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Agriculture

Forest
Service

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Environmental Assessment

Weminuche Landscape Grazing Analysis

ALLOTMENTS:
Burnt Timber,
Canyon Creek,
Cave Basin,
East Silver Mesa,
Fall Creek,
Flint Creek,
Johnson Creek,
Leviathan,
Pine River,
Rock Creek,
Spring Gulch,
Tank Creek, and
Virginia Gulch

Columbine Ranger District,
San Juan National Forest
Hinsdale, La Plata, and San Juan Counties, Colorado
T36-40N, R4-9W, N.M.P.M:

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TABLE OF CONTENTS

Table of Contents	ii
List of Tables	iii
List of Figures	iii
Summary	4
Chapter 1 – INTRODUCTION	6
1.1 Analysis Area	6
1.2 Background	9
1.3 Existing Conditions	12
1.4 Desired Conditions	16
1.5 Purpose and Need for Action	17
1.6 Proposed Action Summary	18
1.7 Compliance with Administrative Framework	24
1.8 Best Available Science	31
Chapter 2 - ALTERNATIVES	33
2.1 Alternative Development	33
2.2 Alternatives Considered but Eliminated From Detailed Analysis	36
2.3 Alternatives Considered in Detail	37
2.4 Design Criteria Common to Alternatives 2, 3, and 4	53
2.5 Comparison of Alternatives	68
Chapter 3 - AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES..	70
3.1 Rangeland Management	70
3.2 Soil / Water	75
3.3 Vegetation	82
3.4 Recreation /Wilderness	92
3.5 Wildlife – Threatened and Endangered Species	101
3.6 Wildlife – Sensitive Species	109
3.7 Wildlife – Management Indicator Species	126
3.8 Fisheries	134
3.9 Socioeconomics	139
3.10 Cultural Resources	143
3.11 Roadless Areas	148
Finding of No Significant Impact	151
Appendix A – Rational for Allotment Recommendations.....	154
Appendix B - Acronyms and Glossary.....	157
Appendix C - Citations and References	158
Appendix D – Bighorn Risk Assessment.....	164

List of Tables

Table 1-1. Sheep Stocking by Allotment	11
Table 1-2. Existing & Desired Conditions, Need for Change, and Adaptive Options	19
Table 2-1. Current Grazing Management by Allotment.....	39
Table 2-2. Design Criteria for General Management of Domestic Sheep	54
Table 2-3. Design Criteria to minimize contact between Bighorn and Domestic Sheep	60
Table 2-4. Design Criteria for General Management of Cattle	64
Table 2-5. Potential Adaptive Options (all classes of livestock).....	67
Table 2-6. Comparison of Alternatives Based on Key Issues.....	68
Table 2-7. Comparison of Allotment Acreage and Status for Alternatives 2, 3,&4.	69
Table 3-1. Vegetative Composition of Allotments Within the Analysis Area.	84
Table 3-2. Federally Listed Terrestrial Species for the SJNF	102
Table 3-3. FS Region 2 Terrestrial Sensitive Wildlife Species for the SJNF.....	110
Table 3-4. Summary of Risk Assessment Rankings.....	119
Table 3-5. Terrestrial MIS identified in the Forest Plan.....	127
Table 3-6. Forest-wide habitat and population trends for MIS.....	128
Table 3-7. Acres of habitat affected by domestic sheep grazing for MIS	128

List of Figures

Figure 1-1. Project Analysis Area.....	7
Figure 1-2 . Trailing Routes Outside the Project Boundary	8
Figure 1-3. Existing Conditions/Monitoring Points	13
Figure 1-4. Bighorn Overlap with Current Allotment Boundaries.....	14
Figure 1-5. Roadless and Wilderness	15
Figure 1-6. Forest Plan Management Areas.....	27
Figure 1-7. Suitable Grazing Acres	28
Figure 2-1. Alternative 3 – Adaptive Management w/Forage Reserves	49
Figure 2-2. Alternative 3 – Existing and Proposed Improvements for Canyon Creek Allotment	50
Figure 2-3. Alternative 4 –Proposed Action - Adaptive Management / Closing Vacant Allotments.....	52
Figure 3-1. Watershed Boundaries.....	76
Figure 3-2. Bighorn Herd Areas and Proposed Open Allotment Boundaries.....	118

SUMMARY

The proposed action analyzed in this Environmental Assessment (EA) constitutes a federal action with the potential to affect the quality of the human environment on Forest Service (FS) lands. Therefore, these projects must be analyzed pursuant to the National Environmental Policy Act (NEPA), which directs federal agencies to carefully consider environmental concerns in the decision-making process and provide relevant information to the public for review and comment.

The FS has prepared this EA in compliance with NEPA and other relevant Federal and state laws and regulations. This EA discloses potential direct, indirect, and cumulative effects on the human and biological environment estimated to result from the implementation of the alternatives analyzed.

The Columbine Ranger District proposes to continue to authorize livestock grazing on all or portions of the Weminuche Landscape in such a manner that will meet or move resource conditions toward desired conditions, and be consistent with the Forest Plan direction, standards and guidelines.

The proposed action is designed to increase the flexibility of livestock grazing systems through adaptive management, which will allow quicker and more effective response to problems areas when they are revealed. Problems will be revealed through the use of short- and long-term monitoring. Application of adaptive management practices should result in healthier soil, watershed, and vegetative conditions.

The analysis area encompasses approximately 166,627 acres on six active sheep allotments, seven vacant sheep allotments, and a small portion of the previously closed Needles Mountains Allotment (*SJNF 2009*). The area is located northeast of Durango, Colorado, in Hinsdale, La Plata, and San Juan Counties, in Townships 36-40 North, Ranges 4-9 West, N.M.P.M. and is within the Columbine Ranger District, San Juan National Forest, Colorado.

Livestock grazing has been determined by the San Juan National Forest Land and Resource Management Plan (*SJNF 2013*), hereafter referred to as the Forest Plan, to be an appropriate use of the public lands and falls under congressional multiple-use mandates (*P.L. 86-517, 1960; P.L. 94-579, 1976*). This action is needed at this time because in the early 1990's, the courts determined that livestock grazing permits should not be re-issued without sufficient National Environmental Policy Act (NEPA) analysis.

Internal and external scoping has revealed five significant issue topics relating to livestock grazing on the landscape:

- Soil/Water Impacts
- Vegetation Impacts
- Recreational Experience Impacts
- Wildlife Impacts
- Socio-Economic Impacts

These issues led the agency to develop four alternatives:

- Alt. 1: No Action – No Livestock Grazing (required by law)
- Alt. 2: No Change – Current Management
- Alt. 3: Adaptive Management / Forage Reserves
- Alt. 4: Proposed Action - Adaptive Management / Close Vacant Allotments

Major conclusions are that while the landscape is generally in good condition, most natural resources benefit from Alternatives 3 and 4 over Alternative 2, including Water Quality, Vegetation and Soils, Recreation, Wildlife, and Cultural Resources. Alternatives 3 and 4 include design criteria specifically designed to address issues regarding such things as bighorn sheep, and certain areas of recreational conflict. Alternative 4 would allow more protection for bighorn sheep but would also reduce flexibility of having forage reserves. Alternative 1 would be of greatest benefit to natural resources, but would have negative socio-economic impacts. Adding Alternative 4 allows for a better range of reasonable alternatives to analyze potential effects to the analysis area.

Based upon the effects of the alternatives, the responsible official will decide whether livestock grazing will proceed as proposed, as modified, or not at all; on all or part of the Weminuche Landscape; and if grazing proceeds, will decide what activities, monitoring, and mitigation will be implemented.

CHAPTER 1 – INTRODUCTION

1.1 Analysis Area

The Weminuche Landscape is located northeast of Durango and is within T36-40N, R4-9W, N.M.P.M on the Columbine Ranger District, San Juan National Forest (SJNF), Hinsdale, La Plata, and San Juan Counties, Colorado. The analysis area is approximately 166,627 acres in size. Approximately 162,599 acres of the analysis area (98%) are on National Forest System lands. The remaining 4,028 acres are split out between Durango Reservoir Grant lands (City Reservoir) at 2,962 acres and private lands at 1,066 acres within the boundaries of the National Forest. The Weminuche Wilderness covers 85% of the analysis area. The remaining 15% is on non-wilderness lands. See Figure 1-1, p.7.

The majority of the project area is located just west and south of the Continental Divide, in extremely rugged and colorful volcanic mountains, with elevations ranging from approximately 7,200 feet to 14,100 feet. The Florida and Pine Rivers and Vallecito Creek have their headwaters in the project area. The project area is principally alpine tundra, mountain grasslands, and spruce-fir forest. There are smaller areas of aspen, mixed conifer, ponderosa pine, and mountain shrub communities. Cirques and talus-covered slopes, along with numerous streams, fens, and lakes add diversity to the rugged landscape.

The allotments included in this analysis are: Burnt Timber, Canyon Creek, Cave Basin, East Silver Mesa, Fall Creek, Flint Creek, Johnson Creek, Leviathan, Pine River, Rock Creek, Spring Gulch, Tank Creek, and Virginia Gulch Allotments.

Various sections of roads and trails may be used for trailing livestock to reach the grazing allotments in this landscape; some trailing routes are outside the analysis area project boundary, and have been included in this analysis. The trailing routes include the following:

- U.S. Highway 160,
- County Roads: 151, 172, 240, 243, 318, 319, 501, 502, 521, 523, 527
- Forest Roads: 076 (Red Rim 2), 081 (Lime Mesa), 595 (Red Rim), 597 (Endlich Mesa), 602 (Pine River), 682 (Missionary Ridge), 724 (Middle Mountain), 775 (Saul's Creek)
- Trail segments of: Pine River Trail 523, Vallecito Creek Trail 529, Cave Basin Trail 530, Young's Canyon Trail 546, and Lime Mesa Trail 676
- A right of way across MacDonald Becket Family Trust properties, and its successors, for access to Canyon Creek Allotment and other cattle allotments.

Figure 1-2 on page 8 displays the trailing routes outside of the analysis area, relative to their location in proximity to Durango and Bayfield.

Figure 1-1. Project Analysis Area

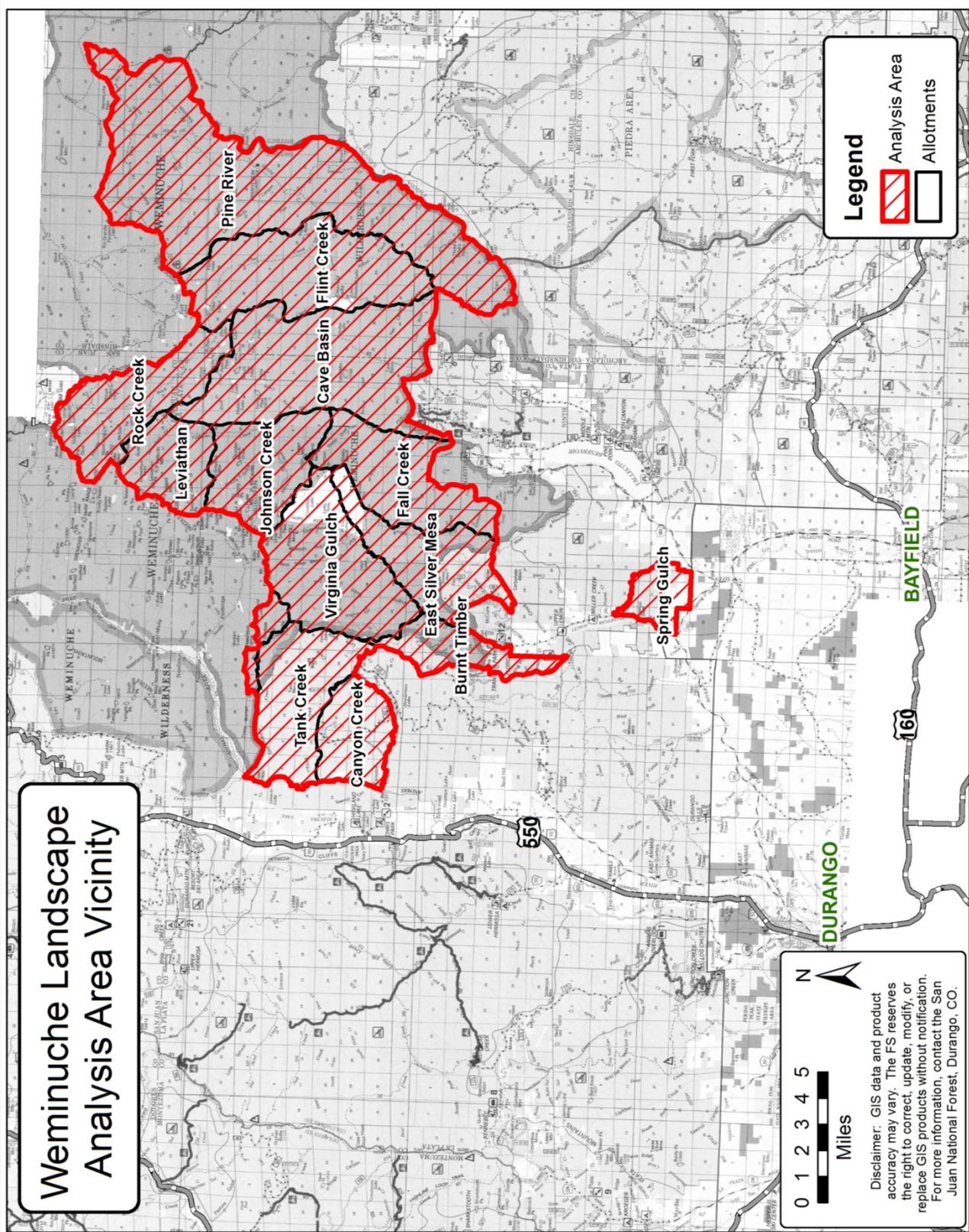
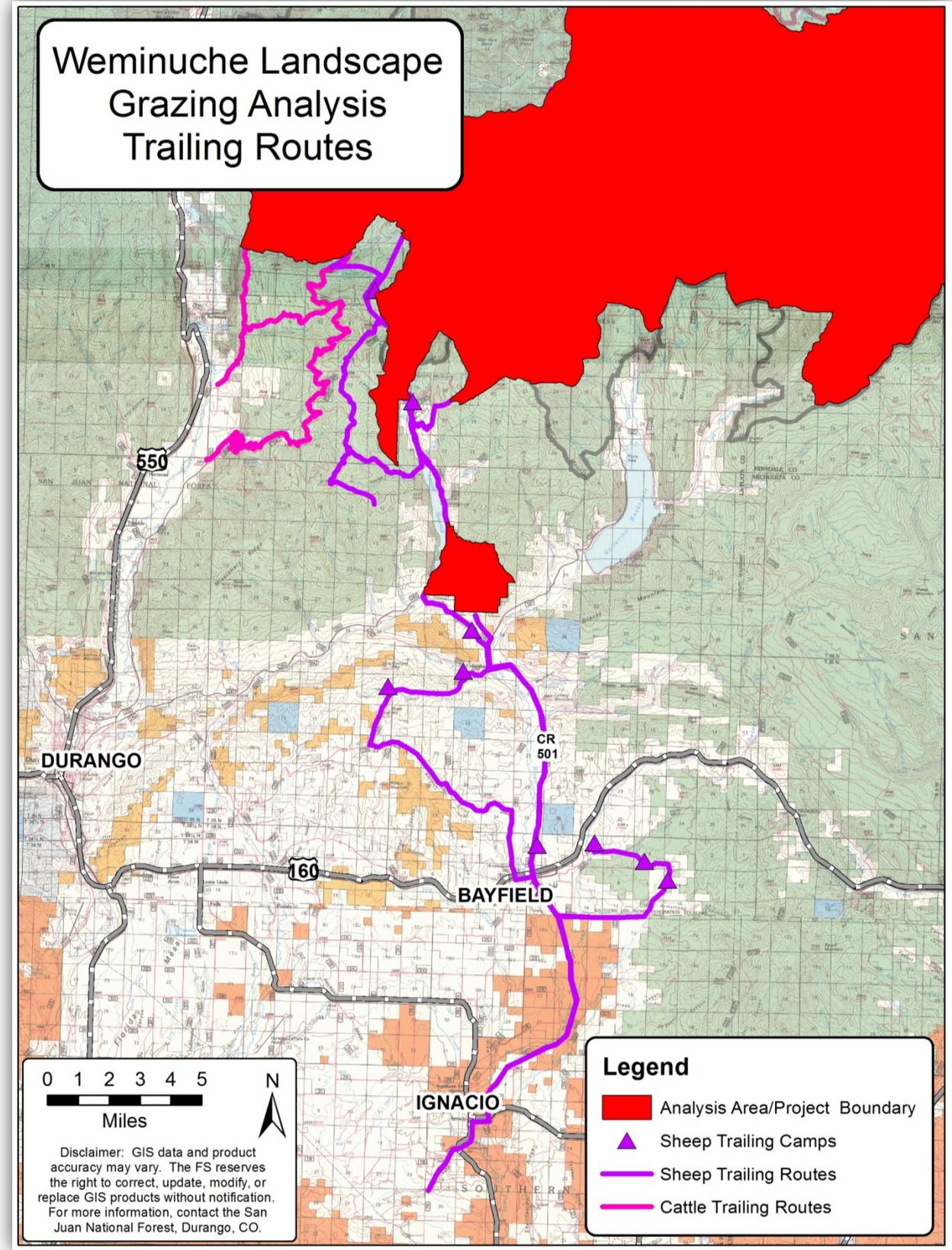


Figure 1-2 . Trailing Routes Outside the Project Boundary



1.2 Background

Livestock grazing is just one of many activities that occur on the Weminuche Landscape. The project area has increasingly become a destination for recreation. Primary recreation activities include hiking and backpacking, viewing wildlife, fishing, snowmobiling, and backcountry skiing. There are two developed Forest Service campgrounds and several trailheads in the landscape. The Continental Divide Trail passes through the landscape. A major portion of the landscape is in the Weminuche Wilderness.

This area has a long history of sheep and cattle grazing; there are currently six active and seven vacant sheep grazing allotments in the analysis area. Prior to the establishment of the San Juan Forest Reserve in 1905, the San Juan Mountains were used as summer range by large bands of domestic sheep from both Colorado and New Mexico, with the first small bands of sheep arriving in the Bayfield/Durango area in 1882 (*Scott 1932*). It is estimated that by 1902, there were approximately 268,000 sheep in the San Juan Mountains. Sheep grazing was generally confined to the higher elevation range above 10,000 feet in elevation (*DuBois 1903*). Livestock grazing was unregulated prior to the establishment of Forest Reserves, with season of use based on weather and vegetative development. Generally, sheep would begin slowly working their way up into the high country in May or June, eventually arriving on the highest elevation summer ranges in early July. They started to leave the high country sometime between September 15 and October 1 (*DuBois 1903*).

At this time (1903), there was no division of allotments, so range was grazed on a first come first serve basis, with some areas grazed multiple times in a season. Sheep were usually herded close together, which made it easier for herders to keep watch over the flocks and prevent individual animals from wandering. These large, close-herded bands were constantly moving ahead into fresh grazing, which caused damage to forage from close cropping and trampling. Bed grounds that were used for long periods of time, or that were used season after season, also became denuded and trampled (*Roberts 1963*). DuBois reported that large numbers of sheep prior to 1903 had already left definite trails through some alpine areas – especially in topographic constrictions (narrow, steep or rocky terrain). Sheep also caused damage to previously well-defined trails by widening the trails, causing braiding of the trails and making the actual trail difficult to locate (*DuBois 1903*).

Following the establishment of the San Juan Forest Reserve in 1905, many changes in management were implemented in an effort to properly manage the rangeland resource. Some of the noteworthy changes included dividing the sheep range into distinct grazing districts (allotments) and assigning these areas to specific permittees with designated numbers and seasons of use, including the designation of specific trailing areas to be used to access the allotments. Other important management changes implemented during this time included the adoption of open herding, which allowed sheep to spread out and graze with a minimum of driving, which resulted in less overgrazing and less trampling. Use of bed grounds was also restricted to no more than three nights in one place in order to reduce adverse impacts to soils and vegetation.

Although it is difficult to precisely track historic sheep stocking rates, because of frequently-changing allotment boundaries and dates of use, a search of historic records gives a general picture of the early days of regulated grazing on the San Juan National Forest. The earliest grazing reports located were from the Annual Grazing Report for the San Juan National Forest,

1908, and show 109,359 sheep and goats authorized to graze on the San Juan National Forest in the area now covered by the Columbine and Pagosa Districts. Historic records show the highest stocking of domestic sheep and goats in that same area to be approximately 198,400 in 1920. From that period on, there were steady declines in stocking. By 1940, there were roughly 104,000 sheep.

By 2013, on the whole Columbine Ranger District, there are now nine active sheep allotments permitted for 6,100 sheep, two sheep forage reserves allotments, and another seven vacant sheep allotments. On the Weminuche Landscape, relevant to this environmental document, there are currently four active sheep allotments (Canyon Creek, East Silver Mesa, Tank Creek, and Virginia Gulch), two “pass-through” sheep allotments (Burnt Timber and Spring Gulch) for a total of approximately 3,550 ewes plus lambs (which are not counted). The Canyon Creek Allotment is being temporarily run with 269 cow-calf pairs.

In summary, the trend in permitted sheep grazing has steadily declined over the years, and is dramatically lower in numbers and distribution than historical use. Several allotments in the landscape have been used off-and-on by cattle over the years (Burnt Timber, Canyon Creek, Fall Creek, and Spring Gulch). The allotments files indicate that many of the currently vacant allotments, notably Johnson, Leviathan, Pine River, and Rock Creek had a history of non-use attributed in part to difficult access and conflicts with high recreational use (*Whitmer 2011*). While many factors have contributed to the decline in sheep stocking on the Columbine Ranger District, the predominant factor is probably the steady decline in demand for wool and lamb.

Table 1-1 shows the total allotment acres, the highest recorded use, the currently permitted numbers of each allotment, the average stocking rate during the last five years of stocking, and the last year each allotment in the analysis area was stocked by domestic sheep. This information was derived from Forest Service allotment files (*Whitmer 2011*).

Table 1-1. Sheep Stocking by Allotment

Allotment	Total Acres	Highest Recorded Sheep Numbers*	Currently Permitted Sheep Numbers	Actual Use (last 5-year ave.)	On Date Range	Off Date Range	Days of use	Last year of actual sheep use
Burnt Timber+ -CanyonCrk band -Tank Crk band -VA Gulch band	5,148	(2625)**	(1550)**	(2075)**	6/24 - 7/4 6/25 - 7/5 6/26 - 7/6	9/14 - 9/30 9/18 - 9/24 9/16 - 10/1	27 18 27	2012 2013 2013
Canyon Creek+	6,328	600	600	600	7/5	9/13	71	2012
E. Silver Mesa+	9,733	850	700	775	7/1	9/25	87	2013
Spring Gulch+	3,077	700	700	700	6/15 - 6/30	9/22 - 10/5	16	2013
Tank Creek+	10,954	1000	700	700	7/6	9/14	71	2013
Virginia Gulch+	14,375	1025	850	775	7/10	9/15	68	2013
Cave Basin	22,452	1400	0	0	7/1	9/15	77	1988
Fall Creek	10,939	1000	0	0	7/1	9/15	77	1968
Flint Creek	16,358	950	0	0	1/1	9/15	77	1972
Johnson Creek	9,456	388	0	0	7/16	9/15	62	1968
Leviathan	6,530	900	0	0	7/1	9/15	77	1970
Pine River	38,843	3600	0	0	7/1	9/15	77	1980
Rock Creek	10,880	1800	0	0	7/1	9/15	77	1970

+Active allotments are shaded in the table

*Highest numbers in any year for the allotment in its present configuration

**same sheep as for the corresponding three allotments

1.3 Existing Conditions

The need for a change in management is identified by comparing what is desired across the landscape (desired conditions) to what currently exists on the landscape in the analysis area (existing conditions).

Existing Conditions for Riparian and Upland Vegetation: In 2009-2012, the FS collected data to document existing conditions across the landscape. Upland data points were rated using the Rangeland Health Evaluation Matrix (RHM) methodology (*USDA 1996*), which is a qualitative ranking of conditions based on Abiotic Characteristics, Vegetative Conditions, and Recovery Mechanisms. Each site results in a ranking of “Healthy”, “At Risk”, or “Unhealthy”. A trend was assigned as either “stable,” “upward,” “downward,” or “not apparent.”

Riparian data points were evaluated using the Proper Functioning Condition (PFC) methodology (*USDA 1996*), which is a qualitative ranking of riparian conditions based on Hydrology, Vegetation, and Erosion. Each site results in a ranking of “Functional,” “Functional-At Risk,” or “Nonfunctional.” A trend was then assigned to each site the same as for the upland sites.

Table 1-2 (p. 19) and Figure 1-3 (next page) show the results these ratings. Of a total of 53 data points (38 upland RHM data points and 15 riparian PFC data points), 50 points were meeting desired conditions (described in *Section 1.4* on page 16). The remaining three points do not meet desired conditions and consisted of: one RHM rated Healthy with a downward trend, one RHM rated At Risk with a downward trend, and one PFC rated At Risk with an unapparent trend.

Examination of the body of available data reveals that, for the project area at the overall landscape level, vegetative conditions are meeting desired conditions (94% of the data points). However, there are isolated areas of concern noted by FS personnel, specifically at bed grounds and trailing “choke points.” More detailed descriptions of the data can be found in Affected Environment of the Water and Vegetation sections in Chapter 3.

Existing Conditions for Bighorn: Figure 1-4 displays current grazing allotments and mapped bighorn sheep summer range. There are currently about 44,457 acres of potential mapped overlap in the Weminuche Landscape, with 986 acres in active allotments and 43,471 acres in vacant allotments. This existing condition is undesirable due to potential for contact between domestic sheep and bighorn sheep, leading to the possibility of disease transmission between the two species.

Existing Conditions for Wilderness: Figure 1-5 displays where grazing allotments and wilderness overlap. Because the desired conditions for wilderness are related primarily to vegetation conditions, the conclusions for existing wilderness conditions are generally the same as for vegetative existing conditions, in that existing conditions are generally meeting desired conditions. However, there were isolated locations within wilderness (Emerald and Pearl Lakes, along the Lime Mesa Trail, Stump Lakes, and Burnt Timber Trail) where conditions were noted to be of concern.

Figure 1-3. Existing Conditions/Monitoring Points

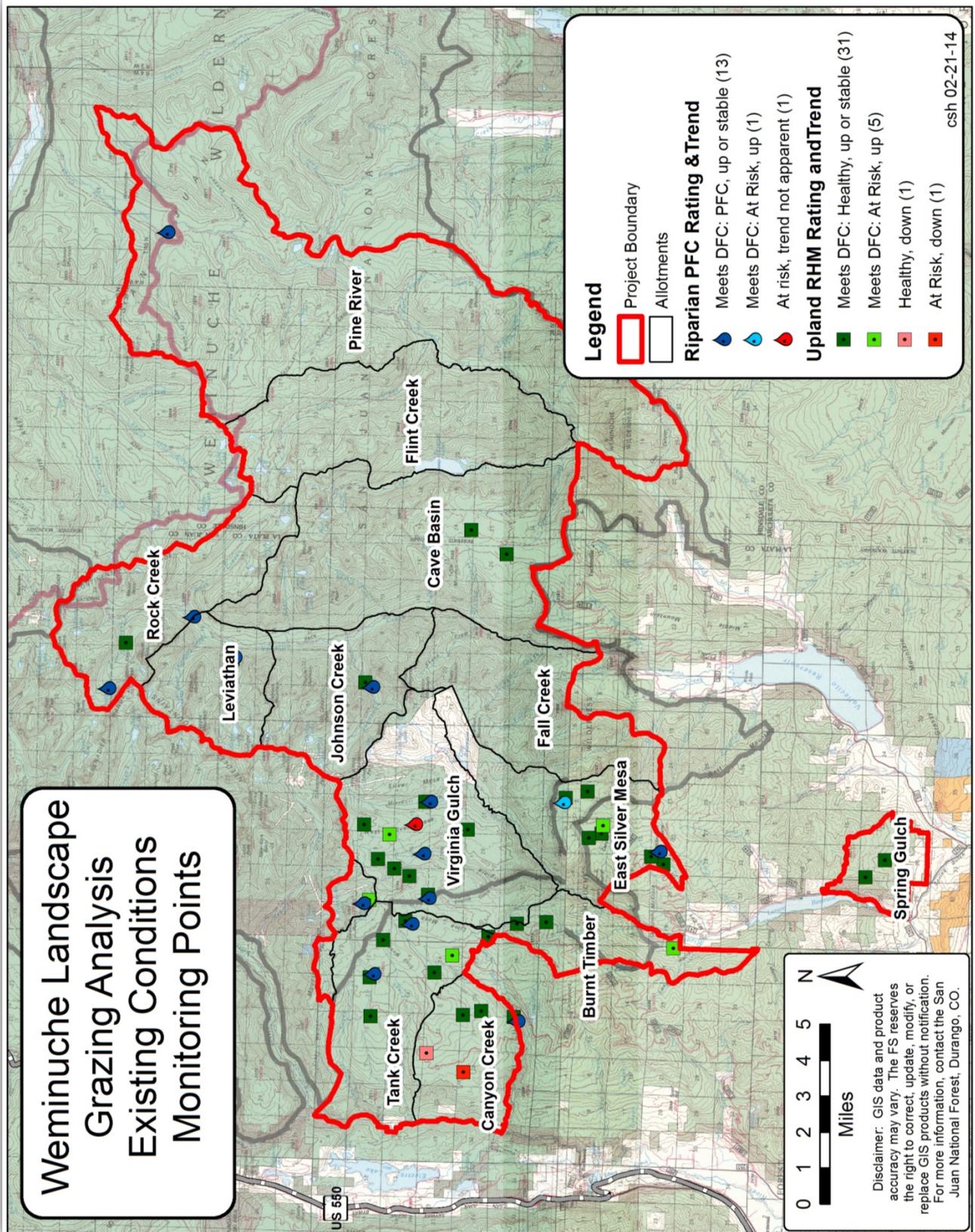


Figure 1-4. Bighorn Overlap with Current Allotment Boundaries

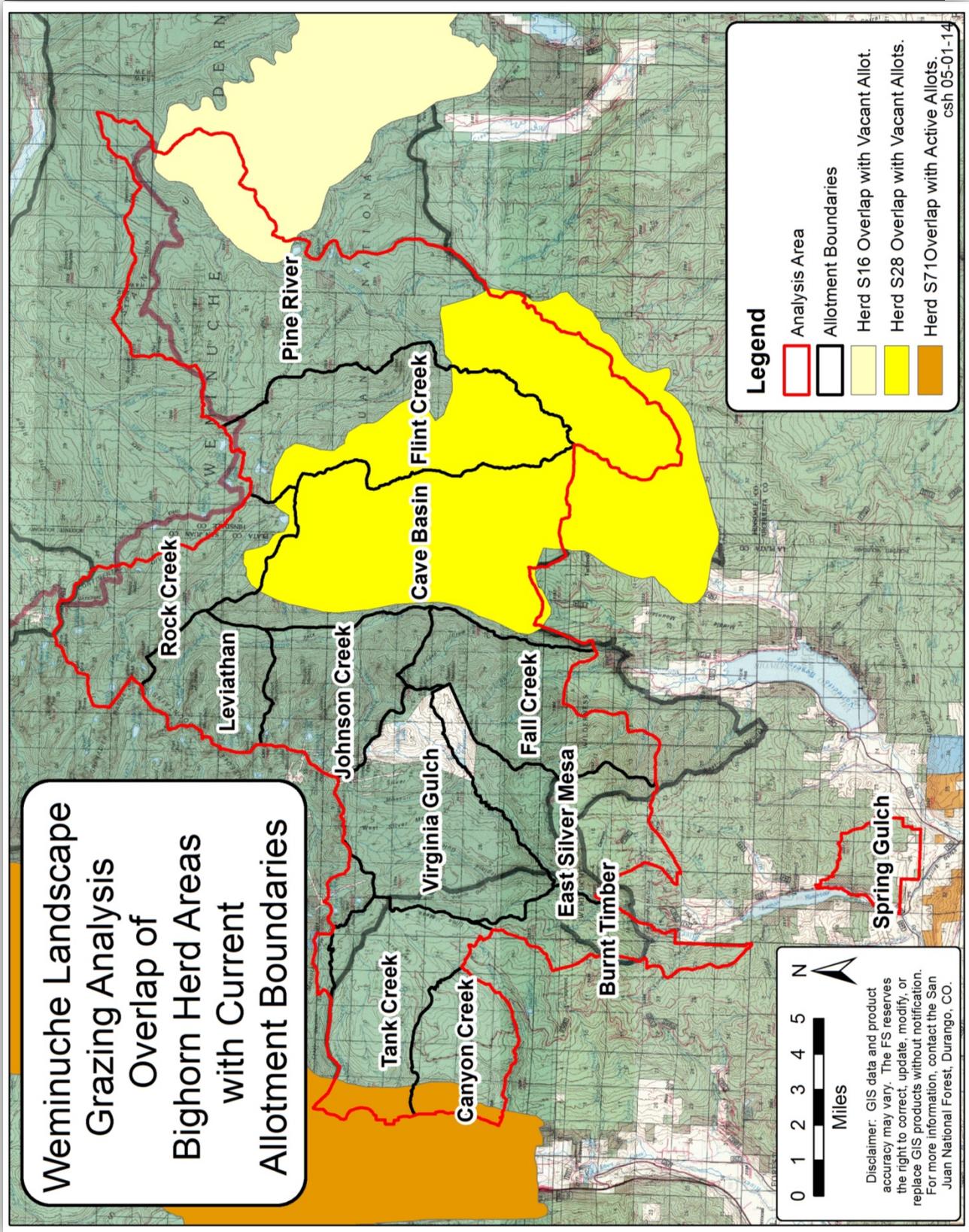
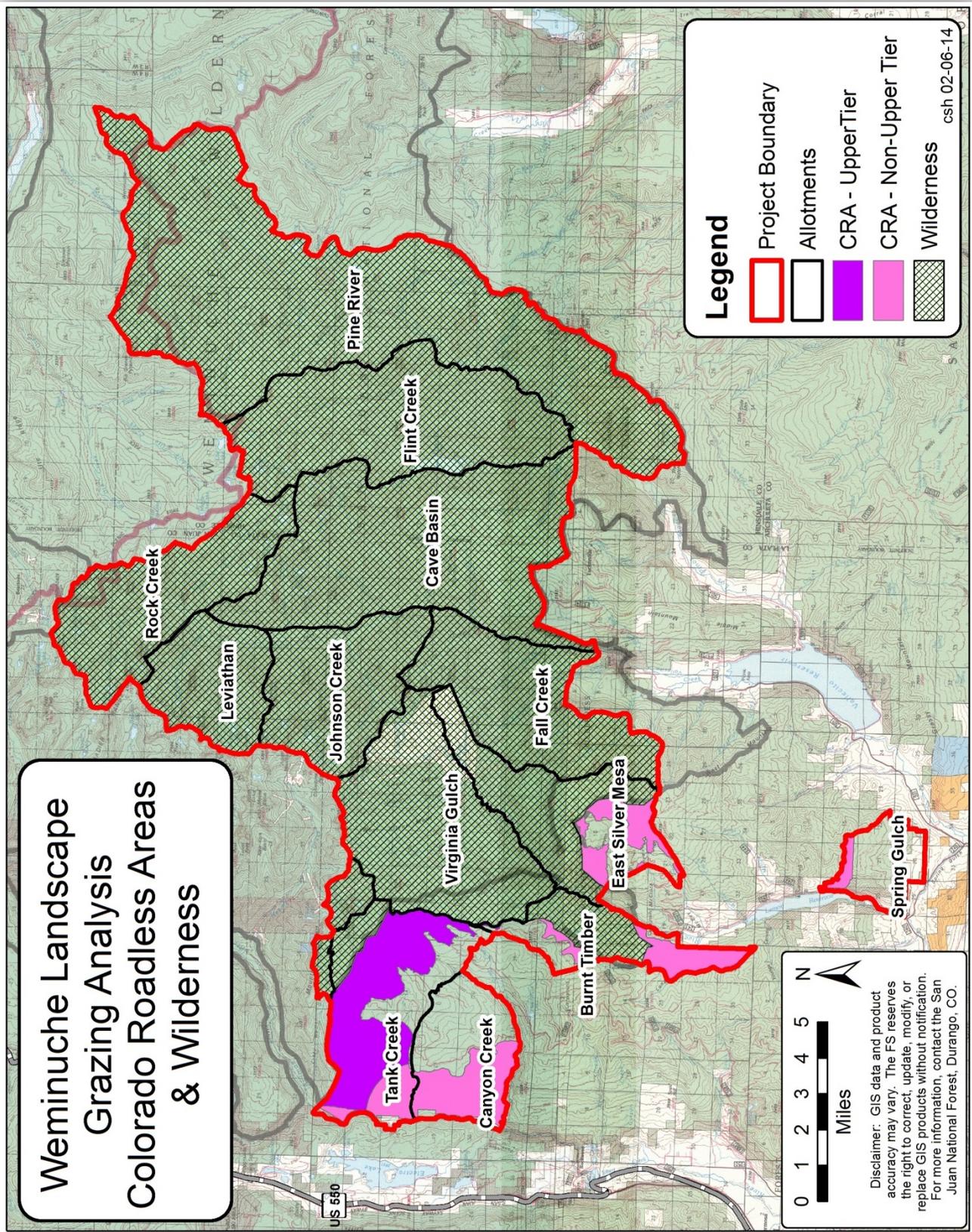


Figure 1-5. Roadless and Wilderness



1.4 Desired Conditions

The desired conditions, standards, and guidelines listed in the Forest Plan, and the 1998 Wilderness Management Direction, provide a basis for the definition of site-specific desired condition goals (see page 24). For this project, landscape scale desired conditions are defined for the entire analysis area, and site-specific desired conditions are defined for benchmark sites and/or key areas. *Benchmark areas* are sites sensitive to changes in land management activities, represent the key resources and concerns associated with the project, and are used to measure long-term conditions and trends relative to project activities. *Key areas* are implementation monitoring sites and serve as annual monitoring sites. Key areas may also serve as benchmark sites for long-term trend monitoring. Benchmark and/or key areas do not necessarily represent conditions over entire allotments. Some benchmark areas and key areas have been established and more may be established as needed in the future. Benchmark areas and key areas will generally be open meadows or other areas in suitable range most likely to be grazed by permitted livestock. The desired conditions defined by the Interdisciplinary Team are as follows:

At the landscape scale:

Bighorn Sheep: Reduce or eliminate overlap between active domestic sheep allotments and mapped bighorn sheep summer ranges. Prevent physical contact between bighorn sheep and domestic sheep. Manage domestic sheep to achieve effective separation from bighorn sheep.

Allowable Use: Utilization guidelines will be met across the analysis area, as defined in the Forest Plan (p.24).

Noxious Weeds: No increase in noxious weeds in the analysis area as a result of domestic sheep grazing activities.

At the site-specific scale:

Plant Community: Native grass and forb species will continue to dominate in both the short and long term.

Upland Rangeland Health: Rangelands will be Healthy with a stable or upward trend; or if At-Risk, the trend will be upward. Vigor and production on all grass and forb species will be high. There will be no increase in noxious weeds as a result of domestic sheep grazing activities. There will be no soil loss off-site, and no pedestaling or gully formation will occur as a result of domestic sheep grazing activities.

Riparian Health: Riparian conditions will be Functional; or if Functional-At Risk, the trend will be upward.

1.5 Purpose and Need for Action

The purpose of this action is to continue to authorize term livestock grazing on all or portions of the Weminuche Landscape in such a manner that will meet or move existing resource conditions toward desired conditions, and be consistent with the Forest Plan direction, standards and guidelines. The site-specific need for those areas where desired conditions are currently being met is to maintain or improve current conditions. The site-specific need for change for those areas which are *not* meeting or moving toward desired conditions is to bring existing conditions up to, or moving towards the desired conditions in a timely manner.

The site-specific need for change in vegetative conditions is to implement adaptive grazing management practices that will improve conditions at the isolated sites that were noted to be in undesirable condition. Table 1-2 (p. 19) lists Existing Conditions, Desired Conditions, Need for Change, and some Adaptive Management Options for each individual monitoring site in the landscape.

The need for change regarding bighorn is to prevent physical contact between bighorn sheep and domestic sheep and goats. This is easily and most effectively dealt with on allotments that are not currently active by closing the allotments to domestic sheep grazing (Cave Basin, Fall Creek, Flint Creek, and Pine River). The two active allotments with mapped overlap between bighorn sheep range and domestic sheep (Canyon Creek and Tank Creek) could move toward desired conditions for bighorn sheep through re-alignment of allotment boundaries to match topographical features and suitable range on the allotments, and through application of design criteria, by maintaining current domestic sheep distribution patterns, and/or by conversion of the allotments to cattle.

There is also a need for change in proposing to re-name the East Silver Mesa Allotment to the Endlich Mesa Allotment to correctly reflect land features within the allotment and match local use of place names.

In addition, there is a need to continue to provide the opportunity for permitted domestic sheep grazing on the Columbine Ranger District. The analysis area contains lands identified as suitable for domestic livestock grazing in the Forest Plan, and authorizing future domestic livestock grazing is consistent with the goals, objectives, standards and guidelines of the Forest Plan. It is Forest Service policy to make forage available to qualified livestock operators from lands Suitable for livestock grazing consistent with land management plans (*36 CFR 222.2 (c); FSM 2203.1*), and to continue contributions to the economic and social well-being of people by providing opportunities for economic diversity and by promoting stability for communities that depend on rangeland resources for their livelihood (*FSM 2202*).

1.6 Proposed Action Summary

A detailed description of the Proposed Action can be found in *Chapter 2, Section 2.3.4*; following is a brief summary of key points of the Proposed Action. The proposed action is to continue to permit term livestock grazing by incorporating adaptive management strategies on six active allotments: Burnt Timber, Canyon Creek, East Silver Mesa, Spring Gulch, Tank Creek and Virginia Gulch. Canyon Creek would be converted to a cattle allotment. Boundary adjustments would be made to eliminate mapped overlap between domestic sheep and bighorn sheep ranges, more accurately reflect natural boundaries, and better reflect actual domestic sheep usage on the ground. As part of the boundary adjustments, the western most parts of Tank Creek and Canyon Creek would be closed to grazing except for livestock trailing to reach the allotments. The East Silver Mesa Allotment would be re-named to Endlich Mesa to correctly reflect land features within the allotment. Sheep grazing on the active sheep allotments would be eliminated when/if the current permittee's family relinquishes the sheep permit.

Cave Basin, Flint Creek, Johnson Creek, Leviathan, Pine River, Rock Creek, and most of Fall Creek Allotments would be closed to livestock grazing under term permits. A portion of western Fall Creek Allotment would be added to the East Silver Mesa Allotment.

This alternative would also include monitoring and a variety of "tools", or adaptive management actions, to meet or move towards desired resource conditions (Table 1-2, next page). Adaptive Management is designed to be flexible in regards to livestock numbers, season dates, and class of livestock. Also included in the proposed action are specific actions included in Site-Specific Design Criteria, and other general Design Criteria as described in *Chapter 2*.

Table 1-2. Existing & Desired Conditions, Need for Change, and Adaptive Options

Area	Existing Conditions	Site Specific Desired Conditions	Need for Change	Site Specific Design Criteria / Adaptive Options	Priority for Monitoring
Allotment: Burnt Timber					
Key Area: BT-RHM1 Burnt Tumber Trail; big open park north of Burnt Timber Creek <u>Vegetation type:</u> Mountain Grass	Considered healthy using the RHM form. <i>Trend:</i> stable.	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: BT-RHM2 West of Transfer Park campground <u>Vegetation type:</u> Aspen/ Mixed Conifer	Considered at risk using the RHM form. <i>Trend:</i> upward.	Improve the RMH rating to "healthy" or retain "at-risk with an upward trend".	Decrease the % of bare soil. Decrease utilization in area surrounding monitoring point	1. Establish a cover frequency monitoring location near key area. 2. Reduce utilization by minimizing length of time in area.	**
Key Area: BT-RHM3 Top of Burnt Timber along trail <u>Vegetation type:</u> Spruce Fire– old logging area – Mountain Grass	Considered healthy using the RHM form. <i>Trend:</i> stable.	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Allotment: Canyon Creek					
Key Area: CC-PFC1 Canyon Creek <u>Vegetation type:</u> Riparian within Spruce Fir upland.	Rated in proper functioning condition using the PFC form. <i>Trend:</i> stable.	The desired condition is to retain "proper functioning condition" rating.	This site is functioning properly. No need for change.		
Key Area: CC-RHM1 Canyon Creek uplands <u>Vegetation type:</u> Aspen – Mixed Conifer	Considered healthy using the RHM form. <i>Trend:</i> stable.	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: CC-RHM2 Big park south end of allotment <u>Vegetation type:</u> Spruce-Fir – Mtn grass	Considered healthy using the RHM form. <i>Trend:</i> stable.	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Benchmark Area: CC-RHM3 Big park south end of allotment <u>Vegetation type:</u> Spruce-Fir – Mtn grass	Considered healthy using the RHM form. <i>Trend:</i> stable.	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.	1. Establish a photo monitoring location near key area	**
Key Area: CC-RHM4 North end of Canyon Creek <u>Vegetation type:</u> Spruce –Fir – Mountain Grassland park	Considered healthy using the RHM form. <i>Trend:</i> downward.	The desired condition is to retain RHM rating of "healthy."	Reduce % of invaders-golden banner, death camus, and Canadian thistle.	1. Establish a photo monitoring location near key area. 2. Reduce utilization by minimizing length of time in area to allow for increased competition of native graminoids.	**
Key Area: CC-RHM5 Holding pasture near range cabin <u>Vegetation type:</u> Mountain Grass	Considered at risk using the RHM form. <i>Trend:</i> downward.	Improve the RMH rating to "at-risk with a stable or upward trend" or better.	Decrease the % of bare soil. Decrease the % of invaders in area (dandelions, golden banner, and aster)	1. Establish a cover frequency monitoring location meadow near key area. 2. Reduce utilization by minimizing length of time in area. 3. Increase % of bunch grasses by 10% within next 10 years.	**
Allotment: Cave Basin					
Key Area: CB-RHM1 Head of Second Creek west of trail <u>Vegetation type:</u> Alpine	Considered healthy using the RHM form. <i>Trend:</i> stable.	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: CB-RHM2 South part of Cave Basin allotment along trail <u>Vegetation type:</u> Mixed Conifer-riparian	Considered healthy using the RHM form. <i>Trend:</i> stable.	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.	1. Continue photo monitoring of site if cattle use the allotment.	**

Area	Existing Conditions	Site Specific Desired Conditions	Need for Change	Site Specific Design Criteria / Adaptive Options	Priority for Monitoring
Allotment: East Silver Mesa					
<u>Key Area: ESM-PFC1</u> Head of McCoy Gulch <u>Vegetation type:</u> Riparian within Spruce Fir upland.	Rated in proper functioning condition using the PFC form. <i>Trend: stable.</i>	The desired condition is to retain “proper functioning condition” rating.	This site is functioning properly. No need for change.		
<u>Key Area: ESM-PFC2</u> Trail crossing on Endlich Mesa Trail <u>Vegetation type:</u> Riparian with willows	Rated in “functional - at risk” condition using the PFC form. <i>Trend: upward.</i>	Improve the PFC rating to “Proper Functioning Condition” or retain “at-risk with an upward trend”.	Reduce trampling at trail crossing	1. Do not use trail crossing for moving sheep through allotment. Keep sheep at least 100’ away from trail.	**
<u>Key Area: ESM-RHM1</u> Head of McCoy Gulch <u>Vegetation type:</u> Mtn Grass - Spruce Fir	Considered healthy using the RHM form. <i>Trend: stable.</i>	The desired condition is to retain RHM rating of “healthy.”	This site is healthy under current management practices.		
<u>Key Area: ESM-RHM2</u> NW of Miller Mtn. <u>Vegetation type:</u> Spruce Fir	Considered healthy using the RHM form. <i>Trend: stable.</i>	The desired condition is to retain RHM rating of “healthy.”	This site is healthy under current management practices.		
<u>Key Area: ESM-RHM3</u> East of Stump Lakes <u>Vegetation type:</u> Spruce Fir logged	Considered healthy using the RHM form. <i>Trend: stable.</i>	The desired condition is to retain RHM rating of “healthy.”	This site is healthy under current management practices.		
<u>Key Area: ESM-RHM4</u> East of Stump Lakes <u>Vegetation type:</u> Mountain Grass - Spruce Fir logged	Considered at risk using the RHM form. <i>Trend: upward.</i>	Improve the RMH rating to “healthy” or retain “at-risk with an upward trend”.	Decrease the % of bare soil.	1. Establish a cover frequency monitoring location in the park near key area. 2. Reduce bare ground and soil movement linked to trail.	**
<u>Key Area: ESM-RHM5</u> NE of Stump Lakes Bedground#1 <u>Vegetation type:</u> Spruce Fir logged	Considered healthy using the RHM form. <i>Trend: stable.</i>	The desired condition is to retain RHM rating of “healthy.”	This site is healthy under current management practices.		
<u>Key Area: ESM-RHM6</u> Endlich Mesa west of trail – bedground #2 <u>Vegetation type:</u> Alpine	Considered healthy using the RHM form. <i>Trend: stable.</i>	The desired condition is to retain RHM rating of “healthy.”	This site is healthy under current management practices.		
<u>Key Area: ESM-RHM7</u> Endlich Mesa east of trail – bedground #3 <u>Vegetation type:</u> Alpine	Considered healthy using the RHM form. <i>Trend: stable.</i>	The desired condition is to retain RHM rating of “healthy.”	This site is healthy under current management practices.		
Allotment: Johnson Creek					
<u>Key Area: JC-PFC1</u> West of switch-backs along Johnson Creek <u>Vegetation type:</u> Riparian within Spruce Fir upland.	Rated in proper functioning condition using the PFC form. <i>Trend: stable.</i>	The desired condition is to retain “proper functioning condition” rating.	This site is functioning properly. No need for change.		
<u>Key Area: JC-RHM1</u> Near switch-backs on Johnson Creek Trail <u>Vegetation type:</u> Mixed Conifer	Considered healthy using the RHM form. <i>Trend: stable.</i>	The desired condition is to retain RHM rating of “healthy.”	This site is healthy under current management practices.	1. Continue of photo monitoring site if sheep use the allotment. 2. Implement bighorn sheep pre-monitoring prior to using allotment.	
Allotment: Leviathan					
<u>Key Area: LE-PFC1</u> Sunlight Creek <u>Vegetation type:</u> Riparian within Spruce Fir upland.	Rated in proper functioning condition using the PFC form. <i>Trend: stable.</i>	The desired condition is to retain “proper functioning condition” rating.	This site is functioning properly. No need for change.		

Area	Existing Conditions	Site Specific Desired Conditions	Need for Change	Site Specific Design Criteria / Adaptive Options	Priority for Monitoring
<p>Key Area: LE-RHM1 Aspen park along Sunlight Creek Trail <u>Vegetation type:</u> Mixed Conifer</p>	<p>Considered healthy using the RHM form. <i>Trend:</i> upward.</p>	<p>The desired condition is to retain RHM rating of "healthy."</p>	<p>This site is healthy under current management practices.</p>	<p>1. Continue of photo monitoring site if sheep use the allotment. 2. Implement bighorn sheep pre-monitoring prior to using allotment.</p>	
Allotment: Pine River					
<p>Benchmark Area: PR-PFC1 Rincon LaVaca Creek west of confluence of Pine River <u>Vegetation type:</u> Riparian within Mountain grassland</p>	<p>Rated in proper functioning condition using the PFC form. <i>Trend:</i> stable.</p>	<p>The desired condition is to retain "proper functioning condition" rating.</p>	<p>This site is functioning properly. No need for change.</p>		
Allotment: Rock Creek					
<p>Key Area: RC-PFC1 Trinity Creek near Trinity Lake <u>Vegetation type:</u> Riparian with willows</p>	<p>Rated in proper functioning condition using the PFC form. <i>Trend:</i> stable.</p>	<p>The desired condition is to retain "proper functioning condition" rating.</p>	<p>This site is functioning properly. No need for change.</p>		
<p>Key Area: RC-PFC2 Vallecito Creek <u>Vegetation type:</u> Riparian within Spruce Fir upland.</p>	<p>Rated in proper functioning condition using the PFC form. <i>Trend:</i> stable.</p>	<p>The desired condition is to retain "proper functioning condition" rating.</p>	<p>This site is functioning properly. No need for change.</p>		
<p>Key Area: RC-RHM1 Campsite near Trinity Creek Trail <u>Vegetation type:</u> Spruce-Fir –mountain meadow</p>	<p>Considered healthy using the RHM form. <i>Trend:</i> upward.</p>	<p>The desired condition is to retain RHM rating of "healthy."</p>	<p>This site is healthy under current management practices.</p>	<p>1. Continue of photo monitoring site if sheep use the allotment. 2. Implement bighorn sheep pre-monitoring prior to using allotment.</p>	
Allotment: Spring Gulch					
<p>Key Area: SG-RHM1 NW ridge saddle <u>Vegetation type:</u> Aspen</p>	<p>Considered healthy using the RHM form. <i>Trend:</i> Stable</p>	<p>The desired condition is to retain RHM rating of "healthy."</p>	<p>This site is healthy under current management practices.</p>		
<p>Key Area: SG-RHM2 Near logging road and spring – middle of allotment <u>Vegetation type:</u> Aspen</p>	<p>Considered healthy using the RHM form. <i>Trend:</i> Stable</p>	<p>The desired condition is to retain RHM rating of "healthy."</p>	<p>Site is healthy, however, need to decrease % of noxious weeds in area (Canada thistle and toadflax).</p>	<p>1. Establish a photo monitoring location in the park near key area. 2. Treat noxious weeds in area</p>	**
Allotment: Tank Creek					
<p>Key Area: TC-PFC1 Trib to Canyon Creek – north end of Lime Mesa <u>Vegetation type:</u> Riparian with willows</p>	<p>Rated in proper functioning condition using the PFC form. <i>Trend:</i> stable.</p>	<p>The desired condition is to retain "proper functioning condition" rating.</p>	<p>This site is functioning properly. No need for change.</p>		
<p>Key Area: TC-PFC2 Grasshopper Creek trib <u>Vegetation type:</u> Riparian with willows</p>	<p>Rated in proper functioning condition using the PFC form. <i>Trend:</i> stable.</p>	<p>The desired condition is to retain "proper functioning condition" rating.</p>	<p>This site is functioning properly. No need for change.</p>		
<p>Key Area: TC-PFC3 Ruby Lake <u>Vegetation type:</u> Riparian with alpine</p>	<p>Rated in proper functioning condition using the PFC form. <i>Trend:</i> stable.</p>	<p>The desired condition is to retain "proper functioning condition" rating.</p>	<p>This site is functioning properly. No need for change.</p>		
<p>Key Area: TC-RHM1 SW of Lime Mesa Trailhead <u>Vegetation type:</u> Mountain grass</p>	<p>Considered healthy using the RHM form. <i>Trend:</i> Stable</p>	<p>The desired condition is to retain RHM rating of "healthy."</p>	<p>This site is healthy under current management practices.</p>		

Area	Existing Conditions	Site Specific Desired Conditions	Need for Change	Site Specific Design Criteria / Adaptive Options	Priority for Monitoring
Benchmark Area: TC-RHM2 NW of Lime Mesa Vegetation type: Alpine	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.	1. Establish a photo monitoring location near key area.	**
Key Area: TC-RHM3 Top of Stag Mesa Vegetation type: Spruce - Fir	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: TC-RHM4 North of Stag Mesa Vegetation type: Alpine	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Benchmark Area: TC-RHM5 North of Tank Mesa – near TC-PFC2 Vegetation type: Alpine	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.	1. Establish a photo monitoring location near key area.	**
Key Area: TC-RHM6 West end of Tank Mesa – end of logging road Vegetation type: Spruce – Fir - logging	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: TC-RHM7 West of Lime Mesa on old logging road Vegetation type: Spruce – Fir – old logging road/herder camp	Considered at risk using the RHM form. <i>Trend: upward.</i>	Improve the RMH rating to "healthy" or retain "at-risk with an upward trend".	Decrease the % of bare soil. Decrease % of noxious weeds in area (Canada thistle)	1. Establish a cover frequency monitoring location in the park near key area. 2. Reduce bare ground and soil movement linked to logging road by 10% within next 10 years. 3. Treat noxious weeds in area	**
Allotment: Virginia Gulch					
Key Area: VG-PFC1 Middle of West Silver Mesa Vegetation type: Riparian with willows	Rated in "functional - at risk" condition using the PFC form. <i>Trend: not apparent.</i>	Improve the PFC rating to "at-risk with an upward trend" or better.	Reduce trampling at trail crossings of stream	1. Do not use trail crossing for moving sheep through allotment. Keep sheep at least 100' away from stream. 2. Continue with photo-point monitoring	**
Key Area: VG-PFC2 Missouri Gulch Vegetation type: Riparian with willows	Rated in proper functioning condition using the PFC form. <i>Trend: stable.</i>	The desired condition is to retain "proper functioning condition" rating.	This site is functioning properly. No need for change.		
Key Area: VG-PFC3 Virginia Gulch Vegetation type: Riparian with willows	Rated in proper functioning condition using the PFC form. <i>Trend: stable.</i>	The desired condition is to retain "proper functioning condition" rating.	This site is functioning properly. No need for change.		
Key Area: VG-PFC4 West Virginia Gulch Vegetation type: Riparian with willows	Rated in proper functioning condition using the PFC form. <i>Trend: stable.</i>	The desired condition is to retain "proper functioning condition" rating.	This site is functioning properly. No need for change.		
Key Area: VG-RHM1 Ridge between West Virginia and Virginia Gulches Vegetation type: Alpine with willows	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: VG-RHM2 Headwaters of Virginia Gulches Vegetation type: Mountain Grassland with willows	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		

Area	Existing Conditions	Site Specific Desired Conditions	Need for Change	Site Specific Design Criteria / Adaptive Options	Priority for Monitoring
Key Area: VG-RHM3 Headwaters of Virginia Gulch Vegetation type: Alpine	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.	1. Establish a photo monitoring location near key area.	**
Key Area: VG-RHM4 West Silver Mesa Vegetation type: Alpine	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: VG-RHM5 Middle of West Silver Mesa Vegetation type: Alpine	Considered at risk using the RHM form. <i>Trend: upward.</i>	Improve the RMH rating to "healthy" or retain "at-risk with an upward trend".	Decrease the % of bare soil.	1. Establish a cover frequency monitoring location in the park near key area. 2. Reduce bare ground and soil movement linked to sheep trailing by 10% within next 10 years. 3. Re-inventory the West Silver bladderpod population within 5 years.	**
Key Area: VG-RHM6 Missouri Gulch uplands Vegetation type: Mountain Grassland	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy however; need to reduce willow browsing and bare ground in area.	1. Establish a photo monitoring location near key area by 2017. 2. Reduce % of willow browse and % bare ground by 10% by 2022.	**
Key Area: VG-RHM7 Headwaters of Virginia Gulch near Oliver Lakes Vegetation type: Alpine	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: VG-RHM8 Headwaters of Virginia Gulch - West Virginia Gulch Vegetation type: Alpine	Considered healthy using the RHM form. <i>Trend: Stable</i>	The desired condition is to retain RHM rating of "healthy."	This site is healthy under current management practices.		
Key Area: VG-RHM9 SE of Ruby Lake Vegetation type: Alpine	Considered at risk using the RHM form. <i>Trend: upward.</i>	Improve the RMH rating to "healthy" or retain "at-risk with an upward trend".	Decrease the % of bare soil.	1. Establish a photo monitoring location in the park near key area. 2. Reduce bare ground and soil movement linked to recreation and sheep trailing by 10% within next 10 years.	**

1.7 Compliance with Administrative Framework

1.7.1 FOREST PLAN DIRECTION

Livestock grazing has been determined by the *San Juan National Forest Land and Resource Management Plan (2013)*, hereafter referred to as the Forest Plan, to be an appropriate use of the Forest and falls under the multiple-use mandate of the Forest Service (*P.L. 86-517, 1960*). The Forest Plan establishes programmatic direction for the management of National Forest System lands. Rangeland management activities within this analysis area are required to meet Forest Plan direction. The purpose and need for action relates directly to meeting Forest Plan direction within this project analysis area. The following forest-wide direction includes:

Desired Conditions

- Terrestrial ecosystems have a diverse composition of desirable native plants that are vigorous and self-perpetuating. Invasive plant species are absent or rare. 2.2.5
- Aspen forests, ponderosa pine forests, pinyon-juniper woodlands, sagebrush shrublands, semi-desert shrublands, mountain grasslands, and semi-desert grasslands that occur in suitable rangelands have a diverse composition of native bunchgrasses that are vigorous and self-perpetuating. 2.2.14
- Non-forested terrestrial ecosystems have community structure and species composition that offer resistance and resilience to changes in climate, including extreme weather events, or epidemic insect and disease outbreaks. 2.2.16
- Spruce-fir forests display variable stand structures and species composition. ... The canopy cover of shrubs in the understory of these forests is highly variable. ... Native grasses and forbs are common and well distributed in most spruce-fir forests. Forest litter is common and well distributed. Invasive plant species are absent or rare. ... All development stages of these forests are well-represented. 2.2.26
- Mountain shrublands display variable stand structures. Most are dense with high canopy cover; others are open with widely spaced shrubs. Gambel oak and other deciduous native shrubs (including mountain mahogany [*Cercocarpus montanus*], serviceberry [*Amelanchier* sp.], chokecherry [*Prunus virginiana*], fendlerbush [*Fendlera rupicola*], and squaw apple [*Peraphyllum ramosissimum*]) are abundant and well distributed. Native grasses and forbs are abundant and well distributed. Invasive plant species are absent or rare. Litter is common and well distributed. High-intensity, replacement fires occur in most mountain shrublands. 2.2.29
- Alpine terrestrial ecosystems sustain their ecosystem diversity. They display a diverse composition of desirable native plant species and vegetation communities (including fellfield and turf types). Invasive plant species are absent or rare. 2.2.34
- Fens, wetlands, and hanging gardens have the water sources and hydrologic systems necessary to support and sustain the special status plant species associated with them. 2.2.41
- Rangeland provides forage for qualified local livestock operations and helps ranches remain sustainable and intact. 2.7.1
- Rangelands provide healthy and sustainable habitat for wildlife populations... 2.7.4
- Rangelands provide diverse, healthy, and sustainable plant communities and conserve soil quality. 2.7.5

- Suitable rangelands on SJNF lands are meeting desired conditions of affected resources. 2.7.6

Standards

- Projects or activities occurring in fens, wetlands, or hanging gardens that are occupied by special status plant species must be designed to maintain the hydrologic systems necessary to support and sustain those species. 2.2.67
- During project-level planning on domestic sheep allotments, management options must be developed to prevent physical contact between domestic sheep and bighorn sheep. Actions may include but are not limited to boundary modifications, livestock type conversion, or allotment closures. 2.3.39
- Grazing permit administration in occupied bighorn sheep habitat must utilize measures to prevent physical contact between domestic sheep and bighorn sheep. Permit administration actions may include, but are not limited to use of guard dogs, grazing rotation adjustments, or relocation of salting and bed grounds. 2.3.40
- Grazing permit administration in occupied bighorn sheep habitat must utilize measures to prevent physical contact between domestic sheep and bighorn sheep. Permit administration actions may include but are not limited to use of guard dogs, grazing rotation adjustments, or relocation of salting and bed grounds. 2.7.11
- Management of domestic sheep must utilize measures to prevent physical contact with bighorn sheep. 2.7.12

Guidelines

- If grazing privileges are relinquished or cancelled on lands where...conflicts with other resources make livestock grazing undesirable, the privileges should not be re-allocated. 2.7.16
- The designation of grazing allotments to be used as forage resources should be considered when grazing privileges terminate, if such designations would improve land management as well as livestock management opportunities. 2.7.21
- Grazing management activities should be modified in, or livestock excluded from, riparian areas that are “nonfunctional” or “functional-at risk” with a downward trend (as rated by the Proper Functioning Condition protocol), where livestock have been determined to be a key causative agent. 2.7.22
- Trailing of livestock should be avoided along riparian areas to the extent practicable. 2.7.23
- Livestock should be moved from the grazing unit or allotment when utilization guidelines on key areas are met or exceeded (45% for rotation systems), or as specified in a NEPA decision for the particular allotment’s AMP or annual operating instructions. 2.7.27
- The residual riparian vegetation guidelines (4–6 inches) should be met or exceeded at the time the livestock leave the pasture/allotment. 2.7.28
- Based on vegetation type, sheep grazing should be planned to reflect moderate use after grazing. Where appropriate, such as areas outside the aspen-forb type, forage should show that it has been topped and selectively grazed, trampling should be minimal and trailing may be evident, but not common. Within the aspen-forb type, trampling and trailing may be evident, but day bedding close to water, as well as trailing to and from water, should not be evident. 2.7.30

Management Areas:

The San Juan National Forest is broken into discrete Management Areas which provide management direction by identifying allowable uses for management activities. The following are management areas for the analyzed allotments (see Figure 1-6):

- Management Area 1 – Natural Processes Dominate (wilderness). Livestock grazing is allowable. Approximately 85% of the landscape falls within this Management Area. Grazing management in wilderness is discussed in *Section 1.7.2*.
- Management Area 3 – Natural Landscape with Limited Management. Livestock grazing is allowable. About 10% of the landscape falls within this Management Area. The largest area of this type on the landscape occurs on the northern end of Missionary Ridge.
- Management Area 4 – High-Use Recreation Emphasis. Livestock grazing may be restricted within developed recreation areas. Only 1% of the landscape falls within this Management Area, located southeast of Lemon Reservoir, at Transfer Park Campground, and along the Animas River. Other than at Transfer Park, there really is no overlap between areas that are grazed and high recreational use areas.
- Management Area 5 – Active Management. Livestock grazing is allowable. Approximately 4% of the landscape falls within this Management Area. These are areas on Missionary Ridge and Endlich Mesa that fall within the areas suitable for timber production (logged in the past and likely to be logged again in the future).

The Forest Plan also establishes an area's general suitability for livestock grazing by conducting a Grazing Suitability Analysis. For this analysis area, the Forest Plan level analysis has determined that approximately 58,408 acres (35%) of the total 166,627 acres within the analysis area are generally suitable for sheep grazing (see Figure 1-7). This same analysis area has 50,239 acres suitable for cattle (30%). These two determinations are based on factors including ownership, topography, slope, soils and geology, vegetation type, canopy cover and distance to water. Private lands within the analysis area are not counted as being suitable since we do not authorize grazing on those lands; however if the lands are not fenced out (Colorado is a fence out state), grazing likely occurs if livestock are using the area, this includes the City Reservoir area. This is a rough estimation of the amount of land that is suitable for livestock grazing.

Figure 1-6. Forest Plan Management Areas

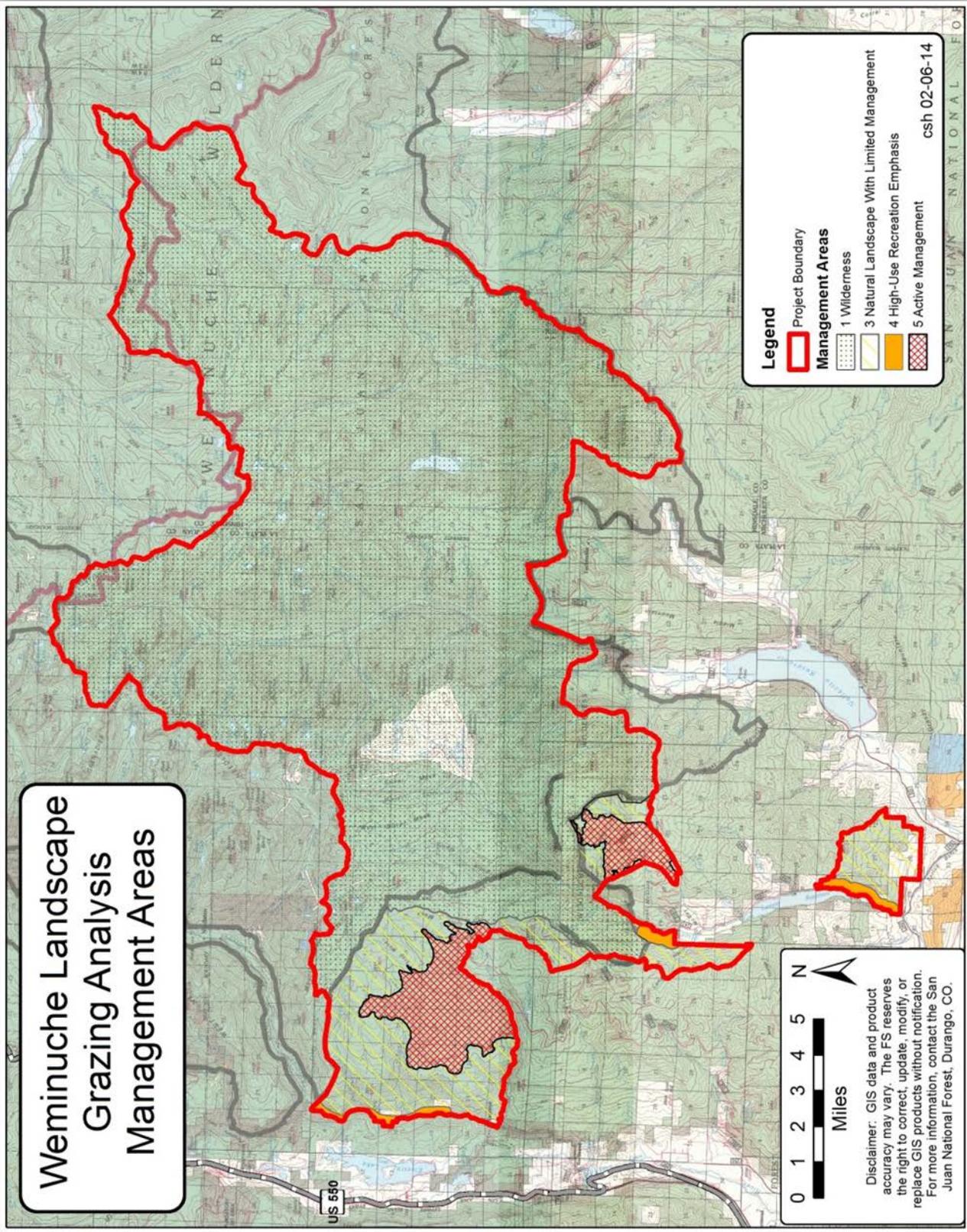
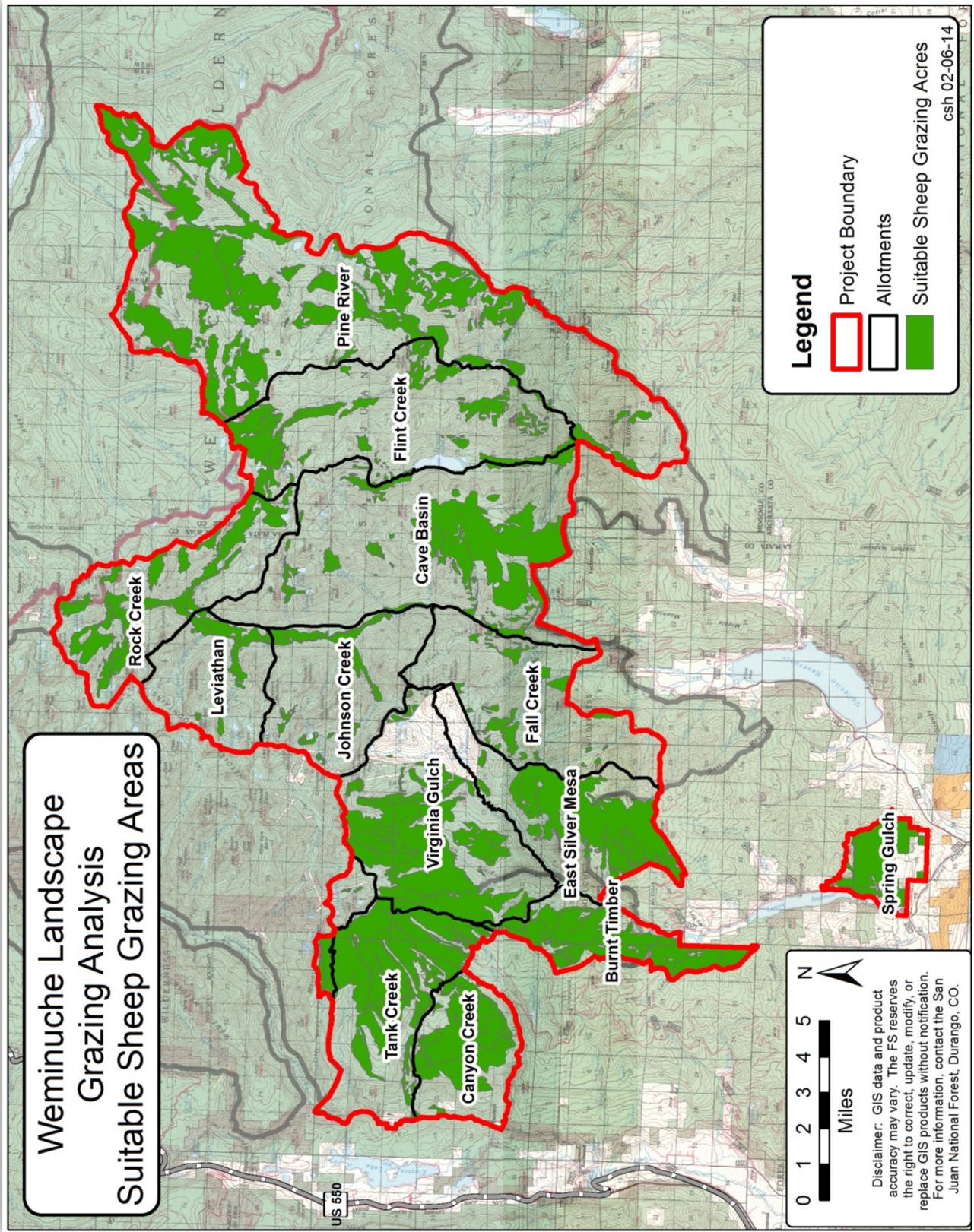


Figure 1-7. Suitable Grazing Acres



1.7.2 WILDERNESS MANAGEMENT DIRECTION

Congressional grazing guidelines Section 4(d)(4)(2) of the Wilderness Act states, “The grazing of livestock, where established prior to the effective date of this Act, shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture” (P.L. 88-577). Livestock grazing was permitted at the time of passage of the Wilderness Act and further Congressional Grazing Guidelines, which have been incorporated into Forest Service policy (FSM 2323.2), allow for continued permitted livestock grazing in the Weminuche Wilderness; this analysis will not further address whether grazing should be allowed in wilderness. The Grazing Guidelines clearly state that, “*The legislative history of this language is very clear in its intent that livestock grazing, and activities and the necessary facilities to support a livestock grazing program, will be permitted to continue in National Forest wilderness areas, when such grazing was established prior to classification of an area as wilderness.*” Congress set forth five basic principles in the Grazing Guidelines:

- 1) *“There shall be no curtailments of grazing in wilderness areas simply because an area is, or has been designated as wilderness, nor should wilderness designation be used as an excuse by administrators to slowly ‘phase out’ grazing. Any adjustments in the numbers of livestock permitted to graze in wilderness areas should be made as a result of revisions in the normal grazing and land management planning and policy setting process, giving consideration to legal mandates, range condition, and the protection of the range resource from deterioration...”*
- 2) *“The maintenance of supporting facilities, existing in the area prior to its classification as wilderness (including fences, line cabins, water wells and lines, stock tanks, etc.), is permissible in wilderness. Where practical alternatives do not exist, maintenance or other activities may be accomplished through the occasional use of motorized equipment... The use of motorized equipment should be based on a rule of practical necessity and reasonableness...”*
- 3) *“The replacement or reconstruction of deteriorated facilities or improvements should not be required to be accomplished using ‘natural materials,’ unless the material and labor costs of using natural materials are such that their use would not impose unreasonable additional costs on grazing permittees.”*
- 4) *“The construction of new improvements or replacement of deteriorated facilities wilderness is permissible if in accordance with those guidelines and management plans governing the area involved. However, the construction of new improvements should be primarily for the purpose of resource protection and the more effective management of these resources rather than to accommodate increased numbers of livestock.”*
- 5) *“The use of motorized equipment for emergency purposes such as rescuing sick animals or the placement of feed in emergency situations is also permissible. This privilege is to be exercised only in true emergencies, and should not be abused by permittees.”*

In summary, subject to the conditions and policies outlined above, the general rule of thumb on grazing management in wilderness should be that activities or facilities established prior to the date of an area's designation as wilderness should be allowed to remain in place and

may be replaced when necessary for the permittee to properly administer the grazing program. Thus, if livestock grazing activities and facilities were established in an area at the time Congress determined that the area was suitable for wilderness and placed the specific area in the wilderness system, they should be allowed to continue. With respect to areas designated as wilderness prior to the date of this Act, these guidelines shall not be considered as a direction to re-establish uses where such uses have been discontinued.

In addition to the Forest Plan (SJNF 2013), management direction for the Weminuche Wilderness is found in the San Juan and Rio Grande Nationals Forests Wilderness Management Direction, Decision Notice and associated Environmental Assessment (SJNF 1998), which was adopted into the Forest Plan. This Wilderness Direction further divides the wilderness into three management prescription zones:

Within the project area, there are approximately 112,650 acres of 1.11& 1.1A Pristine zone found in the wilderness, away from major trail corridors. The desired condition is, “*where natural processes and conditions have not and will not be measurably affected by human use and where natural succession occurs on all existing vegetative communities and is influenced by natural processes and disturbance; and the structure, composition, function and spatial distribution of vegetative types are the result of natural-successional processes. Human influence on vegetation is unnoticeable; plant species are indigenous to the immediate area, with exotic plants being extremely rare. There are opportunities for solitude and a high level of risk and challenge, self-reliance, no signing or posts occur with the exception of historic cairns...there is no lasting evidence of camping activity...grazing actions will adhere to appropriate wilderness management area guidelines for structures and campsites and meet requirements of current Allotment Management Plans. Contact with other users, livestock or agency personnel are very infrequent.*”

There are approximately 28,300 acres of 1.12 Primitive zone found along the trail corridors. The desired condition is, “*where natural succession occurs on all existing vegetative communities, and is influenced by natural processes and disturbance; and the structure, composition and function and spatial distribution of vegetative types are the result of natural-successional processes. Human influence on vegetation is minimal and plant species are predominately native and indigenous to the immediate areas. There are no increases in non-indigenous species composition from an established baseline. The opportunity exists for a moderate to high level of risk and challenge, campsites are dispersed and there is evidence of established campsites and basecamps may exist for commercial recreation uses. Maintained trails exist with intersection signing to indicate direction, but no mileage or destination signing. Grazing actions will adhere to appropriate management area guideline for structures, and campsites and meet requirements of current Allotment Management Plans. Contact with other users is infrequent off trail and moderate on trail.*”

There are approximately 640 acres of 1.13 Semi Primitive zone. This zone is found along the lowest reaches of the Pine River and Vallecito Creek Trails. The desired condition is, “*where natural succession occurs on all existing vegetative communities, and is influenced by natural processes and disturbance; and the structure, composition and function and spatial distribution of vegetative types are the result of natural-successional processes. Human influence on vegetation is minimal and plant species are predominately native and indigenous to the immediate areas. There are no increases in non-indigenous species composition from an*

established baseline. The opportunity exists for a moderate level of risk and challenge and contact with other users, livestock or agency personnel is frequent with Day Use more common. Trailhead signing and appropriate wilderness education information is available at trailheads. Commercial O-G permits for day-use activities in high-use areas are limited. Campsites are dispersed, are evident and may be designated on the ground. Grazing actions will adhere to appropriate wilderness management area guideline for structures and campsites, and meet requirements of current Allotment Management Plans.”

1.7.3 NEPA ANALYSIS AND ALLOTMENT MANAGEMENT PLANS (AMP’S)

While the Forest Plan establishes the general suitability of an area for livestock grazing, the decision to authorize livestock grazing on a particular area of land is the outcome of a comprehensive, integrated resource analysis for the particular allotment(s). This analysis, conducted according to NEPA, is required in order to authorize livestock grazing on the project area, to prescribe site-specific management of the rangeland resources, and to ensure management is capable of meeting or moving toward desired conditions. Analysis and associated decisions made at this level are documented in an EA (such as this document) or an Environmental Impact Statement, and the appropriate decision document, and implemented through the Term Grazing Permit, Allotment Management Plan (AMP) and Annual Operating Instructions (AOI).

1.7.4 GRAZING PERMITS AND ANNUAL OPERATING INSTRUCTIONS (AOI’S)

Term grazing permits authorize a permittee to graze livestock on National Forest System lands, and are normally issued for up to a ten-year period. The permittee is required by the permit to graze under specified terms and conditions designed for resource protection and enhancement, as described in the AMP, which is incorporated as part of the permit. Permits are administered annually through issuance of AOI’s. Grazing permits by themselves do not authorize the permit holder to develop water, construct fences, build roads or trails, manipulate vegetation, or do other ground disturbing activities.

1.8 Best Available Science

This analysis is based on the best available science, as evidenced by the following:

- Recent site-specific field inspections and reviews of the analysis area by the Interdisciplinary Team,
- Review of historic records including historic range reports, range analysis data and monitoring records,
- Extensive use of research, scientific studies and information as documented in the literature cited and references section of this document and the Bighorn Sheep Risk Assessment in Appendix E,
- San Juan National Forest Management Indicator Species (MIS) and Sensitive Species Assessments,
- Consultation with the State Historical Preservation Officer,

- Consultation with the US Fish and Wildlife Service and coordination with the Colorado Parks and Wildlife (CPW),
- Expert opinions of Interdisciplinary Team resource specialists, and use of most recent Geographic Information System (GIS) resource layers, and Wildlife GIS modeling.

DRAFT

CHAPTER 2 - ALTERNATIVES

This chapter describes and compares the alternatives considered for the Weminuche Landscape Grazing Analysis. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a basis for choice among options by the decision maker. The official may choose any of the four alternatives in part or whole, or may choose elements from different alternatives and combine them into a modified alternative to be chosen in the decision.

Some of the information used to compare the alternatives is based upon the design of the alternative (e.g., allotments to be closed) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (e.g., the effects on vegetative conditions).

2.1 Alternative Development

2.1.1 Public Involvement

This project falls under Objection Regulations found at 36CFR218 Subparts A and B. In order to object to a proposed project, a person must submit timely, specific written comments during the public comment periods.

The following public involvement activities have occurred to date for this project proposal:

- The proposal was first listed in the Schedule of Proposed Actions in the January-March 2012 edition, which was available on-line and through quarterly mailings.
- Two permittee scoping meetings were held on May 6, 2011 and January 20, 2012 for those who hold livestock grazing permits on this landscape. During the past three years, annual spring meetings were also held with grazing permittees to discuss current permitted actions, and ideas for possible adaptive actions on the landscape. During these meetings, we discussed and looked at existing domestic sheep use across the landscape, logical boundary adjustments, forage reserves, possible design criteria and various other ideas that were essential to developing the alternatives. Permittees recognized the importance of separation between domestic sheep and bighorn sheep and agreed to all boundary shifts including the western boundary adjustments of Canyon Creek and Tank Creek. In addition to this, numerous phone conversations have occurred with the permittees to get feedback and additional background information. Through this collaborative process, the initial project proposal (Alternative 3) was developed.
- A scoping meeting with CPW was held on December 16, 2011. The proposal was also provided to the public and other agencies for comment during scoping beginning in February 2012, through a scoping letter and press release and which resulted in newspaper articles. Initial scoping letters were also sent to nearby livestock permittees outside the analysis areas and also outfitters and guides that have permits that are within the analysis area. In addition, as part of the public involvement process, the Forest Service sent notification to area Tribes, Chapter Houses, and Pueblos.
- Written scoping responses were received from 57 sources; comments covered a full range of opinions regarding sheep grazing. Using the comments and concerns from the public,

organized groups, other agencies, and internal specialists, the Interdisciplinary Team developed a list of issues to address in this analysis, found in the next section of this EA.

- Also using scoping responses, the details of Alternative 3 were filled in, and Alternative 4 was added. As the process of analysis proceeded, Alternative 4 was determined to be the current Proposed Action rather than Alternative 3, which was labeled the Proposed Action during scoping.

The FS informed the following federal, state, tribal, and local agencies during the development of this environmental assessment:

Federal, State, And Local Agencies:

Colorado Parks and Wildlife
Colorado State Historic Preservation Officer
Colorado State Land Board
La Plata County
Hinsdale County
San Juan County
City of Durango
USDI Fish and Wildlife Service

Tribes and Pueblos:

Hopi Tribe
Jicarilla Apache Nation
Navajo Nation
Northern Ute Tribe
Ohkay Owinge
Pueblo of Acoma
Pueblo de Cochiti
Pueblo of Isleta
Pueblo of Jemez
Pueblo of Laguna
Pueblo of Nambe
Pueblo of Picuris
Pueblo of Pojoaque
Pueblo of Sandia
Pueblo of San Felipe
Pueblo of San Ildefonso
Pueblo of Santa Ana
Pueblo of Santa Clara
Pueblo of Santo Domingo
Pueblo of Taos
Pueblo of Tesuque
Pueblo of Zia
Southern Ute Indian Tribe
Ute Mountain Ute Tribe
Zuni Pueblo

2.1.2 Key Issues

Using internal and external input about the proposed project, the interdisciplinary team developed a list of issues to address in this EA. The FS separated the issues into two groups: *key issues* and *non-key issues*. *Key issues* are defined as those directly or indirectly caused by implementing the proposal. Key issues also usually result in the generation of an alternative, design criteria, or mitigation measure that addresses that issue.

Non-key issues are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Plan, or other higher level decision; 3) irrelevant to the decision to be made; 4) conjectural and not supported by scientific or factual evidence; or 5) fully supportive of, or addressed by, the proposed action. The Council for Environmental Quality NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." A list of non-key issues and reasons regarding their categorization as non-key may be found in the project record.

The FS identified five key issue topics generated from scoping. Additionally, one tracking issue will be analyzed. *Tracking issues* are a sub-set of non-key issues, and are defined as those not identified as key issues, but deemed important enough to track through the analysis and disclose impacts.

Indicators which can be used to compare impacts between alternatives are listed for each issue.

- 1) Soil/Water: Improper trailing and bedding of livestock has sometimes led to erosion (including trail tread damage and terracing), and water quality issues (sedimentation, increased dissolved metals, and fecal contamination). *Indicators for comparing alternatives: monitoring measures (PFC), management of sheep reflected by Watershed Design Criteria; narrative descriptions.*
- 2) Vegetation: Improper trailing and bedding of livestock has sometimes led to undesirable species composition and damage to delicate alpine vegetation. *Indicators for comparing alternatives: Acres grazed; monitoring measures (RHM); management of sheep reflected by Design Criteria; narrative descriptions.*
- 3) Recreational Experience: Sheep bands have sometimes negatively impacted the recreational experience by noise and smell, by encounters with unruly herd dogs, by creating a non-wilderness experience, by reducing wildflowers, and by causing trail tread damage and braided trails. *Indicators for comparing alternatives: Management of sheep reflected by Recreation Design Criteria; monitoring measures (photopoints); narrative descriptions.*
- 4) Wildlife: Domestic sheep could transmit disease to bighorn sheep, compete for forage with wildlife (bighorn sheep, ptarmigan, elk), and could damage Canada lynx and fish habitat. *Indicators for comparing alternatives: Management of domestic sheep reflected by Wildlife Design Criteria; acres of*

open (active, vacant, or forage reserve) allotments overlapping with bighorn sheep summer range; habitat modeling results, narrative descriptions.

- 5) Socio-Economics: Loss or substantial curtailment of permitted grazing could lead to major economic and social damage to permittees, as this is their cultural heritage and sole financial support for most of them. *Indicators for comparing alternatives: qualitative narrative description.*
- 6) Cultural Resources (tracking issue): Cultural resources impacts were not identified as a key issue because no adverse impacts to them from grazing have been identified. There are no alternatives or design criteria that were developed specifically to minimize impacts to cultural resources, and impacts are generally the same across all alternatives. However, because of the importance of cultural resources in the Weminuche landscape, and because of statutory requirements, cultural resources will be analyzed and impacts will be disclosed. *Indicators for comparing alternatives: Management of sheep reflected by Design Criteria; narrative description.*

2.2 Alternatives Considered but Eliminated From Detailed Analysis

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the action proposed during scoping did not suggest any entire new alternatives, but several suggestions were provided.

Some of these suggestions were outside the scope of the decision space for this project or already decided by a higher-level decision. These included suggestions for such things as no grazing in wilderness areas, comments regarding elk and deer population management, and concerns with recreation management. Because these kinds of issues are beyond the scope of the decision space for this project, an alternative was not crafted to address them.

Many ideas were provided regarding what should be included as part of this analysis, such as analyses of grazing impacts on recreation, watershed conditions, impacts to wildlife, monitoring plans, and description of vegetative conditions. These kinds of items have been included in this document; there was no need to craft an additional alternative to include them.

Other suggestions were already included in one or more of the alternatives considered in detail. These included: suggestions to close grazing on the landscape or part of the landscape, with specific areas to be closed often suggested (included in Alternative 1, No Action); and to leave vacant areas vacant instead of closing them (included in Alternative 2).

Other suggestions were considered, but not included in any alternative for the reasons stated:

- Prohibit grazing within a prescribed distance from the Continental Divide Trail. This suggestion would be impractical to implement on the ground. While permittees are encouraged to avoid the major recreation trails, it is not possible to manage sheep grazing to such a level of precision. There are also cases where a trail follows the only logical

route of ingress or egress, which is due to the fact that many trails were originally livestock driveways before they were used by recreationists.

- Leave vacant allotments vacant instead of closing them until a vaccine to prevent disease transmission to bighorn is developed, then consider whether the allotment could be restocked. We did not consider this to be reasonable alternative because the best science to date does not predict a usable vaccine for field application for over 15 years (*Srikumaran 2011*). At that time, if vaccine is a viable option, a new NEPA analysis could be undertaken.
- We considered a forage reserve for cattle on the upper portion of the Pine River Allotment. Through scoping and internal review, this was dropped due to limited accessibility to the area, distance from cattle allotments, and high recreation conflicts. There is also concern regarding the amount of wetlands and fens in this allotment and how cattle would impact them.
- We considered the possibility of moving domestic sheep bands from currently active allotments where the risk of contact with bighorn sheep is high to other currently vacant allotments where the risk of contact with bighorns is low. However, the only vacant allotments on the district at this time are more suitable for cattle grazing than sheep grazing.

2.3 Alternatives Considered in Detail

Four alternatives were considered and analyzed in detail: 1.) No Action/No Grazing, 2.) Current Management, 3.) Adaptive Management with Forage Reserves, and 4.) Adaptive Management with Closing Vacant Allotments.

Based on the effects of the alternatives, the responsible official will decide whether term livestock grazing will proceed as proposed, modified, not at all, on all or part of the Weminuche Landscape; and if so, with what associated activities, monitoring, and design criteria. The official may choose any of the following alternatives in part or whole, or may choose elements from different alternatives and combine them into a modified alternative to be chosen in the decision.

2.3.1 ALTERNATIVE 1 – NO ACTION /NO GRAZING

Under the No Action/No Livestock Grazing Alternative, no term livestock grazing would be permitted on any of the allotments in the landscape. “No action” is synonymous with “no livestock grazing” and means that term livestock grazing would not be authorized within the project area. Following current direction, existing permits would be phased out after giving permittees notice as provided for in Forest Service policy (*FSH 2209.13, R2 ID, Chapter 10, section 16.1*) which says that “...the authorized officer shall provide one year’s written notice before the modification takes effect, except in emergency situations.” According to direction given in *FSH 2209.13, R2 ID, Chapter 90, section 94.1*, “the ‘no livestock grazing’ alternative will always be fully developed and analyzed in detail” and is therefore considered a fully viable alternative in this analysis. Improvements such as corrals would eventually be removed as time and funding allow. This alternative provides an environmental baseline for evaluation of the action alternatives.

2.3.2 ALTERNATIVE 2 – CURRENT MANAGEMENT

Under the Current Management Alternative, term livestock grazing would continue with current AMP's or, in the absence of such, a plan, or if the existing plan is not being followed for a variety of reasons, under the Annual Operating Instructions (AOI's). As provided for in Forest Service policy (*FSH 2209.13, R2 ID, Chapter 90, section 94.1*), "Current management will also be analyzed in detail as an alternative to the proposed action if current management will meet the stated purpose and need for action. This alternative is based on the current management action being implemented. Current management direction may be contained in an AMP, AOI, a biological opinion, or a combination thereof."

Livestock grazing under a term permit would continue to be authorized as it has been in the recent past using a pre-defined number of livestock, seasons of use, and pasture rotation systems. For the allotments in this analysis, this would be as shown in Table 2-1. All six currently stocked allotments would continue to be active and the seven vacant allotments would remain vacant. The vacant allotments would be available for permitted livestock grazing through grant and issuance of term grazing permits with stocking based on historic numbers. This alternative would require the District to go through the grant process and offer new term grazing permits, possibly to new permittees. Canyon Creek, which is temporarily being grazed by cattle, could revert to sheep grazing.

Permitted livestock numbers would not change. For sheep allotments, permitted numbers refer to the number of ewes, each of which may have one or more lambs. Existing improvements would continue to be maintained as assigned in Term Livestock Grazing Permits and may be reconstructed once the useful life has been met and the need identified. New improvements would not be developed unless they are authorized in a NEPA decision. Sheep allotments typically do not have structural improvements except for corrals and loading facilities.

Design Criteria

Those design criteria as indicated in Tables 2-2 through 2-4 (p.54+) by an "x" in the Alternative 2 column are included as part of Alternative 2. These criteria apply to all active allotments across the landscape at all times.

Table 2-1. Current Grazing Management by Allotment

Allotment	Grazing System	Permitted Sheep Numbers	AUM's	Permitted Season of Use
Spring Gulch	rotation	700	69	6/15 - 6/30
	rotation	700	62	9/22 - 10/5
Burnt Timber-Tank Creek sheep band	rotation	700	76	6/25 - 7/5
	rotation	700	117	9/15 - 10/1
Burnt Timber-Virginia Gulch sheep band	rotation	850	92	6/26 - 7/6
	rotation	850	134	9/16 - 10/1
Burnt Timber-Canyon Creek sheep band	rotation	600	65	6/24-7/4
	rotation	600	101	9/14 - 9/30
Canyon Creek	rotation	600	420	7/5 - 9/13
Virginia Gulch	rotation	850	595	7/10 - 9/15
Tank Creek	rotation	700	490	7/6 - 9/14
East Silver Mesa	rotation	700	663	7/1 - 10/4
Flint Creek	rotation	950	722	7/1 - 9/15
Fall Creek	rotation	1000	760	7/1 - 9/15
Cave Basin	rotation	750	570	7/1 - 9/15
Pine River	rotation	850	646	7/1 - 9/15
Rock Creek	rotation	850	646	7/1 - 9/15
Leviathan	rotation	582	442	7/1 - 9/15
Johnson Creek	rotation	388	295	7/1 - 9/15

*shaded parts of table are active allotments

2.3.3 ALTERNATIVE 3 – ADAPTIVE MANAGEMENT w/FORAGE RESERVES

This alternative is to continue to permit term livestock grazing on the Weminuche Landscape by incorporating adaptive management strategies that will allow the lands within the landscape to meet or move towards meeting Forest Plan direction standards, and guidelines and desired conditions identified in this EA. Adaptive management is a process where land managers implement management practices that are designed to meet Forest Plan standards and guidelines, and would likely achieve the desired conditions in a timely manner. However, if monitoring shows that desired conditions are not being met, or if movement toward achieving the desired conditions in an acceptable timeframe is not occurring, then an alternate set of management actions, as described and evaluated under this NEPA analysis, would be implemented to achieve the desired results. Adaptive Management is designed to be flexible in nature, and is based on conditions on the ground; not regulated by fixed livestock numbers, type of livestock, or seasons of use. It can be compared to a performance-based contract that is written with specifications for the *end results*, rather than written with detailed specifications on *how* to accomplish the job.

Adaptive management is a set of specific initial actions that are chosen as the starting point believed to best meet or move toward desired conditions in rangeland health, vegetation composition and abundance, and watershed conditions relative to livestock grazing within the landscape, and is designed to meet Forest Plan standards and guidelines.

Alternative 3, which was presented as the proposed action during scoping, is described below (see Fig. 2-1 and 2-2). After further consideration of internal and external comments, specialist input, and other factors such as management of sheep allotments in other places around the Forest Service, the deciding officer (District Ranger) determined that he would now like to identify Alternative 4 as the Forest Service proposed action.

- Alternative 3 would reissue six term grazing permits on the following active allotments: Burnt Timber, Canyon Creek, East Silver Mesa, Spring Gulch, Tank Creek and Virginia Gulch.
- The East Silver Mesa Allotment would be re-named to Endlich Mesa Allotment to correctly reflect land features within the allotment and better follow local use of place names.
- Boundary adjustments would occur on most of the active grazing allotments (see Table 2-7 for allotment status and acreages). As part of the boundary adjustments, the western most parts of Tank Creek and Canyon Creek would be closed to livestock grazing (total of 5,117 acres) except for trailing to the allotment.
- Boundary adjustments would include adding 1,553 acres from the previously closed Needles Mountains Allotment (*SJNF 2009*) to allotments through logical boundary shifts.
- The northern 2/3 of Rock Creek Allotment, all of Leviathan Allotment, and most of Johnson Creek Allotment would be designated as sheep forage reserves. The remaining parts of Johnson Creek and Rock Creek would be closed to term livestock grazing.
- The southern quarter of the Cave Basin Allotment would be designated as a cattle forage reserve, but closed to sheep grazing.
- Flint Creek and most of Fall Creek would be closed to all livestock grazing under term permits, along with the northern 3/4 of Cave Basin Allotments.
- Canyon Creek Allotment would be converted to cattle, but requires fencing at various places on the north, west and south boundaries to prevent cattle from drifting into other allotments. An additional pasture fence may be needed to create a third pasture (see Figure 2-2). Fencing could be electric or four wire lay-down style fences. Two new stock ponds may be needed to improve cattle distribution (see map for rough locations). This allotment would be closed to sheep grazing.
- Incorporate Design Criteria as described below.
- Access to allotments would continue through trailing from private lands to National Forest Lands (Forest Service has no authority to authorize or deny use of private land trailing routes).

A more detailed description of allotment boundary changes and reasons for closing allotments or leaving them open can be found in *Appendix A* of this document. See *Section 2.5* below for more information about comparison of Alternatives 2, 3, and 4.

Forage reserve is a specific designation for an allotment on which there is no current term permit obligation, but for which a determination has been made to occasionally use the available forage on the allotment, for the purpose of enhancing management flexibility on other allotments. Forage reserve allotments may be occasionally used by authorized livestock from another allotment when there is a loss of forage availability on the home allotment from a variety of factors such as drought, fire, rangeland restoration activities, or resource conflicts. For this analysis, occasional use is defined as grazing the reserve for a maximum of three years out of ten.

Under this alternative, livestock grazing permits for forage reserves would not be granted to new applicants. Rather, preference for grazing would be given to permittees with current term grazing permits held on federal lands where documented resource conflicts exist. Generally, grazing of forage reserves is authorized through the issuance of temporary permits. Typically, a forage reserve would be expected to be used no more than two years out of ten, and would not exceed a total of three out of any ten year period. If use is proposed to exceed this, then an interdisciplinary analysis team would need to verify that conditions on the ground are appropriate for that level of use. See design criteria for further requirements to graze forage reserves.

All applicable standards and guidelines from the current Forest Plan would be applied, and all potential future livestock grazing would incorporate adaptive management strategies (outlined on page 67) which use monitoring and a variety of “tools”, or actions, to reach or maintain desired resource conditions. The adaptive management process allows for dealing with uncertainty and changing conditions over time, and focuses on the end results of meeting or moving towards desired conditions, as opposed to detailing specific seasons of use, permitted livestock numbers, and grazing rotations. In the context of this document, this means that a course of action (design criteria) is selected as a starting point that is believed to best meet or move toward the desired objectives. Monitoring would occur that evaluates results which would be used by the Interdisciplinary Team and the Line Officer to make adjustments to management as needed to ensure adequate progress toward the defined objectives. All adaptive actions would be within the scope of effects documented in this environmental assessment.

A monitoring plan has been developed for Alternatives 3 and 4 and is outlined beginning on page 44. This plan was developed to ensure design criteria have a high probability of resulting in the desired resource outcomes and conditions over the short and long term. Areas currently meeting desired conditions would be monitored per guidance described in the monitoring section to insure that desired conditions are maintained into the future.

Design Criteria

Those design criteria as indicated in Tables 2-2 through 2-4 (p.54+) by an “x” in the Alternative 3 column are included as part of Alternative 3. These criteria apply to all active allotments across the landscape at all times.

Site-Specific Design Criteria for Alternative 3

The design criteria in Tables 2-2 through 2-4 are applicable to the entire project area. During 2009-12 field analysis, some specific locations were identified as having a “need for change”. These sites were determined to have a need for change if they do not currently meet the Desired Condition. Site-Specific Adaptive Management Options are as follows:

Burnt Timber

- No bedding within ¼ mile of Burnt Timber Trail.
- Minimize the number of times sheep cross the trail.
- Boundary adjustment: About 55 acres were moved to Virginia Gulch Allotment since this sheep band is the only one that uses this area.

Canyon Creek

Cattle:

- Boundary adjustments to reflect actual use and topography features: Closure of the western most part of the allotment (1,588 acres) due to topography and vegetation.
- If the use of the allotment administratively switches from sheep to cattle, then follow design criteria for cattle. Cattle grazing may occur only between July 1st and October 1st.
- A range rider would be required five days per week until fences are up and a rotational grazing system is working.
- Fencing for cattle would be needed on the north and west boundaries to prevent cattle from drifting into Tank Creek Allotment. An additional pasture fence would be needed to create a third pasture. Fencing could be electric, traditional four-wire fence, or four-wire lay-down style fence. Maintenance of existing water developments may also be needed.
- Stocking of allotment with cattle would occur slowly over a time. Initial herd size would be 40-50 head. The herd size would be allowed to increase up to 130 head once control of cattle is demonstrated and effective three pasture rotation is established. This is upper limit is based on historical numbers of livestock and suitable acres within the allotment.

Cave Basin

Cattle Forage Reserve:

- Boundary adjustments to potential use and topographic features: only graze southern ¼ of allotment, the rest would be closed to grazing (16,252 acres).
- Cattle grazing could occur only between July 15th and October 1st.
- A range rider would be required 4 - 5 days per week to improve distribution and minimize impacts to riparian areas, fens, and wetlands.
- The upper limit for stocking the forage reserve would be 200 cow/calf pairs based on historical numbers of livestock. However, the actual authorized number would be based

on suitable acres within the forage reserve and rangeland conditions at the time of authorization.

- See design criteria for cattle.

East Silver Mesa (Endlich Mesa)

- No bedding within ¼ mile of lakes (City Reservoir, Stump Lakes, Castillia Lake, Lake Marie, and Lillie Lake)
- Boundary adjustments to reflect actual use and topographic features: 1. Remove south-east section of allotment to grazing use due to topography and lack of vegetation (mainly rock). Add this section to the closed Fall Creek Allotment. 2. Adjust northern boundary to include portions of Virginia Gulch Allotment near City Reservoir and also portions of the western edge of Fall Creek Allotment.

Rock Creek, Leviathan, and Johnson Creek

Sheep Forage Reserves:

- The northern 2/3 of Rock Creek Allotment (7,344 acres), all of Leviathan Allotment (6,530 acres), and most of Johnson Creek Allotment (7,757 acres) would be designated as sheep forage reserves. The remaining parts of Johnson Creek (1,699 acres) and Rock Creek (3,536 acres) would be closed to grazing.
- Trailing to allotments should be through Endlich Mesa or Burnt Timber and Virginia Gulch Allotments. Then take access through Trimble Pass and Columbine Pass down to Johnson Creek then up Vallecito Creek Trail at confluence with Johnson Creek to Rock Creek Allotment. Access is not permitted on the lower seven miles of Vallecito Trail (to minimize conflicts with recreation and bighorn sheep). Sheep are to stay west of the Vallecito Trail at all times, where possible, when travelling to/from Rock Creek Allotment (to minimize conflicts with recreation and bighorn sheep).
- Only one band of domestic sheep would be allowed to use the group of forage reserves in a given year.
- Prior to use, the allotments must be aerially surveyed for a minimum of two days with one week between survey periods to minimize risk of contact to bighorns. This was agreed to be satisfactory protocol with permittees and with Colorado Parks and Wildlife.
- Salting, bedding, and intentional grazing of domestic sheep would not be permitted in a “restricted area” of the Rock Creek Allotment where suitable Uncompahgre Fritillary butterfly habitat exists.

Spring Gulch

- Re-build existing water sources on the allotment to improve sheep distribution.
- Re-open trailing routes that are overgrown due to aspen re-generation following the 2002 Missionary Ridge Fire.

Tank Creek

- Sheep are to stay west of Lime Mesa Trail and no camps within 200 yards of the trail.
- Boundary adjustments to reflect actual use and topographic features: 1. Closure of the western most part of the allotment (3,529 acres) due to topography, vegetation, and overlap with mapped bighorn sheep range. 2. Adjust northern boundary to include

portions of Mountain View Crest and areas near Emerald, Ruby, and Pearl Lakes (formerly part of Needles Mountains Allotment) that are west of the Lime Mesa Trail.

- No bedding within ¼ mile of lakes (Dollar, Emerald, Pearl and Ruby).
- Minimize time spent near lakes north of Mountain View Crest (Emerald, Pearl, and Ruby). If needed, spend more time on west side of Burnt Timber Allotment.

Virginia Gulch

- Grazing rotations would be designed to minimize conflict with recreation use to the extent possible in the following areas: Burnt Timber Trail, Lime Mesa Trail, City Reservoir Trail, and City Reservoir, especially during high traffic times, holiday weekends, wildflower season etc. Minimize the number of times sheep cross the trail. Keep sheep away from the trails as much as possible.
- Sheep are to stay east of Lime Mesa Trail and no camps within 200 yards of the trail.
- Boundary adjustments to reflect actual use and topography features:
 1. Adjust eastern boundary of allotment in correlation to the Endlich Mesa northern boundary expansion.
 2. Adjust northern boundary to include portions of areas near Emerald, Ruby, and Pearl Lakes (formerly part of Needles Mountains Allotment) that are east of Lime Mesa Trail.
 3. Adjust western boundary in correlation to Burnt Timber northern boundary adjustment.

A further list of potential actions is listed in Table 2-5 (p.67). These actions could be incorporated at any time in the future to supplement those identified as design criteria, or to accelerate the rate at which existing conditions are moving toward the desired conditions. This list is not all-inclusive. New science and management techniques may be incorporated as needed or when they are developed. Some practices alone may not meet the desired condition, but in combination with other practices, desired conditions may be met or moved toward. For example, a two-unit deferred livestock grazing system alone may not provide the anticipated result, but when coupled with low stocking rates and construction of additional water developments, desired conditions may be met.

Alternative 3 Monitoring Plan

Monitoring and evaluation leads to improved management and informed management decisions. Monitoring helps determine how the Forest Plan and NEPA Decisions are being implemented, whether AMP implementation is achieving desired outcomes, and whether assumptions made in the planning process are valid. Monitoring and evaluation are key elements in adaptive management, allowing the Forest Service to measure the effectiveness of applied prescribed management actions and if that management is being effective in meeting or moving toward desired conditions within the appropriate timeframes. Through adaptive management, AMPs become dynamic, relevant and useful documents.

Two types of monitoring are associated with AMPs; *implementation* monitoring and *effectiveness* monitoring. Implementation monitoring occurs at key areas and would measure whether or not permit stipulations and Forest Plan guidelines are being met. Effectiveness monitoring occurs at benchmark sites and would evaluate how effective management actions are at moving toward or achieving desired conditions.

Monitoring is both the responsibility of the Forest Service and range permittee. If at any time, the results of monitoring indicate guidelines, or desired resource conditions are not being achieved as predicted, then adaptive management strategies would be implemented to move towards and/or meet desired conditions.

Implementation (Short-Term) Monitoring

Annual monitoring techniques would be used in a dynamic and cyclic process. As results are received and analyzed each year, adjustments to the Annual Operating Instructions (AOI) can be made for the following year. This allows annual livestock grazing management to adapt to fluctuations in short-term factors such as range readiness, precipitation, and other local events like fire. By allowing these short-term adjustments to livestock grazing, Forest Plan Direction is likely to be met.

Range Implementation Monitoring: Allotment Inspections are typically conducted annually as part of rangeland administration (based on budget constraints). Annual monitoring includes a combination of the following, but this list may be revised should other techniques be developed that are more effective in monitoring permit compliance and desired conditions.

- *Compliance with the Terms and Conditions of the Grazing Permits:* Representative areas of the allotment are checked to verify that permittees are in compliance with the terms and conditions of their grazing permits. Included in this category of monitoring are field inspections and permittee reporting.
- *Rangeland Readiness:* Representative areas of the allotments are checked for rangeland readiness. Indicators used to determine rangeland readiness are soil and vegetation conditions. Rangeland is generally ready for grazing when soil has become firm after winter and spring precipitation, and when plants have reached the defined stage of growth at which grazing may begin under the specific management plan without long-lasting damage.
- *Compliance with Annual Operating Instructions (AOI):* The AOI's explain how each allotment is to be managed on a year-to-year basis. These instructions become part of the Term Grazing Permit for each permittee and responsibility for carrying out the instructions falls to the permit holder. The AOIs include instructions for routing schedules, numbers to be grazed, entrance and exit dates, standards for and determination of allowable use, improvement maintenance needs, improvement construction and reconstruction, and general allotment operating procedures.
- *Allowable Use Guides:* Allowable use monitoring methods typically used have been ocular estimates on key areas. This method provides ocular estimates of upland herbaceous species within one of six utilization classes. Allowable use monitoring in riparian areas measures stubble height.
- *Actual Use Reports:* Permittees are responsible for reporting actual use of the allotment at the end of each livestock grazing season. When combined with analysis of other factors such as allotment inspections, the need for annual adjustments to livestock grazing strategy can be determined.
- *Utilization Surveys:* Common forage utilization monitoring methods used consist of employing utilization gauges or ocular estimates. In addition, riparian stubble heights

would be visually assessed (4-6 inch trigger point) to assure that stream bank conditions are not deteriorating. Shrubs and saplings would also be visually assessed to ensure they are not over-utilized by domestic sheep during dormancy. This may be accomplished by annual on-the-ground inspections (including photo points) that document current conditions (measure of riparian health).

Bighorn Sheep Implementation Monitoring:

Active Sheep Allotments:

Presence/absence monitoring within each active allotment should continue as long as an allotment remains active (*1 out of 5 years*). If bighorn sheep are detected at any point, a determination would be made if design criteria are sufficient to reduce risk of potential physical contact between domestic sheep and bighorns. If it is determined that design criteria are not adequate to reduce risk of contact, then adaptive management options would be implemented to reduce risk of contact, which could include adjustment of allotment boundaries, or closing allotments to domestic sheep grazing.

Monitoring efforts should be coordinated with Colorado Parks and Wildlife and the Pagosa Ranger District, due to bighorn distribution across administrative boundaries.

Forage Reserve Sheep Allotments:

Bighorn sheep surveys would be conducted on forage reserve allotments prior to stocking to determine presence or absence of bighorn sheep, and on an annual basis if allotments are stocked. At least two months written notice must be given by requesting permittee to allow enough time for required surveys to be completed. Design criteria and adaptive management assessments would be the same as for active sheep allotments.

Effectiveness (Long-Term Trend) Monitoring

Role of Effectiveness Monitoring: An important role of monitoring is to determine whether management and identified design criteria are successful at moving rangeland resources towards desired conditions. Determining trend toward or away from allotment desired condition objectives allows rangeland managers to determine the relative success of the management system and to adjust management to accomplish objectives.

What Would be Monitored and Where: The long-term health of riparian and upland herbaceous resources would be monitored at benchmark areas selected by the Interdisciplinary Team. These sites may be key areas or other primary range sites where resource concerns have been identified or where resource concerns have arisen due to changing ground conditions as noted from annual monitoring results. Long-term trend monitoring would not be conducted if the allotments are not stocked, or for temporary grazing permits.

Monitoring Methods and Frequency: The long-term health of riparian and upland vegetative resources may be monitored at benchmark sites on each allotment using one or more of the following methods as needed. All methods listed are approved methods described in the Region 2 Rangeland Analysis and Management Training Guide (*USDA 1996*). The list below

may be revised should other techniques be developed that are better at monitoring the effectiveness of design criteria.

- *Rooted Nested Frequency Transects (1 out of 10 years)*: Rooted Nested Frequency transects would be established at benchmark sites within the analysis area as needed. Rooted Nested Frequency transects analyze changes in frequency of individual species over time on a specific site. Increases or decreases in frequency of species within the plant community can be monitored. An increase in a species that is sought-after in the desired plant community can be interpreted as desirable or trending toward the desired plant community. A decrease in a sought-after species can be interpreted as undesirable and considered trending away from the desired plant community.
- *Cover-Frequency Transects (1 out of 10 years)*: These transects are used to monitor changes in canopy cover and relative frequency of herbaceous species. This method provides estimates of canopy cover by species, frequency, ground cover, and production by life form through replicated sampling of plot frame transects. Combining cover and frequency data helps overcome variability in the data due to climate changes. This method is mostly used to determine change in composition over time.
- *Rangeland Health Evaluation Matrix (1 out of 10 years)*: This evaluation gives the examiner a general look at critical rangeland health features. Qualitative evaluation of these features can lead the examiner towards an accurate initial assessment of the rangeland and subsequent management of that land. Comparison of future rangeland health evaluations to initial evaluations provides a glimpse of trend in overall rangeland health as evidenced by a series of health indicators.
- *Photographs and Photo-points (1 out of 10 years)*: Photographs are extremely useful in documenting change on the landscape. Photos should capture the essence of the plot, point or transect, including important characteristics and features of the site. Photos need to include enough of the horizon-line to allow the photographer to easily repeat the photograph from the same angle at a different time.

The long-term health of *riparian areas* would be monitored at riparian sites on active allotments at approximately at varying intervals using a variety of methods, such as:

- *The line intercept method (1 out of 10 years)*: This method consists of horizontal linear measurements of plant intercepts along the course of a line (tape). It is used primarily for quantitative measurements of shrub canopy cover, and is used to calibrate ocular estimates of shrub canopy cover. This method would be used to determine the canopy cover percent of willows needed to determine seral stages.
- *Cover Frequency Transects (1 out of 10 years)*: This inventory method provides quantitative measurements of canopy cover and frequency by plant species, ground cover, and production by life form. It is useful when a replicated sampling design and statistical analysis is required. It is also used to calibrate ocular estimates of canopy cover.
- *Proper Functioning Condition (PFC) (1 out of 10 years)*: This assessment process classifies riparian as being in “Proper Functioning Condition”; “Functional-at risk”, with

either an upward or downward trend; “Non-functional”; or “Unknown.” These ratings evaluate riparian condition based in part on presence/absence and abundance of specific vegetation and the interactions of that vegetation with geology, hydrology, and soils.

- *Photographs and Photo-points (1 out of 10 years)*: Photographs are extremely useful in documenting change on the landscape. Photos should capture the essence of the plot, point or transect, including important characteristics and features of the site. Photos should include enough of the horizon-line to allow the photographer to easily repeat the photograph from the same angle at a different time.
- *Green Line Vegetation Composition (1 out of 10 years)*: This method samples community type composition along edges of live water. There is a strong relationship between amount and kind of vegetation along the water’s edge and bank stability. This method provides a good indication of the general health of the riparian system.

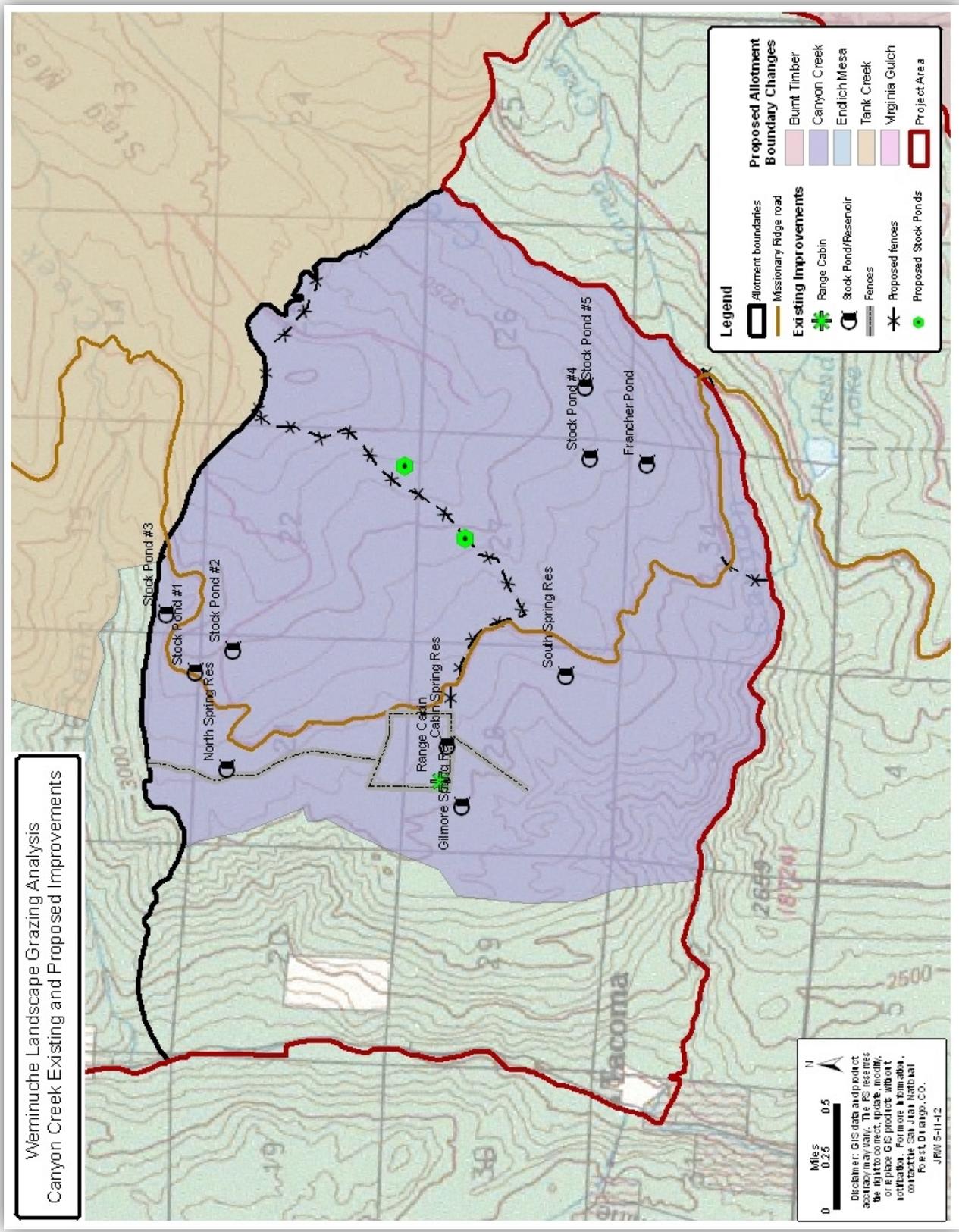
Application of Monitoring Results through Adaptive Management

If the results of implementation or effectiveness monitoring determine that the desired conditions of riparian and/or upland herbaceous resources are not being met, and satisfactory progress is not occurring in moving toward the desired conditions, the Interdisciplinary Team would determine which management actions identified in the design criteria are ineffective. The Team would then determine which adaptive management technique(s) should be implemented to reverse the undesirable trend and which the Team believes would begin moving the site resource(s) of concern towards the desired conditions. The Interdisciplinary Team would make its recommendations to the District Ranger who, after discussions and input from the affected permittee, would decide what action(s) should be taken. The effectiveness monitoring cycle would begin again to monitor the implementation and effectiveness of the newly applied adaptive management actions.

Adaptive management options that may be used are as follows:

- Adjust livestock herding to manage specific areas of concern
- Adjust livestock grazing intensity and/or duration, or change livestock numbers or season of use
- Require livestock grazing in specified areas, or restrict livestock grazing in specified areas
- Rest specified areas from livestock grazing or enact non-use for resource protection
- Adjust livestock trailing routes or time spent on stock driveways or other trailing routes
- Install barriers on trails to prevent livestock from cutting switchbacks
- Use or exclusion of a grazing area
- Adjust grazing area or allotment boundaries, including potentially combining allotments, close allotments, or portions of allotments, to grazing.

Figure 2-2. Alternative 3 – Existing and Proposed Improvements for Canyon Creek Allotment



2.3.4 ALTERNATIVE 4 – PROPOSED ACTION - ADAPTIVE MANAGEMENT / CLOSING VACANT ALLOTMENTS

Based upon comments received through scoping and discussion within the Interdisciplinary Team process, a fourth alternative was added to give some clarity and a wider range of options within the reasonable range of alternatives to analyze in detail. While Alternative 3 was presented during scoping as the proposed action at the time, further consideration led the deciding official to make Alternative 4 the current proposed action.

This alternative would incorporate all the adaptive management options of Alternative 3 for the active grazing allotments (Burnt Timber, Canyon Creek, East Silver Mesa, Spring Gulch, Tank Creek and Virginia Gulch), including boundary adjustments, allotment re-naming, trailing, and design criteria. However, all the currently vacant sheep allotments would be closed to all livestock grazing under a term permit. No forage reserves would be authorized. Additionally, the currently active sheep permits in the landscape would not be transferred beyond the current permittee's immediate family; the sheep permits would continue to operate, but under a sunset clause. When/if the current permittee family decides to waive the sheep permits back to the FS, then the allotments would be closed to sheep grazing. See Fig 2-3 for map of Alternative 4. See *Section 2.5* below for more information about comparison of Alternatives 2, 3, and 4. Adaptive options listed in Table 2-5 would also be included in this action.

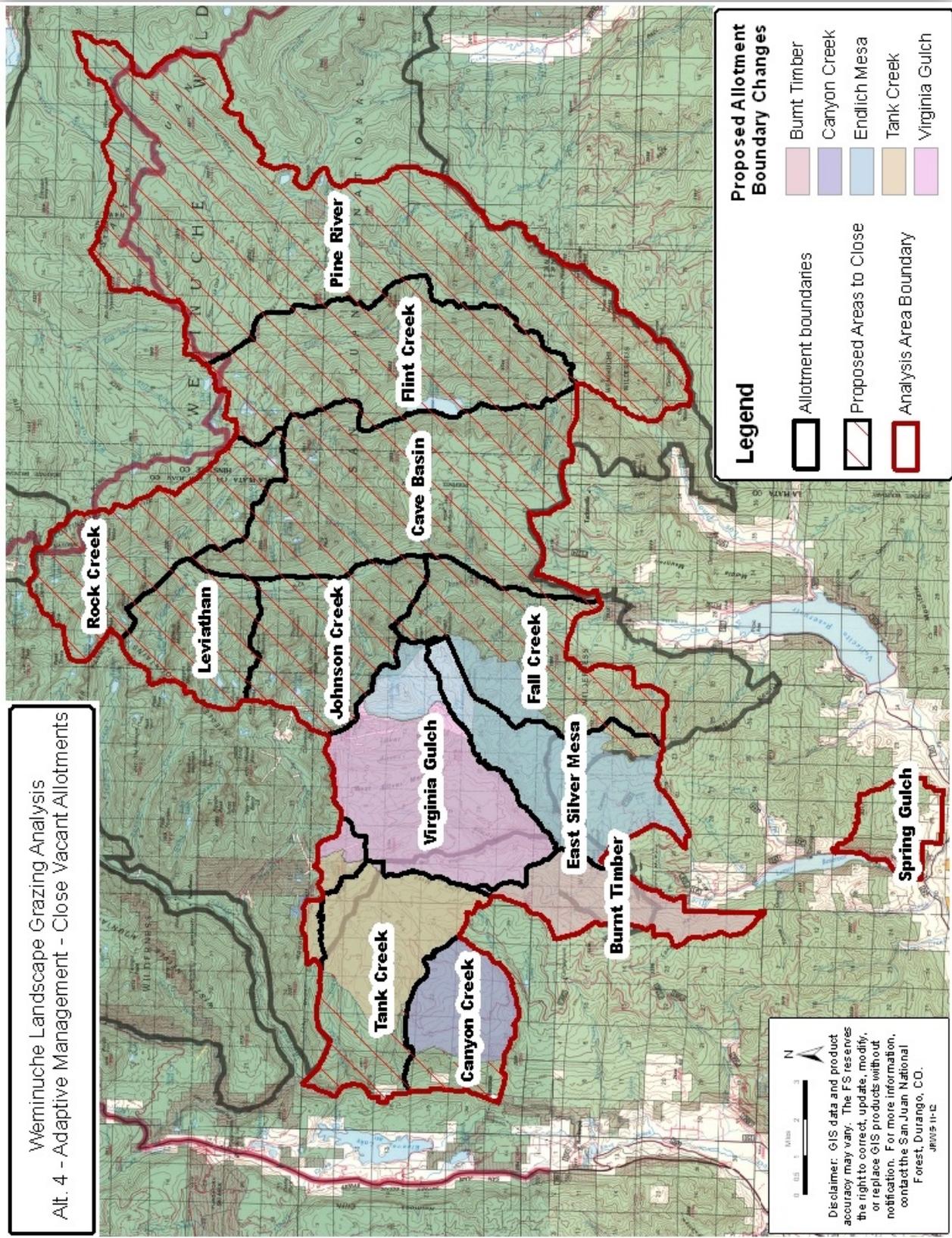
Design Criteria

Those design criteria as indicated in Tables 2-2 through 2-4 (p.54 +) by an “x” in the Alternative 4 column are included as part of Alternative 4. These criteria apply to all active allotments across the landscape at all times. For Alternative 4, design criteria would be the same as Alternative 3 for current active allotments, but would not apply to closed allotments.

Alternative 4 Monitoring Plan

Monitoring would be the same as above for Alternative 3 except minimal monitoring would occur on allotments closed to grazing.

Figure 2-3. Alternative 4 –Proposed Action - Adaptive Management / Closing Vacant Allotments



2.4 Design Criteria Common to Alternatives 2, 3, and 4

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*) and the Range Management Handbook (*FSH 2200*) are the first protection measures to be applied to the project. These sources are incorporated by reference and are not reiterated here. Other Project Design Criteria are then developed, as the need is identified by the FS specialists and authorized officer.

Some of the design criteria below have been used for years or are commonly used practices throughout the western United States and have been found to be effective in reducing potential impacts. Beside the commonly used practices, additional practices concerning the management of contact between domestic sheep and goats and Rocky Mountain bighorn sheep are included. Many of these recommended practices were taken from *Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat* (WAFWA 2012).

Depending on the alternative selected, the applicable design criteria become a part of the project-level decision and the resultant Allotment Management Plans. The list of design criteria has been organized into logical categories. Each bullet statement applies to a specific action alternative as indicated by an “x” in the far right columns.

Alternatives 3 and 4 also have site-specific design criteria in addition to those listed in the following tables.

Table 2-2. Design Criteria for General Management of Domestic Sheep

Livestock Herding and Salting*	Alternative		
	2	3	4
Livestock will be herded using the “open herding system” and distributed across the allotment(s) in order to achieve proper grazing utilization of key forage species. (1.1)	x	x	x
Permittees will spend as much time as needed to move livestock away from identified areas of concern and into areas of normally light use. This allows livestock to make use of forage that otherwise will not be grazed before allowable use standards are met in the key areas and the livestock are required to be removed from the area. Sheep movements should progress around an allotment in such a way to minimize back and forth trailing over the same ground to prevent permanent visual sheep trailing impacts. (1.2)		x	x
At least one herder is required to be with the sheep. The main band will never be left unattended, except at night and short periods when the herder is accomplishing other tasks in the immediate area. A herder must remain in close proximity during the night. (1.3)	x	x	x
Move sheep to a new grazing area every 5-7 days. (1.4)		x	x
Wet areas with saturated soils (seasonal wetlands, snow-banks) should be avoided until they are dry enough to prevent livestock trampling impacts. (1.5)	x	x	x
Permittees will spend as much time as needed to move livestock away from areas of concern (meadows, riparian areas, key areas, and so forth) and into areas of normally light use, provided that such herding does not result in increased potential for contact. This benefits permittees since it allows livestock to make use of forage that otherwise will not be grazed before allowable use standards are met in the key areas and the livestock are required to be removed from a pasture. (1.6)	x	x	x
Livestock grazing will be managed in riparian areas and willow carrs (a wetland willow thicket) to maintain or achieve mid-seral or higher condition to provide cover and forage for prey species within Canada lynx habitat (from Ruediger <i>et al.</i> 2000). (1.7)	x	x	x
Livestock will not be close-herded to and from water. Livestock will be moved away from water sources after animals have finished drinking. (1.8)		x	x
All trailing on federal land for ingress and egress to the permitted allotment will be within the period of use specified in the permit. (1.9)	x	x	x
Salt should be placed in such a way as to distribute livestock use throughout the area. Place salt well away (>1/4 mile) from any water sources, or key areas that traditionally receive heavy use such as roads, parks, and riparian areas. Salt in areas of light use to draw livestock to those areas. The best distribution can be obtained by scattering one-half block chunks in areas of light use. Salt or supplement will not be placed near areas where such placement is liable to result in conflicts with other Forest users. Pick-up your salt after livestock are rotated to the next unit. (1.10)		x	x
Grazing schedules will be developed so that areas are used at different times of the year <u>if at all possible</u> to maximize the opportunity for plant regrowth and recovery. Grazing schedules will be developed in the Annual Operating Instructions based on any or all of the following: the season of use, allowable use standard, residual stubble height, stocking rate, timing of livestock use. (1.11)		x	x

Disposal of Dead Livestock	Alternative		
	2	3	4
When an animal covered by this permit dies from any cause, including contagious or infectious disease, the carcass must be buried in a location greater than 200 feet from water, out of view of roads or trails, and away from any areas of significant public use, within 24 hours of discovery, or notification by forest personnel. Off road travel or the use of heavy equipment must be authorized by the Forest Service, in advance. The preferred method for burial is simply by the use of a pick and shovel. Carcasses may be burned under certain circumstances when authorized by Forest Service personnel on a case by case basis. (1.18)	x	x	x

Livestock Bedding	Alternative		
	2	3	4
Sheep will be bedded on new ground every 1-2 nights and moved to fresh feed daily in accordance with the current routing schedule. Permit requirements for bedgrounds allow for one night in each location. This is referring to closed bedding, or bedding when the sheep are bunched into one area. Two days use on bedgrounds is allowed if open bedding management is practiced. Open bedding is not bunching the sheep for the evening and letting them stay on the hillside where they finished grazing. Open bedding is preferred. (1.12)	x	x	x
Sheep will be bedded on uplands or rocky ground, where possible, but not on canyon edges or canyon rims. Sheep will be bedded no closer than 100 feet from the herder's camp (200 to 300 feet is preferred). If predators are a problem, teepee out with the sheep at night, Do not bed near water sources or recreation trails. (1.13)		x	x
Prevent bedding, salting, trailing, and intentional grazing on sites with high potential for Uncompahgre Fritillary Butterfly. Sites will be agreed upon in consultation with the USFWS and provided to permittees in writing in advance of the grazing season. (1.14)		x	x
Sheep should be bedded at least 300 feet from all water sources, including lakes, ponds, tarns, springs and seeps, system trails, campgrounds, picnic grounds, and the remains of historic structures. There may some exceptions due to topography on the allotment but these will be approved in advance by the Forest Officer. (1.15)		x	x
Bedgrounds in some areas may be closed or relocated in the Annual Operating Instructions on an annual basis, based on impacts. Locations of and frequency of use will be one of annual monitoring indicators. (1.16)		x	x
Herders will be vigilant to domestic sheep movement off of bedgrounds during the night due to lunar phase or predation. These strays will be located and returned to the band the next day. (1.17)		x	x

Herder Camps	Alternative		
	2	3	4
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. (1.19)	x	x	x
Camps and salting areas will be not be placed in wetlands or fens and placed at least 200 feet from all surface water sources, including lakes, ponds, tarns, springs and seeps. (1.20)	x	x	x
Camps will be kept and left clean. All flammable refuse will either be burned or packed put. Unburnable refuse, including cans, bottles, etc., will be packed out. Native materials may be left at site (firewood, log ridgepoles, etc), but everything else must be packed out (1.21)	x	x	x
Camps will be placed at least 200 feet from any system trail. (1.22)	x	x	x
Sheep herders will not be allowed to excavate campsites. (1.23)		x	x
Sheep herders will not be allowed to cut krummholz (dwarf spruce trees at timberline) for firewood. (1.24)		x	x
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 ax. During periods the FS has enacted fire restrictions, these restrictions will be observed. (1.25)	x	x	x
Working Dogs and Pack Stock	Alternative		
	2	3	4
Working dogs are used at the discretion of the livestock owner under appropriate State and County laws and regulations. The Forest Service neither permits nor authorizes the use of working dogs. If the livestock owner chooses to use working dogs, the following are best management practices for the livestock operator to avoid conflicts with people: Working dogs will be under the herder's control and must be non-threatening to recreation or other visitors. Threatening for this purpose will be defined as a dog that comes within approximately 20 feet of a person in an aggressive manner, (i.e. barking and snarling) and continues to follow the person as they attempt to retreat. This applies only if the visitor is not within the bounds of the grazing sheep band. (1.26)		x	x
Working dogs that do not meet the above requirements will be immediately removed by the permittee from the Forest. (1.27)		x	x
The permittee will institute an upper limit on the maximum number of dogs that will be allowed to be used in conjunction with the sheep operation. No more than eight dogs in combination (guard dogs and border collies or other working dogs) will be allowed per sheep band. (1.28)		x	x
Signs may be placed at trailheads giving public notice of the presence of sheep herder working dogs in the Analysis Area if the Public raises the concern of working dogs in the area (posted by the FS). (1.29)	x	x	x
Pack and saddle stock as allowed in the permit are to be used for management of permitted livestock only. Stock may be waived only when the entire grazing permit is waived. (1.30)	x	x	x

Animal Damage Management	Alternative		
	2	3	4
Animal damage management activities will be conducted in accordance with both Federal regulations and State law. Requests for assistance will be done in compliance with the current Animal and Plant Health Inspection Service (APHIS) Animal Damage Management Plan (for example, APHIS 2005) and must be in compliance with the Forest Plan. (1.31)	x	x	x
Predator control (i.e., black bears, mountain lions, bobcats, and coyotes) will not be conducted without following the correct State, APHIS, and Forest Service procedures. These procedures will be provided to permittees in writing (part of the Annual Operating Instructions). (1.32)	x	x	x
It is illegal to kill a grizzly bear, Canada lynx, wolverine, wolf, or any birds of prey. Publications will be made available to permittees to help distinguish the difference between certain protected species and several look-alike species as follows: Grizzly bear and black bear – a bear identification sheet will be given to permittees upon request. Canada lynx and bobcat – an identification sheet will be given to permittees upon request. Wolves and dogs – an identification sheet will be given to permittees upon request. (1.33)	x	x	x
Noxious Plants/Invasive Species	Alternative		
	2	3	4
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. (1.34)	x	x	x
Any seed used on the allotment will be tested for “all states noxious weeds” according to Association of Official Seed Analysts (AOSA) standards and will be certified by a Registered Seed Technologist or Seed Analyst as meeting the requirements of the Federal Seed Act (7 U.S.C. Chapter 37: Sections 1551-1611) and the Rules and Regulations of the Colorado Seed Act pursuant to 35-27-101 through 125, C.R.S. (1993 Supp. as amended by Senate Bill 93-17). (1.35)	x	x	x
Conduct prevention, control, and eradication strategies for targeted invasive plant species, utilizing integrated weed management techniques through implementation of the San Juan NF Invasives Action Plan. (1.36)		x	x
Permittees will make every effort to ensure that livestock do not contribute to the transport of noxious plants onto the allotment(s). Permittees will be given identification information on State of Colorado “noxious weeds” during annual meetings with the FS. The Colorado noxious weed list is available on the internet at: http://www.ag.state.co.us/CSD/Weeds/statutes/weedrules.pdf Noxious plant photos are available at: http://kiowa.colostate.edu/cwis109/noxious_weeds/Noxious_weeds.cfm (1.37)		x	x

<p><i>Note: in addition to Project Design Criteria, the following are recommended practices that will be discussed with permittees at the time of the Annual Operating Instructions meeting with agency personnel:</i></p> <p><i>Permittees are asked to help in locating noxious plant sites and reporting them to the Agency Officer. Permittees willing to assist in treating noxious plants should communicate with the Agency Officer before taking any action.</i></p> <p><i>Livestock coming onto the Forest from lands known to contain noxious plants should be held on clean forage or fed weed-free hay for several days to allow the majority of seeds to pass before turn on.</i></p> <p><i>Any equipment used in the transport of livestock, including horse trailers and stock trucks, should be washed before coming onto the allotment if they have been used in areas where noxious plants were present.</i></p>			
<p style="text-align: center;">Access and Travel Management</p>	Alternative		
	2	3	4
<p>Permittees are required to abide by all FS road and trail restrictions and closures. Use of closed roads, and use of motorized equipment in areas designated as non-motorized requires a separate road use permit to be obtained prior to use. (1.38)</p>	x	x	x
<p style="text-align: center;">Wilderness</p>	Alternative		
	2	3	4
<p>Livestock management in wilderness requires special consideration of the wilderness values. Livestock will be managed within wilderness to minimize impacts on the wilderness environment and to minimize potential conflict with other users of the area. (1.39)</p>	x	x	x
<p style="text-align: center;">Information Notifications</p>	Alternative		
	2	3	4
<p>Provide the public information about the presence of working dogs and the “Dos and Don’ts” when recreating near domestic sheep bands. (1.40)</p>		x	x
<p>Information will be made available at the Columbine Ranger District about livestock grazing rotation schedules so that those recreation visitors who wish to, may avoid encounters with domestic sheep and the resultant activities. (1.41)</p>		x	x
<p style="text-align: center;">Permittee Instructions*</p>	Alternative		
	2	3	4
<p>Annual Operating Instructions (AOIs) will be provided concerning proper management practices, so that this information can be passed on to non-English speaking/reading herders (if applicable). Permittees will be responsible for ensuring that their herders understand and comply with FS requirements. (1.42)</p>		x	x
<p>The earliest turn on date and latest removal date will be based on allotment conditions relative to wet soils or snow, range readiness, vegetative phenology, and on minimizing conflicts with other uses. These annual dates will be communicated through the AOIs. Even when these conditions are met, the dates of livestock grazing will not exceed June 15 – October15. (1.43)</p>		x	x

Monitoring*	Alternative		
	2	3	4
Permittees are responsible for monitoring the following: livestock numbers; pasture entry and exit dates; allotment entry and exit dates; and maintenance activities for assigned improvements. This information will be furnished to the agency office within 30 days of livestock removal. This information will be verified by periodic agency inspections. (1.44)	x	x	x
Permittees will keep a weekly log of specific locations where they encounter certain species of wildlife and will turn it in to the Agency Officer upon request or at the end of the grazing season. The species to be reported will include special status species such as bighorn, lynx, wolverine, etc. (1.45)		x	x
Agency personnel may conduct annual permit administration consisting of monitoring such compliance with AOIs, general livestock locations and use levels, plant phenology of important forage species, noxious weed mapping, soil conditions, riparian conditions and water quality, and impacts from other uses. (1.46)	x	x	x
Any monitoring outcome, when part of the ten-year interval monitoring, that does not meet Desired Condition will require the application of adaptive management strategies to livestock grazing practices to recover and maintain desired conditions, when livestock are a contributing factor to the condition. (1.47)		x	x
Cultural Resources	Alternative		
	2	3	4
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, mining relics, 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 damaged, the proponent shall immediately suspend all operations that might further damage such materials and notify the Columbine Public Lands authorized officer. (1.48)		x	x
Areas of intensive activity such as salt licks, bedding areas, and herder camps will not be located within 100 feet of the boundaries of previously identified significant cultural resources. Range managers will work with archaeologists to select locations that avoid known significant cultural resources and are likely to avoid unidentified sites in areas that lack cultural resource surveys. (1.49)		x	x
Watershed Resources	Alternative		
	2	3	4
Wetlands and fens should be avoided at all times to prevent livestock trampling and grazing impacts. (1.50)		x	x
Sheep movement around the allotment should minimize reoccurring trailing locations to prevent soil compaction and terracing, which result in altered hydrologic function. (1.51)		x	x

*Note: See "Project Design Criteria to minimize contact between Rocky Mountain bighorn sheep and domestic sheep", below for further instructions.

Table 2-3. Design Criteria to minimize contact between Bighorn and Domestic Sheep

Risk Assessments (in the project record)	Alternative		
	2	3	4
<p>High Risk Allotments</p> <p>Permitted domestic sheep and goat grazing will not be authorized within high risk areas of the allotment. In most instances, domestic sheep may still be authorized <i>within the allotment</i> but management will ensure routing and other design criteria to avoid the high risk areas. This can be accomplished through adaptive management tools. (2.1)</p> <p>Moderate Risk Allotments</p> <p>Permitted domestic sheep and goat grazing may be authorized. However, design criteria will still be implemented to strive to reduce the potential for contact even farther. (2.2)</p> <p>Low Risk Allotments</p> <p>Permitted domestic sheep and goat grazing may be authorized. Permitted domestic sheep grazing will be focused towards these areas. However, design criteria should still be implemented to strive to reduce the potential for contact even farther. (2.3)</p>		x	x
Creating More Effective Separation Between Domestic Sheep and Bighorn Sheep	Alternative		
	2	3	4
<p>Follow the response protocol for confirmed contact or threat of impending contact between permitted domestic sheep and bighorn sheep:</p> <p>Permittee</p> <p>The permittee or their agent will contact the Columbine Ranger District range personnel immediately if bighorn come into contact or there is a threat of impending contact with domestic sheep. Contact information as well as phone numbers will be included in the Annual Operating Instructions. (2.4)</p> <p>As an immediate response, the permittee and/or the herders will be authorized to haze bighorn that are threatening to make contact with domestic sheep. This will be accomplished through an agreement between the grazing permittee and the CPW. The agreement will include circumstances requiring hazing response, appropriate type of hazing and reporting requirements. (2.5)</p> <p>Forest Service</p> <p>When informed about potential bighorn/domestic sheep contact, the FS will contact the permittee immediately notifying them of the situation. At this point, the FS and the permittee will implement other design criteria if needed to prevent or reduce the threat of impending contact. At this time an alternate plan of grazing for the remainder of the season, "flexible management" may be implemented to reduce the potential for physical contact to occur. Adjustments may be extended to upcoming seasons. (2.6)</p> <p>Concurrently, as contact, or the threat of contact, is made known, the FS will contact the CPW (contact information will be provided to the FS and the permittee prior to the grazing season). Actions that the CPW will take is at their discretion concerning wildlife health intervention and management of the bighorn. CPW will inform the FS if the situation is rectified and discussion/planning will occur with the permittee to implement an alternate management strategy if needed. The CPW may implement post contact monitoring. (2.7)</p>		x	x
<p>In allotments where there is a confirmed contact, or increased risk of contact, the FS will make the particular domestic sheep band (and the area) a high priority for monitoring to determine if there is bighorn activity in the area or if the risk assessment should be revisited. (2.8)</p>		x	x

<p>The FS will work with CPW to prioritize and implement coordinated annual monitoring of bighorn sheep individuals and populations. Monitoring activities could include coordinated ground counts, aerial counts, electronic data, etc. Implement a system for immediate cross-agency sharing of bighorn sighting reports to keep all parties informed about bighorn use. (2.9)</p> <p>Annually, in conjunction with CPW and the permittee, review the effectiveness of Design Criteria implementation and new information such as recent bighorn sightings. Update the allotment Risk Assessment if necessary, and make adjustments to upcoming grazing accordingly. These adjustments may include adjacent USFS administrative units, depending on availability and feasibility. Feasibility includes the permittees' needs as well as the administrative availability of allotments on other administrative units. Adjustments will be focused on reducing the risk physical contact and creating more effective separation. (2.10)</p> <p>Sheep and goat allotments with mapped overlap of bighorn summer range will be evaluated for closure when/if permits are relinquished back to the FS. (2.11)</p>			
<p>Herding</p> <p>At least one herder is required to be with the sheep. The main flock will never be left unattended, except at night, and short periods when the herder is accomplishing other tasks in the immediate area. A herder must remain in the camp during the night. (2.12)</p>		x	x
<p>Trailing of domestic sheep will happen as much as possible during the middle of the day to avoid bighorn activity periods. In certain areas this may not be possible due to conflicts with recreational users. (2.13)</p>		x	x
<p>Sick or diseased domestic sheep and goats – post turnout</p> <p>Injured, sick or diseased livestock will not be left behind but will be removed or terminated and disposed of according to the “Disposal of Dead Livestock” requirements below and in accordance with State Statute. Sick or diseased animals will be removed or otherwise eliminated when identified. (2.14)</p>		x	x
<p>Sick or diseased domestic sheep and goats – pre turnout</p> <p>It is imperative that permittees maintain a high certainty of domestic animal health in their permitted stock. Permittees/Herders will take appropriate measures to prevent turnout of sick or diseased domestic sheep and goats on grazing allotments, on trailing routes, or in weed control or pack-stock situations. It should also be recognized that “healthy-appearing” domestic sheep and goats may still carry pathogens (harmless to them) that can be transmitted to bighorn sheep. (2.15)</p>		x	x
<p>Sick or diseased bighorn sheep</p> <p>Sick bighorn sheep or carcasses must be reported as soon as possible to CPW staff or the Columbine Ranger District range personnel. Agency personnel will then notify the CPW as soon as possible. (2.16)</p>		x	x
<p>Herder education</p> <p>It is of utmost importance that the permittees spend as much time as necessary teaching the herders the requirements attached to the grazing permit, annual operating instructions and all the applicable Project Design Criteria included here. With the implementation of “adaptive management,” areas authorized for grazing as well as routing patterns and schedules may change from year to year and even within the year, along with other management techniques. Following procedures to avoid contact and prompt accurate reporting of bighorn/domestic sheep contact or impending contact is essential. Herders are crucial to ensuring proper management and in maintaining compliance to an exacting standard. Ultimately the responsibility rests upon the permittees to ensure compliance is being achieved. (2.17)</p>		x	x

<p>Salting</p> <p>Every effort should be made to deny bighorn access and consequent attraction to domestic sheep salting activities. Leaving available salt or excess salt residue in the soil or on rocks or tubs presents a salt source that may attract bighorn and may even train bighorn to follow the domestic sheep bands in search of salt. (2.18)</p> <p>Blocks of salt will be allowed and, if used, will be kept with the domestic sheep at all times. Salt will not be left behind when the domestic sheep are moved. (2.19)</p> <p>Salt or supplement will be placed only 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 streams, springs, water developments, or other wetlands without prior approval of the Agency Officer. Salt or supplement will not be placed near trailheads, on open roads, in natural travel routes, passes, parks, meadows, in areas of concentrated public use, or in other areas where such placement is liable to result in conflicts with other public land users. Salt or supplement will not be placed within tree regeneration areas where the smallest trees are less than three feet tall. (2.20)</p>		x	x
<p>General wildlife sighting reporting</p> <p>Permittees will be required to report wildlife sightings on the annual actual use form that must be turned in each fall to the FS; however sightings of bighorn in proximity to domestic sheep band must be reported immediately. If bighorn are seen near or on a FS sheep allotment, follow the protocol described above. (2.21)</p>		x	x
<p>Planned domestic sheep estrus cycle</p> <p>The planned breeding season for the domestic sheep operation will not occur during the permitted grazing season on federal land. This is intended to reduce the potential for attraction of bighorn rams to domestic sheep ewes in estrus. (2.22)</p>		x	x
<p style="text-align: center;">Permitted domestic sheep stray management</p>	Alternative		
	2	3	4
<p>Accountability of Permittee</p> <p>Extensive efforts will be made by the permittee to remove every authorized domestic sheep from the allotment following the grazing season. All sheep must be accounted for (dead or alive) as they enter and exit each allotment, and as they exit the Analysis Area at the end of the season. Special attention should be given to accounting for sheep at all times. If sheep are unaccounted for, diligent efforts should be made to locate them as quickly as possible. If the FS feels that appropriate efforts are not being implemented, a count-on/count-off inventory will be required as a condition of operation. (2.23)</p>		x	x
<p>Permittees will be required to begin searching for stray domestic sheep within 24 hours of notice by the Forest Service. Stray domestic sheep will be gathered or disposed as soon as they are located. A follow-up report (verbal or written) will be provided to the FS on time, date and action taken to resolve the matter; within four days from the notice given by the FS. Any stray sheep within the boundaries of an allotment are considered to be the property of the allotment permit-holder. (2.24)</p>		x	x
<p>Driveways and trails will be revisited within 1 week of being used to ensure domestics have not been left behind. (2.25)</p>		x	x

<p>Trailing</p> <p>Random on-site compliance monitoring to minimize strays will be conducted by the Forest Service.</p> <p>Trucking of domestic sheep and goats is preferred to trailing except in situations where risk of contact is possible (i.e., trucking drop off points in subpopulation areas). In most cases, trucking reduces the chance of stray domestics, and lessens the chance of opportunistic contact by wandering bighorn sheep.</p> <p>Domestic sheep will be kept in a tight group during trailing. (2.26)</p>		<p>x</p>	<p>x</p>
<p>Domestic sheep identification</p> <p>Permittees may be required to freshly mark (sheep paint) their sheep before they enter onto the National Forest. The FS will coordinate with the permittees annually with specific information regarding color of paint used in marking their sheep, brands used, ear tags used and colors, earmarks, and other distinguishing marks or characteristics that may be used in identifying their sheep. If a permittee does not wish to paint brand their sheep ,that permittee will be assigned a region that they will be responsible for responding to all reports of stray domestic sheep (even if it is not their sheep). (2.27)</p>		<p>x</p>	<p>x</p>
<p>Permit Action</p> <p>Repeated non-compliance with domestic sheep stray management will result in appropriate permit action. (2.28)</p>		<p>x</p>	<p>x</p>

Table 2-4. Design Criteria for General Management of Cattle

General Design Criteria	Alternative		
	2	3	4
Meet Forest Plan guidelines in General Direction for utilization: Mainly seed reproduction - 40% on first used and 50% on last used pastures. Mainly vegetative reproduction - 45% on first used and 55% of last used pastures. (3.1)	x	x	x
Keep livestock distributed as evenly as possible throughout suitable rangelands within pastures or allotments. Once the utilization standard is reached, livestock must be moved to the next pasture, or in the case of the last pasture, they will be removed from the allotment. (3.2)		x	x
Permittees will spend as much time as needed to move livestock away from identified areas of concern and into areas of normally light use. This allows livestock to make use of forage that otherwise will not be grazed before allowable use standards are met in the key areas and the livestock are required to be removed from the area. (3.3)		x	x
Keep livestock in the proper pasture during the time periods specified in the Annual Operation Instructions. (3.4)		x	x
Wet areas with saturated soils (seasonal wetlands, snow-banks) should be avoided until they are dry enough to prevent livestock trampling impacts. (3.5)	x	x	x
Permittees will spend as much time as needed to move livestock away from areas of concern (meadows, riparian areas, key areas, and so forth) and into areas of normally light use. This benefits permittees since it allows livestock to make use of forage that otherwise will not be grazed before allowable use standards are met in the key areas and the livestock are required to be removed from a pasture. (3.6)	x	x	x
Livestock grazing will be managed in riparian areas and willow carrs (a wetland willow thicket) to maintain or achieve mid-seral or higher condition to provide cover and forage for prey species within Canada lynx habitat (from Ruediger <i>et al.</i> 2000). (3.7)	x	x	x
The earliest turn on date and latest removal date will be based on allotment conditions relative to wet soils or snow, range readiness, vegetative phenology, and on minimizing conflicts with other uses. Even when these conditions are met, the dates of livestock grazing must occur between July 1 – Oct. 1. (3.8)		x	x
Any monitoring outcome, when part of the five-year interval monitoring, that does not meet Desired Condition will require the application of adaptive management strategies to livestock grazing practices to recover and maintain desired conditions, when livestock are a contributing factor to the condition.(1.9)	x	x	x
Salt should be placed in such a way as to distribute livestock use throughout the area. Place salt well away (>1/4 mile) from any water sources, or key areas that traditionally receive heavy use such as roads, parks, and riparian areas. Salt in areas of light use to draw livestock to those areas. The best distribution can be obtained by scattering one-half block chunks in areas of light use. Salt or supplement will not be placed near areas where such placement is liable to result in conflicts with other Forest users. Pick-up your salt after livestock are rotated to the next unit. (3.10)		x	x

<p>Grazing schedules will be developed so that areas are used at different times of the year <u>if at all possible</u> to maximize the opportunity for plant regrowth and recovery. Grazing schedules will be developed in the Annual Operating Instructions based on any or all of the following: the season of use, allowable use standard, residual stubble height, stocking rate, timing of livestock use. (3.11)</p>		x	x
Riparian Design Criteria	Alternative		
	2	3	4
<p>Applicable management measures and design criteria from the Region 2 Watershed Conservation Practices Handbook will be followed. These items address the need to provide for stream health. (3.12)</p>	x	x	x
<p>If livestock graze a riparian area before September, the residual stubble height standard would be four inches on riparian graminoids. This assumes that in an average year, the plants would re-grow to meet the residual stubble height standard during the rest of the growing season. (3.13)</p>	x	x	x
<p>Once the residual stubble height standard is reached, livestock must be moved to the next pasture, or in the case of the last pasture, they will be removed from the allotment. (3.14)</p>	x	x	x
<p>Exclude livestock from riparian areas and wetlands that are not meeting or moving towards desired condition objectives where monitoring information shows continued livestock grazing would prevent attainment of those objectives. (3.15)</p>	x	x	x
Noxious Plants/Invasive Species	Alternative		
	2	3	4
<p>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. (3.16)</p>	x	x	x
<p>Any seed used on the allotment will be tested for "all states noxious weeds" according to Association of Official Seed Analysts (AOSA) standards and will be certified by a Registered Seed Technologist or Seed Analyst as meeting the requirements of the Federal Seed Act (7 U.S.C. Chapter 37: Sections 1551-1611) and the Rules and Regulations of the Colorado Seed Act pursuant to 35-27-101 through 125, C.R.S. (1993 Supp. as amended by Senate Bill 93-17). (3.17)</p>	x	x	x
Monitoring*	Alternative		
	2	3	4
<p>Permittees are responsible for monitoring the following: livestock numbers; pasture entry and exit dates; allotment entry and exit dates; and maintenance activities for assigned improvements. This information will be furnished to the agency office within 30 days of livestock removal. This information will be verified by periodic agency inspections. (3.18)</p>	x	x	x

Agency personnel may conduct annual permit administration consisting of monitoring such compliance with AOIs, general livestock locations and use levels, plant phenology of important forage species, noxious weed mapping, soil conditions, riparian conditions and water quality, and impacts from other uses. (3.19)	x	x	x
Any monitoring outcome, when part of the ten-year interval monitoring, that does not meet Desired Condition will require the application of adaptive management strategies to livestock grazing practices to recover and maintain desired conditions, when livestock are a contributing factor to the condition. (3.20)		x	x
Watershed Resources	Alternative		
	2	3	4
Wetlands and fens should be avoided at all times to prevent livestock trampling and grazing impacts. Livestock should be actively herded away from these areas. (3.21)		x	x
Sheep movement around the allotment should minimize reoccurring trailing locations to prevent soil compaction and terracing, which result in altered hydrologic function. (3.22)		x	x
Cultural Resources	Alternative		
	2	3	4
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, mining relics, 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 damaged, the proponent shall immediately suspend all operations that might further damage such materials and notify the Columbine Public Lands authorized officer. (3.23)		x	x
Areas of intensive activity such as salt licks, bedding areas, and herder camps will not be located within 100 feet of the boundaries of previously identified significant cultural resources. Range managers will work with archaeologists to select locations that avoid known significant cultural resources and are likely to avoid unidentified sites in areas that lack cultural resource surveys. (3.24)		x	x
Special Design Criteria	Alternative		
	2	3	4
Site-specific ground disturbance such as installation of water developments, pipelines, fences or enclosures will require site specific cultural and threatened and endangered species clearances. These activities may also need 404 permits.		x	x

Table 2-5. Potential Adaptive Options (all classes of livestock)

Livestock Grazing Management Actions*
<u>Possible Non-Structural Actions:</u>
Reseed with native grass, shrub and forb species (plow and seed, or broadcast seed)
Planting native shrubs
Interseed or furrow for native grass enhancement
Fertilize existing meadows to stimulate herbaceous cover
Use of integrated methods to control noxious and/or non-native plant species (including selective herbicides, biological control agents, and mechanical methods authorized under a separate EA)
<u>Possible Structural Actions:</u>
Construct fence to create riparian unit – allow livestock grazing under riparian livestock grazing guidelines
Construct fence to exclude livestock from areas of concern (riparian, streams, springs, wetlands, mesic meadows, etc.)
Construct temporary electric fence to control livestock distribution patterns
Construct permanent fence to control livestock distribution patterns
Control livestock distribution patterns using water (turn water on or off at developed water sites)
Construct livestock water development (pipeline, tanks, windmill, sediment traps, well, stock dam, submersible pumps, solar)
Construct water gaps to control livestock access to riparian areas
Construct armored stream crossings
Remove existing water development (pipeline, tanks, windmill, well, stock dam)
Remove existing fence line (electric, standard, permanent or temporary)
<u>Possible Management Actions:</u>
Adjust livestock grazing system (i.e. – rest rotation, deferred rotation, rest, high intensity/short duration, etc.)
Adjust use of salt or supplement to draw livestock toward or away from specific areas
Incorporate a range rider to control livestock distribution (herding)
Incorporate use of herding dogs to control livestock distribution
Adjust season of use
Adjust animal numbers
Adjust number of days of livestock utilization
Rest from livestock grazing for one or more seasons
Do not allow livestock grazing
Adjust/combine allotment boundaries
Change pasture design
Implement multiple unit rotation with permittees' private land
Do not re-issue permit when it is waived back to the FS

* Possible actions should adhere to Wilderness Structural and Nonstructural Guidelines when inside wilderness boundary.

2.5 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 2-6. Comparison of Alternatives Based on Key Issues

Issues	Indicator for Comparison	Alternative 1 No Grazing	Alternative 2 Current Management	Alternative 3 Adaptive Management/ Forage Reserves	Alternative 4 Adaptive Management / Closing Vacant Allotments
Water Quality/ Soils Impacts	Riparian Monitoring	None for grazing purposes	Infrequent PFC	PFC at ~10 yr. intervals	PFC at ~10 yr. intervals
	Design Criteria	None	No Design Criteria	Design Criteria to reduce water impacts	Design Criteria to reduce water impacts
Vegetation/ Impacts	Acres Open for Grazing (Total in Allotments)	0 acres	165,074 acres (active or vacant allotments): 6 active, 7 vacant	75,048 acres (active or forage reserves allot): 6 active, 4 forage reserves	47,179 acres (6 active allotments for foreseeable future)
	Upland Monitoring	None for grazing purposes	Infrequent monitoring	RHM at ~10 yr. intervals; Cover Freq. or Rooted- Nested at ~ 10 yr. intervals	RHM at ~10 yr. intervals; Cover Freq. or Rooted-Nested at ~ 10 yr. intervals
	Design Criteria	None	None	Design Criteria to reduce veg impacts	Design Criteria to reduce veg impacts
Recreation Impacts/ Roadless Areas	Monitoring	None for grazing purposes	Informal monitoring	Establish Photopoints	Establish Photopoints
	Design Criteria	None	Avoid Burnt Timber Trail	Avoid Burnt Timber, Lime Mesa and CDT Trails; Other Design Criteria to reduce conflicts	Avoid Burnt Timber, Lime Mesa and CDT Trails; Other Design Criteria to reduce conflicts
Wildlife Impacts	Design Criteria	None	None	Bighorn Design Criteria (Table 2-3)	Bighorn Design Criteria (Table 2-3)
	Acres Open to Grazing in Bighorn Core Range	0 acres	44,457 acres overlap (in active or vacant allotments)	0 acres overlap (in active or forage reserve allotments)	0 acres overlap
Socio- Economic Impacts	Qualitative Description	Ranching families out of business	No change	Increased costs of grazing implementation and administration	Increased costs of grazing implementation and administration. Eventual loss of sheep grazing opportunity.
Cultural Resource Impacts	Design Criteria	None	None	Design Criteria to reduce cultural impacts	Design Criteria to reduce cultural impacts

Table 2-7. Comparison of Allotment Acreage and Status for Alternatives 2, 3,&4.

Allotment	Alternative 2		Alternative 3		Alternative 4	
	Acres prior to boundary adjustments	Current Status	Acres after boundary adjustments	Proposed Status	Acres after boundary adjustments	Proposed Status
Burnt Timber	5,148	Active	5,092	Active	5,092	Active sheep w/sunset clause or cattle
Canyon Creek	6,328	Active	4,740	Active cattle	4,740	Active cattle
			1,588	Closed	1,588	Closed
Cave Basin	22,452	Vacant	6,220	Forage Reserve - Cattle	22,452	Closed
			16,232	Closed		
Endlich Mesa (E. Silver Mesa)	9,733	Active	12,818	Active	12,818	Active sheep w/sunset clause or cattle
			633	Closed	633	
Fall Creek	10,939	Vacant	9,179	Closed	9,179	Closed
Flint Creek	16,358	Vacant	16,358	Closed	16,358	Closed
Johnson Creek	9,456	Vacant	7,775	Forage Reserve - Sheep	9,456	Closed
			1,681	Closed		
Leviathan	6,530	Vacant	6,530	Forage Reserve - Sheep	6,530	Closed
Pine River	38,843	Vacant	38,843	Closed	38,843	Closed
Rock Creek	10,880	Vacant	7,344	Forage Reserve - Sheep	10,880	Closed
			3,536	Closed		
Spring Gulch	3,077	Active	3,077	Active	3,077	Active sheep w/sunset clause or cattle
Tank Creek	10,954	Active	8,353	Active	8,353	Active sheep w/sunset clause or cattle
			3,528	Closed	3,528	Closed
Virginia Gulch	14,375	Active	13,099	Active	13,099	Active sheep w/sunset clause or cattle
Total Available for Grazing	49,615 acres active	6 active sheep 7 vacant	47,179 acres active	5 active sheep 1 active cattle	47,179 acres active	5 active sheep w/sunset or cattle
	115,459 acres vacant					1 active cattle
Total Forage Reserve			27,869 acres forage reserve	3 sheep forage reserves 1 cattle forage reserve		
Total Closed			91,579 acres closed	2 closed 6 portions closed	119,448 acres closed	7 closed 2 portions closed
Total Acreage	165,074		166,627		166,627	

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Council on Environmental Quality regulations direct agencies to succinctly describe the environment that may be affected by the alternatives under consideration (*40 CFR 1502.15*). As such, this chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in Table 2-6 (p.68).

The following chapter is organized by resource area to address issues that were raised during scoping (e.g. Vegetation, Recreation, and Watershed). Resources for which there were no issues are not discussed (e.g. Air Quality). Each resource section begins with a description of the Affected Environment, or the existing conditions. Then, each section provides an analysis of direct and indirect effects, or Environmental Consequences, of implementing each alternative. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and occur later in time or are removed in distance. Differences in impacts between alternatives are emphasized. Each resource section then describes Cumulative Effects, which are the direct and indirect effects of the project added to the effects from other past, present, and reasonably foreseeable actions.

Two time frames are referred to throughout this analysis, short-term and long-term. Short-term is for a ten year period (2013-2023) and long term is considered beyond ten years (2023+).

There are no designated Wild and Scenic Rivers, prime farmlands, or parklands in the project area; therefore, there will be no impacts to these resources from any of the alternatives, and these resources are not discussed further. Although the Pine River and its tributaries are determined to be eligible for Wild and Scenic designation (*SJNF 2013*), the watershed analysis has revealed that grazing is not impacting watershed conditions and therefore is not affecting the characteristics of those river segments.

3.1 Rangeland Management

Affected Environment

The analysis area encompasses six active sheep allotments, seven vacant sheep allotments, and a small portion of the Needles Mountains Allotment (area previously closed in the Silverton Sheep Grazing analysis) on the Columbine Ranger District. These 13 allotments cover approximately 166,627 acres (162,599 acres of National Forest System lands). Of the 162,599 Forest Service acres, 59,601 are considered *capable* rangelands for sheep and 51,310 acres for cattle. Capable rangelands means that they are accessible, have inherent forage producing capabilities, and can be grazed on a sustained yield basis without damage to the forage resource under reasonable management practices. Rangeland capability does not vary by alternative. Rangeland *suitability* refers to the appropriateness of applying certain resource management practices to a particular area of land, and may vary by alternative. A project specific suitability analysis (an analysis of where capable range is also suitable range) has concluded that under current conditions, 58,408

acres of the analysis area are suitable for domestic sheep grazing and 50,239 are suitable for cattle grazing. This determination was based on review of the Forest level suitability analysis, field verification, review of current and historic records and analysis of GIS data layers. Areas that were not included in the suitability analysis were areas that livestock will likely trail to get to allotments or trail to other areas of suitable grazing.

The only range structural improvements in the analysis area are found on the Canyon Creek and Spring Gulch Allotments. Canyon Creek Allotment has eight reservoirs, one range cabin, one corral, and about two miles of fence creating two pastures and one holding pasture. Spring Gulch Allotment has two spring developments and three water reservoirs with all water developments needing some maintenance and cleaning due to silting problems linked to Missionary Ridge Fire in 2002. All range structural improvements are outside of wilderness boundaries.

There are several stock driveways and livestock trails in the analysis area that are currently being used to access sheep allotments. Most of these driveways and livestock trails are also used today as recreation trails. Access to allotments by trailing across county roads and private lands to National Forest Lands is planned to continue with authorization of grazing permits in the analysis area (Forest Service has no authority to authorize or not authorize use of private land trailing routes).

All bands of sheep within this analysis area have several key elements in common:

- At least one sheep herder stays within the general area of the sheep 24 hours a day/7days a week.
- Herders typically move camps every 5-7 days and sheep usually bed in new bedgrounds every 1- 2 nights.
- Due to predator losses in the last 10-15 years, sheep permittees have started using two sheep protection/guard dogs along with 1- 2 working/herding dogs. Permittees have stated that the protection dogs scare away bears, coyotes, deer, elk and other wildlife that try to enter the herds with losses being reduced by 70-80% compared to no protection dogs.
- Current permittees and herders have never reported bighorn sheep within their allotments.
- Permittees have been submitting documentation of actual use of allotments by sheep and also by other wildlife seen as directed in AOIs.

Environmental Consequences

Alternative 1: No Action/No Grazing

Under the No Action Alternative, the 13 sheep allotments in the analysis area (162,572 acres of National Forest System lands) would be closed and no longer available for permitted livestock grazing. This alternative would not allow the Columbine District to use these allotments to provide livestock grazing opportunities to help resolve known or potential resource conflicts on other allotments across the landscape.

Although rangelands within the allotments in the analysis area remain capable, once an allotment is closed to permitted livestock grazing, it is no longer considered suitable range. Since all 13 sheep allotments in the analysis area would be closed under this alternative, there would be no suitable range in the analysis area. This is a reduction of 58,408 acres, as compared to current conditions.

Since all allotments would be closed, no trailing to allotments would occur.

Alternative 2: Current Management

Under the Current Management Alternative, livestock grazing would continue to be authorized as it has been in the recent past using a pre-defined number of livestock, seasons of use, and rotation systems. All six currently stocked allotments would continue to be active and the seven vacant allotments would remain vacant. The vacant allotments would be available for permitted livestock grazing through grant and issuance of term grazing permits with stocking based on historic numbers. This alternative would require the District to go through the grant process and offer new term grazing permits, possibly to new permittees.

It is the expectation that Forest Plan standards and guidelines and Forest Plan desired conditions for rangeland resources would still be met if domestic sheep grazing is authorized, but management flexibility would be somewhat limited. Minor modifications in livestock grazing management could be made in the Annual Operating Instructions to reduce conflicts, but the ability to change grazing systems, trailing routes, season of use, and livestock numbers in response to changing conditions would be limited since monitoring and adaptive management are not a part of current management. Under current management, possible management adjustments needed in the future could require a new NEPA analysis and decision.

Permitted livestock numbers would not change. For sheep allotments, permitted numbers refer to the number of ewes, each of which may have one or more lambs. Existing improvements would continue to be maintained as assigned in Term Livestock Grazing Permits and may be re-constructed once the useful life has been met and the need identified. New improvements would not be developed unless they are authorized in a NEPA decision. Sheep allotments typically do not have structural improvements except for corrals and loading facilities.

Since all 13 sheep allotments in the analysis area would be remain active or vacant under this alternative, there would continue to be 58,408 acres of suitable range in the analysis area. Trailing to allotments would continue as it has in the recent past.

Alternative 3: Adaptive Management w/Forage Reserves

Under this alternative, six allotments would remain active: Burnt Timber, Canyon Creek (would be converted to cattle), East Silver Mesa, Spring Gulch, Tank Creek and Virginia Gulch. The East Silver Mesa Allotment would be re-named to Endlich Mesa Allotment to correctly reflect land features within the allotment. Boundary adjustments would occur on most of the active grazing allotments including, the western most parts of Tank Creek and Canyon Creek being closed to livestock grazing (total of 5,117 acres) except for trailing to the allotment. The

boundary adjustments would also include 1,553 acres from Silverton Landscape EA (Needles Mountains Allotment previously closed) to be added to allotments through logical boundary shifts.

This alternative also includes four forage reserves: The northern 2/3 of Rock Creek Allotment, all of Leviathan Allotment, and most of Johnson Creek Allotment would be designated as sheep forage reserves. The remaining parts of Johnson Creek and Rock Creek would be closed to livestock grazing. The southern quarter of the Cave Basin Allotment would be designated as a cattle forage reserve.

In addition, four other vacant allotments would be closed to sheep grazing: Cave Basin, Fall Creek, Flint Creek, and Pine River.

This alternative continues to provide the opportunity for domestic sheep grazing on the Columbine Ranger District, while reducing the potential for contact between domestic sheep and bighorn sheep. Grazing of forage reserves is authorized through the issuance of temporary permits. Under this alternative, grazing permits for the forage reserves would not be granted to new applicants, or to existing permittees to increase permitted numbers or seasons. Rather, preference for grazing would be given to permittees with current term grazing permits held on federal lands where documented resource conflicts exist.

This alternative represents a considerable reduction in the number of acres available for livestock grazing as compared to current conditions. Under current conditions, there are approximately 162,572 acres in 13 allotments available for livestock grazing. Under Alternative 3, there would be approximately 55,426 acres in six allotments available for livestock grazing, with an additional 21,631 acres in sheep forage reserves and 6,200 acres in cattle forage reserves. The number of acres of capable rangelands remains the same under this alternative as compared to Alternatives 1 and 2. However, once an allotment is closed to permitted livestock grazing, it is no longer considered suitable range. On the six active allotments there are 28,229 acres of suitable range, with an additional 9,455 acres on sheep forage reserves and 4,479 acres on the cattle forage reserve. This is a reduction of 16,245 acres as compared to current conditions, but an increase of 42,163 acres as compared to Alternative 1.

Under this alternative, certain allotment boundaries would be adjusted to more accurately reflect natural boundaries, to better reflect potential actual livestock usage on the ground, and to reduce potential contact between domestic sheep and bighorn sheep. Appendix A of this document gives a detailed description of boundary changes and the rationale for these changes. The allotments proposed for closure under this alternative are the Fall Creek, Flint Creek, Pine River, and Cave Basin (to sheep grazing).

If the four allotments designated as forage reserves are stocked, Forest Plan standards and guidelines and Forest Plan desired conditions for rangeland resources would be met through applied management and monitoring/adaptive management feedback, and the design criteria contained in this EA would be implemented. In terms of rangeland management, this alternative allows for greater management flexibility as compared to current conditions. If monitoring and evaluation finds that desired outcomes are not being achieved, then adaptive management

technique(s) could be implemented to reverse undesirable trends and start moving site resource(s) of concern towards the desired conditions, in a timely manner, without requiring a new NEPA analysis. This could include adaptive management options including, but not limited to: changes to grazing systems, trailing routes, season of use, and livestock numbers in response to changing conditions.

The design criteria (page 54+), monitoring plan (page 44+) and adaptive management options (page 67) adopted under this alternative would allow for more timely changes in management in response to changing conditions than is available under current management. It is more likely under this alternative than under current management that management adjustments could be made in the future without conducting new NEPA analysis (assuming these adjustments are within the scope of this EA), and in a more timely fashion.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Under this alternative, six allotments would remain active (Canyon Creek would be converted to cattle), logical boundary shifts would occur, and all vacant allotments would be closed to grazing. This alternative continues to provide the opportunity for domestic sheep grazing on the Columbine Ranger District, while further reducing the potential for contact between domestic sheep and bighorn sheep. This alternative would have the same environmental effects as Alternative 3 for all active allotments; however by closing all vacant allotments, there would be reduced opportunity for permitted domestic sheep grazing on the Columbine Ranger District. This alternative would allow for more protection for bighorn sheep as compared to Alternative 3, but would also reduce flexibility of having forage reserves. Appendix A of this document gives a detailed description of boundary changes and proposed closures and the rationale for these changes.

This alternative also represents a considerable reduction in the number of acres available for livestock grazing as compared to current conditions. Under current conditions, there are approximately 162,572 acres in 13 allotments available for livestock grazing. Under Alternative 4, there would be approximately 55,426 acres in six allotments available for livestock grazing. Additionally, if the current permittee were to waive the permit on the active allotments back to the government, the active allotments would be closed according to the “sunset clause” (p.51). Therefore, all allotments within this landscape would be closed to sheep grazing and the 55,426 acres would drop to zero. The number of acres of capable rangelands remains the same under this alternative as compared to Alternatives 1 through 3. However, once an allotment is closed to permitted livestock grazing, it is no longer considered suitable range. On the six active allotments there are 28,229 acres of suitable range. This would be a reduction of 30,179 acres of suitable range as compared to current conditions, a reduction of 13,934 acres as compared to Alternative 3, but an increase of 28,229 acres as compared to Alternative 1. If the sunset clause were invoked, the reduction would be the same as Alternative 1.

The allotments proposed for closure under this alternative are: Cave Basin, Fall Creek, Flint Creek, Johnson Creek, Leviathan, Pine River, and Rock Creek.

The design criteria (page 54+), monitoring plan (page 44+) and adaptive management options (page 67) adopted under this alternative would allow for more timely changes in management in response to changing conditions than is available under current management. It is more likely under this alternative than under current management that management adjustments could be made in the future without conducting new NEPA analysis (assuming these adjustments are within the scope of this EA), and in a more timely fashion.

CUMULATIVE IMPACTS

The San Juan and the Rio Grande Forests in Region 2 have closed allotments to livestock grazing to resolve potential conflicts with bighorn sheep. This decreased the opportunity for public land grazing permits both locally and regionally. The closure of additional allotments in this analysis area will further decrease those opportunities and decrease the flexibility in overall vegetation management options as conditions change.

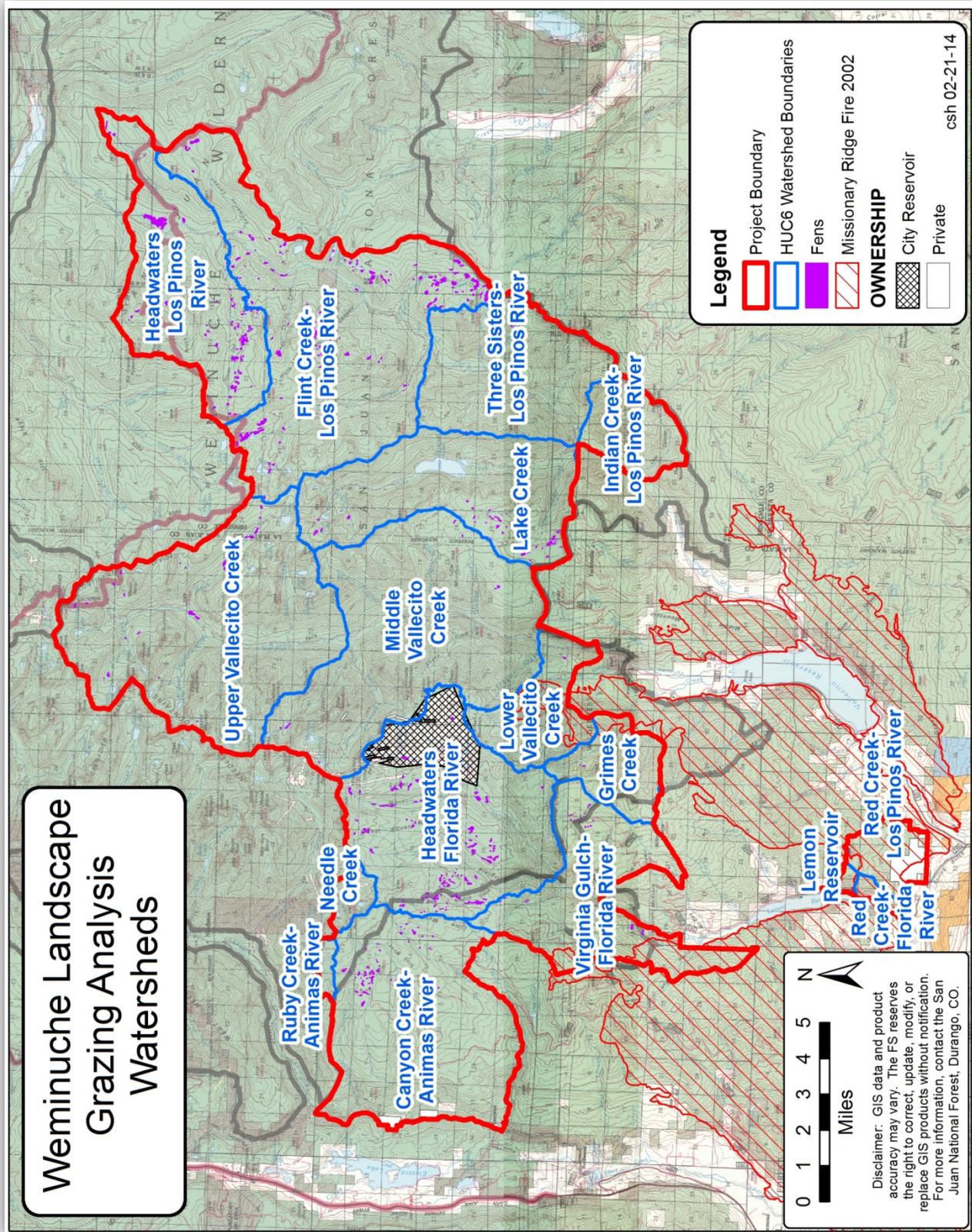
Across the western United States in general, there appears to be a trend towards declining opportunity for sheep grazing. This can be attributed in part to unpredictable markets, concerns for domestic sheep impacts on bighorn sheep, and rising recreational conflicts. The fact that the proposed closures on the Columbine Ranger District have been vacant so long indicates that the cumulative impacts of the proposal have already been realized and are not meaningful at this time.

3.2 Soil / Water

AFFECTED ENVIRONMENT

The analysis area occurs within parts of 17 watersheds (HUC 6 boundaries), with about 85% of that occurring within the Weminuche Wilderness (see Figure 3-1). Average annual precipitation varies by elevation, ranging from 23 inches near Tacoma, on the Animas River, to 47 inches at the highest elevations in the Needle Mountains. Precipitation predominantly occurs in the form of snow during the winter months of November to March. Runoff from the melting snowpack accounts for most of the streamflows within the analysis area and is typically heaviest in May and June. High elevations and extreme topography drive local weather patterns in the summer, which often result in thunderstorms associated with short-term high-intensity rainfall that may cause flash flooding. Much of the analysis extent is above treeline, with rock outcroppings and talus fields dominating the landscape. Soils are primarily cold, shallow and moderate to well-drained (*USDA 1961*), although high alpine fens and wetlands are found throughout the landscape, accounting for nearly 936 acres within the analysis area.

Figure 3-1. Watershed Boundaries



The Missionary Ridge and Bear Creek fires burned 6,082 acres within the analysis area in 2002 and 2003 predominantly in the Middle and Lower Vallecito, Grimes, Red Creek and Virginia Gulch watersheds. A history of hardrock mining occurred throughout a portion of the analysis area in the late 1800's and early 1900's, resulting in discrete sources of heavy metal contamination and low pH effluent (*Lovekin 1997*). Gold and silver were mined in the Needle Mountains, while silver, copper and lead was found in areas near Tuckerville and Cave Basin. Currently, there are approximately 1,066 acres of existing private lands, including mining claims and in-holdings within the analysis area. In addition, the City of Durango maintains 2,961 acres primarily in the headwaters of the Florida River (Virginia Gulch and East Silver Mesa Allotments) for municipal water.

The state of Colorado has mapped the public water supplies and the watersheds that feed them. All streams in the analysis area are tributary to one or more domestic water supplies on the Animas, Pine and Florida Rivers. In addition, two sensitivity zones around streams contributing to public water supply have been mapped. Zone 1 is 100 feet either side of the stream, and zone 2 is an additional ¼ mile from the boundary of Zone 1. Approximately 67.5% of the land in the analysis area is within sensitivity Zones 1 or 2. The state has rated the contaminant potential from dispersed sources in forested areas as moderately low. We conclude from this that most of the land in the analysis area is fairly close to streams that supply a public water supply, but that there is a moderately low potential for activities permitted within the Forest to produce contaminants.

Stream health and general watershed conditions found within the analysis area are dependent on factors such as geology, vegetation, climate, and the effects of land-use history, including grazing. Concentrated grazing on stream banks can lead to changes in the riparian plant community. In situations where plants are a major factor in stream stability, this can lead to the stream not being able to withstand the erosive force of flowing water and bank erosion can then occur. When banks erode, the resulting sediment impacts water quality. Extensive field time and monitoring during the summer of 2010 indicated that sheep typically do not congregate or spend much time in wetlands or riparian areas. Proper Functioning Condition (PFC) surveys were completed by FS personnel in/near a number of riparian areas where recent sheep grazing and/or trailing was known to occur. The Lotic (*Prichard 1998*) and Lentic (*Prichard 2003*) PFC protocols address channel and floodplain functionality and stability, as well as age class and composition of riparian/wetland vegetation. This protocol also assesses such things as whether the upland watershed contributes to riparian degradation, whether hydrology has been disrupted (such as by trails or hoof action), and whether there is excessive erosion or sediment deposition. Approximately 93% (14 out of 15) of the sites inventoried were at "Proper Functioning Condition". The one site that was rated "Functional At Risk" was located near a herding camp and exhibited bank trampling and sloughing, with little to no riparian vegetation diversity present. Previous fieldwork and knowledge of the area, however, indicate that the majority of watercourses in the analysis area are in good to excellent condition. Stream banks that were observed directly after sheep had utilized the area (Coon Creek) showed minimal bank trampling and browsing on streamside plants. In general, there was little evidence that width/depth ratios were outside what is considered normal for the stream types. However, heavy historic and isolated current grazing practices, along with outfitter and recreational trail use have resulted in isolated areas of channel incision and streambank instability at stream crossings and some watering locations, resulting in on-going channel instability and sediment-loading. Additional

data collected relating to vegetative consumption and trampling, as well as comparative photo points supplement and confirm the PFC methodology and results used in this analysis.

In most locations, trails from sheep movement were visible as bent-over plants, but no bare soil was exposed, no erosion was taking place, and impacts were very temporary. In areas where soils are thin and vegetation was sparse, historic sheep grazing has left a visible network of trails and terraces. Current sheep use has likely inhibited the naturally slow revegetation of these trails, but is not causing erosion on existing trails, nor a noticeable increase in the number of trails. An exception to this were isolated areas in the East Silver Mesa, Canyon Creek and Tank Creeks Allotments, where trailing occurs on steep slopes with poorly developed shallow granitic soils and topographic features funnel sheep through the same areas in the landscape. Here exposed soils, trail braiding and minor pedalling were noted in certain places. However, there were numerous instances in most allotments where recreation trails for hikers and horses had exposed and eroded soils (e.g. Lime Mesa and Burnt Timber trails). In places where these trails were trenched, parallel trails have developed, with some delivering sediment directly to the streams. Frequently, sheep use these same trails, and distinguishing between recreation, outfitter, wildlife and sheep impacts is not possible. Impacts from trailing animals to and from grazing allotments were easier to distinguish. However, as the vast majority of trailing routes were either on or along improved county and FS roads, watershed impacts directly related to allotment access were minimal and are not discussed when comparing alternatives.

Water Quality

The waters of Colorado have been designated according to the beneficial uses for which they are presently suitable or intended to be suitable. The use classifications for streams in the analysis area are Cold Water Aquatic Life 1, Recreation E, Water Supply and Agriculture (*CDPHE 2011*). No stream segments within the analysis area are listed by the Water Quality Control Division of Colorado for water quality impairment (*CDPHE 2011*). All stream segments in the analysis area are currently classified as fully supporting their beneficial uses. In addition, the USFS Watershed Condition Framework maps indicate all HUC 6 watersheds within the analysis area are functioning properly, with the exception of Canyon Creek-Animas River, Lemon Reservoir, Red Creek-Los Piños River and Red Creek-Florida River, which are designated as “Functioning at Risk” (*USDA 2011*). Of these, only the Canyon Creek-Animas River watershed showed either soil condition or water quality condition as limiting overall watershed health (i.e. designated “poor” condition). Upon investigation, zinc concentrations exceed total maximum daily loads in a portion of the Animas River, of which this watershed boundary includes. As this is outside of the analysis area and not directly related to sheep grazing impacts, any concerns related to Watershed Condition Framework designations are dismissed.

Literature exists that indicates that concentrated grazing in riparian areas can have direct water quality impacts such as increased turbidity, water temperatures, nitrogen, phosphorous and fecal coliform bacteria concentrations (*Gary 1983, Johnes 1996, Hubbard 2004*). Field knowledge and Environmental Protection Agency-required biennial state testing indicate that water quality has *not* been noted as a problem or a significant issue in any of the watersheds within the analysis area, either currently or historically (*CDPHE 2012*). Additionally, a recent and local study in San Juan County determined that sheep grazing didn’t have any consistent impact on nitrate concentrations in sub-alpine and alpine surface waters (*Raby 2005*). Since there were minimal degraded riparian areas noted indicating concentrations of sheep near water sources, we conclude that the risk is low for fecal coliform contamination from sheep manure as well. As the

likelihood is low, we have not proposed any monitoring of fecal coliform and will rely on continued state testing, as well as the implementation of Best Management Practices and monitoring of riparian areas to mitigate this potential contaminant (*USFS 2012*).

Unlike the Silverton Landscape, where the potential of heavy metal contamination from grazing on mineralized soils exists, this analysis area is geologically quite different. Based on geologic knowledge of the area, mining history and field reconnaissance of the area, this landscape exhibits little opportunity for heavy metal contamination by trailing and grazing on exposed soils. Therefore, impacts related to this are not discussed when comparing alternatives.

Compliance with Clean Water Act

The Clean Water Act recognizes Best Management Practices as the primary mechanism to control nonpoint sources, as supported in Environmental Protection Agency guidance (*EPA 1987*), “For proposed management actions, Best Management Practices designed and implemented in accordance with State approved process will normally constitute compliance with the Clean Water Act.”

FSH 2209.13-93.3 states, “Compliance with the Clean Water Act is achieved through the proper site-specific design, implementation and monitoring of Best Management Practices,” and, “As long as Best Management Practices have been applied and monitoring and adjustments are ongoing, then the Forest Service is in compliance with the Clean Water Act.”

The Watershed Conservation Practices Handbook (*FSH 2509.25*) also states that, “Watershed conservation practices will meet applicable Federal and State laws and regulations, including State Best Management Practices.”

Design criteria and monitoring protocols for each alternative are described earlier in this document.

ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action/No Grazing

Under this alternative, the visible trail terracing from the high number of sheep that were grazed in the early 1900’s would eventually revegetate, though it would be very slow, and use from deer and elk would hinder this revegetation. System trails currently used for sheep herding would no longer be used by sheep, minimizing potential for further trail braiding, compaction and erosion, limiting sedimentation where they are hydrologically connected to stream courses. This alternative would ultimately reduce soil movement from uplands into streams, although this is not currently a noted problem in most areas within the analysis area.

Any contribution of nitrate or fecal coliform to surface waters from sheep manure would be discontinued under this alternative, though the existence or amount of any current impacts is considered to be low.

Alternative 2: Current Management

Under this alternative, impacts to watershed resources would continue as they have in the recent past. Natural revegetation of historic sheep trails would continue, but at a slower rate than in Alternative 1, as any use on these trails slows recovery times. In allotments like East Silver Mesa, Tank Creek and Canyon Creek where current trailing locations coincide with poorly developed granitic soils, continued headcutting, soil erosion and trail braiding is expected to

occur, contributing to sedimentation in areas that are hydrologically connected to stream courses. Historic salting and bedding areas will continue to see the same utilization and/or degradation, as soil compaction and digging will continue to occur at the same rates.

The existence or amount of nitrate or fecal coliform contamination from sheep manure is considered to be low, though it would continue at a similar amount with the continuation of current grazing regimes. In places where bedding or salting grounds are in close proximity to water sources, fecal or mineral contamination is possible.

Alternative 3: Adaptive Management w/Forage Reserves

Under this alternative, natural revegetation of historic sheep trails would continue at a slower rate than in Alternative 1, but at a faster rate than in Alternative 2. The potential for nitrate or fecal coliform contamination would be similar to or less than Alternative 2. Watershed impacts from sheep grazing would be minimized through the incorporation of improved and updated analysis area-wide and site-specific design criteria. In addition, closing portions of Tank Creek and Canyon Creek Allotments to all grazing, as well as all of Canyon Creek, Cave Basin, Fall Creek, Flint Creek and Pine River Allotments to future sheep grazing would eliminate impacts such as soil compaction, streambank trampling and potential nutrient loading. The implementation and effectiveness monitoring programs identified in this EA would work to identify current and future problems with established and future grazing regimes and management, limiting short and long-term impacts to watershed resources.

The addition of the 1,553 acres to the Tank Creek and Virginia Gulch Allotments under this alternative has the potential to impact watershed resources, specifically the Gem Lakes area, if grazing practices are not closely monitored. Although PFC surveys indicate systems are currently “properly functioning”, grazing and recreation have caused trailing, pedalstalling and active erosion in the shallow and highly erosive granitic soils dominant here. Erosion is not currently affecting water quality in these alpine lakes, but the potential exists if heavy grazing continues and/or design criteria are not closely followed.

Under this alternative, the southern portion of the Cave Basin Allotment would potentially see cattle use during drought years or times of poor forage availability. This geographic area has roughly 40 acres of fens and wetlands scattered throughout the landscape. As cattle tend to congregate and linger in riparian areas, there is high potential for increased trampling and vegetation removal, which may lead to bank sloughing, sedimentation and impaired hydrologic function of these systems. However, given the relatively small amount of area that these sensitive systems occupy and the projected minimal use associated with a forage reserve allotment, impacts will likely not affect overall watershed health.

With the change in grazing type from sheep to cattle in the Canyon Creek Allotment identified under this alternative, streambank and riparian conditions may suffer as utilization of these areas will be higher and more intense. Additionally, this change in grazing type will require that some natural springs and seeps within the allotment be developed for watering purposes, permanently altering the natural hydrology of discrete groundwater resources identified in this EA. Given the small number of proposed water developments and the established design criteria, however, overall impacts to watershed health should be minimal.

With a change of status from vacant to forage reserve/closed in Rock Creek, Johnson Creek and Leviathan Creek Allotments identified under this alternative, the potential impacts to watershed

and soil resources in effect will be reduced. Although these allotments are vacant now, they could be re-stocked at any time, and changing to a forage reserve designation will better protect these high-elevation allotments that are littered with headwater streams, wetlands, fens and alpine lakes. Long-term damage is probable and of concern in these areas as any soil compaction from trailing/bedding and streambank trampling would take long periods of time to restore.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Watershed impacts would be similar to those described in Alternative 3, but future impacts related to sheep and cattle grazing would not occur in currently vacant allotments. As forage reserve for cattle grazing would not be authorized within the Cave Basin Allotment, the likely impacts to riparian vegetation, wetlands and stream courses described in Alternative 3 would not occur. The potential impacts related to sheep grazing on forage reserves in the Rock, Leviathan and Johnson Allotments described above would not occur. Similar to Alternative 3, short and long-term watershed impacts in open allotments would be minimized through the use of updated design criteria and monitoring programs established in this EA.

The impact from domestic sheep grazing analyzed under Alternatives 3 and 4 is expected to be minimal. Certain allotments show degradation from past grazing history, but recent stocking rates, better herd management and the incorporation of design criteria and monitoring efforts have all worked to minimize impacts in the recent past. With the incorporation of the adaptive management techniques, updated design criteria and monitoring program(s) described above, impacts to watershed resources should be effectively minimized.

CUMULATIVE IMPACTS

Current watershed and soil conditions are the result of many natural and anthropogenic activities occurring within the analysis area. The largest historical impacts to watershed health and water quality include hardrock mining activities, timber removal, road and trail building, livestock grazing and wildfires. Roughly 5,585 acres of the analysis area was impacted by the recent Missionary Ridge Fire. A drastic reduction of the ground cover component along with hydrophobic and/or erosive soils within the landscape diminished hydrologic form and function in a number of drainages within the analysis area. Overstory removal from various timber sales have altered snowpack accumulation and melt patterns, affecting stream channel composition and morphology to a small degree. Grazing, especially by cattle, has diminished channel stability and water quality to a small degree in some drainages through riparian vegetation reduction, streambank trampling and sedimentation.

Future activities that may negatively impact watersheds and water quality include continued sheep and cattle grazing, private land development (mining claims), new road construction, increasing road and trail use, recreational and outfitter pack stock use, wildlife activities, insect, disease and weed outbreaks, continuing drought and climate change. The combinations of growing use, continuing drought, warming temperatures and increasing tree mortality have the potential to negatively affect watershed function, stability and resilience. Snowpack accumulation patterns and melt timing, along with precipitation event intensity and timing have a direct effect on water yields and ground/surface water interactions. This may negatively impact highly-dependent sensitive springs, seeps, wetlands, fens and high alpine lakes found throughout the analysis area.

The impacts to water and soil resources from grazing, when conducted as in the proposed action, are minimal when compared to cumulative impacts from all events and activities.

3.3 Vegetation

AFFECTED ENVIRONMENT

Rangeland Vegetation

The Weminuche Landscape Grazing Analysis Area consists of diverse vegetation types from lower elevation sage meadows in the southern-most trailing area to closed canopy spruce-fir forest and alpine tundra. Table 3-1 lists the acres of vegetation type within the analysis area in each allotment as it is currently configured, including both suitable and unsuitable grazing acres. The analysis area is comprised of 166,627 acres within thirteen allotments and 629 acres of private and National Forest System lands where sheep and/or cattle are trailed to their respective allotments. Most of the analysis area is in the spruce-fir forest type and the alpine tundra types.

The spruce-fir forest type is found between 9,000 and 12,000 feet elevation and comprises 43% of the acres considered suitable for livestock grazing within the analysis area. Grazing suitability is based on vegetation type, the availability of desirable forage for a particular class of livestock, and environmental factors like topography and accessibility. These high-density forests are dominated by Engelmann spruce (*Picea engelmannii*) and subalpine fir (*Abies lasiocarpa*). This forest type is typically considered secondary range due to relatively closed canopy cover and moderate to low forage production. In general, sheep do not like to reside long in spruce-fir forest due to low forage availability and the risk of predation. Cattle also do not prefer to graze in closed-canopy forest stands. Cattle and sheep will use forested areas for trailing to sites with better forage production or water. Suitable grazing acres within the spruce-fir in this landscape are typically less dense and/or have been harvested with past timber sales.

The spruce-fir forests of the Weminuche Wilderness are currently experiencing an insect and disease epidemic. The Rio Grande National Forest and Pagosa Ranger District of the San Juan National Forest have seen high tree mortality as an effect of this outbreak. Mortality in the spruce-fir is predicted to continue on its westward trajectory into the analysis area in the near future.

Approximately 31% of the suitable grazing within the analysis area occurs in alpine habitats. The alpine zone (above 11,500 feet) comprises a great diversity of species and vegetation communities, including mosses and lichens, which constitute a major contribution to the total flora (*Johnson and Brown 1979*). The alpine zone is potentially the most sensitive to livestock grazing due to the very short annual growing season, harsh environmental conditions, length of vegetation recovery and shallow, rocky soils. Most of the alpine zone within the analysis area is composed of four general alpine vegetation types: fellfield, turf, riparian-wetland, and dwarf willow.

The alpine fellfield type occurs on harsh, wind-swept sites with shallow, rocky, well-drained soil and is dominated by short cushion plants often with a relatively low canopy cover. The dwarf willow alpine type is dominated by snow willow (*Salix nivales*) and alpine willow (*Salix petrophila*) and occurs on relatively dry protected sites on well-drained, shallow soils with moderately steep slopes and northerly aspects. The riparian-wetland type occurs primarily on

low-lying sites with poorly drained soils. This type contains high plant community diversity including tall willow shrublands (*Salix planifolia* and *Salix brachycarpa*) and numerous cottongrasses and sedge species.

The turf alpine type is dominated by forbs and grasses and occurs on protected sites away from excessive wind and tends to have deeper, moist, moderately well-drained soils. Of the alpine turf types, the alpine avens type, where alpine avens (*Geum rossii*) is the dominant or co-dominant plant species, is the most common. Of the alpine vegetation types, the alpine avens turf type is likely the most heavily used by sheep grazing due to the palatable vegetation. Sheep also readily browse on the willows and forbs in the riparian-wetland type although they do not like to stand in water or saturated soils for long periods. The fellfield and dwarf willow types see less livestock grazing because of the lack of desired forage.

Approximately 7% of the suitable grazing acres within the analysis area are within the aspen (*Populus tremuloides*) or aspen with conifer cover types. The remainder of the suitable acres within the analysis area is comprised of mountain grassland (5%), mixed conifer (6%), and mountain shrubland (3%). Ponderosa pine (*Pinus ponderosa*), rock, water and riparian areas are all within the analysis area at less than 5% of the total suitable acres.

Field monitoring and analysis were conducted at key areas during the 2009-2012 field seasons in areas considered suitable for livestock grazing. No analysis was done in areas that were considered *not* suitable for grazing (i.e. rock outcrops, steep, talus slopes, inaccessible terrain, etc.). Based on the field visits made by the Columbine Ranger District Interdisciplinary Team, the inference is made that most of the range is, in general, in good health and vigor. Figure 1-3 (p.13) shows monitoring points within the analysis area and Table 1-2 (p.19) provides a monitoring summary, including any need for change to reach the desired conditions as developed by the Interdisciplinary Team. Desired conditions describe the desired plant community in both the short term and the long term. The chosen desired conditions must be realistic descriptions of communities that can occupy a site under realistic management practices (*USFS 1996*).

Sheep utilize forbs more fully than any other kind of livestock using larger quantities of them and a greater number of species (*Jacobs 1999, Olsen 1999, Stoddard 1975*). Sheep are better adapted to graze steep topography so overuse of the valley bottoms can be avoided, however, when sheep are permitted to bunch together in tight herds, localized damage to plants and soil can occur leaving the ground susceptible to noxious weeds and erosion (*Stoddard 1975, Paulsen 1960*). Substantial disturbance by sheep grazing can be avoided with proper herding techniques and adequate monitoring, which are outlined in the Design Criteria (Table 2-2).

Cattle prefer graminoids to forbs but will browse on shrubs and forbs in an opportunistic situation. Cattle generally graze open meadows where grasses, forbs and water are more plentiful and will utilize heavily timbered areas as secondary range. Cattle readily graze riparian vegetation and can, at times, stay in these areas for extended periods and cause damage to delicate riparian and fen vegetation if proper rotational grazing plans are not followed.

The following table provides total acres by vegetation types by allotment. Historic grazing actions greatly influenced existing range conditions. For a description of past and current allotment management use patterns refer to *Section 1.2 Background* and the Allotment Histories document in the project file (*Whitmer 2011*). The acres reported here are approximate and were determined using the San Juan National Forest's geographic information system (GIS) vegetation database. The acres include National Forest lands and a small amount of private land

within the administrative boundary of the allotments. Vegetative species composition was compiled from GIS and past and present field monitoring notes.

Table 3-1. Vegetative Composition of Allotments Within the Analysis Area.

	Alpine	Mt. Grassland	Mt. Shrubland	Barren Rock	Riparian	Aspen	Aspen with Conifer	Cool-Moist Mixed Conifer	Warm-Dry Mixed Conifer	Ponderosa Pine	Spruce -Fir	Water	Total
Burnt Timber	17	1,264	22	0	20	682	1,842	543	58	19	697	0	5,164
Canyon Creek	0	516	48	3	31	70	1,419	1,095	283	218	2,628	16	6,327
Cave Basin	8,475	399	1,164	774	297	0	725	637	144	0	9,764	72	22,451
East Silver Mesa	2,695	304	118	277	96	0	49	94	0	0	6,036	49	9,718
Fall Creek	2,199	987	588	769	74	80	21	1,581	398	352	3,886	4	10,939
Flint Creek	4,951	331	689	421	104	305	1,282	1,139	74	242	6,448	372	16,358
Johnson Creek	4,310	613	341	126	170	0	489	80	0	0	3,275	52	9,456
Leviathan	3,227	403	136	444	76	156	727	10	0	54	1,242	55	6,530
Needles Mountains	1,134	0	0	16	34	0	0	0	0	0	342	27	1,553
Pine River	9,212	846	1,577	164	1,701	113	2,032	1,487	402	0	21,199	110	38,843
Rock Creek	5,647	249	102	898	183	0	121	0	78	0	3,501	101	10,880
Spring Gulch	0	1,046	130	0	0	1,082	11	62	359	382	0	5	3,077
Tank Creek	2,657	286	163	43	96	0	403	839	379	320	5,748	22	10,956
Virginia Gulch	6,868	539	37	231	213	0	39	0	0	0	6,399	49	14,375
Total	51,392	7,783	5,115	4166	3,095	2,488	9,160	7,567	2175	1587	71,165	934	166,627

Understory vegetation across the analysis area is based on a number of environmental and management factors. Common grasses found in meadows in the lower to mid-elevation range (6,500 to 9,000 feet) are Kentucky bluegrass (*Poa pratensis*), Thurber fescue (*Festuca thurberi*), elk sedge (*Carex geyeri*), common timothy (*Phleum pretense*), brome grasses (*Bromus* spp.) and wheatgrasses (*Agropyron* spp.). Common forbs and shrubs found in this range are dandelion (*Taraxacum officinale*), yarrow (*Achillea millefolium*), heartleaf arnica (*Arnica cordifolia*), American vetch (*Vicia americana*), strawberry (*Fragaria virginiana*), Gambel oak (*Quercus gambelii*), and snowberry (*Symphoricarpos albus*).

At higher elevations (9,001+ feet), the understory is dominated by tufted hairgrass (*Deschampsia caespitosa*), elk sedge, dandelion, bistort (*Bistorta bistortoides*), buttercup (*Ranunculus coloradensis*), carrot (*Daucus* spp.), strawberry and geranium (*Geranium caespitosum*). Common shrubs are native willows (*Salix* spp.), shrubby cinquefoil (*Potentilla fruticosa*), raspberry (*Rubus* spp.), common juniper (*Juniperus communis*) and snowberry. Above 11,500 feet, alpine vegetation is found as described earlier in this section.

There are 936 acres of GIS-classified wetlands and/or sedge meadows in the analysis area mostly within the Pine River, Virginia Gulch and Tank Creek Allotments. Of the 934 acres, there are 283 acres of classified fens. Fens are a specific type of wetland that accumulate organic matter or “peat” and rely on groundwater as its water source. In addition to storing and cycling carbon, fens are areas of high regional biodiversity and refugia for rare species (Cooper 2006).

Chapter 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.3 Vegetation

Cattle and Sheep Trailing Areas

In addition to the thirteen allotments previously listed, 629 acres of Forest Service lands are or may potentially be utilized by sheep and/or cattle for trailing into permitted allotments. The area associated with active and proposed cattle or sheep trailing dissects a diversity of vegetation types from small areas of sagebrush, piñon/juniper and desert grassland (55 acres) across the elevation gradient into the ponderosa pine and warm/dry mixed conifer (113 acres) into areas of mountain grassland and aspen (299 acres) and into the higher elevation spruce/fir forest (162 acres).

Noxious Weeds

Some of the analysis area has been inventoried for noxious weeds. Noxious weeds are reported by allotment and by trailing ingress/egress routes into the respective allotments.

Burnt Timber

Houndstongue (*Cynoglossum officinal*) is one of the most common noxious weeds seen along popular sheep trailing and recreation routes in this allotment. Occurrences of Canada thistle, (*Cirsium arvense*), musk thistle (*Carduus nutans*) and houndstongue have been reported along the southeastern boundary of the allotment, in the Transfer Park campground, along the Burnt Timber Trail, and in association with two sheep bedgrounds near the Lime Mesa Trail.

Canyon Creek

Linaria vulgaris (yellow toadflax) and musk thistle are found along the Missionary Ridge Road within the allotment with a trend of “increasing.” Canada thistle is also common along this busy, forest corridor.

Cave Basin

While no infestations of noxious weeds have been recorded within the Cave Basin Allotment, Canada thistle, musk thistle and houndstongue are common along the Pine River Trail, the trail to Emerald Lake and just outside the southern allotment boundary in the Vallecito Allotment.

East Silver Mesa (Endlich Mesa proposed)

Several acres of Canada thistle exist on the southern portion of the allotment associated with old roads and landings from past logging operations.

Fall Creek

Canada and musk thistle have been reported along the non-system trail along the southern side of the creek in the Fall Creek Allotment.

Spring Gulch

Occurrences of yellow toadflax, musk thistle, Canada thistle and houndstongue have been reported throughout the primary range in the Spring Gulch Allotment.

Tank Creek

Musk and Canada thistle have been reported in localized areas associated with livestock/recreation trails and old logging roads within the Tank Creek Allotment. Canada thistle is also common along the sheep trailing routes used to access the allotment by permittees.

Cattle and Sheep Trailing

The most common noxious weeds associated and recorded within the 629 acre trailing area are Canada and musk thistle. These species commonly occur south and north of the Spring Gulch Allotment and within the Sauls Creek Allotment where the sheep trail through from private lands. Musk thistle and houndstongue occur south of the Burnt Timber Allotment and in the Transfer Park Campground where the sheep trail through and bed-down on their way to the Burnt Timber, Virginia Gulch, East Silver Mesa and Tank Creek Allotments. Musk and Canada thistle are also common along the Pine River Trail which is the primary passage route to the Rock Creek, Leviathan and Pine River Allotments.

Threatened or Endangered Flora Species

There are no federally listed threatened or endangered plant species known or suspected to occur within the Weminuche Landscape Grazing Analysis Area.

Region 2 Sensitive Flora Species

There are known occurrences of five Region 2 sensitive species within the analysis area: whitebristle cottongrass (*Eriophorum altaicum* var. *neogaeum*) in the Tank Creek, Virginia Gulch and Cave Basin Allotments; Chamisso's cottongrass (*Eriophorum chamissonis*) in East Silver Mesa; Colorado tansyaster (*Machaeranthera coloradoensis*) within the Tank Creek and Pine River Allotments; West silver bladderpod (*Physaria scrotiformis*) within the Virginia Gulch Allotment; and sageleaf willow (*Salix candida*) in the Johnson Creek Allotment.

The following twelve species have never been found in the analysis area nor have there been specific surveys conducted for them; however, habitat for these species exists within the analysis area. These species are: stonecrop gilia (*Aliciella sedifolia*), lesser panicled sedge (*Carex diandra*), yellow lady's slipper (*Cypripedium parviflorum*), Smith's draba (*Draba smithii*), English sundew (*Drosera anglica*), slender cottongrass (*Eriophorum gracile*), Kotzebue's grass-of-Parnassus (*Parnassia kotzebuei*), Arizona willow (*Salix arizonica*), autumn willow (*Salix serrisima*), sphagnum moss (*Sphagnum angustifolium*), Baltic bog moss (*Sphagnum balticum*) and lesser bladderwort (*Utricularia minor*).

A more detailed description and analysis of these species can be found in the Biological Evaluation for Plants in this project's records (Jones 2014).

ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action/No Grazing

Under this alternative, term grazing permits would be cancelled after permittees had been given one year written notice of cancellation. Compared to Alternatives 2, 3 and 4, this alternative offers the greatest potential of meeting desired condition objectives for vegetation in the shortest timeframe.

The short-term effect of removal of domestic livestock grazing would be a localized increase in litter and vegetative cover. Soil disturbance associated with livestock trailing and grazing would decrease and livestock-use trails would re-vegetate over time. Removal of grazing would not necessarily bring about immediate changes in composition in upland areas dominated by non-native species and early-seral forbs. In these areas, changes in species composition and ecological succession may only be seen over a long period of time (Heitschmidt 1991). In other

areas that show a mixture of natives and non-natives, it is possible that removal of livestock grazing could favor the native species. Species such as Arizona fescue have been shown to increase their stands under no grazing or light grazing (USFS 2013). However, it is important to note that the rate and direction of plant succession following the removal of grazing is dependent on the degree to which soil properties and hydrology within the area have been altered, in addition to the extent which non-natives and invasive species have occupied the site. Other herbivores would also still be present in the analysis area effecting composition and ecological succession. Effects of grazing by recreational-use stock would continue including the spread and potential increase in non-native vegetation and noxious weeds. Natural disturbances including fire, disease, insects and weather events (such as drought) would continue to influence ecological conditions in the analysis area.

This alternative would result in improved ecological conditions overall since effects of trailing, bedding, salting and other activities associated with grazing by permitted livestock would be eliminated. Desired conditions across the analysis area would remain stable and areas deemed at risk due to domestic livestock grazing would improve.

Noxious weeds would continue to be present across the analysis area. Though permitted livestock would no longer contribute to the spread of invasive species, recreational stock, wildlife, other management activities (such as logging or prescribed burning) and recreation activities (roads and trails) would continue to spread noxious weeds throughout the analysis area.

Alternative 2: Current Management

Under this alternative, livestock grazing management would not change and effects from livestock grazing would be the same as they are today. The existing conditions reported for active allotments would remain the same. The vacant allotments would remain vacant and available for new permits. If permits were issued for the vacant allotments, effects of livestock grazing activities, specifically at trailing, bedding and salting areas would be evident at sites that have currently healed from past grazing. These effects include a decrease in the abundance and vigor of plant species due to sheep grazing and trampling, which often occurs at bedgrounds and salt grounds, and would decrease the amount of ground cover, increase the amount of exposed soil and increase the chance for erosion and runoff (Lull 1959, Orr 1975, Dunford 1954, Smith 1967, Forsling 1931). The alpine turf type, which is the most used alpine type by sheep, may experience greater impacts because of the fragility of the vegetation there and the time in which it takes this zone to recover. Grazing would continue in riparian areas, wetlands and fens. Though sheep do not like to stand and/or graze long in saturated soils, continued trailing through wet areas could cause localized effects on vegetation there.

Under this alternative, the trends described in Table 1-1 for existing conditions at key areas would likely continue on their current trajectories. Non-native species and noxious weeds would likely persist in areas where they currently exist though this condition is influenced by many factors, not just livestock grazing.

Under Alternative 2, no cattle forage reserve would be authorized in the Cave Basin Allotment, therefore there would be no affects from cattle grazing there.

Under Alternatives 2, 3 and 4, in the areas within the analysis area where noxious weeds exist, per the San Juan National Forest Noxious Weed EA and decision (SJNF 2012), the Forest

Service would continue to use an integrated approach including chemical and biological treatments to address the noxious weeds problem within the allotments.

Alternative 3: Adaptive Management w/Forage Reserves

Under Alternative 3, six active grazing permits (Burnt Timber, Canyon Creek, East Silver Mesa, Spring Gulch, Tank Creek and Virginia Gulch) would be reissued incorporating adaptive management strategies. By ensuring that specific design criteria and adaptive management options are implemented, the desired conditions found in Chapter 2 would be reached. Access to allotments would continue through trailing from private lands to USFS lands.

This alternative proposes a boundary adjustment which would close 5,117 acres of the Tank Creek and Canyon Creek Allotments. The acreage exists within rangelands considered unsuitable for grazing and have not seen the effects of active grazing due to inaccessibility, poor forage and/or rocky, steep terrain. The effects on these 5,117 acres of closed allotment would be the same as those listed in Alternative 1.

The boundary adjustment would also add 1,553 acres of the previously-closed Needles Mountains Allotment (*SJNF 2009*). This area which is not currently experiencing any effects from livestock grazing would experience potential change due to sheep grazing, such as decreased vegetative cover and vigor and an increase in soil impacts and vectors to spread noxious weeds. However, with the employment of adaptive management strategies, these effects would be localized and short-lived with monitoring and adjustments in management.

This alternative proposes to keep the southern portion of the Cave Basin Allotment open as a cattle forage reserve. If authorized for temporary use, the impacts currently seen from past cattle activity would continue. Cows tend to wallow and graze in riparian areas. In the Cave Basin Allotment, riparian vegetation and fens are common and would potentially be adversely impacted through decreasing vegetative cover and vigor, and creating interruptions in hydrology due to cattle trailing, trampling and grazing. Specific design criteria and adaptive management options would minimize these concerns.

Under this alternative, the Canyon Creek Allotment would be converted to cattle grazing and considered for improvements such as stock water developments and construction of new pasture boundary fences. Through design criteria, use of fences to create an effective rotational grazing system and the use of adaptive management, the key areas here would maintain a healthy rating. Better dispersal of livestock through range improvements would allow for desired conditions to be obtained.

Portions of Rock Creek, Johnson Creek and Leviathan Allotments would become sheep grazing forage reserves under this alternative. These areas are currently vacant and open to permitted livestock grazing. Under this alternative, grazing could occur temporarily (three years in ten years) as described earlier in this document. Because the allotments would be rested seven out of ten years the effects of livestock grazing would be minimal. Additionally, with the employment of adaptive management strategies, these effects would be localized and short-lived with monitoring and adjustments in management.

Under Alternatives 3, in the areas within the analysis area where noxious weeds exist, per the San Juan National Forest Noxious Weed EA (*USDA 2012*) and decision, the Forest Service would use an integrated approach including chemical and biological treatments to address the noxious weeds problem within the allotments.

Noxious weeds would continue to be present across the analysis area. Though permitted livestock would no longer contribute to the spread of invasive species in the closed allotments, recreational stock, wildlife, other management activities (such as logging or prescribed burning) and recreation activities (roads and trails) would continue to spread noxious weeds throughout the analysis area. Noxious weeds may continue to be spread and introduced in the allotments designated as forage reserves, as they are intended to be utilized by domestic livestock on a temporary basis when need exists.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Under this alternative, all the actions proposed for the six active grazing allotments (Burnt Timber, Canyon Creek, East Silver Mesa, Spring Gulch, Tank Creek and Virginia Gulch) including boundary adjustments, trailing and employing design criteria and adaptive management options would be the same as Alternative 3 and therefore the effects would be the same.

Alternative 4, however, proposes to close all currently vacant allotments to grazing (See Figure 2-3 and Table 2-2). No forage reserves would be authorized. The effects to the allotments that this alternative proposes to close would be the same as described in Alternative 1. Recreational use and recreational stock use would persist. Noxious weeds that currently exist within these allotments would continue to exist and potentially persist with stock and recreational use. However, removing permitted livestock grazing would decrease the opportunity for noxious weeds to spread.

Threatened or Endangered Flora Species Consequences

A determination of “no effect” was reached for threatened and endangered plant species since there are no federally listed threatened or endangered plant species known or suspected to occur within the Weminuche Landscape Grazing Analysis Area.

Region 2 Sensitive Flora Species Consequences

Under Alternative 1, a determination of “no impact” to any known populations of sensitive species or potential habitat of sensitive species due to livestock grazing or activities associated with livestock grazing was made since no livestock grazing permits would be issued on any of the allotments within this landscape.

Under Alternative 4, a determination of “no impact” due to livestock grazing or activities associated with livestock grazing to the *known* populations of sageleaf willow in the Johnson Creek Allotment or to the Colorado tansyaster in the Pine River Allotment or to the whitebristle cottongrass within the Cave Basin Allotment was reached since these allotments would be closed to permitted livestock grazing under this alternative.

Whitebristle cottongrass, Chamisso’s cottongrass and sageleaf willow grow in riparian areas, bogs and fens with saturated soils. Sheep do not typically like to wallow, stand or trail through wet areas though they would graze upon the fringes of these areas where the ground is drier where these species do not persist. Allowing cattle to graze in the southern portion of the Cave Basin Allotment (as proposed in Alternative 3) would have more of an impact on riparian vegetation since cattle would potentially wallow, stand, trail and graze through saturated soils. However, if a forage reserve were to be permitted, design criteria would be employed that would mitigate livestock use in these areas (Table 2-4, Criteria #5). Therefore, a finding of “may

adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federal listing or a loss of species viability range wide” was made for whitebristle cottongrass, Chamisso’s cottongrass and sageleaf willow for Alternatives 2, 3 and 4.

The Colorado tansyaster and West silver bladderpod are known to occur in the fellfield alpine type, which has low canopy cover, abundant surface rock and patches of bare soil. Sheep foraging in this type is minor as the dominant plants that occur there are not preferred forage species (Redders 2009). Though it is not expected to occur, trampling and uprooting of individual plants could occur to these species during associated range management activities such as trailing. Therefore, a finding of **“may adversely impact individuals, but is not likely to result in a loss of viability in the planning area, nor cause a trend to federal listing or a loss of species viability range wide”** was made for Colorado tansyaster and West silver bladderpod for Alternatives 2, 3 and 4.

Potential habitat exists within the project area for the Kotzebue’s grass-of-Parnassus, stonecrop gilia, lesser panicled sedge, yellow lady’s slipper, Smith’s draba, English sundew, slender cottongrass, Arizona willow, autumn willow, sphagnum moss, Baltic bog moss, and lesser bladderwort. There could be potential direct effects due to livestock grazing including grazing, trampling or uprooting of individual plants by livestock grazing in the area, and trampling or uprooting of plants during range management activities. However, adaptive management strategies, specific design criteria and monitoring that would be used under Alternatives 2, 3 and 4 would mitigate continued overuse of these habitats. Therefore, a **“may adversely impact individuals, but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability range wide”** determination was made for Alternative 2, 3 and 4 for the above listed species.

A **“no impact”** determination was made for the following species, which have no habitat within the project area: Missouri milkvetch (*Astragalus missouriensis* var. *humistratus*), Aztec milkvetch (*Astragalus proximus*), stream orchid (*Epipactis gigantea*), Lone Mesa snakeweed (*Gutierrezia elegans*), frosty bladderpod (*Lesquerella pruinosa*), cushion bladderpod (*Physaria pulvinata*), and large-flower triteleia (*Triteleia grandiflora*).

CUMULATIVE IMPACTS

Current vegetative conditions within the analysis area have resulted from many management activities over time including livestock grazing, timber harvest, recreational uses, and fire suppression. Natural disturbances including wildlife activities, insect and disease outbreaks, wind events, fire, landslides, and floods have also had an influence. All these activities have contributed to changes in the composition, structure, and function of the vegetation of the analysis area to some extent. These activities will continue into the foreseeable future resulting in additional changes to the composition, structure, and function of the vegetation here.

Livestock grazing and many other activities have contributed to noxious weed introduction and persistence on the landscape. Activities such as road building, off road vehicle use, dispersed and developed recreation, recreational stock use, mining activities, and drought contribute to invasive species establishment and spread. At current levels of noxious weed treatment, populations of weeds will increase or, at best, remain stable.

Approximately 5,585 acres of the analysis area was burned by the 2002 Missionary Ridge Fire. This effected vegetation composition and succession of most of the Spring Gulch and Burnt Timber Allotments as well as small portions of the Fall Creek and Cave Basin Allotments. Root crowns and underground rhizomes of many grass species are able to tolerate and survive fire. Seeds of forbs and shrubs may also be released by a fire occurrence. Gambel oak and aspen were common species in the burned areas and both species are prolific re-sprouters following a moderate to high intensity fire. Areas that had a component of oak and aspen within a conifer forest, like in the Spring Gulch Allotment, have succeeded post-fire to a mostly aspen-oak-forb composition. In areas that were pure conifer stands and burned at a higher intensity, forbs and shrubs are now the dominant cover. Pure conifer stands are fairly slow to regenerate without seeding or planting although some natural conifer regeneration has been seen within the burned area. In much of the burned area, range suitability increased.

Approximately 11,202 acres of timber harvest has occurred in spruce-fir, Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*) and/or aspen within the analysis area from 1957 to 2003. The resulting vegetative conditions from these harvests are mixed. Some previously-heavily-stocked clear-cut areas are more open mountain meadows and shrublands with sparse overstory regeneration. Other post-harvest areas have succeeded to mature forested stands.

The spruce-fir forests of the Weminuche Wilderness are currently exhibiting an insect and disease epidemic moving generally from east to west at higher elevations. Predicted mortality in these high-elevation forests could affect the analysis area in the short-term by increasing the amount of fine fuels on the forest floor therefore increasing the probability of a fire starting. In the long-term, die-off in the spruce-fir would increase the amount of dead and downed timber on the forest floor therefore increasing the possibility of high-intensity fires. In the long-term, high tree mortality would decrease the canopy cover and could have implications on hydrologic features that occur in closed canopy spruce-fir forests. Mass tree mortality in our forests could change plant species composition and diversity within these areas.

The interactions between vegetation, warming temperatures and change in precipitation are complex, so impacts to plant communities due to changing climate are variable and difficult to predict. However, we know that the temperature in the southwest has increased two degrees Fahrenheit over the past 30 years and that additional warming is predicted (*Western Water Assessment 2008*). Research shows a change in alpine ecosystems with the earlier onset of spring snowmelt, warmer temperatures, and the upward encroachment of tree and subalpine plant species (*Clow 2007; Moir 1999; Crawford in review*). Plant response could be highly species-specific, which suggests current plant communities may not simply move to new landscape positions, but may be replaced by new plant assemblages. In rangelands, the carrying capacity is very likely to change and become more variable overall, but the degree and rate of change is unknown (*Furniss 2010*). Climate change may also exaggerate the infestations of insects and disease in high-elevation forests increasing tree mortality and effecting plant composition.

Because climate change is also hydrologic change there is particular concern that some specialized and small-scale ecosystems within the analysis area may be adversely affected. These are seasonal springs, seeps, small ponds, wetlands and fens all of which occur in the analysis area and many of which house a diverse array of plants including some Forest Service sensitive species.

Climate change may favor many invasive species that can outcompete and displace native species. This decreases the desirable forage plants and decreases overall plant diversity and resiliency of plant communities. The addition of the potential for continued drought combined with a higher frequency of high-intensity wildfires would likely provide increased opportunities for annual weed spread and establishment.

3.4 Recreation /Wilderness

AFFECTED ENVIRONMENT

The project area is divided into 13 grazing allotments, six active and seven vacant, with 85% of the project area within the Weminuche Wilderness. The Wilderness Act of 1964 (*P.L. 88-577*) allows for Congress to designate “wilderness areas” throughout the nation and on public lands managed by the US Forest Service, US Fish and Wildlife Service, Bureau of Land Management and National Park Service. The Act prohibits the use of motorized or mechanized travel and motorized equipment within designated wilderness areas. The Weminuche Wilderness was designated by Congress in 1975 with additions in 1980 and 1993. It is the largest designated wilderness in Colorado, has three 14,000 foot peaks with numerous peaks at or above 13,000 feet. Within the Weminuche, there is 80 miles of the Continental Divide National Scenic Trail which runs along the backbone of the Rocky Mountains. Of these 80 miles, 20 miles are within this project boundary. Primitive forms of travel are allowed, foot and horse, and the major types of recreational activities include hiking, backpacking, horseback riding, horse packing, peak climbing, fishing, hunting, viewing wildflowers, scenery and wildlife, seeking solitude and some winter activities that include snowshoeing and back country skiing. There are 144 miles of system trail and approximately 20 miles of user created trails in the project area.

Within the project area, there are also approximately 26,000 of National Forest lands that are non-wilderness where recreationist drive, hike or horseback to enjoy fishing, hunting, camping, firewood gathering, trailhead access and viewing the scenery. Only around 50% of these 26,000 acres are accessible because of steep rugged terrain. The area of these more motor- dependent activities are in the upper Missionary Ridge area accessible by Missionary Ridge Road (#682) and the East Florida Road (#597) leading to Endlich Mesa. There are two campgrounds within this analysis area: Florida and Transfer Park Campgrounds, both at the bottom of East Florida Road and north of Lemon Reservoir. The sheep enter the active allotments in the wilderness trailing by these two campgrounds, the Burnt Timber Trail, and East Florida Road. The sheep are also herded back out using the same trails, roads and campgrounds.

The following discussion of affected environment is organized by allotment with a discussion of the recreation uses and management direction within each allotment.

Burnt Timber Allotment

This currently active allotment consists of wilderness and non-wilderness acres. There is one system trail, Burnt Timber (#667), which starts at the trailhead adjacent to Transfer Park Campground. This trail is within the Weminuche and is a main access into the Virginia Gulch, Silver Mesa, and Missouri Gulch country, and enables wilderness users to do loop trips using the Endlich Mesa Trail to City Reservoir. The public use of the Burnt Timber Trail is moderate and primarily acts as a corridor to other areas of the wilderness. This allotment acts as a pass-through allotment for several bands of sheep headed to the Virginia Gulch, Canyon Creek and Tank

Creek Allotments, with trailing, grazing and bedding occurring on the way up in the spring, and on the way down in the fall. Trail impacts occur from sheep utilizing the trail in the bottom 2-3 miles and sheep crossing back and forth across the trail into the Virginia Gulch Allotment. The Burnt Timber Trail has become multiple braided and in constant need of repair. There are also noxious weeds along the trail, in the old clear-cuts and up into the Lime Mesa country as well as in the campgrounds and at the trailhead facilities.

There are 11 permitted outfitters in the wilderness that travel through the Burnt Timber Allotment into the Lime Mesa, City Reservoir, Silver Mesa and Endlich Mesa country. The activities they provide are horse packing and back packing trips for the activities of hunting, fishing, viewing scenery, environmental education and enjoying solitude. There are three permitted outfitters in Young's Canyon providing horse pack trips in the fall for the hunting of big game. Recreation activities in this area range from developed camping with full facilities to horseback and back packing trips, camping, fishing, hunting, day hiking, viewing flowers, scenery and wildlife.

The remaining acres of this allotment include two developed campgrounds (Florida and Transfer Park), a large group campground (Florida Group Area) and the Burnt Timber trailhead facility. There are sheep and recreationists interfacing in the developed sites at the campgrounds, at the Burnt Timber trailhead and on the Burnt Timber Trail. Timing of trailing to avoid the busiest recreation weekends reduces the number of complaints from recreation users at the campgrounds, but still conflicts with wilderness users and archery hunters. For most non-wilderness users, seeing the sheep pass through is a unique experience. The sheep herder's horses are sometimes hobbled at the trailhead and their herder camper parked in the vicinity.

Canyon Creek Allotment

Canyon Creek Allotment sits north of Canyon Creek, south of Tank Creek and west to the Durango Silverton Narrow Gauge Railroad. None of this allotment is within the Weminuche Wilderness. The Missionary Ridge Road (#682) and the Lime Mesa Road (#081) are the main public access points to this country. Henderson Lake is enjoyed by the recreating public for camping, fishing, hunting and relaxing. There is also an established dispersed camping area along the north side of Canyon Creek and below the main Missionary Ridge Road.

Hunting, fishing, firewood gathering, dispersed camping, driving for pleasure and snowmobiling in the winter are the main uses within the Canyon Creek Allotment. A local snowmobile club has a Special Use Permit to groom the Missionary Ridge Road and one mile of the Lime Mesa Road. There are no trails, trailheads or campgrounds in this allotment, hence no major recreation/sheep conflicts, except when sheep are bedded in the areas where recreational users camp and hunt. Many of the users to this area are not offended by sheep but are intrigued by seeing them.

Cave Basin Allotment

Cave Basin Allotment is entirely within the Weminuche Wilderness. There is one Forest Service system trail that provides access into this area, Cave Basin Trail (#530), which is off the Middle Mountain Road (#724) north of Vallecito Reservoir. Most recreational use is during the summer and fall with hiking, backpacking, horseback riding, horse packing and hunting as the main activities. The use in this area is moderate, with Dollar Lake as the main destination. The trail does not connect to any other system trails for loop trips, consequently, users encounter trail

traffic in both directions. There are numerous high alpine lakes in the northern part of this allotment (Irving, Lost, and Hidden) with no system trails or user created trails into them. These lake basins provide for a pristine setting where the possibility of encountering other users is very low to non-existent.

There are currently six permits for commercial outfitting and guiding within the Cave Basin area. The activities permitted are hiking, horseback riding, backpacking and horse packing trips, hunting and environmental education.

East Silver Mesa Allotment

This allotment is composed of both wilderness and non-wilderness acres although most of the suitable grazing is in the high alpine ecosystem within the Weminuche Wilderness. In this allotment there is one system trail, Endlich Mesa Trail (#534), which starts from the end of East Florida Road (#597) and travels to City Reservoir. There are sheep trails adjacent to the Endlich Mesa Trail on both the east and west sides. The disturbance to the soils and vegetation in the bedding areas and from trailing are visible in the alpine tundra. Wilderness users to this area encounter not only the sheep in East Silver Mesa but also the sheep that are grazed in the Virginia Gulch and Burnt Timber Allotments, as most users travel through all three allotments when on a wilderness trip. Wilderness users have issue with sheep in this area due to encountering more than one band, the smell of the animals and their feces, noise, the impacts to the wildflowers and the loss of vegetation from grazing.

The upper three miles of the East Florida Road and the Stump Lake Road and trail are located in the non-wilderness acres. These roads rough and minimally maintained, and are best traveled by high clearance vehicles. The ongoing recreation activities include some dispersed camping, hunting, off highway vehicle use, snowmobiling and hiking. A snowmobile club grooms the East Florida Road to the trailhead for motorized winter recreation under a Special Use Permit. This non-wilderness portion of the East Silver Mesa Allotment gets a moderate amount of use in the summer, fall and winter. Because travel on the East Florida Road is rough and slow, the use in the wilderness is low to moderate during the summer and early hunting seasons.

There are 11 permits issued to outfitters that provide multi-day backpacking and horse packing trips. The activities include hunting, fishing, and peak climbing, environmental education and solitude experiences.

Fall Creek Allotment

Fall Creek Allotment is bordered on the east and west by National Forest system trails leading into the Weminuche Wilderness. The Vallecito Trail (# 529) is on the eastern boundary of the allotment and is a main access to hundreds of miles of trails, lakes and peaks within the Weminuche Wilderness. It is one of the most heavily used trails both by day hikers from the Vallecito Campground and by horse packers and backpackers heading in for multi-day trips.

The western edge of this allotment is in the alpine ecosystem and has the Endlich Mesa Trail (#534) as its western boundary. This trail sees moderate use, as the access is limited by a rough road recommended for high clearance vehicles, East Florida Road (#597).

The acres that are currently being grazed by sheep are in the northwestern part of the allotment and show signs of trailing where there is loss of vegetation and soil. The remainder of this

allotment is currently not used due to the steep, heavily forested and rugged terrain, and therefore there are no conflicts with recreationists in the remainder of the allotment.

Within this allotment there is some use by hunters during the archery and first and second rifle seasons. There are eight permits for outfitters in this area to provide some horse packing and backpacking activities mostly in the Endlich Mesa country and traveling along the Vallecito Trail.

Flint Creek Allotment

All of the 16,359 acres of the vacant Flint Creek Allotment are within the Weminuche Wilderness and include big and little Emerald lakes, Flint Lake, and Moon Lake. These are very popular destinations for wilderness users and the Emerald lakes and Flint Lake have specific regulations around the lake basins to protect the lakeshore and riparian ecosystems from camping and livestock impacts. These restrictions have been in place since 1977. National Forest system trails provide access for foot and horse users: Flint Creek Trail (#527), Lake Creek Trail (#528) and the Pine River Trail (#523). These trails receive heavy use during the summer and into archery and first rifle season. There is a user-made trail from Moon Lake to Rock Lake which is very popular and only passable for hikers.

There are eight permits for outfitters provide commercial services to the public for backpacking, horse packing, hunting, fishing, and environmental education trips. During summer and fall (June - October), the recreational use within this allotment is high. Winter sees little use because of the steep terrain and distance from a plowed road for winter access, although there will be an occasional skier or snowshoer winter camping.

Johnson Creek Allotment

Johnson Creek Allotment is entirely within the Weminuche Wilderness. Johnson Creek Trail (#504) is the main system trail that provides access into this allotment and into Chicago Basin as it climbs over Columbine Pass. Also intersecting the Johnson Creek Trail at 12,000 feet is the Endlich Mesa Trail (#534) which travels to Trimble Pass and provides access to City Reservoir in the East Silver Mesa Allotment. In addition to these two trails, there is approximately four miles of the Vallecito Trail (#529) in the lower portion of the allotment.

Approximately 13 miles of a very popular and busy 35 mile backpacking loop falls within this allotment. The loop is popular because users can ride the Durango-Silverton Narrow Gauge Train to one of two train stops on the Animas River (Needleton or Elk Park) and return to the other stop. Vallecito Creek Trail and Johnson Creek Trail make that 13 mile portion of the "loop."

In the upper basins of Johnson Creek there are two alpine lakes (Columbine and Hazel) that draw many visitors, both those making the loop, and many others from Chicago Basin day hiking up and over Columbine Pass. Needle Creek (Chicago Basin) is the busiest drainage in the entire Weminuche Wilderness with 50 -100 visitors daily during July and August. There are nine permitted outfitters in this allotment providing backpacking, horse packing, peak climbing, and environmental education services and some hunting.

There has been no grazing in this allotment since 1968 so the condition and composition of the vegetation is healthy and there are no conflicts between wilderness users and sheep grazing.

Leviathan Allotment

Leviathan Allotment is entirely within the Weminuche Wilderness. There is a user created trail from the Vallecito Trail, going up Leviathan Creek, that provides access to Leviathan Lake and the surrounding peaks. This user created trail is not maintained and once it climbs up the bottom two miles of the drainage, it is not passably by stock.

In addition to Leviathan drainage this allotment includes the Sunlight Creek drainage where there is a user created trail to the Sunlight lakes from the main Vallecito Creek Trail. These two pristine basins are also accessible to backpackers from several directions by high elevation travel. They receive wilderness use by those determined to seek a more solitude experience, climb peaks and enjoy the alpine tundra ecosystem. There are seven permitted outfitters operating within this allotment providing backpacking and environmental education services. This area of the wilderness is rugged and steep and sees light use.

Pine River Allotment

The Pine River Allotment consists of approximately 39,000 acres, all of which are in the Weminuche Wilderness. The Pine River Trail (#523) is the main travel corridor through this allotment and provides access for the many side drainages; Rincon La Osa Trail (#525), Rincon La Vaca Trail (#813), Snowslide Trail (#653), North Fork Trail (#813), Sierra Vandera Trail (#524) and Granite Lake Trail (#540). The area features major attractions and destinations some of which are Pyramid Peak, the Window, the Continental Divide National Scenic Trail (CDNST #813), Granite and Divide Lakes, and Willow Park. The access to the Pine is by three major trailheads: Pine River trailhead (Columbine RD), Poison Park trailhead (Pagosa RD) and Thirty Mile trailhead (Divide RD). From these trailheads the users travel to the Upper Pine and the side drainages to enjoy camping; fishing; peak bagging; hunting; viewing scenery, wildlife, and wildflowers in a primitive wilderness environment. It is a busy area of the Weminuche during the summer and also during hunting seasons. The Pine River Trail corridor and side drainages are used a great deal by wilderness users with recreational livestock which require open meadows for recreational grazing.

There are 15 permits for outfitting in this area. The permits include the following activities: horseback rides, horse packing, multi-day backpacking and horseback trips, fishing, hunting, peak climbing, day hiking and environmental education. There is a minor amount of non-motorized winter activities that occur in this allotment.

Rock Creek Allotment

The Rock Creek Allotment, entirely in the Weminuche Wilderness, hosts the headwaters of Vallecito Creek with Hunchback Pass at the top of the Vallecito Trail (#529). In addition to the Vallecito Trail; Rock Creek Trail (#655) and Nebo Trail (#813) are system trails within this allotment. These system trails enable wilderness users to travel into the heart of the wilderness for multiple days and connect to other adjacent system trails including the Continental Divide National Scenic Trail. There are user made trails up Stormy Gulch and to Vallecito. The lakes in the upper basins (Rock, Trinity, Vallecito and Nebo) are destinations for wilderness users as well as many peaks for technical climbs and walk ups.

There are 10 outfitters permitted in this allotment providing horse packing and backpacking opportunities and environmental education, fishing, and hunting activities.

Spring Gulch Allotment

None of this allotment is in the Weminuche Wilderness, and there are no developed trails or facilities. Spring Gulch Allotment is not very accessible to recreational users because of surrounding private land. Whatever recreational use occurs on this allotment likely only comes from adjacent landowners and is light use.

Tank Creek Allotment

The Tank Creek Allotment is located mostly west and south of the Weminuche Wilderness boundary and north of Henderson Lake and Canyon Creek. The eastern boundary is the Lime Mesa Trail (#676) to Dollar Lake and Mountain View Crest with the western boundary at the Durango-Silverton narrow Gauge Railroad. There are user made trails in this allotment, one up Tank Creek to access Mountain View Crest and another from the clear cuts in the Lime Mesa country to Dollar Lake and Mountain View Crest. Approximately 900 acres of the alpine ecotype are within the Weminuche at 12,000 feet and above.

The sheep bed west of the Lime Mesa trailhead, and water at Dollar Lake, which cause some conflict with recreationists. There is some major head-cutting along the Lime Mesa Trail caused by shallow, granitic soils, an old 4x4 road and repeated sheep trailing and bedding. Due to the roughness of the access road, this part of the Weminuche sees low to moderate use. Users accessing the wilderness from this trailhead for multi-day trips will likely also encounter the sheep in the Virginia Gulch and East Silver Mesa Allotments.

There are impacts to the soil, vegetation and expected experiences of the wilderness users and archery hunters that hunt the Tank Creek and Stag Draw country. The expectations of both user groups conflicts with the current grazing practices occurring on the landscape.

There are five permitted outfitters within this allotment providing horse packing and back packing trips for the activities of hunting, fishing, viewing scenery, environmental education and enjoying solitude. Recreation activities in this area range from dispersed camping, firewood gathering, driving for pleasure, wilderness hiking and horseback trips, fishing, hunting and the viewing of summer wildflowers, scenery and wildlife.

Virginia Gulch Allotment

This allotment is entirely within the Weminuche Wilderness. System trails within this allotment include Burnt timber Trail (#667), Lime Mesa (#676), City Reservoir (#542), and Endlich Mesa (#534) providing access to Dollar Lake, Mountain View Crest, City Reservoir, Lake Marie and Trimble Pass into Johnson Creek. These trails provide access to each other for a loop trip or allow users to get deeper into the wilderness for multi-day trips by connecting with other system trails that allow travel into Johnson Creek, Needle Creek and all along the Vallecito Trail. These trails see moderate use in the summer and early hunting seasons. There are some sheep and user trails into the Oliver lakes country and up into Castilleja Lake.

Wilderness users to this area encounter not only the sheep in Virginia Gulch but also the sheep that are grazed in the East Silver Mesa, Burnt Timber and some of Tank Creek Allotments as most users travel through all of these allotments when on a wilderness trip. In this area of the Weminuche, there are conflicts between sheep and wilderness users, including visual impacts to vegetation including wildflowers, noise, and smell. The herder's livestock guardian dogs are another wilderness issue when the dogs are aggressive to the user.

Where bedding grounds are located and trailing occurs, impacts to the vegetation and soil are evident. City Reservoir and Burnt timber trails have been used as a stock driveway since the 1920's and these trails are trenched, eroded and have up to six parallel trails in the open flat areas. As a hiker, it is difficult to stay on the trail in such a condition, hence hikers and horses exacerbate the problem by traveling on and off the trail. Also, the City Reservoir Trail is located such that drainage does not occur in flat wet meadows that have shallow soils. The sheep use these trails to access and move through to reach the suitable forage in the alpine ecosystem and also to exit this allotment. There are two sheep permittees that cross paths in this allotment making the resource disturbances and social issues more evident.

This country is accessed by three trailheads, two of which are slow rough roads. Due to the remoteness, the use is moderate. During the summer and fall, there are 11 permits issued to outfitters that provide trips via foot or horse for camping, fishing, hunting, viewing scenery, peak climbing, solitude experiences, and environmental education courses.

ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action/No Grazing

Recreation impacts from the removal of sheep grazing in this landscape would eliminate the conflict that exists between recreationists and livestock grazing operations. There would be no sheep on system trails, no conflicts with guard dogs, no continued trailing and bedding and no sheep at popular lakes and destinations. The vegetation loss and soil compaction from trailing and bedding would restore itself over time, or at least be given the opportunity to heal. Burnt Timber and City Reservoir trails could be re-aligned and maintained and kept in better condition. The wildflowers would remain for viewing throughout the growing season. Those people who feel that a "primitive" or "pristine" experience in the backcountry or wilderness should not include sheep would have an improved experience. There would be no ability to restock vacant allotments (Rock, Leviathan, Pine River, Flint Creek, Cave Basin, Johnson Creek and Fall Creek) in the future. For the wilderness acres within this project area, the No Action Alternative would be the best for the wilderness users' desired experience.

Alternative 2: Current Management

Under this action alternative, the level of impacts on recreation in the project area would continue as they currently exist and would increase as the numbers of recreationists increase. For many visitors, the presence of sheep, the visible signs of grazing (trailing, trampling of vegetation and wildflowers), along with the noise, smell and negative sheep dog encounters are undesirable. The solitude experience sought by many wilderness users may be impacted if during their trip, they encounter or camp within sight and sound of a band of sheep. Continuation of current livestock management would not change impacts to recreationists but conflicts and impacts would remain. The system trails, especially the Burnt Timber Trail, would continue being used and crossed by three bands of sheep resulting in continued damage to the trail tread and trail widening. Sheep trailing would continue to create and exacerbate non-system trails. Currently the sheep are trailed onto the Forest in the early summer and off in the fall using the same trails, campgrounds, roads and areas causing double the impacts to the resources (vegetation, soils, and recreational users) in the same grazing season.

Within this analysis area, the seven vacant allotments in the Weminuche Wilderness are available to be re-stocked. If they were re-stocked, there would be impacts to the wilderness

resources, both physical and social, that would appear to be new because of the length of time these allotments have been vacant.

The Design Criteria that would be part of Alternatives 2 contain items that are designed to reduce conflicts with recreation, and help improve the vegetative conditions that impact the influence the recreational experience. Under past management, these Design Criteria have not been consistently applied, but would be reinforced under a new decision to continue grazing. There would continue to be impacts to the vegetative health and composition and to the desired experience of solitude wilderness acres.

Alternative 3: Adaptive Management w/Forage Reserves

Through adaptive management, Forest Plan standards and guidelines would be met and Desired Conditions achieved in a timely manner. If these conditions are not met in a timely manner, then an alternate set of management actions would be taken to achieve the desired results. Short term and long term monitoring would help to inspect resource conditions, document them and correct social and resource concerns in a timely manner.

The Design Criteria that would be part of Alternative 3 contain many items that are designed to reduce conflicts with recreation, and help improve the vegetative conditions that influence the recreational experience. While these Design Criteria would not eliminate impacts to recreation, they would help to reduce negative impacts:

- No sheep bedding within ¼ miles of major lakes.
- No bedding within ¼ mile of Burnt Timber Trail.
- Keeping sheep off of the Lime Mesa Trail.
- Restrictions on the number, and requirements for control over herding dogs.
- Bedding and camping away from higher-use recreational areas.
- Salting away from water, roads, trails, and other high-conflict use areas.

Alternative 3 would benefit wilderness and recreational resources with the closure of the vacant allotments. Two of the allotments are proposed to be closed (Pine River, Flint Creek) and portions of four other allotments (Cave Basin, Rock Creek, Fall Creek and Johnson Creek). By closing these two allotments and portions of the other four, the user conflicts and resource impacts to the high alpine wilderness vegetation from sheep grazing would cease in the closed areas. These closures would help to attain the desired conditions for the resource and social standards set for the Weminuche Wilderness. Included in the areas proposed for closure are high-use recreation areas including the Pine River and all of the side drainages, Divide Lakes, Granite Lake, Flint Lake, Rock Lake, big and little Emerald Lakes, Moon Lake, and approximately 65 miles of system trails.

Alternative 3 would benefit wilderness and recreation resources by changing allotments from vacant to forage reserve status. Two-thirds of Rock Creek, all of Leviathan, most of Johnson Creek, and one-third of Cave Basin Allotments would become forage reserves. All these except Cave Basin would be available for sheep grazing; Cave Basin would be designated as a cattle-only forage reserve. While these allotments have not been grazed for many decades, they are currently considered vacant, and could potentially be re-stocked at any time. By designating them as forage reserves, the potential use would be decreased to a maximum of three years within a 10 year period.

If/when the forage reserves are grazed, impacts to the ecosystem and conflicts between sheep and wilderness users would occur similar to what currently occurs in active allotments. This would likely cause an outcry from recreationist because they will perceive the grazing to be a new use due to the length of time these allotments have been vacant. Trailing to the forage reserves would also cause conflicts because they would be trailed through Burnt Timber Allotment and west through Virginia Gulch country in order to reach the Vallecito Creek drainage, compounding the number of sheep encounters in these already-grazed areas. Johnson Creek and Vallecito Creek Trails are located in narrow drainages heavily used by backpackers and horse packers. The trailing into these forage reserves would create multiple trails and widen the existing trails. This would cause resource degradation, safety issues between stock users and sheep, and more conflicts with wilderness users and sheep evidence (smell, vegetation and wildflower trampling, campsite encounters).

If Canyon Creek Allotment were re-issued for cattle only, Burnt Timber Trail would have one less band of sheep traveling the trail corridor and bedding near the trail corridor, near the campground and the trailhead. This would reduce the encounters between recreation users and sheep.

Re-drawing the boundaries of Canyon Creek and Virginia Gulch Allotments to include some acres of the Needle Creek Allotment would cause conflicts between wilderness expectations and sheep impacts to the alpine ecosystem. These lake basins are popular recreation destinations, are high elevation (12,000 feet) ecosystems with a short growing season and most are accessed by non-system trails. Although sheep have already been grazing these areas, the proposal would legitimize the use.

Alternative 4: Adaptive Management / Closing Vacant Allotments

The issues and concerns associated with Alternative 4 would be the same as those in Alternative 3 except by closing all of the vacant allotments, there would be no forage reserves. This would improve the wilderness resource into the future and there would be no new resource impacts and social conflicts in all closed allotments. Additionally, the possibility of the active sheep allotments being eventually phased out through attrition would further benefit the recreational experience and wilderness resources.

Alternative 1 would be the best for the wilderness and recreation resources, both socially and physically. Alternative 2 would not necessarily improve the wilderness resource or the recreation experience but would allow for the status quo. Alternative 3 could have both negative and positive effects on the recreation and wilderness resources. Alternative 4 would be the second best choice for the least impacts to the wilderness resource and recreational experience.

CUMULATIVE IMPACTS

There are activities other than grazing that have, or could affect recreational and wilderness resources within the Weminuche Landscape. Foremost was the designation of the Weminuche Wilderness in 1975, which protects the majority of the landscape to preserve wilderness characteristics. This is a benefit to those recreationists who prefer primitive styles of recreation.

Past timber sales in the Missionary, Endlich Mesa, and Middle Mountain area have provided access roads into these areas which would otherwise not have been built. The presence of roads allows for recreational users to access the area for hunting, hiking, camping, and other uses.

Approximately 5,585 acres of the analysis area was burned by the 2002 Missionary Ridge Fire. The fire temporarily closed some trails as a result of massive erosion and safety concerns. While all the system trails are now opened, there could still be a threat to recreationists from falling dead trees or re-burn in downed timber, especially off-trail or outside of developed sites.

The Colorado Roadless Rule was passed in 2012, protecting an additional 13,000 acres of the landscape from certain activities. This will help to preserve the more primitive nature of those areas, but would prevent the development more roads or campgrounds.

Mandatory registration for wilderness has been proposed and could be implemented in the near future; this would not immediately affect recreational opportunities, but could eventually lead to some form of permit system in over-utilized wilderness locations.

There currently are no other future projects planned in the landscape that would have substantial impacts on recreational uses.

3.5 Wildlife – Threatened and Endangered Species

AFFECTED ENVIRONMENT

A Biological Assessment (BA) was conducted to evaluate the potential effects from domestic livestock grazing in the Weminuche Landscape to federally listed threatened or endangered fish and wildlife species, species proposed for federal listing, and critical habitat as designated by the U.S. Fish and Wildlife Service (USFWS). The BA addresses those listed species and/or their critical habitats that are known to occur or have the potential to be affected by actions occurring on the San Juan National Forest.

Analyzing and disclosing the effects of this grazing analysis project to federally listed species is needed to comply with the Endangered Species Act (*P.L. 93-205*), as amended; the National Forest Management Act (*P.L. 94-579, FSM 2670*); and the National Environmental Policy Act (*P.L. 91-190*), as amended.

A BA is the means to review, analyze, and document the direct, indirect and cumulative effects to federally listed species, species proposed for federal listing, or designated critical habitat for listed species. The full BA for this project can be found in the project record (*Schultz 2104a*). The section below summarizes the findings of the BA for terrestrial species; see *Section 3.8 Fisheries*, of this document for discussion of findings for aquatic species. The USFWS concurred with the findings of the BA.

Federally listed species addressed in the BA are from the most recent list received from the USFWS (*USDI 2013a*). Table 3-2 summarizes these species, their habitats, their probability of occurrence in the project area, and the projects effects determinations for each species.

Table 3-2. Federally Listed Terrestrial Species for the SJNF

Species	Federal Status	Habitat Present In the Landscape?	Probability of Occurrence and/or Effects	Carried Forward for Further Analysis?	Project Effects Determination
Canada lynx	Threatened	Yes - mature spruce fir, cool-moist mixed-conifer, and willow - riparian areas; no designated linkage areas intersect with landscape	High - animals documented to occur in the landscape.	Yes, see discussion	May Effect, Not Likely to Adversely Affect
Gunnison sage grouse	Proposed Endangered	No – no suitable lek or brood rearing habitat in landscape. Lek sites of low vegetation with sparse shrubs, often surrounded by big sagebrush, below 9,200' elevation. Brood rearing habitat of riparian vegetation and meadows within upland communities. Not known to occur on Columbine RD.	Low	No, dismissed from further evaluation.	No Impact
Mexican spotted owl	Threatened	No – no narrow rock-walled canyons with mixed-conifer	Low – no habitat in the landscape	No, dismissed from further evaluation	No Effect
New Mexico meadow jumping mouse	Proposed Endangered	No – no suitable complex streamside riparian in landscape.	Low	No, dismissed from further evaluation.	No Impact
North American wolverine	Proposed Threatened	Yes – high-elevation subalpine and spruce/fir forests; also cool-moist mixed-conifer, high-elevation aspen mixed with spruce, or cool-moist mixed-conifer, and willow-riparian adjacent to the above habitats. Is very mobile and utilizes a wide range of habitat types. Not confirmed to occur on San Juan NF since early 1900's.	Low	No, dismissed from further evaluation.	No Impact
Southwestern willow flycatcher	Endangered	Yes – 1 patch of marginal habitat occurs in forage reserve allotment	Low – birds not documented to occur during breeding season in or near the landscape, but habitat is present	Yes, see discussion	May Effect, Not Likely to Adversely Affect
Western yellow-billed cuckoo	Proposed Threatened	No – no gallery cottonwood forest in the landscape.	Low	No, dismissed from further evaluation.	No Impact
Uncompahgre fritillary butterfly	Endangered	Yes – 1 patch of habitat potentially suitable, but protocol surveys not conducted	High - 1 patch of habitat potentially suitable, but protocol surveys not conducted	Yes, see discussion	May Effect, Not Likely to Adversely Affect

There is no designated critical habitat for any listed species in the Weminuche Landscape. There are eight terrestrial species listed as threatened, endangered, or proposed for listing under the ESA that have the potential to occur or be affected by projects occurring on the Columbine Ranger District of the San Juan National Forest. Four of these species do not have habitat in the Weminuche Landscape, and therefore would not be affected by the proposed action: Gunnison sage grouse, Mexican spotted owl, New Mexico meadow jumping mouse, and Western yellow-

billed cuckoo. For this reason, these four species were dropped from further evaluation and the effects determination for the two listed species was “no effect”, and the determination for the two proposed species was “no impact.”

ENVIRONMENTAL CONSEQUENCES

Four species were carried forward for additional analysis. Canada lynx, southwestern willow flycatcher, and Uncompahgre fritillary butterfly are the only federally listed terrestrial species with habitat in the Weminuche Landscape. North American wolverine, a species proposed for listing, also has habitat in the landscape. Information on the habitat requirements, status, distribution, abundance, threats, and key habitat components of these species is included in the BA and will not be reviewed here.

For Canada lynx, there is a total of about 151,327 acres of suitable lynx habitat in the landscape, of which about 22% (33,576 acres) is suitable for livestock grazing under current management. The landscape intersects five Lynx Analysis Units (LAUs), the Lower Pine River, Missionary-Florida, Needles, Upper Pine River, and Vallecito Creek. The landscape does not intersect any mapped linkage areas.

For southwestern willow flycatcher, there is a total of about 410 acres of potential flycatcher habitat on federal lands in the Weminuche Landscape. Of this, a total of about 395 acres (96%) is in currently vacant allotments that are proposed for closing under the Alternatives 3 and 4. About 16 acres of potential flycatcher habitat is in a currently vacant allotment that is proposed to be included in a sheep forage reserve under the Alternative 3, but closed under Alternative 4. Of the 16 acres in allotments proposed for forage reserve status under Alternative 3, only 3.9 acres are in areas suitable for domestic sheep grazing. The remaining 12.1 acres are in areas unsuitable for sheep grazing.

For Uncompahgre fritillary butterfly, there is one known butterfly colony in the Weminuche Landscape, although snow willow is widely distributed and relatively abundant in the alpine zone across the landscape. The landscape has been extensively surveyed for butterflies over many years and no new colonies have been located. There is however, one additional location in the landscape that appears to have suitable habitat attributes and the potential for butterfly occurrence seems high. This site has been visited but conclusive survey results have not been obtained. For this reason, until the site can be conclusively surveyed the site will be presumed to be occupied by butterflies and domestic sheep will be managed accordingly.

The proposed action is not likely to jeopardize the continued existence of North American wolverine because there is currently no wolverine population on the SJNF or in the State of Colorado, and the available scientific and commercial information does not indicate that land management actions associated with the proposed action would pose a threat to the wolverine DPS (USDI Fish and Wildlife Service 2013b). Section 7(a)(4) of the ESA requires conferencing with USFWS when a proposed action is likely to jeopardize the continued existence of a proposed species, or destroy or adversely modify proposed critical habitat. Because the proposed action is not likely to jeopardize the continued existence of North American wolverine, conferencing is not required. For this reason, no further analysis of effects to North American wolverine is required.

Alternative 1: No Action/No Grazing

Alternative 1, the No Action Alternative, would be wholly beneficial for federally listed species because domestic sheep and cattle grazing would not be re-authorized in the Weminuche Landscape. There would be no potential impacts from sheep grazing activities to key habitat components for listed species. Selection of Alternative 1 has the potential to provide direct benefits to listed species, but the degree of benefit would probably be small in any given year and limited in scale on the landscape. Benefits to listed species from selecting Alternative 1 would probably be long term (> 10 years). Benefits to listed species from selecting Alternative 1 would probably be most pronounced for Canada lynx at or near the spruce-fir forest/alpine interface. Benefits to Uncompahgre fritillary butterfly would probably be less pronounced because the one area where butterflies are known to occur in the landscape shows little sign of impacts from past sheep grazing practices and domestic sheep have not grazed this allotment since 1980. The allotment containing the additional patch of habitat thought suitable for butterflies has not been grazed since 1970 and shows little sign of past sheep grazing impacts. Field visits to the active allotment containing potential flycatcher habitat found low potential for occupancy, and all areas had not been grazed by sheep since prior to 1980 and showed little sign of past sheep grazing impacts. Because environmental reasons not related to sheep grazing indicate that potential for flycatcher occupancy is low, improvements in flycatcher habitat capability from selecting Alternative 1 would likely be gradual, long term and limited to a few locations.

Alternative 2: Current Management

Selecting Alternative 2 would have both positive and negative effects for listed species. Selecting Alternative 2 would be generally beneficial for listed species, although likely considerably less beneficial than Alternative 1. Alternative 2 would have beneficial effects for listed species because current livestock management practices would maintain current gradual improvement in habitat capability for listed species across much of the landscape, especially when compared to historical livestock management practices. The improvements in habitat conditions for listed species expected to occur over time under Alternative 2 are likely to be generally small and limited to a few localized areas where habitat conditions are being affected by livestock grazing activities under current management practices. For example, under Alternative 2 about 35% of alpine and spruce-fir habitats are suitable for livestock grazing. Under Alternative 2, about 22% of suitable lynx habitat would be in areas suitable for livestock grazing. For these reasons, substantial portions of habitats for listed species would have potential for continued impacts from livestock grazing.

Alternative 2 would also have negative effects for listed species, compared to Alternative 1, because localized areas of grazing impacts to listed species' habitats would continue to be affected by livestock grazing activities, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones and wet meadows, and upland willow stands in alpine basins. Also, currently vacant allotments would remain open and available for livestock grazing, where impacts to habitats for listed species have not recently occurred.

Alternative 3: Adaptive Management w/Forage Reserves

Selecting Alternative 3 would have both positive and negative effects for listed species. Alternative 3 would be more beneficial for listed species than Alternative 2 because four vacant sheep allotments would be permanently closed to sheep grazing under Alternative 3. These four

allotments have substantial amounts of suitable habitat for lynx and southwestern willow flycatcher. Alternative 3 would also be more beneficial than Alternative 2 because application of adaptive management strategies and project design criteria is expected to result in more rapid improvements in habitat conditions in those localized areas where sheep grazing impacts are degrading habitat conditions for listed species.

Alternative 3 would be less beneficial for listed species than Alternative 1 because three active allotments and four forage reserve allotments with habitat for listed species would remain open or available for livestock grazing under Alternative 3, and because improvement in habitat conditions would probably occur over a longer time frame than under Alternative 1. In general, habitat conditions are expected to gradually improve in most areas under Alternative 3 but impacts to habitat for listed species would continue in some localized areas.

Also similar to Alternative 2, Alternative 3 would have negative effects for listed species, compared to Alternative 1, because those localized areas of grazing impacts would continue to be degraded by livestock grazing activities, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones or wet meadows, and upland willow stands in alpine basins. Although more rapid improvement in habitat conditions for listed species is expected under Alternative 3 than under Alternative 2, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations of listed species or the total amount of habitat available for listed species in the Weminuche Landscape.

Under Alternative 3, 17% of alpine and spruce-fir habitats would be suitable for livestock grazing. Under Alternative 3, 13% of suitable lynx habitat would occur in areas suitable for livestock grazing.

Domestic livestock grazing does not appear to be having measurable direct or indirect effects to lynx habitat in closed canopy spruce-fir and cool-moist mixed conifer forests in the Weminuche Landscape. In general, sheep and cattle spend little time in these areas because of the lack of forage under closed canopy conifer forests. The few areas of noticeable sheep and cattle grazing impacts in closed canopy spruce-fir forests were found to be small in scale and limited in scope where animals rested near the edges of parks or alpine zones. For this reason, domestic sheep grazing under Alternative 3 and Alternative 2 is not likely to substantially adversely impact habitat structure for lynx primary prey, such as younger age class conifers used by snowshoe hare in winter, or downed log piles and other woody debris used as hare cover and lynx denning habitat.

Most of the willow riparian areas (potential habitat for lynx and southwestern willow flycatcher) across the landscape are currently in upper mid-seral successional stage, or are in an upward trend and therefore are meeting land management plan direction for riparian condition. Little evidence of willow browsing was observed in willow dominated riparian areas at or near timberline. Sheep readily browse on willows in riparian and upland willow sites and some heavy browsing was observed on willows in a few localized areas. However it was difficult to determine with certainty whether the primary cause of this browsing was domestic sheep or elk because both were present in these localized areas.

Sheep trailing was also evident in some riparian and willow dominated areas, but current plant species composition and distribution are likely similar to conditions found during the reference period. Overall, the effects of sheep grazing and trailing in riparian and wetland areas appears to be small and/or limited to localized areas. For these reasons, selecting Alternative 3 would be

generally beneficial to lynx and flycatcher habitat conditions, compared to Alternative 2, but the benefits would probably be small and localized in scale but continue to improve over the long term (10+ years).

Under Alternative 3 a “restricted area” polygon has been delineated around an area where Uncompahgre fritillary butterfly might occur. Under Alternative 3, domestic sheep activities would be restricted to allow only trailing under controlled circumstances through this polygon; no bedding, salting or intentional grazing would be permitted within the polygon to ensure that sheep grazing does not degrade butterfly key habitat attributes. This “restricted area” polygon was designed to have boundaries that could be readily identified on the ground by sheep herders managing the flocks.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Selecting Alternative 4 would have both positive and negative effects for listed species. Alternative 4 would have more beneficial effects for listed species than Alternative 2 because application of adaptive management strategies and project design criteria should result in more rapid improvements in habitat conditions in those localized areas where sheep grazing impacts are currently occurring, but less beneficial effects than Alternative 1 because improvement in habitat conditions would probably occur over a longer time. Alternative 4 would be more beneficial for listed species than Alternative 3 because four forage reserve allotments available for stocking under Alternative 3 would be closed to livestock grazing under Alternative 4. These four allotments have substantial amounts of suitable habitat for lynx and southwestern willow flycatcher. Alternative 4 would be more beneficial for listed species than Alternative 3, and much more beneficial than Alternative 2, although less beneficial than Alternative 1 because active allotments with habitat for listed species would remain open to livestock grazing under Alternative 4. In general, habitat conditions are expected to gradually improve in most areas under Alternative 4, but impacts to habitat for listed species would continue in some localized areas.

Alternative 4 would have negative effects for listed species, compared to Alternative 1, because those localized areas of grazing impacts would continue to be degraded by livestock grazing activities, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones or wet meadows, and upland willow stands in alpine basins. Although more rapid improvement in habitat conditions for listed species is expected under Alternative 4 than under Alternatives 2 and 3, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations of listed species or the total amount of habitat available for listed species in the Weminuche Landscape.

Under Alternative 4, 15% of alpine and spruce-fir habitats would be suitable for livestock grazing and 10% of suitable lynx habitat in the Weminuche Landscape would occur in areas suitable for livestock grazing. Comparing alternatives, Alternative 4 would reduce the amount of lynx habitat in areas suitable for livestock grazing by 3% compared to Alternative 3 and by 12% compared to Alternative 2.

Domestic livestock grazing does not appear to be having measurable direct or indirect effects to lynx habitat in closed canopy spruce-fir and cool-moist mixed conifer forests in the Weminuche Landscape. In general, sheep and cattle spend little time in these areas because of the lack of forage under closed canopy conifer forests. The few areas of noticeable sheep and cattle grazing impacts in closed canopy spruce-fir forests were found to be small in scale and limited in scope

where animal rest near the edges of parks or alpine zones. For this reason, domestic sheep grazing under Alternative 4 is not likely to substantially adversely impact habitat structure for lynx primary prey, such as younger age class conifers used by snowshoe hare in winter, or downed log piles and other woody debris used as hare cover and lynx denning habitat.

Most of the willow riparian areas (potential habitat for lynx and southwestern willow flycatcher) across the landscape are currently in upper mid-seral successional stage, or are in an upward trend and therefore are meeting land management plan direction for riparian condition. Little evidence of willow browsing was observed in willow dominated riparian areas at or near timberline. Sheep readily browse on willows in riparian and upland willow sites and some heavy browsing was observed on willows in a few localized areas. However it was difficult to determine with certainty whether the primary cause of this browsing was domestic sheep or elk because both were present in these localized areas.

Sheep trailing was also evident in some riparian and willow dominated areas, but current plant species composition and distribution are likely similar to conditions found during the reference period. Overall, the effects of sheep grazing and trailing in riparian and wetland areas appears to be small and/or limited to localized areas. For these reasons, selecting Alternative 4 would be generally beneficial to lynx and flycatcher habitat conditions, compared to Alternative 2, but the benefits would probably be small and localized in scale but continue to improve over the long term (10+ years).

Threatened and Endangered Terrestrial Species Determinations

The effects of the Proposed Action on federally threatened and endangered species and their critical habitats were determined in the Biological Assessment (*Schultz 2014a*). There is no critical habitat for any listed species in the landscape. A determination of “May Effect, Not Likely to Adversely Affect” was made for the Canada lynx, southeastern willow flycatcher, and the Uncompahgre fritillary butterfly. A “No Effect” determination was made for all other listed terrestrial species. Aquatic effects determinations are discussed in the Fisheries section of this EA.

CUMULATIVE IMPACTS

Global climate change is a contentious issue with a great deal of uncertainty about what likely outcomes might be. However, there is little doubt that plants and animals found almost exclusively in the alpine zone may be the first to decline or face shrinking habitat areas as a result of changes in global climate. Most predictions about global climate change predict a gradual loss of alpine habitats as treeline moves upward in response to a generally warming climate. For Uncompahgre fritillary butterfly, the effect of global warming has the potential to have far greater consequences than the combined effects of grazing, recreation, mining, and other human impacts. As such, global climate change may be the most serious threat to long-term persistence of butterfly populations in the Weminuche Landscape.

Perhaps the greatest current and near-future (5- to 10-years) influence on habitat conditions for listed species such as Canada lynx in the Weminuche Landscape is an expanding spruce beetle outbreak within the upper Pine River and upper Vallecito Creek drainages. It is rapidly expanding from northern and eastern portions of the Weminuche Landscape towards southern and western portions of the landscape. The spruce beetle is the most important natural mortality agent of mature spruce trees. Spruce beetle outbreaks can cause extensive tree mortality and

modify stand structure by reducing the average tree diameter, height, and stand density. Infected trees often take a couple years to die, so infestations appear to be more widespread in following years. Beetles grow to adulthood inside trees and then take off to infect new trees. However, most of the spruce-fir forests in the Weminuche Landscape are mixed with subalpine fir, which are not affected by spruce beetles. For this reason, stands with higher fir composition are less affected by beetles than stands with higher spruce composition.

Most spruce-fir forests in the landscape are mature closed-canopy stands that are at risk to beetles. Within the past five years, the upper third of the Pine River and Vallecito Creek drainages have had extensive areas of mortality of mature Engelmann spruce trees, in some areas exceeding 80% to 90% of mature overstory trees. Within stands affected by spruce beetles, there is a high probability that most spruce trees over five inches diameter will die. Within the next five years the beetle outbreak is expected to expand down the Pine River and Vallecito Creek drainages, and is expected to increase in the upper Florida River and Missionary Ridge portions of the Weminuche Landscape. The beetle epidemic has the potential to substantially alter spruce-fir habitat conditions for listed species, reducing its value as forage and cover for lynx and snowshoe hare in the most heavily affected areas. Forage value and cover for snowshoe hare could be greatly reduced by the beetle epidemic because mortality of overstory trees is expected to substantially open the canopy of previously closed-canopy spruce stands.

More localized threats to alpine species, such as Uncompahgre fritillary butterfly, include non-motorized recreation. While alpine ecosystems are hardy and resilient to natural environmental factors, they are particularly vulnerable to human related disturbances and may require decades to recover. Although substantial progress has been made in developing techniques to restore damaged alpine landscapes, this technology is still not capable of restoring alpine plant communities to their pre-disturbance condition (*Hoffman 2006*).

As the number of off-highway vehicles (OHV's) continues to increase on most roads and OHV trails in and near the Weminuche Landscape, the potential for disturbance to lynx using areas adjacent to popular OHV routes also continues to increase each year. The continual annual increase in OHV use observed over the past 5-10 years is likely to continue for the foreseeable future. Non-motorized recreation has also increased each year on most trails in the Weminuche Landscape. Human disturbance in habitats for listed species may cause animals to move away from preferred foraging areas and into areas with lower quality forage or areas where animals are more vulnerable to predation, leading to increased predation or mortality.

Other activities that continue to influence habitat capability for listed species in the Weminuche Landscape include development of private lands adjacent to public lands, increasing levels of OHV traffic on most roads in the landscape, and increasing levels of non-motorized recreation on many trails in the landscape. Influences that continue to affect vegetation in the landscape and therefore affect habitat capability for listed species include ongoing fire suppression, personal use firewood harvesting of standing dead trees for use as primary home heating purposes, and natural events such as wild fire, forest insect and disease outbreaks, wind throw events, and avalanches. All these activities have contributed to changes in the composition, structure, and function of forested habitats in the landscape, and habitat for sensitive species.

Intensive historic levels of livestock grazing, increasing levels of OHV traffic on most roads and motorized trails in the landscape, development of private lands within surrounding Federal lands, water diversion, and 100 years of surface and subsurface mining operations have likely

contributed to substantial cumulative effects in lynx and flycatcher habitat. Some of the impacts of these past activities have been reduced or mitigated through natural re-vegetation of formerly impacted areas and improvements in water quality as abandoned mines have been reclaimed.

Human disturbance as a result of increased vehicle and OHV use in the Silverton Landscape also has potential to impact lynx movement and habitat capability. It is possible that late springtime motorized use of roads and trails through denning and winter foraging habitat may have negative effects if lynx are forced to move kittens because of associated human disturbance (*Ruggiero et al. 2000*). Increased human recreation resulting in more human encounters has potential to increase lynx mortality. Numbers of motorized users on roads and trails in the landscape is expected to continue to increase for the foreseeable future, likely resulting in improvements and expansion of routes for motorized users. The cumulative effect of increased motorized users and infrastructure development on habitat capability for listed species is unknown.

3.6 Wildlife – Sensitive Species

Forest Service Manual 2670 requires reviews of all Forest Service planned, funded, executed or permitted programs and activities for possible effects to Forest Service designated sensitive wildlife species. The process used to evaluate the effects agency activities and programs may have on designated sensitive species is in accordance with the standards established in 50 CFR 402.12, and Forest Service Manual Direction (FSM 2672.4). U.S. Forest Service (USFS) Region 2 sensitive species are designated by the Regional Forester of the Rocky Mountain Region. A Biological Evaluation (BE) was conducted to analyze the impacts of alternatives to designated sensitive species following agency direction (*Schultz 2014b*).

Table 3-3 lists the 30 species designated as Sensitive that are known to occur, may occur, or have habitat on FS lands managed by the San Juan National Forest. The table also provides rationale for why some sensitive species were brought forward for detailed project analysis and other species were not, and provides a summary of how the proposed action might affect each species and their key habitat components, and impact determinations for each species. Specific project impacts are then discussed in more detail for those species with habitat present in the Weminuche Landscape and that are likely to be affected (positively or negatively) by the action alternatives. Details of the analysis leading to the summary can be found in the project record (*Schultz 2014b*). Information on the habitat requirements, status, distribution, abundance and key habitat components of Sensitive Species is on file at the Columbine Ranger District office in Bayfield, Colorado and will not be reviewed here.

AFFECTED ENVIRONMENT

Of the 30 species designated as Sensitive by the USFS Rocky Mountain Region and that have potential to occur in the Weminuche Landscape or be affected by the proposed action, 13 have habitat and are known to occur or may occur in the landscape. Of these 13 species, only two species could be affected by domestic sheep grazing. The two species brought forward for detailed analysis for this domestic sheep grazing project are white-tailed ptarmigan and Rocky Mountain bighorn sheep.

The remaining 28 species either do not have habitat in the Weminuche Landscape, are not known to occur in the landscape, do not regularly breed in or use the landscape or occur only irregularly and unexpectedly and often outside of habitat associations' characteristic of the species, or

domestic livestock grazing is unlikely to substantially affect their preferred habitats or key habitat components. For these reasons, these 28 species will not be evaluated further and the effect of selecting any of the project alternatives on these 28 species is “no impact.”

Table 3-3. FS Region 2 Terrestrial Sensitive Wildlife Species for the SJNF

Species	Habitat Present In Project Area (PA)? [Yes/No]	Species or Habitat Impacted by Project (Yes/No)?	Basic Habitat Description	Project Impact Determination
MAMMALS				
American marten	Yes – known to occur year round in landscape. About 71,020 acres of habitat in landscape, of which 34% is in areas suitable for grazing.	No - foraging habitat (closed canopy spruce-fir forests) generally not affected by sheep grazing	Mature spruce/fir and mixed conifer forests with complex physical structure.	Selecting Alternative 2, 3 or 4 will have “no impact” on American marten. No further analysis is required
Desert Bighorn Sheep	No – no desert canyons in landscape, not known to occur in San Juan, Hinsdale or La Plata County	No	Rocky canyons, grass, low shrub, open habitat with adjacent steep rocky areas for escape and safety. Might occur on Dolores RD; does not occur on Columbine or Pagosa RDs.	Selecting Alternative 2, 3 or 4 will have “no impact” on desert bighorn sheep. No further discussion is required
Fringed myotis	No – landscape too high in elevation, not known to occur in landscape	No	Desert, grassland, and woodland habitats. Roosts in caves, mines, rock crevices, buildings, and other protected sites.	Selecting Alternative 2, 3 or 4 will have “no impact” on Fringed myotis. No further discussion is required
Gunnison’s prairie dog	No – no suitable extensive grassland or prairie dog colonies in landscape not known to occur in San Juan or Hinsdale County	No	High mountain valleys and plateaus at 1830-3660 m; open or slightly brushy country, scattered junipers and pines. Burrows usually on slopes or in hummocks.	Selecting Alternative 2, 3 or 4 will have “no impact” on Gunnison’s prairie dog. No further discussion is required
Hoary Bat	No – landscape too high in elevation, not known to occur in San Juan or Hinsdale County	No	Associated with foliage in trees, mainly ponderosa pine, piñon/juniper and riparian forest.	Selecting Alternative 2, 3 or 4 will have “no impact” on hoary bat. No further discussion is required
River Otter	Yes – known to occur in and near the main stem Pine River. About 121.9 miles of river habitat in landscape.	No - proposed action will not alter aquatic habitat structure or primary prey abundance or distribution	Stream and river riparian	Selecting Alternative 2, 3 or 4 will have “no impact” on river otter. No further discussion is required
Rocky Mountain bighorn sheep	Yes – known to occur in landscape year round. About 38,767 acres of mapped (CPW) summer range in landscape.	Yes – potential for disease transmission with domestic sheep, and potential for forage competition	Open or semi-open habitats, often in precipitous terrain and the adjacent benches and mesa tops, most commonly in alpine, grassland, shrub-steppe and rocky areas.	Selecting Alternative 2, 3 or 4 “may impact individual bighorn sheep but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide”.
Spotted bat	No – too high elevation, not known to occur in San Juan Co.	No	Pinyon-juniper, shrub desert, possibly riparian.	Selecting Alternative 2, 3 or 4 will have “no impact” on spotted bat. No further discussion is required
Townsend’s big-eared bat	No – landscape too high in elevation, no open dry forests	No	Forages in semi-desert shrublands, pinyon-juniper woodlands and open montane forests. Roosts in caves, mines and mature forests.	Selecting Alternative 2, 3 or 4 will have “no impact” on Townsend’s big-eared bat. No further discussion is required
BIRDS				

Species	Habitat Present In Project Area (PA)? [Yes/No]	Species or Habitat Impacted by Project (Yes/No)?	Basic Habitat Description	Project Impact Determination
American bittern	No – no marsh, swamp, or bog with cattails, rushes, grasses, & sedges, not known to occur in San Juan or Hinsdale County	No	Marsh, swamp, or bog with cattails, rushes, grasses, & sedges	Selecting Alternative 2, 3 or 4 will have “ no impact ” on American bittern. No further discussion is required
American peregrine falcon	Yes – suitable foraging habitat, one nest known in the landscape.	No –foraging habitat) generally not affected by sheep grazing	Cliff habitat over 200 feet high with suitable ledges for nest construction.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on American peregrine falcon. No further analysis is required.
Bald eagle	Yes – suitable foraging habitat, one nest known just outside the landscape.	No – foraging habitat generally not affected by sheep grazing.	Nests and roosts are usually found in open-branched trees near larger lakes, streams, rivers and reservoirs.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on bald eagle. No further analysis is required.
Black swift	Yes – known to nest and forage in landscape	No – nesting (waterfalls) and foraging habitat (in air above alpine peaks) not affected by sheep grazing	Nests behind or next to waterfalls and wet cliffs. Forages over forests and open areas.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on black swift. No further analysis is required.
Boreal owl	Yes – known to nest and occur year round in the landscape. About 50,439 acres of habitat in landscape, of which 37% is in areas suitable grazing.	No – nesting habitat (standing dead trees) and foraging habitat (closed canopy spruce-fir forests) generally not affected by sheep grazing	Mature spruce/fir and mixed conifer forested areas with preference for wet situations (bogs or streams) for foraging	Selecting Alternative 2, 3 or 4 will have “ no impact ” on boreal owl. No further analysis is required.
Brewer’s sparrow	No – no sagebrush in landscape; not known to occur in San Juan or Hinsdale County	No	Strongly associated with sagebrush in areas with scattered shrubs and short grass; to lesser extent in mountain mahogany, rabbit brush, and bunchgrass grasslands with shrubs or large openings in pinyon-juniper.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on Brewer’s sparrow. No further analysis is required.
Burrowing owl	No – no suitable extensive grassland or prairie dog colonies in landscape not known to occur in San Juan, Hinsdale or La Plata County	No	Open grasslands associated with prairie dogs. Nests and roosts in burrows dug by mammals or other animals. Not known to occur on Columbine or Pagosa RDs.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on burrowing owl. No further analysis is required.
Columbian sharp-tailed grouse	No – no habitat in landscape; not known to occur in San Juan, Hinsdale or La Plata County	No	Oak/service berry shrublands, often interspersed with sagebrush; aspen forests; irrigated pasture. Recently reintroduced near Dolores, not known to occur on Columbine or Pagosa RDs.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on Columbian sharp-tailed grouse. No further analysis is required.
Ferruginous hawk	No – no suitable extensive grassland or prairie dog colonies in landscape; not known to occur in San Juan or Hinsdale County	No	Open grasslands and shrub steppe communities. Nests in tall trees or shrubs along streams or on steep slopes. Not known to nest on or near SJNF, but is winter visitor and can occur during non-breeding season.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on ferruginous hawk. No further analysis is required.

Species	Habitat Present In Project Area (PA)? [Yes/No]	Species or Habitat Impacted by Project (Yes/No)?	Basic Habitat Description	Project Impact Determination
Flammulated owl	Yes – known to nest in the landscape. About 16,744 acres of habitat in landscape, of which 32% is in areas suitable for grazing.	No – nesting habitat (standing dead trees) and foraging habitat (mixed-conifer and ponderosa pine forests) generally not affected by sheep grazing	Depend on cavities for nesting, open forests for foraging, brush for roosting. Occupy open ponderosa pine or forests with similar features (dry montane conifer or aspen, with dense saplings).	Selecting Alternative 2, 3 or 4 will have “ no impact ” on flammulated owl. No further analysis is required.
Lewis’ woodpecker	No – no suitable mature ponderosa pine or gambel oak in landscape, not known to occur in San Juan or Hinsdale County	No	Open pine forests, burnt over areas with snags and stumps, riparian and rural cottonwoods, and pinyon-juniper woodlands.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on Lewis’ woodpecker. No further analysis is required.
Loggerhead shrike	No – no sagebrush or thorn shrub habitats in landscape, not known to occur in San Juan or Hinsdale County	No	Grassy pastures that are well grazed. Nests in shrubs or small trees, preferably thorny such as hawthorn.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on loggerhead shrike. No further analysis is required.
Northern goshawk	Yes – foraging and nesting habitat in landscape, known to nest in the landscape. About 64,855 acres of habitat in landscape, of which 35% is in areas suitable for grazing.	No – nesting habitat not affected, and, foraging habitat generally not affected by sheep grazing	Mature forest generalist, often found in mixed conifer/aspen stands.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on northern goshawk. No further analysis is required.
Northern harrier	No - no suitable wetlands or cattail marshes in landscape, not known to nest in San Juan Hinsdale County	No	Marshes, meadows, grasslands, and cultivated fields. Nests on the ground, commonly near low shrubs, in tall weeds or reeds, sometimes in bog; or on top of low bush above water, or on knoll of dry ground, or on higher shrubby ground near water, or on dry marsh vegetation.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on northern harrier. No further analysis is required.
Olive-sided flycatcher	Yes – suitable nesting habitat in landscape, known to nest in landscape. About 21,129 acres of habitat in landscape, of which 36% is in areas suitable for grazing.	No – nesting habitat (large, live overstory conifer trees) and foraging habitat (aerial insects in tree canopy) generally not affected by sheep grazing	Mature spruce/fir or Douglas-fir forests with preference for natural clearings, bogs, stream and lake shores with water-killed trees, forest burns and logged areas with standing dead trees.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on olive-sided flycatcher. No further analysis is required.
Purple martin	No – no suitable mature aspen stands in landscape, not known to nest in San Juan, Hinsdale or La Plata County	No	Mature pure aspen stands near streams, springs, or ponds. Breeds on Dolores RD. Not known to occur on Columbine or Pagosa RDs.	Selecting Alternative 2, 3 or 4 will have “ no impact ” on purple martin. No further analysis is required.
Short-eared owl	No - no suitable wetlands or cattail marshes in landscape, not known to nest in San Juan or Hinsdale County	No	Open habitats including grasslands, marsh edges, shrub-steppe, and agricultural lands; requires taller grass cover than Northern harrier	Selecting Alternative 2, 3 or 4 will have “ no impact ” on short-eared owl. No further analysis is required.

Species	Habitat Present In Project Area (PA)? [Yes/No]	Species or Habitat Impacted by Project (Yes/No)?	Basic Habitat Description	Project Impact Determination
White-tailed ptarmigan	Yes- known to occur year round in landscape. About 48,200 acres of habitat in landscape, of which 36% is in areas suitable for grazing.	Yes – nesting and foraging habitat (willows) shows evidence of localized impacts from sheep grazing	Alpine tundra, especially in rocky areas with sparse vegetation. Summer habitats include moist, low-growing alpine vegetation. Canopy cover of willow at winter feeding sites preferred.	Selecting Alternative 2, 3 or 4 “may impact individual white-tailed ptarmigan but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide” .
AMPHIBIANS				
Boreal toad	Yes – suitable habitat and one historic site in landscape. Not known to currently occur in landscape. About 3,567 acres of potential habitat in landscape, of which 46% is in areas suitable for grazing.	No – no evidence that sheep grazing is substantially altering aquatic habitat structure	Wetlands in spruce/fir forest, near water and alpine meadows.	Selecting Alternative 2, 3 or 4 will have “no impact” on boreal toad. No further analysis is required.
Northern leopard frog	Yes – possibly occurs at lowest elevations of landscape. About 3,567 acres of habitat in landscape, of which 46% is in areas suitable for grazing.	No – no evidence that sheep grazing is substantially altering aquatic habitat structure	Riparian and wetland areas.	Selecting Alternative 2, 3 or 4 will have “no impact” on northern leopard frog. No further analysis is required.
INSECTS				
Great Basin silverspot	No – landscape is too high in elevation, not known to occur in San Juan or Hinsdale County.	No	Spring fed and/or subirrigated wetlands at low (7500 feet or less) elevation; larval food plant Viola nephrophylla; wet meadows interspersed with willows and other woody wetland species; adult nectar sources (mostly composites).	Selecting Alternative 2, 3 or 4 will have “no impact” on great basin silverspot. No further analysis is required.

Existing habitat for sensitive species was determined by the use of Geographical Information System (GIS) modeling using vegetative information described in Forest-wide MIS Assessments on National Forest System lands. Habitat modeling was conducted using habitat structural stage matrices described by Towry (1984). In addition, information on species’ distribution across the Forest, professional judgment of Forest Service wildlife biologists, coordination with Colorado Division of Parks and Wildlife (CPW) biologists, coordination with the USFWS, and field reconnaissance of the project area was also used.

White-Tailed Ptarmigan

White-tailed ptarmigan are endemic to alpine habitats of western North America, primarily at or above treeline. They also use riparian zones, meadows and willow carrs near treeline in the subalpine zone. The single most important feature of habitats used by ptarmigan in Colorado is willow (*Salix* spp.), which is their primary food source from late fall through spring. Any activity that reduces the distribution and abundance of willow will likely have negative consequences to ptarmigan (Hoffman 2006).

Ptarmigan are known to exist throughout the Weminuche Landscape in appropriate habitat, but their population numbers are unknown. Ptarmigan populations in the southwest Colorado ore belt, roughly between Telluride, Silverton and Lake City are thought to not be self-sustaining. This area is immediately adjacent to the north of the Weminuche Landscape and may include small portions of the landscape. Research (Larison 2000) demonstrates that reduced over-winter survivorship of adult female ptarmigan caused by cadmium-induced renal failure and brittle bones is limiting ptarmigan breeding densities and productivity in this area.

For this reason, protecting and maintaining fall and winter habitat for adult female ptarmigan is likely to be a key factor in ensuring long-term population persistence in the landscape. Maintenance and protection of fall and winter ptarmigan habitat is especially important given the high site fidelity of wintering birds and the considerable numbers of adult females that are attracted from surrounding breeding habitats to the few suitable wintering sites (Braun 1976).

Rocky Mountain Bighorn Sheep

Rocky Mountain bighorn sheep were historically distributed across the mountainous portions of Colorado and much of the San Juan National Forest. Their sensitive species designation implies there is concern for the long-term viability and/or conservation status of bighorn sheep. This concern is based primarily on potential threats to the long-term viability of bighorn sheep populations, including diseases transmitted from domestic sheep, lack of connectivity and/or loss of genetic variability due to habitat fragmentation, habitat loss, increased human disturbance on summer and winter grounds, competition for forage with domestic livestock, and predation on small isolated herds (Beecham 2007, SJNF 2013b). Although habitat degradation from fire suppression, highways, livestock grazing, and human disturbance is of concern, the susceptibility of bighorn sheep herds to population declines or extirpation due to respiratory diseases, which can be transmitted by domestic sheep or goats (Besser 2012b, Cassirer 2013), appears to be the greatest concern for bighorn sheep population persistence on the San Juan National Forest (SJNF 2013b).

Mortality and depressed recruitment resulting from pathogens introduced by domestic livestock are regarded as the limiting factor for bighorn sheep in Colorado (George 2009). Physical contact between domestic sheep or goats and bighorn sheep increases the risk of disease transmission from domestic animals to bighorn sheep, with potential for a subsequent bighorn sheep mortality event and/or extended period of reduced recruitment.

The complete range of mechanisms and/or causal agents that lead to disease events and low recruitment in bighorn sheep is still debated, and not all bighorn sheep disease events can be attributed to contact with domestic sheep or goats (Besser 2012b, MOU 2009, Aune 1998, Onderka 1984). Until the science is better understood, it is prudent to consider and implement management actions designed to keep the species separate as a means to prevent the potential for disease transmission and subsequent bighorn mortality events (MOU 2009, WAFWA 2012).

A Risk Assessment analysis was produced that focused on the risk of contact between bighorn sheep and domestic sheep in the Weminuche Landscape (Schultz 2014e). This “Risk Assessment” is Appendix D of this EA. No presumption was made that physical contact would lead to disease transmission or a subsequent bighorn sheep mortality event. However, the assumption was made that physical contact between bighorn sheep and domestic sheep results in

an *increased risk* of disease transmission potential to bighorn sheep, with *increased potential* for a subsequent bighorn mortality event. As part of the analysis process, the Risk of Contact Tool, prepared by the USDA Forest Service Bighorn Sheep Working Group (USDA 2013), was used to help evaluate bighorn sheep movements outside their Core Herd Home Range (CHHR), and assess the potential for risk of contact between bighorn sheep and domestic sheep allotments in the Weminuche Landscape.

The “Risk Assessment” process followed a four-step approach to risk assessment and viability analysis. This process directs field units to conduct qualitative, and where possible quantitative, analyses of the potential for interaction between domestic and bighorn sheep when the agency is making decisions requiring NEPA analysis regarding livestock grazing activities. The goal of these analyses is to minimize the potential for physical contact between domestic and bighorn sheep, thereby minimizing the potential for disease transmission and a subsequent mortality event of bighorn sheep.

Within the Weminuche Landscape, small portions of two active domestic sheep and goat allotments (Canyon Creek and Tank Creek), and portions of four vacant sheep allotments (Cave Basin, Flint Creek, Pine River and Rock Creek) overlap with CHHR of three bighorn sheep herds, as mapped by CPW (Figure 1-4). The three herds are: S-16 Cimarrona Peak Herd; S-28 Vallecito Creek Herd; and the S-71 West Needles Herd. There is about 4,079 acres of mapped overlap with the CHHR for the Cimarrona Peak Herd S-16 in the Pine River Allotment. There is about 39,516 acres of mapped overlap with the CHHR for the Vallecito Creek Herd S-28 in the Cave Basin, Flint Creek, Pine River and Rock Creek Allotments. There is about 2,270 acres of mapped overlap with the CHHR for the West Needles Herd S-71 in the Canyon Creek and Tank Creek Allotments.

Beyond CHHR, additional source (suitable) habitat for bighorn sheep extends across other areas of these allotments, suggesting that bighorn sheep could travel or disperse (i.e. foray) into currently unoccupied, but suitable, source habitat creating a potential risk of physical contact between bighorn and domestic sheep. The risk of contact between foraging bighorn sheep and domestic sheep corresponds to the number of bighorn sheep in a herd, proximity of domestic sheep allotments, the distribution of bighorn sheep source habitats (suitable habitat) across the landscape, and the distance and frequency of bighorn sheep forays outside their CHHR. The Biological Evaluation (Schultz 2014b) contains information and details regarding the amount of source habitat within each allotment.

The S-16 Cimarrona Peak and S-28 Vallecito Creek bighorn herds are considered by CPW to represent one large interconnected meta-population, along with S-15 Sheep Mountain herd, to the east and managed by the Pagosa and Divide Ranger Districts. Together, these three herds comprise the Weminuche Population Data Analysis Unit. The current estimate for the Weminuche population is 460 bighorn sheep, which includes 200 sheep in S-15, 135 sheep in S-16, and 90 sheep in S-28 (Weinmeister 2012). Because the three herds are considered to be an interconnected meta-population, it is possible that decisions regarding domestic sheep grazing in the Weminuche Landscape could have indirect effects to the S-15 Sheep Mountain Herd.

The bighorn population of the Weminuche population is one of the largest indigenous populations in the state (Weinmeister 2012). Primary (Tier 1) populations are regarded as those large, native populations comprised of one or more interconnected herds that have received few, if any, supplemental releases of bighorn sheep in the past. These populations likely represent

those indigenous bighorn populations that have maintained the greatest genetic diversity, and their ranges represent habitats where bighorn populations have best been able to persist in sizeable numbers despite various adversities (George 2009). As such, CPW considers the Weminuche population to be among the most important bighorn herds in the state. For this reason, George (2009) recommends considering all opportunities to reduce the potential for contact with domestic sheep and potential for subsequent disease transmission.

There is some recent concern for the population status of S-28, the Vallecito Creek Herd. This concern is due to a recent decline in bighorn observations in some traditional use areas, and fewer lamb observations (Weinmeister pers. comm.). Why recent bighorn observations might be declining in S-28 is unknown. A contributing factor may be the remote nature of this population and the core herd areas within it. Additional monitoring activities and monitoring opportunities in S-28 are being discussed by CPW and the Forest Service in response to this perception of a recent decline in bighorn observations.

The current S-71 West Needles Herd was established with animals translocated from the Georgetown Herd in 2000, and 2002-2003. Bighorn sheep now appear to use the entire Animas River Canyon from Rockwood to Needle Creek, and perhaps somewhat further north. The primary summer range of this herd is the West Needle Mountains, and primary winter and lambing range is the Animas River Canyon from Rockwood to the Cascade Wye (Beecham 2007). The total population size of this herd is estimated at about 60 animals. Recent observations (summer 2012 and 2013) show increased bighorn use along U.S. Highway 550 near Coalbank Pass, west of the West Needle Mountains, indicating the herd may be expanding its range to the west and north. The West Needles Herd is not a Tier 1 or a Tier 2 population, which places this population as a lower priority for inventorying, habitat protection and improvement, and research, as compared to populations that are considered primary core populations or Tier 2 populations.

There are known observations and/or records of bighorn occurring on the Cave Basin, Flint Creek, Pine River, and Rock Creek Allotments since at least the 1940's. There are no confirmed records or observations on any of the other allotments, even though the edges of the Tank and Canyon Creek allotments are part of mapped herd area.

Bighorn sheep are regularly observed in eastern and northern portions of the Cave Basin Allotment during summer, and large portions of the eastern half of the allotment overlap with areas mapped by CPW as bighorn summer concentration area. There was strong circumstantial evidence of physical contact between transplanted bighorns and domestic sheep grazed in the allotment in 1988, and strong evidence that this contact resulted in a presumed complete mortality event of the released bighorns before their first winter. Disease did not appear to have been transmitted from the transplanted bighorns to the native bighorn herd because population size and lamb survival remained stable in the native bighorn herd after the event (Weinmeister 2012). Forest Service travel management seasonal restrictions are in place to protect lambing areas on part of the Cave Basin Allotment.

Bighorn sheep are regularly observed in western, northern and southeastern portions of the Flint Creek Allotment during summer, and large portions of the western half of the allotment overlap with areas mapped by CPW as bighorn summer concentration area. There is consensus that within the past 20 years bighorn use areas have likely expanded slightly in the southeast portion of the allotment.

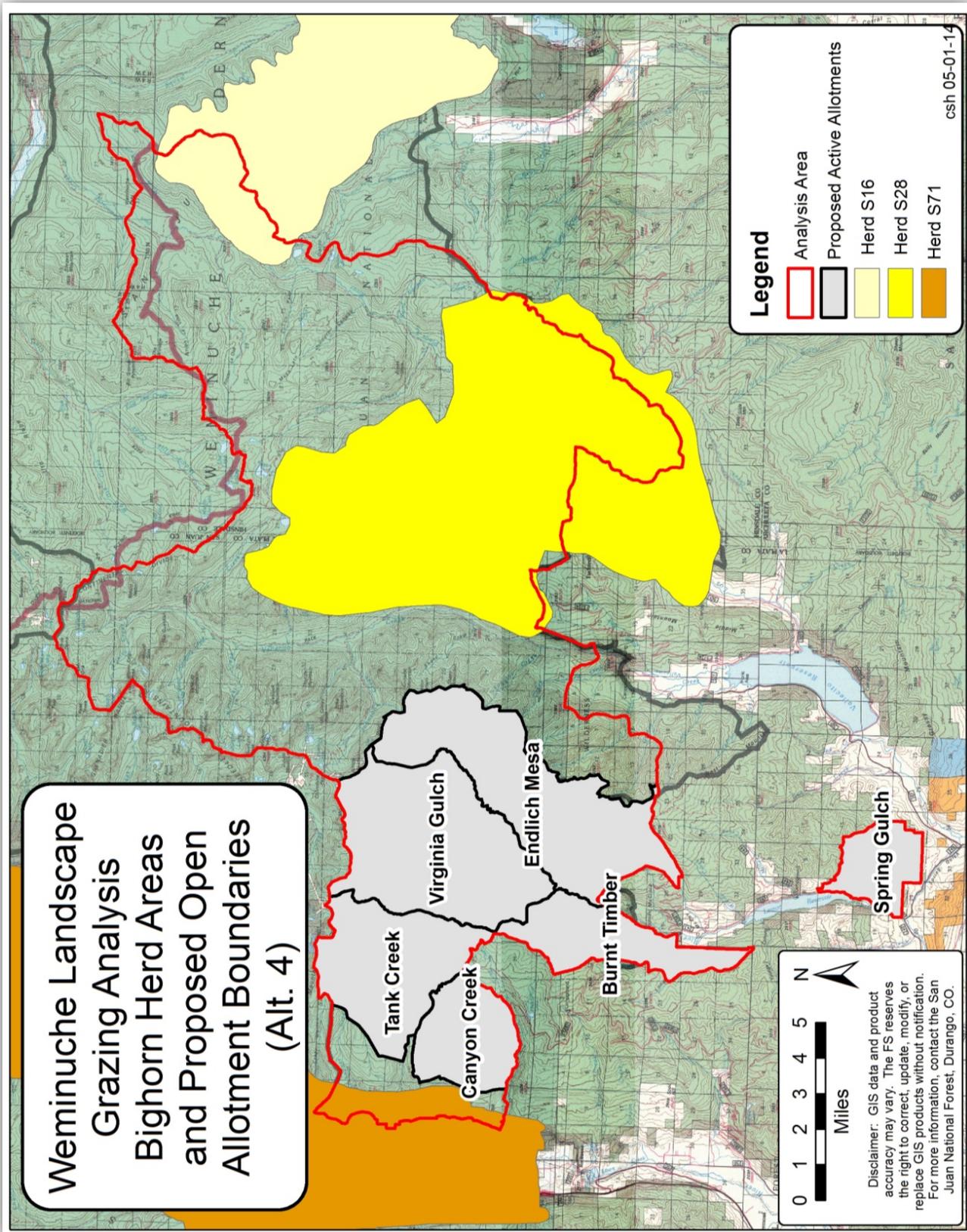
Bighorn sheep are known to use the Pine River Allotment during spring, summer and fall, and for lambing, and continue to be documented in this area every summer. Bighorn sheep are known to use the Rocky Benches and Hunchback portions of the Rock Creek Allotment, and the southern portions that are within the mapped herd area portions during summer.

ENVIRONMENTAL CONSEQUENCES

Overlap of bighorn CHHR with the existing allotment boundaries can be seen in Figure 1-4 on page 14. For comparison, Figure 3-2 (next page) displays CHHR with proposed adjusted allotment boundaries of open allotments (Alternative 4), showing no overlap.

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Figure 3-2. Bighorn Herd Areas and Proposed Open Allotment Boundaries



A summary of the Risk Assessment rankings by allotment and by alternative are shown below in Table 3-4.

Table 3-4. Summary of Risk Assessment Rankings.

Allotment	Risk under Alternative 2	Risk under Alternative 3	Risk under Alternative 4
Burnt Timber	Moderate	Moderate	Moderate
Canyon Creek	High	Low – Closed to sheep	Low – Closed to sheep
Cave Basin	High	Low – Closed	Low - Closed
East Silver Mesa (Endlich Mesa)	High	High	High
Fall Creek	High	Low - Closed	Low - Closed
Flint Creek	High	Low - Closed	Low - Closed
Johnson Creek	High	High – Forage Reserve	Low - Closed
Leviathan	High	High – Forage Reserve	Low - Closed
Pine River	High	Low - Closed	Low - Closed
Rock Creek	High	High – Forage Reserve	Low - Closed
Spring Gulch	Low	Low	Low
Tank Creek	High	High	High
Virginia Gulch	High	High	High

Alternative 1: No Action/No Grazing

Alternative 1, the No Action Alternative, would be wholly beneficial for all designated sensitive species because domestic sheep grazing would not be re-authorized in the Weminuche Landscape. Selecting Alternative 1 would eliminate the potential for physical contact with potential for subsequent disease transmission and bighorn mortality event. There would be no overlap between bighorn CHHR and domestic sheep. There would be no overlap between domestic sheep suitable ranges and bighorn source habitat. There would be no potential for forage competition between bighorn and domestic sheep. There would be no impact on habitats used by sensitive species or impacts to individual animals from selecting Alternative 1. There would be no potential impacts from sheep grazing activities to key habitat components for sensitive species. Selection of Alternative 1 has the potential to provide direct benefits to sensitive species but the degree of benefit for most sensitive species would probably be small in any given year and limited in scale on the landscape. In most areas, benefits to sensitive species from selecting Alternative 1 would probably take a number of years to be detectable, but benefits would probably be long term (> 10 years).

Benefits to designated sensitive species from selecting Alternative 1 would be most pronounced for Rocky Mountain bighorn sheep in the Vallecito Creek Herd S-28, West Needles Herd S-71 and Cimarrona Peak Herd S-16 by removing areas of overlap with domestic sheep grazing allotments, thereby eliminating the possibility of disease transmission between the two species. Selecting Alternative 1 would also benefit bighorn sheep by removing the possibility of forage competition between bighorns and domestic sheep. The benefits of selecting Alternative 1 would be long term (> 10 years) and cover extensive areas of bighorn sheep core herd home ranges (about 46,053 acres). Benefits would also come from gradual, long term improvements in the condition of moist alpine areas adjacent to riparian zones or wet meadows. However, these potential habitat improvements would be limited to those localized areas where current domestic

sheep utilization levels are high and impacts to soil and vegetation are continuing to occur.

Benefits to white-tailed ptarmigan would be primarily in improved condition of summer/fall foraging areas in alpine basins, but these improvements would likely be limited in scope because upland willow stands where browsing impacts were observed were localized and not widespread. In addition, it was difficult to determine with certainty whether the browsing observed on these willows was done by domestic sheep, elk, or a combination of both.

Alternative 2: Current Management

Selecting Alternative 2 would have both positive and negative effects for sensitive species. Selecting Alternative 2 would have beneficial effects for sensitive species because current sheep management practices would maintain current habitat capability for sensitive species across much of the landscape. Alternative 2 would also have negative effects for sensitive species, compared to Alternative 1, because localized areas would continue to be affected by sheep grazing activities, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones and wet meadows, and upland willow stands in alpine basins.

Selection of Alternative 2 is expected to result in continued improvement in habitat conditions for sensitive species, but at a slower rate than would have occurred under Alternative 1. Habitat conditions for bighorn sheep and white-tailed ptarmigan are expected to continue to gradually improve under Alternative 2, assuming that the historic trend of reduced numbers of domestic sheep grazed on the San Juan National Forest over the past 40+ years continues. Numbers of sheep grazed on the San Juan National Forest have dropped about 95% from a high of about 216,600 animals in the 1930's to about 10,800 currently. As numbers of domestic sheep have declined in the Weminuche Landscape and on the entire National Forest, habitat conditions for bighorn sheep have increased and the potential for contact and subsequent disease transmission between bighorns and domestic sheep has declined. Even if numbers of domestic sheep remain relatively stable over the next few (5+) years, a continued gradual improvement in bighorn sheep forage conditions and white-tailed ptarmigan summer/fall habitat areas would be expected under Alternative 2. This is because at current domestic sheep stocking levels, the observed gradual improvement in alpine plant communities is expected to continue.

Though the improvement of resource conditions would be beneficial to bighorn sheep, selecting Alternative 2 would have negative effects for bighorn sheep, compared to Alternative 1, because the allotments where there is currently direct overlap between domestic sheep and bighorn core herd home range would remain open for grazing by domestic sheep, thereby maintaining high potential for direct contact between domestic and bighorn sheep.

Under Alternative 2, there would continue to be about 46,053 acres of direct overlap between bighorn sheep CHHR and domestic sheep allotments in the landscape. Six of the 13 allotments would continue to overlap with mapped bighorn CHHR (Canyon Creek, Cave Basin, Flint Creek, Pine River, Rock Creek and Tank Creek). Of these six allotments, four would remain vacant and because they could be restocked administratively at any time in the future, the potential for contact between domestic sheep and bighorn sheep would remain high. There would continue to be many areas of high potential for contact between bighorn sheep and domestic sheep in the landscape. For this reason, Alternative 2 does not appear to meet the desired condition for bighorn sheep. Under Alternative 2 there would also continue to be potential forage competition between domestic sheep and bighorn sheep in areas of range overlap, maintaining an undesirable existing condition.

Selecting Alternative 2 would be generally beneficial for white-tailed ptarmigan, but much less so than selecting Alternative 1 because improvement in habitat conditions would probably occur over a longer time frame than under Alternative 1. In general, habitat conditions are expected to continue to gradually improve in most areas under Alternative 2 but habitat conditions for ptarmigan would continue to be impacted in those localized areas that are being degraded by sheep grazing activities.

Alternative 3: Adaptive Management w/Forage Reserves

Selecting Alternative 3 would be generally beneficial for sensitive species, although less than under Alternative 1, but more so than selecting Alternative 2. The improvements in habitat conditions for sensitive species expected to occur over time under Alternative 3 are likely to be generally small and limited to localized areas where habitat conditions are being degraded by sheep grazing activities under current management practices.

Similar to Alternative 2, selecting Alternative 3 would have both positive and negative effects for sensitive species. Selecting Alternative 3 would have beneficial effects for sensitive species, compared to Alternative 2, because application of adaptive management strategies and project design criteria is expected to result in more rapid improvements in habitat conditions in those localized areas where sheep grazing impacts are degrading habitat conditions for sensitive species. Also similar to Alternative 2, Alternative 3 would have negative effects for sensitive species, compared to Alternative 1, because those localized areas of sheep grazing impacts would continue to be degraded by sheep grazing activities, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones or wet meadows, and upland willow stands in alpine basins.

Selecting Alternative 3 would be more beneficial for sensitive species than selecting Alternative 2, but would be less beneficial than selecting Alternative 1. This is because improvement in habitat conditions would probably occur over a longer time frame than under Alternative 1, but a shorter time frame than Alternative 2 due to the application of adaptive management strategies and project design criteria. In general, habitat conditions for sensitive species are expected to continue to gradually improve in most areas under Alternative 3, but localized impacts would continue to occur in some areas.

Compared to Alternative 2, the application of adaptive management strategies and project design criteria under Alternative 3 should result in more rapid improvements in habitat conditions in those localized areas where sheep grazing impacts are currently occurring because adaptive management strategies would not be fully applied under Alternative 2. Although more rapid improvement in habitat conditions for bighorn sheep and white-tailed ptarmigan is expected under Alternative 3 than under Alternative 2, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations or the total amount of habitat available for these species in the Weminuche Landscape.

Selecting Alternative 3 would be much more beneficial for bighorn sheep than selecting Alternative 2, although less so than selecting Alternative 1. Alternative 3 would be less beneficial for bighorn sheep than Alternative 1 because three active allotments and three forage reserve allotments in close proximity to bighorn sheep core herd home ranges would remain open to domestic sheep grazing under Alternative 3.

Alternative 3 would be much more beneficial for bighorn sheep than Alternative 2. This is because four vacant sheep allotments available for restocking under Alternative 2 (Cave Basin, Fall Creek, Flint Creek and Pine River) would be permanently closed to sheep grazing under Alternative 3. These four allotments would have High Risk for contact if they were stocked with domestic sheep under Alternative 2, but would have Low Risk for contact if closed under Alternative 3. The potential for physical contact between domestic sheep and bighorn sheep in these four allotments would be reduced from High to Low, and the project's desired condition for bighorn sheep would be met in these four allotments.

Similar to Alternative 2, selection of Alternative 3 would be expected to have some positive effects on forage conditions for bighorn sheep. Selecting Alternative 3 would maintain the continued gradual long term improvement in forage habitat conditions for bighorn sheep that has occurred for the past 40+ years, but probably at a slower rate than would have occurred under Alternative 1. Forage habitat conditions for bighorn sheep would be expected to continue their long term gradual improvement under Alternative 3 because there has been a continued long term decline in the number of domestic sheep grazed on the San Juan National Forest over the past 40+ years. In addition, the amount of bighorn source habitat available for grazing in the Weminuche Landscape under Alternative 3 would be reduced to about 46% of that under Alternative 2. Therefore selecting Alternative 3 would reduce the amount of area where forage overlap between domestic and bighorn sheep could potentially occur, and as the number of domestic sheep on the landscape has declined, so too has the risk for direct physical contact between domestic and bighorn sheep and thus the potential for subsequent disease transmission and potential for bighorn mortality event has also declined.

Even if numbers of domestic sheep remain relatively stable over the next few (5+) years, a continued gradual improvement in bighorn sheep forage conditions and white-tailed ptarmigan summer/fall habitat areas would be expected under Alternative 3. This is because at current domestic sheep stocking levels, the observed gradual improvement in alpine plant communities is expected to continue, and the application of project design criteria and adaptive management practices would further reduce affects from domestic sheep grazing.

Selecting Alternative 3 would be beneficial for white-tailed ptarmigan, although less beneficial than selecting Alternative 1, but more beneficial than selecting Alternative 2. The localized areas currently affected by sheep grazing would continue to be affected, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones and wet meadows, and upland willow stands in alpine basins and on ridgelines. Although more rapid improvement in habitat conditions for ptarmigan is expected under Alternative 3 than under Alternative 2, improvements due to adopting the adaptive management approach are likely to be too small to affect ptarmigan populations or the total amount of habitat available in the Weminuche Landscape.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Selecting Alternative 4 would be mostly beneficial for sensitive species, although less so than under Alternative 1, but more so than selecting Alternative 3 or Alternative 2. The improvements in habitat conditions for sensitive species expected to occur over time under Alternative 4 are likely to be generally small and limited to localized areas where habitat conditions are being degraded by sheep grazing activities under current management practices.

Similar to Alternative 3, selecting Alternative 4 would have both positive and negative effects for sensitive species. Selecting Alternative 4 would have more beneficial effects for sensitive species than Alternative 2 because application of adaptive management strategies and project design criteria is expected to result in more rapid improvements in habitat conditions in those localized areas where sheep grazing impacts are degrading habitat conditions for sensitive species. Also similar to Alternative 3, Alternative 4 would have negative effects for sensitive species, compared to Alternative 1, because those localized areas in active allotments where sheep grazing impacts are occurring would continue to be degraded by sheep grazing activities, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones or wet meadows, and upland willow stands in alpine basins.

Selecting Alternative 4 would be more beneficial for sensitive species than selecting Alternative 3 and much more beneficial than selecting Alternative 2, but would be less beneficial than selecting Alternative 1. This is because improvement in habitat conditions would probably occur over a longer time frame than under Alternative 1, but a shorter time frame than Alternative 3 or Alternative 2 due to the application of adaptive management strategies and project design criteria. In general, habitat conditions for sensitive species are expected to continue to gradually improve in most areas under Alternative 4, but localized impacts would continue to occur in some areas where sheep grazing would continue.

Compared to Alternative 2, the application of adaptive management strategies and project design criteria under Alternative 4 should result in more rapid improvements in habitat conditions in those localized areas where sheep grazing impacts are currently occurring because adaptive management strategies would not be fully applied under Alternative 2. Although more rapid improvement in habitat conditions for bighorn sheep and white-tailed ptarmigan is expected under Alternative 4 than under Alternative 2, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations or the total amount of habitat available for these species in the Weminuche Landscape.

Selecting Alternative 4 would be much more beneficial for bighorn sheep than selecting Alternative 2, more beneficial than Alternative 3, but less than selecting Alternative 1. Alternative 4 would be less beneficial for bighorn sheep than Alternative 1 because three active allotments in close proximity to bighorn sheep core herd home ranges would remain open to domestic sheep grazing under Alternative 4.

Alternative 4 would be more beneficial for bighorn sheep than Alternative 3 because three sheep forage reserve allotments available for grazing up to three years out of every ten under Alternative 3 (Johnson Creek, Leviathan and Rock Creek) would be permanently closed to sheep grazing under Alternative 4. These three allotments would have High Risk for contact if they were stocked with domestic sheep under Alternative 3, but would have Low Risk for contact if closed under Alternative 4. The potential for physical contact between domestic sheep and bighorn sheep in these three allotments would be reduced from High to Low, and the project's desired condition for bighorn sheep would be met in these three allotments.

Selection of Alternative 4 would be expected to have positive effects on forage conditions for bighorn sheep. Selecting Alternative 4 would maintain the continued gradual long term improvement in forage habitat conditions for bighorn sheep that has occurred for the past 40+ years, but probably at a slower rate than would have occurred under Alternative 1. Forage habitat conditions for bighorn sheep would be expected to continue their long term gradual improvement

under Alternative 4 because the amount of bighorn source habitat available for grazing in the Weminuche Landscape under Alternative 4 would be reduced to about 23% of that under Alternative 2 and 23% less than under Alternative 3. Therefore, compared to Alternative 3, selecting Alternative 4 would reduce the amount of area where forage overlap between domestic and bighorn sheep could potentially occur, and as the number of domestic sheep on the landscape has declined, so too has the risk for direct physical contact between domestic and bighorn sheep and thus the potential for subsequent disease transmission and potential for bighorn mortality event has also declined.

Even if numbers of domestic sheep remain relatively stable over the next few (5+) years, a continued gradual improvement in bighorn sheep forage conditions and white-tailed ptarmigan summer/fall habitat areas would be expected under Alternative 4. This is because at current domestic sheep stocking levels, the observed gradual improvement in alpine plant communities is expected to continue, and the application of project design criteria and adaptive management practices would further reduce affects from domestic sheep grazing.

Selecting Alternative 4 would be more beneficial for white-tailed ptarmigan than Alternative 3 and much more than Alternative 2, but less beneficial than selecting Alternative 1. The localized areas affected by sheep grazing in active allotments would continue to be affected, such as near the alpine/spruce-fir interface, moist alpine areas adjacent to riparian zones and wet meadows, and upland willow stands in alpine basins and on ridgelines. Although more rapid improvement in habitat conditions for ptarmigan is expected under Alternative 4 than under Alternative 2, improvements due to adopting the adaptive management approach are likely to be too small to affect ptarmigan populations or the total amount of habitat available in the Weminuche Landscape. Alternative 4 would close the three forage reserve allotments proposed under Alternative 3 and thus the gradual improvement in habitat conditions in the forage reserve allotments would continue. Under Alternative 3, the forage reserve allotments could be restocked for up to three years out of ten, increasing the potential for habitat impacts compared to that under Alternative 4.

Region 2 Terrestrial Sensitive Species Determinations

The effects of the Proposed Action on Forest Service Region 2 Sensitive were determined in the Biological Evaluation (*Schultz 2014b*). A determination that Alternative 2, 3 or 4 “may impact individuals but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide” was made for bighorn sheep and white-tailed ptarmigan. The proposed action was determined to have “No Impact” on all other sensitive terrestrial species. Aquatic impacts determinations are discussed in the Fisheries section of this EA.

CUMULATIVE IMPACTS

Global climate change is a contentious issue with a great deal of uncertainty about what likely outcomes might be. However, there is little doubt that plants and animals found almost exclusively in the alpine zone may be the first to decline or face shrinking habitat areas as a result of changes in global climate. Most predictions about global climate change predict a gradual loss of alpine habitats as treeline moves upward in response to a generally warming climate. For white-tailed ptarmigan, the effect of global warming has the potential to have far greater consequences than the combined effects of grazing, recreation, mining, and other human

impacts. As such, global climate change may be the most serious threat to long-term persistence of ptarmigan populations in the Weminuche landscape.

Perhaps the greatest current and near-future (5- to 10-years) influence on habitat conditions for sensitive species in the Weminuche Landscape is an expanding spruce beetle outbreak within the upper Pine River and upper Vallecito Creek drainages. It is rapidly expanding from northern and eastern portions of the Weminuche Landscape towards southern and western portions of the landscape. The spruce beetle is the most important natural mortality agent of mature spruce trees. Spruce beetle outbreaks can cause extensive tree mortality and modify stand structure by reducing the average tree diameter, height, and stand density. Infected trees often take a couple years to die, so infestations appear to be more widespread in following years. Beetles grow to adulthood inside trees and then take off to infect new trees. However, most of the spruce-fir forests in the Weminuche Landscape are mixed with subalpine fir, which are not affected by spruce beetles. For this reason, stands with higher fir composition are less affected by beetles than stands with higher spruce composition.

Most spruce-fir forests in the landscape are mature closed-canopy stands that are at risk to beetles. Within the past five years, the upper third of the Pine River and Vallecito Creek drainages have had extensive areas of mortality of mature Engelmann spruce trees, in some areas exceeding 80% to 90% of mature overstory trees. Within stands affected by spruce beetles, there is a high probability that most spruce trees over five inches diameter will die. Within the next five years the beetle outbreak is expected to expand down the Pine River and Vallecito Creek drainages, and is expected to increase in the upper Florida River and Missionary Ridge portions of the Weminuche Landscape.

The beetle epidemic has the potential to substantially alter spruce-fir habitat conditions for sensitive species, improving its forage and travel value for species such as bighorn sheep in the most heavily affected areas, and reducing its forage value for species such as American marten in the most heavily affected areas. Forage value for bighorn sheep could be greatly improved by the beetle epidemic because mortality of overstory trees is expected to substantially open the canopy of previously closed-canopy spruce stands, allowing substantial increases in forage production in the understory. Conversely, in northern and eastern portions of the landscape that have many heavily affected forest stands, bighorn mobility across the landscape could be substantially improved thereby increasing the potential for foraging bighorns to contact active allotments and come into physical contact with domestic sheep.

High mortality rates of mature overstory spruce trees would substantially improve the amount and connectivity of habitats for primary cavity excavator species, thereby substantially increasing the number of cavities available for sensitive species that are obligate secondary cavity nesters such as boreal owl and flammulated owl. Because woodpecker populations are expected to increase substantially in response to the ongoing beetle outbreak, similar to post-fire conditions (*Winternitz 1998*), habitat conditions for secondary cavity nesting sensitive species are also expected to substantially improve in the near future.

More localized threats to alpine species, including ptarmigan and bighorn sheep, include mining, water development, and motorized and non-motorized recreation. While alpine ecosystems are hardy and resilient to natural environmental factors, they are particularly vulnerable to human related disturbances and may require decades to recover. Although substantial progress has been

made in developing techniques to restore damaged alpine landscapes, this technology is still not capable of restoring alpine plant communities to their pre-disturbance condition (*Hoffman 2006*).

As the number of off-highway vehicles (OHV's) continues to increase on most roads and OHV trails in and near the Weminuche Landscape, the potential for disturbance to bighorn sheep using areas that are adjacent to popular OHV routes also continues to increase each year. The continual annual increase in OHV use observed over the past 5-10 years is likely to continue for the foreseeable future. Increased motorized disturbance to bighorn sheep in places such as the Tuckerville area may cause animals to move away from preferred foraging areas and into areas with lower quality forage or areas where animals are more vulnerable to predation, leading to increased predation or mortality.

Increased motorized and non-motorized recreation in preferred ptarmigan wintering areas could reduce ptarmigan winter habitat quality through increasing the extent of compacted snow areas and increased disturbance to wintering birds. Ptarmigan populations in some portions of the Weminuche Landscape may be especially vulnerable to loss or degradation of fall and winter habitat given that population densities are likely lower than other parts of the species range and may not be self-sustaining (*Larison 2000*).

Other activities that continue to influence habitat capability for sensitive species in the Weminuche Landscape include development of private lands adjacent to public lands, increasing levels of OHV traffic on most roads in the landscape, and increasing levels of non-motorized recreation on many trails in the landscape. Influences that continue to affect vegetation in the landscape and therefore affect habitat capability for sensitive species include ongoing fire suppression, personal use firewood harvesting of standing dead trees for use as primary home heating purposes, and natural events such as wild fire, forest insect and disease outbreaks, wind throw events, and avalanches. All these activities have contributed to changes in the composition, structure, and function of forested habitats in the landscape, and habitat for sensitive species.

3.7 Wildlife – Management Indicator Species

The 2013 San Juan National Forest Land and Resource Management Plan (Forest Plan) establishes management direction for Management Indicator Species (MIS). Forest Plan direction for MIS addresses maintaining healthy populations of wildlife and fish species. Due to the large number of species that occupy National Forest System lands, a subset of species is identified for analysis purposes that are intended to represent the full range of species. This subset is collectively referred to as MIS. Most MIS have habitat that is well distributed, and are not species at risk nor are they species that are trending towards protected status, and are well distributed across the SJNF.

The Forest Plan establishes goals, objectives, standards, guidelines, and monitoring requirements that are specific to MIS. Each action proposed by the agency is analyzed in a manner that discloses its effects to MIS and evaluates its consistency with the management direction contained in the Forest Plan. The analysis then determines what effect project-level impacts might have on Forest-level population and habitat trends for each MIS. The MIS analysis is based on the best available science such as the most recent Forest-wide habitat and individual MIS assessments, expert professional opinions, and site-specific field review of the analysis area, and can be found in the project record (*Schultz 2014c*).

AFFECTED ENVIRONMENT

There are four terrestrial species identified as MIS in the Forest Plan (SJNF 2013). Some species may not be present in the landscape due to the absence of suitable habitat, or, suitable habitat is present in the analysis area but the proposed action (grazing) would not affect the species or its key habitat components. Only one terrestrial MIS, elk, has habitat present in the Weminuche Landscape and may be affected by grazing. Table 3-5 summarizes the habitat type used by each MIS species, and whether each species was brought forward for detailed analysis regarding this project. The MIS Wildlife Review gives further details and rationale (Schultz 2014c). Affects to MIS that are also designated as Forest Service Sensitive Species were also discussed in the project's Biological Evaluation (Schultz 2014b).

Table 3-5. Terrestrial MIS identified in the Forest Plan.

MIS Species	Preferred Habitat	Brought Forward for Detailed Analysis?
Birds (1)		
Hairy woodpecker (<i>Picoides villosus</i>)	All forested habitats, associated with snags for foraging and nesting. Year-round resident.	No, woodpecker habitat is present in the landscape but nesting and foraging habitat would not be affected by sheep grazing. No further analysis is necessary. Hairy woodpecker was not analyzed further as SJNF MIS.
Mammals (3)		
Abert's squirrel (<i>Sciurus aberti</i>)	Ponderosa pine. Year-round resident.	No, squirrel habitat is present in the landscape but would not be affected by sheep grazing. No further analysis is necessary. Abert's squirrel was not analyzed further as SJNF MIS.
American marten (<i>Martes americana</i>)	Spruce-fir and cool-moist mixed conifer. Year-round resident.	No, marten habitat is present in the landscape but would not be affected by sheep grazing. No further analysis is necessary. American marten was not analyzed further as SJNF MIS.
Elk (<i>Cervus elaphus</i>)	All terrestrial habitats; pine, pinyon-juniper and mountain shrublands in winter. Resident.	Yes , elk habitat is present in the landscape and food sources are potentially affected by sheep grazing.

Existing habitat for each MIS on NFS lands was determined by the use of Geographical Information System (GIS) modeling using vegetative information described in Forest-wide MIS Assessments. Habitat modeling was conducted using habitat structural stage matrices described by Towry (1984). In addition, species information on distribution across the Forest, professional judgment of Forest Service wildlife biologists, coordination with CPW biologists, coordination with the USFWS, and field reconnaissance of the Weminuche Landscape was also used.

The landscape provides optimal hiding cover for elk in mature spruce-fir forests. Foraging habitat for elk is abundant in summer in some alpine and krummholz areas. Elk generally arrive in the landscape during late spring for calving after snow melt, and are present in most habitat types during summer and early fall. Elk generally leave the landscape when snow depth increases in late fall, but a few bull elk remain in the landscape all winter on windswept ridges above timberline.

ENVIRONMENTAL CONSEQUENCES

Table 3-6 summarizes the impacts to Forest-wide habitat and population trends for elk that would result from each of the action alternatives. Details of the analysis leading to the summary can be found in the project record (Schultz 2013c).

Table 3-6. Forest-wide habitat and population trends for MIS.

MIS	Forest-wide Habitat Trend	Forest-wide Population Trend	Forest-wide Habitat	Acres Suitable for Grazing (Alternative 2)	Acres Suitable for Grazing (Alternative 3)	Acres Suitable for Grazing (Alternative 4)
Elk	Stable to downward	Stable	Forage – 568,898	Forage – 17,244 (3.0%)	Forage – 13,018 (2.3%)	Forage – 13,018 (2.3%)
			Cover – 1,002,716	Cover – 26,499 (2.6%)	Cover – 13,850 (1.4%)	Cover – 13,850 (1.4%)
			Winter – 471,234	Winter – 4,611 (<1%)	Winter – 4,611 (<1%)	Winter - 4,611 (<1%)

Table 3-7 shows the amount of terrestrial MIS habitat affected by domestic sheep grazing under Alternatives 2, 3 and 4. In order to determine the amount of affected habitat, we determined what areas were suitable and unsuitable for grazing. Suitable range areas are directly affected or have potential to be affected by sheep grazing. Unsuitable areas are most likely unaffected by grazing. Suitable range areas are tundra, grasslands, open meadows, or open forested areas where sheep spend a majority of their time. Unsuitable areas include 1) lakes, reservoirs, ponds, and major rivers, 2) bare road beds, 3) perennial streams, 4) slopes greater than 40%, and 5) rock outcrop, rubble land, granitic, highly erosive, or areas with very wet soils. Although grazing does not occur in areas such as major rivers and perennial streams, livestock could affect riparian habitat adjacent to these areas. The estimates in Table 3-7 have accounted for grazing occurring adjacent to permanent water sources and their riparian areas.

Table 3-7. Acres of habitat affected by domestic sheep grazing for MIS

MIS	Acres of Habitat Affected by Grazing (Alternative 2)		Acres of Habitat Affected by Grazing (Alternative 3)		Acres of Habitat Affected by Grazing (Alternative 4)	
	Total Acres	Suitable Acres	Total Acres	Suitable Acres	Total Acres	Suitable Acres
Elk Forage	38,820 (100%)	17,244 (44%)	39,131 (100%)	13,018 (33%)	39,140 (100)	11,350 (29%)
Elk Cover	72,956 (100%)	26,499 (36%)	73,125 (100%)	13,850 (19%)	73,124 (100%)	10,129 (14%)
Elk Winter Range	5,053 (100%)	4,611 (91%)	5,053 (100%)	4,611 (91%)	5,053 (100%)	4,611 (91%)
Elk Winter Concentration	2,080 (100%)	1,992 (96%)	2,080 (100%)	1,979 (95%)	2,080 (100%)	1,979 (95%)
Elk Severe Winter Range	49 (100%)	49 (100%)	49 (100%)	49 (100%)	49 (100%)	49 (100%)

Alternative 1: No Action/No Grazing

Alternative 1, the No Action Alternative, would be wholly beneficial for all MIS because domestic sheep and cattle grazing would not be re-authorized on National Forest System Lands in the Weminuche Landscape. There would be no impact on Forest-wide habitat trends or population trends from selecting Alternative 1. There would be no potential impacts from sheep or cattle grazing activities to key habitat components for MIS. Selection of Alternative 1 has the potential to provide direct benefits to MIS, but the degree of benefit would probably be small in any given year and limited in scale on the landscape to those small areas affected by domestic sheep grazing and not meeting desired conditions under current management. Benefits to MIS from selecting Alternative 1 would probably be long term (> 10 years).

Benefits to MIS from selecting Alternative 1 would probably be most pronounced for elk in alpine basins. Benefits to elk foraging areas would come from gradual, long term improvements in the condition of moist alpine areas adjacent to riparian zones or wet meadows. These potential improvements however would be limited to a few localized areas where current utilization levels are high and impacts to soil and vegetation have historically occurred or are continuing to occur.

Alternative 2: Current Management

Selection of Alternative 2 is expected to result in continued improvement in habitat conditions for MIS, but at a much slower rate than would have occurred under Alternative 1. Habitat conditions for MIS are expected to improve under Alternative 2 because there has been a substantial decline in the number of domestic sheep grazed in the Weminuche Landscape from historical numbers, but the number of sheep grazed in the landscape has been quite stable for the past 30 to 45 years. Permitted numbers of domestic sheep grazing in the Weminuche Landscape have dropped about 65% from a high of about 8,200 animals in the late 1960's to about 2,850 animals currently. In addition, numbers of sheep grazing on the San Juan National Forest have dropped about 95% from a high of about 216,600 animals in the 1930's to about 10,800 currently. As numbers of sheep have declined in the landscape, habitat conditions for MIS, especially those MIS that forage in alpine areas in mid to late summer, have had a long term and gradual improvement in foraging habitat conditions. Gradual improvements in habitat conditions for MIS are expected to continue for some time in the future even if numbers of sheep remain relatively stable over the next few (5+) years because alpine plants have a relatively short growing season and recovery processes are slower than in other lower elevation habitat types.

Selecting Alternative 2 would have both positive and negative effects for MIS. Selecting Alternative 2 would have gradual beneficial effects for MIS because gradually improving habitat conditions for MIS would continue and current habitat capability for MIS would be maintained. Alternative 2 would also have gradual negative effects for MIS, compared to Alternative 1, because a few localized areas would continue to be affected by sheep grazing activities, such as near the alpine/spruce-fir interface. Selecting Alternative 2 would be generally beneficial for MIS because of continued gradual improvement in habitat conditions, but much less so than selecting Alternative 1, because improvement in habitat conditions would probably occur over a longer time frame and be of a lower magnitude than under Alternative 1. In general, habitat conditions are expected to continue to gradually improve in most areas under Alternative 2, but habitat conditions for MIS would continue to be impacted in a few localized areas.

Under current management, an average of about 34% of the habitat in the landscape for the four MIS is considered suitable for sheep grazing. Displayed another way, on average about 66% of the habitat for these four species in the Weminuche Landscape is considered unsuitable for sheep grazing under current management. For the one MIS whose habitat could be affected by the project (elk), the amount of habitat suitable for sheep grazing under Alternative 2 represents from 1% to 3% of its habitat Forest-wide. For this reason, selection of Alternative 2 is unlikely to cause measurable changes to Forest-wide habitat trends or population trends for this species.

Population trends for elk are controlled by annual hunter harvest and do not appear to be correlated with the amount of available habitat on the Forest. Therefore, selection of Alternative 2 is unlikely to affect elk population trends forest-wide. The slight habitat improvements resulting from changes in sheep or cattle grazing practices in the Weminuche Landscape are unlikely to cause measurable changes in the amount of elk habitat or populations at the scale of

the entire San Juan National Forest. Changes in habitat capability for elk are likely to be very small in comparison to the relatively large amounts of habitat available at the Forest-wide scale. The changes to elk habitat expected from the rapidly expanding beetle outbreak are expected to far exceed those expected from any management changes that might result from selecting one alternative versus another. Elk are widespread across the Forest and population trends and habitat trends are stable to slightly downward, respectively. In addition, the impacts of sheep and cattle grazing to elk habitats is generally limited to a few localized areas and thus is unlikely to affect more than a few individuals and would not have a measurable impact on habitat or populations trends at the Forest-wide scale.

Alternative 3: Adaptive Management w/Forage Reserves

For MIS, Alternative 3 is expected to be more beneficial than Alternative 2 due to specific project design criteria and adaptive management actions designed to meet or move ecological conditions towards the project's desired conditions, and due to the closing of vacant allotments that could be restocked at any time under Alternative 2. Alternative 2 would generally maintain current rangeland conditions, thereby providing fewer benefits to wildlife and habitats or resulting in slower development of desired conditions than under Alternative 3. Both Alternatives 2 and 3 may affect individuals but are unlikely to affect local populations, and have the potential to cause minor changes in species abundance. Neither of these alternatives is expected to result in negative consequences to MIS populations from the standpoint of affecting viability at the Forest-wide scale.

Selecting Alternative 3 would be generally beneficial for MIS, although less so than under Alternative 1, but more so than selecting Alternative 2. The improvements in habitat conditions for MIS expected to occur under Alternative 3, compared to Alternative 2, are likely to be generally small and limited to a few localized areas where habitat conditions are being affected by sheep grazing activities under current management practices. For example, under Alternative 3 there would be a 51% reduction in the acres of alpine and spruce-fir habitats suitable for domestic sheep grazing (about 20,725 acres), compared to Alternative 2 (about 42,456 acres). Under Alternative 3 only 24% of the elk habitat in the Weminuche Landscape would occur in areas suitable for livestock grazing, compared to 39% of elk habitat under Alternative 2.

Similar to Alternative 2, selecting Alternative 3 would have both positive and negative effects for MIS. Selecting Alternative 3 would have beneficial effects for MIS, compared to Alternative 2, because application of adaptive management strategies and project design criteria should result in more rapid improvements in habitat conditions in some localized areas where sheep grazing impacts are currently occurring. Also similar to Alternative 2, Alternative 3 would have negative effects for MIS, compared to Alternative 1, because a few localized areas would continue to be affected by sheep grazing activities, such as near the alpine/spruce-fir interface. Selecting Alternative 3 would be generally beneficial for MIS, more so than selecting Alternative 2, but less than selecting Alternative 1, because improvement in habitat conditions would probably occur in a shorter time frame than under Alternative 2, but over a longer time frame than under Alternative 1. In general, habitat conditions are expected to continue to improve in most areas under Alternative 3, probably at a faster rate and to a greater degree than under Alternative 2, but habitat conditions for MIS would continue to be impacted in a few localized areas.

Compared to Alternative 2, the application of adaptive management strategies and project design

criteria under Alternative 3 should result in more rapid improvements in habitat conditions in some localized areas where sheep grazing impacts are currently occurring. This is because adaptive management strategies would not be applied under Alternative 2. Although more rapid improvement in habitat conditions for MIS is expected under Alternative 3 than under Alternative 2, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations of MIS or the total amount of habitat available in the Weminuche Landscape.

Under Alternative 3, an average of about 22% of the habitat in the landscape for the four MIS is considered suitable for sheep grazing, compared to about 34% under Alternative 2. Displayed another way, on average about 78% of the habitat for these four species in the Weminuche Landscape is considered unsuitable for sheep grazing under Alternative 3, compared to 66% under Alternative 2. Therefore selection of Alternative 3 would provide a 12% reduction in the amount of habitat affected by grazing in the landscape, compared to Alternative 2. For the one MIS whose habitat could be affected by the project (elk), the amount of habitat suitable for sheep grazing under Alternative 3 represents from 1% to 2% of its habitat Forest-wide. For this reason, selection of Alternative 3 is unlikely to cause measurable changes to Forest-wide habitat trends or population trends for this species.

Because population trends for elk are controlled by annual hunter harvest, they do not appear to be correlated with the amount of available habitat on the Forest. Therefore, selection of Alternative 3 is unlikely to affect elk population trends forest-wide. The slight habitat improvements resulting from changes in sheep or cattle grazing practices in the Weminuche Landscape are unlikely to cause measurable changes in the amount of elk habitat or population trends at the scale of the entire San Juan National Forest. Changes in habitat capability for elk due to selecting Alternative 3 are likely to be very small in comparison to the relatively large amounts of habitat available at the Forest-wide scale. As with Alternative 2, the changes to elk habitat expected from the rapidly expanding beetle outbreak are likely to far exceed those expected from any management changes that might result from selecting one alternative versus another. Elk are widespread across the Forest and population trends and habitat trends are stable to slightly downward, respectively. In addition, the impacts of sheep and cattle grazing to elk habitats is generally limited to a few localized areas and thus is unlikely to affect more than a few individuals and would not have a measurable impact on habitat or populations trends at the Forest-wide scale.

Alternative 4: Adaptive Management / Closing Vacant Allotments

For MIS, Alternative 4 is expected to be more beneficial than Alternative 3 and Alternative 2 due to specific project design criteria and adaptive management actions designed to meet or move ecological conditions towards the project's desired conditions, and due to the closing of forage reserve allotments authorized under Alternative 3. Alternative 2 would generally maintain current rangeland conditions, thereby providing fewer benefits to wildlife and habitats or resulting in slower development of desired conditions than under Alternative 3 or 4. Alternatives 2, 3 and 4 may affect individuals but are unlikely to affect local populations, or cause more than minor changes in species abundance at a relatively small scale. None of the three action alternatives are expected to result in negative consequences to MIS populations from the standpoint of affecting viability at the Forest-wide scale.

Selecting Alternative 4 would be generally beneficial for MIS, although less so than under

Alternative 1, but more so than selecting Alternative 2 or Alternative 3. The improvements in habitat conditions for MIS expected to occur under Alternative 4, compared to Alternatives 2 and 3, are likely to be generally small and limited to a few localized areas where habitat conditions are being affected by sheep grazing activities under current management practices. For example, under Alternative 4 there would be a 55% reduction in the acres of alpine and spruce-fir habitats suitable for domestic sheep grazing (about 19,295 acres), compared to Alternative 2 (about 42,456 acres), and a 4% reduction compared to Alternative 3. Under Alternative 4 only 19% of elk habitat in the Weminuche Landscape would occur in areas suitable for livestock grazing, compared to 39% of elk habitat under Alternative 2, and 24% under Alternative 3.

Similar to Alternative 3, selecting Alternative 4 would have both positive and negative effects for MIS. Selecting Alternative 4 would have beneficial effects for MIS, compared to Alternative 3. Although the same adaptive management strategies and project design criteria applied under Alternative 3 would also be applied under Alternative 4, the three forage reserve allotments authorized under Alternative 3 would not be authorized under Alternative 4. Therefore Alternative 4 is expected to result in improvements in habitat conditions in some localized areas where sheep grazing impacts are currently occurring, similar to Alternative 3, but there would be a portion of the landscape without grazing under Alternative 4 compared to Alternative 3. Also similar to Alternative 3, Alternative 4 would have negative effects for MIS, compared to Alternative 1, because a few localized areas would continue to be affected by sheep grazing activities within the remaining active allotments, such as near the alpine/spruce-fir interface. Selecting Alternative 4 would be generally beneficial for MIS, more so than selecting Alternative 3 and much more so than selecting Alternative 2, but less than selecting Alternative 1, because improvement in habitat conditions would probably occur in a shorter time frame than under Alternative 3, but over a longer time frame than under Alternative 1. In general, habitat conditions are expected to continue to improve in most areas under Alternative 4, but across a larger portion of the landscape than under Alternative 3 or Alternative 2, but habitat conditions for MIS would continue to be impacted in a few localized areas.

Compared to Alternative 2, the application of adaptive management strategies and project design criteria under Alternative 4 should result in more rapid improvements in habitat conditions in some localized areas where sheep grazing impacts are currently occurring. This is because adaptive management strategies would not be applied under Alternative 2. Although more rapid improvement in habitat conditions for MIS is expected under Alternative 4 than under Alternative 2, improvements in habitat conditions as a result of the adaptive management approach are likely to be too small to affect populations of MIS or the total amount of habitat available in the Weminuche Landscape.

Under Alternative 4, an average of about 18% of the habitat in the landscape for the four MIS is considered suitable for sheep grazing, compared to about 34% under Alternative 2 and 22% under Alternative 3. Displayed another way, on average about 82% of the habitat for these four species in the Weminuche Landscape is considered unsuitable for sheep grazing under Alternative 3, compared to 66% under Alternative 2 and 78% under Alternative 3. Therefore selection of Alternative 4 would provide a 16% reduction in the amount of habitat affected by grazing in the landscape, compared to Alternative 2, and a 4% reduction compared to Alternative 3. For the one MIS whose habitat could be affected by the project (elk), the amount of habitat suitable for sheep grazing under Alternatives 3 and 4 represents from 1% to 2% of its habitat Forest-wide. For this reason, selection of Alternative 4 is unlikely to cause measurable changes

to Forest-wide habitat trends or population trends for this species.

Because population trends for elk are controlled by annual hunter harvest, they do not appear to be correlated with the amount of available habitat on the Forest. Therefore, selection of Alternative 4 is unlikely to affect elk population trends forest-wide. The slight habitat improvements resulting from changes in sheep or cattle grazing practices in the Weminuche Landscape are unlikely to cause measurable changes in the amount of elk habitat or population trends at the scale of the entire San Juan National Forest. Changes in habitat capability for elk due to selecting Alternative 4 are likely to be very small in comparison to the relatively large amounts of habitat available at the Forest-wide scale. As with Alternatives 2 and 3, the changes to elk habitat expected from the rapidly expanding beetle outbreak are likely to far exceed those expected from any management changes that might result from selecting one alternative versus another. Elk are widespread across the Forest and population trends and habitat trends are stable to slightly downward, respectively. In addition, the impacts of sheep and cattle grazing to elk habitats is generally limited to a few localized areas and thus is unlikely to affect more than a few individuals and would not have a measurable impact on habitat or populations trends at the Forest-wide scale.

CUMULATIVE IMPACTS

Other activities that continue to influence habitat capability for MIS in the Weminuche Landscape include development of private lands adjacent to public lands, increasing levels of jeep and OHV traffic on most roads in the landscape, and substantial and increasing amounts of recreational use on many trails in the landscape. Influences that continue to affect vegetation in the landscape and therefore affect habitat capability for MIS, include ongoing fire suppression, personal use firewood harvesting of standing dead trees for use as primary home heating purposes, and natural events such as wild fire, insect and disease outbreaks, wind throw events, and avalanches. All these activities have contributed to changes in the composition, structure, and function of habitat for MIS in the landscape.

Perhaps the greatest current and near-future (5- to 10-years) influence on habitat conditions for elk in the Weminuche Landscape is an expanding spruce beetle (*Dendroctonus rufipennis*) outbreak within the upper Pine River and upper Vallecito Creek drainages. It is rapidly expanding from northern and eastern portions of the Weminuche Landscape towards southern and western portions of the landscape. The spruce beetle is the most important natural mortality agent of mature spruce trees. Spruce beetle outbreaks can cause extensive tree mortality and modify stand structure by reducing the average tree diameter, height, and stand density. However, most of the spruce-fir forests in the Weminuche Landscape are mixed with subalpine fir, which are not affected by spruce beetles. For this reason, stands with higher fir composition are less affected by beetles than stands with higher spruce composition.

Most spruce-fir forests in the landscape are mature closed-canopy stands that are at risk to beetles. Within the past five years, the upper third of the Pine River and Vallecito Creek drainages have had extensive areas of mortality of mature Engelmann spruce trees, in some areas exceeding 80% to 90% of mature overstory trees. Within stands affected by spruce beetles, there is a high probability that most spruce trees over five inches diameter will die. Within the next five years the beetle outbreak is expected to expand down the Pine River and Vallecito Creek drainages, and is expected to increase in the upper Florida River and Missionary Ridge portions of the Weminuche Landscape.

Summer foraging habitat for elk could be greatly improved by the beetle epidemic because mortality of overstory trees is expected to substantially open the canopy of previously closed-canopy spruce stands, allowing substantial increases in forage production in the understory.

Spruce-fir forests make up about 43% of the Weminuche Landscape and 37% of the area currently suitable for sheep grazing in the landscape. Spruce-fir forests are also in close proximity to some preferred sheep grazing areas and therefore some small and localized areas of grazing impacts were observed. Undoubtedly, the small scale and generally low intensity of potential negative effects to elk habitats associated with domestic sheep and cattle grazing activities in spruce-fir forests in the Weminuche Landscape is very low in comparison to the expectation of near-future widespread, potentially substantial, and expected long-term impacts from the ongoing spruce beetle outbreak that is rapidly expanding within the Weminuche Landscape.

3.8 Fisheries

Threatened and Endangered Species

AFFECTED ENVIRONMENT

A Biological Assessment (BA) was conducted to evaluate the potential effects from domestic livestock grazing in the Weminuche Landscape to federally listed threatened or endangered fish species, species proposed for federal listing, and critical habitat as designated by the U.S. Fish and Wildlife Service (USFWS). The BA addresses those listed species and/or their critical habitats that are known to occur or have the potential to be affected by actions occurring on the San Juan National Forest, such as water depletions that might affect downstream critical habitats and has been placed in the administrative record for this project (*Schultz 2014a*).

Analyzing and disclosing the effects of this grazing analysis project to federally listed species is needed to comply with the Endangered Species Act (*P.L. 93-205*), as amended; the National Forest Management Act (*P.L. 94-579, FSM 2670*); and the National Environmental Policy Act (*P.L. 91-190*), as amended.

There is no designated critical habitat for any listed species in the Weminuche Landscape. There are five listed aquatic species that occur on the SJNF (*USDI 2013a*): bonytail, Colorado pikeminnow, humpback chub, and the greenback cutthroat trout. Of these, the Colorado pikeminnow and the razorback sucker could be impacted by water depletions as part of the proposed action and are discussed below. The remaining three are not located in, or downstream from, the analysis area and are determined to have “**no effect**” from the proposed action; they are not discussed further in this document.

ENVIRONMENTAL CONSEQUENCES

Alternatives 1 and 2

Under these alternatives there would be no new water depletions (stock ponds or spring developments) authorized from the San Juan River Basin therefore there would be “**no effect**” to downstream listed fish species in the San Juan River Basin.

Alternatives 3 and 4

Alternatives 3 and 4 include the development and/or maintenance of five water sources for livestock use in the Spring Gulch Allotment and nine water sources for livestock use in the Canyon Creek Allotment. The water improvements would result in a net water depletion of approximately 1.6 acre-feet per year from the San Juan River Basin.

Under these alternatives the water depleting activities described above would be authorized in the San Juan River Basin. In August of 2013, the Fish and Wildlife Service provided the San Juan National Forest with a Biological Opinion (BO) for the Final San Juan National Forest Land and Resource Management Plan, which established thresholds for water depletions that would require further consultation with USFWS. The water depletions associated with the BA for Weminuche Landscape Grazing Analysis do not exceed the 2.5 acre-foot threshold and therefore are covered under the aforementioned Section 7 consultation, which resulted in a “**may effect, likely to adversely affect**” cumulative finding for the Forest Plan. No additional consultation will be conducted for downstream listed fish including Colorado pikeminnow and razorback sucker. This BO is on file at the Columbine Ranger District (*USDI 2013b*).

Sensitive Species

AFFECTED ENVIRONMENT

U.S. Forest Service (USFS) Region 2 sensitive species are designated by the Regional Forester of the Rocky Mountain Region. For the SJNF, four fish species are designated as sensitive: Colorado River cutthroat trout (CRCT), flannelmouth sucker, bluehead sucker, and roundtail chub. Of these four species, only CRCT is known to occur within the project area and has the potential to be impacted by this project. The bluehead sucker, flannelmouth sucker, and roundtail chub are not located in the project area and will not be affected by the proposed action and they are not included in any further analysis. A Biological Evaluation (BE) addressing Forest Sensitive Species has been prepared and placed in the administrative record for this project (*Kampf 2014*).

Genetically pure CRCT are known to occupy 14 streams on the SJNF. Core Conservation populations of CRCT are located in two stream reaches in the analysis area, Grasshopper Creek located in the Tank Creek Allotment and West Virginia Gulch located in the Virginia Allotment. These populations are known to be Colorado River lineage CRCT and are not designated as threatened under the Endangered Species Act. A core conservation population is a conservation population that is greater than 99% genetically pure, phenotypically true, and representative of the historic genome of the native Cutthroat Trout (*Hirsch 2013*).

ENVIRONMENTAL CONSEQUENCES

Improper sheep grazing management can potentially degrade riparian and aquatic habitats in a variety of direct and indirect manners (*Platts 1981, 1991*). Direct effects from permitted livestock grazing to fish include directly stepping on individual fish and trampling redds. Indirect effects may include a change in riparian canopy (through livestock grazing and trampling) that could reduce shade and escape cover, reduced terrestrial invertebrate food sources, stream bank degradation, and increased sedimentation or stream widening. Additionally, livestock grazing may affect a number of other water quality parameters (See *Section 3.2 Watershed*).

Alternative 1: No Action/No Grazing

Alternative 1 would not reauthorize sheep grazing in these allotments. This alternative would prevent direct effects associated with livestock trampling of CRCT individuals or their redds, as well as indirect effects associated with livestock grazing.

Alternative 1 will have “**No Impact**” to CRCT core conservation populations.

Alternatives 2, 3 and 4

Alternatives 2, 3, and 4 include authorization of sheep grazing in both the Tank Creek and Virginia allotments. Alternative 2 maintains current management and stock numbers in both allotments while Alternatives 3 and 4 include adaptive management design criteria to reduce impacts to stream banks and water quality. Under current management, Alternative 2, the stream and riparian areas within the project area are generally in good to excellent condition and any aquatic habitat problems within the analysis area tend to be site-specific. Water quality has not been noted as a problem in any of the watersheds within the analysis area (See *Section 3.2 Watershed*). Impacts to stream systems that represent the primary concern to CRCT core conservation populations in the Tank Creek and Virginia Allotments are associated with trailing locations that cross stream courses and livestock use in and near the stream. These impacts appear to be minimal in the analysis area under current management and would be expected to be lessened with the implementation of adaptive management under Alternatives 3 and 4.

Under Alternatives 2, 3, and 4, sheep trailing across streams and livestock watering would continue to occur, therefore the potential for livestock to trample individual CRCT or their redds would remain a concern. It is expected that the overall influence to CRCT populations would be minimal due to the large number of redds during spawning season and sufficient numbers of individuals in the populations to ensure the persistence of both of the core conservation populations under Alternatives 2, 3 and 4. Adaptive management strategies and design criteria that require herding sheep away from watercourses along with varying livestock numbers based on resource conditions would likely reduce but not eliminate the potential direct and indirect effects to CRCT under Alternatives 3 and 4.

Implementation of Forest Plan Standards and Guidelines, adaptive management techniques as described in the EA and project specific design criteria should effectively minimize impacts to watershed resources (See *Section 3.2 Watershed*) and as a result should alleviate both direct and indirect effects to CRCT populations within the analysis area.

Alternatives 2, 3, and 4 “**May Impact Individuals, but is not likely to cause a trend towards Federal listing or result in loss of viability in the planning area**” to CRCT core conservation populations.

MIS Species

The Forest Plan (*SJNF 2013*) for the SJNF identifies species that are to be used to assess long-term population trends and evaluate continued population viability. These species are designated as Management Indicator Species (MIS). The aquatic MIS known to occur within the project area are the brook trout, brown trout, rainbow trout, and cutthroat trout. A detailed analysis of project effects to MIS fish species is included in the BE addressing Forest Sensitive Species and has been placed in the administrative record for this project (*Kampf 2014*).

AFFECTED ENVIRONMENT

Known MIS fish populations located within the analysis area are displayed in the MIS report located in the BE, however there is the potential that some MIS fish are also located in tributary streams or other streams and lakes within the analysis area. It is assumed that MIS fish species inhabit the entire length of perennial streams in which fish occur for the purposes of this analysis. Comprehensive fish population records within the analysis area are not maintained by the SJNF.

ENVIRONMENTAL CONSEQUENCES

Improper grazing management can potentially degrade riparian and aquatic habitats in a variety of direct and indirect manners (Platts 1981,1991). Direct effects from permitted livestock grazing to fish include directly stepping on individual fish and trampling trout redds. Indirect effects include changes in riparian canopy (through livestock grazing and trampling) that could reduce shade and escape cover or reduce terrestrial invertebrate food sources, stream bank degradation resulting in loss of spawning or pool habitat due to increased sedimentation or stream widening. Additionally, livestock grazing may affect a number of other water quality parameters (See Section 3.2 Watershed).

Implementation of Forest Plan Standards and Guidelines, adaptive management techniques as described in the EA, and project specific design criteria should effectively minimize impacts to watershed resources and as a result should alleviate impacts to MIS populations within the analysis area and those encountered on trailing routes to the allotments. Therefore, none of the alternatives would alter current population trends or habitat trends for MIS fish species on a Forest-wide scale.

Alternative 1: No Action/No Grazing

Under this alternative, all of the allotments and associated trailing routes would be closed to livestock grazing and the trailing routes would not be used. All of the direct and indirect effects to fish associated with livestock grazing would be eliminated.

Alternative 2: Current Management

Under this alternative, current livestock stocking rates, season dates, and pasture rotation would continue in all allotments and trailing routes would continue to be used as in the past. None of the allotments within the analysis area would be closed and could be available for livestock grazing in the future. Adaptive management techniques would not be used, resulting in direct and indirect effects to continue as they have in recent years. Site-specific environmental effects would likely not improve over time. Although this alternative would likely not lead to population declines for MIS species, there may be more impacts to individual fish within the analysis area when compared to the other alternatives.

Alternative 3: Adaptive Management w/Forage Reserves

Under this alternative, adaptive management strategies would be used to maintain and/or move towards desired resource conditions within the analysis area. Grazing permits would be re-issued on the six currently active allotments and the remaining allotments would be used as forage reserves, or closed entirely. Portions of some of the forage reserve allotments would also be closed. The forage reserve allotments would minimize direct and indirect effects of livestock grazing by only allowing grazing up to three out of ten years when compared to permitting these

allotments by using historical stocking rates. Direct and indirect effects would be eliminated in the closed allotments and in the portions of the forage reserve allotments that will be closed. Boundary adjustments to the Tank Creek Allotment and the Canyon Creek Allotment, as described in the EA, would alleviate some of the direct and indirect effects associated with livestock grazing by reducing the available acreage of these allotments; however the effects would be minimal. Cattle grazing in the Canyon Creek Allotment may increase stress on the riparian areas when compared to sheep grazing (See *Section 3.2 Watershed*). The change to cattle grazing should not alter current population trends or habitat trends for MIS species on a Forest-wide scale. Design criteria of both a site-specific and general nature would be implemented to minimize impacts to watershed and fishery resources in all active allotments. A monitoring plan would be implemented in support of the adaptive management strategy and should also minimize negative effects to resources. For these reasons, this alternative should reduce direct and indirect effects to fish more than Alternative 2.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Under this alternative, adaptive management strategies would be used to maintain and/or move towards desired resource conditions within the analysis area. Grazing permits would be re-issued as in Alternative 3 with the same effects, but the currently vacant allotments would be closed, entirely eliminating the effects of livestock grazing in these allotments. The boundary adjustments would be the same as Alternative 3 and would have the same effect. Design criteria would be implemented as in Alternative 3 for the active allotments. Cattle grazing in the Canyon Creek Allotment will have the same effects as in Alternative 3. Monitoring would be the same as Alternative 3 in the active allotments, but limited in the closed allotments. Due to closing allotments as opposed to authorizing forage reserves, this alternative should reduce direct and indirect effects to fish more than Alternative 3.

CUMULATIVE IMPACTS

For a detailed description of cumulative impacts to downstream listed fish refer to the Final San Juan National Forest Land and Resource Management Plan.

Anthropogenic factors such as fish stocking, water development, recreational use, mining activities, timber harvest, grazing, road and trail construction, and outfitter use likely have changed the fish population dynamics in the past within the analysis area. Additionally, natural disturbances such as wildfire, insect and disease outbreaks, landslides, floods, droughts, and climate change have and will continue to influence fish populations in the analysis area.

The primary influence to CRCT populations is the introduction of non-native fish species. Past fish stocking in the analysis area has reduced the size, connectivity, and in most cases the genetic purity and presence of CRCT populations (*Young 2008*). Non-native fish introductions represent the primary driver for the reduction of CRCT population size and genetic integrity in the analysis area. Efforts have been underway to re-establish CRCT in some stream reaches in the analysis area which typically consists of stocking barren waters with genetically pure CRCT; such is the case with Grasshopper Creek. It is unlikely that CRCT populations will naturally expand within the analysis area without the implementation of projects specifically designed to increase CRCT populations or numbers of individuals.

Past fish stocking activities have increased the distribution of MIS fish species within the analysis area at a cost to CRCT available habitat. Any future attempts to increase CRCT distribution may reduce the available habitat for MIS species within the analysis area however; no such projects are currently planned.

High recreational use occurs and may increase in the future within the analysis area. Fishing regulations designed to protect core conservation populations of CRCT should serve to protect these populations regardless of increased recreational use over time. Increased fishing pressure and the resulting increased stream access at trail locations may increase isolated sedimentation in the stream and reduction of streamside vegetation. These impacts are expected to be minimal to CRCT populations.

High recreational use within the analysis area may influence MIS fish populations by increased fishing pressure similar to CRCT as well as keeping MIS fish for food subject to State fishing regulations. The effects are expected to be minor and in the unlikely event of substantial reduction of MIS fish populations as a result of high recreational use, these populations could be supplemented by fish stocking, which is regulated by Colorado Parks and Wildlife.

Although potentially impactful in the past, other anthropogenic influences will likely be minimal on CRCT populations in the future due to the implementation of Forest Plan standards and guidelines and special management for core conservation populations of CRCT. Additionally, impacts would likely be minimized since the designation of the Weminuche Wilderness (Virginia Allotment) and the Colorado Roadless Rule (portions of Tank Creek Allotment). Discussions with resource Program Leaders indicate that there are no additional projects planned in the Analysis Area that would add to the cumulative effects.

Climate change has the potential to reduce the available habitat for CRCT by increasing stream temperatures or increasing the likelihood of other disturbances such as flooding or wildfire over time within the analysis area. Increased stream temperatures may limit CRCT to shorter stream reaches as the lower reaches become uninhabitable by CRCT. While climate change may limit CRCT populations to smaller stream segments, water temperature increases may benefit MIS fish species by increasing available habitat, especially at the lower altitudes. Other disturbances such as insect outbreaks or wildfire may impact both CRCT and MIS fish populations as they occur. The potential for these and other natural disturbances to influence fish populations is unknown.

3.9 Socioeconomics

AFFECTED ENVIRONMENT

The social and economic implications of forest resource management are of interest to local residents surrounding federal lands, forest users, and other people throughout the area. The project area contains approximately 89,260 acres in La Plata County, approximately 65,480 acres in Hinsdale County, and approximately 11,890 acres in San Juan County, Colorado.

The current grazing permittees, along with their families, business managers, and ranch hands, primarily live in La Plata County. The communities most likely to be impacted by this project are those in which the permittees and/or their primary business managers live, pay taxes, and do business. Those communities include Durango, Bayfield, and Ignacio and are all located within La Plata County.

Some of the livestock are pastured in San Juan County, New Mexico during part of the winter months while they are not on federal lands. However, economic effects of this pasturing are limited to pasture leases with a few landowners, with most other business expenses concentrated in La Plata County, Colorado; therefore only demographic information and statistics for La Plata County will be used for this analysis.

Much of the following information is taken from the *Economic Profile System-Human Dimensions Toolkit (EPS-HDT 2012)* and *The Economic Base of La Plata County (Magnan 2004)*. EPS-HDT is a software application developed by the Forest Service and the Bureau of Land Management that compiles published statistics from federal data sources, including Bureau of Economic Analysis, Bureau of Census, and Bureau of Labor Statistics.

Geography: La Plata County encompasses approximately 1,087,000 acres (or 1,700 square miles) of land area, making it the 27th largest county in the state of Colorado. La Plata County contains major travel corridors for both east-west travel (US Highway 160) and north-south travel (US Highway 550). It contains the La Plata, Animas, Florida, and Pine River systems. The federal government owns approximately 39% of the land in La Plata County, most of which is managed by the San Juan National Forest, including the land used by grazing permittees discussed in this analysis.

Demographic Information: La Plata County is located in the southwestern region of the state, with its population center being the city of Durango, which is also the county seat. La Plata County has around 50,000 residents, making it the 15th most populated county in the state, with a population density of about 29 inhabitants per square mile. The population growth rate for La Plata County was 14% between 2000 and 2010, which is about the same as for the state of Colorado as a whole, but higher than the nation as a whole. La Plata County is fairly homogeneous racially. Whites make up about 81% of the county population, with Hispanic or Latinos contributing about 11%, American Indian about 5%, and about 3% are other races. This is compared to the state as a whole with about 71% white, 21% Hispanic, 1% American Indian, and 6% other races.

Employment and Income: The highest percentage of employment by industry in La Plata County is in the education, social assistance, and health care industry (19.1%); followed by arts, entertainment, recreation, accommodations, and food industry (12.6%); and then by the retail industry (12.5%); the agriculture industry ranks towards the bottom for the number of jobs by industry (4.1%). Farm employment, which includes ranching as well as farming, provided 3% of all county jobs in 2010, but on average did not provide positive personal income. Agriculture is not a large source of income for La Plata County, even though about half of the county is agricultural land. The percentage of county residents living below the poverty line in 2010 is 10%, compared to 12% of Colorado residents, and 14% of U.S. residents.

Social Factors: The importance of the ranching sector is highlighted more as a social benefit than as an economic base to the area as a whole. It is an important part of the people's heritage in La Plata County (*Bradford 2002*). Ranching operations in the area often operate at a loss or close to the margin and their profitability can be substantially affected by a variation of market conditions. If access to federal lands for livestock grazing is altered appreciably, this change would affect ranching profits and possibly overall business viability. Ranching is an important portion of the income for the permittees for this landscape.

The regional economy surrounding sheep grazing includes more than just livestock production. The related economics of winter pasture rental and agricultural products currently also play a role in the regional agricultural economy as a whole (*Bartlett 2002*).

Financial Efficiency Analysis: Financial efficiency is a comparison of those costs and revenues that can be quantified in terms of actual dollars spend or received on the project. Different ways of calculating financial efficiency could be Present Net Value or Cost/Benefit Ratio, or various other ways to calculate a dollar comparison between alternatives. However, this type of analysis fails to account for non-monetary, unquantifiable costs and benefits that are commonly used to guide land management actions. In fact, the non-monetary factors such as watershed health, social conflicts, value of open space, or wildlife values are often more important to land management decisions than the monetary factor (*University of Wyoming 2003*). Furthermore, the main differences in the action alternatives in this analysis involve implementation of design criteria that affect administrative, managerial, and behavioral differences, but not differences in monetary investments.

For these reasons, a financial efficiency analysis was not performed for this project analysis.

ENVIRONMENTAL CONSEQUENCES

Alternative 1: No Action/No Grazing

The No Action Alternative would reduce public land available for livestock grazing by roughly 162,500 acres. This acreage includes Forest Service acreage from all the allotments in the landscape. Groups and individuals who are in favor of eliminating grazing on federal land would find this alternative to be the most effective in achieving their agenda. From a regional economic perspective, this loss of public livestock grazing acreage would not be noteworthy. However, locally this acreage is important because it contributes to the viability of private land ranches. The private ranch lands rely on the public land forage to maintain the viability of their operations. High land prices prohibit the addition of more private lands for ranching and forage. Besides the obvious value to the ranching families, the viability of the ranches is valuable and beneficial to the community at large for open space, wildlife habitat, scenery, tourism to view ranching, and other amenities. While it is not possible to measure the contribution of these individual ranches, ranching in general contributes to the economy of La Plata County. Alternative 1 would have the greatest negative social impact to local communities as the elimination of all livestock grazing on all allotments may cause dependent ranching operations to go out of business. If individuals and families move from the area, communities may lose their leaders, volunteers, participants, or other types of community energy and capacity in terms of residents. In addition to loss of human resources, selling of ranches often results in the splitting and subdivision of value-rich lands, changing the character and setting of the community in terms of scenery, wildlife habitat, and can increase pressure on local service providers such as emergency services (*Levy 2008*).

Alternative 2: Current Management

Continuation of the current situation would not create any further costs to operations grazing on National Forest System lands. Outside forces, such as interest rates, fuel prices, or market conditions could change the margin of profit for any operation regardless of AUM's (Animal Unit Month) grazed on federal lands, but there would likely be no change from the current economic situation due to Forest Service action. Socioeconomic factors would not be affected.

This alternative would have the greatest effect on those groups or individuals who feel that grazing on federal land is a subsidy to private ranchers and should not be occurring. This alternative maintains current operations without consideration of mitigations or monitoring efforts that could address some concerns shared by groups not in favor of grazing.

Alternative 3: Adaptive Management w/Forage Reserves

Alternative 3 requires allotments be managed more actively than Alternative 2 due to new design criteria. Because of the flexible nature of adaptive management, it is difficult to predict the impact to ranching operations. Some operators may be effective in monitoring and adjusting to adaptive management options, while others may be unable to adapt to the new conditions. As with Alternative 2, outside forces play a large role in the ability for ranchers to maintain an operation's profitability.

Some ranches may not be able to adapt to the new management practices and/or profit margins could become too small to remain in business. Some ranching operations could possibly fail.

Socially, Alternative 3 would have greater benefit and value to a larger number of interest groups than Alternative 2. People who are interested in protecting and improving resources on federal land (including wildlife and fish habitat, protecting a primitive wilderness experience, and increasing hunting and fishing opportunities) would see their values reflected more in the closure of some of the allotments and the management activities associated with Alternative 3. Those groups interested in no grazing on federal lands would still not favor this alternative, but may appreciate the mitigation measures and additional management requirements included in the alternative.

Alternative 3 also has social benefits to the permittees and the grazing industry. The inclusion of new design criteria, which are intended to minimize and resolve issues with other resources, may result in a better social acceptance of sheep grazing, lessening pressure to eliminate it altogether.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Alternative 4 would have similar overall socioeconomic impacts as Alternative 3, except that all vacant allotments would be closed instead of designating some of them as forage reserves. This would provide less economic flexibility and stability for grazing permittees because options for grazing livestock in emergency situations would be lost.

Social acceptance of Alternative 4 would be highest for the federal lands because it would result in all vacant allotments being closed to grazing, and likely eventual elimination of all sheep permits in this landscape, due to the sunset clause to be added to active permits. Groups interested in immediately ending all grazing on federal lands may still object to this action alternative, but would appreciate the closure of vacant allotments and additional mitigation and management requirements.

Environmental Justice:

Executive Order 12898 requires that all federal actions consider the potential of disproportionate effects on minority and low-income populations in the local area of the proposed action. While the *individual* permittees or their employees may be part of a population of concern under the Order, the overall *population* of La Plata County is neither greater than 50% minority nor greater than the county or state average of individuals living below the poverty line (*US Census Bureau 2000*). Disproportionate negative impacts on area populations are not expected. Employment and

economic incentive provided to minority permittees and their typically minority herders provides a benefit to these ethnic groups.

CUMULATIVE IMPACTS

Beginning in the early 1980's, expenses outstripped gross income in La Plata County agriculture, resulting in a general trend towards negative net- income for the agricultural sector. Adding to the equation is the pressure put on agricultural lands by the rapid expansion of rural residential development and property values that are escalating far beyond the agricultural worth of the land. County land use decisions become ever more complex and contentious with the increasing number of small parcels, surrounded by desirable and developable agricultural parcels (*LPC 2009*).

3.10 Cultural Resources

AFFECTED ENVIRONMENT

There is evidence of occupation of the analysis area from approximately 10,500 years ago to the present. During prehistoric times, the analysis area was primarily utilized on a seasonal basis for resource procurement activities such as hunting and plant gathering. This occupation is affiliated with paleoindian, archaic, and protohistoric (Ute) cultures. Evidence of historic occupation includes the remains logging, mining, ranching, and herding activities. The historic period occupation in the analysis area is affiliated with European-American, Hispanic-American, and Native-American cultures.

The analysis area for the grazing assessment is the 166,627 acres of land within the Weminuche Landscape. A review of existing San Juan National Forest and Colorado Historical Society records was conducted to identify previous incidences of archaeological survey and known historic properties within the analysis area. Thirty-two cultural resource inventories have been completed in the analysis area within the past 30 years, resulting in approximately 5,450 acres of intensive level inventories. The previous surveys were conducted in support of recreation, prescribed burns, minor land use authorizations, and timber management.

The Colorado Historical Society's records indicate that 125 cultural resources have been identified within the analysis area. The majority of sites in the general region of the analysis area consist of prehistoric sites associated with lithic reduction and seasonal camping. A smaller percentage of the cultural resources are attributed to historic natural resource exploitation in the area.

In addition to the landscape, the trailing routes to the landscape were also analyzed for impacts to cultural resources. These are primarily existing road and trail corridors that are used to bring stock to the grazing allotments and any camps that occur leading into the Weminuche landscape. The analysis area for this portion is 1,664 acres of potential effects. This includes the trail and a fifty foot buffer on either side of the trail. Fifty cultural resource inventories have been completed in the trailing area within the past 30 years, resulting in approximately 761 acres of intensive level inventories. Fifteen cultural resources are located within the trailing corridor. They are primarily associated with prehistoric resource exploitation.

Under 36 CFR 800.16(d) the Area of Potential Effects (APE) is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of

historic properties, if any such properties exist. The Area of Potential Effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking. Under Alternatives 2 and 3, the potential to affect historic properties would be limited to the allotments which are proposed to remain active, or are proposed for emergency use. As Colorado is a fence-out state, and very little fencing of private property is present in the analysis area, grazing does occur on private property within the active allotments. As grazing on private property is considered a connected action, non-federal lands are included in the APE.

Under Alternative 2, the APE would be those allotments that would remain active (165,060 acres). Thirty-two cultural resource inventories have been completed in the analysis area for Alternative 2 within the past 30 years, resulting in approximately 5,450 acres of intensive level inventories. Within the Alternative 2 APE, 125 cultural resources have been identified. Of this number, 236 are considered not eligible for the National Register of Historic Places (NRHP). Forty sites require additional data prior to evaluating them for the NRHP and are currently considered potentially eligible. The remaining 134 sites are eligible for the NRHP.

Under Alternative 3, the APE would be those allotments proposed as active and as forage reserve (75,042 acres). Twenty-six cultural resource inventories have been completed in the APE for Alternative 3 within the past 30 years, resulting in approximately 4,351 acres of intensive level inventories. Within the Alternative 3 APE, 72 cultural resources have been identified. Of this number, 43 are considered not eligible for the National Register of Historic Places (NRHP). Twenty-four sites require additional data prior to evaluating them for the NRHP and are currently considered potentially eligible. The remaining five sites are eligible for the NRHP.

Under Alternative 4, the APE would be those allotments proposed as active without a forest reserve (47,209 acres). Twenty-three cultural resource inventories have been completed in the APE for Alternative 3 within the past 30 years, resulting in approximately 3,466 acres of intensive level inventories. Within the Alternative 4 APE, 49 cultural resources have been identified. Of this number, 25 are considered not eligible for the National Register of Historic Places (NRHP). Nineteen sites require additional data prior to evaluating them for the NRHP and are currently considered potentially eligible. The remaining five sites are eligible for the NRHP.

The stock trailing APE would be the same for Alternatives 2, 3 and 4 and would consist of the trail and a fifty foot buffer on either side of the trail and any camps that occur leading into the Weminuche landscape (1,664 acres). Fifty cultural resource inventories have been completed in the trailing area within the past 30 years, resulting in approximately 761 acres of intensive level inventories. Within the trailing APE, 15 cultural resources have been identified. Of this number, 11 are considered not eligible for the National Register of Historic Places (NRHP). Three sites require additional data prior to evaluating them for the NRHP and are currently considered potentially eligible. The remaining site is eligible for the NRHP.

Compliance with Section 106 of the National Historic Preservation Act

The San Juan National Forest drafted a document titled Standard Range Rescission Strategy for Cultural Resources to provide specific direction and guidance for accomplishing the Section 106 process for open range grazing permit renewal. Consultation with the Colorado State Historic Preservation Officer on this guidance was completed on June 25, 2008 (CHS #51571).

Per the *San Juan National Forest Standard Range Rescission Strategy for Cultural Resources (SJNF 2008)*, the focus of the analysis is known livestock congregation areas and their

intersection with areas known or likely to contain cultural resources. Such locations within allotments that are currently active and proposed to remain open to sheep grazing were examined during field analysis efforts conducted for this undertaking.

The Forest rangeland management staff defined areas where livestock are known to congregate within the APE. Predictive variables for sheep concentration included known bedding areas, salting locations, water sources, and landscape choke points that contributed to severe trailing. Known herder camp locations were also considered. A computer mapping site prediction model was run to identify areas likely to contain cultural resources. The model utilized environmental factors such as proximity to water, slope, and vegetation types. Site records, orthophotos and the SJNF suitable sheep grazing acres GIS layer were used to further refine new survey areas. Additional intensive sample survey was also planned in suitable sheep forage areas on slopes of less than 35% to assess the accuracy of the inventory strategy.

Fourteen locations on National Forest lands within the Area of Potential Effects for Alternatives 2, 3 and 4 were identified by the rangeland management staff and the archaeologist as meeting the definition of intersection areas between sheep concentration and areas known or likely to contain cultural resources. The records search indicated that most of these locations lacked previous survey and that there are no known cultural resources in these locations. The same strategy was applied to the trailing APE and nine locations were identified by the rangeland management staff and the archaeologist as meeting the definition of intersection areas between sheep concentration and areas known or likely to contain cultural resources. One was previously surveyed and the remaining eight locations were on private land. Letters were sent to private land owners on May 23, 2012 requesting permission to survey on their property. No replies giving permission were received within a month of their delivery; therefore these locations were not surveyed.

Approximately 362 acres of new survey was conducted for this analysis. Nineteen acres of new intensive survey was conducted in sheep concentration areas and herder camps that lacked previous survey and were likely to contain cultural resources. An additional 295 acres of intensive sample survey was conducted in sheep grazing areas outside of identified sheep congregation locations. Forty-nine acres of intensive survey was conducted within the trailing APE.

A cultural resource report containing survey results, National Register determinations, and grazing effects on historic properties was produced and sent to the Colorado State Historic Preservation Officer.

ENVIRONMENTAL CONSEQUENCES

The cultural resources objective of this rangeland planning on the Weminuche landscape is to protect historic properties from impacts related to the continued permitting of livestock grazing. Concentrated livestock grazing has the potential to directly affect historic properties through trampling or displacement. Overgrazing can result in a decrease in vegetation and an increase in the amount of bare soil within a site. Typical dispersed sheep grazing patterns are unlikely to impact cultural resources. Sheep congregation and overgrazing would typically occur at sheep bedgrounds. Concentrated trailing generally occurs at choke points formed by landscape features that restrict sheep movement options. Repeated livestock trailing in the same areas can form new intermittent drainages within a site. Poor sheep bedground management, repeated use of the

same salting locations, and continued use the same trailing routes for moving sheep bands have the potential to impact cultural resources. Both overgrazing and livestock trailing have the potential to indirectly affect historic properties by causing or enhancing erosion within archaeological sites. Sheep herder campsites, when located on an archaeological site, can disturb site deposition and surface artifacts. Sheep herders could use wooden components of historic cultural resources for firewood.

The effects of a proposed project are taken into consideration for cultural resources that are eligible or potentially eligible for the National Register of Historic Places. Cultural resources determined to be ineligible for inclusion in the Register do not require protection, and don't warrant further consideration of effects from the proposed project. The recording of this class of cultural resources has exhausted their data potential, and effectively mitigated any impacts that may occur to them.

Alternative 1: No Action/No Grazing

Since livestock grazing would not occur under this alternative, there would be no direct impacts from sheep grazing activities to historic properties in the analysis area. There is some potential for indirect impacts associated with current grazing practices to occur short term, but these would likely cease as well. The elimination of livestock grazing should result in an increase in the abundance, distribution and vigor of plant species which would increase the amount of ground cover and soil organic matter, and decrease the amount of bare soil, which would decrease the potential for soil erosion, compaction, and runoff. This would have a generalized beneficial effect on archaeological sites. Potential impact areas as sheep bedding grounds, concentrated sheep trailing locations, and associated herder camps would be eliminated. An indirect impact from the elimination of livestock grazing is that future surveys that might be required for the authorization of structural range improvements would not be conducted, and the opportunity for that survey would be lost.

Alternative 2: Current Management

The potential for current livestock grazing practices to have direct or indirect impacts to eligible sites and potentially eligible sites located within the APE would remain the same or possibly lessen if the trend of a substantial decrease in the historic numbers of sheep grazed continues. Current grazing practices would continue to maintain problem areas on the landscape caused by poor bed ground management, repeated use of the same salting locations, and repeated sheep trailing through the same areas. Problem areas on the landscape caused by the historic grazing practices would be unlikely to improve. Allowing livestock grazing to continue under current range management would maintain the established trends in rangeland conditions. Existing abundance, distribution and vigor of plant species due to livestock grazing, along with their influence on soils, would continue in its present state. In general, where undesirable impacts are occurring to eligible or potentially eligible archaeological sites due to soil movement by rills and gullies, sheet erosion and scouring, they would likely continue. Eligible or potentially eligible archaeological sites located in areas not meeting or moving toward the desired conditions could experience downward trends in vegetative cover and soil stability, since no new improvements or livestock grazing system changes would be implemented to positively affect those conditions. Eligible or potentially eligible archaeological sites located in areas already meeting or moving towards desired conditions would likely remain in a stable condition, barring any factors that contribute to livestock concentration.

There are no additional known eligible or potentially eligible sites within identified sheep congregation areas or herder camps. No impacts to eligible or potentially sites from sheep grazing activities were observed.

Future maintenance of existing rangeland management improvements, the implementation of new improvements and grazing management activities (such as herder camp locations, heavily utilized bedding grounds and salting locations, repeated sheep trailing, and corral reconstruction) should consider potential impacts to historic properties prior to implementation.

Alternative 3: Adaptive Management w/Forage Reserves

Under Alternative 3, the potential for direct and indirect impacts to eligible and potentially eligible sites located within the APE should lessen, as opposed to Alternative 2. In general, an increase in the abundance, distribution and vigor of the forage species would be likely to occur, which would increase the amount of ground cover and soil organic matter, and decrease the amount of bare soil, which would increase infiltration and decrease runoff and erosion. Those areas that currently do not meet desired conditions would have the best chance to improve conditions because of the more responsive and flexible type of livestock grazing management under this alternative. This would be a benefit for eligible or potentially eligible archaeological sites located in areas not meeting desired conditions, as they would likely trend towards a more stable condition, barring any factors that contribute to livestock concentration. The design criteria specific to this alternative (those in particular that address livestock bedding, trailing, salting, and herder camps) should result in a decrease of potential impacts to historic properties. As Alternative 3 would result in the closure of eight allotments and decrease use on four allotments (those changing to forage reserves instead of potentially being stocked), there should be a benefit for cultural resources in these allotments identical to that discussed under Alternative 1.

There are no additional known eligible or potentially eligible sites within identified sheep congregation areas or herder camps. No impacts to eligible or potentially eligible sites from sheep grazing activities were observed.

Future maintenance of existing rangeland management improvements, the implementation of new improvements and grazing management activities (such as herder camp locations, heavily utilized bedding grounds and salting locations, repeated sheep trailing, and corral reconstruction) should consider potential impacts to historic properties prior to implementation.

Alternative 4: Adaptive Management / Closing Vacant Allotments

Under Alternative 4, the potential for direct and indirect impacts to eligible and potentially eligible sites located within the APE should lessen, as opposed to Alternatives 2 and 3. In general, an increase in the abundance, distribution and vigor of the forage species would be likely to occur, which would increase the amount of ground cover and soil organic matter, and decrease the amount of bare soil, which would increase infiltration and decrease runoff and erosion. Those areas that currently do not meet desired conditions would have the best chance to improve conditions because of the more responsive and flexible type of livestock grazing management under this alternative. This would be a benefit for eligible or potentially eligible archaeological sites located in areas not meeting desired conditions, as they would likely trend towards a more stable condition, barring any factors that contribute to livestock concentration. The design criteria specific to this alternative (those in particular that address livestock bedding,

trailing, salting, and herder camps) should result in a decrease of potential impacts to historic properties. As Alternative 4 would result in the closure of twelve allotments, there should be a benefit for cultural resources in these allotments identical to that discussed under Alternative 1.

There are no additional known eligible or potentially eligible sites within identified sheep congregation areas or herder camps. No impacts to eligible or potentially eligible sites from sheep grazing activities were observed.

Future maintenance of existing rangeland management improvements, the implementation of new improvements and grazing management activities (such as herder camp locations, heavily utilized bedding grounds and salting locations, repeated sheep trailing, and corral reconstruction) should consider potential impacts to historic properties prior to implementation.

CUMULATIVE IMPACTS

Activities and actions other than livestock grazing that have occurred, or will be occurring, in the analysis area could impact cultural resources. These include recreational use, fire suppression activities, fuels reduction (mechanical and prescribed burning), and timber harvest activities. Typically, planned actions of the Forest Service such as timber harvest, trail construction, and fuels reduction require a cultural resource clearance which would require avoidance of negative impacts to cultural resources. However, unforeseen or unregulated activities have greater potential for impacting cultural resources. For example, wildfire could burn standing structures, or fire suppression activities could disturb artifacts during fireline construction. Personal firewood gathering has the potential to remove aspen art. Illegal artifact collection occurs and can be exacerbated by increased public access. Natural or man-caused erosion could expose or wash artifacts away.

Based on the information presented above, implementation of any alternative analyzed in this EA would not result in substantial cumulative impacts to cultural resources.

3.11 Roadless Areas

AFFECTED ENVIRONMENT

Unroaded and undeveloped areas provide opportunities to manage for potential wilderness areas, non-motorized and limited motorized recreation, and other commodity and amenity uses. Areas that are undeveloped or roadless in nature can serve a variety of purposes. They can be managed as research natural areas or special interest areas, used for resource production or to provide non-motorized recreation, or, if suitable, recommended as wilderness.

The Forest Service has inventoried and studied roadless areas since the 1970's. These areas are referred to and tracked today as Roadless Areas. Roadless Areas are generally defined as areas in a National Forest or National Grassland that (1) are larger than 5,000 acres (in the west) or, if smaller, contiguous to a designated wilderness or primitive area; and (2) contain no system roads; and (3) have been inventoried by the Forest Service for possible inclusion into the Wilderness Preservation System.

The previous Forest Plan identified potential roadless areas on the San Juan National Forest and generally refer to them as Roadless, Unroaded, or RARE II Areas (Roadless Area Review and Evaluation) (*SJNF1992*). Of the 24 RARE II Areas listed in the Forest Plan, approximately

22,140 acres of the East Animas and the Florida River Areas are found within the analysis area. These roadless areas were not recommended for inclusion into the Wilderness Preservation System under the Forest Plan, and weren't established as wilderness or Wilderness Study Areas under the Colorado Wilderness Act of 1980. Roadless inventory was updated for the *2001 Roadless Rule (USDA 2001)*, and the areas were then referred to as Inventoried Roadless Areas. The 2001 inventory includes approximately 12,830 acres of Inventoried Roadless Areas in this analysis area; the main difference between RARE II and Inventoried Roadless Areas in this project area is that designated wilderness was excluded from the newer inventory.

Roadless inventory was then updated again in 2009 during rulemaking for the *Colorado Roadless Rule (USDA 2012)*, which are referred to as Colorado Roadless Areas (CRAs). The inventory for the *Colorado Roadless Rule* took a closer look, and refined the boundary to better reflect actual conditions on the ground. Under the 2009 inventory, there are approximately 13,585 acres of the East Animas, Florida, and Weminuche Adjacent CRAs in this landscape (see Figure 1-5), of which, approximately 6,301 acres are in upper tier roadless. Upper tier roadless is a subset of CRA which provides a higher level of protection. The Colorado Roadless Rule, and its associated mapping, supersedes the 2001 Roadless Rule in the state of Colorado.

The CRA acreage is located in the south-western part of the analysis area, on portions of the Tank Creek, Canyon Creek, Burnt Timber, East Silver Mesa, and Spring Gulch Allotments. The entire Upper Tier CRA acreage is located on the Tank Creek Allotment.

The analysis area totals approximately 166,627 acres; of which 13,585 acres are roadless, 141,633 acres are in the Weminuche Wilderness, with 11,409 acres being the balance.

The Colorado Roadless Rule describes nine resources or features that are often found in and characterize CRAs. The intent of the *Rule* is to protect these roadless characteristics.

1. High quality or undisturbed soil, water and air;
2. Sources of public drinking water;
3. Diversity of plant and animal communities;
4. Habitat for threatened, endangered, proposed, candidate and sensitive species, and for those species dependent on large, undisturbed areas of land;
5. Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation;
6. Reference landscapes (none are identified in this analysis area);
7. Natural-appearing landscapes with high scenic quality;
8. Traditional cultural properties and sacred sites; and
9. Other locally identified unique characteristics.

ENVIRONMENTAL CONSEQUENCES

Details regarding the environmental impacts of each alternative on the nine roadless characteristics can be found in corresponding sections of Chapter 3 of this EA: impacts to roadless characteristics #1 and #2 can be found in *Section 3.2 Soil and Water*; impacts to roadless characteristics #3 and #4 can be found in *Sections 3.5 through 3.8* pertaining to wildlife and fisheries; impacts to roadless characteristics #5 and #7 can be found in *Section 3.4 Recreation/Wilderness*; impacts to roadless characteristics #8 can be found in *Section 3.10*

Cultural Resources; and roadless characteristics # 6 and #9 do not exist in this landscape and are therefore not discussed.

None of the alternatives would result in actions that are prohibited by the *Colorado Roadless Rule*. Prohibited actions are summarized as tree cutting, sale or removal, road construction or reconstruction, and linear constriction zones.

Alternative 1: No Action/No Grazing

Under the No Action Alternative, there would no longer be grazing authorized in this landscape. The nine roadless characteristics of CRAs would be improved by the elimination of grazing.

Alternative 2: Current Management

Alternative 2 is the current condition. Impacts to the nine roadless characteristics would remain unchanged from present. There are currently impacts from grazing occurring to soil and water in isolated locations, to recreation and scenery, and to habitat for some special status species. See relevant sections of this Chapter.

Alternatives 3 and 4: Adaptive Management

Alternatives 3 and 4 would have identical impacts to the nine roadless characteristics of the CRAs. Grazing would continue within the CRAs under these alternatives; closing vacant allotments or creating forage reserves would occur in areas outside of CRAs and therefore would not affect CRAs. Alternatives 3 and 4 contain many Design Criteria and adaptive options that are not included in Alternative 2, which would help to decrease negative impacts from grazing to roadless characteristics.

CUMULATIVE IMPACTS

Cumulative effects to the roadless characteristics of the CRA areas in the landscape could be contributed by past, present, or reasonably foreseeable actions or events, in addition to the impacts contributed by the proposed action. There are no other projects currently ongoing within the roadless areas, and there are no other activities planned for the CRAs at this time.

Past actions that may have contributed impacts to the roadless characteristics can be found in corresponding cumulative effects sections of Chapter 3 of this EA, including the Wildlife, Cultural, Recreation, and Soil/Water sections.

Based on the information presented above, implementation of any alternative analyzed in this EA would result in non-substantial cumulative impacts to roadless characteristics.

FINDING OF NO SIGNIFICANT IMPACT

As the responsible official, I am responsible for evaluating the effects of the project relative to the definition of significance established by the CEQ Regulations (*40 CFR 1508.13*). I have reviewed and considered the EA and documentation included in the project record, and I have determined that the proposed action will not have a significant effect on the quality of the human environment. As a result, no environmental impact statement will be prepared. My rationale for this finding is as follows, organized by sub-section of the CEQ definition of significance cited above.

Context

For the proposed action and alternatives, the context of the environmental effects is based on the environmental analysis in this EA.

The project area is not of a scale to be of regional, state, or national significance. The total project area of impact is about 166,627 acres, which is only 8% of the San Juan National Forest, so the local significance is also low.

Intensity

Intensity is a measure of the severity, extent, or quantity of effects, and is based on information from the effects analysis of this EA and the references in the project record. The effects of this project have been appropriately and thoroughly considered with an analysis that is responsive to concerns and issues raised by the public. The agency has taken a hard look at the environmental effects using relevant scientific information and knowledge of site-specific conditions gained from field visits. My finding of no significant impact is based on the context of the project and intensity of effects using the ten factors identified in 40 CFR 1508.27(b).

1. *Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.*

Beneficial and adverse impacts were considered and there will be only localized short-term adverse effects. The overall long-term effects will result in a sustainable ecosystem within the project area (Chapter 3).

2. *The degree to which the proposed action affects public health or safety.*

Public health and safety will not be negatively affected. Design Criteria aimed at reducing conflicts between recreationists and herd dogs should improve public safety (pp. 41-44, 53-59)

3. *Unique characteristics of the geographic area such as the proximity to historical or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*

There will be no significant effects on unique characteristics or ecologically critical areas such as historic or cultural resources (p.143+), park lands, prime farmlands (p.69), wetlands (p.75+), wild and scenic rivers (p.69), or ecologically critical areas.

4. *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*

The term “controversial” in this context refers to substantial *scientific* dispute as to the size, nature, or effects of a major federal action on some human environmental factor, rather than to public opposition of the proposed action. The effects on the quality of the human environment are not likely to be highly controversial, because there is no known scientific controversy over the impacts of the project. Public scoping and comment period did not reveal any controversial effects (p.35).

5. *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*

The effects analysis shows the effects are not uncertain, and do not involve unique or unknown risks. Livestock grazing has been occurring within the landscape since before 1900 and the impacts are well-known and predictable.

6. *The degree to which the action may establish precedent for future actions with significant effects or represents a decision in principle about a future consideration.*

The action will not establish a precedent for future actions that may have significant effect on the environment. It does not represent a decision in principle about a future consideration.

7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.*

This action is a stand-alone action, and is not related to any other proposal or action. Cumulative effects of past, present, and reasonably foreseeable projects have been considered and evaluated in addition to the impacts of this project. No significant cumulative impacts were identified (Chapter 3).

8. *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*

The action will have no significant adverse effect on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places. The action will also not cause loss or destruction of significant scientific, cultural, or historical resources (p.143).

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*

Biological Assessments were conducted for the project area, and can be found in the project file (*Jones 2014, Schultz 2014a*). There are no listed plant species in the project area (p.89), so there will be no effects to them. There is also no critical habitat for any listed species in the project area. It was determined that the project “may effect, not likely to adversely affect” the Canada lynx, southeastern willow flycatcher, and the Uncompahgre fritillary butterfly. A “No Effect” determination was made for all other listed terrestrial species

(p.107). It was also determined under a programmatic consultation that the project “may effect, likely to adversely affect” the Colorado pikeminnow and razorback sucker due to cumulative water depletions (p.135). The USFWS has concurred with these determinations and no further consultation is required.

10. Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

The proposed action does not violate any known law or environmental protection requirement. Federal, state, local, and tribal entities were consulted on the proposal and no objections to the project were raised by them (p.33+).

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APPENDIX A – RATIONAL FOR ALLOTMENT RECOMMENDATIONS

Table 1: Rationale for Allotment Boundary Adjustments and Status Recommendations

Allotment Name	Proposed Status Under Alt. 4	Boundary Adjustment Notes and Status Recommendation
Burnt Timber	Active (sheep)	<p>Recommendation: Active, available for grazing, boundary adjustment</p> <p>Boundary: Remove minor acres from northern boundary and add to Virginia Gulch Allotment</p> <p>Rationale: Virginia Gulch Allotment is the only allotment to use this portion of the allotment. Logical adjustment due to existing trails on the allotment. Potential for contact between domestics and bighorn is moderate. Adequate amount of grazing available to make this a viable sheep allotment.</p>
Canyon Creek	Active (cattle)	<p>Recommendation: Active, available for grazing for cattle, adjust western boundary</p> <p>Boundary: Close western portion to grazing</p> <p>Rationale: Western boundary of allotment is too steep and un-usable. Permittee has requested to change class of livestock to cattle to reduce risk to bighorns. Potential for contact between domestics and bighorn goes from high to low with the change of livestock. Existing improvements will need to be maintained and new fencing and waters may need to be developed to help distribution of cattle. Adequate amount of grazing available to make this a viable allotment.</p>
Cave Basin	Closed	<p>Recommendation: Close to grazing.</p> <p>Rationale: Allotment is in key bighorn sheep range. Potential for contact between domestics and bighorn goes from high to low with the closure.</p>
Endlich Mesa (name changed from East Silver Mesa)	Active (sheep)	<p>Recommendation: Active allotment available for grazing and adjust allotment boundary to reflect current use.</p> <p>Boundary: Add acres from Fall Creek (eastern boundary) and acres from Virginia Gulch (northern boundary).</p> <p>Rationale: Need to reflect current use by domestic sheep (requested by sheep permittee). Name change to correctly reflect land features within the allotment. Potential for contact between domestics and bighorn is high on the allotment. Adequate amount of grazing available to make this a viable sheep allotment.</p>

Allotment Name	Proposed Status Under Alt. 4	Boundary Adjustment Notes and Status Recommendation
Fall Creek	Closed	<p>Recommendation: Adjust boundary and close allotment</p> <p>Boundary: Add acres from the western side of the Fall Creek Allotment to the Endlich Mesa Allotment.</p> <p>Rationale: Boundary changes will help improve suitable forage base for the East Silver Mesa allotment and reflects current use (requested by grazing permittee). Potential for contact between domestics and bighorn goes from high to low with the closure.</p>
Flint Creek	Closed	<p>Recommendation: Close allotment</p> <p>Boundary: No boundary adjustments.</p> <p>Rationale: Potential for contact between domestics and bighorn goes from high to low with the closure. No request to use allotment in 40 years. Minimal access to allotment.</p>
Johnson Creek	Closed	<p>Recommendation: Close allotment</p> <p>Boundary: No boundary adjustments.</p> <p>Rationale: Potential for contact between domestics and bighorn goes from high to low with the closure. No request to use allotment in 40 years. Minimal access to allotment.</p>
Leviathan	Closed	<p>Recommendation: Close allotment</p> <p>Boundary: No boundary adjustments.</p> <p>Rationale: Potential for contact between domestics and bighorn goes from high to low with the closure. No request to use allotment in 40 years. Minimal access to allotment.</p>
Pine River	Closed	<p>Recommendation: Close allotment</p> <p>Boundary: No boundary adjustments.</p> <p>Rationale: Potential for contact between domestics and bighorn goes from high to low with the closure. No request to use allotment in 30 years. Minimal access to allotment.</p>
Rock Creek	Closed	<p>Recommendation: Close allotment</p> <p>Boundary: No boundary adjustments.</p> <p>Rationale: Potential for contact between domestics and bighorn goes from high to low with the closure. No request to use allotment in 40 years. Minimal access to allotment.</p>
Spring Gulch	Active	<p>Recommendation: Active allotment available for grazing</p> <p>Boundary: No boundary adjustments.</p> <p>Rationale: Potential for contact between domestics and bighorn is low.</p>

Allotment Name	Proposed Status Under Alt. 4	Boundary Adjustment Notes and Status Recommendation
Tank Creek	Active (sheep)	<p>Recommendation: Active allotment available for grazing and adjust allotment boundaries to reflect current use and topography.</p> <p>Boundary: Add acres from Needles Mountains Allotment (closed in Silverton Grazing Decision) to northern boundary, adjust western boundary, adjust eastern boundary to Lime Mesa Trail.</p> <p>Rationale: Need to reflect current use by domestic sheep (requested by sheep permittee). Western boundary of allotment is too steep and un-usable. Potential for contact between domestics and bighorn is high. Western area will be closed to help increase separation between bighorns and domestic sheep. Northern boundary adjustment reflects current use by domestic sheep and offsets unusable western acres with usable acres. Eastern boundary will be moved to Lime Mesa Trail to reduce crossing of trail by sheep. Adequate amount of grazing available to make this a viable sheep allotment.</p>
Virginia Gulch	Active (sheep)	<p>Recommendation: Active allotment available for grazing and adjust allotment boundaries to reflect current use and topography.</p> <p>Boundary: Add acres from Needles Mountains Allotment (closed in Silverton Grazing Decision) to northern boundary, adjust eastern boundary (move acres to Endlich Mesa Allotment), adjust western boundary to Lime Mesa Trail. Add minor acres from Burnt Timber Allotment.</p> <p>Rationale: Permittee requested boundary adjustments to reflect current use and logical topographical boundaries (northern and eastern boundary adjustments). Western boundary will be moved to Lime Mesa Trail to reduce crossing of trail by sheep. Potential for contact between domestics and bighorn is high on the allotment. Adequate amount of grazing available to make this a viable sheep allotment.</p>

APPENDIX B - ACRONYMS AND GLOSSARY

AMP – Allotment Management Plan

AOI – Annual Operating Instructions

APE – Area of Potential Effect (for cultural resources)

AUM – Animal Unit Month

BA – Biological Assessment (for Threatened and Endangered Species)

BE – Biological Evaluation (for Sensitive Species)

CFR – Code of Federal Regulations

CHHR – Core Herd Home Range for Bighorn Sheep

CPW – Colorado Parks and Wildlife

CR – County Road

CRA – Colorado Roadless Area

EA – Environmental Assessment

FS – Forest Service

FSH – Forest Service Handbook

FSM – Forest Service Manual

GIS – Geographic Information System

HUC – Hydrologic Unit Code

LAU – Lynx Analysis Unit

MIS – Management Indicator Species (wildlife)

NEPA – National Environmental Policy Act

NRHP – National Register of Historic Places (for cultural)

OHV – Off Highway Vehicle (ATVs, motorcycles, and other unlicensed motor vehicles)

PFC – Proper Functioning Condition (for riparian areas)

RHM – Rangeland Health Matrix Evaluation

SJNF – San Juan National Forest

USFS – United States Forest Service

USFWS – United States Fish and Wildlife Service

APPENDIX C - CITATIONS AND REFERENCES

- 36 CFR 222. 2012. Range Management, Subpart A; Grazing and Livestock Use on the National Forest System.
- 40 CFR 1500. 1986. CEQ Regulations for the National Environmental Policy Act.
- Aune, K., N. Anderson, D. Worley, L. Stackhouse, J. Henderson, J. Daniel. 1998. A comparison of population and health histories among seven Montana bighorn sheep populations. Proc. Bienn. Symp. North. Wild Sheep and Goat Council. 11:46-69.
- Bartlett, E. T., Torell, L. A., Rimbey, N. R., Van Tassell, L. W., McCollum, D. W. 2002. Journal of Rangeland Management. 55:426-438. September 2002.
- Beecham, J. J., C. P. Collins, and T. D. Reynolds. 2007. Rocky Mountain bighorn sheep (*Ovis canadensis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available on the world wide web at: <http://www.fs.fed.us/r2/projects/scp/assessments/rockymountainbighornsheep.pdf>.
- Besser, T. E., E. F. Cassirer, C. Yamada, K. A. Potter, C. Herndon, W. J. Foreyt, D. P. Knowles, and S. Srikumaran. 2012a. Survival of bighorn sheep (*Ovis canadensis*) commingled with domestic sheep (*Ovis aries*) in the absence of *Mycoplasma ovipneumoniae*. Journal of Wildlife Diseases 48:168-172.
- Besser, T. E., M. A. Highland, K. Baker, E. F. Cassirer, N. J. Anderson, J. M. Ramsey, K. Mansfield, D. L. Bruning, P. Wolff, J. B. Smith, and J. A. Jenks. 2012b. Causes of pneumonia epizootics among bighorn sheep, Western United States, 2008-2010. Emerging Infectious Diseases 18:406-414.
- Bradford, D., Reed, F., Baird LeValley, R., Campbell, C., Kossler, S. 2002. Livestock grazing on the National Forests: Why continue to do it? Rangelands. Vol. 24, no. 2 (April 2002): p. 3-11.
- Braun, C. E., R. W. Hoffman, and G. E. Rogers. 1976. Wintering areas and winter ecology of white-tailed ptarmigan in Colorado. Colorado Division of Wildlife Spec. Rep. No. 38. W-R-S-38-'76. Denver, CO. 35 pp.
- Cassirer, E. F., R. K. Plowright, K. R. Manlove, P. C. Cross, A. P. Dobson, K. A. Potter, and P. J. Hudson. 2013. Spatio-temporal dynamics of pneumonia in bighorn sheep. Journal of Animal Ecology 82:518-528.
- Clow, D.W.. 2007. Changes in the Timing of Snowmelt and Streamflow in Colorado: A Response to Recent Warming. Journal of Climate, V. 23, pp. 2293 – 2306.
- Colorado Department of Public Health and Environment (CDPHE). 2011. Water Quality Control Commission Regulations. Surface Water Quality Classifications and Standards. Regulation 34-Classifications and Numeric Standards for San Juan River and Dolores River Basins. Amended 6/13/2011.
- Colorado Department of Public Health and Environment (CDPHE). 2012. Water Quality Control Division. Section 303(d) Listing Methodology. 2012 Listing Cycle.

- Cooper, D.J. and E.C. Wolf. 2006. Fens of the Sierra Nevada, California. Final Report to the USDA Forest Service. pp. 47.
- Crawford, J.A. and K. Nydick. In review. Sensitivity of the alpine flora of the San Juan Mountains, Colorado to Climate Change.
- DuBois, C. 1903. Report on the proposed San Juan Forest Reserve, Colorado. Unpublished Report on file at the supervisor's office of the San Juan National Forest.
- Dunford, E.G. 1954. Surface runoff and erosion from pine grasslands of the CO Front Range. *Journal of Forestry* 52:923-927.
- EPA. 1987. Nonpoint Source Controls and Water Quality Standards. Environmental Protection Agency. Memo #NPS: FY-87-49. August 19, 1987.
- EPS-HDT. 2012a. Economic Profile System-Human Dimensions Toolkit. A Profile of Demographics, La Plata County. May 3, 2012.
- EPS-HDT. 2012b. Economic Profile System-Human Dimensions Toolkit. A Profile of Demographics, State of Colorado. June 19, 2012.
- Executive Order 12898. 1994. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.
- Forsling, C.L. 1931. A study of the influence of herbaceous plant cover on surface runoff and soil erosion in relation to grazing on the Wasatch Plateau in Utah. Tech Bulletin 220, USDA.
- FSH 2200. 2005. Range Management Handbook. USDA Forest Service.
- FSH 2209.13. 2007. Grazing Permit Administration Handbook. USDA Forest Service, R2 Interim Directive # 2209.13-2007-8.
- FSH 2509.25. 2006. Watershed Conservation Practices Handbook. USDA Forest Service, Rocky Mountain Region. http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsh?2509.25
- FSM 2323.2. 2007. Wilderness Management of Range. USDA Forest Service WO AMENDMENT 2300-2007-1.
- FSM 2670. 2005. Threatened, Endangered and Sensitive Plants and Animals. USDA Forest Service.
- Furniss, Michael J. et al. 2010. Water, climate change, and forests: watershed stewardship for a changing climate. Gen. Tech. Rep. PNW-GTR-812. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 75 p.
- Gary, H.L., S.R. Johnson, and S.L. Ponce. 1983. Cattle grazing impact on surface water quality in a Colorado Front Range stream. *Journal of Soil Water Conservation*. 38:124-128.
- George, J. L., R. Kahn, M. W. Miller, and B. Watkins. 2008. Colorado Bighorn Sheep Management Plan 2008 – 2018. Colorado Division of Wildlife, 6060 Broadway, Denver, CO, 80216. 96 pp.
- George, J. L., R. Kahn, M.W. Miller, and B. Watkins. 2009. Colorado Bighorn Sheep Management Plan 2009 – 2019. Colorado Division of Wildlife Special Report 81. Colorado Division of Wildlife, 6060 Broadway, Denver, CO, 80216. 88 pp.

- Heitschmidt and Stuth. 1991. *Grazing Management - An Ecological Perspective*, Timber Press Inc.
- Hirsch, C.L., M.R. Dare, and S.E. Albeke. 2013. Range-wide status of Colorado River Cutthroat trout (*Oncorhynchus clarkii pleuriticus*): 2010. Colorado River Cutthroat Trout Conservation Team Report. Colorado Parks and Wildlife, Fort Collins.
- Hoffman, R. W. 2006. White-tailed ptarmigan (*Lagopus leucura*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available on line at: <http://www.fs.fed.us/r2/projects/scp/assessments/whitetailedptarmigan.pdf>.
- Hubbard, R.K., Newton, G.L., and Hill, G.M. 2004. Water quality and the grazing animal. *Journal of Animal Science*. 82:E255-E263.
- Jacobs, James S., Michael F. Carpinelli, and Roger L. Sheley. 1999. *Revegetating Noxious Weed-Infested Rangeland in Biology and Management of Noxious Rangeland Weeds*. Oregon State University Press, Corvallis.
- Johnes, P., Moss, B., and Phillips G. 1996. The determination of total nitrogen and total phosphorous concentrations in fresh waters from land use, stock headage, and population data: testing of a model for use in conservation and water quality management. *Freshwater Biology* 36(2): 451-473.
- Jones, Beth. 2014. *Biological Evaluation for Plants in the Weminuche Landscape*. Columbine Ranger District.
- Kampf, Clay, and Matthew Dare. 2014. *Biological Evaluation for San Juan National Forest Aquatic Sensitive Species and Management Indicator Species*. Weminuche Landscape Grazing Analysis. Columbine Ranger District. 14pp.
- Larison, J. R., G. E. Likens, J. W. Fitzpatrick, and J. G. Crock. 2000. Cadmium toxicity among wildlife in the Colorado Rocky Mountains. *Nature* 406:181-183.
- Levy, Loyd. 2008. *La Plata County Economic Drivers – Job Generation by second homes and other economic drivers*. Region 9 Economic Development District of Southwest Colorado, Inc. Lloyd Levy Consulting LLC.
- Lovekin, Jonathan R., Satre, Michael J., Sheriff, William M., and Sares, Matthew A. 1997. *USFS-Abandoned Mine Land Inventory Project Final Summary Report for the San Juan National Forest*.
- Lull, H.W. 1959. *Soil compaction on forest and range lands*. Miscellaneous publication 769, USDA.
- Magnan, Nick. 2004. *The Economic Base of La Plata County, Colorado*. Economic Development Report. Dept. of Agriculture and Resource Economics, CSU, Fort Collins, CO. June 2004-EDR 04-04.
- Martin, K.D., T.J. Schommer, and V.L. Coggins. 1996. Literature review regarding the compatibility between bighorn and domestic sheep. *Proc. Bienn. Symp. North. Wild Sheep and Goat Council*. 10:72-77.
- Moir, W.H., S. Rochelle, A. Schoettle. 1999. *Microscale Patterns of Tree Establishment*

- NearUpper Treeline, Snowy Range, Wyoming. *Arctic, Antarctic, and Alpine Research* 31(4): 379 – 388.
- MOU. 2009. Memorandum of Understanding for Management of Domestic Sheep and Bighorn Sheep. USDA Forest Service R2, USDI BLM CO, CO Dept. of Agriculture, CO Woolgrowers Assoc., and CO Division of Wildlife. March 2009. 4pp.
- Olsen, Brett E. 1999. *Grazing and Weeds in Biology and Management of Noxious RangelandWeeds*. Oregon State University Press, Corvallis.
- Onderka, D.K. and W.D. Wishart. 1984. A major bighorn sheep die-off from pneumonia in southern Alberta. *Proc. Bienn. Symp. North. Wild Sheep and Goat Counc.* 4:356-363.
- Orr, H.K. 1975. Recovery from soil compaction on bluegrass range in the Black Hills.
- Public Law 86-517. 1960. Multiple Use Sustained Yield Act.
- Public Law 88-577. 1964. The Wilderness Act.
- Public Law 91-190. 1970. The National Environmental Policy Act of 1969, as amended.
- Public Law 93-205. 1973. The Endangered Species Act of 1973, as amended.
- Public Law 94-579. 1976. Federal Land Policy and Management Act.
- Public Law 104-19. 1995. Rescissions Act.
- Paulsen, Harold A. Jr. 1960. Plant Cover and Forage Use of Alpine Sheep Ranges in the Central Rocky Mountains.
- Platts, W. S. 1981. Sheep and Streams. *Rangelands* 3(4).
- Platts, W. S. 1991. Livestock Grazing. Pages 389-423 in Meehan, W. R. 1991. *Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats*. American Fisheries Society Special Publication 19. Bethesda, Md. 251pp.
- Prichard, Don. 1998. A User Guide to Assessing Proper Functioning Condition and Supporting Science for Lotic Areas. BLM Technical Reference 1737-15.
- Prichard, Don. 2003. A User Guide to Assessing Proper Functioning Condition and Supporting Science for Lentic Areas. BLM Technical Reference 1737-16. 1999, revised 2003.
- Raby, Kim and Williams, Mark. 2005. *New Tools for Evaluating Alpine and Subalpine Sensitivity and Water Quality in the Upper Animas Watershed, San Juan County, Colorado*. University of Colorado at Boulder, Institute of Arctic and Alpine Research. MSI Project Number 1540651.
- Raby, Kim S. 2005. *Use of Water Quality Data for Land Management Decisions: A Case Study in San Juan County, Colorado*. University of Colorado.
- Redders, Jeffery. 2009. *Silverton Range Landscape Biological Evaluation for Plants*. Onfile, Columbine Ranger District, Bayfield, CO.
- Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S. McKelvey, and J. R. Squires. 2000. The scientific basis for lynx conservation: qualified insights. Pages 443-454 in Ruggiero, L.F., K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. S.

- McKelvey, and J. R. Squires. (Tech. Eds.). Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 pp.
- San Juan National Forest. 1992. Land and Resources Management Plan, as Amended. USDA Forest Service Rocky Mountain Region.
- San Juan National Forest. 1998. Wilderness Management Direction Amending the Land and Resource Management Plan. USDA Forest Service Rocky Mountain Region.
- San Juan National Forest. 2008. Standard Range Rescission Strategy for Cultural Resources. USDA Forest Service Rocky Mountain Region
- San Juan National Forest. 2009. Environmental Assessment and Decision Notice for Silverton Landscape Grazing Analysis. USDA Forest Service, San Juan National Forest, Durango, CO.
- San Juan National Forest. 2012. Environmental Assessment for the Management and Control of Noxious Plants on the San Juan/Rio Grande National Forests. USDA Forest Service, Durango, CO and Monte Vista, CO.
- San Juan National Forest. 2013. Final SJNF and Proposed Tres Rios Field Office Land and Resource Management Plan. USDA Rocky Mountain Region.
- San Juan National Forest. 2013b. Risk Assessment and Viability Analysis for Rocky Mountain Bighorn Sheep on the SJNF. Aug. 21, 2013. SJNF, Durango, CO. 65pp.
- Schultz, Chris. 2014a. Biological Assessment for Federally Listed Terrestrial and Aquatic Species for Weminuche Landscape Grazing Analysis. Columbine Ranger District. 77pp.
- Schultz, Chris. 2014b. Biological Evaluation for U.S. Forest Service Designated Sensitive Terrestrial Wildlife Species for Weminuche Landscape Grazing Analysis. Columbine Ranger District. 77pp.
- Schultz, Chris. 2014c. Wildlife Review for San Juan National Forest Fish and Wildlife Management Indicator Species for Weminuche Landscape Grazing Analysis. Columbine Ranger District. 24pp.
- Schultz, Chris. 2014d. Migratory Bird Report for Weminuche Landscape Grazing Analysis. Columbine Ranger District. 17pp.
- Schultz, Chris. 2014e. Assessment of Risk of Physical Contact Between Rocky Mountain Bighorn Sheep and Domestic Sheep in the Weminuche Grazing Analysis Landscape. Columbine Ranger District. 115pp.
- Smith, D.W. 1967. Effects of cattle grazing on a ponderosa pine-bunchgrass range in CO.
- Srikumaran, Subramaniam. 2011. Letter regarding an update on the development of a vaccine against pneumonia for use in bighorn sheep in the field. To Gray Thornton, President and CEO, Wild Sheep Foundation. October 11, 2011.
- Stoddart, Laurence A., Arthur D. Smith, and Thadis W. Box. 1975. Range Management: Third Edition. McGraw-Hill, Inc.
- Towry, R.K. 1984. Wildlife habitat requirements. Pages 174-177 in Hoover, R.L., and D.L. Wills eds. Managing forested stands for wildlife. Colorado Division of Wildlife in cooperation with

- USDA Forest Service, Rocky Mountain Region Denver, CO.
- University of Wyoming. 2003. The Role of Agriculture in Maintaining Open Spaces in Wyoming. Wyoming Open Spaces, September 2003. B-1141.
- US Census Bureau. 2000. Profile of General Demographic and Select Economic Characteristics: 2000, Montrose County, Colorado.
- USDA. 1961. General Soil Map. San Juan National Forest.
- USDA. 1996. Rangeland Analysis and Management Training Guide. Rocky Mountain Region, US Forest Service.
- USDA. 2011. Watershed Condition Framework. A Framework for Assessing and Tracking Changes to Watershed Condition. USDA Forest Service SF-977. May 2011. www.fs.fed.us/publications/watershed
- USDA. 2013. Bighorn sheep risk of contact tool users guide. USDA Forest Service, Intermountain Region, January 2013. Unpublished Document, prepared by USDA Forest Service Bighorn Sheep Working Group, and Critigen, Inc. 76 pp.
- USDI, Fish and Wildlife Service. 2013a. Unit Species List of federally Threatened, Endangered, and Candidate species for the San Juan National Forest, December 2013.
- USDI, Fish and Wildlife Service. 2013b. Biological Opinion for the Land and Resource Management Plan Revision 2013, and Oil and gas Leasing Availability Decision. Letter from USDI Fish and Wildlife Service, Denver, CO, BO TAILS 06E24100-2013-F-0133. Aug. 2013.
- USFS. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide. FS-990a. 105pp.
- WAFWA. 2012. Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat. Wild Sheep Working Group, Western Association of Fish and Wildlife Agencies
- Weinmeister, B. 2012. Bighorn sheep management plan, data analysis unit RBS-20, Weminuche Herd. game management units S15 (Sheep Mountain), S16 (Cimarrona Peak), S28 (Vallecito). Colorado Parks and Wildlife. 67 pp. Available on the internet at: <http://cpw.state.co.us/Documents/Hunting/BigGame/DAU/BighornSheep/RBS20DAUPlan.pdf>
- Weinmeister, B. Personal communications with Brad Weinmeister, Terrestrial Biologist, Durango Area Office, Colorado Department of Parks and Wildlife, Durango, CO.
- Western Water Assessment. 2008. Climate Change in Colorado. A Synthesis to Support Water Resources Management and Adaptation. A report by the Western Water Assessment for the Colorado Water Conservation Board. 52 p.
- Whitmer, Jared. 2011. Weminuche Landscape Allotment Histories. Columbine Ranger District. 18pp.
- Young, M.K. (2008, October 10). Colorado River Cutthroat Trout (*Oncorhynchus clarkii pleuriticus*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region.

APPENDIX D – BIGHORN RISK ASSESSMENT

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