of steep (>30%) slopes are not considered suitable for grazing, nor do they have a high potential for cultural resources. Most of the analysis area has thick alpine grasses that can protect potential buried cultural deposits. However, past heritage resource inventories revealed that some eligible sites are being adversely affected some seasons, depending on sheep movement. Current livestock management with additional
project design features should result in less surface disturbance in the analysis area. If project design features are implemented, there should be no increase in direct or indirect impacts to sites such as 5ML302 and 5ML303, and 5ML662, which may be nominated as part of a special Historic District. If project design features are followed by permittees, sheep grazing within the proposed District will be a compatible use within the designated area. Livestock grazing distribution patterns and herd management, if done correctly, can improve vegetation complexity and structure, which is important in the protection of buried archaeological deposits and site matrices.

**Alternative 3 – Allotment Boundary Reconfiguration**

The boundary of the allotment would be reconfigured to exclude that area north of the CDNST (Trail 787) and north of the Miners Creek Trail (Trail 803). The intent of boundary reconfiguration is to create a buffer and no longer graze those areas of highest contact concern between bighorn and domestic sheep. It is possible that impacts may increase around some eligible heritage resources on Snow Mesa if herders modify the grazing regime from current management. However, if the project design features are strictly enforced for this action alternative, new surface disturbances should not occur. Livestock grazing distribution patterns and herd management, if done correctly, can improve vegetation complexity and structure, which is important in the protection of buried archaeological deposits and site matrices.

**Alternative 5 – Wishbone Allotment**

This allotment includes 10,487 acres within the Coller, East Bench, Six Mile, Deep Creek Road, South River, Shallow, and Crystal Lake allotments/pastures (Wishbone) that could be newly authorized for sheep grazing, most of which have been previously grazed by cattle. About 32% of the Wishbone Allotment consists of steep (>30%) slopes not considered suitable for grazing, nor do they have a high potential for cultural resources. Because sheep have never grazed in some of these areas and some areas have not been grazed at all recently, it is more difficult to analyze the effects of sheep grazing on heritage resources. Therefore, project design features for this alternative, especially monitoring, will be critical in reducing potential negative effects to eligible and unevaluated sites within this alternative. The South River and Crystal Lakes pastures appear to have the greatest potential for heritage resources, the highest number of days allotted for grazing, and therefore the highest potential for direct and indirect effects to heritage resources. Thick vegetation in the Crystal Lake area will help mitigate potential impacts. South River may be more vulnerable to potential effects because it is at a lower elevation in dryer sites with less vegetation near the Rio Grande River. Eligible and unevaluated sites within the South River Allotment have the highest potential for negative direct and indirect effects. However, livestock grazing distribution patterns and herd management, if done correctly, can improve vegetation complexity and structure, which is important in the protection of buried archaeological deposits and site matrices.

Sheep grazing is not expected to negatively affect the listed Seven Mile Bridge, 5ML27, or 5ML273.8, a segment of the Creede Branch of the Denver and Rio Grande Railroad designated as a National Historic District and listed on the National Register of Historic Places. Previously documented site 5ML289 and newly documented sites 5ML725,
5ML726, 5ML727, 5ML748, and unevaluated site 5ML731 will not likely be adversely affected by sheep grazing if project design features are followed.

An indirect positive effect of choosing Alternative 5 would be the removal of sheep, and therefore the potential negative direct and indirect effects to the significant sites within the Snow Mesa, Table, Miners, and Ouray allotments that are being considered for a Multiple Property District. An indirect negative effect of removal of sheep from their historic range within the Snow Mesa, Table, Miners, and Ouray allotments would be the loss of heritage and a living sheepscape that has been in existence there for generations. Conversely, Alternative 5 endeavors to provide an opportunity to continue that heritage in a different set of pastures/allotments, also accounting for a positive indirect effect.

3.4.6.5 Cumulative Effects

Under the action alternatives, the loss of archaeological resources has occurred in the past and may occur in the future. The cumulative effect is that over time fewer archaeological resources will be available to learn about past human lifeways, to study changes in human behavior through time, and to interpret the past to the public. Heritage resource inventory, recording, evaluating, and archiving basic information about each site for future reference serves to minimize potential effects. In conjunction with livestock grazing, recreational activities, illegal all-terrain vehicle use, and illegal collection can lead to cumulative, long-term, irreversible adverse effects to heritage resources. Because of the low to high density of historic properties in the analysis area, the overall potential cumulative effect to heritage resources is considered moderate.

3.4.6.6 Recommendation

According to the 2004 revised regulations [36 CFR 800.4(d) (1)] for Section 106 of the National Historic Preservation Act (16 U.S.C. 470f), the recommended determination for all action alternatives is **no historic properties affected** if recommended design features are implemented.

3.4.6.7 Project Design Features

*Site Avoidance and Monitoring: Alternative 2*

Range conservationists and archaeologists will work with the permittee(s) and the herders to move sheep and herder camps away from 5ML302, 5ML303, and 5ML662. Sites 5ML302, 5ML303, 5ML662, 5ML663, 5ML664, 5ML679, 5ML680, and 5ML684.1 will be monitored every 5 years for grazing and recreation impacts.

*Multiple Property District: Alternative 2*

Sites 5ML303, 5ML662, 5ML663, 5ML664, 5ML665, 5ML679, 5ML680, 5ML681, 5ML682, 5ML683, and 5ML708 are recommended as contributing toward a potential Multiple Property Historic District; the prehistoric landscape may represent some of the earliest occupation and exploitation of the high country subsequent to glaciation of the analysis area and the South San Juan Mountains and the historic sheepscape may
represent a unique set of adaptations to this high country. Oral histories from current and past permittees and shepherders would be compiled as part of this effort.

**Monitoring: Alternative 5**

If this Alternative is chosen, the following eligible and unevaluated sites will be monitored the first year sheep are put on: 5ML289, 5ML725, 5ML726, 5ML727, 5ML729, 5ML748, and 5ML731. Site 5ML748 will be avoided by all water development infrastructure of the Six Mile Spring by placing the pipe above the site on a steeper slope within the tree line. Sheep should be kept off of the site.

**Identification of New Watering and Bedding Areas**

If new bedding or watering areas are identified within any of the proposed Alternatives, additional heritage resource assessment may be necessary to determine if additional survey is needed prior to implementation.
Salting and Erosion Reporting

Salt licks should be moved on a continual basis and located in areas of low site potential and far from significant heritage resources. Range managers should work with archaeologists on selecting the most optimal locations for the protection of unidentified cultural resources. To mitigate the effects of erosion stemming from livestock grazing on unidentified and potentially significant cultural resources, Forest Service range personnel must report substantial erosion to the Heritage Program Manager.

Pre-Implementation Survey

If any new actions are planned, such as spring developments, water haul sites, or new fencing, or if grazing patterns change or livestock numbers increase, an additional heritage resource assessment is required to determine if additional survey is needed prior to implementation.

Discovery and Education Stipulation

All persons associated with operations under this authorization must be informed that any objects or sites of cultural, paleontological, or scientific value such as historic or prehistoric resources, graves or grave markers, human remains, ruins, cabins, rock art, fossils, or artifacts shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered, the proponent shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the Rio Grande National Forest authorized officer of the findings. The discovery must be protected until notified in writing to proceed by the authorized officer (36 CFR 800.110 & 112, 43 CFR 10.4).

3.4.7 Forest Condition

3.4.7.1 Scope of Analysis

This section addresses relevant past actions, the existing conditions, and the direct, indirect, and cumulative effects within the footprints of Alternatives 1, 2, 3, and 5, as they relate to timber management and forest conditions. The effects analyses within this section are based on the assumption that all pertinent Forest Plan standards and guidelines will be implemented in addition to the Project Design Features. Within this section, the term forest condition is used to refer to the condition of the tree component of the forest vegetation, as it relates to applicable Forest Plan Desired Conditions. Each alternative is summarized by Forest Plan Management Area in Table 3-9.
### Table 3-9. Summary of Management Areas included, by alternative

<table>
<thead>
<tr>
<th>Management Area</th>
<th>Acres / Percentage</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 – Backcountry</td>
<td>17,613 ac. / 77.5%</td>
<td>15,133 ac. / 66.7%</td>
<td>4,325 ac. / 41.3%</td>
<td></td>
</tr>
<tr>
<td>4.21 – Scenic Rivers and Byways</td>
<td>0 ac. / 0.0%</td>
<td>0 ac. / 0.0%</td>
<td>906 ac. / 8.6%</td>
<td></td>
</tr>
<tr>
<td>5.11 – General Forest &amp; Intermingled Rangelands</td>
<td>5,098 / 22.5%</td>
<td>7,202 ac. / 33.3%</td>
<td>1,263 ac. / 12.1%</td>
<td></td>
</tr>
<tr>
<td>5.13 – Forest Products</td>
<td>0 ac. / 0.0%</td>
<td>0 ac. / 0.0%</td>
<td>116 ac. / 1.1%</td>
<td></td>
</tr>
<tr>
<td>5.41 – Deer &amp; Elk Winter Range</td>
<td>0 ac. / 0.0%</td>
<td>5 ac. / 0.0%</td>
<td>3,321 ac. / 31.7%</td>
<td></td>
</tr>
<tr>
<td>State Lands</td>
<td>0 ac. / 0.0%</td>
<td>0 ac. / 0.0%</td>
<td>549 ac. / 5.2%</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>22,711 ac. / 100%</td>
<td>22,340 ac. / 100%</td>
<td>10,480 ac. / 100%</td>
<td></td>
</tr>
</tbody>
</table>

*Alternative 1 does not authorize grazing, so is not shown in this table.

#### 3.4.7.2 Past Actions that have affected the Existing Condition

In context of each alternative as-a-whole, past timber management activities have had only minor effects, impacting 5 acres, 798 acres, and 30 acres of Alternatives 2, 3, and 5, respectively.

There is one recorded timber management activity within the spatial extents of Alternatives 2 and 3 that occurred in 1989 near the headwaters of Bennett Creek and Boulder Creek. This harvest activity was the first stage of a three-stage shelterwood silvicultural system. The first stage of the shelterwood system is the preparatory cut, which typically removes one-third of the stand basal area in an effort to increase wind firmness (Alexander 1973, Alexander 1987). This treatment may have increased the amount of grasses and forbs within the harvest units, and to a lesser extent, established tree seedlings.

Two distinct timber management activities occurred within the spatial extent of Alternative 5. One of these, which is the same harvest described in the previous paragraph, occurred near the headwaters of Boulder Creek in 1989 (26 acres affected). The second activity recorded in the area is a patch clearcut harvest activity that occurred in 1980 and impacted about 4 acres being considered in alternative 5. The patch clearcutting occurred in an aspen stand, and the harvested areas appear to be fully regenerated.

#### 3.4.7.3 Existing Condition

The cover types within each alternative vary slightly in specific composition, but all trend similarly with grasses and forbs as the dominant cover type within this areas of proposed management. Cover types are summarized by alternative in Table 3-10.
Table 3-10. Summary of cover types, by alternative

<table>
<thead>
<tr>
<th>Cover Type</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
<th>Alternative 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasses and Forbs¹</td>
<td>14,388 ac. / 63.4%</td>
<td>14,235 ac. / 63.7%</td>
<td>6,734 ac. / 64.2%</td>
</tr>
<tr>
<td>Shrubs</td>
<td>1,346 ac. / 5.9%</td>
<td>2,012 ac. / 9.0%</td>
<td>746 ac. / 7.1%</td>
</tr>
<tr>
<td>Spruce-fir</td>
<td>1,792 ac. / 7.9%</td>
<td>1,746 ac. / 7.8%</td>
<td>215 ac. / 2.1%</td>
</tr>
<tr>
<td>Aspen</td>
<td>1,381 / 6.1%</td>
<td>768 ac. / 3.4%</td>
<td>1,579 ac. / 15.1%</td>
</tr>
<tr>
<td>Cottonwood</td>
<td>0 ac. / 0.0%</td>
<td>0 ac. / 0.0%</td>
<td>16 ac. / 0.2%</td>
</tr>
<tr>
<td>Ponderosa pine</td>
<td>7 ac. / 0.0%</td>
<td>0 ac. / 0.0%</td>
<td>65 ac. / 0.6%</td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>0 ac. / 0.0%</td>
<td>0 ac. / 0.0%</td>
<td>720 ac. / 6.9%</td>
</tr>
<tr>
<td>Water</td>
<td>8 ac. / 0.0%</td>
<td>12 ac. / 0.1%</td>
<td>50 ac. / 0.5%</td>
</tr>
<tr>
<td>Rock/Bare</td>
<td>3,772 ac. / 16.6%</td>
<td>3,566 ac. / 16.0%</td>
<td>347 ac. / 3.1%</td>
</tr>
<tr>
<td>Other</td>
<td>16 ac. / 0.1</td>
<td>0 ac. / 0.0%</td>
<td>9 ac. / 0.1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>22,710 ac. / 100%</td>
<td>22,339 ac. / 100%</td>
<td>10,481 ac. / 100%</td>
</tr>
</tbody>
</table>

¹ Some sites that were historically classified as a spruce-fir cover type may be currently classified as a grass or forb cover type due to the loss of mature canopy cover resulting from a spruce beetle outbreak.

The cover types with trees as the dominant vegetative life form include the Engelmann spruce/subalpine, aspen, Douglas-fir, ponderosa pine, cottonwood, and bristlecone pine. The Engelmann spruce/subalpine fir, Douglas-fir, ponderosa pine, and aspen cover types are commercially valuable species, so subsequent discussion focuses on those four cover types.

**Engelmann spruce-subalpine fir.** The Rio Grande National Forest has been experiencing a spruce beetle infestation across the Forest for the past 10 years (Fig. 3-4). This native insect has been the primary disturbance agent within the spruce/fir cover type in the alternatives analyzed. Most stands have experienced complete mortality of the mature Engelmann spruce component. In the lower elevation band of this cover type, stands with intermixed components of aspen, subalpine fir, or blue spruce have experienced a dampened effect from the spruce beetle infestation, while higher elevation stands that tend to be dominated by Engelmann spruce have been set back to the stand initiation structural stage.

**Douglas-fir.** This cover type generally has a lower wood production capability than the spruce-fir type. Often, slight to moderate infestations of Douglas-fir dwarf mistletoe, a native saprophytic plant, can be found in these stands. Douglas-fir dwarf mistletoe can persist in stands for many years, and if infestation of individual trees is severe enough, it can predispose trees to other mortality causal agents like Douglas-fir beetle. Douglas-fir beetle is a native insect that has become more prevalent in this cover type over the past few years. This insect prefers to attack trees that have been weakened by fire, dwarf mistletoe, or other similar agents, and has been killing Douglas-fir in small, localized patches within a portion of the area proposed for grazing under alternative 5. Overall, conditions in this cover type are within the Desired Conditions for the Forest Plan Management Area Prescription (MAP) in which they are found (MAP 3.3, MAP 5.41, and MAP 4.21).
**Ponderosa pine.** This cover type is intermittently managed across the Forest, and management typically focuses on improving deer and elk winter range conditions. This cover type is generally within the historic range of variation and is often found with minor components of Douglas-fir intermixed. This cover type is primarily found in the Coller pasture of alternative 5; no ponderosa pine dwarf mistletoe or mountain pine beetle activity has been observed in these stands.

**Aspen.** This cover type isn’t heavily managed on this Forest, primarily due to a weak aspen market. Aspen is typically characterized as an early seral tree species and often sprouts vigorously after disturbances where historic aspen root systems are still viable. The widespread Engelmann spruce mortality caused by the spruce beetle has, in many cases, opened the canopy and allowed more light and moisture to reach the ground; aspen is expected to increase in some stands as it takes advantage of these early seral site conditions.

![Spruce/fir stands affected by spruce beetle.](image)

**Figure 3-4. Spruce/fir stands affected by spruce beetle.**

### 3.4.7.4 Direct, Indirect, and Cumulative Effects

**Information Applicable to All Alternatives**

Domestic sheep typically prefer to eat grasses and forbs over shrub and tree species. In southcentral Colorado, the diet of domestic sheep on forest range allotments was observed during the course of a summer as sheep were herded through areas containing a variety of herbaceous and woody plant species. Woody species on the allotment included rose, currant, and mountain mahogany, and tree species on the allotment included pinyon pine, Rocky Mountain juniper, ponderosa pine, Douglas-fir, and quaking aspen. The study found that the major diet components of domestic sheep were grasses and sedges, and no utilization of shrubs or trees was documented (MacCracken and Hansen 1981). Based on the dietary preferences of domestic sheep, there is minimal potential for domestic sheep to have any direct effects on timber management activities or forest conditions.
Alternative 1 – No Authorized Grazing

Under this alternative, grazing by domestic sheep would not be reauthorized and the allotments would become vacant. This alternative would not have any direct, indirect, or cumulative effects to timber management activities or the forest condition.

Alternative 2 – Continued Current Grazing

The pastures included in this alternative contain approximately 680 acres of aspen and spruce-fir stand that are within MAP 5.11. Of the 680 acres, none of the stands area is likely to have any timber management proposed due to lack of access, steep terrain, and tentative unsuitable stand classifications. Within the spruce-fir stands, the current understory conditions offer greater herbaceous diversity than pre-beetle conditions, and may be more conducive to grazing of domestic sheep.

Within the footprint of this alternative, there are no ongoing or reasonably foreseeable timber management projects. Due to the dietary preferences of domestic sheep and the lack of ongoing or reasonably foreseeable timber management projects, this alternative would not have any direct, indirect, or cumulative effects on forest management activities or forest conditions.

Alternative 3 – Allotment Boundary Reconfiguration

This alternative would reconfigure the current grazing allotments to exclude the area north of the CDNST (Trail 787) and north of the Miners Creek Trail (Trail 803). Portions of the vacant Ouray Allotment would be added to the available grazing areas. This alternative contains approximately 770 acres of aspen and spruce-fir cover types in MAPs that allow timber harvest. The current understory conditions of the spruce-fir stands offer greater herbaceous diversity than pre-beetle conditions, and may be more conducive to grazing of domestic sheep. Within the footprint of this alternative, there are no ongoing timber management projects. Most of the acreage where timber harvest is allowed is located within MAP 5.41 and MAP 4.21 on sites with poor road access. No timber management is planned within these areas in the foreseeable future.

There is one timber management activity currently under analysis within this area that, if approved, would allow removal of dead Engelmann spruce within 300 feet of existing roads, but would not total more than 250 acres. Due to dietary habits of domestic sheep, this alternative would not have any direct effects on subsequent reforestation efforts associated with this timber management project. Domestic sheep may delay log hauling operations if the flock is on a haul route, but the chances of this are low and the impacts to operations would not be significant.

When the effects of this alternative are combined with past and ongoing timber management projects, no cumulative effects to the timber resource or forest condition are expected. As previously stated, the dietary components of domestic sheep rarely include any tree species; this is the primary factor that nearly eliminates the potential for direct and indirect effects from grazing to impact forest management activities or forest conditions. There are no other reasonably foreseeable future projects that would contribute to this cumulative effects analysis.
**Alternative 5 – Wishbone Allotment**

This alternative would vacate a majority of the current allotment (Alternative 2) and add new pastures in areas where modeling has shown the least potential for interaction between domestic sheep and bighorn sheep. This alternative contains approximately 384 acres of aspen, 664 acres of Douglas-fir, 5 acres of ponderosa pine, and 68 acres of spruce-fir cover types in MAPs that allow timber harvest. Within the footprint of this alternative, there are no ongoing timber management projects. Most of the acreage where timber harvest is allowed is located within MAP 5.41 and MAP 4.21 on sites with poor road access. No timber management is planned within these areas in the foreseeable future.

The patch clearcutting that occurred in 1980 and affected 4 acres likely has no lasting effect on grazing patterns of domestic sheep due to two primary factors. First, aspen stands typically re-sprout vigorously following clearcutting, and second, 37 years have passed since treatment and the stand is likely in full-site occupancy stage and well above the browse height of domestic sheep.

Due to the dietary preferences of domestic sheep, and the lack of ongoing and reasonably foreseeable timber management projects, this alternative would not have any direct, indirect, or cumulative effects on forest management activities or forest conditions.

**3.4.7.5 Cumulative Effects**

Due to the spruce beetle epidemic within the analysis area and on the Forest as whole, trees will continue to die. Spruce beetle-related mortality would slowly open up the canopy and result in increased growth of grasses and forbs. The increase of grass could amplify the competition between grasses and conifer regeneration, resulting in a decrease in the survival of conifer regeneration. An increase in larger canopy openings from dying spruce could also increase the number of aspen seedlings. Timber management activities may also open up the canopy and allow for more grass cover and therefore increased competition between grasses and seedlings. Both of the action alternatives would have a minor effect on timber resources, and sanitation/salvage activities considered in the future would be able to continue as planned.

**3.4.8 Threatened, Endangered, and Sensitive Plants**

**3.4.8.1 Scope of Analysis**

This analysis briefly discusses plants that are threatened, endangered, proposed, or Region 2 designated Sensitive species (TES) and their habitats. The scope of this analysis is confined to the analysis area for the Miners, Snow Mesa, Table, and Ouray allotments and the areas analyzed for Alternative 5 (Wishbone Allotment) as described in Chapter 1, Section 1.3 and shown in Figures 1-1 and 1-2.
3.4.8.2 Past Actions that have affected the Existing Condition

Past activities in the analysis area that may have affected TES plants and habitats include livestock grazing, wildlife herbivory, timber harvesting/thinning and wood gathering, recreation, roads and trails, fire suppression and use, mining, and insects and disease. These are discussed in more detail within this document and in the associated botanical biological assessment/biological evaluation (BA/BE) for the analysis area.

3.4.8.3 Existing Condition

There are presently no reported records or suspected occurrences of threatened or endangered plants on the Rio Grande National Forest. Threatened and endangered plants in Colorado have unique habitats or ranges that do not occur on this Forest, and no plants that occur on this Forest are proposed for listing by the U.S. Fish and Wildlife Service. Based on documented occurrence or habitat affinity, 11 Sensitive plant species are known or suspected to occur in this project area (Table 3-11).

Table 3-11. Effects determination for Sensitive plant species in the analysis area, by alternative

[NI = no impact; MAII = may adversely impact individuals, but not likely to result in a loss of viability in the planning area, nor cause a trend toward Federal listing.]

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternative 1</td>
</tr>
<tr>
<td>Alicella sedifolia</td>
<td>NI</td>
</tr>
<tr>
<td>Aquilegia chrysantha var. rydbergii</td>
<td>NI</td>
</tr>
<tr>
<td>Astragalus ripleyi</td>
<td>NI</td>
</tr>
<tr>
<td>Cypripedium parviflorum</td>
<td>NI</td>
</tr>
<tr>
<td>Draba grayana</td>
<td>NI</td>
</tr>
<tr>
<td>Draba smithii</td>
<td>NI</td>
</tr>
<tr>
<td>Eriophorum chamissonis</td>
<td>NI</td>
</tr>
<tr>
<td>Eriophorum gracile</td>
<td>NI</td>
</tr>
<tr>
<td>Machaeranthera coloradoensis</td>
<td>NI</td>
</tr>
<tr>
<td>Neoparrya lithophila</td>
<td>NI</td>
</tr>
<tr>
<td>Ranunculus karelinii</td>
<td>NI</td>
</tr>
<tr>
<td>Salix arizonica</td>
<td>NI</td>
</tr>
<tr>
<td>Salix candida</td>
<td>NI</td>
</tr>
<tr>
<td>Salix serissima</td>
<td>NI</td>
</tr>
<tr>
<td>Sphagnum angustifolium</td>
<td>NI</td>
</tr>
<tr>
<td>Sphagnum balticum</td>
<td>NI</td>
</tr>
</tbody>
</table>
3.4.8.4 Direct, Indirect, and Cumulative Effects

A detailed effects analysis is documented in a botanical BA/BE for the analysis area in the project record. The discussion below is a brief summary of the botanical BA/BE. None of the alternatives would be expected to result in significant direct, indirect, or cumulative effects to threatened, endangered, proposed, or Region 2 Sensitive plant species.

**Alternative 1 – No Authorized Grazing**

This alternative proposes no permitted livestock grazing or associated rangeland actions in support of livestock grazing permits. There would be no new management actions, and foreseeable future actions would have negligible effects on Sensitive plant species. No current activities are known to be detrimentally impacting documented Sensitive plant species. Therefore, there would be no direct, indirect, or cumulative effects anticipated on any known or suspected Sensitive plant species or their habitats (Table 3-11).

**Alternatives 2 and 3 – Continued Current Grazing and Allotment Boundary Reconfiguration**

Known or potential habitat exists for 12 Forest Service Region 2 Sensitive plant species within Alternative 2 and 3 analysis areas. These 12 species were potentially determined to be directly, indirectly, or cumulatively affected (assuming potential habitat was occupied). Direct effects could be from livestock directly grazing or trampling individual plants. Indirect effects could result from a change in surrounding forage canopy (through livestock grazing and/or trampling or introduction of invasive plant species) that could be detrimental to individual plants. Indirect effects could also occur due to a change in hydrologic function in fragile areas such as fens and wetlands, which are primary habitat for some Sensitive plant species.

The effects determination made by alternative for these species is summarized in Table 3-11. Cumulative effects consider a combination of effects such as, but not limited to, recreation (camping, hiking, etc.), fuels or timber management, wildlife populations, and livestock grazing. Cumulatively, no projects are planned in the foreseeable future (next decade) in the analysis area that would be expected to significantly impact these Sensitive plant species. Implementing any livestock grazing action alternative would likely have a minimal impact on these plants by following the project design features identified in Chapter 2, Section 2.5—including Forest Plan standards and guidelines and Watershed Conservation Handbook practices pertinent to livestock grazing and rangelands.

**Alternative 5 – Wishbone Allotment**

The Wishbone Allotment comprises lower-elevation habitat not analyzed in Alternatives 2 and 3. Three additional species were analyzed as a result of Alternative 5: *Aquilegia chrysantha* var. *rydbergii*, *Astragalus ripleyi* and *Cypripedium parviflorum*. The effects determination for these species is summarized in Table 3-11.
There is a known occurrence of *Draba smithii* above the road in a rocky, cliffed area near Wagon Wheel Gap. Although sheep briefly trail past this area, they are confined to the Highway 149 corridor; therefore, this area will not be impacted by livestock.

Cumulatively, there are no projects planned in the foreseeable future (next decade) in the analysis area that would be expected to significantly impact these Sensitive plant species. Implementing any livestock grazing action alternative would likely have a minimal impact on these plants by following the project design features identified in Chapter 2, Section 2.5—including Forest Plan standards and guidelines and Watershed Conservation Handbook practices pertinent to livestock grazing and rangelands.

Cumulatively, no projects are planned in the foreseeable future (next decade) in the analysis area that would be expected to significantly impact these Sensitive plant species.

### 3.4.9 Fisheries Resources

#### 3.4.9.1 Scope of Analysis

This analysis will focus on the effects of sheep grazing on the fisheries resources within the Snow Mesa analysis area.

#### 3.4.9.2 Past Actions that have affected the Existing Condition

Because of the remote location of the analysis area, and because much of the area is in designated backcountry management area prescription, few vegetative management activities have taken place within the area during the past several decades. This area has characteristics similar to wilderness, but motorized and mechanized use on existing trails and roads is allowed. Some of the roads/trails have stream crossings and are located within the water influence zone of the streams. The most significant action that has impacted the fisheries within the analysis area is the introduction of nonnative trout into the streams. Livestock grazing has occurred in the area since 1927.

#### 3.4.9.3 Existing Condition

Overall stream conditions within the analysis area are generally healthy and stable. In addition, most riparian areas are in robust condition from a vegetative and stream characteristic perspective. Bank stability is within Forest guidelines, stream channels are stable, and riparian condition is good with minor exceptions. Self-sustaining populations of nonnative trout can be found in most of the lower reaches of the perennial streams within the analysis area. Colorado Parks and Wildlife also maintains a hatchery-supported Rio Grande cutthroat trout fishery in Crystal Lake and there is a recreational population of Rio Grande cutthroat trout in Red Mountain Creek. There are no significant stream impacts from permitted sheep grazing within the analysis area.

#### 3.4.9.4 Direct, Indirect, and Cumulative Effects

Improper livestock management can potentially degrade riparian and aquatic habitats in a variety of direct and indirect ways that have been outlined by Platts (1991). However,
neither of the action alternatives would be expected to result in significant direct, indirect, or cumulative effects on the existing nonnative trout populations or their habitat within the analysis area due to the permitted sheep being herded to the higher elevation benches and away from streams and riparian areas. There could be some relatively small localized areas impacted where the sheep may cross the stream, or be watered, but the sheep are herded through these areas and are not allowed to bed or rest within the riparian areas. Currently, the stream and riparian areas within the project area are in overall good to robust condition and any aquatic habitat problems within the analysis area tend to be site-specific and not an overall threat to the fish populations or their habitat.

Direct effects from permitted livestock grazing to fish include directly stepping on individual fish and/or trampling trout redds. Indirect effects could result from a change in riparian canopy (through livestock grazing and/or trampling) that could reduce shade or escape cover, and degrading stream banks could result in a loss of spawning or pool habitat due to increased sedimentation.

Nonnative trout have displaced the native Rio Grande cutthroat trout throughout the analysis area. Self-sustaining populations of brook trout and nonnative cutthroat trout are currently present throughout most of the perennial waters within the allotment. Nonnative cutthroat trout have been stocked in the past in Crystal Lake (Snake River and Pikes Peak cutthroat), but currently Rio Grande cutthroat trout are being stocked every other year by Colorado Parks and Wildlife to maintain a recreational sport fishery in the lake.

Some riparian zones within the analysis area receive recreational use such as hiking, camping, and fishing. A couple of trail stream crossings contribute sediment to the streams, but the impacts are negligible. If sedimentation substantially increased in volume it could create habitat for disease hosts and vectors, which could then be spread by direct transfer of spores/species in mud and water that may be on equipment and anglers' gear. Increased sedimentation could also impact spawning success due to silt suffocating fish eggs in redds.

**Alternative 1 – No Authorized Grazing**

This alternative proposes no permitted sheep grazing or range management actions within the allotment. Watersheds, stream channels, and riparian areas would be left in their existing condition. Under this alternative, natural effects to aquatic systems would occur and nonnative trout populations would continue to be viable and self-sustaining.

**Alternative 2 – Continued Current Grazing**

This alternative would maintain current livestock grazing management practices. There would be no changes in permitted numbers of livestock, permitted season of use, kind, or class of livestock, or grazing system (other than minor changes made, by exception, in the AOI).

There are currently no significant impacts from permitted sheep grazing to stream health or fish populations within the analysis area. Sheep are currently kept on high-elevation benches well outside of water-influence-zones (WIZ). Sheep may be herded through WIZ areas but they are not allowed to rest or bed in these areas. Specific design features prevent sheep from bedding within 300 yards of any running stream, spring, lake, or
designated trails, and the sheepherder’s camp cannot be within 200 feet of live water. Implementation and compliance with Forest Plan standards and guidelines, project design features, and Watershed Conservation Practices Handbook practices have been successful in minimizing sheep impacts to streams on the allotment and are expected to continue to be effective if successfully implemented in the future. Under this alternative, stream trout populations would continue to be self-sustaining and stream habitat should remain in good condition.

**Alternative 3 – Allotment Boundary Reconfiguration**

Under this alternative the areas north of Forest Service trails 787 and 803 would be taken out of use. Meadows of the currently vacant Ouray Allotment would be added to the allotment. These areas would be north of Forest System Road 532 and include areas around Crystal Lake.

Similar to Alternative 2, sheep would be still be kept on high-elevation benches well outside of WIZ areas and would not be allowed to rest along streams/lakes or within the riparian areas. Sheep grazing is not anticipated to increase detrimental effects to the fishery resources. Trailing to and from the newly included southern meadows may have some minor detrimental effects where trailing passes through riparian areas and across streams. These effects may increase localized erosion and sedimentation to streams but are expected to be minimal and should not have any noticeable effect on the fish populations or habitat.

**Alternative 5 – Wishbone Allotment**

This alternative creates separation from bighorn sheep by having the domestic sheep graze at lower elevations, more removed from the areas that have had conflict in the past. Grazing activities are not expected to increase overall detrimental impacts to fish habitat. The new areas grazed will include access to perennial streams for watering on the Forest, including South River, Shallow and Crystal Lake pastures. Proper adherence to project design features will further minimize these aspects.

Impacts to watersheds can impact fish habitat by increasing sedimentation. As noted in the watershed assessment, watershed resources are not anticipated to be adversely affected. Watering along the Rio Grande and smaller perennial streams and ponds will see some localized impacts but it is not anticipated that longlasting or widespread impacts will occur.

3.4.9.5 Cumulative Effects

Cumulatively, past, present, and reasonably foreseeable actions such as permitted livestock grazing, timber harvest, road building and maintenance, trail building and maintenance, and recreation activities will occur within the analysis area but are not expected to negatively affect the fisheries resources within the area. There are no large-scale vegetation treatment proposals known that would affect the analysis area in the foreseeable future. Recreational activities including hiking, camping, hunting, and wildlife viewing will continue in the area, but will have little effect on the fishery resources because of the remoteness of the area. There are no known activities proposed
that would change recreation use or patterns. Colorado Parks and Wildlife imposes trout harvest limits to lessen the effects of angling on the fish populations. Wildlife will continue to use the area for summer habitat, but wildlife use is expected to remain about the same and its impacts on riparian areas have been minimal. There are no past, present, or reasonably foreseeable actions that would negatively affect the fishery resources within the analysis area.

3.4.10 Invasive Plants/Noxious Weeds

3.4.10.1 Scope of Analysis

This section discusses invasive plants designated as “noxious weeds” by the State of Colorado that may occur within or adjacent to the analysis area. The scope of the analysis is the analysis area for the Miners, Snow Mesa, Table, and Ouray allotments, and the areas analyzed for Alternative 5 Wishbone Allotment as described in Chapter 1, Section 1.3 and shown in Figures 1-1 and 1-2.

Past Actions that have affected the Existing Condition

Past ground-disturbing activities have allowed invasive plants an opportunity to establish. Road construction and maintenance, trail construction and maintenance, limited timber harvest, and grazing (primarily livestock and elk) all have the potential to disturb the ground. Wildlife, livestock, machinery, recreational vehicles, people, wind, and water transport seeds from existing infestations to new sites. The analysis is predominantly backcountry; therefore, many of these establishment and transport mechanisms are minimized.

Portions of the analysis area have a road and trail network that can potentially facilitate the transport of invasive plants by people or animals (wildlife or livestock). For more information on past activities relevant to ground disturbance and noxious plants, see the “Rangeland Resources” (section 3.4.1) topics in this chapter under the same heading.

3.4.10.2 Existing Condition

Noxious plants occur within the Rio Grande National Forest and within Mineral County. Known noxious plants occur within the analysis area at the following sites:

- Forest System Road (FSR) 532; isolated occurrences Canada thistle (*Cirsium arvense*)
- FSR 533.2A; isolated occurrences Canada thistle
- FSR 505; isolated occurrences Canada thistle
- Forest System Trail (FST) 803; isolated occurrences Canada thistle
- Railroad corridor in Coller pasture: isolated occurrences Canada thistle
- FSR 508.1B; isolated occurrences Canada thistle
- FSR 526; isolated occurrences Canada thistle
The following noxious plant species are found within Mineral County: yellow toadflax \((\text{Linaria vulgaris})\), musk thistle \((\text{Carduus nutans})\), spotted knapweed \((\text{Centaurea maculosa})\), hoary cress \((\text{Cardaria draba})\), perennial pepperweed \((\text{Lepidium latifolium})\), downy brome \((\text{Bromus tectorum})\), black henbane \((\text{Hyoscyamus niger})\), and common mullein \((\text{Verbascum thapsus})\). The majority of the known occurrences are located on roadsides, at trailheads, or along recreation trails outside of the analysis area. The known infestations appear to be the result of recreation livestock, motorized use, or past ground-disturbing activities and not associated with sheep grazing activities.

### 3.4.10.3 Direct, Indirect, and Cumulative Effects

Noxious weeds are a concern because they compete with native plants for sunlight, water, nutrients, and space. They have the potential to displace native plants and animals. Noxious plants can reduce forage for livestock and wildlife, degrade wildlife habitat, and negatively affect recreation opportunities. Weeds that provide little vegetative cover can impact soil health by exposing the soil to rainfall impacts, overland flow, and higher temperatures than would occur in the natural plant community. Many noxious plants are also injurious or poisonous to wildlife as well as to humans, livestock, and domestic animals.

The long-term effects of any infestations that may become established within the analysis area would result in the reduction of species diversity within the native plant community. Therefore, it is necessary that on-going noxious plant inventories continue and treatment of known, existing infested areas inside and outside of the analysis area continue, as part of the long-term unified management of the Rio Grande National Forest. Noxious plants are systematically listed and targeted for priority management by the Forest Service on an annual basis.

The alternatives are not expected to result in significant direct, indirect, or cumulative effects.

**Alternative 1 – No Authorized Grazing**

Permitted livestock exclusion would eliminate a potential vector for seed transport and a disturbance factor that has the potential to create a niche for possible noxious plant infestations.

However, to date, sheep grazing operations in the project area are not known to have been a factor in spreading noxious plants. Recreation activities may continue to present a seed transport and disturbance factor in the analysis area; however, the limited use of the general backcountry area decreases the potential. Weed-free hay and feed requirements for recreational users are in place.

**Alternative 2 – Continued Current Grazing**

Under this alternative, domestic sheep would access the analysis area. Although permitted livestock have the potential to be a vector for the spread of noxious plants, sheep operations have not been a known factor to date. The continued spread of noxious plant infestations would likely be associated with recreational livestock use and wildlife...
grazing. Weed-free hay and feed requirements for recreational users and livestock permittees are in place.

**Alternative 3 – Allotment Boundary Reconfiguration**

Domestic sheep would continue to access the analysis area. There would be no change in the spread of noxious plants by sheep operations between Alternatives 2 and 3.

**Alternative 5 – Wishbone Allotment**

Domestic sheep would continue to access part of the analysis area. There would be no change in the spread of noxious plants by sheep operations between Alternatives 2, 3, and 5, although domestic sheep grazing would take place on seven new pastures within the Wishbone Allotment, and the Snow Mesa Allotments would be vacated from domestic sheep.

3.4.10.4 Cumulative Effects

Cumulatively, past, present, and reasonably foreseeable actions such as permitted livestock grazing, timber harvest, road building and maintenance, trail building and maintenance, and recreation activities all contribute to the creation of possible niches and seed transport mechanisms to allow for the establishment and spread of noxious plants within the analysis area. The Forest would continue to monitor and control noxious weeds.

3.5 Cumulative Effects Summary

The Council for Environmental Quality defines cumulative impact as:

“The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

In other words, cumulative effects are simply the sum total of past, present, and reasonably foreseeable future environmental, social, and economic effects of land management activities which, when taken in context of this specific project, affect the conditions and trends of resources and values within the project area and adjacent area of influence.

Cumulative effects, addressed previously under individual resource write-ups, were determined on a list of past, present, and reasonably foreseeable future actions in the analysis area developed by the interdisciplinary team and recorded in the project record (i.e., actions included livestock grazing, recreation, trails, wildlife populations, private land/open space, specially designated areas, and socio-economics).

There are no large-scale vegetation treatment proposals known that would affect the analysis area in the foreseeable future. The naturally occurring beetle activity in the area
could have impacts to the watershed as trees are killed and potential changes in hydrology occur. The actions proposed in the alternatives of this EA would be expected to have no effect on the overall fire regime in this environment since the regime at these upper elevations is believed to be extremely infrequent. There are no known proposed activities that would change recreation use or patterns. There are no proposed large-scale recreation improvements or infrastructure.

3.6 Other Disclosures

All alternatives comply with the Clean Air Act. The Rio Grande Forest Plan Final Environmental Impact Statement (USDA Forest Service 1996a) explains on pages 3–151 through 3–154 that air quality in the Rio Grande National Forest is good for all metrics, that the entire Forest meets National Ambient Air Quality Standards, and that nothing proposed in the Forest Plan would substantially change existing air quality. The selection of any alternative would not noticeably alter air quality and, therefore, would be expected to be in full compliance with the Clean Air Act.

There are no adverse effects expected to public health or safety under any of the alternatives. The actions proposed in the alternatives of this EA would have no effect on park lands or prime farmlands. These kinds of land allocations or land capability do not exist in the analysis area.

The actions proposed in the alternatives of this EA would have no effect on ecologically critical areas (no such areas have been formally recognized and designated within the analysis area and there are no proposed activities that would alter the natural appearance or function of landscapes in this area).

The actions proposed in the alternatives of this EA would not be expected to significantly affect the overall fire regime in this environment. The actions proposed in the alternatives of this EA would be in compliance with the desired conditions relative to prescribed and wildland fire use for the applicable management areas in this analysis area.

The proposed alternative is consistent with the Forest Plan, and applicable laws and regulations were considered in this EA. The proposed actions are consistent with Federal, State, and local laws and requirements for the protection of the environment. The proposed actions are consistent with the direction of the Regional Forester relative to water, the National Forest Management Act, and wildlife. Finally, general issues regarding biological diversity (biodiversity) were judged to be outside the scope of this analysis; they are more appropriately analyzed at the Forest scale. This project-level EA tiers to the biodiversity assessment completed for the revised Forest Plan Final Environmental Impact Statement (USDA Forest Service 1996a).

Executive Order 12898 (February 11, 1994) mandates Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations (known as environmental justice). During the course of this analysis, no alternative considered resulted in any identifiable effects or issues specific to any minority group or low-income population or community. The Forest Service considered all input from persons or groups regardless of age, race, income status, or other social and economic characteristic. There
are no civil rights issues, and none of the alternatives have any civil rights-related effects because consideration of permitted livestock grazing has no effect on rights protected under civil rights law.

There are no adverse effects expected on inventoried roadless areas under any of the alternatives (i.e., there is no road construction or reconstruction proposed under any alternative that would alter the roadless characteristics).

The effects on the human environment are not highly uncertain, are very unlikely to involve unique or unknown risks, and are not likely to be highly controversial because there is no scientific controversy on the impacts of the proposed actions in the alternatives. The effects analysis in this chapter show that the effects are not uncertain, and do not involve unique or unknown risk. The proposed actions are not likely to establish a precedent for future actions with significant effects. The predicted cumulative impacts are not significant.

3.6.1 Global Climate Change

The Forest Service acknowledges that global climate change is an important emerging concern worldwide. However, there is no established scientific methodology to measure the effects of small-scale projects such as this project on global climate. This analysis briefly addresses global climate change in two ways: (1) effects of climate change on a proposed project, and (2) effects of a proposed project on climate change. Each of these is briefly discussed below relative to this project.

Effects of Climate Change on a Proposed Project. NEPA does not specifically require analysis of how environmental factors, such as global climate change, might impact a proposed action. Any differences in effects of climate change on the project between the two alternatives would be negligible.

Effects of Proposed Project on Climate Change. The proposed action is extremely small in scope and magnitude relative to a planetary scale. Although it may be possible to quantify a project’s direct effects on carbon sequestration and greenhouse gas emissions, there is no certainty about the actual intensity of individual project indirect effects on global climate change. Cumulative effects would be a consideration of greenhouse gas emissions affecting climate from multiple projects over time. But, as greenhouse gas emissions are integrated across the global atmosphere, it is not possible to determine the cumulative impact on global climate from emissions associated with any number of particular projects. Nor is it expected that such disclosure would provide a practical or meaningful effects analysis for project decisions. Any differences between the two alternatives would be negligible at a global scale.
Chapter 4. List of Preparers

The following specialists contributed to the Snow Mesa and Wishbone Sheep Allotment interdisciplinary process.

Table 4-1. List of preparers

<table>
<thead>
<tr>
<th>Team Member</th>
<th>Position Title</th>
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<tbody>
<tr>
<td>Tristram Post and Tanner</td>
<td>Interdisciplinary Team Leader/Range Management</td>
</tr>
<tr>
<td>Dutton</td>
<td>Specialist and Noxious Weeds</td>
</tr>
<tr>
<td>Dale Gomez</td>
<td>Wildlife Biologist</td>
</tr>
<tr>
<td>Mary Jones</td>
<td>Botany</td>
</tr>
<tr>
<td>Guy Blackwolf</td>
<td>NEPA/GIS Specialist</td>
</tr>
<tr>
<td>Jody Fairchild</td>
<td>Recreation and Wilderness Management Specialist</td>
</tr>
<tr>
<td>Lisa McClure</td>
<td>Recreation/Wilderness and Trails</td>
</tr>
<tr>
<td>Randy Ghormley</td>
<td>Rio Grande National Forest Wildlife Program Lead</td>
</tr>
<tr>
<td>Ellen Hardy</td>
<td>Writer/Editor</td>
</tr>
<tr>
<td>Erin Hegberg</td>
<td>Archeologist</td>
</tr>
<tr>
<td>Angie Krall</td>
<td>Archeologist</td>
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<tr>
<td>Marcy Reiser</td>
<td>Archeologist</td>
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<tr>
<td>Rachael Sanchez</td>
<td>Forester</td>
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<tr>
<td>Vaughn Thacker</td>
<td>Soil Scientist/Hydrology</td>
</tr>
<tr>
<td>Barry Wiley</td>
<td>Fisheries Biologist</td>
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<tr>
<td>Cheryl O'Brien</td>
<td>GIS Support</td>
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<tr>
<td>Kevin Duda</td>
<td>Forester</td>
</tr>
<tr>
<td>Martha Williamson</td>
<td>Divide District Ranger</td>
</tr>
</tbody>
</table>
Chapter 5. Agencies, Tribal Governments, and Individuals Consulted

In addition to listing the project in the Forest’s Schedule of Proposed Actions, printing public notices and short articles in the Valley Courier (newspaper of record), and online availability of the scoping documents and EA for Comment as discussed in Section 1.8 of this EA, the Forest Service consulted the following Federal, State, and local agencies; Tribal governments; and individuals/organizations during the development of this EA.

Federal, State, and Local Agencies

- Colorado Parks and Wildlife
- Gunnison National Forest, Gunnison Ranger District
- Hinsdale County Commissioners
- Mineral County Commissioners
- Department of Interior, U.S. Fish and Wildlife Service
- Colorado Department of Agriculture
- USDA Agricultural Research Service
- San Juan National Forest
• USDA Forest Service, Rocky Mountain Regional Office

*Tribal Governments*

• Southern Ute Indian Tribe
• The Hopi Tribe
• Ute Mountain Ute Tribe
• Ute Tribe of the Uintah and Ouray Reservation
• Pueblo of Nambe
• Jicarilla Apache Tribe
• San Ildefonso Pueblo
• Ohkay Owingeh
• Pueblo of Santa Ana
• Navajo Nation
• Taos Pueblo
• Pueblo de Cochiti
• Pueblo of Picuris
• Santo Domingo Pueblo

*Individuals – Organization Represented*

• Jerry Brown – Grazing Permittee
• Wayne Brown – Grazing Permittee
• Bonnie Brown – Colorado Woolgrowers Association
• Adam Skadberg – Outfitter
• Park Grazing Association
• Broad Acres Ranch
• Jonathan Ratner – Western Watersheds Project
• Colvig Silver Camp
• Mathew Ismert – Wilderness Ranch
• Bill Manning – Colorado Trail Foundation
• Greg Warren – Continental Divide Trail
• Teresa Martinez – Continental Divide Trail Coalition
• Greg Pearson – Lost Ute Outfitters
• Terry Meyers – Rocky Mountain Bighorn Sheep Society
San Luis Valley Ecosystem Council
Kevin Hurley – Wild Sheep Foundation
American Sheep Industry Association
Guilliford

The following individuals responded to the project’s scoping opportunities or to the draft EA for Comment:

*Individuals and Organization Represented – Responded to 2012 or 2014 Scoping Opportunities:*

- Jerry Brown – Grazing Permittee
- Wayne Brown – Grazing Permittee
- Jonathan Ratner – Western Watersheds Project
- Bill Manning – The Colorado Trail Foundation
- Teresa Martinez – Continental Divide Trail Coalition
- Colorado Parks and Wildlife
- Terry Meyers – Rocky Mountain Bighorn Sheep Society
- Kevin Hurley – Wild Sheep Foundation
- National Wildlife Federation
- High Country Citizens Alliance
- Backcountry Hunters and Anglers
- Allen Edwards
- Colorado Wildlife Federation
- The Navajo Nation

*Individuals and Organizations Represented – Responded to 2015 Draft EA for Comment:*

- Greg Goltz
- Shawn Andreatta
- Colorado Wool Growers Association
- Jerry Brown – Grazing Permittee
- Lonnie Brown – Grazing Permittee
- Wayne Brown
- George Van Den Berg
- Hinsdale County
● Greg Dyson – Wild Earth Guardians
● Mark Thurmond
● Maria Bulgin
● Kevin Hurley – Wild Sheep Foundation
● Kathleen Zimmerman – National Wildlife Federation
● Terry Meyers – Rocky Mountain Bighorn Sheep Society
● Mineral County
● Patricia Dorsey – Colorado Parks and Wildlife

*Individuals and Organizations Represented – Responded to 2017 Proposed Action:*

● David Osborn
● William Alspach - Trails Preservation Alliance (TPA) and the Colorado Off-Highway Vehicle Coalition (COHVCO)
● Glenn Hockett - Gallatin Wildlife Association
● Les Owen - Colorado Department of Agriculture
● Bonnie Brown - Colorado Woolgrower’s Association
● Fred McLeroy
● Jerry Brown – Grazing Permittee
● Wayne Brown – Grazing Permittee
● Rick Basagoitia - Colorado Parks and Wildlife
● Kevin Hurley - Wild Sheep Foundation
● Greg Dyson - Wild Earth Guardians
● Jonathan B. Ratner - Western Watersheds Project
● Terry E. Meyers - Rocky Mountain Bighorn Sheep Society
Glossary

**Allotment** ~ A designated area of land available for livestock grazing.

**Allotment, active** ~ An established allotment that has a grazing permit (as defined under FSM 2200) currently issued to permit livestock grazing on that area. This also includes those situations where a permit has expired and the Forest Service is working on the issuance of a new permit (e.g., the transition period caused by permits expiring 12/31 and not getting the new permit issued for a few months).

**Allotment, closed** ~ An allotment that no longer has grazing permits issued, and where a decision has been made to close that allotment area to permitted livestock grazing.

**Allotment, vacant** ~ An allotment that does not have a grazing permit (under FSM 2200) issued to permit livestock grazing on that area.

**Allotment management plan** ~ A document that specifies the program of action designated to reach a given set of objectives.

**Analysis area** ~ The area under study.

**Animal unit (AU)** ~ Considered to be one mature (1,000 pound) cow or the equivalent based on average daily forage consumption of 26 pounds dry matter per day.

**Animal unit month (AUM)** ~ The amount of feed or forage required by an animal unit for 1 month; not synonymous with head month.

**Annual operating instructions (AOI)** ~ A document that provides instructions from the Forest Service to the term permit holder (called a permittee) regarding management requirements, projects, agreements, and other information for the current grazing season.

**Bed ground** ~ An area where animals sleep and rest.

**Benchmark** ~ Representative, often permanent, reference sites that reflect the results of management actions in the shortest time frames.

**Browse** ~ The part(s) of shrubs, woody vines, and trees available for animal consumption.

**Capable rangeland** ~ Rangeland that is accessible and used by domestic livestock, has inherent forage producing capabilities, and can be grazed on a sustained yield basis without damage under reasonable management goals. Non-capable rangeland has no current grazing value for domestic livestock or should not be used for grazing because of physical or biological restrictions, or lacks improvements that would allow use.

**Carr** ~ A wetland willow thicket.

**Class of livestock** ~ Age and/or sex group of a kind of livestock.

**Contact** ~ Direct contact between body parts of two animals during which a disease might be transmitted from one to another. Contact typically refers to nose-to-nose or face-to-face interactions that may lead to the transmission of respiratory disease via secretions or aerosols. Synonymous with “Interaction.”
Cumulative effects/impacts ~ The impacts or effects on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The time period of consideration for cumulative effects analysis is generally from the late 1800s and continuing two decades into the future, unless stated otherwise in this document.

Die-off ~ A large-scale mortality event that impacts many animals from a population and may have significant demographic consequences for the long-term persistence of that population.

Direct effects ~ Direct effects are those occurring at the same time and place as the triggering action.

Dispersal ~ The process whereby individuals leave one habitat or landscape to seek another habitat or landscape in which to live.

Effective separation ~ Spatial or temporal separation, between wild sheep and domestic sheep or goats, resulting in minimal risk of contact and subsequent transmission of respiratory disease between animal groups.

Endangered species ~ A species that is in danger of extinction throughout all or a significant portion of its range.

Environmental justice ~ The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.

Forage ~ Browse and herbage that is available and may provide food for grazing animals or be harvested for feeding.

Forb ~ Any herbaceous plant other than those in the Poaceae (grass), Cyperaceae (sedge), and Juncaceae (rush) families.

Grass ~ A member of the Poaceae family.

Grazing permit ~ A document authorizing livestock to use National Forest System lands or other lands under Forest Service control for livestock production.

Head month ~ One month's use and occupancy of the range by one animal. For grazing fee purposes, it is a month's use and occupancy of range by one weaned or adult cow with or without calf, bull, steer, heifer, horse, burro, or mule, or five sheep or goats.

Herd ~ An assemblage of animals usually of the same species.

Herder ~ One who tends livestock on rangeland (usually applied to the person herding a band of sheep or goats).

Herding ~ The handling or tending of a herd.

Heritage resources ~ These consist of sites, features, and values having scientific, historical, educational, and/or cultural significance. They include concentrations of artifacts, structures, landscapes, or settings for prehistoric or historic events.
Heritage resource inventory ~ A systematic, on-the-ground search designed to identify the locations of heritage resources. Heritage resources identified in such inventories are recorded on State of Colorado cultural resource site forms which includes a determination of the significance of individual sites.

Historic habitat ~ Based on historic records, landscape that was previously occupied by bighorn sheep and thought to have provided necessary requirements to sustain a wild sheep population through time.

Indirect effects ~ Indirect effects are those occurring at a later time or distance from the triggering action.

Interaction ~ Synonymous with “Contact.”

Interdisciplinary team ~ A group of individuals from different resource backgrounds assembled to solve a problem or perform a task.

Irretrievable commitments of resources ~ Losses that are in effect for a period of time. An example is a grazing allotment that is managed to remain in poor condition. The gap between its current condition and its potential productivity is an on-going irretrievable loss.

Irreversible commitments of resources ~ Changes that cannot be reversed, except in the extreme long term. An example is when a species becomes extinct; this is an irreversible loss.

Key area ~ A portion of rangeland selected because of its location, grazing or browsing value, or use. It serves as a monitoring and evaluation point for range condition, trend, or degree of grazing use. Properly selected key areas reflect overall acceptability of current grazing management over the rangeland.

Landtype association (LTA) ~ An ecological mapping unit based on similarities in geology, soils, and plant associations. Repeatable patterns of soil complexes and plant communities are useful in delineating map units. Landtype associations are an appropriate ecological unit to use in Forest- or area-wide planning and watershed analysis (on the Forest, soil mapping units were aggregated into 13 distinct landtype associations).

Livestock use permit ~ A permit issued when the primary purpose of grazing use on National Forest System lands or lands controlled by the Forest Service for reasons other than livestock production.

Management area ~ An area that has common direction throughout that differs from neighboring areas. The entire forest is divided into management areas, with each area described, and policies and prescriptions relating to their use listed. Also called management-area prescription.

Movement corridor ~ Routes that facilitate movement of animals between habitat fragments.

Occupied habitat/range ~ Suitable habitat in which a wild sheep population currently exists.
**Permitted livestock** ~ Livestock presently being grazed under a permit or those that were grazed under a permit during the preceding season, including their offspring retained for herd replacement.

**Permittee** ~ Any entity that has been issued a grazing permit.

**Permitted use** ~ The number of animals, period of use, and location of use specified in Part 1 of the grazing permit.

**Present net value** ~ An economics term that considers the present value of the cash inflows less the present value of the cash outflows (it considers the time value of money).

**Proposed species** ~ A species that has been officially proposed by the U.S. Fish and Wildlife Service for listing as threatened or endangered.

**Redd** ~ A spawning nest made by fish.

**Riparian area** ~ A geographically delineable area with distinctive aquatic and riparian ecosystem values and characteristics.

**Riparian ecosystem** ~ A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

**Risk/risk assessment/risk management** ~ In this context, evaluation of the probability that a wild sheep population could experience a disease event with subsequent demographic impacts.

**Salting** ~ Providing salt as a mineral supplement for animals. Placing salt on the rangeland in such a manner as to improve distribution of livestock.

**Scoping** ~ Contact/discussion with the public, internally, and with agencies and tribal governments over a proposed action to determine the scope of issues to be addressed.

**Sensitive species** ~ A species that is not presently listed as threatened or endangered by the U.S. Fish and Wildlife Service, but a population viability concern has been identified as evidenced by: (1) significant current or predicted downward trends in population numbers or density, and/or (2) significant current or predicted downward trends in habitat capability that may reduce a species' existing distribution.

**Spatial separation** ~ A defined physical distance between animal populations.

**Stock driveway** ~ A strip of land specifically designated for the controlled movement of livestock.

**Soil compaction** ~ Soil that has a 15% increase in bulk density over natural undisturbed conditions.

**Soil erosion hazard** ~ A rating of a soil’s potential to erode.

**Soil health** ~ An assessment of soil physical, biological, and chemical conditions related to growing plants (forests and grasslands) over the long term.

**Soil standards** ~ A requirement that no more than 15% (area extent) of an activity area may be compacted, eroded, displaced, puddled, or severely burned. In addition, in order
to maintain soil fertility, organic matter must be maintained on soils with little organic matter reserves.

**Structure class** ~ A classification of forested cover types which aggregates habitat structural stage into broader categories. Each category is defined in the table shown under habitat structural stage.

**Succession** ~ The process of vegetative and ecological development whereby an area becomes successively occupied by different plant communities.

**Suitable habitat** ~ In context for bighorn sheep, landscape that has all necessary habitat requirements to sustain a wild sheep population through time.

**Suitable rangeland** ~ Areas where grazing is appropriate considering economics, environmental consequences of livestock grazing, rangeland conditions, and the other uses or values of an area.

**Temporal separation** ~ Segregating animal populations over time to prevent association, such that they may occupy the same physical space but at different times.

**Threatened species** ~ A species that is in danger of extinction throughout all or a significant portion of its range.

**Trailing** ~ Controlled directional movement of livestock.

**Transmission** ~ The physical transfer (direct or indirect mechanisms) of a disease agent from one animal to another, either within an animal population or between animal populations. In some instances, transmission can lead to full expression of disease in individuals or populations.

**Unoccupied habitat/range** ~ Suitable habitat in which a wild sheep population does not currently exist.

**Viability** ~ The demographic and genetic status of an animal population whereby long-term persistence is likely.

**Watershed condition** ~ Watershed condition is assessed by calculating the acreage of all surface disturbances that have occurred over time within each watershed area. Acreages for each kind of disturbance are adjusted to get an equivalent roaded area and then added together to get an accumulated total disturbed area. Watershed disturbance is compared to concern levels established in the Forest Plan to determine whether cumulative watershed disturbances are likely to pose a threat to watershed health.
References Cited


Tranel, J.E., Sharp, R.L., Deering, J., and Dalsted, N. (2013). Lease rates for privately owned, non-irrigated pasture for 2013. Agriculture and Business Management,
Colorado State University Extension and the Department of Agricultural and Resource Economics, Fort Collins, CO.


Appendix A: Notification Protocol

Herder Sees Bighorn near Domestic Sheep

1) Herder Makes Phone Calls
2) Herder Hazes Bighorn Away from Area

**Phone Calls**

- Divide District Wildlife Biologist
- CPW District Wildlife Manager Creede
- CPW District Wildlife Manager South Fork
- CPW Terrestrial Biologist

- Divide District Range Conservationist
- District Ranger
- Livestock Permitees

**Assumptions:**
1. Domestic sheep are being trailed to or are within the Wishbone Allotment.
2. Extent of calling tree activation may depend on specifics of report.
3. Additional personnel not listed on this tree may be notified by key personnel.

FS/CPW Receives Report of Stray Domestic Sheep from the general public/Sheriff

**Minimum Information Needed:**
1) Phone number of reporting party
2) Where? GPS Location?
3) When? How Many?
4) Were Bighorns seen in the area?

- CPW 719-587-6900
- Forest Service 719-657-3331
- Reporting Party
- CPW 719-587-6900
- Forest Service 719-657-3331

- CPW District Wildlife Manager Creede
- CPW District Wildlife Manager South Fork
- CPW Terrestrial Biologist

- Divide District Range Conservationist
- Divide District Wildlife Biologist
- District Ranger
- Livestock Permitees

**Assumptions:**
1. Domestic sheep are being trailed to or are within the Wishbone Allotment.
2. Extent of calling tree activation may depend on specifics of report.
3. Additional personnel not listed on this tree may be notified by key personnel.