



United States
Department of
Agriculture

Forest
Service

March 2009



Environmental Assessment

San Juan Landscape Rangeland Assessment



**Ouray Ranger District and Gunnison Ranger District
Grand Mesa, Uncompahgre, and Gunnison National Forests**

Ouray, Gunnison, Hinsdale Counties, Colorado

Cover photo: Box Factory Park courtesy of Barry Johnston

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, DC 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

**San Juan Landscape Rangeland Assessment
Environmental Assessment
Ouray, Gunnison, Hinsdale Counties, Colorado**

Lead Agency: USDA Forest Service
Grand Mesa, Uncompahgre and Gunnison
National Forests

Responsible Officials:

Tamera Randall-Parker, District Ranger
Ouray Ranger District
2505 South Townsend
Montrose, CO 81401

James Dawson, District Ranger
Gunnison Ranger District
216 North Colorado St.
Gunnison, CO 81230

Charles Richmond, Forest Supervisor
Grand Mesa, Uncompahgre & Gunnison NF
2250 Hwy 50
Delta, CO 81504

For Information Contact:

Kelley Liston, Range Conservationist
2505 South Townsend
Montrose, CO 81401
970-240-5408
kliston@fs.fed.us

Abstract: This Environmental Assessment discloses the effects of three alternatives related to livestock grazing on twenty-three range allotments on the Ouray and Gunnison Ranger Districts on the Grand Mesa, Uncompahgre and Gunnison National Forests. The three alternatives analyzed include No Permitted Livestock Grazing, Existing Condition (“No Action”) and Proposed Action which includes combining and closing individual allotments to better allow adaptive management to meet forest and national goals.

This Environmental Assessment (EA) is a public document that provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). It reveals the direct, indirect, and cumulative effects of a proposed action and alternative actions for permitted domestic livestock grazing management within the San Juan Landscape analysis area.

This document follows the format established in the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations {CFR} §1500-1508). It includes a discussion of the need for the proposal; alternatives to the proposal; the physical, biological, social and economic impacts of the proposed action and alternatives; and a listing of agencies and persons consulted. It is tiered to the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) for the 1986 Revised Land and Resource Management Plan, as amended (Forest Plan) for the Grand Mesa, Uncompahgre, and Gunnison National Forests.

Table of Contents

Chapter 1. Purpose of and Need for Action	3
1.0 Document Structure	3
1.1 Background	3
1.2 Purpose of and Need for Action	4
1.3 Summary of the Proposed Action	5
1.4 Authorizing Actions	5
1.4.1 Laws and Acts	6
1.4.2 Forest Service Manual (FSM) and Forest Service Handbook (FSH)	7
1.4.3 Permits, Plans and Instructions (FSM and FSH)	8
1.5 Decision Framework	9
1.6 Public Involvement	9
1.6 Conformance with Forest Plan	10
1.7 Issues	12
1.7.1 Key Issues	12
1.7.2 Non-key Issues	14
Chapter 2. Alternatives, Including the proposed action	17
2.0 Introduction	17
2.1 Alternatives Considered in Detail	17
2.1.1 No Permitted Livestock Grazing (No Grazing) Alternative	17
2.1.2 Existing Condition (“No Action”) Alternative	18
2.1.3 Proposed Action Alternative (Adaptive Management)	19
2.1.4 Proposed Design Criteria	24
2.1.5 Proposed Monitoring Requirements	36
2.1.6 Summary of Alternatives	39
2.2 Alternatives Considered but Eliminated from Detailed Study	46
2.2.1 Convert Active Sheep Allotments to Cattle Allotments	47
2.2.2 Middle Fork Livestock Driveway Use	47
2.2.3 Closing Sheep Allotments in Wilderness	47
2.2.4 Reallocation of use on the Bear Creek Allotment	48
2.3 Comparison of Alternatives	48
Chapter 3. Affected Environment and Environmental Consequences	55
3.0 General Affected Environment Information	55
3.0.1 Current Allotment Status	55
3.0.2 Activities that Affect Ground Conditions	56
3.1 Air Quality	57
3.1.1 Affected Environment	57
3.1.2 No Grazing Alternative Environmental Consequences	59
3.1.3 Existing Condition & Proposed Action Alternatives Environmental Consequences	60
3.1.4 Cumulative Effects	60
3.2 Soils & Geology	60
3.2.1 Affected Environment	60
3.2.2 No Grazing Alternative Environmental Consequences	61
3.2.3 Existing Condition Alternative Environmental Consequences	61
3.2.4 Proposed Action Alternative Environmental Consequences	62
3.2.5 Cumulative Effects	62

3.2.6 Mitigation and Monitoring.....	62
3.3 Watershed Resources.....	63
3.3.1 Affected Environment.....	63
3.3.2 General Environmental Consequences Common to All Alternatives.....	65
3.3.3 No Grazing Alternative Environmental Consequences	66
3.3.4 Existing Condition Alternative Environmental Consequences.....	67
3.3.5 Proposed Action Alternative Environmental Consequences	67
3.3.6 Cumulative Effects.....	68
3.4 Vegetation.....	68
3.4.1 Affected Environment.....	68
3.4.2 No Grazing Alternative Environmental Consequences	69
3.4.3 Existing Condition Alternative Environmental Consequences.....	70
3.4.4 Proposed Action Alternative Environmental Consequences	71
3.4.5 Cumulative Effects.....	71
3.5 Sensitive Plants.....	72
3.5.1 Affected Environment.....	72
3.5.2 No Grazing Environmental Consequences	74
3.5.3 Existing Condition & Proposed Action Alternatives Environmental Consequences	74
3.5.4 Cumulative Effects.....	75
3.6 Noxious Weeds & Other Invasive Species	75
3.6.1 Affected Environment.....	75
3.6.2 No Grazing Alternative Environmental Consequences	77
3.6.3 Existing Condition Alternative Environmental Consequences.....	77
3.6.4 Proposed Action Alternative Environmental Consequences	78
3.6.5 Cumulative Effects.....	78
3.6 Threatened and Endangered Wildlife Species	78
3.6.1 Affected Environment.....	79
3.6.2 No Grazing Alternative Environmental Consequences	88
3.6.3 Existing Condition & Proposed Action Alternatives Environmental Consequences	89
3.6.4 Cumulative Effects.....	92
3.7 Sensitive Species	93
3.7.1 Affected Environment.....	93
3.7.2 No Grazing Alternative Environmental Consequences	104
3.7.3 Existing Condition & Proposed Action Alternatives Environmental Consequences	107
3.7.4 Cumulative Effects.....	111
3.8 Management Indicator Species.....	113
3.8.1 Affected Environment.....	114
3.8.2 No Grazing Alternative Environmental Consequences	117
3.8.3 Existing Condition & Proposed Action Alternatives Environmental Consequences	118
3.8. Cumulative Effects.....	120
3.9 Range Resources.....	120
3.9.1 Affected Environment.....	120
3.9.2 No Grazing Alternative Environmental Consequences	123
3.9.3 Existing Condition Alternative Environmental Consequences.....	124

3.9.4 Proposed Action Alternative Environmental Consequences 124

3.9.5 Cumulative Effects..... 125

3.10 Recreation & Wilderness 125

3.10.1 Affected Environment..... 125

3.10.2 No Grazing Alternative Environmental Consequences 128

3.10.3 Existing Condition & Proposed Action Alternatives Environmental
Consequences..... 129

3.10.4 Cumulative Effects..... 130

3.11 Transportation System 131

3.11.1 Affected Environment..... 131

3.11.2 No Grazing Alternative Environmental Consequences 131

3.11.3 Existing Condition Alternative Environmental Consequences..... 131

3.11.4 Proposed Action Alternative Environmental Consequences 131

3.11.5 Cumulative Effects..... 132

3.12 Heritage Resources 132

3.12.1 Affected Environment..... 132

3.12.2 No Grazing Alternative Environmental Consequences 133

3.12.3 Existing Condition & Proposed Action Alternatives Environmental
Consequences..... 133

3.12.4 Cumulative Effects..... 133

3.12.5 Mitigation & Monitoring 133

3.13 Socio-economics 134

3.13.1 Affected Environment..... 134

3.13.2 No Grazing Alternative Environmental Consequences 135

3.13.3 Existing Condition Alternative Environmental Consequences..... 135

3.13.4 Proposed Action Alternative Environmental Consequences 135

3.13.5 Cumulative Effects..... 136

3.14 Short-term Uses and Long-term Productivity 136

3.15 Unavoidable Adverse Effects..... 136

3.16 Irreversible & Irretrievable Commitments of Resources 136

3.17 Cumulative Effects..... 136

3.18 Other Required Disclosures 137

Chapter 4. Consultation and Coordination 139

4.0 Preparers and Contributors..... 139

4.1 Response to Public Comment 140

Glossary of Terms..... 141

Acronyms & Abbreviations..... 149

References 151

Appendix A. Qualitative Risk Assessment 157

Appendix B. Proposed Action details of Individual Allotments 165

Appendix C. Domestic Sheep Terms, Grazing Behavior, and Herding 171

Appendix D. Historic & Current Stocking Levels 175

Appendix E. Specific Allotment Data (Includes established Monitoring) 177

Cattle Allotments 177

Alpine Plateau C&H 177

Baldy-Section 25 C&H 179

Big Blue C&H 180
Big Park C&H 181
Coal Creek C&H 185
Cocan Flats and Box Factory C&H..... 186
Corbett/Boiler C&H 187
Green Mountain C&H 189
Little Cimarron C&H..... 190
West Dallas C&H Allotment 190
Sheep Allotments..... 193
Bear Creek S&G..... 193
Big Blue-Fall Creek-Little Cimarron S&G 194
Bighorn S&G..... 196
Crystal-Lower Elk S&G 196
Hero-Idarado S&G 196
Middle Fork-Wetterhorn S&G 198
Miner-Poughkeepsie S&G..... 201
Uncompahgre Peak-North Henson S&G..... 201
Stock Driveways..... 202

CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

1.0 Document Structure

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment (EA) discloses the direct, indirect, and cumulative environmental consequences that would result from the proposed action and alternatives. The document is organized into four chapters:

- *Chapter 1. Purpose and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes design criteria. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3. Affected Environment and Environmental Consequences:* This chapter describes the environmental consequences of implementing the proposed action and other alternatives. This analysis is organized by resource area.
- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental impact statement.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at Ouray District Office of the Grand Mesa, Uncompahgre and Gunnison National Forests, Montrose, Colorado.

1.1 Background

National Forest System (NFS) rangeland is managed to conserve the land and its vegetation while providing food and habitat for both livestock and wildlife while providing various other uses and values. Under multiple-use concepts, areas available for permitted livestock grazing (allotments) also serve as watersheds, wildlife habitat, and recreation sites. Grazing privileges are authorized on national forests and grasslands through paid permit. Permittees cooperate with the Forest Service in range improvement projects.

Grazing actions on public land are viewed as on-going actions. Prior to the 1930's, extensive unregulated grazing on public land was a major problem until Congress enacted laws that required grazers to own a local home ranch to qualify for a permit to graze. The Granger-Thye Act of 1950 (P.L. 81-478) established direction for National Forest System allotment management, including the authorization to issue grazing permits for terms up to 10 years, authorization to use grazing fee receipts for rangeland improvement, and establishment of grazing advisory boards. In addition, requirements, such as base property and commensurability, were designated by statute to insure economic stability to local

communities, as well as to foster stewardship of the public land resources, and to manage the rangelands in a sustainable manner. For the Forest Service, this law established controls and fostered stewardship of the public land grazing resource.

The period of unregulated grazing resulted in adverse environmental consequences, including soil loss and watershed modifications, which created many of the permanent and semi-permanent impacts seen today. The severity of some of these existing impacts must be clearly acknowledged to ensure that unrealistic expectations for future management do not exist.

The analysis area is located on lands administered by the Ouray and Gunnison Ranger Districts, on the Uncompahgre National Forest, in Ouray, Gunnison, and Hinsdale Counties, Colorado. The analysis area is contained within 2 tracts of land encompassing about 200,000 total acres of National Forest System (NFS) land. The Dallas portion of the analysis area is located south of Highway 145 and Dallas Divide, and west of the town of Ridgway, and north of the Ouray and San Miguel County line near the Sneffels Range. The Cimarron and Uncompahgre portions of the analysis area are located north and east of Ouray Colorado; west of Highway 149, and south of Highway 50. It includes the Uncompahgre Wilderness, a federally designated wilderness area.

The Dallas portion of the analysis area consists of six cattle allotments – West Dallas, Corbett Creek, Coal Creek; Boiler, Cocan Flats, and Box Factory. The Cimarron and Uncompahgre portion of the analysis area consists of nine cattle allotments – Baldy, Section 25, Cobbs Gulch, Green Mountain, Lou Creek, Big Park, Little Cimarron, Big Blue, and Alpine Plateau and eight sheep allotments – Hero-Idarado, Crystal/Lower Elk, Big Blue/Fall Creek/Little Cimarron, Bear Creek, Uncompahgre Peak/North Henson, Miner-Poughkeepsie, Bighorn, and Middle Fork/Wetterhorn.

This EA provides the analysis required by law. It describes the alternative ways under which permitted livestock grazing within the analysis area can be implemented and the potential effects associated with each alternative. This analysis is tiered to the Final Environmental Impact Statement (FEIS) *Grand Mesa, Uncompahgre and Gunnison National Forests Land and Resources Management Plan* (LRMP), as amended in 1991, and is designed to be adaptable to subsequent LRMP revisions.

1.2 Purpose of and Need for Action _____

The purpose of this environmental analysis is to determine whether to allow livestock grazing to continue to be permitted within all, part of, or none of the analysis area. Furthermore, if the decision is to continue permitted grazing, the analysis will determine what management actions will be applied in order to meet or progress toward achieving desired rangeland resource conditions as outlined in the analysis. This analysis will also define the timeframes to achieve the desired resource conditions to the extent that livestock grazing is the key-limiting factor.

The need for this action is driven by Court decisions which found that permitting of livestock grazing is a discretionary action and as such is subject to NEPA analysis and disclosure. In addition, the need for action is driven by disparities between existing and desired resource conditions. Specifically, the need for this action is tied to any important resource, social, or economic disparity that was found when comparing the existing condition in the analysis area to the Forest Plan desired conditions as determined by the interdisciplinary team (IDT)

and authorized officer on a site-specific basis. The need for action is further defined by the scope of the analysis (i.e., the analysis is limited to evaluating the appropriate level and management of permitted livestock grazing, given considerations of rangeland condition and other Forest Plan goals and objectives).

Livestock grazing is a discretionary action by the Forest Service and there is an overall need to analyze the possible effects in order to continue or modify the grazing authorization. There is an overall need for greater management flexibility to cope with fluctuations in environmental and social conditions including, but not limited to, annual changes in weather; to be responsive to permittee requests for reasonable operational adjustments; and to respond to unforeseen issues. There is also an opportunity to utilize all or portions of vacant allotments to facilitate adaptive management.

1.3 Summary of the Proposed Action _____

The action proposed by the Forest Service to meet the purpose and need is to continue to permit livestock grazing within the San Juan Landscape Analysis area (analysis area) under an adaptive management strategy (Forest Service Handbook [FSH] 2209.13, Chapter 90; Quimby 2006) that will meet or move toward Forest Plan desired conditions and project-specific desired conditions. The proposed action includes the incorporation of management practices common to all allotments. Many of these management practices have already been implemented in practice, but will be formally incorporated through this analysis. The Proposed Action will also combine some allotments, close some allotments, and will incorporate adaptive management. There are eight domestic sheep allotments and fifteen cattle allotments within the analysis area that are discussed in the Proposed Action. Of the fifteen cattle allotments, ten are active allotments operated by a total of ten individual permittees; five are vacant including 2 allotments that have been used in conjunction with 2 existing active allotments. Of the eight sheep allotments, five are active operated by four permittees; three are vacant (see Table 2.1).

The proposed action will result in the development of new allotment management plans (AMPs) for the allotments in the analysis area to implement the alternative.

Individual Allotment Management Plans (AMPs) will have a monitoring plan and Annual Operating Instructions (AOIs) a will contain a monitoring schedule that will allow the Forest Service to determine whether actions are being implemented as planned and, if so, the desired results are being attained in an acceptable timeframe. Based on monitoring findings, livestock grazing management may be adjusted within specified adaptive management limits as described in this NEPA analysis.

Details of the Proposed Action can be found in Chapter 2 of this document.

1.4 Authorizing Actions _____

It is Forest Service policy to conduct its operations in a manner that ensures the protection of public health, safety, and the environment through compliance with all applicable Federal and State laws, regulations, orders, and other requirements. This EA considers whether actions described under its alternatives would result in a violation of any Federal, State, or local laws or requirements (40 CFR §1508.27), or would require a permit, license, or other entitlement (40 CFR §1502.25).

1.4.1 Laws and Acts

Organic Administrative Act of 1897

Congress passed the Organic Administrative Act of 1897 to improve and protect forests or secure favorable water flows and to furnish a continuous supply of timber for citizens of the United States. Although this is the founding legislation for the National Forests, this law also included provisions for the inventory and monitoring of these lands.

Transfer Act of 1905

The Transfer Act transferred the forest reserves of the United States from the Department of Interior, General Land Office to the Department of Agriculture, Bureau of Forestry. Part of the transfer included a change in management emphasis from a grazing priority to more of a forestry priority.

Taylor Grazing Act of 1934 (43 U.S.C. 315)

The Taylor Grazing Act was intended to “stop injury to the public grazing land by preventing overgrazing and soil deterioration; to provide for their orderly use, improvement, and development; [and] to stabilize the livestock industry dependent upon the public range.” This Act was pre-empted by the Federal Land and Policy Management Act of 1976.

Granger-Thye Act of 1950 (P.L. 81-478)

Granger-Thye Act established direction for National Forest System allotment management, including the authorization to issue grazing permits for terms up to 10 years; authorization to use grazing fee receipts for rangeland improvement; and establishment of grazing advisory boards. In addition, requirements, such as base property and commensurability, were designated by statute to insure economic stability to local communities, as well as to foster stewardship of the public land resources, and to manage the rangelands in a sustainable manner. The purpose of this law was to establish controls and stewardship of the public land grazing resource.

Multiple-Use Sustained-Yield Act of 1960 (Public Law 86–517), as amended December 31, 1996 by P.L. 104–333

Since 1960 land management on national forests has been governed by the Multiple-Use Sustained-Yield Act (MUSYA). MUSYA mandates that national forests be “administered for outdoor recreation, range, timber, watershed, and wildlife & fish purposes.”

The Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (P.L. 93-378)

This act amended the earlier research legislation and directed the Secretary of Agriculture to: “...to make and keep current a comprehensive inventory and analysis of the present and prospective conditions of and requirements of the forest and range lands of the United States ...” This act also included specific language to include National Forest Systems in the inventory and monitoring effort and also added non-timber attributes.

Federal Land Policy and Management Act of 1976

Congress recognized the value of the public lands, declaring that these lands would remain in public ownership under the Federal Land Policy and Management Act (FLPMA). Congress used the term "multiple use" management, defined as "management of the public lands and

their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people."

National Forest Management Act of 1976

NFMA sets up guidelines for the Secretary of Agriculture to develop, maintain, and revise as necessary land and resource management plans (LRMPs) for units within the National Forest System. Each plan is a comprehensive set of "multiple-use" management prescriptions in order to address each major resource of the forest including the following: establish forest wide objectives and goals for multiple-use; establish forest-wide management standards and guidelines in order to satisfy the requirements set forth in the NFMA regarding future activities; establishing the management direction for the future management activities of a specific area.

Public Rangelands Improvement Act of 1978 (U.S.C. Title 43 Chapter 37 § 1901(b))

The Congress established a national policy and commitment to: (1) inventory and identify current public rangelands conditions and trends as a part of the inventory process required by section 1711 (a) of this title; (2) manage, maintain and improve the condition of the public - rangelands so that they become as productive as feasible for all rangeland values in accordance with management objectives and the land use planning process established pursuant to section 1712 of this title; (3) charge a fee for public grazing use which is equitable and reflects the concerns addressed in paragraph (a)(5)..."

The Forest and Rangeland Renewable Resources Research Act of 1978 (P.L. 95-307)

The act replaced earlier research legislation but repeated the language to conduct broad-scale resource inventories.

Rescission Act of Fiscal Year 1995 (P.L. 104-19, Section 504)

The Rescission Act of 1995 Section 504(a) requires each National Forest System unit to identify all allotments for which NEPA analysis is needed. These allotments must be included in a schedule that sets a due date for the completion of the requisite NEPA analysis. Section 504(a) requires adherence to these established schedules. Sections 504(b) and (c) state that if a grazing permit expires or is waived and the permit authorizes grazing in one or more listed allotments for which the scheduled NEPA analysis has yet to be completed, the Forest Service must issue a new term grazing permit upon the same terms and conditions, including the length of term, as the one which expired or was waived, unless there are reasons other than the lack of the necessary NEPA analysis which justify not issuing a new permit. These provisions do not alter the line officer's authority to make a decision not to issue a new permit for reasons other than not having completed the analysis required by NEPA and other applicable laws. In addition, several Omnibus Appropriations Acts have amended the Rescissions Act to allow the authorized officer to continue to issue term grazing permits under certain circumstances, and to revise the schedule to meet changing priorities.

1.4.2 Forest Service Manual (FSM) and Forest Service Handbook (FSH)

FSM 2200

Forest Service Manual 2200 gives authority to protect, manage, and administer the National Forest System, and other lands under Forest Service administration for range management purposes, emanates from the acts listed in Section 1.4.1 among others.

FSM 2255.02-2255.04b (36 CFR 222.8) objectives include cooperation with Animal and Plant Health Inspection Service (APHIS), and other Federal, State, and county agencies to foster enforcement of livestock quarantine and testing programs to prevent spread of contagious animal diseases. Enforcement of Federal or State quarantine regulations will only be done in cooperation with APHIS or the State official in charge when requested by them. Locally it is necessary to ensure that carcasses of all animals that die from a contagious disease or that might contaminate a water supply or become a public nuisance are disposed of in accordance with State law or local ordinance. Owners of such animals are responsible for disposal of carcasses.

FSM 2255.05 requires all grazing permittees to conform to livestock laws and quarantine regulations of the State and Secretary of Agriculture while their livestock are on Forest Service administered land. Forest officers shall not allow livestock under quarantine to enter Forest Service administered lands until the quarantine is lifted or until the hold order is released. Grazing permits may be suspended or cancelled, in accordance with FSM 2204, for failure to comply with such laws or with any approved special rules of a recognized livestock association.

FSH 2209

FSH 2209.13 – Grazing Permit Administration limits grazing permits with term status to authorized use and management of the grazing resource for livestock production purposes. Objectives and policy for issuing grazing permits with term status are in FSM 2231.02 and 2231.03.

1.4.3 Permits, Plans and Instructions (FSM and FSH)

Term Grazing Permits

Term Grazing Permits authorize a permit holder to graze livestock (specifies numbers, kind, class, and season of use) on specific National Forest System lands. The permit holder is required by the permit to graze under specific terms and conditions designed for resource protection and enhancement, according to the NEPA-based decision. Term livestock grazing permits are typically issued for a 10-year term. Term livestock grazing permits by themselves do not authorize the permittee to develop water, construct fences, build roads or trails, manipulate vegetation, or do other ground-disturbing activities. See **Forest Service Manual (FSM) 2231.03** and **Forest Service Handbook (FSH) 2209.13 Chapter 96.2-** (includes **Interim Directive 2209.13-2007-1**) for more detailed information regarding term grazing permits.

Allotment Management Plans (AMPs)

AMPs are an administrative document developed by the Forest Service that incorporates the pertinent livestock management direction decisions made in the Decision Notice from the environmental assessment. The AMP is not a decision document in that it simply documents in a clear format management requirements and actions decided upon in the Decision Notice. The AMP becomes a term and condition of the modified grazing permit. Subsequent modifications to grazing or related management activities may be made as long as those changes are within the scope of the NEPA decision. See **FSH 2209.13 Chapter 96.1**.

Annual Operating Instructions (AOIs)

AOIs are issued on an annual basis; these documents provide instructions to the term permit holder (permittee) regarding management requirements, projects, agreements, and so forth for the current grazing season. They are not decision documents in that they simply implement on an annual basis the NEPA decision. See **FSH 2209.13 Chapter 96.3**. The AOI sets forth:

1. The maximum permissible grazing use authorized on the allotment for the current grazing season and specifies numbers, class, type of livestock, and timing and duration of use.
2. The planned sequence of grazing on the allotment, or adaptive management prescriptions and monitoring that will be used to make changes.
3. Structural improvements to be constructed, reconstructed, or maintained and who is responsible for these activities.
4. Allowable use or other standards to be applied and followed by the permittee to properly manage livestock.
5. Monitoring for the current season especially where adaptive management prescriptions are being followed.

1.5 Decision Framework

Given the purpose and need, the deciding official (per delegations in FSM 2204.3) reviews the proposed action, the other alternatives, and the environmental consequences in order to make the following decision(s):

Whether or not to authorize some level and management of livestock grazing on all, part, or none of the analysis area given considerations of rangeland condition, Forest Plan goals and objectives, and public input. If the decision is made to authorize some level of livestock grazing, the management framework will be described (including standards, guidelines, grazing management, and monitoring) so that desired condition objectives are met or that movement occurs toward those objectives in an acceptable timeframe. Once a decision is made, Term Grazing Permits, Allotment Management Plans (AMPs), and Annual Operating Instructions (AOIs) may be issued provided that they are in compliance with the NEPA-based decision. These documents (permits, AMPs and AOIs) are simply implementing documents and do not constitute decision points for this analysis.

1.6 Public Involvement

Initial discussions between the Forest Service and the affected grazing permit holders began in 2007.

The Ouray Ranger District invited public comment and participation regarding this project through the Schedule of Proposed Actions (SOPA), and a scoping letter. The district contacted more than seventy county, state, and federal agencies, tribes, environmental groups, permittees and other interested parties. Eight responses to the April 2008 scoping letter were received. The Notice of Opportunity to Comment was open to public comment on the proposal from April 8 through May 15, 2008.

All relevant public, agency, and tribal government input to this project was considered in the environmental analysis for these allotments. The project record includes copies of the letters received during the scoping period and substantive comments were addressed as discussed in Sections 1.7 and 2.2 of this document. Chapter 4 lists the agencies, tribal governments, and individuals consulted.

1.6 Conformance with Forest Plan

This EA is tiered to the 1991 Final Supplemental Environmental Impact Statement (FSEIS) and amended Land and Resource Management Plan (LRMP) for the Grand Mesa, Uncompahgre, and Gunnison National Forests. All alternatives (Chapter 2) comply with these documents as well, unless specifically noted otherwise. The LRMP provides guidance for all management activities; establishes management standards and guidelines; and describes resource management practices, levels of resource production, and the availability and suitability of lands for resource management. Additionally, the LRMP provides the framework to guide the daily resource management operations of the GMUG, and subsequent land and resource management decisions made during project planning. The National Forest Management Act (NFMA) requires that resource plans and permits, contracts, and other instruments issued for the use and occupancy of Federal lands be consistent with the LRMP. Site-specific project decisions must also be consistent with the Forest Plan, unless the Forest Plan is modified by amendment. This EA is a project-level analysis and evaluates the Proposed Action’s conformance with the LRMP and other regulations.

This project is designed to achieve the LRMP’s Forest-wide desired conditions. Lands within the GMUG National Forest are managed for a particular emphasis or theme known as a Management Area (MA). Each MA in the Forest Plan has a description of the physical setting for the area, a description of the desired conditions for the area, and a list of the standards and guidelines that apply to the area.

Analysis Area includes lands in the following LRMP Management Areas: 2A, 2B, 3A, 4B, 4D, 5A, 5B, 6B, 7A, 8B, 8C, and 9A. These management areas are further described below.

Management Area	Direction
2A-Semi-primitive motorized recreation opportunities in a natural appearing environment	Range management will reduce conflicts between recreation and livestock. Vegetation treatment will enhance plant and animal diversity
2B-Roaded natural and rural recreation opportunities	Major travel routes maintained or improved visual quality. Range management will reduce conflicts between recreation and livestock. Vegetation treatment including timber harvest will enhance visual quality, recreation setting and animal diversity.
3A-Semi-primitive non-motorized recreation opportunities	Vegetation treatment will maintain visual quality and plant and animal diversity. User density is controlled by access.

Management Area	Direction
4B-Wildlife habitat management for one or more management indicator species	Semi-primitive non-motorized, semi-primitive motorized and roaded natural recreation opportunities will be provided. Livestock grazing will be compatible with wildlife habitat management. Vegetation treatment will enhance plant and animal diversity.
4D-Aspen management	Area is managed to maintain to improve aspen and to provide wood fiber, wildlife habitat visual quality and plant and animal diversity. Semi-primitive non-motorized, semi-primitive motorized and roaded natural recreation opportunities will be provided. Livestock grazing is compatible with aspen management.
5A-Big game winter range in non-forested areas	Semi-primitive non-motorized, semi-primitive motorized and roaded natural recreation opportunities will be provided. Motorized recreation on local roads is managed to prevent unacceptable stress on big game animals during primary big game use season. Vegetation treatment will enhance plant and animal diversity. Livestock grazing is compatible, but managed to favor wildlife habitat.
5B-Big game winter range in forested areas	Semi-primitive non-motorized, semi-primitive motorized and roaded natural recreation opportunities will be provided. Motorized recreation on local roads is managed to prevent unacceptable stress on big game animals during primary big game use season. Harvest methods used to improve winter range can be clearcut, shelterwood or selection. Vegetation treatment will enhance plant and animal diversity. Livestock grazing is compatible, but managed to favor wildlife habitat.
6B-Livestock grazing	Rangeland will be maintained at or above a satisfactory condition. Semi-primitive non-motorized and roaded natural recreation opportunities will be provided. Vegetation treatment will enhance plant and animal diversity.
7A-Wood fiber production and utilization on suited timber lands on slopes less than 40%	Semi-primitive non-motorized, semi-primitive motorized and roaded natural recreation will be provided. Vegetation treatment will enhance plant and animal diversity.
8B-Primitive wilderness recreation setting	High levels of solitude, high opportunities for challenge, risk and self-reliance. Trail encounters will generally be low, less than 5 other parties per day. The area is closed to motorized use.

Management Area	Direction
8C-Semi-Primitive wilderness recreation setting	Moderate levels of solitude, low opportunities for challenge, risk and self-reliance. Trail encounters will generally be moderate to high, less than 5 to 20 other parties per day. The area is closed to motorized use.
9A-Aquatic/Riparian ecosystems	Riparian areas are inclusions within other management areas. Site specific management will generally be accomplished by managing vegetation to protect soil and water resources.

By tiering this project to the LRMP, it is expected that all applicable requirements would be met.

1.7 Issues

The Forest Service separated the issues into two groups: key and non-key issues. Key issues were defined as those directly or indirectly caused by implementing the proposed action. Non-key issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain 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)..."

1.7.1 Key Issues

The Forest Service identified the following issues during scoping:

Table 1.7.1 Key Issues

Issue	Indicator	Where addressed
Management flexibility: Frequently changing environmental and social conditions, including, but not limited to, annual weather fluctuations such as drought, permittee requests for operational flexibility, Forest Service management desire to annually minimize resource conflicts, unforeseen changes, and so forth require the Forest Service to regularly adjust management actions to current conditions and demands. Historically rigid stocking and grazing system regimes inadequately address annual management flexibility needs.	Adaptability to change (i.e., management flexibility to readily adapt to current environmental and social conditions) within constraints imposed by the selected alternative. The indicator is intended to provide a qualitative measure for how well an alternative is responsive to the Forest Service's need to make annual management modifications.	All alternatives, Chapter 3, Appendices
Domestic and Bighorn Sheep conflicts: The potential for contact between domestic and RMBH sheep.	Risk. The indicator is intended to provide a quantitative/qualitative measure for risk of contact between domestic and RMBHS.	A risk assessment was prepared to evaluate where interactions between domestic and RMBH sheep may occur, and whether it could be measured qualitatively or quantitatively as a high, medium, or low risk of contact. This can be found in Appendix A of this document. The Risk Assessment is a dynamic document that should be reviewed annually to determine trigger points and effectiveness.

Issue	Indicator	Where addressed
<p>Cost efficiency. Permitted livestock grazing in this analysis area is valuable to the local economic and social vitality. Livestock-based agriculture is historically and culturally important to the communities adjacent to the analysis area.</p>	<p>Present Net Value (PNV). The indicator is a measure of the difference between discounted revenues and discounted costs.</p>	<p>An economic returns report may be found in the project file. Values can be found in Chapter 3 Socio-economics.</p>
<p>Livestock grazing may affect native plant communities throughout the analysis area, resulting in a decline in native plant composition and cover, an increase in noxious or invasive species, vegetation loss, degraded water quality, and increased erosion potential.</p>	<p>Allowable use standards as applied to key species on key areas.</p> <p>Native perennial forb, grass, and shrub cover as evaluated on benchmark sites</p> <p>Riparian vegetation cover as evaluated on benchmark sites.</p> <p>Changes in Noxious weed cover or rate of spread/decline.</p> <p>Cover Frequency Index (CFI) as evaluated on benchmark sites</p>	<p>Proposed action, design criteria, AMPs.</p>

1.7.2 Non-key Issues

Other environmental and social concerns were identified through scoping. Many comments received during the public comment period were not considered key issues because they have been mitigated in the same way in all alternatives, or were not significantly affected by any alternative, or were outside of Forest Service jurisdiction. Some of these concerns were already regulated by Forest Plan standards and guidelines. The resource concerns with the greatest potential to be impacted, while not key issues, are addressed as environmental considerations in Chapter 3.

Table 1.72 Non-key Issues

Non-key Issue	Reason Not Considered
Rangeland grazing provides economic benefits to Montrose County.	Socio-economic benefits have already been considered for all counties affected in Section 3.13 of this document.
Monitoring of the vegetative canopy and monitoring end-of-season impacts were of concern to specific groups.	This is already addressed as part of the proposed action (Chapter 2) and is a vital part of adaptive management as spelled out in the individual AMPs monitoring plan and in the individual allotment AOIs monitoring schedule.
Livestock may further spread noxious weeds.	This is already addressed as part of all alternatives (Chapter 2) and includes guidance from both the GMUG Invasive Species action plan, and the Rocky Mountain Region invasive species management strategy.

CHAPTER 2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

2.0 Introduction

This chapter describes and compares the alternatives considered for the San Juan Landscape Rangeland Assessment. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and informing the public. Information used to compare the alternatives is based upon the environmental, social and economic effects of implementing each alternative.

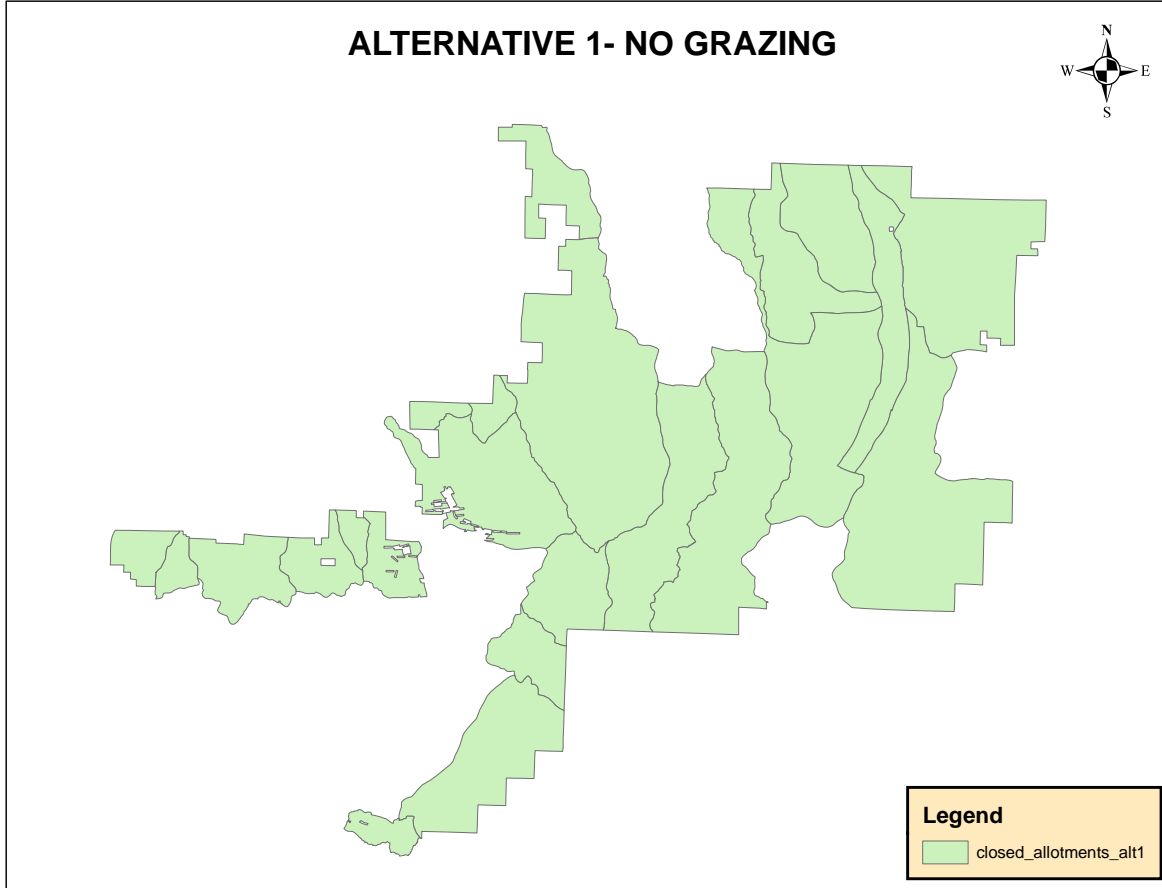
2.1 Alternatives Considered in Detail

The Forest Service developed three alternatives, including the No Permitted Livestock Grazing (No Grazing), Existing Condition and Proposed Action alternatives, in response to issues raised by the public. More detailed information regarding individual allotments and management can be found in Appendices B, C, D and E of this document.

2.1.1 No Permitted Livestock Grazing (No Grazing) Alternative

This alternative should not be confused with the Existing Condition Alternative. Under the No Grazing Alternative, the LRMP would continue to guide management of the project area with the exception permitted livestock grazing within the Analysis Area would be discontinued. Term grazing permits would be allowed to lapse based on the existing expiration dates and would not be renewed per direction in 36 CFR 222.4 and R2 ID to FSH 2209.13 16.13. The affected allotments would be permanently closed by a separate decision signed by the Authorized Officer. Allotment management plans would not be prepared and monitoring activities related to rangeland resource conditions would occur infrequently as funding allowed. Historic culture and tradition of the area would be altered. Some areas would remain impacted by previous grazing activities. Under this alternative, existing Forest-Service owned fences would be removed from NFS lands, as there would no longer be an effective means or need to maintain these structures. Other rangeland structural improvements, including corrals and developed water sources would be evaluated over time to determine whether to retain or remove them.

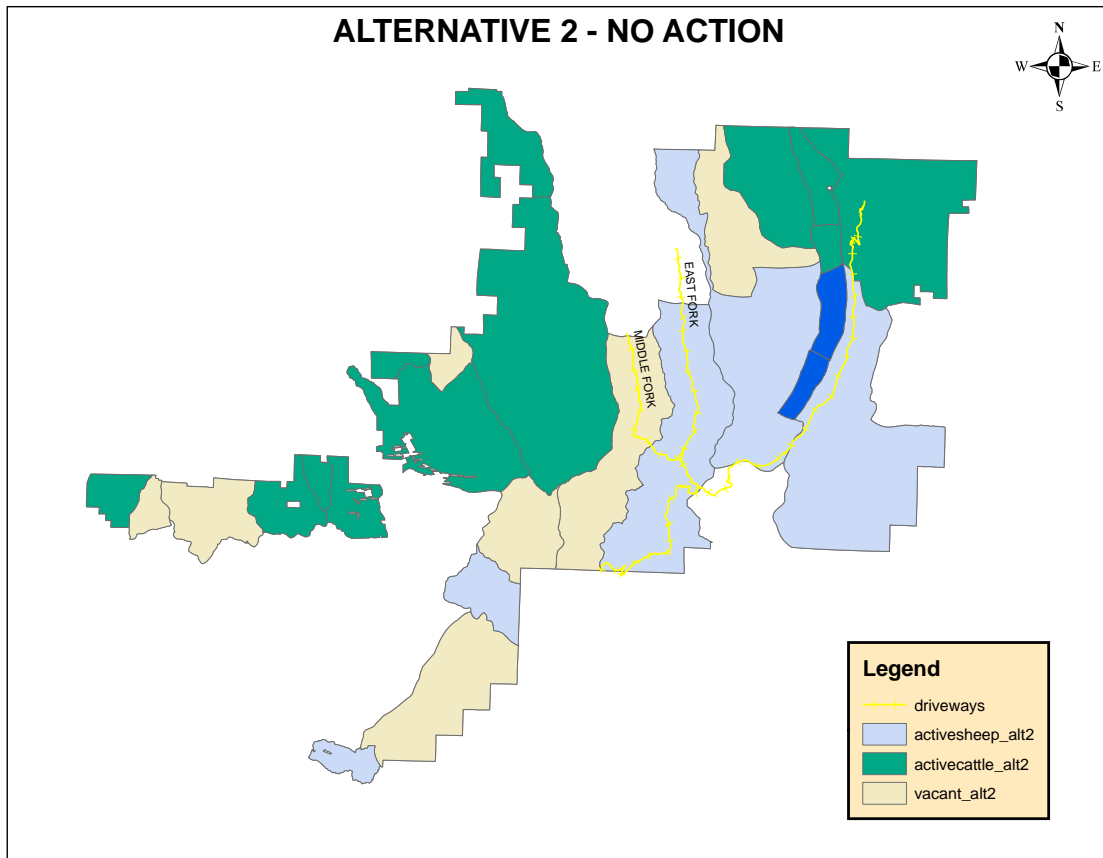
Figure 2.1.1. Alternative 1-No Grazing



2.1.2 Existing Condition (“No Action”) Alternative

Although livestock grazing is a discretionary action, the Existing Condition in this document is the “No Action” alternative because permitted livestock grazing can continue to occur under existing permits without this NEPA analysis until a change is required in management that is outside the scope of the AOIs. As represented in this EA, the No Action alternative is consistent with the 40 CFR Part 1500/36 CFR Part 220 and different from the description in USFS 1996 RAMTG/FSH 2209.13. The Council for Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) requires that a No Action alternative be developed as a benchmark from which the agency can evaluate the proposed action and other alternatives. Under the Existing Condition alternative, livestock grazing allotments would continue to be permitted and managed essentially as they have been over the past three to five years or as specified AMPs as appropriate. AOIs would continue to be issued as they currently are. These AOIs can implement limited management changes in response to higher level decisions but are limited in the scope and context of their ability to respond to changing conditions or new information. The Existing Condition alternative does not lend itself as much to adaptive management practices as the Proposed Action.

Figure 2.1.2 Alternative 2-Existing Condition (“No Action”).



2.1.3 Proposed Action Alternative (Adaptive Management)

The action proposed by the Forest Service to meet the purpose and need is to continue to permit livestock grazing within defined portions of the San Juan Landscape Analysis area (analysis area) under an adaptive management strategy (Forest Service Handbook [FSH] 2209.13, Chapter 90; Quimby 2006) that will meet or move toward Forest Plan desired conditions and project-specific desired conditions.

Adaptive management is a process that uses monitoring information to determine if management changes are needed and, if so, what changes, and to what degree. It is a process that allows the Forest Service to cope with uncertainty and changing conditions over time. It gives the authorized officer the flexibility to adapt to ever-changing environments, which exist in this project area, and to respond to new information. The goal of adaptive management is to resolve the disparity between the Forest Plan desired conditions and the existing conditions in the analysis area as they relate to livestock management, considering rangeland condition and other forest plan goals and objectives. Adaptive-management principles would be applied by describing sideboards, which are flexible enough to ensure that progress is made in achieving the desired resource conditions and objectives. Each sideboard would have the ability to adjust for annually changing conditions or disturbances such as drought, fire, flood, disease; permittee requests/needs; resource conflicts, and planned management activities. Monitoring is vital to successful adaptive management as it provides the basis for determining if management needs to be changed, if so to what extent

and direction, and for determining if needed changes are within the bounds of the NEPA analysis and decision.

The proposed action includes the incorporation of management practices common to all allotments. Many of these management practices have already been implemented but will be formally incorporated through this analysis. The proposed action will also combine some allotments, close some allotments, and will incorporate adaptive management on all allotments to be grazed by permitted livestock.

Under this alternative:

- The Bighorn S&G (Sheep & Goat) allotment; Little Cimarron C&H (Cattle & Horse) allotment, and the Middle Fork-Wetterhorn S&G allotment would be closed.
- The Middle Fork Driveway, which traverses the Middle Fork Wetterhorn Allotment, would remain open to trailing by domestic sheep authorized by a grazing permit under specific design criteria.
- Allotments that would remain open to permitted livestock grazing are shown in Figure 2.1.3.
- The Cobbs Gulch C&H and the Miner-Poughkeepsie S&G allotments would remain vacant, except for the portion of the latter that is incorporated into the Bear Creek S&G allotment. The two upper pastures of the Big Blue C&H allotment would also be vacant. The Cocan Flats C&H and Box Factory C&H allotments will remain vacant until further evaluations are made.
- Allotment Management Plans would be developed on active allotments.
- The Ridge Stock Driveway; Middle Fork Driveway, East Fork Driveway would be used as the primary access route for domestic sheep into and out of the Analysis area; additional routes including Big Blue and Fall Creek would also be authorized on a yearly basis.

A list of possible rangeland management adaptive options – called the Grazing Management Toolbox – is presented in Table 2.1.3a. This list of management tools is not intended to be all inclusive, but provides a sense for the types of actions available to the Forest Service to maintain or improve resource conditions to meet Forest Plan and project level desired conditions and management objectives. New rangeland management techniques, as they are developed, would be incorporated into this toolbox, to the extent that their implementation is consistent with the effects documented in this EA and its accompanying Decision Notice. Forest Plan standards and guidelines, the Watershed Conservation Practices Handbook (FSH 2509.25), and Project Design Criteria (see section 2.7 later in this chapter) are incorporated by reference. The alternative may, in some cases, restrict the use of a tool or require the use of more than one tool used in conjunction with each other. All proposed adaptive management actions would be within the scope of effects documented in this EA, or a supplemental NEPA document and decision would be prepared.

Table 2.1.3a. Grazing Management Toolbox.

Use of any tool below must consider rangeland condition and other relevant LRMP goals and objectives for the analysis area under study. These tools do not pre-empt the Project Design Criteria in section 2.1.4 or the constraints designed into the alternative.	
<ul style="list-style-type: none"> ✓ Change season of use -- do not exceed the currently estimated Animal Unit Month (AUM) capacity; use range readiness to determine livestock turn on date and allowable use standards and guidelines to determine livestock off date. ✓ Change livestock class – do not exceed estimated AUM capacity. ✓ Adjust livestock herding to manage specific areas of concern. ✓ Restrict livestock grazing in specified areas (does not apply to recreation and outfitter/guide livestock under this analysis). ✓ Use or exclusion of a pasture. ✓ Use temporary and/or permanent range improvements to manage specific areas, or to improve overall livestock management. ✓ Adjust allotment/pasture boundaries. 	<ul style="list-style-type: none"> ✓ Change livestock numbers -- do not exceed the currently estimated AUM capacity; use allowable use standards and guidelines to determine proper rangeland use and time to move livestock (including off date). ✓ Adjust livestock grazing intensity and/or duration. ✓ Rest specified areas from livestock grazing. ✓ Adjust livestock trailing time spent on stock driveways. ✓ Modify allotment infrastructure (removal, construction, relocation, or reconstruction of range improvements). This may require additional environmental analysis, clearances, and subsequent NEPA decision. ✓ Adjust salting and/or supplement practices. ✓ Vegetation treatments, using chemical, mechanical, biological, or cultural methods for invasive species control, or other non-structural range improvement activity.

The proposed action will result in the development of new allotment management plans (AMPs) for the allotments in the analysis area to implement the alternative.

Individual AMPs will contain a monitoring plan with monitoring schedules included in individual allotment AOIs that will allow the Forest Service to determine whether actions are being implemented as planned, and if so, if the desired results are being attained. Based on monitoring findings, livestock grazing management may be adjusted within specified adaptive management limits as described in this NEPA analysis. This means that a proposed course of action would be selected as a starting point that is believed to best meet or move toward Forest Plan desired conditions. Recurrent monitoring would occur over time with evaluation of the results being assessed by the Forest Service to make appropriate adjustments in management, as needed, to ensure adequate progress toward LRMP and project level desired conditions which include, but are not limited to, the following:

- Move towards or meet desired rangeland and riparian vegetation conditions on allotments within the analysis area within the implementation timeframe;

- Ensure that the proposed action will not likely jeopardize the continued existence of the endangered Uncompahgre fritillary butterfly or cause adverse modifications of critical habitat for this species;
- Minimize the risk of disease transmission between domestic sheep and Rocky Mountain bighorn sheep by implementing management practices that separate them spatially and/or temporally; and
- Prevent the spread of noxious weeds associated with livestock grazing activities.
- All adaptive management options available would be analyzed under this environmental assessment and available, if applicable, for potential future use on active grazing allotments.

Figure 2.1.3 Alternative 3- Proposed Action.

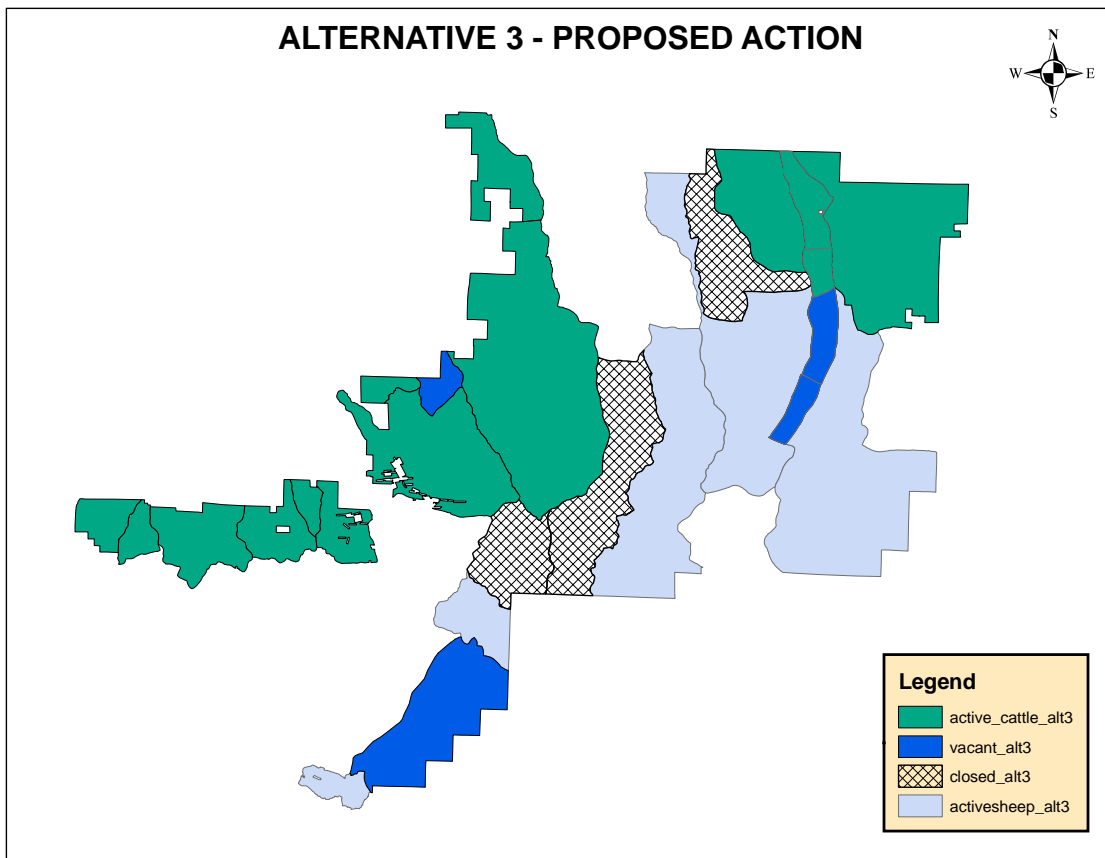


Table 2.1.3b. Actions Common to Allotments under Proposed Action Alternative

Type of Allotment	Management Item
Active cattle allotments	Pastures will not be used more than once in any grazing season.
Allotments that are meeting management objectives and/or desired conditions:	Additional management practices are not anticipated for allotments that are currently meeting management objectives or desired conditions.
Allotments or pastures that are not meeting management objectives and/or desired conditions or are not making satisfactory progress towards desired condition:	<p>If desired conditions are not met in five years, or if an evaluation indicates that progress is not being made towards desired conditions that will result in meeting those conditions within the implementation timeframe, management will be re-evaluated and a decision to either stay the course or to follow a different course of action will be made. Based on monitoring, if a change in management is warranted one or more of the following actions may be taken, as applicable:</p> <ul style="list-style-type: none"> • If riparian areas are degraded as evidenced by PFC resulting in a rating of functional-at-risk or non-functional, then livestock will be managed so that there will be at least 6” of residual stubble height on tall sedges at the end of the grazing season or the end of the growing season, whichever is later; or incorporate at least one season of rest from livestock grazing following the PFC survey. A negative GRI rating will be followed by implementing livestock management actions resulting in at least a neutral rating the following year. • Change allowable use standard (LRMP) on uplands to 35% or less on allotments with rotational grazing systems and 25% or less for allotments with season-long grazing systems; • Shorten the grazing season in specific pastures to increase the opportunity for growth or re-growth and to reduce the frequency; • Establish a stubble height indicator on uplands; • Requiring a full-time range rider to manage livestock, • Development of additional water sources. If this is implemented, then additional NEPA and clearances will be required prior to beginning construction. • If the permittee is or unable to invest the effort or time to implement these management practices to

Type of Allotment	Management Item
	<p>meet or move towards desired condition, then the stocking rate and/or season of use will be reduced to the level dictated by monitoring results.</p> <p>If monitoring results show that resource conditions are still not meeting or moving towards desired condition within five years of implementing these additional management practices, then reductions in the permitted livestock number and/or season of use would be made. Permanent and temporary range improvements constructed for implementation of the prescribed management would be removed. Changes will be reflected in the annual operating instructions (AOI) and in the term grazing permit, as needed.</p>

A range of grazing systems and management strategies would be applied within the analysis area. Implementation would occur through incorporation of this proposed action into an allotment management plan (AMP) specific to each allotment. All grazing systems and management adjustments would be designed to meet all Forest Plan guidance and desired conditions. Specific details of individual allotments including permitted number of livestock, livestock type, permitted season of use and permitted AUMs can be found in **Appendix B** of this document.

2.1.4 Proposed Design Criteria

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 are the first protection measures to be applied to the project. Both of these sources are incorporated by reference and are not reiterated here. Other Project Design Criteria (PDC) will then be developed, as needed.

The PDC identified below have been implemented on allotments within the analysis area, and also include standards and guidelines from the Forest Plan or direction contained in the Watershed Conservation Practices Handbook (FSH 2509.25) References below to “permittee” include the Grazing Permit holder, their agent, herder, rider, or employee. References below to “permitted livestock” apply to animals authorized under a Grazing Permit (i.e., where the primary purpose is livestock production) and is not intended to be applicable to recreation livestock, animals authorized under livestock use permits (i.e., where the primary purpose is not livestock production), or outfitter and guide livestock. Depending on the alternative selected, the applicable PDC become a part of the Allotment Management Plans.

The list of PDCs has been organized into logical categories. Each PDC bullet statement applies to a specific action Alternative as indicated by an “x” in the far right column. The PDCs listed for Alternative 2 reflect current management requirements. The PDCs under Alternative 3 expand the requirements under current management (Alternative 2) to include

measures that would additionally reduce negative impacts to the environment. Effects are expected to be negligible with the implementation of PDCs.

Table 2.1.4 Proposed Design Criteria

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
MANAGEMENT PRACTICES COMMON TO ALL ALLOTMENTS	Authorized livestock may include cow/calf pairs; other mature cattle including bulls; yearling cattle; ewes with lambs; other mature sheep including rams. Domestic sheep will not be introduced into bighorn sheep range without additional risk assessment.	To allow management flexibility to permittee operations on NFS lands without impacting wild sheep herds.		x
	Pastures will be clean of livestock by the prescribed off-date or by the time that allowable use criteria are met on the key species/key areas, whichever occurs first, and livestock will remain out of the cleaned pastures.	To promote healthy upland and riparian vegetation conditions by meeting allowable use guidelines and through compliance with the terms and conditions of the grazing permit and AOI.	x	x
	Annual fluctuations in timing and amounts of precipitation and/or changes in vegetative condition (such as by fire, flood, or hail) may result in an annual change of authorized numbers and/or seasons of use and could result in changes in rotation schedules or management practices. .	To allow for management flexibility.	x	x
	Range improvements will be maintained yearly by the assigned permit holder; new construction and/or removal of improvements will occur as needed. Most new or reconstruction will be completed under a cost-share arrangement with the permit holder.	Required under the terms and conditions of the term grazing permit.	x	x
	All livestock carcasses are to be moved at least one hundred feet from the high water line of lakes and streams and out of sight of roads, trails, and recreation sites. Carcasses of animals that have died as a result of contagious or infectious diseases will be burned within 24 hours of discovery. In such event, a burning permit will be obtained from the District Ranger prior to burning.	Public health and safety; water quality.	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	To promote healthy upland and riparian vegetation conditions and allow livestock to make use of forage that otherwise will not		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	areas of normally light use.	be grazed before allowable use standards are met in the key areas and the livestock are required to be removed from a pasture.		
	Salt or supplement will be placed at least 1/4 mile away from all water sources, including live streams, stock ponds, seeps, springs, and other developed and undeveloped water sources; and 1/4 mile away from roads, skid trails, timber regeneration areas, high-use recreation areas, and other known concentration areas. Salt or supplement should be placed and moved to less utilized areas. Permanent salt or supplement grounds will not be established. Salt or supplement pastures prior to placing livestock in them.	To promote healthy upland and riparian vegetation conditions by reducing impacts associated with concentrated use near salting areas; to promote use of areas that typically receive lighter use.	x	x
	Salt or supplement will be placed on rocky knolls, well-drained sites or in timber where excessive trampling will not destroy plant growth. As utilization patterns develop, salt or supplement will be moved to areas where forage has not been grazed, or where it has been grazed lightly. Salt or supplement will be removed from area after allowable use criteria has been achieved. No salt or supplement will be allowed to remain in any location that could attract bighorn sheep into areas used by domestic sheep.	To promote healthy upland and riparian vegetation conditions by reducing impacts associated with concentrated use near salting areas; to promote use of areas that typically receive lighter use.	x	x
	Annual Operating Instructions (AOIs) will be developed annually and will include management practices to be implemented, season of use, authorized livestock number, range improvements planned for the year, authorized trailing routes on and off NFS lands(domestic sheep only). Permittees will be responsible for ensuring that their herders/riders understand and comply with Forest Service requirements.	Implement planned grazing to meet resource objectives; comply with the terms and conditions of the term grazing permit.	x	x
	Livestock will be removed from an allotment or pasture if resource monitoring or new information suggests this course of action after all management options have been	To promote healthy upland and riparian vegetation conditions by meeting allowable use guidelines and through compliance with the terms and conditions of the		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	exhausted.	grazing permit and AOI.		
	Livestock will be in apparent good health when placed on NFS lands.	To reduce the risk of disease transmission between domestic livestock and wildlife.		x
	Permittees are encouraged to contact the Forest Service on a regular basis (at least weekly during the grazing season) to update on conditions, request changes, or report problems.	Good communication between the Forest Service and the permittees is essential to allow for adjustments due to changing conditions; evaluation of current management practices; and resolution of resource concerns.	x	x
MANAGEMENT PRACTICES (common to all sheep allotments unless specified otherwise)	Sheep will be bedded on new ground every night and moved to fresh feed daily.	To promote healthy upland and riparian vegetation conditions by reducing impacts associated with concentrated use	x	x
	Camps will be placed at least 200 feet from live water.	To protect water quality.	x	x
	Camps will be kept clean and garbage packed out.	Public health and safety; permit compliance; visuals; wilderness values.	x	x
	Sheep herders will not be allowed to cut krummholz (dwarf spruce trees at timberline) for firewood.	To protect krummholz in the alpine ecosystem.		x
	Camps will be placed at least 200 feet from system trails and stock driveways where practical, and ¼ mile from any lake.	To minimize impacts to system trails and stock driveways	x	x
	Use an appropriate number of herders to control and move bands of sheep to desired grazing areas. The main flock will never be left unattended for any reason.	To promote healthy upland and riparian vegetation conditions by reducing impacts associated with concentrated use.	x	x
	The Forest Service and permit holder will jointly notify the public through trailhead signage of the presence of sheep that are protected by guard dogs in the area.	Public education regarding sheep grazing within the analysis area to minimize potential conflicts between grazing activities and recreation users.		x
	Domestic sheep will not graze or trail across NFS lands while in estrous. Generally, ewes will come into estrous in the fall after the lambs are weaned and after the ewes are removed from NFS	To reduce the risk of contact between domestic and wild sheep.	x	x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	lands; breeding occurs in November-December..			
	Domestic sheep will be in apparent good health when moved onto NFS lands.	To reduce the risk of contact between domestic and wild sheep.		x
	Stray domestic sheep will be gathered or disposed of by the permittee within 72 hours of notification. Herders will keep close count on sheep and will take timely action to recover any strays.	To reduce the risk of contact between domestic and wild sheep.		x
	The permittee and/or the FS will notify CDOW as soon as possible if individual or small groups of bighorn sheep come into contact with domestic sheep. Notification procedures will be included in the AOI.	To reduce the risk of contact between domestic and wild sheep.		x
	The CDOW is responsible for promptly responding to notifications of contact between wild and domestic sheep and for any subsequent management actions related to wild sheep.	To verify and respond to incidences of contact between domestic and wild sheep.		x
	Permittees may use hazing techniques and guard dogs to ensure separation of wild and domestic sheep.	To reduce the risk of contact between domestic and wild sheep.		x
	Move sheep to a new grazing area every 5-7 days.	To promote healthy upland and riparian vegetation conditions by reducing impacts associated with concentrated use.	x	x
	Bedding grounds need to be relocated every 3 days (open bedding) or 1 day (closed bedding). Sheep will not be bedded within 200' of any perennial stream or water source.	To promote healthy upland and riparian vegetation conditions by reducing impacts associated with concentrated use.	x	x
	The permittees and their herders will follow the annual operating instructions for the grazing allotment.	To manage rangeland resources to comply with Forest Plan and other direction; and compliance with the terms and conditions of the permit.	x	x
	Transplants of wild sheep into the analysis area should be designed to minimize the likelihood of contact between wild and domestic sheep.	To reduce the risk of contact between domestic and wild sheep.		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	Domestic sheep will not be bedded or salted within 500' of snow survey and vegetation monitoring equipment in Senator Beck Basin.	To minimize or eliminate conflicts between sheep grazing operations and CSAS operations.		x
SHEEP DRIVEWAYS	Trailing time along the Ridge Stock Driveway is limited to 4 days up and 3 days down from the National Forest boundary between Alpine Plateau and the respective allotment boundary. On the Cimarron Stock Driveways (East and Middle Fork Driveways) trailing time is limited to 2 days each way between the Forest boundary and the Cimarron trailheads unless mutually agreed upon otherwise at the annual allotment meeting or during the grazing season.	To promote healthy upland and riparian vegetation conditions by reducing impacts associated with concentrated use; and to reduce the risk of disease transmission between domestic and wild sheep on the Middle Fork Stock Driveway.	x	x
	Trailing activities will comply with direction in the 2210 Management of Sheep Driveways letter dated January 25, 1989 unless otherwise agreed upon at the annual allotment meeting or during the grazing season, or if resource needs arise.	To minimize resource impacts and conflicts due to sheep trailing.	x	x
	Bands of sheep using the Ridge Stock Driveway will bed in the Soldier Creek corral.	To minimize resource impacts and conflicts on the Big Blue allotment.	x	x
	Bands of sheep using the Cimarron driveways will not overnight on the Big Cimarron C&H allotment except at the Big Cimarron corral near the Forest boundary.	To minimize resource impacts and conflicts on the Big Cimarron allotment.	x	x
	Bands of sheep using the Middle Fork driveway will overnight either on the East Fork side of the Middle Fork drainage, or further down (north) the Middle Fork of the Cimarron. (map on file and provided to the permittee in the AOI.) Permittee will patrol the driveway immediately after trailing to check for and remove all strays.	To increase spatial distance between domestic sheep trailing on the Middle Fork stock driveway and bighorn sheep range in the area west of Coxcomb Peak. Removing strays will reduce the risk of contact between wild and domestic sheep.		x
	A coordination meeting with permittees, CDOW, BLM, San Juan NF, and GMUG NF will occur annually.	To minimize potential conflicts between permittees; clarify requirements such as those regarding TES or R2 sensitive species; and develop annual operating instructions and	x	x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
		trailing schedules.		
	Bands of sheep using the Ridge stock driveway in the vicinity of Uncompahgre Peak will restrict trailing to the existing route. As specified above, trailing time is limited to 4 days up and 3 days down from the National Forest boundary between Alpine Plateau and the respective allotment boundary. Incidental grazing use occurring during trailing activities is anticipated and should be minimized. Sheep will not be allowed to loiter in the area of the occupied colony.	To avoid impacts to the Uncompahgre fritillary butterfly colony at Uncompahgre Peak.		
NOXIOUS AND INVASIVE SPECIES	Any hay, straw or other feeds used on the allotment will be either certified or tagged as being free of noxious plants, or will consist of heat-treated pelletized feeds, as directed by Regional order number 02-97-01 and 02-97-02.		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 Forest Service.			x
	Conduct prevention, control, and eradication strategies for targeted invasive plant species, utilizing integrated weed management techniques through implementation of the GMUG weed action plan.		x	x
	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 the Forest Service: Permittees should report noxious weed sites on the actual use report at the end of the grazing season, or should report them directly to the Forest Officer during the grazing season. Permittees willing to assist in treating noxious plants should discuss with the Forest Officer before taking any action.	To favor native vegetation by minimizing potential vectors for noxious weed seed transport and establishment; minimize the risk of increasing existing noxious weed infestations within the analysis area; and to minimize the risk of new noxious or invasive plant species becoming established with the analysis area.		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	<p>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 through the GI tract before turn on.</p> <p>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.</p>			
ANIMAL DAMAGE MANAGEMENT	Animal damage management activities will be conducted in accordance with Federal regulations, State law, and Forest Service policy. Authorization for animal damage management would continue to be authorized on an annual basis by the Forest Service under the existing programmatic environmental analysis and cooperative agreement with USDI Wildlife Services.		x	x
THREATENED, ENDANGERED, AND SENSITIVE SPECIES	Do not establish or maintain bedgrounds, graze, or place salt or supplement on known occupied habitat of the Uncompahgre Fritillary Butterfly. Incidental grazing use occurring during trailing activities is anticipated but should be minimized. The Forest Service will annually provide the permittee with a map of known or suspected locations to avoid.	Habitat for the Uncompahgre Fritillary Butterfly, a federally listed endangered species, exists within the analysis area in the vicinity of Uncompahgre Peak. Trailing and grazing within occupied habitat can have adverse affects. Management actions should ensure that the effects of grazing will be minimal and will help to maintain or improve habitat..		x
	<p>Livestock grazing will be managed in riparian areas and willow carrs to maintain or achieve mid seral or higher condition to provide cover and forage for prey species within Canada lynx habitat.</p> <p>Livestock grazing will be managed so that browsing of aspen regeneration within the analysis area does not inhibit successful regeneration to provide or maintain habitat for prey species within Canada lynx habitat as specified under Design Criteria specific to Upland Vegetation..</p>	The Canada lynx (<i>Lynx canadensis</i>) is a federally listed threatened species within the analysis area. Future management of grazing activities within the analysis area should ensure that the effects of grazing will be minimal and will maintain or improve lynx habitat.		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	Livestock utilization levels in Nate Creek are currently estimated to be less than 10%, due to topography, lack of forage, and limited access. Monitoring conducted jointly between the range and fisheries programs will be used to determine whether management changes are needed and the type of changes needed.	The greenback cutthroat trout (<i>Oncorhynchus clarki stomias</i>) is a federally listed threatened species within the analysis area. Future management of the Nate Creek drainage should ensure that the effects of grazing will continue to be minimal and will maintain existing conditions.		x
R2 SENSITIVE SPECIES	Adjust timing, duration, intensity of livestock grazing based on monitoring of Nokomis fritillary butterfly populations. Manage livestock grazing to minimize negative impacts on the abundance of larval food plants or adult nectar sources for Nokomis fritillary butterfly. Maps and instructions to the permit holder will be provided as information becomes available.	The Nokomis fritillary butterfly (<i>Speyeria nokomis nokomis</i>) is a R2 Forest Service sensitive species that occupies wet meadows, seeps, and bogs that support bog violet. Although light to moderate grazing may be beneficial to the butterfly habitat, excessive grazing can be a threat.		x
	Adjust grazing management as needed based on impacts to known populations of stonecrop gilia and tundra buttercup. This may include changes to timing, duration, or intensity of grazing use; avoidance of known populations to limit access; or other practices as yet undetermined. Maps and instructions to the permit holder will be provided as information becomes available.	It is unknown as to whether Stonecrop gilia (<i>Gilia sedifolia</i>) exists within the analysis area. Unless occurrences are near water sources or in areas frequented by domestic sheep, they are probably somewhat naturally protected from grazing impacts. It is unlikely that domestic sheep grazing would have a significant impact upon the tundra buttercup (<i>Ranunculus gelidus</i>) based on current available information.		x
	Adjust grazing management practices implemented to minimize domestic and bighorn sheep interaction as needed based on monitoring information as specified under Design Criteria specific to sheep allotments and driveways.	Bighorn sheep (<i>Ovis canadensis canadensis</i>) are a R2 sensitive species within the analysis area. Ongoing monitoring and evaluation of the management practices included as Project Design Criteria is needed to determine the effectiveness of preventing contact between domestic and wild sheep. Additional management actions, including the possibility of adjusting permitted grazing or trailing areas, will be developed by the Forest Service, the affected permittee(s), and the		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
		CDOW if monitoring confirms contact between wild and domestic sheep		
	Manage livestock grazing in Big Blue Creek to Forest Plan riparian standards to maintain existing condition for the conservation population of Colorado Cutthroat Trout. (CRCT) Manage livestock grazing on other stream reaches within the analysis area to maintain existing CRCT populations as specified in Design Criteria for Riparian Vegetation.	Colorado River cutthroat trout (<i>Oncorhynchus clarki pleuriticus</i>) are present on about 40 miles of stream and rivers within the analysis area. Maintaining or improving riparian vegetation conditions on these reaches is important to maintaining the populations of this species.		x
	Manage livestock grazing so that regeneration of aspen clones is not significantly inhibited where suitable habitat exists for aspen dependent R2 sensitive species as specified under Design Criteria specific to R2 Sensitive Species.	The Northern Goshawk (<i>Accipiter gentilis</i>), and purple martin (<i>Progne subis</i>) are both R2 sensitive species associated with aspen habitat. Within the analysis area, livestock grazing has not had any direct or indirect effects upon the forested vegetation types that provide habitat for these birds. Browsing impacts on aspen regeneration or shrub understory is limited to a few isolated sites. Continuing or improving existing management under the proposed action on mixed conifer and aspen sites should benefit these species.		x
	Limit livestock use of browse and herbaceous plant production to that not needed by big game on winter range areas, and no more than 10-15% of current years growth on other areas. Individual allotment management plans, which have the winter range management area prescription designated within the allotment, will reflect livestock use levels to assure adequate quantity and quality of browse and herbaceous vegetation is available for big game during the winter months. Coordination with adjacent landowners and/or agencies should be evaluated as a way to accomplish this standard (5A & 5B Management Area direction).	To promote healthy upland and riparian vegetation conditions; provide adequate forage for big game species winter range.		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	Protect regeneration from livestock damage. Maximum grazing use on transitory ranges resulting from clearcuts is: 20% of current growth on key shrubs, 40-50% of current growth on key grasses, and 20% of total production on key forbs.	LRMP – Management area direction for Merriam’s turkey and northern goshawk, red-naped sapsucker		x
UPLAND VEGETATION	Livestock grazing systems will be designed to maximize the opportunity for plant regrowth and recovery, by focusing on the frequency of defoliation, the intensity of defoliation, and the timing and duration of livestock use.	To promote healthy upland and riparian vegetation conditions through consideration of morphological and physiological response of plants to grazing.		x
	Entry and exit dates onto NFS lands will be based on current permitted on-dates; historic range readiness indicators; the availability of water; estimated carrying capacity; and resource conditions. Entry and exit dates are not firm, and will be adjusted based on meeting allowable use standards and resource or environmental conditions, such as drought or range readiness.	To promote healthy upland and riparian vegetation conditions and allow for management flexibility through consideration of changing resource or environmental conditions.	x	x
	Grazing schedules will be developed in the annual operating instructions based on the prior year Grazing Response Index (GRI) and/or an evaluation of grazing from the previous season and the resource conditions of the current season. A negative GRI will be corrected the following year by changing any or all of the following: the season of use, allowable use standard, residual stubble height, stocking rate, timing of livestock use, or through the use of temporary range improvements. The management goal would be to have a positive or neutral GRI score as an average over every three-year period	To promote healthy upland and riparian vegetation conditions and allow for management flexibility through consideration of changing resource or environmental conditions.		x
	On allotments with rotational grazing systems, create sub-units within the allotment without construction of permanent fencing resulting in a neutral or positive GRI. The maximum allowable use on key areas is 50% by weight of current year’s growth. On allotments with season-long grazing systems, the maximum allowable use on	To promote healthy upland and riparian vegetation conditions through consideration of morphological and physiological response of plants to grazing		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
	key areas is 35% by weight of current year's growth. Livestock will be removed from the pasture or the allotment when the allowable use standard is reached.			
RIPARIAN VEGETATION	In key riparian areas, a 4" residual stubble height on tall sedges is an indicator that the site is moving towards desired condition. Residual stubble height of less than 4" would result in either additional monitoring the following year, or a change in management practices, using tools in the grazing toolbox. Allowable use will be no more than 50% by weight of the current year's growth on key forage species on allotments with rotational grazing systems, and will not exceed 35% by weight on allotments with season-long grazing systems. On browse species, livestock use will not exceed 10-15% of current year's growth.	Needed to manage riparian ecosystems (LRMP III-177-179) and promotes healthy upland and riparian vegetation conditions through consideration of morphological and physiological response of plants to grazing. Needed to protect or maintain habitat for certain management indicator species.	x	x
SOILS	Restore and maintain organic ground cover on benchmark sites of at least 50% canopy cover or greater as determined by long-term monitoring such as cover-frequency transects. The amount of organic ground cover needed will vary by different ecological types and should be commensurate with the potential of the site. (NOTE: Such ground cover allows for prescribed fire and site preparation without increasing surface runoff from a 10-year storm (WRENS II.60; USFS 1966))	Organic ground cover is vital to maintain hydrologic function. Reduced ground cover decreases infiltration of water and increases surface runoff and peak flows. Continued or severe loss of ground cover often results in the formation of pedestals, rills, and gullies that greatly concentrate runoff, increase peak flows, and damage streams.		x
	Manage land treatments to limit the sum of detrimentally compacted, eroded, and displaced soil to no more than 15% of any activity area by restricting concentrated-use sites, and similar soil disturbances.	Soil compaction increases soil density and reduces large pores so that water absorption and root growth are impaired. Ground cover, deep snow, and frozen soil reduce compaction. This measure also prevents severe soil heating.		x
CULTURAL RESOURCES	Moving towards desired conditions for soils and vegetation as specified above should also help protect buried or partially sites.	Protect cultural/heritage resources.		x

Topic	Design Criteria	Rationale for Criterion	Alternative	
			2	3
WILDERNESS	Manage permitted livestock grazing in wilderness areas to meet upland and riparian allowable use standards. Identify and monitor benchmark sites using long-term methodology in RAMTG, such as cover-frequency.	Needed to protect wilderness values (LRMP III-22).	x	x
TRAVEL MANAGEMENT	Permittees will comply with the Uncompahgre Travel Management Plan decision approved 3/1/2002. If permittees need administrative access on closed roads, they are to contact the District office for approval. Administrative access will be approved through the annual operating instructions on a case by case basis.	To promote healthy upland and riparian vegetation conditions, improve wildlife habitat, and minimize resource impacts due to permittee operations.	x	x
PERMITTEE MONITORING	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. The permittee will also complete a Grazing Response Index (GRI) annually. This information is requested at the end of each grazing season, and will be made part of the permanent allotment files. The Forest Officer will provide a reporting form for the permittees use.	To determine if prescribed management practices, season of use, livestock number and range improvements are effective in meeting resource objectives.		x

2.1.5 Proposed Monitoring Requirements

Monitoring and evaluation leads to improved management and informed management decisions. Monitoring helps determine how the LRMP 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 us to measure whether or not we are being effective in moving toward our 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 will measure whether or not LRMP standards and guidelines are being met, while effectiveness monitoring will evaluate how effective management actions are at moving toward or achieving desired conditions.

Budgets and personnel will determine what limitations will be placed on rangeland monitoring activities. A realistic implementation monitoring strategy for the allotments within the analysis area may be to monitor as many allotments as possible utilizing both Forest Service and permittee monitoring. Upland and riparian areas will be the focus of

effectiveness monitoring. Individual allotment objectives will determine what monitoring will take place. Key benchmark areas, where already determined are disclosed for each allotment in Appendix E of this document.

Implementation (Short-Term) Monitoring

Annual monitoring techniques will vary depending on the resources and allotments being monitored and the availability of staffing and funding. Any of the following monitoring techniques may be used alone or in combination:

Annual Allotment Resource Inspections:

- 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 AOIs clearly 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 pasture rotations, numbers to be grazed, pasture entrance and exit dates, standards for and determination of allowable use, improvement maintenance and construction, and general allotment operating procedures (Rangeland Analysis Management Training Guide - RAMTG).
- Allowable Use Standards: These standards are designed to ensure that short-term effects of grazing activities are able to provide for the long-term health and sustainability of rangeland resources. There are a variety of allowable use standards that may be employed on any key area depending on the resource concerns. The most commonly used include trigger stubble height, residual stubble height (occurring at the end of the grazing season or the end of the growing season, whichever occurs later), riparian shrub utilization, stream-bank impacts, and so forth. In addition, the Grazing Response Index (GRI) is a tool frequently used as a substitute for or in addition to the allowable use standards (RAMTG).
- Production-Utilization Surveys: Production, actual use, allowable use and acreage are estimated, overlain and delineated on a map. This allows the manager to see where forage is over-allocated or under-used. These type studies can help direct management on a year-to-year basis (RAMTG).
- Stubble Height: Visually assess stubble height and assure that streambank conditions are not deteriorating. Visually assess that shrubs and saplings are not over-utilized during dormancy. Accomplish by annual on-the-ground inspections (including photo points) that document the current condition.
- Grazing Response Index (GRI): The GRI is used to assess the effects of annual grazing pressures, and the effects of repetitive defoliation during the growing season. Looking at GRI scores for certain pastures or allotments over a five to ten year period, provides a general indicator as to whether or not management is providing the

required combination of grazing frequency, intensity and rest opportunity to best meet physiological needs of forage resources (RAMTG).

Effectiveness (Long-Term Trend) Monitoring

Probably the most important role of monitoring is to determine whether management is successful at moving rangeland resources towards desired conditions. Determining trend toward or away from allotment objectives allows rangeland managers to accurately determine the relative success of the management system and to adjust management to speed the accomplishment of objectives. Trend for a variety of rangeland resource parameters may need to be monitored.

The long-term health of *riparian and upland vegetation* will be monitored at 5-10 year intervals on each allotment using one or more of the following methods as needed:

- Cover-Frequency Transects: 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 (RAMTG).
- Ocular Plot: Similar to Cover-Frequency, but limited to collecting canopy cover by species, ground cover and life form (RAMTG).
- Line Intercept: The Line Intercept method consists of horizontal, linear measurements of plant intercepts along the course of a tape. It is used primarily for quantitative measurement of shrub canopy cover. It is ideally suited to riparian-shrub communities. This method allows for measurement of shrub density along a repeatable line to determine whether shrub populations and densities are increasing, decreasing or static (RAMTG).
- Rangeland Health Evaluation Matrix: 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 (RAMTG).
- Photographs and Photo-points: 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* will be monitored at 5-10 year intervals using one or more of the following methods as needed:

- Proper Functioning Condition: This monitoring process classifies riparian as being in one of the following classifications: “Proper Functioning Condition” (PFC), “Functional”, “Functional-at-risk” (with either an upward or downward trend), “Non-functional”, or “Unknown”. These ratings evaluate riparian condition based on

presence/absence of specific vegetation and the interactions of that vegetation with geology, hydrology, and soils (RAMTG).

- Green Line Vegetation Composition: An evaluation of the vegetation in this area of a stream can provide a good indication of the general health of the watershed as well as the specific stream. Well-developed green line vegetation stabilizes channel banks and buffers water forces. This enhances channel stability, even for inherently unstable stream types (RAMTG).
- Riparian Characteristics Evaluation: This evaluation gives the examiner a general look at critical riparian features. Qualitative evaluation of these features can lead the examiner towards an accurate initial assessment of riparian resources and subsequent management of these areas. Comparison of future riparian characteristic evaluations to initial evaluations provides a glimpse of trend in overall riparian health as evidenced by a series of riparian characteristics (RAMTG).
- Photographs and Photo-points: 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.

If at any time, the results of monitoring indicate standards, guidelines, or desired resource conditions are not being achieved as predicted, then other adaptive management strategies will be implemented (i.e. herding, fencing, changes in AUMs, seasons of use, periods of rest, etc.) to move towards and/or meet desired conditions.

Stream and Riparian Monitoring

Stream and riparian monitoring should be set up in coordination with the Fisheries monitoring and should include the streams within the allotments that are on the State 303(d) or 305(b) lists. Monitoring utilizing the Proper Functioning Condition methodology should continue in Key Areas (USDI, 1998).

2.1.6 Summary of Alternatives

The alternatives are summarized in the tables 2.1.6a and 2.1.6b below by allotment. More detailed information regarding individual allotments and management can be found in Appendices B, C, D and E of this document.

Table 2.1.6a. Summary of Sheep Allotments & Stock Driveways by Alternative

Allotment	No Alternative	Grazing	Existing Alternative	Condition	Proposed Alternative	Action
Bear Creek S&G	Closed	– cancel existing term permit after mandatory notification (36 CFR 222.4(a)(1)).	Retain existing term grazing permit and rotation with (BLM) American Flats S&G. Formally incorporate that portion of the Miner-Poughkeepsie S&G that has been used with Bear Creek Allotment. <u># Permitted, Dates</u> 878 ewes/lambs (e/l) 7/11-8/5. Continue existing management practices and grazing rotation. Maintain existing range improvements annually.		Maintain current permitted AUMs; incorporate design criteria to: minimize conflicts with RMBHS and protect habitat occupied by Federally listed T, E, or S species; reduce impacts to identified archaeology sites; maintain or improve upland and riparian vegetation condition, with an emphasis on frequency, timing, and intensity of grazing.	
Big Blue-Fall Creek-Little Cimarron S&G	Closed	– cancel existing term permit after mandatory notification (36 CFR 222.4(a)(1)).	Retain existing term grazing permit. Continue existing grazing rotation and management practices. Maintain existing range improvements annually. <u># Permitted, Dates</u> 850 e/l 7/6 – 9/15		Maintain current permitted AUMs; incorporate design criteria to: minimize conflicts with RMBHS; and protect habitat occupied by Federally listed T, E, or S species; reduce impacts to identified archaeology sites; maintain or improve upland and riparian vegetation condition, with an emphasis on frequency, timing, and intensity of grazing.	
Bighorn S&G	Closed	to provide habitat for Rocky Mountain bighorn sheep.	Closed to provide habitat for Rocky Mountain bighorn sheep.		Closed to provide habitat for Rocky Mountain bighorn sheep.	
Crystal-Lower S&G	Elk	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	Retain existing term grazing permit as authorized below. Continue existing grazing rotation and management practices. Maintain existing range improvements annually. <u># Permitted, Dates</u> 600 e/l 7/6 – 9/10		Maintain current permitted AUMs; incorporate design criteria to: minimize conflicts with RMBHS; minimize impacts to habitat occupied by Uncompahgre Fritillary butterfly; reduce impacts to identified archaeology sites; improve upland and riparian vegetation condition, with an emphasis on frequency, timing, and intensity of grazing.	

Allotment	No Alternative	Grazing	Existing Alternative	Condition	Proposed Alternative	Action
Hero-Idarado S&G	Closed	– cancel existing term permit after mandatory notification (36 CFR 222.4(a)(1)).	Retain existing term grazing permit. Continue existing grazing rotation and management practices. Maintain existing range improvements annually. <u># Permitted, Dates</u> 1000 e/1 7/22 – 7/28 1000 e/1 8/20 – 8/26		Maintain current permitted AUMs; incorporate design criteria to minimize improve upland and riparian vegetation condition, with an emphasis on frequency, timing, and intensity of grazing.	
Middle Fork- Wetterhorn S&G	Closed.	Retain privileges on Middle Fork Livestock Driveway for domestic sheep on allotments administered by San Juan NF or BLM.	Closed. Retain privileges on Middle Fork Livestock Driveway for domestic sheep on allotments administered by San Juan NF or BLM.		Closed. Retain privileges on Middle Fork Livestock Driveway for domestic sheep.	
Miner-Poughkeepsie S&G	Closed		Vacant – adjust boundary to show portion used with Bear Creek S&G for the past 10-15 years.		Same as Bear Creek S&G.	
Uncompahgre Peak- North Henson	Closed	– cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	Retain existing term grazing permit. Continue existing grazing rotation and management practices. Maintain existing range improvements annually. <u># Permitted, Dates</u> 900 e/1 7/11 – 9/20		Maintain current permitted AUMs; incorporate design criteria to: minimize conflicts with RMBHS and habitat occupied by Uncompahgre Fritillary butterfly; avoid identified archaeology sites; improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.	
Ridge Driveway	Retain	trailing privileges associated with bands on BLM and San Juan N.F.;	Continue as currently permitted and authorized. See trailing chart in Appendix.		Continue as permitted and authorized. Incorporate design criteria to minimize conflicts with RMBHS and	
Middle Driveway	Fork					

Allotment	No Alternative	Grazing	Existing Alternative	Condition	Proposed Alternative	Action
East Fork Driveway	privileges on the GMUG would be closed with the term grazing permits following mandatory notification. (36 CFR 222.4(a)(1))				Uncompahgre butterfly; avoid archaeology sites.	Fritillary identified

Table 2.1.6b. Summary of Cattle Allotments by Alternative

Allotment	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
<p>Alpine Plateau C&H</p>	<p>Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))</p>	<p>Retain existing term grazing permits, grazing rotation and management practices. Continue grazing 2 lower pastures of Big Blue C&H with Alpine Plateau, as described in the proposed action.</p> <p>Maintain existing range improvements annually.</p>	<p>Combine the Alpine Plateau and part of the Big Blue allotments into a single allotment with an 8 pasture rotation system. Livestock use on the two lower elevation pastures will be limited to early season use prior to moving to higher elevations, and late season use prior to leaving the allotment. Of the 330 head of cattle authorized to graze on the combine Big Blue/Alpine Plateau allotment, 159 head may be converted to sheep if the opportunity arises. Sheep numbers will be no more than 1000 ewes with lambs for 3 weeks in July and 3 weeks in September. Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.</p>
<p>Baldy & Section 25 C&H</p>	<p>Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))</p>	<p>Retain existing term grazing permit, 4 pasture grazing rotation, and management practices. Continue using these 2 allotments as a single allotment. Maintain existing range improvements annually.</p> <p><u># Permitted, Dates</u></p> <p>80 c/c; 2 bulls; 35 yrlg 6/14-7/6</p> <p>80 c/c; 35 yrlg 7/27-9/6</p> <p>20 c/c 9/7 – 9/30</p>	<p>Maintain current permitted AUMs; Incorporate BLM standards for BLM unit included in this allotment, and design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing; formally combine the two allotments to create one one allotment</p>

Allotment	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Big Blue C&H	Closed	Graze lower 2 pastures with Alpine Plateau C&H; upper 2 pastures remain vacant. Grazing use will be limited to early season use prior to moving to higher elevations, and late season use prior to leaving the allotment. Maintain existing range improvements annually.	Graze lower 2 pastures with Alpine Plateau C&H; upper 2 pastures remain vacant. Incorporate design criteria to improve upland and riparian vegetation condition. Maintain or improve fisheries habitat in Big Blue Creek. (see Alpine Plateau C&H allotment)
Big Park C&H	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	Retain existing term grazing permit, season-long grazing rotation, and management practices. Maintain existing range improvements annually. <u># Permitted, Dates</u> 200 c/c 6/15 – 8/30	Retain existing term grazing permit, grazing rotation, and management practices. Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.
Box Factory C&H	Closed	Vacant	Combine with West Dallas C&H. Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.
Coal Creek C&H	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	Retain existing term grazing permit, season-long grazing rotation, and management practices. Maintain existing range improvements annually. <u># Permitted, Dates</u> 17 c/c 7/1-9/20	Maintain current permitted AUMs and season-long grazing system. Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.
Cocan Flats C&H	Closed	Vacant	Combine with West Dallas C&H. Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.

Allotment	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Cobbs Gulch C&H	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	Vacant, due to recent expiration of term on/off grazing permit.	<p>Retain as a vacant allotment unless restocked by a qualified applicant under the following conditions:</p> <p>Adjacent landowner with qualifying base property and livestock; On date will be no earlier than July 1. Off date will be no later than 8/31.</p> <p>Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.</p> <p>Permitted livestock number will be based upon grazing capacity as determined by a forage production study.</p>
Corbett/Boiler C&H	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	<p>Retain existing term grazing permit, 2 pasture rotational grazing system, and management practices. Maintain existing range improvements annually.</p> <p><u># Permitted, Dates</u></p> <p>50 c/c 7/1 – 9/20</p>	<p>Permitted livestock number will not exceed 80 cow/calf pair July 1 to September 20; Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing. single allotment.</p>
Green Mountain C&H	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	<p>Retain existing term grazing permit, 8 pasture grazing rotation, and management practices. Maintain existing range improvements annually.</p> <p><u># Permitted, Dates</u></p> <p>578 c/c 7/1 – 10/15</p>	<p>Maintain current permitted AUMs; incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.</p>
Little Cimarron C&H	Closed	Closed	Closed

Allotment	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Lou Creek C&H	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	Retain existing term grazing permit, 3 pasture grazing rotation, and management practices. Maintain existing range improvements annually. <u># Permitted, Dates</u> 125 c/c 6/21 – 8/31 55 c/c 7/16 – 10/5 350 c/c 8/25 – 10/10	Maintain current permitted AUM's; Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing.
West Dallas C&H	Closed – cancel existing term permit after mandatory notification. (36 CFR 222.4(a)(1))	Retain existing term on-off grazing permit; alternate season of use every other year as follows: <u># Permitted, Dates</u> 121 cow/calf pair from 7/14-8/15 (odd years); 8/15-9/15 (even years). This is the “on” portion of the permit. 64 cow/calf pair from 7/14-8/15 (odd years); 8/15-9/15 (even years). This is the “off” portion of the permit. Maintain existing range improvements annually.	Maintain current permitted AUM's, season of use, and grazing rotation. Incorporate design criteria to improve upland and riparian vegetation condition with an emphasis on frequency, timing, and intensity of grazing Reconstruct existing fences between West Dallas and Box Factory allotments. Develop additional water sources as needed.

2.2 Alternatives Considered but Eliminated from Detailed Study

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 Proposed Action provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of complying with the Rescissions Act, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

2.2.1 Convert Active Sheep Allotments to Cattle Allotments

A proposal to convert active domestic sheep allotments to cattle allotments was included in the response to scoping by bighorn sheep society. This would include only those active sheep allotments where there is potential conflict between domestic and RMBH sheep – 4 out of the current 5 active sheep allotments. A portion of 3 of these allotments is within the Uncompahgre Wilderness; the 4th allotment lies in the Bear Creek drainage.

Conversion of these active sheep allotments to cattle was not considered practical in this area due to topography and high elevation, which are key components of the rangeland suitability determination. Cattle use at these higher elevations would result in a high incidence of pneumonia and brisket disease, resulting in potentially higher operating costs to permittees due to death loss and doctoring sick animals. There is no infrastructure in place to properly manage cattle, and range improvement construction costs would be significant due to the difficult terrain. Additionally, new improvements would not be authorized within designated wilderness.

2.2.2 Middle Fork Livestock Driveway Use

A proposal was suggested to consider using alternatives to using the Middle Fork driveway for trailing sheep through and into the analysis area. One suggestion was to truck sheep rather than trail them.

The risk analysis addressed trailing and made a determination that the risk of contact between domestic and bighorns was low. Typical trailing behavior of domestic sheep would preclude bighorn activity (i.e., noise, dust, dogs, and overall domestic sheep activity). Trucking can and is sometimes done, depending on fuel and other costs, but the costs can be prohibitive to current permittees

2.2.3 Closing Sheep Allotments in Wilderness

A proposal was suggested to develop an alternative that analyzes closing sheep allotments in wilderness and moving sheep to non-wilderness allotments elsewhere on the Forest.

This proposal does not meet the stated purpose of and need for action (see Chapter 1, sections 1.5 and 1.6). Proposed Action partially addressed this proposal by eliminating all permitted livestock grazing from the Analysis area. There is a lack of available sheep allotments on the Forest to absorb these sheep as described by Ranger District below:

- Ouray Ranger District -- has no allotments available for relocating sheep, other than allotments where potential conflicts with RMBHS or TES species exist. The Miner-Poughkeepsie allotment, although outside the mapped RMBHS overall range, is difficult to access, and has limited forage availability, unless used with the Bear Creek S&G allotment, as is currently the case.
- Norwood Ranger District -- has 3 vacant domestic sheep allotments; however, a current rangeland analysis is not yet completed, and a NEPA decision is not expected to be completed until late in 2009. These allotments are partially within and adjacent to the Lizard Head wilderness. Because of the size, proximity, and extent of the existing permittees operations in the San Juans, they felt that it was cost prohibitive to relocate 1 or 2 bands of their sheep, in terms of overall allotment management and trucking costs. In addition, they felt there would be significantly higher losses to

predation, and that forage quality is lower in the lower elevation, more heavily forested allotments. Based on discussions with the permittees, a decision to utilize these allotments would in all likelihood, result in their going out of business.

- Gunnison Ranger District – has 2 vacant domestic sheep allotments; however, a current rangeland analysis is not yet completed, and a NEPA decision is not expected to be completed until later in 2009. There is potential overlap with RMBHS on these vacant allotments.

2.2.4 Reallocation of use on the Bear Creek Allotment

This proposal was to authorize some sheep use by the Bear Creek herd on the Alpine Plateau allotment, the closed El Paso allotment, and/or the Green Mountain C&H allotment, to reduce use on the Bear Creek allotment. This would result in increased trailing time along the Ridge driveway; and re-opening the El Paso S&G allotment which was closed to term livestock permits to allow for protection of Uncompahgre Fritillary butterfly habitat. Although sheep grazing on the Alpine Plateau allotment may be feasible at some point in the future, as reflected in the proposed action, additional trailing days on the Ridge driveway is not. Use of a portion of the Green Mountain allotment in conjunction with Bear Creek allotment would be potentially beneficial because it could reduce tall larkspur cover on the Green Mountain allotment, thus reducing cattle losses due to larkspur; however, there would be significantly increased losses of sheep to predation; forage quality is lower in this, more heavily forested allotment; and the trailing route between the two allotments does not exist or is extremely hazardous.

2.3 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 2.3. Comparison of Alternatives.

	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Air Quality fugitive dust	There would be no vehicle traffic on public lands associated with grazing activities, so no addition to fugitive dust from permittees or forest administration would occur.	Any dust generated by vehicles at a given location would be localized and short-term. Fugitive dust emissions would also occur from wind blown erosion, however, because of the large expanses of forested and vegetated areas on the public lands, wind blown dust is considered to be negligible if not immeasurable.	Same as the existing condition.
Air Quality – vehicle exhaust	There would be no vehicle traffic on public lands associated with grazing activities, so no addition to emissions from permittees or forest administration would occur.	Exhaust emissions from vehicles would be short term and localized. Alternative is not expected to cause or contribute to violations of State or Federal air quality standards, and would not result in adverse effects on ambient air quality within the analysis area.	Same as the existing condition.
Air quality – climate change	Same as Existing Condition.	Methane release from livestock and NO _x emissions from vehicle traffic will continue to occur within the airshed; therefore, there would be no change.	Same as Existing Condition.

	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Soils & Geology	<p>Forage plants will benefit on most areas for a period of time, thereby improving soil conditions and reducing soil erosivity. Many plants may have more opportunity to complete their life cycle resulting in improved plant vigor; greater amounts of litter and decaying organic matter; and decrease in bare soil. However, lack of disturbance cycles may cause a decline in some plants.</p>	<p>Soil-health concern areas would likely persist, and there would be minimal progress toward Forest Plan Desired Conditions. In the long term, soil health would remain at its current level.</p>	<p>Improve soil health in the few isolated concern areas and move toward Forest Plan Desired Conditions through the use of adaptive management allowing a quicker response to changing conditions, to protect resources. Soil compaction would, over time, be given the opportunity to recover.</p>
Watershed Condition	<p>This alternative is expected to improve soil conditions on all key areas over the next ten years by reducing the amount of forage removed and increasing litter inputs. Long-term livestock exclusion or lack of disturbance cycles may lead to plant decadence and loss of vigor.</p>	<p>Continued grazing at current levels will result in isolated areas with soil compaction, concentrated browsing, and stream bank disturbance, which increases the potential for erosion and sediment production. Riparian health would remain static or begin to improve.</p>	<p>Grazing will continue at levels that are similar to those currently authorized, which will likely result in localized areas of soil compaction, concentrated browsing, and stream bank disturbance, and therefore the potential for erosion and sediment production. Riparian health would remain static or begin to improve.</p>
Water Quality	<p>This alternative would provide additional cover to protect the soil surface and help to prevent erosion and production of sediment. <i>E coli</i> introduction would be reduced</p>	<p>Water quality and designated uses would be at greater risk to degradation from sediment and <i>E coli</i> entering streams than the no grazing alternative.</p>	<p>Same as Existing Condition Alternative.</p>

	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Water developments & Rights	Stockpond maintenance would no longer occur under this alternative. Existing storage structures would need to be removed or accept the risk of erosion and downstream sedimentation from structural failure. Water rights would be unaffected.	Stockpond use and maintenance would continue. Water rights would be unaffected.	Similar to Existing Condition Alternative except adaptive management practices may slightly change duration, timing, or use than current scenario. Water rights would be unaffected.
Vegetation	There would be no direct effects to upland or riparian vegetation from livestock grazing and trailing. Noxious weed introduction from livestock-related disturbances would be eliminated.	Sustain current conditions. Maintain residual vegetation cover, plant vigor, amounts of bare ground and overall rangeland health at current levels.	Increase residual vegetation in areas where it is at less than desirable levels, lessen amounts of bare ground in areas where it is currently too prevalent, and increase the vigor of individual plants.
Sensitive Plants – Stonecrop gilia	Unidentified populations in the analysis area of the species may see some benefit from the removal of grazing due to removal of disturbance.	The low forage value and high elevation of Stonecrop gilia habitat may leave it undesirable for sheep, which prefer richer bottomlands. Unless Stonecrop gilia occurrences are near water sources, such as snow banks, or in areas through which sheep travel to get to better forage, they are probably somewhat naturally protected from grazing impacts.	Same as Existing Condition

	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Sensitive Plants – tundra buttercup	Populations in the analysis area of the species may see some benefit from the removal of sheep grazing due to removal of disturbance in terrain that makes up its habitat; since there is no information on the palatability or preference of this species for forage, nor is the habitat likely to be grazed this benefit would likely not be noticed.	It is unlikely that sheep would have a significant impact upon this plant. Since it can occur on talus slopes and ridges, it would be conceivable that sheep could trail over plants and possibly damage them. It is unlikely that sheep would be trailed over habitats where this species grows because of late-lying snow banks.	Same as Existing Condition
Noxious and invasive species	No increase in noxious or invasive species establishment due to livestock grazing activities.	Livestock grazing has not been a significant vector in establishment of noxious or invasive weed species; this is not anticipated to change.	Same as existing condition.
Greenback cutthroat trout	No effect	No effect	No effect
Uncompahgre Fritillary Butterfly and Canada lynx	Same as existing condition.	May affect, not likely to adversely affect	Same as existing condition.
Gunnison’s prairie dog, Northern goshawk, and Purple Martin	No effect	No effect	No effect
Rocky Mountain bighorn sheep, Colorado River cutthroat trout, Northern leopard frog, and Nokomis fritillary butterfly	Same as existing condition.	May adversely impact individuals, but is not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing	Same as existing condition.
Forested habitat associated MIS	No change to project numbers at project or forest scale; no direct or indirect effects on forest vegetation types providing habitat.	No change to population numbers at project or forest scale; temporary displacement of individuals due to habitat alteration and/or disturbance.	Same as existing condition.

	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Merriam's turkey and Common trout	Same as existing condition.	No change to population numbers at project or forest scale;	Same as existing condition.
Range Resources	Benefits include increased litter accumulation; less bare ground; improved plant vigor; improved residual vegetation cover, and improved rangeland and riparian health. Long term livestock exclusion may lead to plant decadence, and a build-up of vegetative litter, reducing plant vigor.	Maintain residual vegetation cover, plant vigor, amounts of bare ground and overall rangeland health at current levels.	Similar to existing condition except in areas where desired conditions are meeting or moving towards desired objectives, improved livestock management should result in maintaining or meeting objectives in 10-15 years. In areas of poor to fair range condition, it will take much longer to see improvements to overall range health.
Recreation - General character	No change to recreational opportunities available.	No changes to general character of recreation experience.	Individual areas may have the perception of a more primitive experience.
Outfitter-guide operations	No change to number or variety of recreational opportunities.	Similar to those under recreation – general character.	Similar to existing condition.
Recreation Trails	No change to livestock driveways that are also used as recreational trails; no future impacts to other trails due to livestock grazing. No change to numbers of trails and types of routes.	No change to livestock driveways that are also used as recreational trails; there would be some impacts to other trails due to livestock grazing. No change to numbers of trails and types of routes.	Same as existing condition.
Wilderness Values	Natural conditions and wilderness character anticipated to improve over time.	Limited areas where desired conditions have not been achieved, or have been lost; or where standards have been exceeded.	Same as existing condition.
Recreation - Social Interaction	There would be no social interaction between livestock and recreation users.	Some negative social interaction anticipated between permitted livestock operations and recreation users.	Same as existing condition.

	No Grazing Alternative	Existing Condition Alternative	Proposed Action Alternative
Heritage Resources	There would be no future impacts from grazing to heritage resources. Evidence of previous grazing activities will continue to exist on non-renewable heritage resources.	Livestock may have a continued effect on heritage resources if they travel through a resource site or if they are concentrated on a site. Future livestock grazing may cause surface disturbance that could affect the integrity of historical structures and prehistoric sites.	Same as existing condition.
Transportation System	There would be minimal reduced effects to the current transportation system. There would be no collision potential between livestock and vehicles on lands in the analysis area.	There would be no change in effects to the current transportation system. Collision potential would continue to exist at current levels between livestock and vehicles on lands in the analysis area.	There would be minimal change in effects to the current transportation system based on adaptive management practices or use of different livestock staging areas. Changes are not anticipated in traffic levels or normal wear and tear of road surfaces. Collision potential would continue to exist at approximately current levels.
Socio-economics			
Present Net Value (PNV)	-\$300,013.16	-\$580,230.99	-\$757,632.83

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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 the alternatives chapter.

3.0 General Affected Environment Information _____

3.0.1 Current Allotment Status

There are eight domestic sheep allotments and fifteen cattle allotments within the analysis area that are discussed in this document in all alternatives. See Table 3.0 below for current status.

Table 3.0.1 Current Allotment Status and Number of Permittees within Analysis Area

ALLOTMENT	STATUS	# OF PERMITTEES
Big Blue Cattle & Horse (C&H)	Vacant (used with Alpine Plateau C&H since at least 2000)	0
Cocan Flats C&H	Vacant	0
Box Factory C&H	Vacant	0
Little Cimarron C&H	Vacant	0
Baldy C&H	Active	1
Section 25 C&H	Active	1
Corbett Creek & Boiler C&H	Active	1
West Dallas C&H	Active	1
Coal Creek C&H	Active	1
Big Park C&H	Active	1
Green Mountain C&H	Active	1
Alpine Plateau C&H	Active	2
Lou Creek C&H	Active	1

ALLOTMENT	STATUS	# OF PERMITTEES
Cobbs Gulch C&H	Vacant due to recent permit expiration	0
Bighorn S&G	Vacant	0
Miner-Poughkeepsie S&G	Vacant (used with Bear Creek S&G)	0
Middle Fork-Wetterhorn S&G	Vacant	0
Crystal-Lower Elk S&G	Active	1
Hero-Idarado S&G	Active	1
Bear Creek S&G	Active	1
Big Blue-Fall Creek-Little Cimarron S&G	Active	1
Uncompahgre Peak-North Henson S&G	Active	1

3.0.2 Activities that Affect Ground Conditions

Numerous past, present, and future activities affect the conditions on the ground and present an ever-changing set of circumstances which management activities are forced to adapt. Below are lists of activities that have, are, or are anticipated to occur within the analysis area.

Past actions that have affected existing condition include:

- Timber harvest;
- Hard rock mining;
- Homesteading on areas now under Forest Service management and control;
- Heavy historic livestock grazing across the landscape;
- Recreational use including increasing unauthorized Off Highway Vehicle (OHV) use
- Development on private lands;
- Road and trail construction and maintenance activities;
- Wildfire;
- Restoration/rehabilitation activities; and
- Wildlife habitat improvement projects.

Current activities affecting existing condition include:

- Noxious weed control;
- Livestock grazing activities;
- Timber harvest; firewood cutting;
- Recreational use, including motorized and non-motorized use, outfitter guide operations, and special events;
- Fire use and wildfire suppression;
- Development of private lands;
- Watershed improvement projects;
- Water diversions, rights and developments;
- Private land development; and
- Road and trail maintenance;

Reasonably foreseeable activities include:

- Increasing recreational use, including motorized and non-motorized use, outfitter guide operations, and special events;
- Increasing development on private lands;
- Noxious weed control;
- Timber harvest; firewood cutting;
- Water diversions, rights and developments
- Watershed improvement projects;
- Fire use and wildfire suppression activities;
- Livestock grazing activities;
- Wildlife habitat improvement projects; and
- Road and trail development and maintenance;

3.1 Air Quality

3.1.1 Affected Environment

Air quality in the analysis area is affected by activities currently conducted within the area. The analysis area for direct, indirect, and cumulative effects is defined here as the analysis area with approximately a 40-mile radius buffer which includes both Class I and Class II airsheds.

Comparative information, such as ambient air quality, atmospheric conditions, and existing air emission sources, were derived from databases maintained by the United States Environmental Protection Agency (U.S. EPA 2006a) and Colorado Department of Public Health and Environment, Air Pollution Control Commission (CAPCC 2006). Regulatory standards for air quality (e.g., criteria pollutants) were obtained from U.S. EPA (U.S. EPA 2006b) and Colorado Department of Public Health and the Environment Air Pollution Control Commission (CAPCC 2006).

The federal government and State of Colorado have established ambient air quality standards for criteria air pollutants. The criteria pollutants are carbon monoxide (CO), lead (Pb), sulfur dioxide (SO₂), particulate matter smaller than 10 microns (PM₁₀), ozone (O₃), and nitrogen dioxide (NO₂). In 1997, the U.S. EPA revised the federal primary and secondary particulate matter standards by establishing annual and 24-hour standards for particulate 2.5

micrometers in diameter or smaller (PM_{2.5}). Ambient air quality standards must not be exceeded in areas where the general public has access. **Table 3.1** lists federal and state air quality standards. National primary standards are levels of air quality necessary, with an adequate margin of safety, to protect public health. National secondary standards are levels of air quality necessary to protect public welfare from known or anticipated adverse effects of a regulated air pollutant. The attainment status for pollutants in the project area is determined by monitoring levels of criteria pollutants (CO, Pb, SO₂, PM₁₀, O₃, and NO₂) for which National Ambient Air Quality Standards (NAAQS) and Colorado Ambient Air Quality Standards exist. Air quality in the analysis area is designated as attainment for all criteria pollutants meaning no violations of Colorado or national air quality standards have been documented in the area.

No data is available regarding current ambient greenhouse gas concentrations in air unless they are already regulated constituents.

Table 3.1.1 State of Colorado and National Ambient Air Quality Standards

Pollutant	Averaging Time	Air Quality Standard Concentration ^(a)	
		Colorado	National
Ozone	1 hour	235 µg/m ³ (0.12 ppm)	235 µg/m ³ (0.12 ppm)
	8 hours	--	157 µg/m ³ (0.08 ppm)
Carbon Monoxide	1 hour	40,000 µg/m ³ (35 ppm)	40,000 µg/m ³ (35 ppm)
	8 hour	10,000 µg/m ³ (9 ppm)	10,000 µg/m ³ (9 ppm)
Nitrogen Oxides	Annual Arithmetic Mean	100 µg/m ³ (0.05 ppm)	100 µg/m ³ (0.053 ppm)
Sulfur Dioxide	Annual Arithmetic Mean	10 µg/m ³ (0.004 ppm) ^(c)	79 µg/m ³ (0.03 ppm)
	24 hours	50 µg/m ³ (0.02 ppm) ^(c)	367 µg/m ³ (0.14 ppm)
	3 hours	--	1,310 µg/m ³ (0.5 ppm) ^(b)
Particulate Matter as PM ₁₀	Annual Arithmetic Mean	50 µg/m ³	50 µg/m ³
	24 hours	150 µg/m ³	150 µg/m ³
Particulate Matter as PM _{2.5}	Annual Arithmetic Mean	--	15 µg/m ³
	24 hours	--	65 µg/m ³
Lead (Pb)	Quarterly Arithmetic Mean	--	1.5 µg/m ³

Note: µg/m³ = micrograms per cubic meter; ppm = parts per million; PM₁₀ = Particulate Matter smaller than 10 microns; PM_{2.5} = Particulate Matter smaller than 2.5 microns.

Sources: Colorado Code of Regulations (CCR) 5 CCR 1001-14 and Code of Federal Regulations, 40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards

(a) Primary Standard unless otherwise noted

(b) Secondary Standard

(c) Category II increment per 5-CCR-1001-14

Source: *Deer Creek Shaft and E Seam Methane Drainage Wells Project FEIS* (2007)

In the vicinity of the analysis area, the primary sources of air pollution include smoke from grass and forest fires, fugitive dust from roadways/natural wind blown dust and vehicle emissions. The primary pollutants of concern associated with these existing sources are oxides of nitrogen (NO_x), carbon dioxide (CO), sulfur dioxide (SO₂), and particulate matter with an aerodynamic diameter less than 10 microns (PM₁₀) and with an aerodynamic diameter less than 2.5 microns (PM_{2.5}). The combustion of fossil fuels is the primary source of NO_x, CO and SO₂ emissions. Vehicle traffic and wind erosion contribute to PM₁₀ emissions.

The analysis area is designated a Class II area, as defined by the Federal Prevention of Significant Deterioration (PSD) provision of the Clean Air Act. The PSD Class II designation allows for moderate growth or degradation of air quality within certain limits above baseline air quality. No management activities related to motorized travel will occur in Wilderness Areas. Due to the nature of the project (i.e., permittee vehicle travel on designated routes), no specific permit requirements apply to gaseous emissions.

Fugitive Dust

When a vehicle travels an unpaved road the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. Emissions associated with vehicle traffic would include fugitive particulate emissions as a result of travel on unpaved roads. Fugitive dust particles are generally large enough that long-range transport of these emissions does not occur. Fugitive dust generated from road use is expected to be short-term and localized.

Vehicle Exhaust

Nitrogen oxides form when fuel burns at high temperatures, such as in motor vehicle engines. Motor vehicles are responsible for approximately 34% of all nitrogen oxide emissions in the United States (EPA July 2007). The EPA through the implementation of standards for new vehicles regulates vehicle exhaust emissions. States may also impose vehicle emissions testing programs for vehicles registered in their state. Emissions associated with vehicle traffic would include NO_x and CO emissions from vehicle tailpipes. Diesel fueled vehicles would also emit SO_x.

Carbon monoxide (CO) is a product of motor vehicle exhaust, which contributes about 60 percent of all CO emissions nationwide. High concentrations of CO generally occur in areas with heavy traffic congestion such as cities (USEPA, 1999). Locally, the analysis area has a background concentration of 6.41-27.13 tons/year/square mile (USEPA, 1999). Nationally, CO concentrations have consistently declined over the last 30 years. Therefore, CO emissions will not be further addressed as the declining trend is expected to continue.

SO_x will not be specifically addressed as it applies only to a small number of vehicles that will be using the public routes.

Climate Change

Approximately 14% of U.S. NO_x emissions come from vehicle traffic (EIA, Nov 2007). NO_x has approximately 310 times the global warming potential of carbon dioxide equivalency. However the percentage of NO_x emitted is very low compared to other green house gases and even considering the greater global warming potential vehicle emissions (NO_x) count for less than 1% of total U.S. global warming potential. Livestock also emit methane, another potent greenhouse gas. See Cumulative Effects section for discussion.

3.1.2 No Grazing Alternative Environmental Consequences

Fugitive Dust & Vehicle Exhaust

There would be no vehicle traffic on public lands associated with grazing activities under this alternative; therefore, no addition to fugitive dust or emissions from permittees or forest administration would occur.

Climate Change

Methane release from livestock and NO_x emissions from vehicle traffic will continue to occur within the airshed only from different locations; therefore, there would be no change to the existing condition.

3.1.3 Existing Condition & Proposed Action Alternatives Environmental Consequences

Fugitive Dust

The existing condition would continue. The average speed limit on unpaved motorized routes by permittees and agency staff will likely be less than the 30 mph which minimizes actual dust emissions. Any dust generated by vehicles at a given location would be localized and short-term. Fugitive dust emissions would also occur from wind blown erosion, however, because of the large expanses of forested and vegetated areas on the public lands, wind blown dust is considered to be negligible if not immeasurable.

Vehicle Exhaust

Exhaust emissions from vehicles would be short term and localized. These emissions are not regulated. None of the alternatives are expected to cause or contribute to violations of State or Federal air quality standards, and would not result in adverse effects on ambient air quality within the analysis area.

Climate Change

Methane release from livestock and NO_x emissions from vehicle traffic will continue to occur within the airshed; therefore, there would be no change to the existing condition.

3.1.4 Cumulative Effects

Vehicle traffic and associated emissions in the analysis area would increase slightly as the demand for recreation or other uses in the area increases under any of the alternatives. However, these increases are not considered significant. These increases are not expected to cause or contribute to violations of State or Federal air quality standards, and would not likely result in adverse effects on ambient air quality within the analysis area.

While any of the alternatives for this analysis will incrementally contribute to climate change whenever traffic levels increase, the extent of the change is not attributable to the proposed action or the alternatives. These changes are not discernable between alternatives or even on a national scale due to the limited size of the analysis area and the unknown vehicle miles traveled by the general public. There would be no climate change effects from fugitive dust.

3.2 Soils & Geology

3.2.1 Affected Environment

This analysis area is within the South Central High lands Section of the Southern Rocky Mountains, Steppe-open woodland-coniferous forest-alpine meadow physiographic province. This area is on the northern flanks of the San Juan Mountain range. It contains a mix of mesas, canyons and mountain landforms. The geology consists of material broadly called the San Juan Volcanics. It is a mixture of extrusive volcanic material which may be ash flows, breccias, tuffs and deposited conglomerates that are mixtures of all this material. The north

central and western portions of the analysis area are also influenced by underlying sedimentary material, usually sandstones, shales and interbedded sandstone and shales. The steeper canyon and drainage sideslopes are moderately prone to debris flows and slope slumps if saturated by large rainfall events or rapid snow melt periods.

The soils that have formed from this geologic material exhibit a wide range of characteristics as identified in the *Ouray Soil Survey*, which was inventoried during the early 1990's. In the inventory there were 55 individual soils identified and 72 distinct mapping units. Review of this data shows that there is a wide variety of soil characteristics. In the steep, rugged, high glaciated mountainous terrain, the soils tend to be medium textured, contain large amounts of coarse fragments in the soil profile/surface and soils may range from shallow to deep. The soil characteristics in the lower elevations on the mesa's and canyon terrain also have fairly wide ranges. The canyons are usually steep and rocky, with valley bottom riparian areas that may contain poorly drained soil conditions. The soils on the flatter mesa's flanks are usually deeper, medium to fine textured and in aspen oak and grass areas contain more organic matter.

Historical livestock use of areas within this analysis area during the late 1800s and early 1900s likely had an effect on soil health. During this period of unregulated grazing, soil health was impacted primarily through hoof action (compaction), plant-health reduction, and erosion. There are localized areas where soil productivity was affected. Timber harvest, recreation, wildfire, and mining impacts also have affected soils in this analysis area.

3.2.2 No Grazing Alternative Environmental Consequences

The elimination of livestock grazing on the allotments will benefit forage plants on most areas for a period of time, thereby improving soil conditions and reducing soil erosivity. The elimination of livestock grazing will allow all forage plants to complete their growth cycle. Some plants in small isolated areas may have a longer interval in which they can complete their growth cycle, depending on elk selectivity in these areas. This will allow forage plants to improve in vigor, resulting in greater amounts of litter and decaying organic matter. Bare soil will decrease. This recovery cycle may take decades. Over time the majority of the vegetation will remain in the same state or even decline due to the lack of disturbance cycles. Soils may continue to be affected, as described in the Existing Condition Alternative, along livestock driveways that are maintained for use by allotments outside of the analysis area.

3.2.3 Existing Condition Alternative Environmental Consequences

Grazing animals can impact the soil resource. These impacts may include trampling of the soil, compaction of the soil (which may lead to reduced infiltration), reduced plant growth (due to greater density of the soil and less available moisture), trailing that may lead to gully erosion, and loss of adequate protective vegetative ground cover (resulting in increased erosion). Over use of rangelands leads to more bare ground exposed, increase of weeds, increased erosion rates and decreases in soil productivity. These impacts usually are a result of large numbers of animals on areas for long periods of time on a regular basis.

Livestock (primarily cattle) grazing can have significant effects on riparian conditions and water resources as well. As with upland rangeland areas, the frequency of grazing, the intensity of grazing, and the opportunity for plants to grow before grazing, or regrow after grazing, are factors that affect the impacts of grazing on riparian vegetation. While the geology of the area affects stream bank stability, in general the longer the time period that

cattle graze along a stream, the greater the chances that bank damage will occur. Grazing can directly affect stream bank conditions. While grazing impacts riparian vegetation, as just described, it can also physically affect the stream banks proper. Livestock can physically trample and cause bank failure.

Soil-health concern areas (bare soils, bank trampling, compaction, etc) would likely persist, and there would be minimal progress toward Forest Plan Desired Conditions. The allotment management plans are not current and cannot adjust to changing environmental or management issues. In the long term, soil health would remain at its current level.

3.2.4 Proposed Action Alternative Environmental Consequences

If livestock grazing activities are concentrated the effects would be similar to the Existing Condition Alternative; however, the Proposed Action Alternative would improve soil health in the few isolated concern areas (bare soils, bank trampling, compaction, etc) and move toward Forest Plan Desired Conditions through the use of adaptive management. This Alternative allows a quicker response to changing conditions, so that livestock concentration could be adjusted as necessary to protect resources.

Soil compaction would, over time, be given the opportunity to recover. This would be a positive enhancement over the current management situation. The current management philosophy focuses on herbaceous vegetation needs. Adaptability to changing conditions means that vegetation management (using techniques designed to allow plants the ability to grow before grazing and/or regrow after grazing) would improve; therefore, giving deep-rooted native species a chance to repopulate areas where they have been replaced by mid-seral or early-seral plants. This is done by allowing plants the ability to establish foliage, which in-turn, allows the plants to produce carbohydrates to nourish their roots. The perpetuation of a healthy root system promotes and allows for healthy range conditions. The outcome of healthier range conditions will result in increases of residual ground cover and a decrease of bare ground. This will lead to better infiltration and less runoff, which combined with better distribution of livestock across each allotment, will allow individual desired plants to increase their vigor, cover, and frequency. Less bare ground means more plants holding the soil in place while lessening the likelihood of invasion by noxious weeds.

3.2.5 Cumulative Effects

Timber harvest, recreation, wildfire, mining and other on-going activities will continue to effect soils in the analysis area whether or not livestock grazing is present. An important factor in protection of soil productivity is protection offered by soil litter. The amounts of Litter and bare soil are very likely the best indicators of overall soil health condition and trend, relative to rangeland management. When bare soil is being reduced and litter increasing, in most cases, the soil should be improving in health. All actions that keep this protective soil cover intact will also contribute to better soil health and protection of soil productivity. In general, soil impacts such as displacement or severely burned soils are not an issue on these allotments.

3.2.6 Mitigation and Monitoring

Soil erosion and compaction can be mitigated to reduce impacts to water quality. A 1985 agreement between the Forest Service and the Environmental Protection Agency mandated the Water Resource Evaluation of Nonpoint Silvicultural Sources (WRENSS) as official

guidance to control nonpoint sources of water pollution. Its controls were used to construct many management measures and design criteria. Others are adapted from Federal and State BMPs and work of other Regions and agencies. “Best Management Practices” are, by definition, the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (CDPHE, 2001; WY DEQ, 2001).

Manage land treatments to maintain enough organic ground cover in each activity area to prevent harmful increased runoff (*R-2’s Watershed Conservation Practices Handbook FSH 2509.25*). Organic ground cover (plants, litter, and humus) is vital to maintain hydrologic function. Reduced ground cover decreases infiltration of water and increases surface runoff and peak flows. Continued or severe loss of ground cover often results in the formation of pedestals, rills, and gullies that greatly concentrate runoff, increase peak flows, and damage streams. Monitoring should observe evidence of pedestals, rills, and surface runoff. Compare average organic ground cover of treated activity areas with reference areas, using ocular methods, rooted nested frequency method, cover-frequency method (USFS, 1996a), soil pedon data, pace transects, or other accepted monitoring methods. Monitoring requirements are consistent with those already proposed in Chapter 2 of this document for range resources; therefore, there are no additional monitoring requirements specific to this analysis.

Manage land treatments to limit the sum of severely burned soil and detrimentally compacted, eroded, and displaced soil to no more than 15% of any activity area. Soil compaction is caused by the weight of vehicles and animals on the ground. It increases soil density and reduces large pores so that water absorption and root growth are impaired. Clay and loam soils compact more than sandy soils. Soils compact more when soil moisture exceeds the plastic limit. Ground cover, deep snow, and frozen soil reduce compaction. The 15% limit applies to all natural and human disturbances that may impact soil structure, organic matter, and nutrients in areas allocated for vegetation production (R2 FSH 2509.18). Where excessive soil impacts already exist from prior activity, the emphasis should be on preventing any additional detrimental impacts and on reclamation where practicable. As defined in the National Soil Handbook (FSH 2509.18) soil quality standards are intended for areas where management prescriptions are being applied, such as timber harvest areas and range allotments. Monitor extent of detrimentally compacted, displaced, and eroded soil in those activity areas with the most disturbances. Monitoring requirements are consistent with those already proposed in Chapter 2 of this document for range resources; therefore, there are no additional monitoring requirements specific to this analysis.

3.3 Watershed Resources _____

3.3.1 Affected Environment

The desired condition of watershed resources (upland soils, riparian, channel, wetland, and groundwater components) is to provide for the absorption of precipitation and attenuation of runoff. Streams are in dynamic equilibrium and are resilient to normal flood and drought events. In addition, stream flows provide water of sufficient quantity, quality, and timing to support State designated uses and provide habitat capable of supporting an abundance and diversity of species.

The analysis area lies almost entirely (>99%) within the Gunnison River Basin, with the remainder in the San Miguel. Principal drainage systems include the Lake Fork of the Gunnison, Big & Little Blue Creeks, Cimarron Rivers, upper Uncompahgre River, Cow Ck, and the Dallas Creeks. It includes an estimated 610 miles of intermittent and perennial streams, and 1295 acres of wetlands.

Water related values include a variety of ecological and social benefits including healthy riparian corridors, fisheries habitat, drinking water, agricultural supplies etc. Many are identified by the State of Colorado as designated or classified beneficial uses with appropriate water quality standards for their protection.

Watershed Condition

The GMUG National Forest completed a watershed condition assessment in 2005 based on NF lands within 6th level watersheds. The assessment utilized physical factors related to sediment production and routing to characterize overall sensitivity to natural or management related disturbances. Known disturbance factors (ie recent fires, road density, timber harvest mining, etc.) were used to characterize disturbance intensity. The results were then combined and used as an indicator of overall watershed integrity. The continuum of results for the 225 6th level watersheds across the GMUG, were then separated in 4 classes or groups from low to high in terms of physical sensitivity, disturbance intensity, and integrity to facilitate interpretations and comparison of conditions across the GMUG.

Portions of 20 6th level watersheds are included within the analysis area. Approximately 95% of the analysis area is classed as high or moderately high in terms of physical sensitivity due the prevalence of steep slopes, rapid runoff, and potential for high intensity storm events. At the same time, the rugged terrain has limited the extent of management related activities to a few localized areas. So although relative sensitivity to disturbance is high or moderately high in much of the area, only 25% of the area ranked moderate or low in terms of overall integrity (Upper Uncompahgre and Little Cimarron rivers).

The legacy of historic mining in the upper Uncompahgre is responsible for the low integrity rating. The presence of stream corridor roads and dispersed recreational pressures are the causes for the Little Cimarron's poor rating. The ratings do not imply the entire watershed or all streams and associated riparian zones are in poor condition; but rather that localized upland or stream impairment is more likely. The NF lands within the analysis area are considered to be within the range of natural variation in terms of watershed integrity, with the exception of the upper Uncompahgre River portion (15% of the analysis area).

Water Quality

The Colorado Water Quality Control Commission is responsible for identifying designated uses of water and the establishment of water quality standards to support or protect them. The designated uses identified for the streams within the analysis area include:

- Agriculture
- Drinking Water Supply
- Aquatic Life Cold 1 & 2
- Primary Contact Recreation
- Secondary Contact recreation

The commission's 2008 report "Status of Water Quality in Colorado" concludes that the majority of streams in the analysis area fully support all assigned designated uses, or that no

impairment is suspected (Lake Fork of the Gunnison, the Blues, Cimarrons, and upper Cow Creek & Uncompahgre River tributaries). Suspected impairment to aquatic life cold 1 & 2 occurs in the Dallas Creek drainages and the lower Cow Creek & Uncompahgre River tributaries. Those streams are included in the “Monitoring and Evaluation” list (M&E) of the report. The potential impairment is due to elevated levels of selenium (SE) that naturally occurs in the Mancos Shale formation that is more prevalent in those systems.

The main-stem of the Uncompahgre River and portions of Red Creek are included on the 303d list of “Impaired Waters” due to heavy metal concentrations (Cd, Zn, & Cu) caused by historic mining activities. The water quality is considered insufficient to fully support aquatic life 1 & 2. Under the provisions of the Clean Water Act the State is required to make a total maximum daily load (TMDL) determination for all 303d listed waters of the state. The process has not begun for the Uncompahgre River and Red Creek, but they are considered a high priority by the state.

Water Developments and Rights

The primary consumptive water use of water produced in the analysis area is for agriculture purposes. The Colorado Division of Water Resources administers 40 active water rights for agricultural uses held by private entities within the analysis area. The rights are for small reservoirs, ditches, spring developments, and pipelines. The reservoir rights are for 1 to 40 acre-feet of storage. Ditch rights range from 0.5 cubic feet per second (cfs) to 25 cfs. The largest rights are for the Sneva ditch (25 cfs) on Cow Creek just above the Forest boundary, the Cimarron ditch (25 cfs) on the West Fork of the Cimarron River, the Cronenberg ditch (12.5 cfs) on the West Fork of Dallas Creek, and the Stealy ditch (7 cfs) on Owl Creek at the Forest boundary.

The season of use for the irrigation water rights typically runs from mid-May through September. The federal government also holds state administered water rights for 11 stock ponds throughout the analysis area. The ponds hold water seasonal and store from 0.3 to 4 acre feet to meet livestock watering needs.

Drinking water is the other consumptive use that is potentially affected by livestock grazing in the analysis area. The Colorado Department of Public Health and Environment (CDPHE) is the lead agency in assuring that safe drinking water is provided by all public systems in the state, and for enforcing standards established by the Safe Drinking Water Act. Four surface water dependent providers are included in the analysis area (Project 7, Grand Junction, the Town of Nucla, and the Town of Ridgway). Sixty percent of the Town of Ridgway’s total source water area is included in the analysis area; the intake is just a short distance below the District boundary. The other systems have 11 percent or less of their source areas within the analysis area.

The Colorado Water Conservation Board holds 20 in-stream flow water rights on major streams within the analysis area in support of non-consumptive ecological uses or values.

3.3.2 General Environmental Consequences Common to All Alternatives

The direct effects of livestock occur in localized upland areas, riparian zones, and stream reaches.

Watershed Condition

Vegetative removal or changes in composition or density can potentially influence watershed stream channel conditions. Vegetation removal and soil compaction from any number of use activities can increase surface runoff and decrease interception/infiltration. Loss of effective vegetative cover increases the potential for soil erosion. The actual occurrence and magnitude of soil loss depends on additional site & topographic factors as well as the nature and intensity of subsequent runoff events. In the extreme, the factors may combine and lead to severe erosion reducing site productivity and generating sediment that may be delivered to the stream system. Typically little or no erosion occurs, or is short-lived because the loss of cover occurs on a small area and vegetative re-growth precedes extreme weather events.

Permanent or frequent loss of cover virtually assures soil loss and eventual loss of site productivity. Productivity losses facilitate a cycle of reduced plant vigor or compositional changes that accompany chronic erosion. Establishment or spread of undesirable species or noxious weeds may be encouraged. This would occur only in areas subject to chronic over grazing.

Sediment production and delivery to the stream network from either upland or near channel sources adversely affects water quality and physical channel conditions. High gradient stream reaches ($\geq 3\%$) are not as vulnerable to sediment loading as those with low gradients, especially those $\leq 1\%$. Excessive sediment in low gradient reaches can trigger negative changes in channel geometry (shallower and wider), bottom substrate, bank stability, and fish habitat.

Water Quality

Potential water quality affects would be the result of either sediment or pathogens (E coli.) Sediment may be derived from either upland or near channel sources and negatively affect cold water fisheries by the deleterious affect on habitat. Introduction of E coli occurs via fecal matter deposition directly into or adjacent to streams or other water bodies. Low gradient slow moving reaches throughout the area would be most vulnerable to water quality degradation.

Water Developments and Rights

There are no grazing effects to privately held water developments, their operations, or state water rights. Permittees utilize the existing stock ponds in order to water livestock. The small ponds require occasional repair and maintenance. Currently there is no new stock pond construction planned within the analysis area; any new construction would require additional environmental analysis.

3.3.3 No Grazing Alternative Environmental Consequences

No direct or indirect effects would occur from livestock, as there would be no permitted grazing within the analysis area.

Watershed Condition

This alternative would retain the most vegetative cover, increase litter-fall, and provide the least compaction and trampling of upland sites in the short-term. This alternative is expected to improve soil conditions on all key areas over the next ten years by reducing the amount of forage removed and increasing litter inputs. Long-term livestock exclusion or lack of disturbance cycles may lead to plant decadence and loss of vigor.

Water Quality

This alternative would provide additional cover to protect the soil surface and help to prevent erosion and production of sediment. The potential of *E coli* introduction from permitted livestock grazing would be eliminated.

Water Developments and Rights

Stockpond maintenance would no longer occur under this alternative. Existing storage structures would need to be removed or accept the risk of erosion and downstream sedimentation if earthen berm or dam failure occurs. The use and administration of privately held water rights would continue and be unaffected.

3.3.4 Existing Condition Alternative Environmental Consequences

Watershed Condition

Continued grazing at current levels will result in isolated areas with soil compaction, concentrated browsing, and stream bank disturbance, which increases the potential for erosion and sediment production. Riparian health would remain static or begin to improve as some areas recover from the effects of previous livestock grazing.

Water Quality

Water quality and designated uses would be at greater risk to degradation from sediment and *E coli* entering streams than the no grazing alternative. The greatest threats are on low gradient slow moving stream reaches in the analysis area.

Water Developments and Rights

Stockpond use and maintenance would continue under this alternative. The use and administration of privately held water rights would continue and be unaffected.

3.3.5 Proposed Action Alternative Environmental Consequences

Watershed Condition

Grazing will continue at levels that are similar to those currently authorized, which will likely result in localized areas of soil compaction, concentrated browsing, and stream bank disturbance, and therefore the potential for erosion and sediment production. Riparian health would remain static or begin to improve as some areas recover from the effects of previous livestock grazing. This alternative does provide greater flexibility in adjusting management in response to any localized areas not meeting desired conditions as well as to environmental conditions that may increase risks (drought, fire, etc.)

Water Quality

Water quality and designated uses would be at greater risk to degradation from sediment and *E coli* entering streams than the no grazing alternative. The greatest threats are on low gradient slow moving stream reaches in the analysis area.

Water Developments and Rights

Stockpond use and maintenance would continue under this alternative. Depending on which adaptive management practices are used, there may be slight differences in the duration, timing, or use than current scenario. The use and administration of privately held water rights would continue and be unaffected.

3.3.6 Cumulative Effects

There are no notable differences in cumulative watershed effects among the various alternatives. Differences between them in localized areas are much more likely.

3.4 Vegetation

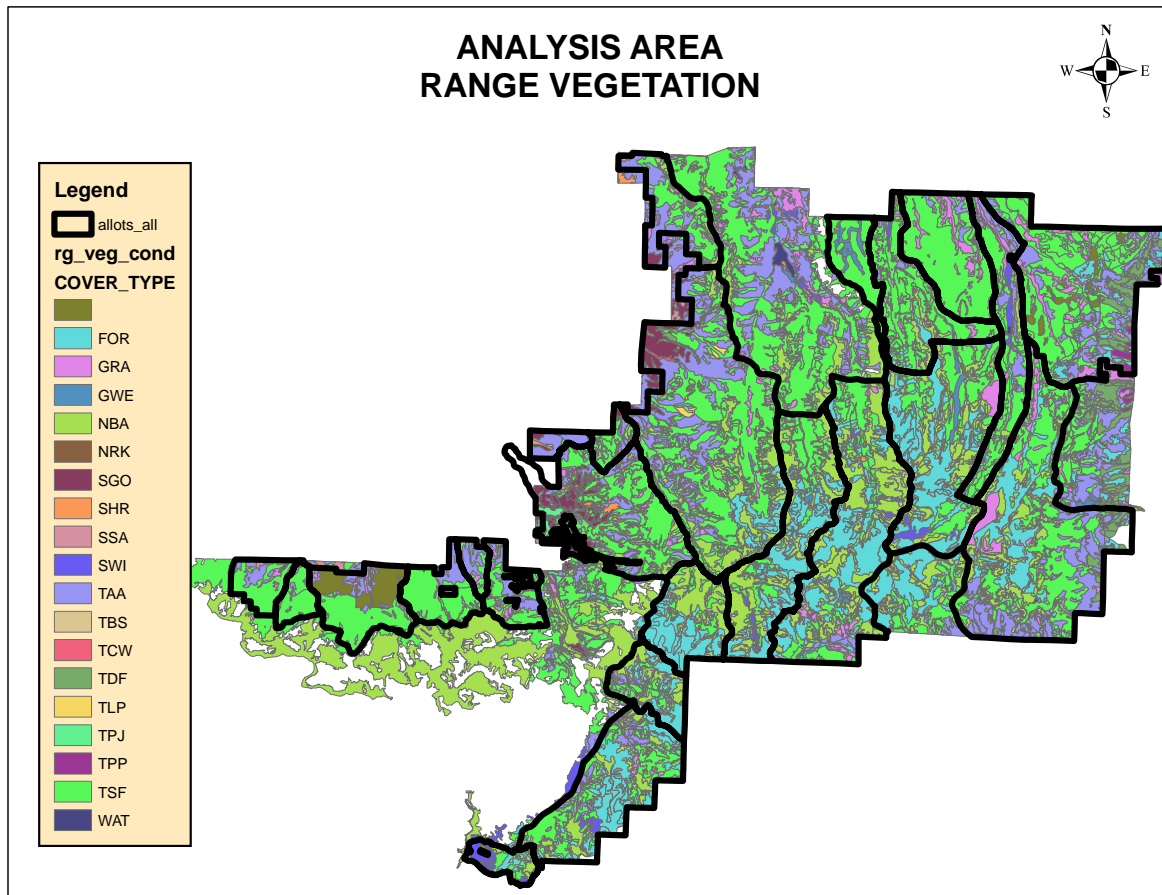
3.4.1 Affected Environment

Vegetation in the analysis area is represented by the cover types in Table 3.4.1 and the corresponding Figure 3.4.1. Since most of this landscape is covered by grazing allotments vegetation is directly tied to the range resource as a whole that is further discussed later in Sections 3.5 and 3.6.

Table 3.4.1 Vegetation Cover Types

Cover Type	Symbol Displayed on Map	Approximate acres	#	Approximate % of analysis area
Rock/barren	NBA, NRK	28,057	15	
Grass	GRA, GWE	8,971	5	
Forb	FOR	30,700	17	
Shrub	SHR, SGO, SWI, SSA	4,055	2	
Aspen	TAA	24,000	13	
Spruce-fir	TSF, TDF, TBS,	84,042	46	
Pine	TLP, TPP	1,075	< 1	
Willow/cottonwood	TCW	1,800	< 1	
Water	WAT	79	< 1	
Alpine (includes several cover types)		42,800	23	

Figure 3.4.1 Range Vegetation



Suppression of natural fire, intensive grazing practices, and timber harvest activities over the past 50 years has changed the pattern of vegetation communities and in some cases, natural functions. The restoration of the natural processes of soil building, nutrient cycling, and proper hydrologic function results in a more functional and more adaptive ecosystem. Although there may be some isolated riparian and upland sites in less than desired condition, current livestock management and stocking rates are such that the analysis area overall is considered to be moving towards or meeting resource objectives.

3.4.2 No Grazing Alternative Environmental Consequences

Under the No Grazing Alternative, there would be no direct effects to vegetation from livestock grazing and trailing. There would be no impact from livestock to streambanks in areas accessible to them and there would be no grazing of riparian shrubs by livestock.

The elimination of permitted livestock grazing would be expected to result in gradual plant community changes over time, depending on the plant community. Changes are likely to be expressed as a change in plant cover or species composition in these plant communities. The overall effect of no livestock grazing on vegetation could be beneficial initially and potentially neutral thereafter. Any areas in less than desired condition would probably show an increase in litter accumulation and decreases in bare ground. The accumulation of litter would insulate the ground; provide some water-holding capacity and a decrease in surface soil movement and erosion. In the absence of grazing or other disturbance, plants would

continue to accumulate litter (dead grass blades left at the end of the growing season). Long term livestock exclusion may lead to plant decadence (if no other mechanism of disturbance is present), and a subsequent build-up of vegetative litter, reducing plant vigor, and creating rangelands that are less healthy and productive. Changes to alpine plant communities would occur very slowly, over decades, rather than years compared to what we will see in lower elevation riparian and upland plant communities.

Because riparian areas tend to have an inherently high level of natural disturbance, they tend to be highly resilient as well, once the impacts of land use activities cease. Therefore, the removal of livestock grazing, in areas where desired conditions are not being met, would very likely result in improved conditions in a relatively short time frame. Riparian species would likely increase in cover and frequency. Streambanks would stabilize as riparian vegetation establishment occurs on previously unvegetated or unstable sites. However, because of the dynamic nature of stream systems, high level of natural disturbance, and natural hydrologic processes, (including presence of beaver) dramatic changes can occur in short amounts of time. In riparian areas where desired conditions are being met or where progress is being made, the absence of livestock grazing is not likely to result in a noticeable difference in vegetation composition or canopy cover. Study results (Holland, et. al) suggested that while livestock removal may be effective in initiating rapid recovery of deteriorated montane riparian ecosystems, it may not be necessary for recovery. The long-term exclusion of livestock may lead to a closed canopy, reduced willow vegetative stem recruitment, and reduced species diversity.

3.4.3 Existing Condition Alternative Environmental Consequences

Under this alternative, the current conditions would be sustained or would improve slightly in the plant communities within the analysis area. The influence of livestock use on plant community composition and rangeland health depends on timing, intensity, and duration/frequency, as well as, site characteristics, and the forage preferences of the animal. In some areas, non-native grass species and forbs comprise a higher percentage of canopy cover than native species. (see tables in Appendix E comparing native and non-native cover frequency indices) On some of these sites, forage production is still relatively high, and bare ground comprises less than 20% of average canopy cover. Other sites generally tend to be in good to excellent condition, with high forage-production potential. The effect of continuing existing management would be to maintain residual vegetation cover, plant vigor, amounts of bare ground and overall rangeland health at current levels. Plant species diversity and forage quality and quantity within the analysis area may improve slightly under this alternative, because of current relatively low stocking rates and management practices

Continuing current management would be neutral to positive for mid- to late-seral upland plant communities and riparian plant communities with heavy willow cover, saturated soils or armored banks. These sites would tend to be more naturally resilient to disturbances. Since current management is fairly static from year to year, there is not likely to be any significant change in conditions on these sites. Current management may not allow enough flexibility to respond to changes in vegetative conditions quickly enough to promote the desired effects. Management response to annual changes in biological, environmental or social conditions may be limited in scope, or may not occur at all. Overall, however, the direct effects of implementing this alternative would be mostly positive, although desired conditions would not be met as quickly as in the proposed action.

3.4.4 Proposed Action Alternative Environmental Consequences

Under the Proposed Action, the effect of adaptive management would be to increase residual vegetation in areas where it is at less than desirable levels, reduce the amount of bare ground in areas where it is currently too prevalent, and increase the vigor of individual plants through better distribution of livestock across allotments. Increased litter in areas where it is inadequate ensures that plenty of material is available for trapping sediment in runoff and overland flow events. Additionally, litter insulates plant crowns and over-wintering buds, protects and covers soil, helps retain soil moisture, and allows the plant to continue photosynthesis for carbohydrate production and storage. Greater carbohydrate storage results in more roots being produced by each plant. This increases the erosion defensibility and moisture-holding capacity of soils. It also provides a buffer to plants in times of stress such as drought. Less bare ground means more plants holding the soil in place while lessening the likelihood of invasion by noxious weeds, or other invasive plant species.

Under this alternative, revised allotment management plans will contain objectives that are designed to meet defined conditions for soil and upland vegetation. The condition and trend of the vegetation will likely improve since allowable use levels are set to provide for maintenance or improvement of each specific plant community type and condition. Improved grazing management and adaptive stocking rates will allow vegetation to reach desired conditions on most allotments within 10-15 years. The more productive range sites may recover more rapidly, especially those associated with plant communities in early-intermediate seral stages dominated by native species. Early seral plant communities associated with less resilient shallow and/or rocky soils, especially those dominated by introduced species, may require more than 15 years to move toward late seral vegetative condition. Areas in early and early-intermediate seral stages will advance toward late seral vegetative conditions as a result of improved management practices. Changes in management practices will improve grazing efficiency and reduce adverse effects on soil and upland vegetation within the allotments.

The risk of invasive species establishment due to livestock management practices would decline long-term under this alternative. The proposed action prescribes livestock management and limits utilization, which would lessen the chance of weed invasion. As range conditions improve and less soil disturbance occurs, there will be less bare soil to invite weed invasion. See Section 3.6 for more information on noxious weeds.

Overall, the direct effects of implementing the proposed alternative of livestock grazing using adaptive management would be positive in achieving or moving toward desired conditions for all vegetation types.

3.4.5 Cumulative Effects

The effect of adaptive management on these allotments would be to increase residual vegetation where needed, reduce litter accumulations and amounts of bare ground where excessive, and increase the overall vigor of plants through better management of livestock within the analysis area. Increasing beneficial vegetation and improving its vigor ensures that plenty of material is available for trapping sediment in runoff and overland flow events. Additionally, adequate litter cover insulates plant crowns and overwintering buds, protects and covers soil, holds moisture in the ground and allows the plants to continue photosynthesis for carbohydrate production and storage. Greater carbohydrate storage results in more roots being produced by each plant. This increases the erosion defensibility and

moisture-holding capability of soils. It also provides a buffer to plants in times of stress (such as drought). Less bare ground means more plants holding soil in place while lessening the likelihood of invasion by noxious weeds or other invasive plant species. Utilizing the concepts of GRI, individual plants will be grazed fewer times. Limiting defoliation of each plant to three times or less increases the plant's ability to store nutrients and increase vigor.

Population growth in and around the project area may result in a greater number of forest users. Unauthorized OHV and motorcycle use already impact many of the riparian areas. Social trails and semi-permanent camping areas are developing as well. In addition to livestock grazing, these actions may have an overall negative effect on the integrity of rangeland and riparian ecosystems by weakening the vegetation and creating ruts, cuts and unvegetated scars across portions of the riparian zone. High numbers of big game animals, especially elk, have a significant effect on herbaceous vegetation. The dietary overlap between elk and livestock is similar. Grazing management of forage by the Forest Service takes wildlife grazing use into consideration. Management of elk numbers is under the control of the Colorado Division of Wildlife.

Cumulative actions that can have an impact on rangeland vegetation by noxious weed invasion or expansion include heavy recreation, prescribed burning or fire use, and forest vegetative treatments such as timber sales or thinning. Noxious weeds are likely to invade areas that are burned. Recreation events or repeated recreation in one area can remove existing vegetation and increase risk of noxious weeds colonizing bare soil.

Past timber management practices have had an overall positive effect on promoting herbaceous conditions through increased understory vegetation production and stimulation of a variety of herbaceous species, despite a concurrent increase in noxious weed infestations, most notably Canada thistle. Increased ground cover protects soil resources from erosion and high temperatures. Increased herbaceous vegetation has a positive effect on riparian and upland sites, and creates favorable habitats for many terrestrial and aquatic species.

3.5 Sensitive Plants

No Threatened or Endangered plant species are located within the analysis area. The Forest Service requires an evaluation of effects to Forest Service sensitive species and habitat (FSM 2672.4). This evaluation is necessary to ensure that Forest Service actions do not contribute to the loss of viability of any native or desired non-native plant species, nor cause any species to move toward federal listing. A Biological Evaluation was prepared in conformance with Forest Service manual direction to determine the effects of livestock grazing on sensitive species and habitats.

3.5.1 Affected Environment

The Regional Forester's Sensitive Species List and Unit Species List for the Grand Mesa, Uncompahgre, and Gunnison National Forests were reviewed to determine which species or habitats may be potentially affected. Additional plant species information for the GMUG (Johnston, 2005) was reviewed for species of concern, and Barry Johnston, GMUG NF Botanist, was contacted for his input on plant species to consider.

3.5.1 Forest Service Sensitive Plants Evaluated

Plants		
Stonecrop gilia	<i>Gilia sedifolia</i>	Gravelly exposed areas of ash flow tuff above 11,700'
Tundra buttercup	<i>Ranunculus gelidus</i>	Among rocks and scree on exposed summits or slopes above 12,000'

Stonecrop gilia (*Gilia sedifolia*)

Stonecrop gilia is a narrow endemic known from two occurrences in the San Juan Mountains of southwestern Colorado. The type locality (“Sheep Mountain”) was last seen in 1892, and its exact location is uncertain. This location is currently thought to be the Sheep Mountain located on the Uncompahgre NF in Gunnison County on the ridge between the Little Cimarron and the East Fork of Big Cimarron. This location would be within the Big Blue/Fall creek/Little Cimarron S&G allotment. The other occurrence, known from Half Peak in Hinsdale County, Colorado, consists of two stands and approximately 1,100 individuals. It was last seen in 2003. The Half Peak occurrence is on the Gunnison National Forest, and the type locality may be on the San Juan National Forest. This location is outside the analysis area for this project.

Stonecrop gilia is ranked globally critically imperiled (G1) by NatureServe, and it is considered critically imperiled (S1) in Colorado. It is considered critically imperiled because it is known from only two occurrences, one of which has not been seen in over 100 years. The USDA Forest Service Region 2 has designated this species as a sensitive species. It is not listed as threatened or endangered under the Endangered Species Act.

Information on the habitat of Stonecrop gilia is sparse. It is apparently restricted to dry, rocky or gravelly talus of tuffaceous sandstone. Collections of this species at both sites were at or above treeline; at 11,750 feet on Sheep Mountain and between 12,920 and 13,400 feet at Half Peak. The geology of both areas is composed of landslide materials, talus, and rock glacier deposits that are composed primarily of ash-flow tuff material from the upper slopes. Recent surveys have found populations on the Rio Grande National Forest and only one population on the GMUG, on the summit of Half Peak (outside the project area). This species which was "thought to be extinct" may not be an accurate description as nobody had looked for it since it was synonymized (re-named) under another species until 1998. Most of its potential habitat needs to be surveyed.

Tundra buttercup (*Ranunculus gelidus*)

Tundra buttercup is a low growing perennial herb that is found in alpine habitats of North America from Canada and Alaska, Colorado, Idaho, Montana, and Utah. Tundra buttercup grows above timberline in alpine meadows, alpine tundra sedge communities, and on talus slopes. Quite often it is found growing among rocks and scree on exposed summits and slopes above 12,000 feet. In Colorado it is extremely local and has been reported at 13,500 feet in Colorado and at 10,585 to 11,780 feet in Utah. There are 2-3 known populations on GMUG in Gunnison and Hinsdale Counties. The populations are reportedly small, but there have been no searches or counts. One of those locations appears to be on the Uncompahgre Peak/North Henson S&G allotment.

Tundra buttercup is ranked globally as apparently secure (G4/G5) by NatureServe, and it is considered imperiled (S2) in Colorado. The USDA Forest Service Region 2 has designated this species as a sensitive species. It is not listed as threatened or endangered under the Endangered Species Act.

3.5.2 No Grazing Environmental Consequences

Stonecrop gilia

Under the No Grazing Alternative Stonecrop gilia will continue to be threatened by off-road vehicle use and other recreation, mining, exotic species invasion, effects of small population size, global climate change, and pollution and grazing in known populations outside of the analysis area. Unidentified populations in the analysis area of the species may see some benefit from the removal of grazing due to removal of disturbance in the rugged, sparse terrain that makes up its habitat.

Tundra buttercup

Under the No Grazing Alternative Tundra buttercup will continue to be threatened by recreation (including trail use/construction), mining, exotic species invasion, effects of small population size, global climate change, and pollution and possibly grazing outside of the analysis area. Populations in the analysis area of the species may see some benefit from the removal of sheep grazing due to removal of disturbance in terrain that makes up its habitat; however, since there is no information on the palatability or preference of this species for forage, nor is the habitat likely to be grazed this benefit would likely not be noticed.

3.5.3 Existing Condition & Proposed Action Alternatives Environmental Consequences

Stonecrop gilia

There is no data available on the presence of Stonecrop gilia or current sheep grazing use on the Sheep Mountain site located within the boundaries of the Big Blue/Fall Creek/Little Cimarron allotment. However, in comparison, the allotment that includes Half Peak (known population of Stonecrop gilia on the Gunnison NF) is currently vacant but remains active and provides some insight to potential impacts. This allotment on Half Peak has historically been subjected to intense sheep grazing pressure. However, the low forage value and high elevation of Stonecrop gilia habitat may leave it undesirable for sheep, which prefer richer bottomlands. Unless Stonecrop gilia occurrences are near water sources, such as snow banks, or in areas through which sheep travel to get to better forage, they are probably somewhat naturally protected from grazing impacts. Careful surveys and monitoring are needed to substantiate this, and as more information is available the magnitude of this threat may need to be reconsidered.

Livestock management practices that prevent access to occurrences of Stonecrop gilia by sheep are likely to confer benefits to the species. Since habitat for Stonecrop gilia is of very low forage value it is unlikely that actions on behalf of Stonecrop gilia will affect the grazing regime or have economic impacts.

Tundra buttercup

Based upon the type of habitat this species occupies, it is unlikely that sheep would have a significant impact upon this plant. There is no information available on the palatability or preference of this species for forage. Since it can occur on talus slopes and ridges, it would

be conceivable that sheep could trail over plants and possibly damage them. However, it is unlikely that sheep would be trailed over habitats where this species grows because of late-lying snow banks.

3.5.4 Cumulative Effects

Stonecrop gilia

Observations and opinions of experts show that there are several tangible threats to the persistence of Stonecrop gilia. These threats are disturbance and habitat conversion due to off-road vehicle use and other recreation, sheep grazing, mining, exotic species invasion, effects of small population size, global climate change, and pollution. These effects will continue whether or not grazing occurs in the analysis area.

Tundra buttercup

Very little information is available on potential threats to this species. Not much research has been conducted on this species anywhere within its range. One common piece of information is that populations are typically found in very small patches that grow on inaccessible sites that are stable and mostly invulnerable-resilient. Several references site trail construction as the primary threat since human use would be unlikely due to inaccessibility and rockiness. However, the habitats where this species grows are usually away from trails, probably because late-lying snow banks are poor places to locate trails. The only way people would likely walk through occupied habitat would be if the site were located on a route up to a peak or other destination. These effects will continue whether or not grazing occurs in the analysis area.

3.6 Noxious Weeds & Other Invasive Species _____

3.6.1 Affected Environment

Noxious weeds are a concern because their aggressive and adaptable nature allows them to successfully compete with native plants for sunlight, water, nutrients, and space. They have the potential to displace native plants and animals. They can reduce forage for wildlife and livestock, degrade wildlife habitat, reduce biodiversity, increase soil erosion, and negatively affect recreation opportunities. In extreme situations with certain weeds, there is a corresponding impact to soil health since the weeds provide little effective cover and the soil is exposed to rainfall impacts, overland flow, and higher temperatures than would occur in the natural plant community. Many noxious plants are also injurious or poisonous to both wildlife and to humans and their animals.

Spread of Noxious Weeds

Past ground-disturbing activities typically allow noxious plants an opportunity to establish and spread. Construction, travel routes, recreation activities, etc. all disturb the ground. Ultimately, wildlife, livestock, machinery, recreational vehicles, people, wind, and water transport seeds from existing infestations to new sites. Within the wilderness portions of the analysis area, some of the transport mechanisms are eliminated, therefore, reducing the potential for noxious weed establishment. Outside of the wilderness, however, there is a well-established road and trail network that can potentially facilitate the transport of invasive plants by people, machinery (OHV, full size vehicles, equipment), or animals (wildlife or livestock).

Noxious Weeds in Area

Noxious weeds known to occur within the analysis area include:

- Houndstongue (*Cynoglossum officinale*)
- Canada thistle (*Cirsium arvense*)
- Musk thistle (*Caduus nutans*)
- Oxeye daisy (*Chrysanthemum leucanthemum*)
- Whitetop (*Cardaria draba*)

Noxious weeds found adjacent to the analysis area in Ouray County include:

- Leafy spurge (*Euphorbia esula*)
- Meadow knapweed (*Centaurea pratensis*)
- Absinth wormwood (*Artemisia absinthium*)

No information on noxious weeds in Gunnison or Hinsdale Counties was available; however, generally speaking, the weed species are anticipated to be similar to what has been inventoried already.

The known infestations occur primarily along roadsides and trails; at trailheads and recreational sites, including campgrounds; and in past timber harvest areas. Although none of these species are on the priority species list for the Forest (see 2008-2010 Invasive Species Action Plan), they are all on the State of Colorado or Ouray County lists.

A noxious weed inventory has been initiated and is on-going for the analysis area. Data is current through 2004. Additional inventory needs are needed and identified in the Forest Invasive Species Action Plan. Data from the current inventory indicates that less than 1% of the analysis area is infested with noxious weeds.

All of the known weed infestations occur outside of both the Uncompahgre and Sneffels Wilderness areas; no new weed infestations have been identified within the wilderness based on weed inventories conducted to date. To date, livestock grazing operations in the Uncompahgre wilderness have not been a factor in spreading noxious weeds, as evidenced by the lack of weeds in this wilderness due to topography and lack of a forage resource. There are no known noxious weed infestations in the Sneffels Wilderness area, and permitted livestock grazing occurs adjacent to, but not within this wilderness. Noxious weed infestations outside the Uncompahgre Wilderness are associated primarily with past timber harvest activities, grazing by livestock and large ungulates, and other human activities, including road maintenance, and recreational use. Road maintenance and recreation activities are likely to continue to be primary sources of seed transport and disturbance in the analysis area. Based on past observations, road maintenance and recreation activities are not anticipated to significantly contribute to increased infestations over the next 20-30 years.

A noxious weed inventory map can be found in the project file at the Ouray District Office.

Integrated Weed Control

Because of the aggressive and adaptable nature of many noxious weeds, including those that exist within the analysis area, an integrated weed control program including: prevention; hand-pulling; biological control, and appropriate herbicide use has been implemented within the analysis area.

Prevention methods used include:

- Limiting seed dispersal by noxious weed species;
- Containing neighboring weed infestations;
- Minimizing soil disturbances;
- Detecting and eradicating weed introductions early;
- Establishing competitive vegetation;
- Properly managing vegetation.

Successful biological control agents have been used primarily for musk thistle.

Hand-pulling of houndstongue has been implemented within the analysis area and on adjacent NFS and private lands.

Herbicide treatments have been used primarily on system roads; there have been no herbicide treatments to date in the wilderness. Herbicide treatments are conducted by State certified qualified supervisors or applicators employed by either the Forest Service or Ouray County, and are in compliance with the herbicide label.

Aquatic Invasive Species

There are no known aquatic invasive species in the analysis area; however, zebra mussels have been found in the State of Colorado. Zebra mussels could potentially expand to Ridgeway and Blue Mesa Reservoirs, which are adjacent to the analysis area. Although a prevention program is in place to prevent zebra mussel infestations at these reservoirs, it is possible for the populations to expand to NFS lands, effectively reducing ongoing and future efforts to improve riparian and stream habitat conditions. There is currently no readily apparent evidence linking livestock to the spread of zebra mussels; therefore, this will not be further considered in the environmental consequences sections.

3.6.2 No Grazing Alternative Environmental Consequences

Eliminating permitted livestock grazing within the analysis area would remove one potential vector for noxious weed seed transport and one disturbance factor that could potentially create a niche for noxious weed infestations. All other noxious weed vectors would remain the same.

3.6.3 Existing Condition Alternative Environmental Consequences

Prescribed livestock grazing is designed and intended to minimize niches for noxious plants. Some species of invasive plants can be suppressed in areas where livestock graze, particularly if grazed early in their growth cycle. In areas where livestock concentrate, there may be a higher occurrence of bare ground that provides a suitable environment for noxious weeds to colonize, especially if there is a nearby seed source. If livestock are properly managed, grazing use should result in low to moderate use of herbaceous and shrubby plants, improved plant vigor; little to no increase in bare ground. Moderate grazing levels can minimize the spread of noxious or invasive weed species by reducing the physiological impact of grazing on native plants, and by minimizing soil disturbance that can provide a niche for new infestations. (Sheley & Petroff, *Biology and Management of Noxious Rangeland Weeds*) Areas of concentrated use, such as near water; trails; cattleguards/gates that tend to have higher grazing levels would be the most susceptible to noxious weed invasion associated with permitted livestock grazing activities. Since current livestock management is resulting in few infestations tied specifically to those activities, there would be relatively little or no change over existing conditions.

Although permitted livestock have the potential to be a vector for the spread of noxious plants, livestock operations do not appear to have been a factor to date, as evidenced by the lack of noxious weeds in the Uncompahgre Wilderness and the low level of weed infestation within the analysis area. . In the Sneffels Wilderness area, there has been little to no grazing activity despite the proximity of 3 active grazing allotments due to topography and lack of a forage resource. Outside of wilderness areas, noxious weed infestations are associated primarily with past timber harvest activities, grazing by livestock and large ungulates, and other human activities, including road maintenance, and recreational use. The current weed inventory indicates that many of the weed infestations are adjacent to roads and trails. Because of this, it is more likely that potential spread and new infestations would occur as a result of other human activities, rather than as a result of livestock management activities.

3.6.4 Proposed Action Alternative Environmental Consequences

Effects are expected to be similar as those for the Existing Condition Alternative. There will continue to be some areas of concentrated use, such as near water, trails, cattleguards, and gates that would be more susceptible to noxious weed invasion from livestock management activities. Overall, improved management of livestock should result in fewer niches created for noxious weed infestations.

3.6.5 Cumulative Effects

Cumulative actions that have an impact on the risk of noxious weed invasion include recreation activities; grazing by livestock and large wild ungulates; and road and trail maintenance activities. Other activities may include prescribed fire; fire use; and timber harvest. Historically, although past timber harvest has resulted in noxious weed infestations; future timber harvest is anticipated to be at lower levels and is therefore expected to be of little significance. Prescribed fire and fire use would be relatively new activities within the analysis area and are expected to result in higher levels of noxious weed infestation in some areas, based on observations on other parts of the Forest. Other activities, such as timber harvest, road and trail maintenance, recreational use, and fire will continue to create a niche suitable for weed infestations.

As reflected in the current noxious weed inventory for the analysis area, infestations are relatively small and localized, and are primarily associated with road and trail systems. There are some weed species that exist on adjacent County and private lands that will eventually be found within the analysis area. Current treatment activities are not adequate to control or contain existing infestations; a sudden or large expansion of infestations would overwhelm existing resources.

The long-term cumulative effects of any noxious weed infestations that become established within the analysis area would result in the reduction of species diversity within the native plant community. As a result, ongoing noxious weed inventories and treatments should continue both within and outside of the analysis area, in cooperation with other Federal land management agencies, and counties.

3.6 Threatened and Endangered Wildlife Species _____

Species below are covered in detail. The Colorado pikeminnow, razorback sucker, humpback chub, and bonytail would only be affected by future (and currently unplanned) depletions associated with new developments in the analysis area range allotments. New

range developments resulting in depletions would be covered by the reporting requirements of Programmatic Biological Opinion ES/GJ-6-CO-99-F-033-CP062 (April 27, 2007).

3.6.1 Affected Environment

Greenback cutthroat trout (*Oncorhynchus clarkia stomias*)

The greenback cutthroat trout (GCT) was listed as endangered in 1973 under the Endangered Species Act. Successful stocking efforts in the early 1970 have resulted in the species being down listed to threatened in 1978. The species has remained in this status since that time. The greenback cutthroat trout is not included on the current USFWS species list from the Grand Junction ESO, but is identified on the R2 Forest Service species list as a threatened species which is known to occur on the Arapaho-Roosevelt and Pike-San Isabel National Forests.

Recent advances in genetic analysis has determined that several populations of Colorado River cutthroat trout (CRCT) on the Western Slope are now being classified as greenback cutthroat trout since genetic material shows that these fish appear to be of genetic lineage. In 2007 a scientific publication was published in the Journal of Molecular Ecology which provided new evidence that some populations of putatively pure populations of Colorado River cutthroat trout comprise another subspecies of cutthroat trout, greenback cutthroat trout (*Oncorhynchus clarkia stomias*). Greenbacks are federally listed species (threatened) with a historic range east of the Continental divide in Colorado. Many of these “new” populations of greenback cutthroat trout occur in western Colorado and in particular occur on the GMUG and White River National Forests. How these fish got to western Colorado is still a mystery, but one plausible explanation is through stocking by early settlers or federal or state agencies.

Greenback cutthroat trout are native to the Arkansas River and the South Platte River basins in Colorado (and perhaps southeastern Wyoming; USFWS 1998; Fig. 1). Ecologically, the greenback cutthroat trout is similar to other salmonids in the western United States (Behnke 1992). It is a spring-spawning subspecies inhabiting relatively clear, cold waters which preys largely on invertebrates (USFWS 1998) Greenback cutthroat trout declined rapidly after the arrival of large numbers of immigrants to the Front Range of Colorado in the mid- to late 1800s. Populations of the subspecies were decimated by mining pollution (Ubbelohde et al. 1976), stream dewatering for agriculture (Jordan 1891), and harvest for commercial sale (Wiltzius 1985). By 1919 greenback cutthroat trout were still found in many tributaries of the upper Arkansas River (Carhart 1950), but there are no reports of extant populations in other locations. By this time, non-native trout species had also been widely introduced (Wiltzius 1985). Greenback cutthroat trout readily hybridize with rainbow trout (*O. mykiss*) and non-indigenous cutthroat trout subspecies (Allendorf and Leary 1988) and cannot persist in sympatry with brook trout (*Salvelinus fontinalis*) or brown trout (*Salmo trutta*) (Behnke 1992). Therefore, introductions of non-native trout and their subsequent invasions of adjacent waters probably eliminated greenback cutthroat trout from nearly all of their remaining historical range. By the 1930s, the sub-species was considered extinct (Green 1937).

Because greenback cutthroat trout were extirpated so quickly, their historical range is poorly understood. Behnke and Zarn (1976) assumed that they occupied most streams and rivers from the foothills upstream (approximately 1800 m elevation). Migration barriers (Mullan 1974; Wiltzius 1985) and cold summer water temperatures (<8 C; Harig 2000) probably excluded them from most lakes and high-elevation streams. Based on the amount of stream habitat above 1829 m elevation currently occupied by trout in Colorado (Colorado Division of Wildlife, unpublished data), we estimate that greenback cutthroat trout historically

occupied up to 6276 km of habitat in the Arkansas River basin and 6955 km in the South Platte River basin.

As of 1999, there were 11 historical and 44 introduced populations of greenback cutthroat trout, of which 18 in the South Platte River basin and 3 in the Arkansas River basin were considered stable (USFWS 1998; Colorado Division of Wildlife, unpublished data). Because of progress made toward recovery, the 1998 plan proposed delisting when two additional stable populations were created in the Arkansas River basin and a long-term management plan was completed. Because a new population was discovered in this basin in 1998 and at least one more introduced population may achieve stability in the next year, a proposal to delist this subspecies may be forthcoming.

Since 2006 an additional 35 populations of GCT have been found in the Gunnison, Dolores, and Upper Colorado River basins. Additionally, some of the populations of GCT in the South Platte and Arkansas basins have since been genetically tested and classified as CRCT. This has created an overlap in the distribution of GCT and CRCT, spanning the entire distribution of these species in Colorado.

Essentially greenback trout can live in any habitat and tolerate any water quality that supports other species of trout. The greenback cannot, however, coexist with other species due to competition and/or hybridization. Restoration efforts have selected small sites above barriers where the non-native trout are eradicated and greenbacks are then stocked. The success of restoration projects depend on obtaining a complete kill of non-native trout and prevention of their reintroduction.

Cover and shelter requirements are similar to other trout species. Young-of-year and juvenile fish select shallower, more open habitat; larger, older fish select deeper areas with more cover (boulders, log jams, particularly undercut streambanks). Present habitat of most greenback populations are very small streams (5-20 ft. wide) and habitat parameters are "small scale". Reproductive site requirements are similar to other trout species: suitable gravel substrate (0.25-2.0 inches) with adequate flow to maintain oxygen requirements of incubating eggs is necessary for successful reproduction. Simply, any "trout habitat" can be greenback habitat if no other species of trout are present. Any impact on any trout habitat (such as loss of riparian vegetation, flow depletion, accelerated erosion, etc.) would effect a greenback population in the same manner as it would other species of trout.

The greenback cutthroat trout also occurs in pond/lake habitats (i.e., Lythe Pond - Fort Carson, and various lakes in Rocky Mountain National Park).

In the late nineteenth century the greenback cutthroat trout was greatly reduced in abundance by toxic mine pollution, and irrigation diversions (for agriculture). Cumulatively, problems that have added to the decline of the trout which are linked to the irrigation projects and agricultural practices directly are: water diversion and drawdown, water temperature alteration, siltation, and erosion (linked to grazing and general agricultural practices). Timbering (i.e., forest clearing, alteration, and resultant vegetation changes); hydroelectric power diversions; man-made pollution caused by effluents from industrial, human sewage, and agricultural practices; and physical damage to watersheds caused by such construction activities as highways, ski areas, and housing developments. Also non-native trout (brook, rainbow, brown and other subspecies of cutthroat trout) were widely introduced throughout the range of the greenback. Brook trout replaced the greenback in small tributary streams

and brown trout replaced greenback in the large rivers. Rainbow trout hybridized with greenback trout, and since the hybrids are fertile, population purity was irretrievably lost.

The decline of the greenback was so rapid that in 1937, Greene declared them extinct. Behnke established a basis for the diagnosis of pure greenback trout from examination of museum specimens. Intensive collections during the past 15 years have discovered four pure populations of *S. c. stomias*. All of these populations occur in tiny headwater streams above barriers to upstream migration that protect the greenback populations from non-native trout.

Within the analysis area GCT are only present in Nate Creek, a small tributary of Cow Creek on the west side of the San Juan Mountain range near Ridgeway, CO. The presence of GCT was confirmed in 2007 through AFLP genetic analysis. The Nate Creek population is confined to approximately three miles of habitat located on the Uncompahgre National Forest lands. It is suspected that additional fish are located below the Forest boundary, but this has not been confirmed since the land is in private ownership.

The population has been sampled twice in since 2002. Mean fish/mile estimates have increased nearly double since 2002 for adult fish greater 150 mm (Table 1). The majority of fish sampled occurred in the lower one-mile stretch of Nate Creek. Abundance of fish drops in each 1 mile reach of the stream. The population is absent of other non-native trout and appears stable based on qualitative and quantitative sampling over the last 10 years.

Habitat for the GCT in Nate Creek is good condition, but is naturally limiting in some key fish habitat parameters. Fish habitat can be classified primarily as step pool and step run habitat. Data collected on Nate Creek suggest that available spawning gravel, over-winter habitat, and high spring velocities may be habitat constraints for the population.

Grazing, motorized/non-motorized recreation and water development are the primary land management activities occurring in the Nate Creek sub-watershed. Nate Creek flows are augmented by water from the West Fork of the Cimarron River. However, non-native fish in the West Fork Cimarron River have not appeared in Nate Creek. Grazing use in Nate Creek is low, and does not appear to be affecting fish habitat conditions in Nate Creek. Road densities are low for the Cow Creek watershed and Nate Creek sub-watersheds.

Uncompahgre fritillary butterfly (*Boloria acrocne*)

The Uncompahgre fritillary butterfly is an endangered alpine species that is closely associated with patches of snow willow (*Salix reticulata nivalis*) in the mountains of southwestern Colorado. Researchers believe the species has a biennial life history. Eggs laid one year would be caterpillars the following year, and then turn to adult butterflies the next year. This means there are essentially two populations per colony, each representing even and/or odd years.

Adult butterflies are on the wing approximately three weeks per year usually beginning in mid-July. Active flight periods near Uncompahgre Peak have ranged from June 15th to August 10th (Alexander, personal communication). Adults feed on nectar of a wide range of alpine flowering plants. Mating and egg laying occur during the summer months with females laying their eggs on snow willow, which also provides a food source for the caterpillars.

The only known populations of the Uncompahgre fritillary butterfly in the world are located in southwestern Colorado. Within the analysis area, the Uncompahgre fritillary butterfly is included on the current USFWS species list for Gunnison, Hinsdale, Ouray, San Juan, and

San Miguel Counties. The species was originally described from a single population found on Uncompahgre Peak in 1978. Since that time the Natural Heritage Program and Western State College in Gunnison have been working with the USFWS, USFS, and BLM to identify and inventory suitable habitat throughout southwestern Colorado. Extensive surveys have been conducted within the range of the Uncompahgre fritillary butterfly to identify suitable snow willow habitat and to locate populations. At the present time there are eleven known colonies of the Uncompahgre fritillary butterfly within the San Juan Mountains of southwestern Colorado. Some of these colonies actually include more than one population of butterflies, but have been lumped together geographically. Currently there is genetic research being done to determine if these populations are distinct or should remain separate colonies (Dr. Kevin Alexander, personal communication).

All known populations are associated with patches of snow willow at or above 12,500 feet. Within this elevation potential habitat is located on north, northeast, east, and southeast aspects that are leeward to alpine ridges, generally associated with areas where snow drifts. These areas have poorly developed soils and are usually still covered with rock scree. The snow willow tends to grow down slope from the scree where moisture from the slowly melting snowdrift is deposited.

Within the analysis area there is one known colony of the Uncompahgre fritillary butterfly that consists of three populations (Upper & Lower UP 1, and UP 6). This colony is found on the south east side of Uncompahgre Peak, in the head of the Nellie Creek drainage. It is the original site where the butterfly was first collected and described in 1978. Suitable but unoccupied habitat also exists between the upper and lower UP 1 populations, and in small scattered patches within the site boundary.

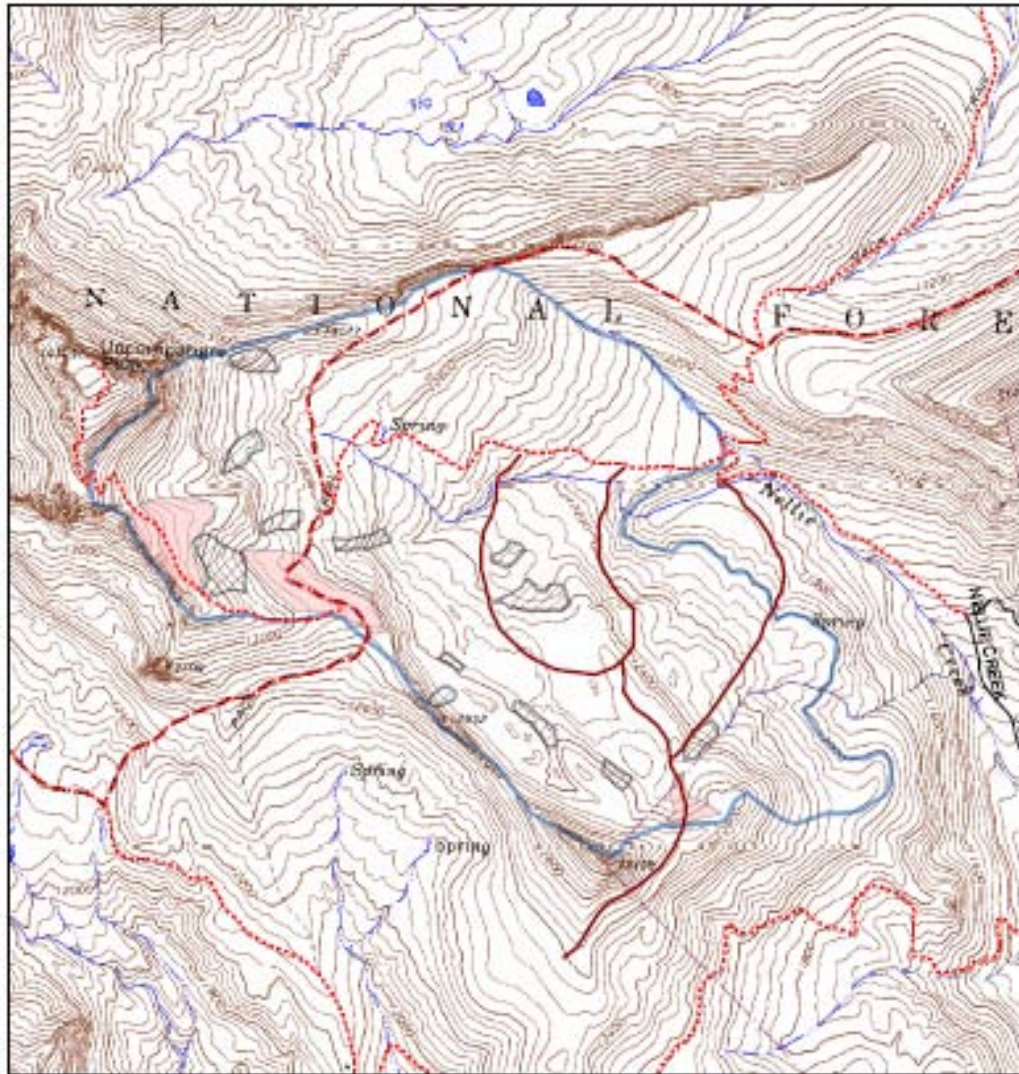
Dr. Kevin Alexander from Western State has been monitoring the three known populations within this site for the last seven years. According to his data, this population appears to have a stable trend in numbers and distribution within the available habitat (Terry Ireland, personal communication).

The primary activities occurring within the boundaries of the site of this colony are domestic sheep trailing, and people hiking the recreational trails/stock driveway and route to the top of Uncompahgre Peak. The main Ridge stock driveway passes through the lower UP 1 butterfly population. Each year up to 8 bands of sheep are permitted to trail up this driveway and 4 are permitted to trail down. All of these sheep pass through the saddle where the lower UP 1 population is located. One band of sheep is also trailing through the UP 6 population as they move them from Nellie Creek to the upper basin of El Paso Creek to graze this portion of the Uncompahgre Peak/North Henson allotment.

This Ridge stock driveway also serves as the trail to Uncompahgre Peak. Uncompahgre Peak is a very popular "14'r" in Colorado because of the easy trailhead access and short walk to the top. People walking the trails and route to the top mainly stay on the established trail but occasionally leave the trail to pass other hikers or to rest on the way up or down from the peak. The established route to the top passes through both the upper and lower UP 1 populations of butterflies. Based on input from research conducted by Western State, the Forest Service has rerouted the original location of the Ridge stock driveway/Uncompahgre Peak trail to avoid impacting the lower UP 1 population. It is now located on the edge of the suitable habitat, and signs have been posted in the area to keep hikers on the new trail location. The route to the top of Uncompahgre Peak branches off the stock driveway and continues up the edge of the lower UP 1 population and through the area occupied by the

upper UP 1 population. This has helped reduce the potential for direct mortality due to trampling by hikers.

Figure 3.6.1a Uncompahgre Fritillary Butterfly Habitat within Analysis Area



Legend

- Recreation Trails
 - Sheep Trails
 - - - Driveways
 - Forest Roads
 - Site Boundary
 - Occupied Habitat
 - ▨ Snow Willow
- 0 0.15 0.3 0.6 Miles

Created By: Ryan Tomblin
October 6th, 2008

Canada lynx (*Lynx Canadensis*)

The Canada lynx was listed as a threatened species in the lower 48 in 1998. It is currently listed by the USFWS for all Counties within the analysis area.

The historical range of the Canada lynx extended from Alaska across much of Canada with southern extensions into parts of the western United States, the Great Lakes States, and New England. Occurrence corresponds very closely to the range of their primary prey, the snowshoe hare. Currently there are five geographic areas recognized within the United States that support lynx populations. The GMUG National Forests are located within the Southern Rocky Mountains geographic area that includes the mountainous regions of Colorado, south-central Wyoming, and north-central New Mexico. The Southern Rocky Mountains geographic area is separated from the Northern Rocky Mountains geographic area by the vast sagebrush and desert shrub communities in the Wyoming Basin and Red Desert in Wyoming, and the arid Green River and Colorado River plateaus in western Colorado and eastern Utah.

The Southern Rocky Mountains are considered to be the southernmost extent of the range of the Canada lynx. The State of Colorado is thought to have had a small remnant population of lynx when the species was listed as threatened in 1998. Since that time the Colorado Division of Wildlife has had a very active program of reintroducing lynx to suitable habitats in the southwestern Forests. Those lynx have done fairly well and have expanded onto the GMUG National Forests. They primarily occupy the spruce-fir forests of the San Juan Mountains. A few collared lynx have been documented to occur on the Uncompahgre Plateau, but an established reproducing population does not occur at this time.

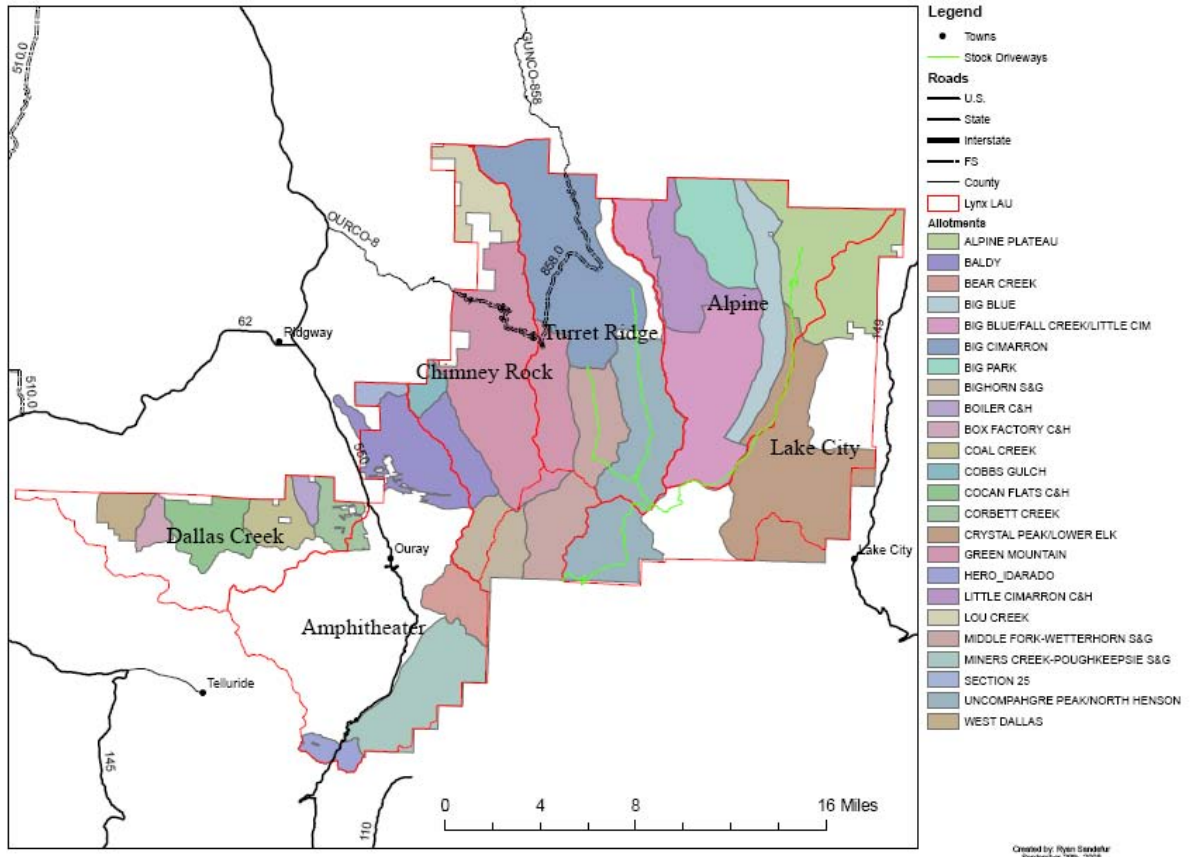
Breeding typically occurs during March and April, and kittens are born in April and May. Natural reproduction following the reintroduction has been documented by the CDOW. Litter size has typically been two and occasionally three kittens, but reproduction has not occurred in the last three years, probably in response to declining snowshoe hare populations. Male lynx do not help with rearing the young, and will have very large home ranges. Kittens remain with the female for most of their first year. Male lynx also tend to take long “walkabouts” covering huge distances over the course of the summer.

The analysis area includes six Lynx Analysis Units (LAUs), and supports known populations of the threatened Canada lynx. The relationship of these LAUs to the existing grazing allotment boundaries is shown on the map below. As described from the east side of the analysis area to the west, those LAUs include Lake City, Alpine, Turret Ridge, Chimney Rock, Amphitheatre, and Dallas. Open areas within the analysis area do not have livestock grazing permits. There are several LAUs and suitable lynx habitat located on BLM lands and the San Juan National Forest that are immediately adjacent to the LAUs within the analysis area.

Non-habitat acres within the LAUs include non-forested lands such as meadows, rock outcrops and talus, alpine vegetation, and surface water, as well as dry forest and shrub-dominated types such as ponderosa pine, scattered Douglas-fir, pinyon-juniper woodland, Gambel oak, mixed mountain shrub, and sagebrush.

Suitable lynx habitat within the LAUs includes all acres of denning, winter forage, and other habitat. Denning habitat includes mature and old growth stands of spruce-fir, mixed aspen and conifer, and Douglas-fir. Winter forage habitat includes all denning habitat plus younger stands of spruce-fir, mixed aspen and conifer, dense Douglas-fir, and willow riparian within 400 meters of these cover types. Other habitat includes open-grown stands of spruce-fir and Douglas-fir, aspen stands with minor conifer invasion, and pure aspen stands within 500 meters of these cover types.

Figure 3.6.1b Lynx Analysis Units within Analysis Area



Unsuitable habitat within the LAUs includes all acres of suitable lynx habitat that have been converted to an early seral stage or completely removed from the landscape due to recent wildfires, landslides, avalanches, or vegetation management projects on National Forest system lands.

The following table summarizes the baseline habitat conditions for all LAUs within the analysis area:

Table 3.6.1 Table Habitat Conditions by LAU

LAU Name	Total Acres	Non-Habitat Acres	Suitable Habitat Acres			Unsuitable Habitat Acres	Percent Unsuitable
			Denning	Winter Forage	Other		
Alpine	49,714	16,870	26,407	4,519	1,840	78	0.15%
Amphitheatre	58,880	32,294	12,227	12,555	1,804	0	0%
Chimney Rock	33,425	8,769	13,731	10,594	329	2	0.006%
Dallas Creek	27,683	9,863	12,897	4,505	418	0	0%
Lake City	44,213	19,576	11,062	9,223	4110	242	0.55%
Turret Ridge	46,314	19,391	17,773	8,378	752	20	0.04%

Each of the LAUs, individually and cumulatively, provides the baseline habitat conditions necessary to support Canada lynx. Areas identified as suitable lynx habitat are in good condition and are well connected throughout the landscape. The forested areas are largely functioning under natural processes. As shown on the table above, very little of the forested landscape has been converted to an unsuitable condition through natural events or management activities.

Based on range vegetation inventories and surveys conducted within the analysis area, a majority of the riparian areas and high elevation willow communities are in good to excellent condition with a stable to upward trend. There appear to be only a few isolated places where these habitat types do not meet current Forest Plan standards or objectives. Field observations of browsing use within aspen stands appear to be limited in scope. Again, the impact of browsing upon aspen regeneration or shrub understory appears to be happening only on a few isolated sites, primarily on active sheep allotments or big game winter ranges. Therefore, the current condition of these vegetation communities meets the overall needs of snowshoe hare and other species that may provide prey for lynx.

The analysis area also includes the Red Mountain Pass Landscape Linkage, and portions of the Silverton-Lake City Landscape Linkage. The Red Mountain Landscape Linkage is within the Amphitheatre LAU. These Landscape Linkages provide connectivity between the LAUs on the Uncompahgre NF and the LAUs located on BLM lands and the San Juan NF to the south. State highway 550 passes through the analysis area, including the Red Mountain Pass Landscape Linkage Area. There are no major highway improvement projects or changes in management of this highway occurring at the present time. The Forest Service has agreements in place with Ouray, Gunnison, and Hinsdale Counties to conduct annual maintenance of the higher standard Forest Service roads. That maintenance includes the grading and road drainage maintenance activities necessary to sustain summer travel. Ouray County also has county roads on the Forest that are maintained for public use. Each spring they plow snow from the Canyon Creek, Yankee Boy Basin, Imogene Pass, Corkscrew Gulch, and Poughkeepsie Gulch roads within the Amphitheatre LAU to facilitate jeep access

for tourists and outfitters in the county. This plowing is included in the baseline snow compaction assessment for the GMUG National Forest.

Private lands within the boundaries of the LAUs continue to be developed for various purposes. Most residential development is occurring near Ouray and Lake City. Most other private land is currently managed for agricultural purposes, primarily as rangeland for livestock grazing.

Predator control is authorized on an annual basis by the Forest Service under the existing programmatic NEPA and Cooperative Agreement with USDI Wildlife Services within the boundaries of the closed sheep allotments which are located within the Amphitheatre, Turret Ridge, Alpine, and Lake City LAUs. Wildlife Services may utilize a variety of control techniques to harass or kill problem coyotes. Lethal control techniques are limited to shooting or trapping the offending animals only. Predator control activities are occurring within the active sheep allotments in the analysis area. All bands of sheep are constantly tended by a full-time herder. Most of the permittees are utilizing guard dogs as well. Whenever a problem develops with predation on their sheep, the permittee has the option of contacting USDA Wildlife Services for assistance. They are not authorized to harass or kill any other species of predator. In the last 15-20 years, they have killed less than 10 coyotes per year on the Forest. There are no records of Canada lynx mortalities due to predator control activities.

Gunnison's prairie dog (*Cynomys gunnisoni*)

The Gunnison's prairie dog is currently listed as a candidate for listing as a threatened species within a portion of their range. The current distribution of the Gunnison's prairie dog includes the 4 corners area of the southwestern United States. They are found in southeastern Utah, northern Arizona, northwestern to central New Mexico, and in Colorado they are found in the south central and south western part of the state. In Colorado, the populations in the south central part of the state tend to occur in higher elevations compared to the south western populations that occur in drier habitats. Within the analysis area it is included on the current USFWS species list for Gunnison and Hinsdale Counties. The Gunnison's prairie dog is found in open areas with a lower canopy of vegetation allowing them to visually spot predators. Prairie dog colonies typically occur in areas of flat topography with occasional hills. Vegetation on these sites is short or mid grass prairie and grass-shrub communities, and often includes dryland pastures and irrigated hay fields. They can occur in a wide range of elevations from approximately 5,000-12,000ft. Due to the burrowing nature of the species their habitat requires a deep soil layer that is well drained. Primarily herbivorous, their diet is mostly grasses but will vary with plant availability during the season.

In 2005 and 2006 Colorado State University conducted extensive surveys of suitable habitat within Colorado for the Colorado Division of Wildlife. These surveys indicated that the Gunnison's prairie dog is well distributed across a large portion of their range in southwestern and south-central Colorado. Ouray Ranger District records do not include any known Gunnison's prairie dog colonies within the analysis area. Gunnison Ranger District records indicate there was an active prairie dog colony on Alpine Plateau near Big Blue Creek in 2004, but the colony was inactive in 2007. The observed distribution of this species is largely below the elevation of the Uncompahgre National Forest. Suitable habitat within the analysis area includes open meadows that intersperse stands of aspen or mixed Englemann spruce and subalpine fir. In the lower elevations of the analysis area, potential habitat is located on the Alpine Plateau, Little Cimarron, Big Cimarron, the Uncompahgre

Valley between Ridgway and Ouray, and the Dallas Creek area. The only known location of a colony on the Forest is within the boundaries of the Alpine Plateau C&H grazing allotment.

Females have one litter a year and can begin reproducing their first spring depending on resource availability. The size and success of the litter is dependent on body mass. During the breeding period is when any emigration/immigration would occur between towns.

3.6.2 No Grazing Alternative Environmental Consequences

Greenback cutthroat trout

There would be no direct or indirect effects to GCT from the implementation of the No Grazing alternative as livestock grazing would not occur in Nate Creek.

Determination: The No Grazing alternative will have no effect upon the threatened GCT. Rationale: The only known population of GCT is located in Nate Creek. Site-specific surveys and assessment have determined that existing livestock grazing use is not having an effect on fish habitat conditions in this stream, therefore removing use would continue to have no effect.

Uncompahgre fritillary butterfly

With the removal of grazing, direct effects to the Uncompahgre Peak colony would still include some degree of mortality to adult butterflies or larvae as a result of due to trampling heavy foot traffic from hikers climbing the 14,309 foot Uncompahgre Peak within the lower UP 1 population. The established route to the top passes through both the upper and lower UP 1 populations of butterflies. The Forest Service has rerouted the original trail to avoid much of the lower UP 1 population, and has posted the area as an area occupied by endangered species. This has helped reduce the potential for direct mortality due to trampling by hikers.

Indirect effects to this butterfly colony from grazing activity would be removed.

Population monitoring at the Uncompahgre Peak site does not indicate that either the direct, indirect or cumulative effects of recreation activities are significantly impacting the populations of the colony. According to his Dr. Kevin Alexander's research data from the past seven years, this colony appears to have a stable trend in numbers and distribution within the available habitat (Terry Ireland, personal communication).

Determination: The No Grazing alternative may effect, but is not likely to adversely affect the endangered Uncompahgre fritillary butterfly. Rationale: Impacts are occurring as a result of the high recreation use in this area, but site-specific research and monitoring in this area indicate that the butterfly populations of this colony appear to have a stable trend in numbers and distribution within the available habitat.

Canada lynx

Removal of grazing can have a positive effect on snowshoe hare habitat if it improves aspen regeneration and the species composition and vigor of riparian plant communities. However, each of the affected LAUs, individually and cumulatively, currently provides the baseline habitat conditions necessary to support Canada lynx. Areas identified as suitable lynx habitat are in good condition and are well connected throughout the landscape. The forested areas are largely functioning under natural processes and not currently experiencing effects from

livestock grazing within the analysis area is not having any direct or indirect effects upon the forested vegetation types providing habitat for the lynx

Based on vegetation inventories and surveys conducted within the analysis area, a majority of the riparian areas and high elevation willow communities are in good to excellent condition with a stable to upward trend. The positive upward trend with or without grazing assures favorable habitat for snowshoe hare.

Predator control is not authorized to harass or kill any species of predator other than coyotes. Therefore, Canada lynx mortalities are not predicted to occur as a result of predator control activities.

Determination: The No Grazing alternative may effect, but is not likely to adversely affect Canada lynx. Rationale: Each of the Lynx Analysis Units, individually and cumulatively, provides the baseline habitat conditions necessary to support Canada lynx. Areas identified as suitable lynx habitat are in good condition and are well connected throughout the landscape.

Gunnison's prairie dog

Removal of grazing would improve the condition of meadows and open-grown sagebrush habitats within the analysis area which provide habitat for the Gunnison's prairie dog by increasing plant density and residual cover that. However, prairie dogs often utilize areas that are in poor condition and will continue to contribute to site disturbance and impacts to vegetation at the location of the colony.

With the removal of grazing, sites that are dominated by undesirable or non-native species and have reduced cover of vegetation and litter may either see an increase in vigor, cover, or frequency of desired plants and further reduction of bare ground or sites may see the persistence of undesirable or non-native species continuing to affect prairie dogs

The vegetation community at the site of the one known prairie dog colony is a grass/forb meadow. The No Grazing alternative is not anticipated to affect habitat for the prairie dog at this site unless site conversion to a shrub community occurs. The presence of shrub cover is not anticipated to increase over time. Although not currently occupied by prairie dogs, other sites could see a reduction in prairie dog habitat where a conversion to shrub communities occurs.

Determination: The No Grazing alternative will have no impact on the Candidate Gunnison's prairie dog. Rationale: The occurrence of Gunnison's prairie dog within the analysis area is very limited. There is no evidence that historic use was any greater than the present distribution. The vegetation community at the site of the one known prairie dog colony is a grass/forb meadow. The No Grazing alternative is not anticipated to affect habitat conditions for the prairie dog at this site. Habitat potential for the Gunnison's prairie dog could be reduced on other unoccupied sites within the analysis area where they have the potential to produce shrub cover.

3.6.3 Existing Condition & Proposed Action Alternatives Environmental Consequences

Greenback cutthroat trout

There would be no direct effects to GCT from the implementation of the Existing Condition or Proposed Action alternatives. Livestock grazing is not heavy in the fish-bearing sections

of Nate Creek which see virtually no use due to lack of forage and difficulty for livestock access.

Some indirect effects to Nate Creek could occur in association with continued livestock use in Nate Creek subwatershed. Impacts associated with intermittent streams located near the headwaters may cause localized channel erosion and could deliver sediment downstream to lower Nate Creek. This could cause minor effects to some spawning areas.

Neither the Existing Condition nor Proposed Action alternative is expected to incrementally affect GCT or fish habitat on Nate Creek.

Determination: The proposed action will have no effect upon the GCT. Rationale: The only known population of GCT is located in Nate Creek. Site-specific surveys and assessment have determined that existing livestock grazing use is not having an effect on fish habitat conditions in this stream. The proposed action is not expected to incrementally affect cutthroat trout populations or fish habitat on Nate Creek.

Uncompahgre fritillary butterfly

Current sheep trailing and incidental grazing during trailing are having direct and indirect effects upon the Uncompahgre Peak colony of the Uncompahgre fritillary butterfly. Additional impacts are likely occurring as a result of the high recreation use in this area. Direct effects from the Existing Condition or Proposed Action alternatives to the Uncompahgre Peak colony currently include some degree of mortality to adult butterflies or larvae as a result of trampling by both domestic sheep trailing and heavy foot traffic from hikers climbing the Uncompahgre Peak. The sheep are generally herded along the driveway but impact an area that is wider than the actual trail. Trailing through the occupied habitat occurs every year during the active flight period of the butterfly. As a result, adult butterflies or larvae can be crushed and killed.

The primary indirect effect to this butterfly colony is the grazing activity that occurs during trailing. As each band of sheep is trailed through the area they eat the flowers that provide nectar sources for adult butterflies. Monitoring in the area indicates there is a significant loss of available nectar sources following sheep trailing (Dr. Kevin Alexander, personnel communication). This limits the food available to adult butterflies during the active flight period which can affect their reproductive success.

One possible mitigation or adaptive management technique to consider that would virtually eliminate the impacts of domestic sheep grazing to this colony is to reroute the Ridge stock driveway out of upper Nellie Creek. The best possible route from the standpoint of the butterfly is to move the stock driveway to the Big Blue Creek drainage on the north side of Uncompahgre Peak. This would avoid the largest impact of trailing the 8 bands of sheep up and 4 bands down through the occupied habitat associated with the Ridge stock driveway.

However, population monitoring at the Uncompahgre Peak site does not indicate that either the direct, indirect or cumulative effects of grazing and recreation activities are significantly impacting the populations of the colony. According to Dr. Kevin Alexander's research data, this colony appears to have a stable trend in numbers and distribution within the available habitat (Terry Ireland, personal communication).

Determination: The Existing Condition or Proposed Action alternatives may effect, but are not likely to adversely affect the endangered Uncompahgre fritillary butterfly. Rationale: Site-specific research and monitoring in this area indicate that the butterfly populations of

this colony appear to have a stable trend in numbers and distribution within the available habitat. Based upon these factors, the impacts of livestock use will continue to affect this colony of butterflies, but the effects to the population are sufficiently minor that they are insignificant in scope.

Canada lynx

Browsing or grazing can have a direct effect on snowshoe hare habitat if it alters the structure or composition of native plant communities. Livestock grazing can be a factor in the decline or loss of aspen regeneration and the species composition and vigor of riparian plant communities.

Each of the LAUs, individually and cumulatively, provides the baseline habitat conditions necessary to support Canada lynx. Areas identified as suitable lynx habitat are in good condition and are well connected throughout the landscape. The forested areas are largely functioning under natural processes. Livestock grazing within the analysis area is not having any direct or indirect effects upon the forested vegetation types providing habitat for the lynx. Based upon field observations the impact of browsing upon aspen regeneration or shrub understory appears to be happening only on a few isolated sites, primarily on active sheep allotments or big game winter ranges. Under the proposed action, livestock grazing will continue to be managed so that it will not significantly inhibit regeneration of aspen clones.

Based on range vegetation inventories and surveys conducted within the analysis area, a majority of the riparian areas and high elevation willow communities are in good to excellent condition with a stable to upward trend. There appear to be only a few isolated places where these habitat types do not meet current Forest Plan standards or objectives. The proposed action includes management actions that will maintain or improve native species composition and vigor of these plant communities. Monitoring requirements would be incorporated in to allotment management plans to assess annual grazing and browsing use as well as the condition and trend of riparian areas. Adaptive management strategies are included to adjust grazing practices if necessary to meet Forest Plan standards. These standards would assure maintenance of habitat for snowshoe hare.

Predator control is not authorized to harass or kill any species of predator other than coyotes. Therefore, Canada lynx mortalities are not predicted to occur as a result of predator control activities.

Determination: The Existing Condition or Proposed Action alternatives may effect, but are not likely to adversely affect the threatened Canada lynx. Rationale: Each of the Lynx Analysis Units, individually and cumulatively, provides the baseline habitat conditions necessary to support Canada lynx. Areas identified as suitable lynx habitat are in good condition and are well connected throughout the landscape. The forested areas are largely functioning under natural processes and would not be significantly affected by livestock grazing. Riparian vegetation, high elevation willow, and shrub communities that provide habitat for snowshoe hare largely meet Forest Plan standards and guidelines. The proposed action includes management practices that will maintain or improve the condition of upland and riparian plant communities and provides mechanisms for grazing compliance and vegetation monitoring to meet Forest Plan standards. Based upon these factors, the impacts of livestock use will continue to affect Canada lynx within the analysis area, but the effects

are insignificant or discountable at the scale of an individual LAU or the combined LAUs within the analysis area.

Gunnison's prairie dog

The occurrence of Gunnison's prairie dog within the analysis area is very limited. There is no evidence that historic use was any greater than the present distribution. Meadows and open-grown sagebrush habitats within the analysis area provide habitat for the Gunnison's prairie dog. Livestock grazing can affect vegetation composition, density, and residual cover that are features of prairie dog habitat. Prairie dogs often utilize areas that are in poor range condition, and will contribute to site disturbance and impacts to vegetation at the location of the colony.

Range vegetation data within the analysis area indicates there are some upland sites located on active cattle allotments that do not meet the Forest Plan standards. Those sites are dominated by undesirable or non-native species and have reduced cover of vegetation and litter. The implementation of improved grazing practices through management of the timing and duration of grazing and enforcement of proper forage use criteria is anticipated to increase the vigor, cover, and frequency of desired plants, and reduce the amount of bare ground on sites that are currently below standard.

The vegetation community at the site of the one known prairie dog colony is a grass/forb meadow. The proposed action is not anticipated to affect habitat for the prairie dog at this site. Improved grazing practices may affect the species composition and grass/forb cover at this site, but the presence of shrub cover is not anticipated to increase over time. Habitat potential for the Gunnison's prairie dog could be reduced on other sites within the analysis area where they have the potential to produce shrub cover and are currently in poor condition due to livestock grazing. None of these sites are currently occupied.

Determination: The Existing Condition or Proposed Action alternatives will have no impact on the Candidate Gunnison's prairie dog. Rationale: The occurrence of Gunnison's prairie dog within the analysis area is very limited. There is no evidence that historic use was any greater than the present distribution. The vegetation community at the site of the one known prairie dog colony is a grass/forb meadow. The proposed action is not anticipated to affect habitat conditions for the prairie dog at this site. Habitat potential for the Gunnison's prairie dog could be reduced on other sites within the analysis area where they have the potential to produce shrub cover and are currently in poor condition due to livestock grazing. None of these sites are currently occupied.

3.6.4 Cumulative Effects

Because habitat and/or populations of the Greenback cutthroat trout, Uncompahgre fritillary butterfly, and Gunnison's prairie dog is limited in extent in the project area, cumulative effects are limited to those populations as discussed above.

Due to the large ranges of Canada lynx, effects include future State, tribal, local, or private actions that are reasonably certain to occur in the within the LAUs that impact linkage areas and fragment or destroy habitat. Direct mortality of Canada lynx may occur due to vehicle collisions at any of the road intersections. Compaction of snow (from over snow travel) may also make Canada lynx more susceptible to competition for prey from other predators.

3.7 Sensitive Species

The Forest Service requires an evaluation of effects to Forest Service sensitive species and habitat (FSM 2672.4). This evaluation is necessary to ensure that Forest Service actions do not contribute to the loss of viability of any native or desired non-native animal species, nor cause any species to move toward federal listing. A Biological Evaluation was prepared in conformance with Forest Service manual direction to determine the effects of livestock grazing on sensitive species and habitats.

3.7.1 Affected Environment

The Regional Forester's Sensitive Species List and Unit Species List for the Grand Mesa, Uncompahgre, and Gunnison National Forests were reviewed to determine which species or habitats may be potentially affected. For this analysis, the entire Unit Species List for the GMUG was reviewed in context of the Existing Condition and Proposed Action alternatives (R2 TEPS Species List, August 24, 2007). All of the species listed were considered, and the following species were determined to be associated with the analysis area and potentially affected by the Existing Condition and Proposed Action alternatives. The species analyzed may be different for other State and Federal agencies in the area

Table 3.7.1 Forest Service Sensitive Species Evaluated

Common Name	Scientific Name	Suitable Habitat Present and Potentially Affected Within the Project Area
Mammals		
Rocky Mountain Bighorn Sheep	<i>Ovis canadensis canadensis</i>	Mapped overall, summer, & winter range, summer concentration areas, lambing grounds
Gunnison’s prairie dog	<i>Cynomys gunnisoni</i>	Subalpine meadows, open-grown sagebrush
Birds		
Northern goshawk	<i>Accipiter gentillis</i>	Mature aspen and mixed aspen-conifer forest
Purple martin	<i>Progne subis</i>	Mature aspen forest
Amphibians		
Northern leopard frog	<i>Rana pipiens</i>	Ponds, lakes, wetlands
Fish		
Colorado River cutthroat trout	<i>Oncorhynchus clarki pleuriticus</i>	Perennial streams
Insects		
Nokomis fritillary butterfly	<i>Speyeria nokomis nokomis</i>	Wet meadows, seeps, & bogs supporting bog violet
Reptiles, Molluscs		
No species identified		

The remaining sensitive species listed for the GMUG National Forest are outside of any effects of the proposal, geographically or biologically, and are eliminated from further review. The Existing Condition and Proposed Action alternatives will have no impact upon any of these species or their habitat.

Rocky Mountain bighorn sheep (*Ovis canadensis Canadensis*)

The bighorn species (*O. canadensis*) was historically distributed from the Canadian provinces of British Columbia and Alberta south to Mexico. Their current range has been significantly reduced from the historical distribution. The Rocky Mountain bighorn sheep are found within Forest Service Region 2 and the GMUG National Forest.

Rocky Mountain bighorn sheep are primarily animals of open habitats, such as alpine meadows, open grasslands, shrub-steppe, talus slopes, rock outcrops, and cliffs. In some places, however, they may use areas of deciduous and conifer forests, especially where openings may have been created by clear-cuts or fire. Densely forested areas provide little

forage and poor visibility and are rarely used by bighorn sheep, except for shade in summer, escape from insects, and protection from high winds on very cold days. Open forests, however, are used in some areas for foraging and thermal cover. Visibility is an important habitat variable for bighorn sheep, so much so that the structure and height of vegetation are probably more important than composition of plant species because high visibility facilitates the detection of predators. While bighorns feed in open areas, they are rarely found more than 400 meters from escape cover, where they have an advantage over most predators. Talus slopes, rock outcrops, and cliffs provide habitat for resting, lambing, and escape cover.

In general, bighorn sheep forage opportunistically, feeding on palatable plant species that are available seasonally. Seasonal forage consumption depends on plant succulence, nutrient quality, and availability. Bighorn sheep select forbs most frequently, followed by grasses, and then shrubs.

The birthing season for Rocky Mountain bighorn sheep begins in late April and early May, and it coincides with the timing of vegetation green-up and milder climatic conditions. Lambing areas are usually on or very close to wintering areas and may be used year after year by the same maternal group. Adult ewes seek out steep, rugged topography for giving birth, which provides protection from predation, shelter from inclement weather, and isolation during the development of the mother-young bond. In some bighorn populations, male sheep gather on their fall or winter ranges 1 to 2 months prior to the breeding season to establish and reinforce dominance relationships between individuals. It is during this pre-rut period that physical contact between males occurs.

The Colorado Division of Wildlife manages two herds of Rocky Mountain bighorn sheep within the analysis area The Ouray-Cow Creek Herd (Unit S21) and Pole Mountain/Upper Lake Fork Herd (Unit S33). Unit S21 is located in Ouray, Hinsdale, and Gunnison Counties. It is bounded on the north by Colorado State Highway 62, on the east by Blue Creek and that part of Gunnison County in the Uncompahgre NF west of Blue Creek, on the south and west by the San Miguel-Uncompahgre and San Juan-Uncompahgre divide, and on the west by US Highway 550. Most of this Unit is within the analysis area.

Unit S21 is somewhat unique in Colorado as it is one of the few remaining indigenous herds. In the early 1900's this herd was estimated at about 1,000 individuals. The first drastic decline in the herd occurred in 1923, when mining activity and housing development reduced critical winter range, and disease from domestic livestock infected the herd. Several domestic sheep allotments occur within Unit S21. The size of the herd remained depressed over the next several decades, estimated at 150 to 200 in the late 1970s. In 1983, lungworm and pneumonia were the likely causes of low lamb recruitment and likely caused another population crash four years later reducing herd to approximately 40 animals. The herd gradually increased to about 80 by the mid 1990s, and contains 100 to 150 head currently.

Disease, particularly *Pasteurella* pneumonia, is the primary management concern for Unit S21. *Pasteurella* and lungworm were determined to be the causes for a drastic population decline during the early 1980s. Similar occurrences prior to the 1980s have also been recorded. To deal with the disease threat from 1979 to 1985, bighorns were trapped and treated for lungworm with Fenbendazole, then released within the Ouray area to reduce lungworm loads and to minimize the potential for a *Pasteurella* die-off. Fenbendazole blocks were occasionally distributed in wintering areas during the 1980s and 1990s. Currently, there is no specific disease monitoring occurring within the herd unit, other than necropsy and testing of animals that are hit by cars.

Three translocations have been associated with Unit S21. Two of these were out of the herd and were conducted with the primary purpose of reducing Unit S21 population and the potential spread of spread of lungworm and *Pasteurella*. The first translocation occurred in 1983 and involved 19 sheep being relocated to the Bristol Head Herd, while the second occurred in 1985, with 20 sheep moved to Brown 's Canyon. The single translocation into Unit S21 occurred in 1992, when 21 bighorns from the Georgetown Herd were released into Cutler Creek.

Mining development within the Unit S21 began in the late 1800s. Prior to this time, bighorns wintered throughout the area currently occupied by the town of Ouray and on benches in the Uncompahgre Valley between Ouray and Ridgeway. As development increased, the herd's winter range decreased. Unit S21 currently winters in significantly smaller patches of habitat within the same area as they did historically. Current wintering areas include benches along the Uncompahgre River Valley south of Ouray, downstream to Dexter Creek, Cutler Creek, and to East Baldy Peak. Many sheep also winter above 9,000 ft. in areas that are open, south-facing slopes in close proximity to rugged volcanic tuft outcrops. The analysis area includes all of this winter range. Historic summer distribution probably occurred in the areas that are currently used, and included the upper elevations of the Cimarron, Cow Creek, and Uncompahgre River drainages. Historically, the Sneffles Range west of Ouray was probably used much more extensively as summer range than it is now.

There is possible interchange between Unit S21 and bighorns in the Unit S33 and/or Animas herds. Two radio-collared sheep from the Animas Herd have been located within Unit S21 in association with Ouray bighorns. If these herds increase, it could lead to increased exchange of individuals, especially of dispersing juveniles.

Habitat quality within Unit S21 is considered good. The rough terrain provides necessary escape cover, and forage quantity and quality generally appear adequate. The primary habitat concerns in this unit are the loss of disturbance-free wintering areas, increases in spruce and oak brush, and availability of suitable forage due to competition with domestic livestock. Wintering sheep are now restricted to small benches that are undeveloped or developed in low densities. These are increasingly threatened by ongoing fire suppression, which has allowed oak-brush stands to dominate formerly suitable sheep habitat. In 1989, 800 acres of oak scrubland were burned to increase available bighorn habitat, and fertilization treatments to improve forage vigor have been conducted. Competition with domestic livestock has been a concern for at least 70 to 80 years, when accounts of district rangers noted that large portions of the area were not suitable for bighorns because of domestic livestock grazing. Declining numbers of domestic livestock have likely reduced competition in recent years; however, competition with other wildlife species, particularly elk, could be a threat to bighorns as both deer and elk densities are moderate to high within the herd unit.

Other management concerns for this herd include increased recreational use. Traditional bighorn wintering areas that occur on private land face heavy development pressure. A new gold mining operation is planned in the Uncompahgre Wilderness in the West Fork of the Cimarron drainage. Equipment, personnel, and ore will be transported to and from the mine using daily helicopter flights.

Unit S33 is located in Hinsdale and San Juan Counties. It is bounded on the south and east by the Uncompahgre-Animas-Lake Fork, and Gunnison divides, between Red Mountain Pass and the headwaters of Big Blue Creek and Colorado Highway 149, on the west and south by

Colorado Highway 149 between Gunnison-Hinsdale County line and the Continental Divide (Spring Creek Pass), north and west of the Continental Divide between Spring Creek Pass and the headwaters of Lost Trail Creek, west of Lost Trail Creek and Stony Pass, north and east of Stony Gulch, north of Colorado Highway 110 between Cunningham Gulch and US Highway 550 between Colorado Highway 110 and Red Mountain Pass.

Occurring on the Uncompahgre, Gunnison, and Rio Grande National Forests, Unit S33 is likely an indigenous herd that received two small supplemental transplants totaling five sheep in 1987. Three of these translocated animals were from the Trickle Mountain Herd, and two were from the San Luis area. The herd currently numbers about 60 animals, but because the unit contains large expanses of suitable bighorn habitat, it may have supported a larger herd in the past. Historically, there were three sub-populations within the unit, described as the Pole Mountain, Lake Fork, and Henson Creek sub-herds. Sheep still inhabit these traditional areas, occupying alpine habitats year-round, but typically concentrating above tree line after winter snows have receded and new forage becomes available. During winter, many of these sheep migrate to lower elevations in the broken, south-facing slopes available on the Lake Fork and Henson Creek drainages. Sheep have also been observed below Rio Grande Reservoir during the winter months.

The San Luis Peak (Unit S22) and Bristol Head herd units (Unit S53) are situated to the east of Unit S33 across Highway 149, Unit S21 is immediately adjacent to the northwest, and the Animas Canyon Herd resides immediately to the southwest of the unit. Although undocumented at this time, there may be periodic interchange with Units S22 and S53, but it is likely minimal due to large, intervening expanses of forest cover. Exchange with the Animas Canyon Herd has been documented, and exchange with animals in Unit S21 is likely based on their proximity and the availability of movement corridors.

An apparent die-off occurred in the late 1980s, causing a population decline that prompted the closure of hunting in 1991. During an aerial survey in 1988, three of four radio-collared sheep were found dead in different locations throughout the unit, suggesting that a widespread die-off had occurred. At least five bands of domestic sheep were seen across the unit during the survey. Hunting was reinstated within the unit in 2006, with a harvest quota of 2 rams. Domestic sheep grazing has historically occurred throughout the herd unit, and four allotments are currently active. Continued domestic sheep grazing is a primary concern to managers because of the risk of contact between domestic and wild sheep, as some active allotments are situated on the boundary between the Lake Fork and the Cow Creek herd units. No specific disease monitoring has occurred in the Lake Fork Herd unit, and the herd has never been treated with Fenbendazole. CDOW attempted to trap sheep in the Lake Fork unit during the winter of 2005-2006 to obtain biological samples for disease testing, but was unsuccessful due to interference by elk at the bait site.

Habitat quality in the Unit S33 is excellent. Large blocks of high quality habitat are distributed throughout the unit, with good connectivity between seasonal ranges. Summer ranges include alpine habitats containing excellent forage and juxtaposed with cliffs and rocky outcrops that provide critical lambing and escape terrain. At lower elevations, broken, south-facing slopes provide critical winter range with abundant forage and escape terrain. Plant community succession is of concern, particularly on winter ranges. Conifer encroachment, particularly in traditional bighorn use areas, will become an increasing threat if not addressed through management action. In addition, large herds of elk and deer

inhabiting this unit could cause competition for space and resources, but this is not now considered a limiting factor for bighorns.

Continued domestic sheep grazing is a primary concern to managers, as some active allotments are situated on the boundary between the Lake Fork and the Cow Creek herd units, posing a severe risk of disease transmission to bighorns in both herds.

State heritage programs in Colorado classify bighorn sheep as secure (NatureServe). Bighorn sheep are hunted in Colorado and Wyoming. Within the analysis area the Colorado Division of Wildlife currently issues 4 Resident rifle hunting licenses for rams in Unit S21 and 2 Resident rifle hunting licenses for rams in Unit S33. Forest Service Region 2 has designated the Rocky Mountain bighorn sheep as a sensitive species. This designation is primarily based upon threats to the long-term viability of bighorn sheep populations in the Region 2, which include diseases transmitted by domestic livestock, the lack of connectivity and/or loss of genetic variability (fitness) due to habitat fragmentation, habitat loss, increased human disturbance, competition with domestic livestock, and predation on small, isolated herds.

As part of the analysis process for this project, a Qualitative Risk Assessment was completed to evaluate the potential effects of the proposed action upon Rocky Mountain bighorn sheep (Appendix 1). People that were involved in this Risk Assessment included Rangeland Management Specialists, Wildlife Biologists, and Line Officers from the GMUG and San Juan National Forests and the San Juan and Gunnison Field Offices of the BLM. Also involved were the local Terrestrial Biologists and District Wildlife Managers of the CDOW offices in Montrose and Gunnison. All of the sheep grazing permittees were involved in the entire Risk Assessment process as well. The primary goal of the Risk Assessment was to determine the potential for contact between bighorn and domestic sheep and for the group to collaboratively develop solutions to reduce the risk of contact. The Risk Assessment is a dynamic document that should be reviewed annually to determine trigger points and effectiveness. The effect of domestic livestock diseases on bighorn sheep is well documented, although, many historic diseases have been eliminated through the use of vaccines. Disease continues to represent a concern to the health of bighorn herds in areas where bighorns and livestock, primarily domestic sheep and goats, have an opportunity to interact, even though the disease vectors are not fully understood.

Gunnison's prairie dog (*Cynomys gunnisoni*)

The Gunnison's prairie dog is included on the R2 Forest Service sensitive species list and is also currently identified as a candidate for listing as a threatened species within a portion of their range. See Section 3.6.1 for discussion of Affected Environment.

Northern Goshawk (*Accipiter gentilis*)

The northern goshawk is ranked globally secure (G5) by NatureServe, and it is considered locally vulnerable (S3B) in Colorado during the breeding season. It is considered locally vulnerable because of ongoing habitat alteration, primarily through logging practices. The USDA Forest Service Region 2 has designated this species as a sensitive species. It is not listed as threatened or endangered under the Endangered Species Act.

The northern goshawk is holarctic in distribution, and appears to be relatively abundant and widespread. In North America, the breeding range of the northern goshawk includes most of Alaska and Canada south of the Arctic Circle. This range extends south along the Cascades

and Sierra Nevada ranges into central California, the Rocky Mountains into southern Arizona, the Northern Mountains of the U.S., and south along the Appalachians to West Virginia and Maryland. They breed locally in highlands of Mexico to Jalisco and Guerrero.

The northern goshawk is considered to be a habitat generalist. Throughout their breeding range they are associated with a variety of mature forest habitat types, including aspen, mixed aspen-conifer, ponderosa pine, and lodgepole pine. Goshawks require a mosaic of forest structural stage conditions within their home range to meet their nesting, post-family fledging area, and foraging habitat requirements. Literature also reports a higher use of mature forest types within a mosaic of forest structural conditions. Mature forests become more important to goshawks during the breeding season, particularly for nesting and foraging habitat. On the GMUG National Forests, nest trees within active nesting territories are highly associated with large aspen trees. However, goshawk nests have also been documented in lodgepole pine and ponderosa pine trees.

According to the MIS Species Assessment (2005) for the northern goshawk, populations appear to be well distributed across the GMUG National Forest. The majority of goshawk detections and nest sites were documented during goshawk survey efforts, incidentally by Forest service personnel engaged in fieldwork. Most of this fieldwork was initiated by the need for biological clearances of proposed Forest Service projects, primarily timber sales and fuels projects. Therefore, a majority of the analysis area has not specifically been surveyed since these types of activities do not generally occur on this part of the Forest. Within the areas surveyed on the Forest, known goshawk nest sites occur predominantly in mature stands (structural stages 4B and 4C) of aspen, mixed aspen-conifer, ponderosa pine, and lodgepole pine. Forest data also indicates that all known nest sites were within one mile of a perennial water source and within 0.5 mile of a perennial or intermittent drainage.

Based upon existing survey data and the characteristics of local populations and known nest sites on the Forest, it is reasonable to assume that northern goshawks are located in suitable habitats throughout the analysis area, and that they occur in low densities. The primary habitat type that would potentially be utilized is mature aspen and mixed aspen-conifer forest. Within the analysis area, these habitats are largely functioning under natural processes and timber harvest or fuels projects have been negligible.

Currently, there are no long-term indices of trends or estimates of goshawk breeding population size at the Forest, Region, or National scales. Local Forest data indicates that approximately 22% (8 out of 71) of all known nesting territories are active each year. Active territories do not remain active every year, but they may be utilized periodically over the 20-year sample period. The reasons for this variability are unknown.

Purple martin (*Progne subis*)

The purple martin is ranked globally secure (G5) by NatureServe, and it is considered vulnerable (S3) in Colorado during the breeding season. It is considered vulnerable because of ongoing habitat alteration, primarily through logging practices. The USDA Forest Service Region 2 has designated this species as a sensitive species. It is not listed as threatened or endangered under the Endangered Species Act.

The purple martin breeds locally throughout the eastern United States from the Atlantic to the Great Plains, across the Southwest, and up the Pacific Coast from south-central California to British Columbia. They winter in South America. Breeding birds have been confirmed on the GMUG National Forest.

In Colorado, the Purple martin is highly associated with mature aspen forest habitat. The purple martin is entirely insectivorous, capturing insects during flight. Nesting occurs near the edges of old-growth aspen stands, usually near a stream, spring, or pond. These aspen stands are often adjacent to ponderosa pine or spruce/fir forest or open brush fields of snowberry, sage, serviceberry, mountain mahogany, or oak. They are secondary cavity-nesting birds, utilizing pre-existing cavities within aspen trees.

Data available from the Forest Service and the Rocky Mountain Bird Observatory indicates they are present on the Uncompahgre Plateau and the Lone Cone area of the San Juan Mountains. Site-specific surveys have not been conducted to determine the presence of this species within the analysis area.

Most purple martins probably first arrive in Western Colorado in mid-May and immediately begin to engage in nest-cavity defense and pair-bond formation. They are secondary cavity nesters, relying on natural cavities or abandoned woodpecker holes. By the first of June, incubating has begun and hatching generally begins in mid June. The 28 day nestling stage lasts through most of July and, for later nests, into early August. In Colorado they do not form large nest colonies like they do in the Eastern U.S.; only 4 or 5 pairs inhabit most BBS Atlas Blocks.

Suitable habitat is present in several locations within the analysis area. Aspen forest communities within the analysis area are largely functioning under natural processes. Timber harvest and fuels management project within the aspen forest type has not occurred to a significant degree.

Northern leopard frog (*Rana sylvatica*)

The northern leopard frog is ranked globally secure (G5) by NatureServe, and it is considered vulnerable (S3) in Colorado. It is considered vulnerable because of the observed reduction in distribution and presence within suitable habitats in the Rocky Mountains. The causes of this decline are not clearly understood. The USDA Forest Service Region 2 has designated this species as a sensitive species. It is not listed as threatened or endangered under the Endangered Species Act.

The northern leopard frog ranges across much of the northern U.S. and southern Canada. It is found throughout the State of Colorado except in the Republican River drainage and southeastern Colorado south of the Arkansas River.

Within Colorado, this species inhabits the banks and shallow portions of marshes, ponds, lakes, reservoirs, beaver ponds, streams, and other bodies of permanent water, especially those having rooted aquatic vegetation. Their diet consists largely of insects, grubs, and larvae. Northern leopard frogs require a broad range of habitats in close proximity due to their complicated life histories. Suitable habitats are present throughout the analysis area but have not been quantified or mapped. Data available from the Forest Service indicates they are present in scattered locations in low densities

Following hibernation, northern leopard frogs become active in April or May. Breeding takes place in the shallow, non-flowing portions of permanent bodies of water and in seasonally flooded areas adjacent or contiguous with permanent pools. Various studies of northern leopard frog breeding habitats have been conducted in the Rocky Mountain region. In northern Colorado and in Wyoming, Corn and Livo (1989) found that northern leopard frogs bred and successfully hatched in a gravel pit, stock ponds, and beaver ponds.

Hammerson (1999) noted that the northern leopard frogs bred in shallow, quiet areas of permanent bodies of water, in beaver ponds, and in seasonally flooded areas adjacent to or contiguous with permanent pools or streams in Colorado.

Breeding pools typically contain vegetation, mats of algae, and fairly clear water. Eggs are laid on the surface of the submergent vegetation. Tadpoles need bodies of water with no overhead canopy and that are free of introduced predaceous fish. These bodies of water should be reasonably shallow so that the sun can heat them to temperatures suitable for rapid development, especially at higher elevations, where the growing season may be short. However, the ponds should not be too shallow because they would dry too rapidly for tadpoles to complete their 58 to 105 day larval period.

Metamorphosis typically proceeds through the summer months and terrestrial forms appear in August or September, depending on the elevation. In various locations across their range, subadult frogs, after completing their larval period, migrate across land to suitable feeding sites at larger lakes. The habitat through which successful dispersal occurs is not known completely. The destination habitat for subadults is other ponds and suitable foraging habitat around those ponds. Juvenile northern leopard frogs disperse farther and more rapidly along streams than they do over land. In the fall, subadult and adult frogs migrate to overwintering sites. Little is known of potential overwintering sites for northern leopard frogs in Region 2; however, winter habitat in the Rocky Mountain region is expected to be similar to that throughout the species' range. Most likely they use the bottoms of flowing streams and ponds (and possibly springs) that are large enough that they do not freeze solid in winter.

The northern leopard frog is one of the more terrestrial of the ranid frogs, using a considerable amount of upland habitat around breeding ponds. Following reproduction, adult northern leopard frogs move into upland habitat in which they may feed for the summer. Many citations mention movements by this species of up to 3.0 km from water, and Dole (1971) notes that subadults move up to 5.2 km away from natal ponds.

Frog movements among habitats and pond spacing are two of the most important factors to consider in management of northern leopard frogs, as both factors are likely to greatly affect population density in this species. The pattern of spacing of suitable breeding sites across the landscape and upland movements made by northern leopard frogs are probably both very important in colonization or recolonization of ponds and the maintenance of healthy metapopulations. In the Rocky Mountain Region, meadows, wetlands, and riparian areas are probably important connecting habitats due to relatively humid microclimates compared to surrounding habitats.

Suitable habitat within the analysis area includes beaver ponds, stock ponds, and the perennial and intermittent streams. Livestock grazing can influence habitat conditions within breeding ponds and in the shallow, non-flowing portions of streams.

Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*)

The Natural Heritage Program rank for Colorado River cutthroat trout (CRCT) is G4 (global rank: uncommon but not rare; some cause for long-term concern due to declines or other factors) and for this subspecies is T3 (intraspecific rank: at moderate risk of extinction due to a restricted range, relatively few populations [often 80 or fewer], recent and widespread declines, or other factors). Within Colorado it is ranked as S3 (vulnerable due to a restricted range, relatively few populations [often 80 or fewer], recent and widespread declines, or other factors making it vulnerable to extirpation). Regions 2 and 4 of the USFS have

designated the CRCT a sensitive species. CRCT was first petitioned for listing as threatened or endangered under the Endangered Species Act in December 1999, but in April 2004, the U.S. Fish and Wildlife Service (USFWS) concluded that this subspecies did not warrant listing. In June 2007, the USFWS issued a 12-month finding that this subspecies still did not warrant listing under the Endangered Species Act.

CRCT has a historic range encompassing the Green River and Colorado River drainages in southwestern Wyoming, eastern Utah, and Colorado west of the Rocky Mountains, northeastern Arizona, and northwestern New Mexico. Currently, CRCT populations exist in the small headwater streams, where they enjoy a selective advantage over non-native fish, of the Green and Upper Colorado rivers in Utah, Wyoming, and Colorado; an area less than one percent of the historic range. Introductions of rainbow and other species of cutthroat trout have eliminated pure populations of CRCT from much of its range by hybridization. Pure strain populations currently exist in 21 waters in the Colorado and White River drainages of western Colorado. An additional 38 slightly hybridized populations exist in small headwaters of the White, Colorado, Yampa, and North Platte Rivers.

Currently there are 32 conservation populations known to occur on the GMUG National Forest. Two additional populations occur on public land adjacent to the Forest. Conservation Populations are restricted to approximately 96 miles of stream, with most populations occurring in tributaries of the North Fork of the Gunnison River. Streams on the GMUG support 27% of the known Colorado River cutthroat trout (CRCT) Conservation Populations in the Colorado, Dolores and Gunnison Geographic Management Units (GMUs). Existing populations are located in isolated headwater streams of generally 2-4 miles in length, and remain at risk for localized extirpations. Two CRCT Conservation Populations have been established in lakes totaling approximately 75 surface acres on the Grand Mesa; however, severe drought and dam reconstruction have likely affected the abundance of these populations. The total miles of stream occupied by CRCT on the Forest have increased 29% since 2001. However, this increase was largely due to the discovery of new CRCT Conservation Populations, and not from increases in abundance or dispersal of individual populations.

CRCT are present on approximately 40 miles of stream and rivers in the analysis area. These waters include: Fall Creek, Big Blue Creek, West Fork, Middle, and East Fork of Cimarron River, Cow Creek, and Owl Creek. Only the population in Fall Creek is considered a "Conservation Population" as described in the Conservation Agreement (2006). Conservation populations show no introgression with rainbow trout and other non-native cutthroat trout. Furthermore, this population is one of the few on the GMUG NF not threatened by other non-native trout such as brook and brown trout. CRCT in Big Blue Creek are in very low numbers.

The cold water streams which the trout inhabit are typically high in elevation with a gradient greater than four percent. The average daily flow rates are low, less than 30 cubic feet/second with some flows less than 5 cubic feet/second. The streams supporting good populations possess a balanced pool to riffle ratio with the pools occurring naturally or as a result of beaver activity. Streambeds are composed of cobble-boulder-gravel substrates. Habitat for CRCT in the project area is composed primarily of step-pool and step-run habitat, with stream gradients ranging from 2-8%. The exceptions are two high elevation streams in Big Blue Creek and Fall Creek, where low gradient riffle-pool sequences exist. Suitable spawning habitat abundant in most of the CRCT streams, and may affect recruitment of

young CRCT. Fine sediment is generally low, but observed to be rather high in depositional areas located on Big Blue Creek. Unfortunately, these small depositional areas are often where suitable spawning habitat occurs. Fish cover is good throughout these streams, and is composed of large boulders, pools, large woody debris, and undercut banks

The CRCT is a generalized forager, feeding on a broad spectrum of prey organisms. In the analysis area, population estimates for adult CRCT range from 64 fish per mile to 102 fish per mile, with the greatest abundance occurring in Fall Creek. Mean length for all fish is 155 mm, with total length of fish captured ranging between 47-365 mm. This data indicates that reproduction is occurring on these streams and that all age classes are represented. Brook trout and rainbow trout are also present in the analysis area, and co-exist with CRCT in Big Blue Creek, West Fork, Middle, and East Fork of Cimarron River, and Cow Creek.

The female constructs a redd (nest) in the gravel substrate in flowing stream sections. The eggs are deposited in the redd and, after fertilization, the female covers the eggs with substrate gravel. Cutthroat trout are not lakebed spawners, and thereby require feeder streams and creeks in which to spawn. For this reason, lake populations have declined due to artificial barriers to the spawning runs created by man.

Grazing, motorized and non-motorized recreation and water development are the primary land management activities occurring in the analysis area that affect CRCT. Livestock use is heaviest near the Forest boundary and changes to sheep grazing near headwater areas. Water development is extensive in the Cimarron watershed with several large diversions and one large reservoir.

Nokomis fritillary butterfly (*Speyeria nokomis Nokomis*)

The Nokomis fritillary butterfly is one of six subspecies of Nokomis butterflies in North America. Nokomis fritillary is the generally accepted common name for *Speyeria Nokomis*, and it is typically used for the subspecies *S. n. nokomis*. This subspecies is also commonly called the Great Basin silverspot butterfly.

NatureServe has determined that the Nokomis fritillary species is globally vulnerable and has assigned it a Global Heritage Status Rank of G3. The rationale for the G3 ranking cites the species' very spotty distribution in wet places that are associated with generally arid range, disturbance and significant problems at many sites, and increasing isolation of the less than 100 viable metapopulations. The National Heritage Status Rank for United States populations is N3. The Global Heritage Status Rank for the Nokomis fritillary butterfly subspecies is critically imperiled (G3T1), based on its "limited range, few remaining sites, and significant threats to habitats". These ranks were last reviewed and changed on 30 September 1998. USFS Regions 2 and 3 have designated the Nokomis fritillary butterfly as a sensitive species. In Region 2, this subspecies is found only in western and south-central Colorado. The sensitive species listing rationale in Region 2 cites the small size and isolation of populations, compromised metapopulation dynamics, and widespread loss and modification of the very limited springs and spring-fed wetlands that the butterflies require. Specific threats listed in the sensitive species evaluation include loss and degradation of their habitat resulting from draining, capping springs, and development. Both the Nokomis fritillary butterfly and blue silverspot butterfly (*Speyeria nokomis caerulescens*) subspecies were designated as candidates for listing under the Endangered Species Act until 1996, but they were never listed.

The historic range of the Nokomis fritillary species extended from eastern California through Nevada and Utah to western Colorado, and south through eastern Arizona and New Mexico to northern Mexico. Known localities within its range are widely separated due to restricted habitat. The Grand Mesa, Uncompahgre, and Gunnison National Forests contain habitat and known records of the Nokomis fritillary butterfly. The northwest portion of the Uncompahgre National Forest (the Uncompahgre Plateau) is immediately south of the large Unaweep Canyon population in Mesa County. The Unaweep Canyon population is the largest known population of Nokomis fritillary butterfly in Colorado, and it is probably second in size to the largest known population located in Uintah County, Utah. The Colorado Natural Heritage Program (2005a) has given it an element occurrence rank of A (excellent estimated viability). This population includes five confirmed small (5 to 20 acres) colonies along a 5-mile stretch of West Creek, and additional habitat about 2.5 miles further upstream that could support a colony.

The Nokomis fritillary is associated with the Upper Sonoran (pinyon-juniper, various shrubs) and Canadian (fir-spruce-tamarack, some pine, aspen-maple-birch-alder-hemlock) Life Zones of the southwestern United States and northern Mexico. Habitats are generally described as permanent spring-fed meadows, seeps, marshes, and boggy streamside meadows associated with flowing water in arid country. The presence of an adequate supply of the larval foodplant bog violet (*Viola nephrophylla*) is a critical habitat component. Microhabitat conditions for the bog violet include soggy soil and shade, often under shrubs such as willows. Willows are usually present and probably help to create the microclimate that the violets need. An adequate supply of nectar sources is another important habitat requirement. Nokomis fritillaries utilize a variety of species; including native and introduced thistles (e.g., *Cirsium*, *Carduus*, and *Onopordon* species), horsemint (*Agastache*), and joe pye weed (*Eupatorium maculatum*). These microhabitats are naturally scarce in the arid landscapes where they occur, and are threatened by excessive livestock grazing and activities that alter wetland hydrology.

The presumed neotype location for the Nokomis fritillary butterfly is at Mount Sneffels, near the town of Ouray, Colorado. The Colorado Natural Heritage Program (2005) includes BLM public lands, USFS, and private lands in the description for the element occurrence record, which falls within the southeastern unit of the Uncompahgre National Forest. Ellis examined this site in September 1989 and found that it was “abusively overgrazed” and that most of the willow thickets had been stripped by year-round horse grazing. A search was conducted for the Nokomis fritillary butterfly during the 1998 Natural Heritage Inventory of the Uncompahgre River Basin (Lyon, 1999). Suitable habitat was inventoried and a population was located in the Mount Sneffels area. This population is currently within designated wilderness. A foot trail passes close to the butterflies found. It does not directly impact suitable habitat. No references to livestock grazing were included in the data for this site.

3.7.2 No Grazing Alternative Environmental Consequences

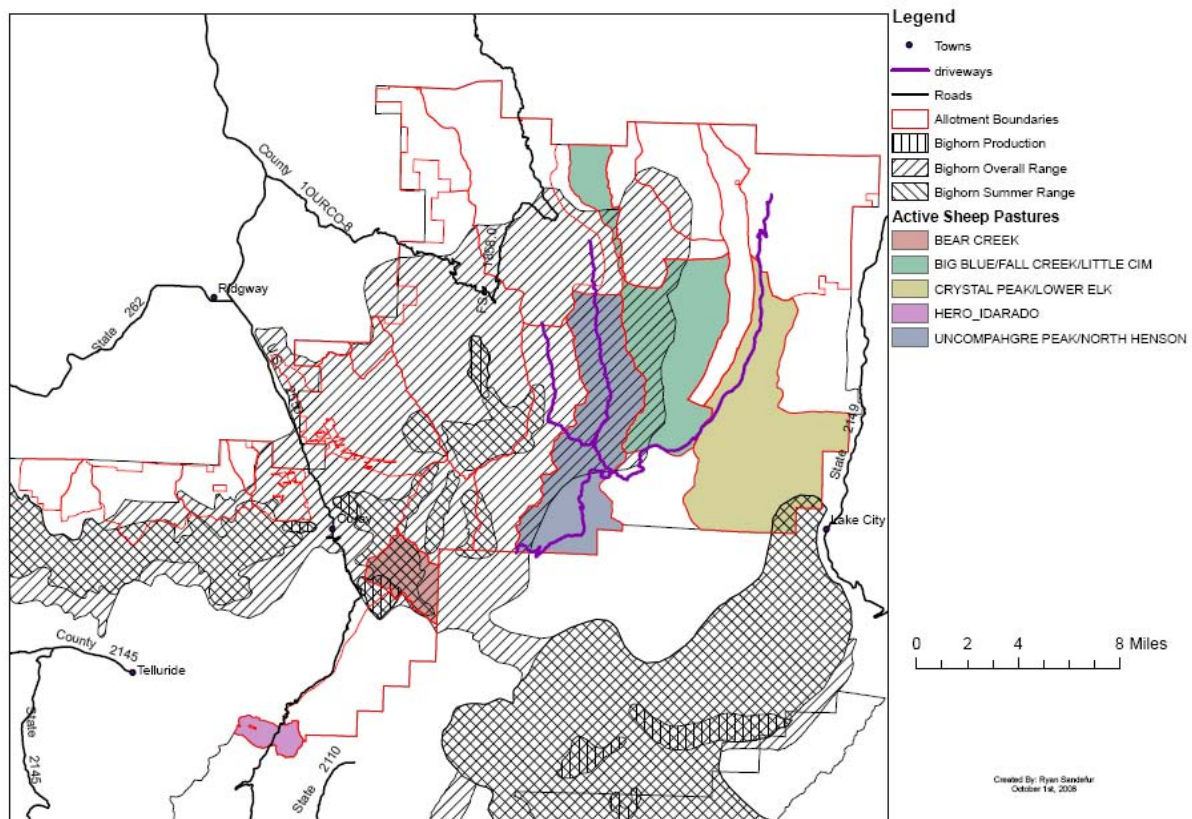
Rocky Mountain bighorn sheep

With the No Grazing alternative, risk of contact between domestic and wild sheep in the analysis area would be removed. However, domestic sheep may continue to graze the adjacent BLM allotments where there is essentially no topographic boundary between the wild and domestic sheep in the area. Therefore, a continued moderate and moderate/high

potential for interaction to occur would still exist off forest. The Risk Assessment should be reviewed annually to determine trigger points and effectiveness.

Determination The No Grazing alternative “may adversely impact individuals,” but is “not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing” for the Rocky Mountain bighorn sheep based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Figure 3.7.2 Bighorn Sheep Range in Analysis Area



Gunnison’s prairie dog

See section 3.6.2 and 3.6.4 for discussion of effects on Gunnison’s prairie dog.

Determination The No Grazing alternative will have “no impact” on the Gunnison’s prairie dog based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Northern goshawk and Purple martin

Aspen and mixed aspen-conifer forests that provide suitable habitat for Northern goshawk and Purple martin are largely functioning under natural processes. As livestock grazing within the analysis area is currently not having any direct or indirect effects upon the forested

vegetation types providing habitat for the northern goshawk or purple martin, the No Grazing alternative would also not have any direct or indirect effects. Based upon field observations, the impact of browsing upon aspen regeneration or shrub understory would only occur in a few isolated sites primarily on big game winter ranges.

Determination The No Grazing alternative will have “no impact” on the Northern goshawk or Purple martin based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Northern leopard frog and Colorado River cutthroat trout

Under the No Grazing alternative, continuing impacts to wetland and riparian vegetation and aquatic communities, including damage to streamside vegetation, increased sedimentation as a consequence of resulting erosion, and more rapid movement of water through stream systems where riparian vegetation is no longer present to stem water flow would no longer occur within the analysis area. However, effects that have occurred in the past to those systems may not completely recover over time and may continue to impact CRCT habitat. Other effects to CRCT under the No Grazing alternative may continue from areas outside the analysis area including increases in the levels of nitrates and fecal coliform bacteria from livestock waste and the use of various pesticides for weed control (the most common being 2, 4-D Amine, Escort, Plateau, and Roundup). Fortunately, many of the commonly used pesticides have short half-lives (one week to 30 days) which will prevent the build-up of these chemicals negatively impacting water quality.

Determination The No Grazing alternative “may adversely impact individuals,” but is “not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing” for the Colorado River cutthroat trout based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Nokomis fritillary butterfly

Under the No Grazing alternative long-term impacts including soil compaction and reduced water infiltration as a result of previous livestock grazing can lead to a loss of larval host plants and invasion by non-native grasses. Removal of light or moderate grazing may negatively affect the butterflies by removing their larval food plants competitive advantage. For example, bog violets appear to be “locally more abundant” in grazed habitats, perhaps because grazing can help reduce competition with other plant species and improve conditions for violets to regenerate. Ellis (1989) also noted that cattle browse young willow shoots in pastures that have been burned, which helps maintain more open willow stands.

Determination The No Grazing alternative “may adversely impact individuals,” but is “not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing” for the Nokomis fritillary butterfly based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species. If the action is modified in a manner that causes effects not considered, or if new information

becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

3.7.3 Existing Condition & Proposed Action Alternatives Environmental Consequences

Rocky Mountain bighorn sheep

As part of the analysis process for this project, a Qualitative Risk Assessment was completed to evaluate the potential effects of the proposed action upon Rocky Mountain bighorn sheep (Appendix 1).

Based upon the Qualitative Risk Assessment it is apparent that most of the existing domestic sheep grazing and trailing activities within the analysis area occur outside of any mapped bighorn sheep range, or occur within the area mapped as overall range. Four areas of overlap were evaluated during the Risk Assessment process to determine the risk of physical contact between wild and domestic sheep.

The first area of overlap evaluated is located at the southeastern corner of the Crystal Peak/Lower Elk allotment. This is the only area where summer range for the S33 herd is within the analysis area. During the Risk Assessment process the permittee explained that his sheep do not graze this area. The area mapped as bighorn sheep summer range is on the steep face of the mountain above Henson Creek and the Lake Fork. There is a large band of dark timber between the summer range and the basins that are grazed by domestic sheep. There is also a significant amount of recreational activity at Crystal Lake and Larson Lake. For these reasons, he does not take his sheep across the ridge off Crystal Peak into the Crystal Lake or Larson Lake areas. Therefore, the group gave this area an overall risk rating of very low.

The next area evaluated is associated with the Middle Fork stock driveway. This stock driveway is used by one band of sheep to trail on to and off the Uncompahgre Peak/North Henson allotment. It was established as an alternate route for the Ridge stock driveway to reduce impacts to vegetation and soils on this main driveway. The Middle Fork stock driveway is located within the Middle Fork/Wetterhorn allotment, which has been closed to sheep grazing to prevent impacts to bighorn sheep. The driveway is located primarily in an area of overall bighorn sheep range, but passes within ½ mile of mapped bighorn sheep summer range near the head of the Big Cimarron and Cow Creek. Trailing occurs for 2-3 days in early to mid-July to bring the sheep on to the Forest and then again for 2-3 days in mid to late August to take the sheep off the Forest. The domestic sheep are trailed through this area in a large band. Moving the sheep involves several people and dogs, and there is generally a lot of noise and activity occurring at the time. The actual trail comes up the Middle Fork drainage and then tops out in the basins and ridges of the upper drainages above tree line. The edge of the mapped bighorn sheep range includes the upper portion of the ridge above the trail where there are rock cliffs and outcrops that provide escape terrain. Based on the factors considered in the Risk Assessment, the overall risk rating for this stock driveway was determined to be Very Low. The group involved in the Risk Assessment thought that in combination the high level of activity during trailing, the short duration of time trailing occurs, and the very steep topography located between the sheep trail and bighorn summer range effectively inhibit interaction between wild and domestic sheep in this area.

The permittee that utilizes the Middle Fork stock driveway and grazes the Uncompahgre Peak/North Henson allotment also has a permit to graze the adjacent BLM allotment at American Flats. When grazing this BLM allotment, sheep have been using a portion of the Middle Fork/Wetterhorn allotment on the Forest which is currently closed to livestock grazing. This portion of the Middle Fork/Wetterhorn allotment is essentially a topographic extension of American Flats across the administrative boundary, and the permittee says that it is virtually impossible to prevent sheep from using this area. As a result, he has requested that this area be added to his permit to prevent unauthorized use. This area is adjacent to mapped bighorn sheep summer range around Wildhorse Peak. If authorized, this would place domestic sheep within ¼ mile of an active bighorn sheep summer range area. Domestic sheep graze the BLM allotment for 3-4 weeks, and are probably on the Forest for several days. There is essentially no topographic boundary between the wild and domestic sheep in this area. Therefore, the group thought that this situation would have a moderate to high potential for interaction to occur and recommended that this area not be added to the permit. Additional measures should be taken to designate the BLM/Forest boundary and to prevent domestic sheep grazing on the National Forest as much as possible.

The Bear Creek allotment has the most significant overlap with bighorn sheep use areas. Included within the allotment boundary are summer range and lambing areas. The season of use for domestic sheep does not coincide with bighorn lambing so the group decided this would not be an issue. When the group compared the actual use areas for both wild and domestic sheep, it was apparent that the actual overlap is much less than anticipated. Much of the terrain in the lower portions of Bear Creek is extremely steep and rocky, which is where much of the bighorn sheep use occurs. Only the upper basins of Bear Creek are being grazed by domestic sheep, primarily in combination with the permittee's BLM permit in the American Flats area. Grazing use on the combined BLM and Forest permits is for approximately 50 days during July and August. Approximately 10-14 days are spent on the National Forest. When grazing the Bear Creek allotment, domestic sheep are within ½ mile of bighorn sheep. There are no major topographic barriers between wild and domestic sheep use areas. However, the bighorn favor those areas near escape cover. The domestic sheep are grazing the flat, open basin while the bighorn are on the edges of the basin away from Engineer Pass. Based on the factors considered in the Risk Assessment, the overall risk rating for this allotment was determined to be Moderate. The group involved in the Risk Assessment thought that in combination the limited amount of suitable grazing area, the timing and duration of grazing use, and proximity to occupied bighorn sheep summer range without significant topographic barriers could provide opportunities for interaction.

The Proposed Action Alternative would utilize a series of management actions to reduce the risk of contact between wild and domestic sheep instead of removing domestic sheep from areas of overlap. Several management actions were discussed and developed to alleviate contact between wild and domestic sheep, and those actions are included in the proposed action. The effectiveness of these management actions is debatable, and if they do not prove to be effective, actions should be taken to remove domestic sheep from the allotment to prevent physical contact.

The Existing Condition alternative will not be as flexible in the management actions for reducing the risk of contact.

Determination The Proposed Action “may adversely impact individuals,” but is “not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing” for

the Rocky Mountain bighorn sheep based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species evaluated in detail in this Biological Evaluation. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Gunnison's prairie dog

See section 3.6.3 and 3.6.4 for discussion of effects on Gunnison's prairie dog.

Determination The Existing Condition and Proposed Action alternatives will have “no impact” on the Gunnison's prairie dog based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species evaluated in detail in the Biological Evaluation. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Northern goshawk and Purple martin

Aspen and mixed aspen-conifer forests that provide suitable habitat for Northern goshawk and Purple martin are largely functioning under natural processes. Livestock grazing within the analysis area is not having any direct or indirect effects upon the forested vegetation types providing habitat for the northern goshawk or purple martin. Based upon field observations the impact of browsing upon aspen regeneration or shrub understory appears to be happening only on a few isolated sites, primarily on active sheep allotments or big game winter ranges. Under the Existing Condition or Proposed Action alternatives, livestock grazing will continue to be managed so that it will not significantly inhibit regeneration of aspen clones.

Determination The Existing Condition and Proposed Action alternatives will have “no impact” on the Northern goshawk or Purple martin based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species evaluated in detail in the Biological Evaluation. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Northern leopard frog and Colorado River cutthroat trout

Livestock can have significant impacts on wetland and riparian vegetation and aquatic communities, including damage to streamside vegetation, increased sedimentation as a consequence of resulting erosion, and more rapid movement of water through stream systems where riparian vegetation is no longer present to stem water flow. The effects are a further reduction of water resources available to fish and amphibians and a loss of effective habitat.

Livestock grazing was historically far more intensive than at present, but in certain areas, it still degrades habitat of streams with Colorado River cutthroat trout (CRCT). Although grazing effects are often confounded with other factors and sometimes difficult to isolate, the preponderance of evidence suggests that concentrations of livestock in riparian zones often lead to bank damage, higher sediment delivery, and the removal of woody and herbaceous vegetation, all of which can contribute to trout population reductions. However, different

grazing systems are likely to have different effects on stream channels. For example, relative to high-intensity, short-duration grazing by cattle, season-long grazing has been demonstrated to cause declines in terrestrial macroinvertebrate infall and aquatic macroinvertebrate drift and reduced trout density and biomass. In addition, use of channels by cattle that coincides with the incubation of trout eggs and alevins may lead to reed trampling and reduced embryo survival.

The Existing Condition and Proposed Action alternatives would have some direct effects to local fisheries and fish habitat since livestock use would occur on the stream. Impacts to CRCT streams would be greatest where cattle grazing currently and will continue to occur, and considerably less where sheep grazing occurs. Reaches of the lower ends of Big Blue Creek would be most susceptible to livestock use since banks are largely comprised of vegetation. Other CRCT streams within the analysis area are less susceptible to grazing disturbance since stream channel and banks are composed of large cobble and boulder materials. Impacts to fish habitat cover, bank stability, streamflows, and other key habitat parameters are not expected to show measurable changes following the implementation of the Proposed Action. Some impacts to bank stability, undercut banks, pool depth and spawning gravel could occur from livestock trailing and riparian use.

Indirect effects to fish habitat are expected to occur where intermittent and headwater channels are grazed by livestock. Sediment from sloughing banks could be delivered downstream to CRCT occupied habitat causing some impacts to spawning areas.

Cattle produce considerable amounts of waste products that run into waterways. The changes are subtle over time but they profoundly alter aquatic ecosystems. High levels of cattle grazing activity in and around frog breeding ponds lead to substantial increases in the levels of nitrates and fecal coliform bacteria in these ponds.

The Existing Condition and Proposed Action alternatives include the use of various pesticides for weed control, the most common being 2, 4-D Amine, Escort, Plateau, and Roundup. Unfortunately, pesticide use is one of the more difficult inputs to study, and typically, it is necessary to contact county extension agents throughout a region to get a sense of the types of pesticides most commonly used and the pattern in which they are used. Fortunately, many of the commonly used pesticides have short half-lives, usually from one week to 30 days. If used judiciously, they may be more or less safe, but this depends on individual applicators. No region-wide statistics exist on the extent of the use of pesticides, and it is beyond the scope of this assessment to compile such data.

Determination The Existing Condition and Proposed Action alternatives “may adversely impact individuals,” but is “not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing” for the Colorado River cutthroat trout based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species evaluated in detail in the Biological Evaluation. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

Nokomis fritillary butterfly

Livestock grazing can have short-term negative impacts including reduced nectar availability and vegetation cover, and long-term impacts including soil compaction and reduced water infiltration, which can lead to a loss of larval host plants and invasion by non-native grasses.

Excessive livestock grazing can be a serious threat to Nokomis fritillary butterflies and their habitat, but light or moderate grazing may actually benefit the butterflies by giving their larval foodplants a competitive advantage. Ellis (1989) noted that at the Unaweep Canyon site, Nokomis fritillary butterflies continue to coexist with current livestock (cattle) grazing practices, and have even persisted in areas that have been heavily grazed for the past 100 years. Bog violets appear to be “locally more abundant” in the grazed habitats, perhaps because grazing can help reduce competition with other plant species and improve conditions for violets to regenerate. Ellis (1989) also noted that cattle browse young willow shoots in pastures that have been burned, which helps maintain more open willow stands. The timing and intensity of grazing are critical factors, along with other site-specific conditions; sustained and intense grazing degrades the habitat and is not recommended. Ellis examined the Mount Sneffels, Ouray County site in September of 1989 and found that it was abusively overgrazed, and most of the willow thickets had been stripped by year-round horse grazing. In 1999, Lyon visited this same site as part of the Natural Heritage program assessment for the Uncompahgre River Basin. At that time a population of Nokomis fritillary butterflies persisted at the site. She did not provide any comments about grazing use at the time.

Livestock grazing at this site would continue under both the Existing Condition and Proposed Action alternatives. Grazing should be managed to minimize negative impacts on the abundance of larval foodplants or adult nectar sources. The spatial and temporal effects of grazing can be managed by adjusting stocking rates, modifying grazing regimes, and managing water resources to avoid concentrating activity in critical habitat areas.

Light to moderate grazing has been shown to benefit Nokomis fritillary butterflies by giving a competitive advantage to their larval foodplants, but sustained and intense grazing can degrade habitat and eliminate nectar sources during the adult flight. Different grazing regimes may have decidedly different impacts, and recent research suggests that the combined effects of integrated fire and grazing systems (e.g., patch-burn grazing) may be significant. Cattle tend to graze preferentially in the burned areas, resulting in “patchy” grazing patterns. The combination of fire and grazing is also an effective way to control the willow stands. Very little rigorous research examining grazing impacts has been done, so any grazing regime should be implemented with caution. Populations of Nokomis fritillary butterflies and their essential habitat components should be monitored, so that the intensity, timing, and duration of grazing can be adjusted in response to observed impacts on them.

Determination The Existing Condition and Proposed Action “may adversely impact individuals,” but is “not likely to result in a loss of viability in the Planning area, nor cause a trend toward federal listing” for the Nokomis fritillary butterfly based upon the anticipated direct, indirect, and cumulative effects of the proposed action upon the habitat and individual species evaluated in detail in the Biological Evaluation. If the action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the action may impact sensitive species in a manner or to an extent not previously considered, a new or revised Biological Evaluation will be required.

3.7.4 Cumulative Effects

Rocky Mountain bighorn sheep

Unit S21 is increasingly threatened by ongoing fire suppression, which has allowed oak-brush stands to dominate formerly suitable sheep habitat. Other management concerns for Unit S21 include increased recreational use. Increasing numbers of hikers, dogs, horseback

riders, off-highway vehicle and 4x4 enthusiasts, and mountain bikers are a major threat to the continued persistence of the Ouray/Cow Creek bighorns. The greatest concern is disturbance by recreationalists and domestic dogs during winter months when bighorns are concentrated and stressed. Traditional bighorn wintering areas that occur on private land face heavy development pressure. In addition, Highway 550 poses a significant threat to bighorn sheep during seasonal movements, and a few sheep are killed in vehicle collisions each year. Although mining activity in the area has decreased significantly within the last 20 years, a new gold mining operation is planned in the Uncompahgre Wilderness in the West Fork of the Cimarron drainage. Equipment, personnel, and ore will be transported to and from the mine using daily helicopter flights. The impact of this operation on sheep in the herd unit is unknown but could be significant.

Other concerns for Unit S33 include increased recreational use. Hiking, biking, camping, hunting, fishing, wildlife watching, cross-country skiing, and off-highway vehicle use are some of the activities taking place in the herd unit. Although much of the area is remote, bighorns in the unit tend to show a strong fidelity to certain areas, creating the potential for conflict as human use escalates in those areas. Areas of particular concern are along the Alpine Loop west of Lake City, and the Lake Fork drainage above Lake San Cristobal, where continuous recreational disturbance could lead to displacement of sheep into suboptimal habitats. In addition, development is considered a great threat to resident sheep in certain areas. Much of the private land above Lake San Cristobal is continuously being developed. Construction near the river bottom and on the north side of the valley is occurring in areas used by bighorns during the winter months, and decreasing winter range availability may represent a potential bottleneck for herd productivity.

Gunnison's prairie dog

See discussion of cumulative effects in Section 3.6.4 for Gunnison's prairie dog.

Northern goshawk and Purple martin

Threats to the northern goshawk and purple martin on the GMUG National Forests are management activities, wildfires, and widespread insect/disease activity that result in habitat loss or degradation. Timber harvest, mechanical treatments, prescribed fire, stand-replacement wildfires, and large-scale insect/disease epidemics can result in habitat loss and/or fragmentation. Livestock grazing within the analysis area could have indirect impacts to forest habitat if it is intense enough to impact tree regeneration or alter fire regimes.

Northern leopard frog and Colorado River cutthroat trout

Management activities, natural occurrences, grazing, recreation, and large scale fires may continue to impact riparian conditions that provide habit for these species. Due to the emerging genetic work on what were initially thought to be Colorado cutthroat trout, please see section 3.6.4 for discussion of Greenback cutthroat trout for discussion of cumulative effects.

Nokomis fritillary butterfly

Nokomis fritillary butterfly **is cumulatively affected by continued** loss and degradation of their wetland habitat from draining, capping springs, and other water development whether related to grazing or other developments on public and private lands.

3.8 Management Indicator Species ---

Requirements for Management Indicator Species (MIS) are established in section 219.19 of the 1982 planning regulations (36 CFR Part 219). The 1982 Rule directed forests to manage fish and wildlife habitat to maintain viable populations and directed forests to select MIS as a process or method to help ensure species viability.

The 1982 planning regulations provided guidance for implementation of the National Forest Management Act when the GMUG Forest Plan was promulgated in 1983, and amended in 1991. The 1982 regulations have now been superseded by regulations published in the Federal Register on January 5, 2005 (the new rule). The new rule only addresses forest planning and has no application to project level planning. The new rule expressly drops the 1982 rule's concept of wildlife viability and the requirement to monitor MIS. However, during the three-year transition period, the new rule allows amendment of an existing Forest Plan under the provisions of the superseded 1982 rule with certain modifications.

In May of 2005, the Forest Supervisor of the GMUG National Forest signed a Decision Notice and Finding of No Significant Impact to Amend the Forest Plan for MIS. The Forest Plan Amendment revised the MIS species list and language in Forest Direction and Standards and Guidelines for Management Areas and the Monitoring Plan. The GMUG is currently proceeding with revision of the Forest Plan under the new planning rule. In this transition period, project level analysis will comply with the 2005 Forest Plan Amendment. Accordingly, this amendment requires MIS assessment of project level planning decisions but imposes no obligation to collect or analyze population data at the project level. Project level analysis is tiered to Forest level MIS assessment. This assessment was updated and completed by the Forest in 2005.

The following table displays the current list of MIS for the GMUG National Forests and their relationship to the project area.

Table 3.8 GMUG National Forests MIS Species List

Common Name	Scientific Name	Habitat Association	Habitat or Species Present Within the Project Area?
Rocky Mountain elk	<i>Cervus elephus</i>	General habitats, habitat effectiveness	Yes
Abert's squirrel	<i>Sciurus aberti</i>	Ponderosa pine	Suitable habitat is not present nor are there records of this species occurring within the analysis area. There are no activities proposed in or around suitable habitat for these species. Therefore, no direct, indirect, or cumulative effects will occur and no further analysis is necessary.
Brewer's sparrow	<i>Spizella breweri</i>	Sagebrush	Suitable habitat is not present nor are there records of this species occurring within the analysis area. There are no activities proposed in or around suitable habitat for these species. Therefore, no direct, indirect, or cumulative effects will occur and no further analysis is necessary.
Northern goshawk	<i>Accipiter gentiles</i>	Aspen-conifer	Yes
Merriam's wild turkey	<i>Meleagris gallopavo</i>	P/J, oak, ponderosa pine, mtn. shrub	Yes
Pine (American) marten	<i>Martes Americana</i>	Spruce-fir	Yes
Red-naped sapsucker	<i>Sphyrapicus varius</i>	Aspen	Yes
Common trout	<i>Oncorhynchus spp.</i>	Aquatic	Yes

3.8.1 Affected Environment

The analysis area is very large and diverse. It includes approximately 200,000 acres of National Forest land that ranges in elevation from around 7,800 feet to over 14,000 feet.

The analysis area primarily includes vegetation cover types present on the Uncompahgre National Forest that occurs in higher, moister climates. Those cover types include Gambel oak, mixed mountain shrub, Douglas-fir, aspen, mixed aspen-conifer, and spruce-fir.

Notably absent are pinyon and juniper woodland, ponderosa pine forest, and sagebrush. Much of the Uncompahgre Wilderness includes large expanses of alpine vegetation as well as rock and talus.

The analysis area also includes numerous perennial and intermittent streams, ponds, wetlands, and fens with their associated vegetation. The ecosystems present are largely functioning under natural conditions. Timber or fuels management activities occur on a relatively minor portion of the landscape.

Not all of the analysis area is currently grazed by livestock. Historic levels of livestock grazing (especially domestic sheep) were much greater than present use. Big game animals present within the analysis area include Rocky Mountain bighorn sheep, Rocky Mountain elk, mule deer, black bear, and mountain lion. There are also other predators including the Canada lynx, bobcat, and coyote.

Detailed Species Assessments of the following species habitat needs, distribution, and their habitat and population condition, status and trend on the GMUG National Forest are available in the Management Indicator Species Assessment for the Grand Mesa, Uncompahgre, and Gunnison National Forests (November, 2005).

Rocky Mountain Elk

The analysis area is primarily utilized as summer range by Rocky Mountain elk. Within this summer range are calving and summer concentration areas. The lower elevations of the Forest also provide winter range. Livestock grazing practices can affect habitat capability and elk distribution through competition for forage and space.

Elk populations are intensively monitored by the Colorado Division of Wildlife (CDOW). CDOW manages the elk populations within the boundaries of the analysis area. Included within the analysis area are portions of two Data Analysis Units (DAU), E-25 and E-35. Each DAU has a specific management plan that includes population objectives for numbers, age class distribution, and harvest. Annual harvest and census data is used to estimate elk population characteristics within each DAU. CDOW's monitoring data indicates the population trend in these DAUs is very similar to most of those on the GMUG. Population levels have fluctuated over the last 25 years but the trend indicates an overall increase in numbers. DAU E-25 has decreased in the last few years to a level that is at or slightly below the population objective of 4,500. DAU E-35 has shown a consistent increasing trend in the elk population. Although there is a recent downward trend, the current population is estimated to be almost twice as high as the population objective of 2,900 elk.

The active sheep allotments contain elk summer range along with elk calving and summer concentration areas. They do not contain any mapped elk winter range. Domestic sheep primarily graze on forbs and shrubs, and lesser amounts of grass and grass-like plants. Therefore, the dietary overlap between domestic sheep and elk is not very strong.

The active and proposed cattle allotments contain elk summer and winter range, along with elk calving and summer concentration areas. Cattle and elk have very similar diets and there is a strong dietary overlap. Research indicates that at certain densities and times of the year, cattle are socially intolerable to elk. Elk can be displaced from preferred habitats by the presence of cattle. Active cattle allotments, and vacant allotments that are proposed to be added to active allotments, which contain mapped big game winter range management are:

Alpine Plateau C&H, Lou Creek C&H, Green Mountain C&H, Section 25 C&H, Baldy C&H, and Corbett Creek C&H.

Northern goshawk

Habitat for the northern goshawk is extensive throughout the GMUG National Forest. Northern goshawks appear to occur in low densities throughout this suitable habitat. The analysis area includes breeding and rearing habitat for the northern goshawk. Aspen habitats persisting on the landscape are vital to this species. There are no long-term indices of population trends within the range of this species, including the GMUG. Threats to the northern goshawk are management activities, wildfires, and widespread insect/disease activity including “Sudden Aspen Decline” which results in habitat loss or degradation. For more discussion on affected environment see Section 3.7.1.

Merriam’s turkey

On the GMUG National Forest, the distribution and abundance of Merriam’s turkey is largely tied to the availability of ponderosa pine, pinyon and juniper with ponderosa stringers, and Gambel oak habitats. The analysis area includes year round habitat for the Merriam’s turkey. Forest understory vegetation and riparian areas and meadows interspersed with forest habitat are important habitats for turkey. Merriam’s turkeys migrate altitudinally with the changing seasons. The valleys and lower elevation foothills provide winter range. The Gambel oak and mixed mountain shrub habitats provide nesting areas in the spring. Aspen and mixed aspen-conifer habitats are utilized as brood rearing areas. The understory herbaceous vegetation provides ground cover and food for adults and their young. Insects associated with this understory vegetation also provide an important food source. Understory shrubs such as snowberry, current, and rose, as well as the interspersed stands of Gambel oak provide berries and mast in the fall.

Current populations are recovering from a large-scale die-off and subsequent reintroduction effort. Overall, the population trend is increasing and becoming stable.

Pine Marten

The analysis area includes year round habitat for the pine marten. Pine marten are highly associated with mature to old growth stands of spruce-fir or lodgepole pine forest habitat. They will also utilize stands of mixed aspen and conifer which have a codominant aspen and conifer overstory or stands that are heavy to conifer. Their distribution is based on habitat availability. Structural habitat features such as down wood, snags, culls, and leaning dead or dieing trees are important to pine marten. Their primary prey is the red squirrel so they must also be present in fairly high densities. Population monitoring has not been conducted to determine a trend for this species.

No management practices specific to livestock grazing are included in the proposed action. No specific Forest Plan direction relative to livestock grazing is relevant to this species.

Red-naped Sapsucker

The red-naped sapsucker is highly associated with aspen forest habitat. Suitable habitat is present throughout the GMUG, including the analysis area. The analysis area contains suitable breeding habitat for the red-naped sapsucker. This species is a cavity nester that utilizes live and dead standing aspen trees for nesting. Threats to the northern goshawk are management activities, wildfires, and widespread insect/disease activity including “Sudden

Aspen Decline” which results in habitat loss or degradation. Available population data does not provide a conclusive trend in populations.

Common Trout

The Forest Plan MIS Amendment (USFS 2005) has identified an assemblage of “common trout” to evaluate management affects to aquatic ecosystems. This assemblage includes rainbow, brown, cutthroat, and brook trout. Electrofishing samples indicate that rainbow and cutthroat trout are the only MIS trout species present in the analysis area. Livestock grazing, especially cattle grazing, can threaten habitat features of streams supporting common trout species.

3.8.2 No Grazing Alternative Environmental Consequences

Forest Habitat Associated Species (Rocky Mountain elk, Northern goshawk, red-naped sapsucker, and pine marten).

The No Grazing alternative would maintain or enhance forage capacity for elk within the analysis area. Forage availability for elk and other wild herbivores is anticipated to be adequate to sustain the CDOW herd population objectives for each Data Analysis Unit. The No Grazing alternative will also encourage elk to remain on National Forest lands and alleviate distribution problems that can occur with elk seeking available forage on adjacent private lands.

The No Grazing alternative is not anticipated to result in any changes to population numbers at the project or Forest scales. Forest habitat associated species (i.e., northern goshawk, red-naped sapsucker, and pine marten) potential habitat effects of removal of livestock grazing is anticipated to be similar to that of elk.

Livestock grazing practices are not likely to have an effect on the habitat conditions for the pine marten or its primary prey species.

Within the analysis area, aspen and mixed aspen-conifer forests that provide suitable habitat are largely functioning under natural processes. Therefore, the removal of livestock grazing would not have any direct or indirect effects upon the forested vegetation types providing habitat for MIS.

Merriam’s Turkey

Under the No Grazing alternative the removal of moderate grazing may retard growth new herbaceous growth. At the same time livestock effects to openings and riparian areas, which are also important turkey habitats, would no longer occur.

The effects of the No Grazing alternative are not anticipated to result in any changes to population numbers at the project or Forest scales.

Common Trout

Livestock grazing, even if removed, can have lasting impacts on wetland and riparian vegetation and aquatic communities, including damage to streamside vegetation, increased sedimentation as a consequence of resulting erosion, and more rapid movement of water through stream systems where riparian vegetation is no longer present to stem water flow. The effects are a further reduction of water resources available to fish and amphibians and a loss of effective habitat. Persistent bank damage, higher sediment delivery, and the removal of woody and herbaceous vegetation, can all contribute to continued trout population

reductions. Sediment from sloughing banks could be delivered downstream to aquatic MIS occupied habitat causing some impacts to spawning areas.

The No Grazing alternative is not anticipated to result in any changes to population numbers at the project or Forest scales.

3.8.3 Existing Condition & Proposed Action Alternatives Environmental Consequences Forest Habitat Associated Species (Rocky Mountain elk, Northern goshawk, red-naped sapsucker, and pine marten)

Livestock grazing practices can affect habitat capability and elk distribution through competition for forage and space. Cattle and domestic sheep do not have similar diets, but cattle and elk have very similar diets and there is a strong dietary overlap. The proposed action includes management actions specific to allowable livestock forage utilization that would promote healthy rangeland conditions and provide residual plant cover that would be available as forage for elk and other wild herbivores. Assuming these allowable use criteria are effectively implemented, forage capacity for elk should be maintained or enhanced within the analysis area. Under the concept of adaptive management, compliance with this management action should be relatively high through implementation of consistent monitoring and the use of the Grazing Response Index. Forage availability for elk and other wild herbivores is anticipated to be adequate to sustain the CDOW herd population objectives for each Data Analysis Unit. Implementation of proper use criteria for livestock should also help to encourage elk to remain on National Forest lands and alleviate distribution problems that can occur with elk seeking available forage on adjacent private lands.

The effects of the proposed action are not anticipated to result in any changes to population numbers at the project or Forest scales. The proposed action may temporarily displace or alter how individuals use portions of the analysis area through habitat alteration and/or disturbance, but these effects would be temporary in nature.

Forest habitat associated species (i.e., northern goshawk, red-naped sapsucker, and pine marten) potential habitat effects of livestock grazing is anticipated to be similar to that of elk.

High levels of browsing use by livestock can result in the failure of harvested or burned aspen stands to successfully regenerate and persist on the landscape

Livestock grazing practices are not likely to have an effect on the habitat conditions for the pine marten or its primary prey species.

Within the analysis area, aspen and mixed aspen-conifer forests that provide suitable habitat are largely functioning under natural processes. Livestock grazing is not currently having any direct or indirect effects upon the forested vegetation types providing habitat for MIS. Based upon field observations the impact of browsing upon aspen regeneration or shrub understory appears to be happening only on a few isolated sites, primarily on active sheep allotments or big game winter ranges. Under the proposed action, livestock grazing will continue to be managed so that it will not significantly inhibit regeneration of aspen clones.

The effects of the proposed action are not anticipated to result in any changes to population numbers at the project or Forest scales. The proposed action may temporarily displace or alter how individuals use portions of the analysis area through habitat alteration and/or disturbance, but these effects would be temporary in nature.

Merriam's Turkey

Livestock grazing can have an effect on habitat conditions for the Merriam's turkey. Moderate grazing may stimulate new herbaceous growth, but continuous, intensive grazing depletes invertebrate abundance and reduces the cover component necessary for polt growth and development. Livestock are usually attracted to openings and riparian areas, which are also important turkey habitats.

The Existing Condition and Proposed Action alternatives include management actions specific to allowable forage utilization on upland and riparian sites. It also includes desired vegetation management objectives for meadow and shrub habitats that are compatible with turkey habitat objectives. The Forest Plan also includes vegetation management objectives for forest and shrub habitats including browse, winter range, and herbaceous/shrub understory vegetation condition and trend that would maintain or improve habitats for turkey.

The effects of the Existing Condition or Proposed Action are not anticipated to result in any changes to population numbers at the project or Forest scales. The proposed action may temporarily displace or alter how individuals use portions of the analysis area through habitat alteration and/or disturbance, but these effects would be temporary in nature.

Common Trout

Continued livestock can have impacts on wetland and riparian vegetation and aquatic communities, including damage to streamside vegetation, increased sedimentation as a consequence of resulting erosion, and more rapid movement of water through stream systems where riparian vegetation is no longer present to stem water flow. The effects are a further reduction of water resources available to fish and amphibians and a loss of effective habitat.

Livestock grazing was historically far more intensive than at present, but in certain areas, it still degrades habitat of streams with trout. Although grazing effects are often confounded with other factors and sometimes difficult to isolate, the preponderance of evidence suggests that concentrations of livestock in riparian zones often lead to bank damage, higher sediment delivery, and the removal of woody and herbaceous vegetation, all of which can contribute to trout population reductions. However, different grazing systems are likely to have different effects on stream channels. For example, relative to high-intensity, short-duration grazing by cattle, season-long grazing has been demonstrated to cause declines in terrestrial macroinvertebrate infall and aquatic macroinvertebrate drift and reduced trout density and biomass. In addition, use of channels by cattle that coincides with the incubation of trout eggs and alevins may lead to redd trampling and reduced embryo survival.

The Existing Condition and the Proposed Action alternatives would have some direct effects to local fisheries and fish habitat since livestock use would occur on the stream. Impacts to aquatic MIS streams would be greatest where cattle grazing is currently using stream and riparian areas and will continue to occur, and considerably less where sheep grazing occurs. Section of the lower ends of Big Blue Creek would be most susceptible to livestock use since banks are largely comprised of vegetation. Other aquatic MIS streams are less susceptible to grazing disturbance since stream channel and banks are composed of large cobble and boulder materials. Impacts to fish habitat cover, bank stability, streamflows, and other key habitat parameters are not expected to show measurable changes following the implementation of the Proposed Action. Some impacts to bank stability, undercut banks, pool depth and spawning gravel could occur from livestock trailing and riparian use.

Indirect effects to fish habitat are expected to occur where intermittent and headwater channels are grazed by livestock. Sediment from sloughing banks could be delivered downstream to aquatic MIS occupied habitat causing some impacts to spawning areas.

The effects of the proposed action are not anticipated to result in any changes to population numbers at the project or Forest scales. The proposed action may temporarily displace or alter how individuals use portions of the analysis area through habitat alteration and/or disturbance, but these effects would be temporary in nature.

3.8. Cumulative Effects

Forest Habitat Associated Species (Rocky Mountain elk, Northern goshawk, red-naped sapsucker, and pine marten)

The modification of forest interior habitat and/or removal of suitable occupied nesting trees could have adverse effects to nesting goshawks and red-naped sapsuckers. Timber harvest, mechanical treatments, prescribed fire, stand-replacement wildfires, and large-scale insect/disease epidemics can also result in habitat loss and/or fragmentation for the forest habitat associated species.

Merriam's Turkey

Timber harvest, mechanical treatments for the purposes of fire suppression or habitat improvements for other species, prescribed fire, stand-replacement wildfires, and large-scale insect/disease epidemics, and activities on lower elevation private land can all result in habitat loss and/or fragmentation for Merriam's Turkey

Common Trout

Impacts on wetland/riparian vegetation and aquatic communities from management activities, wildlife, recreation, roads, and activities on private lands (which include damage to streamside vegetation, increased sedimentation as a consequence of resulting erosion, and more rapid movement of water through stream systems where riparian vegetation is removed) will continue to impact trout and their habitats where trout are present.

3.9 Range Resources

3.9.1 Affected Environment

The analysis area encompasses a total of 23 grazing allotments that are either currently active or vacant. There are 15 active allotments, and 8 vacant allotments. Of the vacant allotments, 3 are totally or partially used with other active allotments and have been used in this manner for at least the last 3 years.

The Alpine Plateau and Big Blue allotments have been grazed together since 2003; Corbett and Boiler allotments have been grazed in combination since 2004; and a portion of Miner-Poughkeepsie has been grazed with the Bear Creek allotment for 15 years or more. In addition, the Baldy and Section 25 allotments have been grazed together since 1994, as per the April 14, 1994 memorandum for livestock grazing on Forest Service Baldy, BLM Baldy, Section 25 and Hillside units.

There are 13 term grazing permit holders on the above-mentioned allotments. These consist of family operations and individuals as well as operations with a manager who oversees day-to-day operations

Rangeland Suitability

A determination of range suitability is required only at the Forest Plan level. It is used as general information provided to the deciding officer to help with a determination of goals, objectives, management area, or geographic area prescriptions. Suitability determinations are limited in precision and accuracy; it is a modeling exercise on a broad landscape scale, and is not required at the project level. Because of this, it is inevitable and acceptable that there will be an intermingling of suitable and non-suitable lands. While livestock may sometimes be found on non-suitable lands, no capacity is allocated based on those lands nor is any management focused on attempting to encourage or support more than incidental use of those lands.

Of the estimated 200,000 acres within the analysis area, approximately 20-25% is considered to be suitable for livestock grazing. This includes lands considered suitable for livestock grazing on vacant allotments. The remainder is considered to be unsuitable for a variety of reasons, including slope; lack of forage resources; or inaccessibility. More information regarding suitability specific to individual allotments may be found in individual 2210 allotment files found at the ranger district offices.

Elevation and Slope

Elevations in the analysis area range from 7315’ to 13500’. More than half of the analysis area is at an elevation greater than 10,500’.

Approximately 45 percent of the analysis area has slopes less than 35%. Generally speaking, lands suitable for cattle grazing would be on slopes of 0-35%; lands suitable for sheep grazing would be on slopes up to 65%.

Table 3.9.1 Slope

Slope Breaks	Estimated acres	% of analysis area
Less than 15%	22370	12
16-35%	59260	33
36-65%	74189	41
Greater than 65%	26092	14

Historic Management

Historically, stocking levels within the analysis area were heavier than they are today. Grazing seasons were longer, and in addition, heavier stocking and in some cases improper grazing management of livestock and sheep contributed to rangeland conditions seen in early photos of the area. This affected species diversity, as well as forage value and production throughout the analysis area.

There were at one time at least 14 sheep allotments and 17 cattle allotments within the analysis area. Many were combined and the stocking rates subsequently reduced, through reductions in permitted livestock number, a change in the grazing season, or attrition. See Appendices B and D of this document for more information.

Current Management

The analysis area today consists of 4 active sheep allotments that have a long history of use by large numbers of domestic sheep, and a fifth allotment, Hero-Idarado, which was established following the Red Mountain land acquisition. Sheep have traditionally entered the analysis area along the same stock driveways – Ridge Stock Driveway, the earliest driveway in use; and the Middle Fork and East Fork Stock Driveways (also referred to as the Cimarron driveways) which were established in about 1940. Access via Big Blue and Fall Creek has also been authorized consistently for several years. Trailing privileges are established by grazing allotment, and include allotments on the Grand Mesa-Uncompahgre and Gunnison National Forests, as well as the San Juan National Forest, and the Gunnison and Columbine Field Offices (San Juan Public Land) of the BLM. See Appendix B for more information. Management of sheep driveways is implemented as per direction and agreement documented in the January 25, 1989 letter filed at the Ouray Ranger district office. Sheep are managed on the basis of “once-over” grazing under a deferred rotation management system. Generally, sheep are put on fresh feed every day to put weight on the lambs. If sheep are confined to a grazing area until utilization standards are met, the lambs will not do well. Additionally, this type of confinement generally results in an unacceptable level of soil damage from trailing and trampling.

The remaining 9 active allotments are all used by cattle, and they too have a long history of use within the analysis area. Access to the cattle allotments has traditionally been by trailing from private lands or trucking. Rotational grazing systems that implement annual changes to the timing of livestock use in the allotment or pastures has been used on nearly all of the cattle allotments for at least the last 3 -5 years, with the exception of the Coal Creek and Big Park allotments, which are grazed under season-long grazing systems.

Although there may be some isolated riparian and upland sites in less than desired condition, current rangeland conditions within the analysis area have improved over the years to the point that areas once identified as being in poor rangeland condition have improved and are moving towards or meeting desired conditions..

Rangeland vegetation within the analysis area is comprised of a number of (generalized) plant communities as shown in the table below. The most common plant cover type in the analysis area is spruce-fir, encompassing approximately 46% of the analysis area.

Rangeland analysis and inventories were conducted from 2003 to 2007. The inventory process involves identification of plant species and their relative frequency and composition, determination of relative rangeland health, riparian characteristic evaluations, and preparation of allotment analysis maps and summarization of data. Methods used in the collection of data for this project include Ocular Plant Composition Method, Cover-Frequency Method, and Rangeland Health Evaluation Matrix, as well as photo documentation of long-term changes. Future information collected can be compared to baseline data or desired condition data to see how close we are to achieving management goals. Specific allotment data collected on benchmark sites is shown in Appendix E. Historical records are stored at the Ouray and Gunnison Ranger District offices.

The Grazing Response Index (GRI) is used as an indicator of the effects of the current season's grazing activity and is used to assist in making decisions to resolve problems and adjust management in a way that will move the resource toward desired conditions. The GRI addresses three areas of grazing management: 1) **frequency** – number of times a plant is defoliated during the grazing period; 2) **intensity** – amount of leaf material removed during the grazing period; and 3) **opportunity** – amount of time plants have to grow prior to grazing or regrow after grazing. Opportunity is the one factor most highly related to long-term health and vigor of the vegetation.

A series of positive GRI scores over time would be expected to promote a healthy range condition; a continuing series of neutral GRI scores over time would most likely maintain the current range condition. A continuing series of negative GRI scores would most likely be related to a decline in rangeland condition.

3.9.2 No Grazing Alternative Environmental Consequences

The livestock driveways would be maintained as is, for other domestic livestock under permit that continue to use them to access grazing allotments outside of this analysis area.

There would be no direct effects to soils or vegetation from the livestock grazing and trailing that currently occurs on an annual basis. There would be no direct impact from livestock to streambanks in areas accessible to them and there would be no grazing of riparian shrubs by livestock. Noxious weed introduction from livestock-related disturbances would be eliminated.

Range improvements that are no longer needed would be removed over time, incurring costs over a period of several years. Improvements that would be removed included Forest-Service owned fences, gates, cattleguards, and developed water sources, such as spring developments. Some range improvements, such as ponds, or corrals may be retained for wildlife or recreational use, but would still require funding for maintenance. Over time, some of these improvements may be abandoned due to lack of maintenance funds. Attention to finding funds to remove these improvements is needed, as the Range Betterment Fund (RBF) is not likely to provide sufficient funds.

Effects to rangeland vegetation would be the same as described in section 3.4.2.

The ability to respond to annual changes in biological, physical, and social changes/desires relative to livestock grazing would be nonexistent.

Cumulatively, the elimination of permitted livestock grazing would be expected to result in gradual plant community changes over time, particularly in plant communities on suitable livestock ranges, near water or other congregation areas. Changes are likely to be expressed as a change in plant cover or species composition in these plant communities. Changes to alpine plant communities would occur very slowly, over decades, rather than years compared to what we will see in lower elevation riparian and upland plant communities.

Noxious weeds are often suppressed in areas where livestock graze, especially if livestock are allowed to graze on weeds early in their growth cycle. On the other hand, areas where livestock concentrate or have concentrated, may have higher occurrences of bare ground. These patches of bare ground are very suitable places for noxious weeds to colonize, especially if other populations are nearby.

3.9.3 Existing Condition Alternative Environmental Consequences

The effect of current management on rangeland and its associated vegetation would be to sustain current conditions. The amount and type of use in terms of timing, intensity, and duration/frequency by livestock is directly related to seral condition, forage value and rangeland health. Effects to rangeland vegetation would be the same as described in section 3.4.3.

Current management is not always adequate to respond to changes in environmental conditions, events and information on a year-to-year basis. Environmental factors such as drought, wildfire, fire-use or prescribed fire can result in changes to the amount, condition, and diversity of vegetation. The ability to change grazing system, season of use, and livestock numbers would be limited, to the point of being unresponsive to annual changes in biological, physical, and social conditions. Annual changes made in the Annual Operating Instructions (AOI) to permittees would generally be done by exception. Possible management adjustments needed in the future could require a new NEPA analysis.

The cumulative effect of continuing existing management would be to maintain residual vegetation cover, plant vigor, amounts of bare ground and overall rangeland health at current levels. Overall, this alternative would still be expected to meet Forest Plan standards and guidelines and the Forest Plan desired conditions for rangeland resources.

3.9.4 Proposed Action Alternative Environmental Consequences

Under this alternative, allotment management plans (AMPs) will be developed that will contain resource objectives for soil, riparian, and upland vegetation. The condition and trend of the soil and vegetation on sites already meeting or moving towards desired condition is not likely to change significantly over existing conditions; these areas would continue to stay healthy. On the isolated sites where desired conditions are not being met, there would be long-term improvement to plant species diversity, ground cover, and forage production.

The effect of adaptive management would be to increase residual vegetation in areas where it is less than desirable, lessen amounts of bare ground in areas where it is currently too prevalent, and increase the vigor of individual plants through better distribution of livestock across the analysis area. Increasing litter in areas where it is inadequate ensures that plenty of material is available for trapping sediment in runoff and overland flow events. Additionally, litter insulates plant crowns and over-wintering buds, protects and covers soil, helps retain soil moisture, and allows the plant to continue photosynthesis for carbohydrate production and storage. Greater carbohydrate storage results in more roots being produced by each plant. This increases the erosion defensibility and moisture-holding capacity of soils. It also provides a buffer to plants in times of stress such as drought. Areas that have a low percent of bare ground would stay relatively the same. Areas that have a high percentage of overall bare ground would expect to decrease slightly. Less bare ground means more plants holding the soil in place while lessening the likelihood of invasion by noxious weeds, or other invasive plant species. Other effects to rangeland vegetation would be the same as described in section 3.4.4.

The risk of invasive species establishment due to livestock management practices would decline long-term under this alternative. The proposed action prescribes livestock management and limits utilization, which would lessen the chance of weed invasion. As

range conditions improve and less soil disturbance occurs, there will be less bare soil susceptible to weed invasion.

Overall, the direct effects of implementing the proposed alternative of livestock grazing using adaptive management would be positive in achieving or moving toward desired conditions for all vegetation types.

Increased ground cover means more plants would be holding soil in place while lessening the likelihood of invasion by noxious weeds or other invasive plant species. Utilizing the concepts of GRI, individual plants will be grazed fewer times. Limiting defoliation of each plant to three times or less increases the plant's ability to store nutrients and increase vigor.

Management flexibility would be optimized under this Alternative. The Forest Service would be able to more readily adjust management practices in response to annual changes in biological, physical, and social conditions in order to move conditions toward Forest Plan desired conditions. Management adjustments (i.e., using the Grazing Management Toolbox), within the scope of this EA, could be made without conducting new NEPA analysis.

3.9.5 Cumulative Effects

Population growth in and around the project area may result in a greater number of forest users. Unauthorized OHV and motorcycle use already impact many of the riparian areas. Social trails and semi-permanent camping areas are developing along most creeks as well. In addition to livestock grazing, these actions may have an overall negative effect on the integrity of rangeland and riparian ecosystems by weakening the vegetation and creating ruts, cuts and unvegetated scars across portions of the riparian zone. Recreationists also tend to leave gates open. Livestock wander into pastures where they have already grazed or into pastures they are not supposed to graze until later in the season. This causes additional use in excess of the utilization standards already met or consumes forage that should have been available later in the season.

High numbers of big game animals, especially elk, have a significant effect on herbaceous vegetation. The dietary overlap between elk and livestock is similar. Livestock grazing management for upland grasses takes wildlife forage use into consideration, but management of elk numbers is under the control of the Colorado Division of Wildlife.

Suppression of natural fire, intensive grazing practices, and timber harvest activities over the past 50 years has changed the pattern of vegetation communities and in some cases, natural functions. The restoration of the natural processes of soil building, nutrient cycling, and proper hydrologic function results in a more functional and more adaptive ecosystem. Improved livestock management practices, riparian management, and vegetation treatment areas within the analysis area makes it likely that meeting the desired soil, water and vegetation conditions within an acceptable timeframe would occur.

3.10 Recreation & Wilderness _____

3.10.1 Affected Environment

General Character

The general character of the analysis area is managed to include an array of recreational experiences from primitive non-motorized wilderness experiences where contact with other

parties is less than 5 to front country roaded and rural recreation opportunities where primary recreation management is centered on visual quality or agriculture. Popular recreational activities in the analysis area include motorized (including motorcycling and ATVing) and non-motorized trail use (including “peak bagging”, mountain bike riding, and horseback riding), wilderness experiences, dispersed camping (near roads), recreational driving/sightseeing, and hunting.

Rangeland grazing is compatible with all recreation niches represented in the Analysis Area either by LRMP design or Congressional mandate. In general, Forest recreationists tend to accept livestock grazing in the analysis area. Wilderness Areas are somewhat more controversial and will be discussed further below.

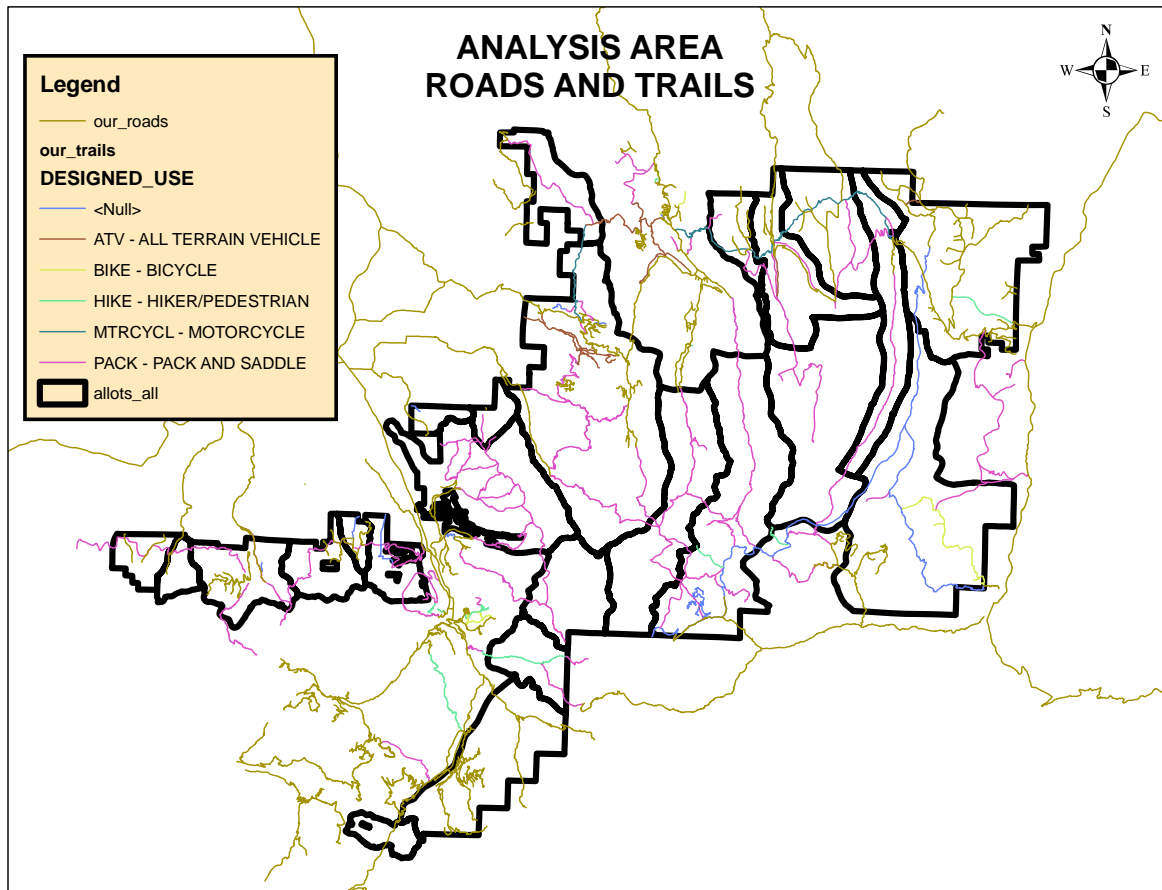
Outfitter/Guides

There are an estimated twelve Outfitter/Guides that operate within the analysis area, conducting a wide array of activities such as guided hunting, backpacking, horse tours, peak climbing, and hut-to-hut skiing and mountain biking.

Trails

Within the analysis area there are approximately 36 miles of motorized trails and 254 miles of non-motorized trails (includes Wilderness Areas). See Figure 3.10.1 below.

Figure 3.10.1a Roads and Trails in Analysis Area



Wilderness Values

The Mt. Sneffels and Uncompahgre (formerly “Big Blue”) Wilderness Areas were designated as such under the Colorado Wilderness Act of 1980, pursuant to the Wilderness Act of 1964. Consequently, management objectives for the wilderness stem from these two acts of Congress. Broadly stated, Wilderness is to be managed for:

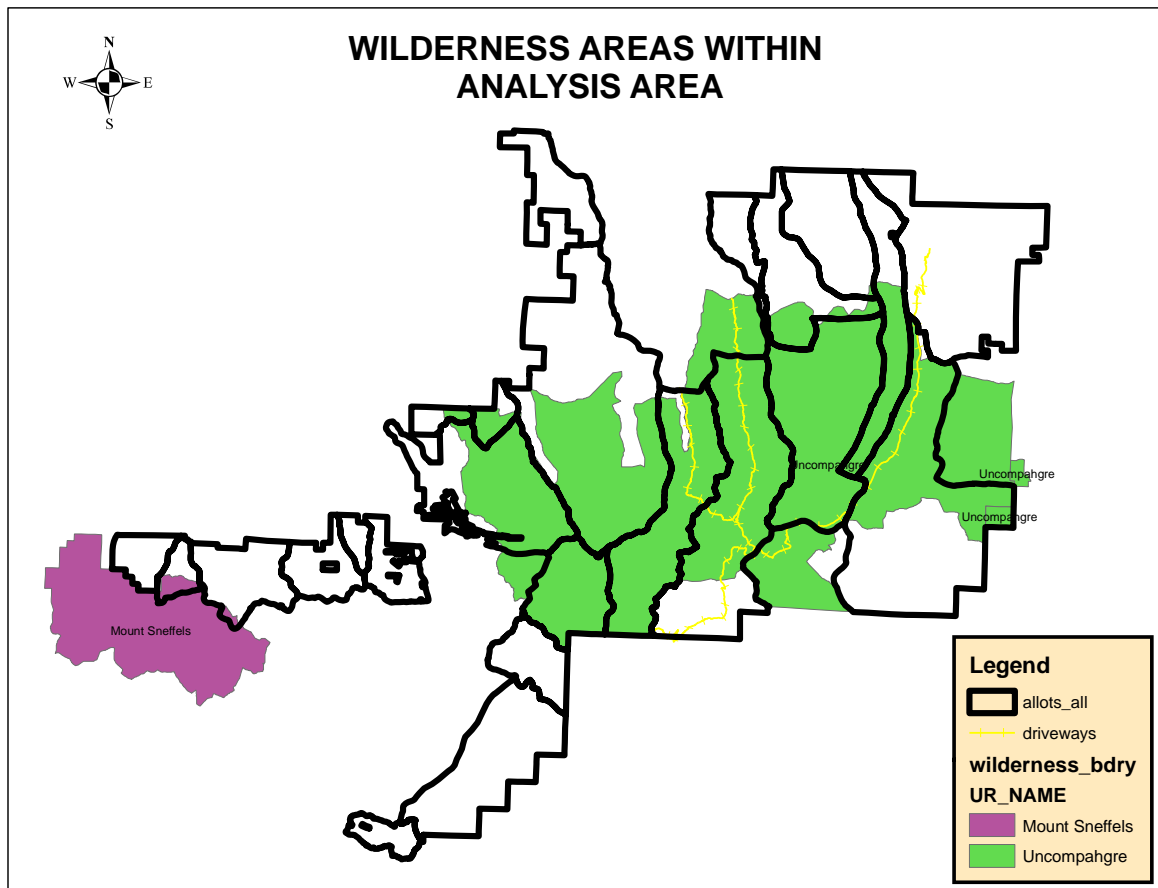
- Natural conditions and wilderness character or “wildness”
- Ecological health and integrity
- Education on wilderness values (physical, spiritual, and experiential)
- Opportunities for solitude or primitive and unconfined recreation
- Special provisions found in both acts, such as grazing and water use

The Wilderness Act of 1964 recognizes livestock grazing as an appropriate use of wilderness. However, the effects of livestock grazing should be consistent with desired conditions in the LRMP for management areas 8B-Primitive Wilderness Recreation Setting and 8C-Semi-primitive Wilderness Recreation Setting and should not result in impacts that exceed desired conditions.

Livestock grazing occasionally conflicts with recreational use in the Wilderness areas. It can displace visitors, make popular camping areas less desirable, and compete with recreational stock for limited forage. Grazing can also alter *natural conditions* and diminish *wilderness character*, which are primary wilderness management objectives. All of these impacts can

affect wilderness experiences, which are unique and often very personal to wilderness visitors. Many wilderness visitors feel that grazing is an inappropriate use of wilderness resources and that it conflicts with the fundamental tenets of wilderness. Others are not as sensitive to grazing impacts. In any case, grazing was explicitly grandfathered into the Wilderness Act of 1964 and cannot be restricted for any of these “social” reasons.

Figure 3.10.1b. Wilderness Areas In and Near Analysis Area



Social Interactions

Negative social interactions in the Analysis Area have not been reported with any frequency between recreationists and livestock.

The types of interactions between recreationists and livestock operations that have been reported include those involving campers, hikers, or hunters and livestock; motorized users and livestock; recreationists vandalizing range improvements; hikers and domestic sheep operations with guard dogs; vehicle/livestock collisions.

3.10.2 No Grazing Alternative Environmental Consequences

General Character

Minimal changes to the general character of the recreation experience will occur because it is the interaction of all recreation activities and management objectives that define the recreation niche, of which rangeland management is a small component. With the removal

of livestock, there may be the perception of a more remote and primitive experience, but recreational opportunities available will not change.

Outfitter/Guides

As described above, the removal of livestock may change visitors' perception of how remote or primitive the analysis area is. This would be true for both the general public and for customers guided by permitted outfitter-guide companies operating in the area. However, livestock removal would not change the number or variety of recreational opportunities offered by outfitter-guides.

Trails

Trails in the area may become more desirable to certain user groups if livestock is not present. Where trails have previously been impacted by livestock use, the impacted trail conditions are likely to persist until trail maintenance is completed at varying intervals. Future damage from livestock will no longer occur in this area under this alternative with the exception of livestock driveways where they intersect or are coincident with system recreation trails. Livestock driveways may be maintained for use by allotments on other adjacent public lands. In these circumstances, trail conditions may remain as they currently are.

The trail system as far as numbers and types of routes will remain the same.

Wilderness Values

Remnants of previous grazing activity can alter *natural conditions* and diminish *wilderness character*, which are primary wilderness management objectives in both the short and long-term durations depending on extent of damage. Over time the wilderness values would be returned to a point where the casual observer likely would not notice evidence of previous grazing activity. Stock facilities would likely be removed which would also remove elements that may be inconsistent with wilderness values.

Social Interactions

Future conflicts between recreationists and livestock would not occur in the within the analysis area.

3.10.3 Existing Condition & Proposed Action Alternatives Environmental Consequences

Environmental Consequences would be generally the same for both the Existing Condition and Proposed Action Alternatives except as noted below.

General Character

No changes to the general character of the recreation experience are likely occur because it is the interaction of all recreation activities and management objectives that define the recreation niche, of which rangeland management is a small component. Individual areas may have the perception of a more primitive experience under the Proposed Action Alternative as adaptive management may have more flexibility in busy seasons than currently exists in the Existing Condition Alternative.

Outfitter/Guides

The effects of this Alternative on Outfitter-Guides would be similar to those described above under “General Character”.

Trails

Trails would continue to see impacts from livestock use. Areas near stock driveways would have the same effects as no grazing alternative.

The trail system as far as numbers and types of routes will remain the same.

Wilderness Values

Effects to wilderness values would be the same as current conditions under both the Existing Condition and Proposed Action Alternatives. While there are locations in the Wilderness in which desired conditions have not been attained or have been lost or standards have been exceeded, at least in part due to grazing, these are generally limited in space and time and responsible permit administration should mitigate most grazing impacts outside of the acceptable range. In some cases, however, it may be difficult to distinguish recreation impacts from grazing impacts and determine an appropriate remedy.

Livestock grazing occasionally conflicts with recreational use in the Wilderness. It can displace visitors, make popular camping areas undesirable, compete with recreational stock for limited forage, and interfere with the wilderness experience. However, these social impacts are highly subjective and are very difficult to quantify. There is active cattle and sheep grazing within the wilderness portions of the allotments. However, there are no known conflicts between livestock grazing and wilderness visitors, but as the area is continued to be grazed, a potential for conflict exists, but visitors to this area are typically less sensitive to livestock grazing and both the frequency and severity of such a conflict would be low. The actual number of visitors potentially affected is unknown.

Social Interactions

Negative social interactions may continue in the future between recreationists and permitted livestock operations on NFS lands. However, this can be partially mitigated through the continued use of signing and education of forest users.

3.10.4 Cumulative Effects

General Character

The general character of the recreation experience is the interaction of all recreation activities and management objectives that define the recreation niche, of which rangeland management is a small component. Therefore, all of these forces will continue to interact to define the recreation niches in the area.

Outfitter/Guides

The effects of this Alternative on Outfitter-Guides would be similar to those described above under “General Character”.

Trails

All recreation and forest management activities including travel management activities will continue to direct the trail network available in the area.

Wilderness Values

Wilderness character and values are subjective to the user. They will continue to be so whether or not grazing is present.

Social Interactions

Negative social interactions may continue as long as grazing is present. Other social interactions will continue to occur between various user groups with varying interests.

3.11 Transportation System

3.11.1 Affected Environment

There are approximately 183 miles of roads in the analysis area (Figure 3.10a above). This transportation system functions to provide access for recreation, forest management, and other permitted activities. Specific activities related to livestock grazing on the road network include trailering (moving in a trailer or truck) livestock, general travel for accessing allotments and occasionally herding/trailing (moving) livestock. Any use of a road will result in wear and tear of the road surfacing. When livestock is present on roadways there is a potential for livestock-vehicle collisions or traffic delays.

Grazing Permits include special stipulations for the use of Forest roads in the AOIs.

Trails have been discussed in the Recreation & Wilderness Section above.

3.11.2 No Grazing Alternative Environmental Consequences

If the No Grazing Alternative was selected, there would be minimal reduced effects (such as livestock trailering congestion and less wear and tear of road surfacing) to the current transportation system from grazing-related activities. There would be no collision potential between livestock and vehicles on lands in the analysis area. Other existing uses of the Forest transportation system would continue at current levels.

3.11.3 Existing Condition Alternative Environmental Consequences

If the Existing Condition Alternative was selected, there would be no change in effects to the current transportation system from grazing-related activities. Collision potential would continue to exist at current levels between livestock and vehicles on lands in the analysis area. Other existing uses of the Forest transportation system would continue at current levels.

3.11.4 Proposed Action Alternative Environmental Consequences

If the Proposed Action Alternative was selected, there would be minimal change in effects to the current transportation system from grazing-related activities. Effects might be seen in the timing of grazing activities based on adaptive management practices or use of different livestock staging areas. Changes are not anticipated in traffic levels or normal wear and tear of road surfaces. Collision potential would continue to exist at approximately current levels between livestock and vehicles on lands in the analysis area. Other existing uses of the Forest transportation system would continue at current levels.

3.11.5 Cumulative Effects

Recreation, forest management, and other permitted activities will continue to affect road surfacing, structure and traffic patterns at current levels. Collision potential will continue with the presence of wildlife and livestock in surrounding areas.

3.12 Heritage Resources

This analysis discusses heritage resources (sites, features, and values having scientific, historical, educational, and/or cultural significance). Heritage resources include artifacts, structures, landscapes, or settings for prehistoric or historical events.

3.12.1 Affected Environment

The focus of the study is on the Analysis Area shown in Chapter 2, section 2.1. Specifically, it involved a literature search of existing information pertinent to the Analysis Area and a review of the National Register of Historic Places for listed cultural resources. The heritage resource analysis and assessment was done according to the Standard Inventory Strategy, an a priori agreement with the State Historic Preservation Officer based on regulations in 36 CFR part 800.13, implementing Section 106 of the National Historic Preservation Act. Further, the heritage resource analysis and assessment were carried out using the Rocky Mountain Region's 1996 Memorandum of Understanding between the Colorado State Historic Preservation Officer and the Forest Service regarding range management activities.

Livestock grazing, mining and recreation are the dominant activities that have occurred in most portions of the analysis area. Previously recorded prehistoric sites have been most impacted by mining and grazing, with recreation having some impacts caused by hiking trails and artifact collection. Mining construction activities, particularly in Ironton Park and surrounding areas, have probably obscured whatever prehistoric sites were present, resulting in under-representation of aboriginal sites in the mining areas. Historic sites, most related to mining, have had minimal impact by livestock grazing, with the exception of cattle or sheep temporarily occupying abandoned structures. Some 20th century structures in the Big Blue (Uncompahgre) Wilderness area, were torn down about the time of the Wilderness designation, to prepare it by removing incompatible uses.

Many prehistoric and historic sites are located in the analysis area. Prehistoric sites that have been recorded include lithic scatters which represent tool production activities; open campsites which indicate multiple and/or long-term occupations including wild food and game processing activities; rock structures such as hunting blinds and rock cairns; and quarry sites, where stone was acquired for tool manufacture. Some of these high elevation campsites contain thousands of artifacts, only visible in eroded, exposed soil, with additional artifacts probably hidden by thick tundra. Soils can be deep, and the possibility of subsurface cultural deposits is high. Twenty prehistoric sites were recently recorded in the Uncompahgre Peak area and were analyzed for grazing and other impacts and possible mitigation measures (see Mitigation & Monitoring section below). The discovery of such large sites at high elevations is quite significant and further research is planned for these important resources.

Historic features in the allotments include old cabins built by early miners and settlers, and cow and sheep camps and salt camps (small structures to store salt) utilized by cowboys and sheep herders to manage livestock on the Forest. The Red Mountain/Ironton Park area contains 74 recorded historic sites, mostly related to mining activities. In addition to miners' cabins, sites include remains of railroad grades, toll roads, mines, mining camps, prospect pits, several mill foundations, a smelter, and trash scatters.

The inventory and/or plans for preservation of the Heritage Resources are completed for the State of Colorado so that the significance of each site can be determined.

A Heritage Resource report is in progress and will be contained within the Project file.

3.12.2 No Grazing Alternative Environmental Consequences

Under the No Grazing Alternative, there would be no future impacts from grazing to heritage resources. Evidence of previous grazing activities will continue to exist on non-renewable heritage resources. Processes other than grazing will continue to negatively impact heritage resources.

3.12.3 Existing Condition & Proposed Action Alternatives Environmental Consequences

Livestock may have an effect on heritage resources if they travel through a resource site or if they are concentrated on a site by placement of salt or gathering pens, or by natural shade that provides shelter. Most impacts are usually slight and temporary in nature. However, the prehistoric sites recently recorded show a varying degree of livestock impact to the soils including trailing, bedding, and livestock concentrations in shaded areas provided by boulders and in salting areas. Indirect effects from such soil impacts can continue for many years after the livestock have been removed, thus identification of the cause of eroded solids in the prehistoric sites of the study area is uncertain. Monitoring for a period of several years is needed to identify if current stocking levels have an ongoing additional impact to the sites.

Future livestock grazing (Alternatives 2 and 3) within the allotments may cause surface disturbance that could affect the integrity of historical structures and prehistoric sites. Natural weathering and erosion, grazing of elk, deer, and mountain sheep, and vandalism or illegal excavation, can also contribute to the cumulative effects on heritage resources. So, even with no grazing (Alternative 3) there will continue to be impacts to the heritage resources.

3.12.4 Cumulative Effects

Activities such as recreation, grazing in surrounding areas where livestock trailing is required and other forest management activities will continue to negatively impact heritage resources. Consequently, there will continue to be impacts to cultural sites, whether or not livestock graze in the allotments in the Analysis Area.

3.12.5 Mitigation & Monitoring

Sites and vegetation cover should be monitored to determine regrowth potential.

Although specific mitigation measures for recorded heritage sites have not been finalized, considerations should be given much in the same manner as for vegetation or soils when damage caused by livestock has occurred. Moving towards desired conditions for soils and vegetation should also help protect buried or partially buried sites. Some adaptive management measures that may be used to protect heritage sites impacted by livestock include:

- Monitor impacted known heritage sites for three consecutive years, noting any decrease in cover or any increase in soil impacts, depth of erosion channels, or loss of surface artifacts. Stabilize soils damaged by previous livestock grazing especially around boulders.
- Avoid known damaged heritage sites with livestock trailing, bedding, and salting.
- Fence or otherwise deter livestock from known impacted heritage sites.

3.13 Socio-economics

3.13.1 Affected Environment

The analysis area is contained within portions of Gunnison, Ouray, and Hinsdale Counties. Ranches with grazing permits in the analysis area have their base operations in Gunnison, Ouray, and Montrose counties. According to the most recent National Agricultural Statistics Service (NASS) data for cattle and sheep, the four counties have an inventory of 33,000 beef cattle and 18,386 sheep. Permitted grazing within the analysis area totals 9192 AUMs. If it is assumed that a full year of grazing is needed for the inventory of beef cattle and sheep, then the analysis area supports about 1.6% of the total AUMs needed to support this inventory (excluding sales of livestock).

Although most ranches in the West are only partially dependent on federal grazing land for forage, this forage source is often a critical part of their livestock operation. Greer (1994) and Taylor et al (1992) both found that while the reliance of ranchers on forage from federal land grazing can appear relatively unimportant when calculated on an acreage or animal-unit-month (AUM) basis, they become quite important when calculated on a seasonal dependency basis. The rigidity of seasonal forage availability means that the optimal use of other forages and resources are impacted when federal AUMs are not available. Dozens of researchers over the last 25 years have found that potential reductions in income and net ranch returns are greater than just the direct economic loss from reductions in federal grazing. Because ranching operations have economic linkages with other sectors of the area's economy, changes in federal grazing can also have implications for the overall economy.

Results from ranch level analyses suggest that there are at least three possible approaches to evaluating the economic importance of federal grazing to local communities: 1) evaluating federal AUMs only, 2) evaluating federal AUMs and the effects on total ranch production, and 3) evaluating federal AUMs and their effect on the economic viability of the ranch operation. Taylor, et al (2005) found in Park County, Wyoming that the effects of federal grazing to the local economy were roughly twice as large when considering the total ranch production compared to federal AUMs only. From the perspective of ranch viability, effects to the local economy were roughly twice as large compared to total ranch production, or four times larger than federal AUMs only. Which of these approaches is the most relevant in a particular situation depends on a number of factors including the individual ranch's level of dependency on federal grazing, the magnitude of the proposed change in grazing, the

financial solvency of the ranch, the availability of alternative sources of forage, and the desire of the rancher to remain in ranching. Limited information regarding some of these factors is available and discussed below. Other information is unavailable or beyond the scope of this analysis.

Ranch operations in the Uncompahgre Valley and adjacent areas have historically built their operation with reliance upon Forest Service grazing permits. Private grazing land is generally not available for replacement of federal permits, due in part to high land values throughout the area. Consequently, permittee operations are quite vulnerable to changes in Federal grazing. Should any of these ranches cease operation, land values suggest that residential development and consequently, loss of open space, would likely replace agricultural use of these private lands.

Although a definitive assessment is not possible for this analysis, it is recognized that adjustments to federal grazing, whether in terms of AUM reductions or cost increases to permittees, can have important consequences to individual ranch operations and ranch viability, as well as implications to families, social structure, lifestyle, local economies, and land use.

3.13.2 No Grazing Alternative Environmental Consequences

The economic effect of this alternative would be the greatest for permittees and the local economy. Because all livestock grazing would cease in these allotments at least 25 jobs could be directly affected by loss of these grazing allotments.

Because this analysis does not consider the permittees' personal business and financial information (i.e., profit margin, real estate, equipment, other personal property investments, total debt, etc.), it is difficult to assess whether a ranch would become unviable under this alternative. It could compel the permittees to rent or buy additional pasture or purchase additional feed, to maintain their current livestock numbers. Although this would be an additional expense for the permittees, it would create economic opportunity for the suppliers of these products and /or needs. Under this alternative, any operation forced to sell, and therefore go out of business, would be perceived by local residents as directly caused by the elimination of livestock grazing on Federal land. When working ranches have ceased operations during the past decade, vacant ranchland has sometimes been sold to developers, thereby potentially increasing sub-divisions and loss of open space.

The economic effect of this alternative also includes the cost for removal of existing range improvements, specifically internal, Forest-Service owned fences. Spring developments and ponds would probably not be removed, but there would be a long-term cost to the Forest Service to continue to maintain these improvements for other uses, including wildlife. Corrals would likely also not be removed, but there would be a long-term cost to the Forest Service to continue to maintain these improvements for the recreating public.

3.13.3 Existing Condition Alternative Environmental Consequences

No change to permittee operations or the local economy will result under this alternative.

3.13.4 Proposed Action Alternative Environmental Consequences

This alternative requires that allotments be managed more actively than the Existing Condition, and at a greater cost to the permittee. It is difficult to accurately predict the extent

of such costs. Some operators may be effective in monitoring and using forage from Forest Service land with new management, while others may be unable to adapt to the new conditions and remain profitable.

3.13.5 Cumulative Effects

Over time other uses or conversion of uses of private land will continue to put social and economic pressure on federal lands that are currently available for grazing. Federal grazing, while it provides an opportunity for local ranchers and sustainability of local rural economies, will be subject to changing conditions and values for both public and private lands in the area.

3.14 Short-term Uses and Long-term Productivity _____

NEPA requires consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

In general see chapter 3 all analysis, particularly the analysis for Range Resources and Socioeconomics.

3.15 Unavoidable Adverse Effects _____

Livestock grazing in either the No Action or Proposed Action Alternatives may have short-term impacts on vegetation through trampling or being consumed. The Proposed Action Alternative, however, is likely to improve long-term productivity and sustainability for rangeland resources in the project area through the use of adaptive management.

3.16 Irreversible & Irretrievable Commitments of Resources _____

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

There are no irreversible commitments of resource associated with this process, although arguably, continued damage to cultural resources is not reversible. The irretrievable commitment of resources in this case is the temporary removal of vegetation and compaction that inevitably occurs with the continuation of grazing activities. In areas where poor rangeland condition exists, some short-term losses may occur until those sites have reached desired conditions. These losses are not irretrievable.

3.17 Cumulative Effects _____

Cumulative effects have been addressed by individual resource areas in Chapter 3.

3.18 Other Required Disclosures_____

NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with ...other environmental review laws and executive orders.”

US Fish and Wildlife Service concurrence has been obtained (December 16, 2008) for informal consultation for under Section 7 of the Endangered Species act for Canada Lynx, Uncompahgre Fritillary butterfly, Greenback cutthroat trout and Gunnison’s prairie dog.

The State Historic Preservation Office (SHPO) will be contacted if future causing ground disturbing actions occur in historical places.

CHAPTER 4. CONSULTATION AND COORDINATION

4.0 Preparers and Contributors

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

ID TEAM MEMBERS:

Team Members	Area(s) of Consideration
Kelley Liston, District Rangeland Management Specialist	Project Leader, Range Resource, Noxious Weeds, Special Status Plants, Socioeconomics, GIS
Craig Grother, Zone Wildlife Biologist	T&E, Sensitive and MIS, GIS
Chris James, Zone Fisheries Biologist	T&E, Sensitive and MIS aquatics
Mark Hatcher, District Rangeland Management Specialist	Review
Terry Hughes, Forest Soil Scientist	Soils
Bob McKeever, Archaeologist	Heritage Resources (Surveys)
Sally Crum, Archaeologist	Heritage Resources
Edna Mason, District Range Technician	Information, Review
Warren Young, Forest Soils Scientist	Watershed
Niccole Mortenson, Natural Resource Specialist (NEPA Specialist)	Air quality, Transportation, Recreation/Wilderness, Writer/Editor

FEDERAL, STATE, AND LOCAL AGENCIES:

Bureau of Land Management, Gunnison Field Office
Bureau of Land Management, San Juan Field Office
Columbine Ranger District, USFS
Norwood Ranger District, USFS
Gunnison Ranger District, USFS
Division of Wildlife, Montrose Service Center
Division of Wildlife, Gunnison Service Center
BOCC, Ouray, Hinsdale, Gunnison, Montrose Counties
CSU Extension
Colorado State Forest Service (Gunnison and Montrose)

TRIBES:

Southern Ute Tribe
Uintah and Ouray Business Committee
Ute Mountain Ute Tribe

OTHERS:

Grazing permittees
Outfitter & guides
Colorado Woolgrower Association
Gunnison Stock Growers
Forest Guardians
High Country Citizens Alliance
Ouray Trail Group
Colorado Wild
Colorado Fourteeners Initiative
Lake Fork Stakeholders Watershed Group
Center for Snow and Avalanche Studies
Senator Wayne Allard
The Wilderness Society
Rocky Mountain Bighorn Society
Western Colorado Congress
Public Lands Partnership
Rocky Mountain Elk Foundation
Congressman John Salazar
Forest Guardians

4.1 Response to Public Comment _____

Ten public comments were received in response to scoping of this project. Public comments have been addressed in the body of this document. See Issues sections.

GLOSSARY OF TERMS

Term	Definition/Description
Allotment	A designated area of land available for livestock grazing.
Allotment, active	An established allotment that has a grazing permit (as defined under FSM 2200) currently issued to permit livestock grazing on that area. This also includes those situations where a permit has expired and the Forest Service is working on the issuance of a new permit -- e.g., the transition period caused by permits expiring 12/31 and not getting the new permit issued for a few months.
Allotment, closed	An allotment that no longer has grazing permits issued, and where a decision has been made to close that allotment area to permitted livestock grazing.
Allotment, vacant	An allotment that does not have a grazing permit (under FSM 2200) issued to permit livestock grazing on that area.
Allotment Management Plan (AMP)	A document that specifies the program of action designated to reach a given set of objectives.
Allowable use	The degree of utilization considered desirable and attainable on various specific parts of an allotment considering the present resource condition, management objectives, and management level.
Analysis Area	The area under study.
Animal Unit (AU)	Considered to be one mature (1000 pound) cow; 5 mature sheep; or the equivalent based on average daily forage consumption of 26 pounds dry matter per day.
Animal Unit Month (AUM)	The amount of feed or forage required by an animal unit for one month. Not synonymous with Head Month.
Annual Operating Instructions (AOI)	A document that provide instructions from the Forest Service to the term permit holder (called a permittee) regarding management requirements, projects, agreements, and so forth for the current grazing season.
Annual Plant	A plant that completes its life cycle and dies in one year or less
Apparent Trend	An interpretation of trend based on a single observation. Apparent trend is described in the same terms as measured trend except that when no trend is apparent it shall be described as "none." Note: Some agencies utilize the following definition: "An assessment, using professional judgment, based on a one-time observation. It includes consideration of such factors as plant vigor, abundance of seedlings and young plants, accumulation or lack of plant residues on the soil surface, soil surface characteristics, i.e., crusting, gravel pavement, pedicled plants, and sheet or rill erosion."
Aquatic ecosystem	The stream channel. Lake, or estuary bed, water, biotic communities, and the habitat features that occur therein.
Available Forage	That portion of the forage production that is accessible for use by a specified kind or class of grazing animal.

Term	Definition/Description
Available Water	The portion of water in a soil that can be absorbed by plant roots.
Band	Any number of sheep handled as a unit attended by a herder.
Bare ground	All land surface not covered by vegetation, rock or litter.
Base property	Those lands in a ranching enterprise which are owned or under long-term control of the operator. Base property is owned and used by a grazing permittee to qualify for a term grazing permit.
Bed ground	An area where animals sleep and rest.
Benchmark	Representative, often permanent, reference sites that reflect the results of management actions in the shortest time frames.
Biennial	A plant that lives for two years, producing vegetative growth the first year and usually blooming and fruiting in the second year and then dying.
Browse	The part(s) of shrubs, woody vines, and trees available for animal consumption.
Canopy	(1) The vertical projection downward of the aerial portion of vegetation, usually expressed as a percent of the ground so occupied. (2) The aerial portion of the overstory vegetation. cf. canopy cover
Canopy Cover	The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included. It may exceed 100%.
Capable rangeland	Rangeland that is accessible and used by domestic livestock, has inherent forage producing capabilities, and can be grazed on a sustained yield basis without damage under reasonable management goals. Non-capable rangeland has no current grazing value for domestic livestock or should not be used for grazing because of physical or biological restrictions, or lacks improvements that would allow use.
Carr	A wetland willow thicket.
Class of livestock	Description of age and/or sex-group for a particular kind of animal. Example, cow, calf, yearling, ewe, doe, fawn, etc.
Composition	Syn. species composition.
Continuous grazing	The grazing of a specific unit by livestock throughout a year or for that part of the year during which grazing is feasible. The term is not necessarily synonymous with yearlong grazing, since seasonal grazing may be involved.
Cool season plant	A plant which generally makes the major portion of its growth during the late fall and early spring and sometimes winter. Cool-season species generally exhibit the C3 photosynthetic pathway. cf. warm-season plant.
Cover	(1) The plants or plant parts, living or dead, on the surface of the ground. Vegetative cover or herbage cover is composed of living plants and litter cover of dead parts of plants. Syn. foliar cover. (2) The area of ground cover by plants of one or more species.
Cover Class	Syn with range cover class.
Cover type	A taxonomic unit of vegetation classification referencing existing vegetation. Cover type is a broad taxon based on existing plant species that dominate, usually

Term	Definition/Description
	within the tallest layer.
Cumulative effects/impacts	The impacts or effects on the environment that result from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The time period of consideration for cumulative effects analysis is generally from the late 1800s and continuing two decades into the future, unless stated otherwise in this document.
Death loss	The number of animals in a herd that die from various natural and accidental causes. Usually expressed as a percentage.
Deferment	Delay of livestock grazing on an area for an adequate period of time to provide for plant reproduction, establishment of new plants, or restoration of vigor of existing plants. cf. deferred grazing, rest.
Deferred grazing	The use of deferment in grazing management of a management unit, but not in a systematic rotation including other units. cf. grazing system.
Deferred rotation	Any grazing system, which provides for a systematic rotation of the deferment among pastures.
Desirable plant species	Species which contribute positively to the management objectives.
Desired plant community	A plant community which produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established for an ecological site(s). The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.
Deteriorated range	Range where vegetation and soils have significantly departed from the natural potential. Corrective management measures such as seeding would change the designation from deteriorated range to some other term. Syn. degenerated range.
Direct effects	Direct effects are those occurring at the same time and place as the triggering action.
Diversity	The distribution and abundance of different plants and animal communities within an area.
Drought	(1) A prolonged chronic shortage of water, as compared to the norm, often associated with high temperatures and winds during spring, summer, and fall. (2) A period without precipitation during which the soil water content is reduced to such an extent that plants suffer from lack of water.
Dry ewe	A ewe without a lamb(s).
Ecological status	The degree of similarity between the existing vegetation (all components and their characteristics) and existing soil conditions compared to the potential natural community and the desired soil condition on a site.
Endangered species	A species that is in danger of extinction throughout all or a significant portion of its range.
Environmental justice	The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.
Ewe	Female sheep of breeding age.
Ewe lamb	Immature female sheep.

Term	Definition/Description																		
Flock	A group of sheep on a farm or range managed in fenced pastures and not herded.																		
Forage	Browse and herbage that is available and may provide food for grazing animals or be harvested for feeding.																		
Forb	Any herbaceous plant other than those in the Poaceae (grass), Cyperaceae (sedge), and Juncaceae (rush) families.																		
Grass	A member of the Poaceae family.																		
Grass-like plant	A plant of the Cyperaceae (sedge) or Juncaceae (rush) families that vegetatively resemble a true grass of the Poaceae family.																		
Grazing permit	A document authorizing livestock to use National Forest System lands or other lands under Forest Service control for livestock production.																		
Habitat Structural Stage	<p>A tree size and canopy closure classification for forested cover types and is defined as follows:</p> <table border="1"> <thead> <tr> <th>Structure Class</th> <th>Habitat Structural Stage</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1 & 2</td> <td>GRASS/FORB/SHRUB/SEEDLING. Stand dominance by grasses, forbs (broad-leaved herbaceous plants), shrubs and/or tree seedlings up to 1" Diameter at Breast Height -- 4.5 feet (DBH) for softwoods and 2" DBH for hardwoods.</td> </tr> <tr> <td>2</td> <td>3a</td> <td>SAPLING-POLE. Stand dominance by trees in the majority of the 1-8.9" DBH size for softwoods and 2-8.9" DBH for hardwoods with a canopy closure of less than or equal to 40%.</td> </tr> <tr> <td>3</td> <td>3b & 3c</td> <td>SAPLING-POLE. Same as Structure Class 2 except canopy closure is 41-100%.</td> </tr> <tr> <td>4</td> <td>4a</td> <td>MATURE. Stand dominance by trees in the majority of the 9" or larger DBH size and tree age under 200 years for softwoods and under 100 years for hardwoods. Canopy closure is 40% or less.</td> </tr> <tr> <td>5</td> <td>4b, 4c & 5</td> <td>LATE-SUCCESSIONAL FOREST. Two conditions are possible for meeting this category: a) Stand dominance by trees in the majority of the 9" or larger DBH size and tree age under 200 years for softwoods and under 100 years for hardwoods. Canopy closure is greater than 40%. b) Stand dominance by trees in the 5" DBH or greater size with a tree age over 200 years for softwoods and over 100 years for hardwoods. Tree crown cover is over 70 percent.</td> </tr> </tbody> </table>	Structure Class	Habitat Structural Stage	Description	1	1 & 2	GRASS/FORB/SHRUB/SEEDLING. Stand dominance by grasses, forbs (broad-leaved herbaceous plants), shrubs and/or tree seedlings up to 1" Diameter at Breast Height -- 4.5 feet (DBH) for softwoods and 2" DBH for hardwoods.	2	3a	SAPLING-POLE. Stand dominance by trees in the majority of the 1-8.9" DBH size for softwoods and 2-8.9" DBH for hardwoods with a canopy closure of less than or equal to 40%.	3	3b & 3c	SAPLING-POLE. Same as Structure Class 2 except canopy closure is 41-100%.	4	4a	MATURE. Stand dominance by trees in the majority of the 9" or larger DBH size and tree age under 200 years for softwoods and under 100 years for hardwoods. Canopy closure is 40% or less.	5	4b, 4c & 5	LATE-SUCCESSIONAL FOREST. Two conditions are possible for meeting this category: a) Stand dominance by trees in the majority of the 9" or larger DBH size and tree age under 200 years for softwoods and under 100 years for hardwoods. Canopy closure is greater than 40%. b) Stand dominance by trees in the 5" DBH or greater size with a tree age over 200 years for softwoods and over 100 years for hardwoods. Tree crown cover is over 70 percent.
Structure Class	Habitat Structural Stage	Description																	
1	1 & 2	GRASS/FORB/SHRUB/SEEDLING. Stand dominance by grasses, forbs (broad-leaved herbaceous plants), shrubs and/or tree seedlings up to 1" Diameter at Breast Height -- 4.5 feet (DBH) for softwoods and 2" DBH for hardwoods.																	
2	3a	SAPLING-POLE. Stand dominance by trees in the majority of the 1-8.9" DBH size for softwoods and 2-8.9" DBH for hardwoods with a canopy closure of less than or equal to 40%.																	
3	3b & 3c	SAPLING-POLE. Same as Structure Class 2 except canopy closure is 41-100%.																	
4	4a	MATURE. Stand dominance by trees in the majority of the 9" or larger DBH size and tree age under 200 years for softwoods and under 100 years for hardwoods. Canopy closure is 40% or less.																	
5	4b, 4c & 5	LATE-SUCCESSIONAL FOREST. Two conditions are possible for meeting this category: a) Stand dominance by trees in the majority of the 9" or larger DBH size and tree age under 200 years for softwoods and under 100 years for hardwoods. Canopy closure is greater than 40%. b) Stand dominance by trees in the 5" DBH or greater size with a tree age over 200 years for softwoods and over 100 years for hardwoods. Tree crown cover is over 70 percent.																	
Head Month	One month's use and occupancy of the range by one animal. For grazing fee purposes, it is a month's use and occupancy of range by one weaned or adult cow with or without calf, bull, steer, heifer, horse, burro, or mule, or 5 sheep or goats.																		
Herd	An assemblage of animals usually of the same species.																		
Herder	One who tends livestock on rangeland (usually applied to the person herding a band of sheep or goats).																		
Herding	The handling or tending of a herd.																		
Heritage resources	These consist of sites, features, and values having scientific, historical, educational, and/or cultural significance. They include concentrations of artifacts, structures, landscapes, or settings for prehistoric or historic events.																		

Term	Definition/Description
Heritage resource inventory	A systematic, on-the-ground search designed to identify the locations of heritage resources. Heritage resources identified in such inventories are recorded on State of Colorado cultural resource site forms which includes a determination of the significance of individual sites.
Indirect effects	Indirect effects are those occurring at a later time or distance from the triggering action.
Interdisciplinary Team (IDT)	A group of individuals from different resource backgrounds assembled to solve a problem or perform a task.
Irretrievable commitments of resources	These are losses that are in effect for a period of time. An example is a grazing allotment that is managed to remain in poor condition. The gap between its current condition and its potential productivity is an on-going irretrievable loss.
Irreversible commitments of resources	These are changes that cannot be reversed, except in the extreme long term. An example is when a species becomes extinct; this is an irreversible loss.
Key area	A portion of rangeland selected because of its location, grazing or browsing value, or use. It serves as a monitoring and evaluation point for range condition, trend, or degree of grazing use. Properly selected key areas reflect overall acceptability of current grazing management over the rangeland.
Krummholtz	Dwarf, timberline forest composed of Engelmann spruce.
KV funds	Funds derived from the sale of National Forest timber authorized for use in reforestation and timber stand improvement work on areas cut by timber sales.
Lamb	Newborn sheep.
Lamb crop	The number of lambs produced by a given number of ewes, usually expressed in a percent of lambs weaned of ewes bred.
Lambing	Act of parturition (giving birth).
Landscape character	The overall visual and cultural impression of landscape attributes. The physical appearance and cultural context of a landscape that gives it an identity and a "sense of place". It includes existing land use patterns, ecological unit descriptions, and existing landscape character descriptions.
Livestock use permit	A permit issued when the primary purpose of grazing use on National Forest System lands or lands controlled by the Forest Service for reasons other than livestock production.
Management area	An area that has common direction throughout that differs from neighboring areas. The entire forest is divided into Management Areas, with each area described, and policies and prescriptions relating to their use listed. Also called Management-area Prescription.
Pasturella	A bacterial disease that can manifest as an upper respiratory (nose and lungs) disease, causing coughing, sneezing, runny eyes, and runny nose, or it can manifest as a dermatologic (skin) disease, causing abscesses and sores. It is extremely contagious.

Term	Definition/Description
Permitted livestock	Livestock presently being grazed under a permit or those that were grazed under a permit during the preceding season, including their offspring retained for herd replacement.
Permittee	Any entity that has been issued a grazing permit.
Permitted use	The number of animals, period of use, and location of use specified in Part 1 of the grazing permit (see also definition for authorized use).
Plant association	A potential natural plant community of definite floristic composition and uniform appearance, represented by stands occurring in places with similar environments.
Plant community	An assemblage of plants living and interacting together in a specific location. No particular ecological status is inferred. Plant communities may include exotic or cultivated species.
Prescribed fire	Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements (where applicable) must be met, prior to ignition. Formerly called Management-ignited Fire.
Prescribed natural fire	Obsolete term -- see Wildland fire use.
Present net value	An economics term which considers the present value of the cash inflows less the present value of the cash outflows (it considers the time value of money).
Proposed species	A species that has been officially proposed by the USDI Fish and Wildlife Service (FWS) for listing as threatened or endangered under the Endangered Species Act.
Ram	Male sheep of breeding age.
Ram lamb	Immature male sheep.
Riparian area	Geographically delineable area with distinctive resource values and characteristics that are comprised of the aquatic and riparian ecosystems.
Riparian ecosystem	A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.
Rosgen stream classification	<p>A widely-used method for classifying streams and rivers based on common patterns of channel morphology as follows:</p> <p>Aa+ = Very steep, deeply entrenched, debris transport, torrent streams.</p> <p>A = Steep, entrenched, cascading, step/pools streams. High energy/debris transport associated with depositional soils. Very stable if bedrock or boulder dominated channel.</p> <p>B = Moderate entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools. Very stable plan and profile. Stable banks.</p> <p>C = Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well defined floodplains.</p> <p>D = Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.</p> <p>DA = Anastomosing (multiple-channels) narrow and deep with excessive, well vegetated floodplains and associated wetlands. Very gentle relief with highly variable sinuosities and width/depth ratios.</p>

Term	Definition/Description
	<p>Very stable streambanks.</p> <p>E = Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.</p> <p>F = Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.</p> <p>G = Entrenched “gully” step/pool and low width/depth ratio on moderate gradients.</p>
Salting	Providing salt as a mineral supplement for animals. Placing salt on the rangeland in such a manner as to improve distribution of livestock.
Scoping	Contact/discussion with the public, internally, and with agencies and tribal governments over a proposed action to determine the scope of issues to be addressed.
Secondary range	Secondary range is that part of the range which is suitable for livestock use, but is used very little or not at all because of accessibility, lack of water, management system, or combination of these. Livestock use is normally minimal or nonexistent until the primary range has reached or exceeded allowable use levels.
Sensitive species	A species that is not presently listed as Threatened or Endangered by the FWS, but a population viability concern has been identified as evidenced by: 1) significant current or predicted downward trends in population numbers or density, and/or 2) significant current or predicted downward trends in habitat capability that may reduce a species' existing distribution.
Stock driveway	A strip of land specifically designated for the controlled movement of livestock.
Stocking density	The relationship between number of animals and area of land at any instant of time. It is typically expressed as animals per acre.
Soil compaction	Soil that has a 15% increase in bulk density over natural undisturbed conditions.
Soil erosion hazard	A rating of a soil's potential to erode.
Soil health	An assessment of soil physical, biological, and chemical conditions related to growing plants (forests and grasslands) over the long term.
Stream health	This is assessed by comparing characteristics of streams in the analysis area to the same characteristics for a reference stream of the same classification (using Rosgen's Stream Classification).
Structure class	A classification of forested cover types which aggregates Habitat Structural Stage into broader categories. Each category is defined in the table shown under <i>Habitat Structural Stage</i> .
Succession	The process of vegetative and ecological development whereby an area becomes successively occupied by different plant communities.
Suitable rangeland	Areas where grazing is appropriate considering economics, environmental consequences of livestock grazing, rangeland conditions, and the other uses or values of an area.
Threatened species	A species that is in danger of extinction throughout all or a significant portion of its range.

Term	Definition/Description
Trailing	Controlled directional movement of livestock.
Transitory rangeland	This is suitable range which comes into being as a result of partial or complete removal of forest cover by logging, fire, insects, or disease for which the management objective is to reestablish the tree cover as soon as possible. These areas may be grazed so long as soil is not damaged and the grazing impact remain compatible with requirements and use of other resources.
Travel management	Providing for safe, environmentally responsible and customer-responsive movement of vehicles and people to and through Forest lands.
Unauthorized livestock	Any cattle, sheep, goat, hog, or equine not defined as a wild free-roaming horse or burro by 36 CFR §222.20(b)(13), which is not authorized by permit (or Bill for Collection) to be upon the land on which the livestock is located and which is not related to use authorized by a grazing permit (livestock owned by other than a National Forest grazing permit holder). Noncommercial pack and saddle stock used by recreationists, travelers, other forest visitors for occasional trips, as well as livestock to be trailed over an established driveway when there is no overnight stop on Forest Service administered land do not fall under this definition.
Water Influence Zone (WIZ)	The land next to water bodies where vegetation plays a major role in sustaining long-term integrity of aquatic systems. It includes the geomorphic floodplain, riparian ecosystem, and inner gorge. Its minimum horizontal width (from top of each bank) is 100 feet or the mean height of mature dominant vegetation, whichever is most.
Watershed condition	Watershed condition is assessed by calculating the acreage of all surface disturbances that have occurred over time within each watershed area. Acreages for each kind of disturbance are adjusted to get an equivalent roaded area and then added together to get an accumulated total disturbed area. Watershed disturbance is compared to concern levels established in the Forest Plan to determine whether cumulative watershed disturbances are likely to pose a threat to watershed health.
Wildfire	An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.
Wildland fire	Any non-structure fire, that occurs in the wildland. Three distinct types of wildland fire have been defined and include wildfire , wildland fire use , and prescribed fire .
Wildland Fire Use (WFU)	The application of the appropriate management response to naturally ignited wildland fires to accomplish specific resource management objectives in predefined designated areas outlined in Fire Management Plans and accomplished under the confines of a Wildland Fire Implementation Plan (WFIP). Formerly called Prescribed Natural Fire.

ACRONYMS & ABBREVIATIONS

ACC	Average Canopy Cover
AMP	Allotment Management Plan
AOI	Annual Operating Instructions
AU	Animal Unit
AUM	Animal Unit Month
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
CDOW	Colorado Division of Wildlife
CEQ	Council for Environmental Quality
CFI	Cover-Frequency Index (calculated ACC X frequency)
CFR	Code of Federal Regulations
DN	Decision Notice
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impact
FSH	Forest Service Handbook
FSM	Forest Service Manual
FSR	Forest System Road
FTR	Forest Trail
GMUG	Grand Mesa, Uncompahgre and Gunnison National Forests
IDT	Interdisciplinary team
LAU	Lynx Analysis Unit
LTA	Landtype Association
MA	Management Area
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
PDC	Project Design Criteria
P.L.	Public Law
PNV	Present Net Value
R2	Region Two of the Forest Service (also called the Rocky Mountain Region)
RMBHS	Rocky Mountain Bighorn Sheep
RNA	Research Natural Area
S&G	Sheep and Goat
SOPA	Schedule of Proposed Actions
TES	Threatened, Endangered, and Sensitive Species
UFB	Uncompahgre fritillary butterfly
USC	United States Code
USDA	United States Department of Agriculture

REFERENCES

Air Quality

CAPCC. 2006. Colorado Department of Public Health and Environment, Air Pollution Control Commission website <http://www.cdphe.state.co.us/regulations/airregs/index.html>

Deer Creek Shaft and E Seam Methane Drainage Wells Project FEIS. 2007. Air Quality Section, Pg 56-62.
http://www.fs.fed.us/r2/gmug/policy/minerals/deer_creek/Deer_Ck_Shaft_and_ESeam_MD_W_Project_FEISr2.pdf

EIA, November 2007. Energy Information Administration, <http://www.eia.doe.gov/oiaf/1605/ggrpt/index.html#intensity>

FP-03, U.S.Customary Units. 2003. Standard Specification for Construction of Roads and Bridges and Federal Highway Proejcts, FP-03, U.S.Customary Units. Table 703-3. Pg 602.

USEPA, 1999. United States Environmental Protection Agency website. NATIONAL AIR QUALITY AND EMISSIONS TRENDS REPORT, 1999
<http://www.epa.gov/air/airtrends/aqtrnd99/pdfs/Chapter2a.pdf>

USEPA, 2006a. United States Environmental Protection Agency website
<http://www.epa.gov/air/data/>

USEPA, 2006b. United States Environmental Protection Agency website
<http://www.epa.gov/libraries/core/envlaw.htm>

USEPA, 2006c. United States Environmental Protection Agency website
<http://www.epa.gov/ttn/chief/ap42/>

USEPA, July 2007. United States Environmental Protection Agency website
<http://www.epa.gov/otaq/invntory/overview/pollutants/nox.htm#onroad>

Noxious Weeds

Davison, J., Ed Smith, Linda Wilson. Livestock Grazing Guidelines for Controlling Noxious Weeds in the Western United States. University of Nevada-Reno Extension Publication No EB-06-05.

Executive Order 13112, February 3, 1999. Invasive Species.

Federal Noxious Weed Act (Public Law 93629)

USDA Forest Service. Strategic plan for Fiscal Years 2004-2008.

USDA Forest Service, Grand Mesa, Uncompahgre, and Gunnison National Forests. Invasive Species Action Plan 2008-2010.

USDA Forest Service, Region 2. Rocky Mountain Region Invasive Species Management Strategy. FY 2005-2010.

Western Society of Weed Science. Weeds of the West, 9th edition, 2002.

Sheley, Roger L. and Janet K. Petroff, editors. Biology and Management of Noxious Rangeland Weeds. 1999.

Westbrooks, R. 1998. Invasive plants, changing the landscape of America: Fact Book. Federal Interagency Committee for the Management of Noxious and Exotic weeds. (FICMNEW), Washington, D.C. 109 pp

Range & Vegetation Resources

Brock, J.H., R.D. Huntley, L.R. Primosch. 1978. A Range survey of sheep driveways in the Uncompahgre National Forest. unpublished.

Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pages 699--884 plus appendices and index.

Grand Mesa, Uncompahgre, and Gunnison National Forests. 1991. Amended Land and Resource Plan.

Holland, Kathryn A., Leininger, Wayne C. and M. J. Trlica. 2005. Grazing history affects willow communities in a montane riparian ecosystem *Rangeland Ecology & Management*, Mar 2005, Vol. 58, no. 2, p. 148–154.

Leonard, Steve; Gene Kinch, Van Elsbernd, Dr. Mike Borman, Dr. Sherman Swanson. 1997. Riparian area management. Grazing Management for riparian-wetland areas. Technical reference 1737-14. U.S. Department of the Interior, Bureau of Land Management, National Applied Resource Sciences Center. 63 p.

Milchunas, Daniel G. 2006. Responses of plant communities to grazing in the southwestern United States. Gen. Tech. Rep. RMRS-GTR-169. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 126 p.

Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-1. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pages 1-294 plus index.

Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pages 295-698 plus index.

Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-3. Fort Collins, CO: U.S.

Quimby, Chuck. 2006. A Practical Approach to Adaptive Management with a Specific Focus on Livestock Management NEPA Based Decisions (Draft). Unpublished manuscript on file at Rocky Mountain Region of the Forest Service, Lakewood, Colorado. Draft dated 2/10/2006. 28pp.

Sayre, Nathan F. 2001. The new ranch handbook: A guide to restoring western rangelands

USDA Forest Service. 1996. Rangeland Analysis and Management Training Guide. US Dept. of Agric. Forest Service. Rocky Mountain Region. Denver, CO. August 1996.

<http://www.fs.fed.us/r2/projects/scp/assessments/giliasedifolia.pdf>

<http://www.fs.fed.us/r2/projects/scp/assessments/ranunculuskarelinii.pdf>

USDA Forest Service. 2006. Summary of the Science Panel Discussion, Nov. 2, 2006. Payette National Forest, McCall Idaho.

U.S. Department of the Interior, Bureau of Land Management, Proper Function Condition Work Group. 1993. Riparian Area Management. Process for assessing proper functioning condition. Technical Reference 1737-9. 51 p.

U.S. Department of the Interior, Bureau of Land Management, Proper Function Condition Work Group. 1994. Riparian Area Management. Process for assessing proper functioning condition for lentic riparian-wetland areas. Technical Reference 1737-11. 37 p.

USDI Bureau of Land Management. Technical Report 1737-12. Riparian Area Management. Using Aerial photographs to assess Proper Functioning Condition of riparian-wetland areas. 1996.

Winward, Alma H. 2000. Monitoring the vegetation resources in riparian areas. Gen. Tech. Rep. RMRS-GTR-47. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain research Station. 49 p.

Socio-economics

Bartlett, E.T. "Valuing Range Forage on Public Rangelands". Proceedings: Range Economics Symposium and Workshop, Salt Lake City, Utah. USDA Forest Service, GTR INT-149, 1983.

Bartlett, E.T.; R.G. Taylor, and J.R. McKean. Impacts of Federal Grazing on the Economy of Colorado, A report to the U.S. Forest Service, Bureau of Land Management and the Colorado State Agricultural Experiment Station, Fort Collins, Colorado, 1979.

Gee, C.K. "The Use of Linear Programming to Estimate Range Forage Values". Proceedings: Range Economics Symposium and Workshop, Salt Lake City, Utah. USDA Forest Service, GTR INT-149, 1983.

Greer, A. J. The Nature of Federal Land Grazing Permits and Seasonal Grazing Dependencies in a Four-County Region in Southern Oregon, Oregon State University, Extension Service, Special Report 932, Corvallis Oregon, April 1994.

Hahn, W.F., T.L. Crawford, K.E. Nelson, and R.A. Bowe. Estimating Forage Values for Grazing National Forest Lands. Staff Report No. 89-51, Commodity Economics Division, Economic Research Service, USDA, Washington D.C., 1989.

Perryman, J.S., C.E. Olson. Impact of Potential Changes in BLM Grazing Policies on West-Central Wyoming Cattle Ranches, University of Wyoming, Agricultural Experiment Station, Research Journal 87, Laramie, Wyoming, 1975.

Rowe, H.L., E.T. Bartlett. "Development and Federal Grazing Policy Impacts on Two Colorado Counties: A Comparative Study". Current Issues in Rangeland Resource.

Taylor, David T., Roger H. Coupal, and Thomas Foulke. The Economic Impact of Federal Grazing on the Economy of Park County, Wyoming. University of Wyoming, Department of Agricultural and Applied Economics. Laramie, Wyoming, 2005.

Taylor, R.G., E.T. Bartlett, and K.D. Lair. "Seasonal Dependency on Federal Forage in Colorado". Journal of Range Management, 34(5):373-376.

Torell, L., J. Tanaka, N. Rimby, T. Darden, L. Van Tassell, and A. harp. Ranch-Level Impacts of Changing Grazing Policies on BLM Land to Protect the Greater Sage-Grouse: Evidence from Idaho, Nevada, and Oregon, Policy Analysis Center for Western Public Lands, Caldwell, Idaho, Policy Paper SG-01-02, 2002.

T&E Wildlife References

- Andelt, W. F. and P. M. Lukes. 2007. Occupancy of Random Plots by Gunnison's Prairie Dogs in Colorado During 2007. Final Report to the Colorado Division of Wildlife (CDOW) on Gunnison's Prairie Dog Research in Colorado. CDOW Wildlife Research Report. December 2007.
- Finch, Deborah M.; Stoleson, Scott H., eds. 2000. Status, ecology, and conservation of the Southwestern Willow Flycatcher. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 131p.
- Gall, L.F. 1984. Population structure and recommendations for conservation of the narrowly endemic butterfly *Boloria acrocne* (Lepidoptera: Nymphalidae). *Biol. Conserv.* 28: 111-138.
- Kingery, Hugh E. 1998. Colorado Breeding Bird Atlas. Published by the Colorado Bird Atlas Partnership and Colorado Division of Wildlife, Denver, CO.
- Ruediger, et. al. 2000. Canada Lynx Conservation Assessment and Strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.
- USDA Forest Service. 2007. Rocky Mountain Region – TEPS Species. Regional and Unit species lists of TEPS species. Published in Regional Supplement to FSM 2670.
- USDI Fish and Wildlife Service. 2008. Colorado Field Office County List - USFWS Ecological Services, Grand Junction, CO. Updated February 2008.
- U.S. Fish and Wildlife Service. 1990. Uncompahgre Fritillary Butterfly Recovery Plan. Denver, Colorado. 19 pp.

Sensitive Wildlife References

- Allendorf, F. W., and R. F. Leary. 1988. Conservation and distribution of genetic variation in a polytypic species, the cutthroat trout. *Conservation Biology* 2:170-184.
- Anderson, D.G. (2004, August 9). *Gilia sedifolia* Brandeg. (stonecrop gilia): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.
- Beecham, J.J. Jr., C.P. Collins, and T.D. Reynolds. (2007, February 12). Rocky Mountain Bighorn Sheep (*Ovis canadensis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/rockymountainbighornsheep.pdf> [date of access].
- Beecham, J.J. Jr., C.P. Collins, and T.D. Reynolds. (2007, February 12). Rocky Mountain Bighorn Sheep (*Ovis canadensis*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.
- Behnke, R. J. 1979. Monograph of the native trouts of the genus *Salmo* of western North America. U.S. Forest Service, Lakewood, Colorado.
- Behnke, R. J. 1992. Native trout of western North America. American Fisheries Society Monograph 6.

Behnke, R. J., and M. Zarn. 1976. Biology and management of threat- ened and endangered western trout. General technical report RM- 28. U.S. Forest Service, Rocky Mountain Forest and Range Experi- ment Station, Fort Collins, Colorado.

Colorado Division of Wildlife. 2008. 2008 Colorado Sheep and Goat Hunting information. Annual brochure produced by CDOW, DNR, Denver Colorado.

CRCT Task Force. 1999. Conservation agreement and strategy for Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) in the States of Colorado, Utah, and Wyoming. Colorado Division of Wildlife, Fort Collins. 75pp.

Hammerson, Geoffrey A. 1986. Amphibians and Reptiles in Colorado. Published by the University of Colorado and the Colorado Division of Wildlife, Denver, CO. June 1986.

Kennedy, P.L. (2003, January 2). Northern Goshawk (*Accipiter gentiles atricapillus*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Kingery, Hugh E., et al, 1998. Colorado Breeding Bird Atlas. Published by the Colorado Bird Atlas Partnership and the CDOW, Denver, CO. 1998.

Lyon, Peggy, T. Stephens, J. Siemers, D. Culver, P. Pineda, J. Zoerner. A Natural Heritage Assessment for the Uncompahgre River Basin. Colorado Natural Heritage Program, Fort Collins, CO. March 1999.

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: October 27, 2008).

Selby, G. (2007, April 25). Great Basin Silverspot Butterfly (*Speyeria nokomis nokomis* [W.H. Edwards]): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Spackman, S., B. Jennings, J. Coles, C. Dawson, M. Minton, A. Kratz, and C. Spurrier. 1997. Colorado Rare Plant Field Guide. Prepared for the Bureau of Land Management, US Forest Service, and US Fish and Wildlife Service by the Colorado Natural Heritage Program.

Smith, B.E. and D.A. Keinath. (2007, January 16). Northern Leopard Frog (*Rana pipiens*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

Ubbelohde, C., M. Benson, and D. A. Smith. 1976. A Colorado history. Pruett Publishing, Boulder, Colorado.

USDA Forest Service. 2005. Management Indicator Species of the Grand Mesa, Uncompahgre, and Gunnison National Forest. Species assessments for MIS on the GMUG NF. November 2005.

USDA Forest Service. 2007. Rocky Mountain Region – TEPS Species. Regional and Unit species lists of TEPS species. Published in Regional Supplement to FSM 2670.

Weber, W.A. and R.C. Wittmann. 2001. Colorado Flora of the Western Slope. Third Edition. University Press of Colorado. Boulder, Colorado.

Wiltzius, W. J. 1985. Fish culture and stocking in Colorado, 1872-1978. Division report 12. Colorado Division of Wildlife, Denver

Young, M.K. (2008, October 10). Colorado River Cutthroat Trout (*Oncorhynchus clarkii pleuriticus*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region.

MIS References

USDA Forest Service. 1991. Amended Land and Resource Management Plan, Grand Mesa, Uncompahgre, and Gunnison National Forests. Delta, Colorado.

USDA Forest Service. 2005. Management Indicator Species Assessment for the Grand Mesa, Uncompahgre, and Gunnison National Forests, Version 1.0. Delta, Colorado. November, 2005.

USDA Forest Service. 2005. Decision Notice and Finding of No Significant Impact, Management Indicator Species Forest Plan Amendment. Delta, Colorado. May, 2005.

APPENDIX A. QUALITATIVE RISK ASSESSMENT

Qualitative Risk Assessment

San Juan Landscape Rangeland Assessment

Ouray and Gunnison Ranger Districts

Grand Mesa, Uncompahgre, Gunnison National Forests

Introduction

The Forest Service is preparing an environmental assessment for 23 livestock grazing allotments. The analysis area for this group of allotments includes that portion of the Uncompahgre National Forest from Lake City to Dallas Divide (approximately 200,000 acres). There are eight domestic sheep allotments within the analysis area. Five of these are currently active and the other three are vacant. The Colorado Division of Wildlife has two bighorn sheep management units within the analysis area. Unit S21 is known as the Ouray-Cow Creek herd and Unit S33 is known as the Pole Mountain/Upper Lake Fork herd.

One of the primary management concerns as identified in the literature associated with domestic sheep grazing is the potential for interaction between wild and domestic sheep, and the risk of physical contact. Physical contact has been identified as a probable causative factor in the transmission of certain diseases from domestic sheep to wild sheep. In some instances, these diseases have been implicated as one causative factor in die-off of wild sheep populations. Significant (>50% of the population) bighorn sheep die-offs have occurred in every western state from the late 1800's to the present. These large-scale epizootics are thought to be caused by macroparasites, bacteria, and viruses in combination with environmental and social stressors. The effect of these various diseases on bighorn sheep is well documented. Based on best available science which indicates that an increased potential for disease transmission may lead to an increased risk die-off of wild sheep, it is believed that separation of the species in space and time is the most feasible preventative measure.

As part of the analysis process for this project, a Qualitative Risk Assessment was completed to evaluate the potential effects of the proposed action upon Rocky Mountain bighorn sheep. The primary goal of the Risk Assessment was to determine the potential risk of contact between bighorn and domestic sheep and for the group to collaboratively develop solutions to reduce the risk of contact.

Process

People that were involved in this Risk Assessment included Rangeland Management Specialists, Wildlife Biologists, and Line Officers from the GMUG and San Juan National Forests and the San Juan and Gunnison Field Offices of the BLM. Also involved were the local Terrestrial Biologists and District Wildlife Managers of the CDOW offices in Montrose and Gunnison. All of the sheep grazing permittees in the analysis area were involved in the entire Risk Assessment process as well.

The process of completing the risk assessment was as follows:

Qualitative Risk Assessment

Concentrate on the “risk of contact” between wild and domestic sheep

Baseline Data/Maps

Bighorn sheep distribution (CDOW data from NDIS). Handout with definitions.

Overall Range – The area which encompasses all known seasonal activity areas within the observed range of a bighorn sheep population.

Within the Overall Range:

- Production Area – AKA Lambing areas
- Winter Range – area where 90% of the bighorn sheep are located during the average 5 winters out of 10.
- Severe Winter Range
- Winter Concentration Area
- Summer Range – area where 90% of the bighorn sheep are located between spring green-up and the first heavy snowfall
- Summer Concentration Area
- Migration Corridors
- Mineral Lick
- Water Source

The data used to define the seasonal bighorn sheep use areas is based on consistent observations by CDOW personnel, other agency personnel, and sportsmen. The mapping is based on use areas, not random observations. It is based on occupied habitats, not historical use areas or simply suitable habitat. The CDOW updated this data in 2007, and considers it to be as accurate as possible.

- Domestic sheep use/distribution (USFS data, permittee data)
- Allotment maps
- Permit data
- Numbers/Season of use
- Rotations/patterns of use
- Locations of sheep camps
- Driveways/trails
- Bed grounds

Each permittee reviewed this information with Rangeland Management Specialists from the Forest and together they developed maps that reflected actual grazing use and trailing routes for each of the active allotments.

Evaluate Field Information

Overlay bighorn sheep data with domestic information

Evaluate spatial and temporal overlap

Look at both seasonal concentration areas and overall bighorn sheep range

Rate the Risk of Overlap/Contact

Goal: Provide decision makers with a qualitative assessment of risk of contact

Very Low – Very High

Risk Rating Factors include:

- Spatial overlap
- Timing/season of use
- Duration of use
- Topography of the area(s)
- Animal behavior

Develop Management Options and Alternatives

Review the management actions included in the proposed action and determine their applicability to the situation.

Develop additional management actions if necessary.

Discuss the need for moving domestic sheep out of areas of overlap, how that would happen, and what the consequences would be to the sheep producer.

Results

The relationship of the grazing allotment boundaries to mapped bighorn sheep range within the analysis area is shown on the attached map.

Based upon the Qualitative Risk Assessment it is apparent that most of the existing domestic sheep grazing and trailing activities within the analysis area occur outside of any mapped bighorn sheep range, or occur within the area mapped as overall range. Four areas of overlap were evaluated during the Risk Assessment process to determine the risk of physical contact between wild and domestic sheep.

The results of the Risk Assessment were documented in the meeting notes for each area. A total of three meetings took place with the working group during the month of June, 2008.

Middle Fork Stock Driveway Uncompahgre Peak/North Henson Allotment 6/4/2008

Attendees:

Kelley Liston – USFS, Rangeland Management Specialist

Craig Grother – USFS, Wildlife Biologist

Edna Mason – USFS, Range Technician

Tara DeValois – BLM, Rangeland Management Specialist, Gunnison Field Office

Brad Banulis – CDOW, Terrestrial Biologist

Shane Nicolas - permittee

Randy Leonard - permittee

Ernie Etchart - permittee

Kelly Crane – CDOW, District Wildlife Manager

Ron Harthan - CDOW, District Wildlife Manager

We began our risk assessment process by looking at the Middle Fork Stock Driveway on the Middle Fork-Wetterhorn allotment. The allotment is currently vacant; our proposed action is to close the allotment and keep the driveway open.

Currently, the driveway has 2 trailing privileges up, and 2 down, both issued to Inda. In recent years, Leonard's have used it, by trading out the privilege with Juan. Typically, when Randy goes up, he trails up the Middle Fork to the East Fork trail, and then cuts over to the Uncompahgre Peak-North Henson allotment. Dependent on snow levels, trail condition. When he comes off, if he is trailing from Capitol City he plans one overnight stay, and then trails - 2 long days. The Middle Fork-Wetterhorn allotment is entirely within the CDOW mapping polygon for overall BHS range; there are 2 summer range polygons that also overlap a portion of the allotment. Ron Harthan and Kelly Crane identified a smaller area within the summer range unit where they consistently see more BHS and where there is a higher percentage of BHS harvest. This area is in the Difficulty-Coxcomb-Wetterhorn area, and lies west and outside of the Middle Fork-Wetterhorn allotment. They (CDOW) identified this area as potentially of more concern to them.

Factors discussed in the risk assessment:

Spatial Overlap	Timing/Season of Use	Duration	Topography	Behavior
Driveway passes within ½ mile of mapped bighorn sheep summer range	early season – 2 nd week of July late season – 1 st week of September	2 days up (1 day per band) 2-3 days down (2 bands, with 1 overnight stay)	Significant topographic barriers between the driveway and the east boundary of the summer range.	BHS behavior would typically mean that they would not approach a domestic band that is trailing due to noise, movement, human activity.

Based on the factors considered in the Risk Assessment, the overall risk rating for this stock driveway was determined to be Very Low. The group involved in the Risk Assessment thought that in combination the high level of activity during trailing, the short duration of time trailing occurs, and the very steep topography located between the sheep trail and bighorn summer range effectively inhibit interaction between wild and domestic sheep in this area.

The permittee that utilizes the Middle Fork stock driveway and grazes the Uncompahgre Peak/North Henson allotment also has a permit to graze the adjacent BLM allotment at American Flats. When grazing this BLM allotment, sheep have been using a portion of the Middle Fork/Wetterhorn allotment on the Forest which is currently closed to livestock

grazing. This portion of the Middle Fork/Wetterhorn allotment is essentially a topographic extension of American Flats across the administrative boundary, and the permittee says that it is virtually impossible to prevent sheep from using this area. As a result, he has requested that this area be added to his permit to prevent unauthorized use.

This area is adjacent to mapped bighorn sheep summer range around Wildhorse Peak. If authorized, this would place domestic sheep within ¼ mile of an active bighorn sheep summer range area. Domestic sheep graze the BLM allotment for 3-4 weeks, and are probably on the Forest for several days. There is essentially no topographic boundary between the wild and domestic sheep in this area. Therefore, the group thought that this situation would have a moderate to high potential for interaction to occur and recommended that this area not be added to the permit. Additional measures should be taken to designate the BLM/Forest boundary and to prevent domestic sheep grazing on the National Forest as much as possible.

Crystal/Lower Elk S&G 6/23/2008

Attendees:

Kelley Liston – USFS, Rangeland Management Specialist

Craig Grother – USFS, Wildlife Biologist

Edna Mason – USFS, Range Technician

Brad Banulis – CDOW, Terrestrial Biologist

Shane Nicolas - permittee

Randy Leonard - permittee

Ernie Etchart - permittee

Kelly Crane – CDOW, District Wildlife Manager

This allotment is permitted to Nicolas Family. Unlike the Bear Creek, Unc Peak-North Henson, and Big Blue-Fall-Creek-Little Cim, that have overlap with the S21 herd, this allotment has some overlap (overall range only) with the S33 herd.

Spatial Overlap	Timing/Season of Use	Duration	Topography	Behavior
There are no camps or bedding areas within the mapped BHS overall range.	early season – 2 nd week of July	Full season	Very steep, difficult country, with a natural barrier between the area used by domestic sheep and the mapped BHS overall range.	BHS do not travel through dark timber to reach the area used by domestic sheep.
	late season – 1 st week of September			

During the Risk Assessment process the permittee explained that his sheep do not graze the area mapped as bighorn summer range. The area mapped as bighorn sheep summer range is on the steep face of the mountain above Henson Creek and the Lake Fork. There is a large band of dark timber between the summer range and the basins that are grazed by domestic sheep. There is also a significant amount of recreational activity at Crystal Lake and Larson

Lake. For these reasons, he does not take his sheep across the ridge off Crystal Peak into the Crystal Lake or Larson Lake areas. Therefore, the group gave this area an overall risk rating of very low.

Bear Creek Allotment 6/30/2008

Attendees:

Kelley Liston – USFS, Rangeland Management Specialist, Ouray RD

Craig Grother – USFS, Wildlife Biologist, Norwood-Ouray RD

Edna Mason – USFS, Range Technician, Gunnison RD

Tara DeValois – BLM, Rangeland Management Specialist, Gunnison Field Office

Jake Schmalz - BLM, Rangeland Management Specialist, Gunnison Field Office

Brad Banulis – CDOW, Terrestrial Biologist

Brandon Diamond – CDOW, Terrestrial Biologist

Shane Nicolas - permittee

Randy Leonard – permittee

Juan Inda – permittee

Calvin Inda - permittee

Ernie Etchart - permittee

Kelly Crane – CDOW, District Wildlife Manager

Rowdy Wood – USFS, Rangeland Management Specialist, Columbine RD

Chris Schultz – USFS, Wildlife Biologist, San Juan National Forest

Tammy Randall-Parker, District Ranger, Ouray RD

Mark Hatcher – USFS, Rangeland Management Specialist, Gunnison RD

The Bear Creek allotment has the most significant overlap with bighorn sheep use areas. Included within the allotment boundary are summer range and lambing areas. The season of use for domestic sheep does not coincide with bighorn lambing so the group decided this would not be an issue.

Spatial Overlap	Timing/Season of Use	Duration	Topography	Behavior
Domestic sheep grazing occurs within ½ mile of bighorn sheep.	July and August each year.	10 to 14 days	No major topographic barriers between wild and domestic sheep use areas	The domestic sheep are grazing the flat, open basin while the bighorn are on the edges of the basin closer to escape cover.

When the group compared the actual use areas for both wild and domestic sheep, it was apparent that the actual overlap is much less than anticipated. Much of the terrain in the lower portions of Bear Creek is extremely steep and rocky, which is where much of the bighorn sheep use occurs. Only the upper basins of Bear Creek are being grazed by domestic sheep, primarily in combination with the permittee's BLM permit in the American Flats area. Grazing use on the combined BLM and Forest permits is for approximately 50 days during July and August. Approximately 10-14 days are spent on the National Forest. When grazing the Bear Creek allotment, domestic sheep are within ½ mile of bighorn sheep. There are no major topographic barriers between wild and domestic sheep use areas. However, the bighorn favor those areas near escape cover. The domestic sheep are grazing the flat, open basin while the bighorn are on the edges of the basin away from Engineer Pass.

Based on the factors considered in the Risk Assessment, the overall risk rating for this allotment was determined to be Moderate. The group involved in the Risk Assessment thought that in combination the limited amount of suitable grazing area, the timing and duration of grazing use, and proximity to occupied bighorn sheep summer range without significant topographic barriers could provide opportunities for interaction.

Conclusions

The proposed action would utilize a series of management actions to reduce the risk of contact between wild and domestic sheep instead of removing domestic sheep from areas of overlap. Several management actions were discussed and developed to alleviate contact between wild and domestic sheep, and those actions are included in the proposed action as follows:

Actions common to all sheep allotments unless specified otherwise:

- Move sheep to a new grazing area every 5-7 days.
- Use a herder to control and move bands of sheep to desired grazing areas.
- Bedding grounds need to be relocated every 3 days (open bedding) or 1 day (closed bedding).
- Trailing use will comply with agreed upon authorizations specified in the memo on management of sheep driveways dated January 25, 1989.
- Follow the established annual operating instructions for the grazing allotment.
- Prevent grazing, bedding, and salting on sites where there are known colonies of Uncompahgre Fritillary Butterfly.
- Livestock grazing systems will be designed to maximize the opportunity for plant regrowth and recovery, by focusing on the frequency of defoliation, the intensity of defoliation, and the timing and duration of livestock use.
- Grazing schedules will be developed so that pastures are used at different times of the year, every year. Grazing schedules will be developed in the annual operating plan based on the Grazing Response Index and/or an evaluation of grazing from the previous season and the resource conditions of the current season. A negative GRI will be corrected the following year by changing any or all of the following: the season of use, allowable use standard, residual stubble height, stocking rate, timing of livestock use.

- Domestic sheep will not graze or trail across NFS lands while in estrous. Generally, ewes will come into estrous in the fall after the lambs are weaned; breeding occurs in November-December.
- Domestic sheep will be in apparent good health when moved onto NFS lands.
- Stray domestic sheep will be gathered or disposed of within 72 hours of notification.
- Permittees may use hazing techniques and guard dogs to scare off wild sheep.
- The permittee will notify CDOW as soon as possible if individual or small groups of bighorn sheep come into contact with domestic sheep.
- Conduct prevention, control, and eradication strategies for targeted invasive plant species, utilizing integrated weed management techniques through implementation of the GMUG weed action plan.

The effectiveness of these management actions is debatable, and if they do not prove to be effective, actions should be taken under the concept of adaptive management to remove domestic sheep from the areas of overlap to prevent physical contact.

APPENDIX B. PROPOSED ACTION DETAILS OF INDIVIDUAL ALLOTMENTS

Grazing systems on cattle allotments, whether upland or riparian, should provide for a maximum amount of vegetative regrowth following grazing. Rotational grazing systems are favored over season-long systems in order to allow for deferment. Since no one grazing system will meet all needs on all allotments, the systems should be flexible to allow for fluctuating conditions.

Grazing systems on cattle allotments require good water distribution and quantity, often to help minimize grazing impacts in riparian areas. Proper salting and frequent riding by the permittee are key to a successful management system. Salt should be placed in areas that help to distribute the cattle away from more sensitive areas, such as any live water sources, developed water, or other areas of concern. Frequent riding by the permittee to move cattle out of riparian areas or other concentration areas, as well as to monitor changing conditions on an allotment or pasture is critical.

The following tables show the proposed action by allotment, and include the permitted livestock number and kind, season of use, and permitted AUMs. Narratives following each table will describe additional components of the proposed action for each group of allotments, as well as identification of some of the elements of the analysis that will be considered.

ACTIVE CATTLE ALLOTMENTS WITH ROTATIONAL GRAZING SYSTEMS	Permitted Livestock Number	Livestock Kind	Permitted Season of Use	Permitted AUM's
	55	cattle	7/16 - 10/5	
LOU CREEK C&H	125	cattle	6/21 - 8/31	1265
	350	cattle	8/25 - 10/10	
GREEN MOUNTAIN C&H	578	cattle	7/1 - 10/15	2684

Reduce the duration that plants are exposed to livestock grazing on these allotments by moving livestock and using salting and riding to a maximum of 20-25 days per grazing area each year to maximize the period of plant growth and regrowth. This will create sub-units within the allotment without construction of permanent fencing, and should result in a neutral or positive GRI. The maximum allowable use on key areas is 50% of current year's growth.

Range improvements will be maintained yearly; new construction and/or removal of improvements will occur as needed.

Combine Baldy and Section 25 into a single allotment (Baldy) utilizing a deferred-rotation grazing system implemented in a 1994 agreement between U.S. Forest Service, BLM, and the permittee.

ACTIVE CATTLE ALLOTMENTS (COMBINED ALLOTMENTS)	Permitted Livestock Number	Livestock Kind	Permitted Season of Use	Permitted AUMs
BALDY C&H				
	115	cattle	6/10 – 9/30 (including BLM)	307
SECTION 25 C&H				
SECTION 25 C&H (on/off portion)	20			
BOILER C&H				
	80	cattle	7/1 - 9/20	216
CORBETT CREEK C&H				
COCAN FLATS C&H				
BOX FACTORY C&H	185	cattle	7/15-9/20	395
WEST DALLAS C&H				
BIG BLUE C&H	159	cattle	7/1 – 9/30	635
BIG BLUE C&H (if opportunity arises)	**1000	sheep	7/1 – 7/21; 9/1 – 9/21	350
ALPINE PLATEAU C&H	171	cattle	6/16 – 9/30	795

Combine Boiler and Corbett Creek allotments into a single allotment with a 2 pasture rotation system, as has been done since 2003.

Combine the West Dallas, Cocan Flats and Box Factory allotments into a single allotment with a 3-4 pasture deferred rotation grazing system. Continue use of adjacent private land under a term on/off permit with the West Dallas pasture and a maximum of 121 head on NFS lands and 64 head on private land.

Combine the Alpine Plateau and part of the Big Blue allotments into a single allotment with an 8-9 pasture rotation system. Livestock use on the two lower elevation pastures will be limited to early season use prior to moving to higher elevations, and late season use prior to leaving the allotment. Cattle numbers on the Big Blue pastures (159 head) may be converted to sheep if the opportunity arises for no more than 1000 ewes with lambs for 3 weeks in July and 3 weeks in September.

Reduce the duration that plants are exposed to livestock grazing on these allotments by moving livestock and using salting and riding to a maximum of 20 - 25 days per grazing area each year to maximize the period of plant growth and regrowth. This will create sub-units

within the allotment without construction of permanent fencing and should result in a GRI that is neutral or positive.

The maximum allowable use is 50% by weight of current year's growth. Range improvements will be maintained yearly; new construction or reconstruction will occur as needed.

ACTIVE CATTLE ALLOTMENTS WITH SEASON-LONG GRAZING SYSTEMS	Permitted Livestock Number	Livestock Kind	Permitted Season of Use	Permitted AUM's
BIG PARK C&H	200	cattle	7/15 - 8/30	408
COBBS GULCH C&H	27	cattle	6/10 - 8/31	98
COAL CREEK C&H	17	cattle	7/1 - 9/20	61

Reduce the duration that plants are exposed to livestock grazing on these allotments by moving livestock and using salting and riding to a maximum of 20 days per grazing area each year on good to excellent condition ranges, and 12-15 days per year on poor to fair condition ranges to maximize the period of plant growth and regrowth. This will create sub-units within the allotment without construction of permanent fencing, and should result in a GRI that is neutral or positive.

The maximum allowable use on key areas is 35% by weight of current year's growth.

Range improvements will be maintained yearly; new construction and/or removal of improvements will occur as needed.

ACTIVE SHEEP ALLOTMENTS	Permitted Number	Livestock	Livestock Kind	Permitted Season of Use	Permitted AUM's
BEAR CREEK S&G	878		sheep	7/11 - 8/5	226
BIG BLUE/FALL CRK/LITTLE CIMARRON S&G	850		sheep	7/6 - 9/15	821
HERO-IDARADO S&G	1000		sheep	7/22 - 7/28 8/20 - 8/26	92
CRYSTAL PEAK/LOWER ELK S&G	500		sheep	7/6 - 9/10	650
UNCOMPAHGRE PEAK/NORTH HENSON S&G	900		sheep	7/11 - 9/20	639

The analysis of these allotments will include:

A qualitative risk assessment for the S21 and S33 herds will be completed cooperatively between CDOW, USFS, BLM, and permittees.

Suitable and unoccupied wild sheep range should be identified and evaluated cooperatively between USFS, CDOW and the permittees.

Transplants of wild sheep into the analysis area should be designed to minimize the likelihood of contact between wild and domestic sheep.

USFS and permittees will map sheep camps and areas used by domestic sheep on a 1:24,000 map.

USFS and permittees will work cooperatively with CDOW to refine mapping of bighorn ranges.

VACANT PROPOSALS	ALLOTMENT	Permitted Livestock Number	Livestock Kind	Permitted Season of Use	Permitted AUM's
	LITTLE CIMARRON C&H	0	cattle	none	0
	MIDDLE FORK-WETTERHORN S&G	0	sheep	varies	0
	BIGHORN S&G	0	sheep	none	0
MINERS S&G	CREEK-POUGHKEEPSIE	0	sheep	varies	0

Little Cimarron C&H – This is a cattle allotment that has not been used since 1962 or earlier. Due to the narrow, steep sided canyons, and heavily timbered and rocky hillsides, forage availability is minimal. The main portion of the suitable and usable range is located in the bottom of the Little Cimarron Creek drainage. The proposal is to close this allotment to livestock grazing due to lack of forage availability. The analysis will include evaluating whether the allotment or portions of it could be combined into either the Big Park C&H allotment, or the Big Blue-Fall Creek-Little Cimarron S&G allotment.

Middle Fork-Wetterhorn S&G. This allotment has a significant amount of overlap with the bighorn range. It has been vacant since 1992. It is proposed for closure because of the overlap with bighorn sheep range. It is not suitable for cattle grazing. The Middle Fork Livestock Driveway will remain open; use is authorized annually and includes trailing privileges for 2 bands entering NFS lands, and privileges for 2 bands exiting NFS lands. The analysis will include evaluating the feasibility of issuing temporary or livestock use permits on an as-needed basis for emergency forage, noxious weed control, or other short-term vegetation management projects, as well as potential allotment boundary adjustments to allow for spatial separation between domestic and bighorn sheep.

Bighorn S&G: The grazing privileges on this allotment were voluntarily surrendered to the Forest Service by then permittee Emmett Elizondo in 1988, to provide summer range for bighorn sheep. The proposal is to close this allotment to livestock grazing.

Miners Creek-Poughkeepsie Gulch S&G: The grazing privileges on this allotment were voluntarily surrendered to the Forest Service by then permittee Emmett Elizondo in 1988. The proposal for this allotment is to issue temporary or livestock use permits as needed for emergency forage, noxious weed control, or other short-term vegetation management projects, as well as potential allotment boundary adjustments to allow for spatial separation between domestic and bighorn sheep.

Permittee	allotment	# bands	entry point/access on	exit point/access off	admin org
Inda	Bear Creek/ American Flats	1	Middle Fork privilege or truck to Capitol City	Middle Fork privilege	Ouray RD and Gunnison FO
	Picayne- Mineral Pt	1	Middle Fork privilege or truck to Capitol City	Middle Fork privilege	San Juan BLM
	Cannibal	1	Trail Powderhorn	Trail Powderhorn	Gunnison RD
	Calf	1	Trail Powderhorn	Trail Powderhorn	Gunnison RD
	Rambouillet	1	Truck	na	Gunnison RD
Etchart	Hero-Idarado	1	truck to Red Mtn pass	truck from Red Mtn pass	Ouray RD
	Red Mountain				San Juan BLM
	Gladstone	1	trucks to Cement Creek	truck from Cement Creek	San Juan BLM
	Stony Pass/Elk Creek	1	truck to Cunningham	Ridge privilege; or trail off Silverton	Columbine RD
	Deer Park	1	truck to Cunningham	Ridge privilege	Columbine RD
Nicolas	Crystal/Lowe r Elk	1	Ridge privilege	Ridge privilege	Ouray RD
	California Gulch	1	Ridge privilege or truck from Eureka	Ridge privilege or truck from Eureka	San Juan BLM
Leonard	Uncompahgre/ North Henson	1	East Fork privilege or truck to Capitol City	East Fork	Ouray RD
	Big Blue/Fall Creek/Little Cimarron	1	East Fork privilege or trail from Fall Creek trailhead	East Fork privilege	Ouray RD
	Engine Creek/Deer Creek	1	truck	truck	Columbine RD
	Henson Creek	1	truck Capitol City	truck Capitol City	GFO
	American Lake	1	Ridge privilege	Ridge privilege	GFO

Ridge Stock Driveway:

- 3 privileges up;
- 5 privileges down

East Fork Stock Driveway:

- 2 privileges up,
- 2 privileges down

Middle Fork Stock Driveway:

- 2 privileges up,
- 2 privileges down

Note that this only includes the 4 sheep operators on the Ouray RD, plus their associated operations on adjacent NFS and BLM lands. Other trailing privileges on the Ridge Driveway are also in effect.

APPENDIX C. DOMESTIC SHEEP TERMS, GRAZING BEHAVIOR, AND HERDING

Domestic sheep and cattle differ in their behavior and how they are effectively managed and handled. This appendix provides the reader with some background information on domestic sheep terms, grazing behavior, and herding. Domestic sheep are gregarious animals (i.e., they prefer to be with a group). It is rare to see a sheep by itself. Sheep are also relatively defenseless animals. They are subject to predation by many animals including coyotes, eagles, bobcats, lions, bears, and domestic dogs. Project Design Criteria (see Chapter 2, section 2.7) were specifically designed with domestic sheep behavior and known effective herder and herding practices in mind.

Domestic Sheep Terminology

Table E-1 displays many of the common terms applicable to domestic sheep and their management. Each of these terms is also be found in Appendix B (List of Terms Used).

Table E-1. Domestic Sheep Terminology.	
Terms applicable to domestic sheep (arranged alphabetically)	
Band	Any number of sheep handled as a unit attended by a herder.
Bed ground	An area where animals sleep and rest.
Bleat	The cry of a sheep, goat, or calf.
Death loss	The number of animals in a herd that die from various natural and accidental causes. Usually expressed as a percentage.
Docking	To shorten an animal's tail by cutting.
Dry ewe	A ewe without a lamb(s).
Ewe	Female sheep of breeding age.
Ewe lamb	Immature female sheep.
Flock	A group of sheep on a farm or range managed in fenced pastures and not herded.
Herd	An assemblage of animals usually of the same species.
Herder	One who tends livestock on rangeland (usually applied to the person herding a band of sheep or goats).
Herding	The handling or tending of a herd.

Lamb	Newborn sheep.
Lamb crop	The number of lambs produced by a given number of ewes, usually expressed in a percent of lambs weaned of ewes bred.
Lambing	Act of parturition (giving birth).
Ram	Male sheep of breeding age.
Ram lamb	Immature male sheep.
Stock driveway	A strip of land specifically designated for the controlled movement of livestock.
Trailing	Controlled directional movement of livestock.
Wether	Castrated male sheep.

Sheep Grazing Habits

Sheep have a split in their upper lip, so they are adept at picking the preferred leaves off of plants. They are finicky feeders in the morning and choose only tidbits of the choicest plants. They settle down and feed better in the evening, and are not nearly as selective in their choice of forage. The less the herder handles the herd, the better the animals thrive. However, in order to systematically graze an allotment, checks and controls must be applied by the herder.

Sheep prefer fresh feed each day. However, elapsed time will allow the feed to freshen up, particularly after a rain. Open herding results in less travel. If use is forced, the herder must tighten the spread of the herd resulting in trampling damage to the range and adverse effects on the sheep.

Sheep Movement and Herding

Moderate topography is best for ease of handling. Thick brush acts as a barrier to grazing sheep even though there are trails through the brush. On most summer allotments, sheep will graze upslope after leaving their afternoon watering and bedding site. They will then regroup and bed down for the night on a ridge top or some other high vantage point. They instinctively use these high points for protection and vantage. Sheep do not like to night bed in thick trees or in the bottom of basins, or depressions. From the high points, they will usually begin grazing at daybreak.

It is very important the herder be with the flock to influence the direction when they begin to graze. The sheep will otherwise often graze the same direction as they did the previous day, watering at the same site and bedding down on the same bed ground. This results in poor lambs and excessive trampling along the persistent routes of travel. When sheep leave the shade-up area during warm weather, they tend to graze on the shady side of the canyon and avoid open slopes. Sheep will usually not graze downhill in the evening.

It is difficult to force sheep to shift from succulent forage, such as shifting from forbs to mature grass. Feed is generally more succulent on cooler north and east aspects. During

warm weather, sheep make good use of aspen and similar range. They prefer to graze in the shade of the trees in the afternoon after leaving the shade-up area.

During cool or stormy weather, sheep have a tendency to travel. During warm summer days, sheep shade-up from mid-morning to late-afternoon. Under these conditions, sheep begin grazing at daylight and again from late afternoon until dark.

Water distribution and location are important to sheep. The ideal situation is to have water available in the bottom of every canyon. It is difficult to force sheep to use the slopes below available water on hillsides. Watering sites should be close enough so excess trailing is unnecessary. Sheep should not be required to go more than a mile to water. Doubling the distance sheep travel to water increases the grazing use adjacent to the water source several times.

It is difficult to get sheep off steep slopes once they are established there. The herd will delay going to water until they are very thirsty. They will then trail (often on a run) off the slope with resulting damage to the range and slopes.

Sheep will tend to follow the path of least resistance. The most accessible and easily herded portions of the range will tend to be grazed heavier unless the herder is diligent in following recommended management practices. Areas adjacent to water, especially if water is scarce, can receive heavier grazing pressure unless carefully managed by the herder. If shade-up areas are limited, the available shady areas will receive heavy use during warm weather. Shading up too often in one place is as damaging as repetitive use of bed grounds.

Sheep also prefer the upper half of slopes and ridge tops. These areas, particularly ridge tops, should be closely watched and evaluated. On the other hand, some portions of the range tend to be under utilized. Small isolated corners, slopes cut up or isolated by rocks or brush, the lower portions of long slopes, slopes below available water, steep, rough country, and some of the timbered areas fit into this category.

Sheep should be managed on the basis of “once-over” grazing under rest-rotation or deferred rotation management. Cattle are placed in a pasture or grazing unit and confined there until the desired degree of use is obtained; this approach is undesirable with sheep.

Adapted from: USDA Forest Service. 1996. Rangeland Analysis and Management Training Guide. US Dept. of Agric. Forest Service. Rocky Mountain Region. Denver, CO. August 1996.

APPENDIX D. HISTORIC & CURRENT STOCKING LEVELS

Allotment Name	1980 (or earlier)	Current Stocking Level	Grazing season 1980 (approx)	Current Grazing season	
Baldy C&H	80		7/1 – 8/31		
Section 25 C&H	20	80 c/c; 115 yrlg	6/16-10/15	6/14 – 9/30	Combined since 1994 under 4/12/94 MOU for livestock management.
Cobbs Gulch C&H	27	Na	8/11 – 9/30	na	
Lou Creek C&H	437	125 c/c 55 c/c 350 c/c	6/21-10/10	6/21-8/31 7/16-10/15 8/25-10/10	1800 aum 1940; 1204 in 1960
Green Mountain C&H	508		7/1 – 10/15		
Devil's Canyon C&H	35	578 c/c	7/1 – 10/15	7/1-10/15	Combined into Green Mountain Allotment in late 90's
Big Park C&H	150	200 c/c	7/1 – 9/30	7/15-8/30	Class of livestock was sheep until mid-1970s; then converted to cattle.
Big Blue C&H	100 (1990)		7/1-9/30		Used with Alpine Plateau since 2003
Alpine Plateau					
Little Cimarron C&H	12 c/c	0	na	na	Permit cancelled in 1967
West Dallas C&H					Part of old Dallas C&H prev to 1939. Hayden Peak S&G added in 1961; removed 1964. Old Dallas C&H divided into West Dallas; East Dallas; Cocan Flats; Box Factory in 1960.
Cocan Flats C&H	118	0	7/1-9/10	na	Class of livestock was sheep until about 1975, converted to cattle. Old Cocan Flats and East Dallas combined 1960-61.
Box Factory C&H	50 (1996)	0	7/1-9/20	na	
Coal Creek C&H	70	17 c/c	7/1-9/20	7/1-9/20	12/1957 this allotment was split into Coal Crk, Boiler, Corbett.
Corbett Creek C&H	66		7/1-9/20		
Boiler C&H	61	52 c/c	7/1-9/20	7/1-9/20	Grazed together since 2002-2003

Allotment Name	1980 (or earlier)	Current Stocking Level	Grazing season 1980 (approx)	Current Grazing season	
Crystal Lake/Lower Elk S&G	na	600 e/l	na	7/6-9/10	
Bear Creek S&G	800	878	7/1- 9/15	7/11-8/5	Grazed with BLM American Flats S&G
Uncompahgre Peak S&G	1100 e/l		7/6-9/15		Uncompahgre Peak and North Henson were combined into a single allotment with 1 band of sheep in about 1989.
North Henson S&G	900 e/l	900 e/l	7/11-9/20	7/11-9/20	
Hero-Idarado S&G	na	1000 e/l	na	7/22-7/28; 8/20-8/26	
Big Blue S&G	1200 e/l		7/6-9/15		
Fall Creek S&G	1200 e/l	850	7/6-9/15	7/6-9/15	Combined in 1985
Little Cimarron S&G	1100 e/l		7/6-9/20		
Middle Fork Wetterhorn S&G	900 1986	0	7/11-9/5	na	Cancelled 1992
Bighorn S&G	925	0	7/16-9/15	na	Vacant as of 1985. Prior to 1966, this was 2 allotments (West Cow and Middle Cow)
Miner S&G					Vacant as of 1985; a portion is currently grazed with the Bear Creek S&G.
Poughkeepsie S&G	567	0	7/11-9/15	na	
Total					

APPENDIX E. SPECIFIC ALLOTMENT DATA (INCLUDES ESTABLISHED MONITORING)

Cattle Allotments

Alpine Plateau C&H

The most recent vegetation inventory on Alpine Plateau was completed in 2004 in conjunction with the Long Draw Timber sale. Areas on top showed the vegetation in good shape and meeting Forest standard with the exception of the lack of willows in the wet areas. The lack of willows is attributed to both cattle and elk use. A small 2-way exclosure cage was placed in Big Willow in 2003 to help understand the use occurring on willows. One side of the exclosure remains in place year round and the other side is put up before the cattle enter the allotment and removed in the fall when the cattle are removed. In the five years since the cage was established willow growth has been observed in both sides of the cage with the year round side showing significant growth. Vegetation on the top is characterized by spruce-fir forest, wet meadow riparian and open hillsides with Thurber's fescue. Areas on the side of the plateau have been historically used heavy by both cattle and elk. Willows are almost nonexistent in the riparian areas and there is essentially no regeneration of aspens. Old aspen trees show heavy winter browse use on the bark. The length of time cattle stay on the side, in two pastures, has been reduced to 10 – 14 days each for entering and leaving the allotment. Vegetation on the side hills is characterized by dry open Thurber fescue meadows, spruce-fir forests, aspen groves and narrow riparian streams.

Historically, this allotment included significantly more area and several permittees grazed the allotment. Records show the numbers of cattle run were 532. Around 1960, the numbers were changed to around 330 and have stayed at that level. Grazing plans have the 2 permittees cattle grazing one herd of cattle on top. The side of the plateau pastures (Wilson and Narrow Grade) and the Soldier Creek pasture, are where the cattle are grazed separately. The past permittees for one reason or another have not run the cattle together on the top of the plateau. The Soldier Creek pasture was a part of the Big Blue Allotment until the early 1990s.

The Ridge stock driveway crosses this allotment. A maximum of four bands are authorized to travel the Ridge in the spring and eight bands in the fall. In recent years, there have been 2-3 bands trailing up in the spring, and 3-4 bands coming out in the fall.

Range improvements on this allotment include:

Improvement	Length	Condition	Year constructed
Narrow Grade Cattleguard	-	Satisfactory	1960
Soldier Summit Cattleguard	-	Satisfactory	1945
North Alpine Cattleguard	-	Poor	1960
East Rim Division Fence	1.5	Removal	1945
Sawmill Division Fence	1.5	Critical	1945
Alpine/Big Blue Fence	2	Critical	1985
Narrow Grade Boundary Fence	.8	Critical	1965
Lake Fork Boundary Fence	1.5	Good	1989
Baldy N.F. Boundary Fence	1.2	Satisfactory	1975
Baldy N.F. Boundary Fence	3	Satisfactory	1957
Baldy N.F. Boundary Fence	.6	Satisfactory	1967
Baldy N.F. Boundary Fence	.6	Satisfactory	1957

An Environmental Assessment, which included soil erosion observations and an Allotment Management Plan were completed in 1984 for the grazing on Alpine Plateau. Since the implementation of the AMP a new pasture, Soldier Creek, has been added to the allotment with no additional numbers of cattle being permitted. The documents are available in the 2210 file in the Gunnison Ranger District Office.

Extensive vegetative analysis was completed for the top of the plateau in conjunction with a timber sale in 2005. An inspection of the vegetation information is available in the Long Draw Timber Sale in Gunnison.

A small population of yellow toadflax near Soldier Summit appears to have been effectively controlled. There is a lot of Canada thistle throughout the allotments alongside the roads. There are no other known populations of weed species of concern. Starting in 2007 contracts were awarded for noxious weed treatment on the allotment. Additionally, the BLM is treating along the Alpine Plateau road leading to the allotment.

There are 2 permittees on this allotment. One permittee runs 171 cow/calf pairs, from 6/16 to 9/30, on the side of the plateau and on top. The other permittee runs 159 cow/calf pairs, from 7/1 to 9/30, in Soldier Creek, parts of the Big Blue allotment and on top.

The data summarized below was collected on riparian sites on the allotment. There is no long term data associated with these plots, as they were established in 2007.

Bare ground and Cover/Frequency Index for Permanent Study Plots

Benchmark	ACC for ground	% bare	ACC for litter	for	Σ CFI for Native Plants	for	Σ CFI for Non-Native Plants
Big Willow Park 021	12%		85.5%		12152.3		687.5
W. Fork Middle Blue Creek 015	0		97.1%		29287.6		0
W. Fork Middle Blue Creek 022	4.7%		88.7%		4285.4		7932.9

Baldy-Section 25 C&H

The Baldy and Section 25 C&H allotments have been grazed as a single allotment in conjunction with lands under the management of the BLM since 1994, under an interagency agreement. Although the 2 allotments have never been formally combined, they are considered to be and will be described as a single allotment for this analysis.

The allotment encompasses approximately 10766 acres, of which about 1300 is considered to be suitable for livestock grazing. Prior to 1965 the allotment included the Cobbs Gulch and Dry Creek allotments. Cattle and sheep both grazed the allotment until 1952. Allotment files indicate heavy overstocking by livestock in the late 1950's followed by major reductions in the stocking rate.

There are about 1.6 miles of fence and 14 developed water sources on this allotment. Some of the fences are in poor to very poor condition and will require reconstruction in the next 2-4 years or sooner. Vegetation is characterized by gambel oak; spruce-fir; aspen; and forb and grass dominated parks. There have been few noxious weeds observed on this allotment; the most common is Canada thistle.

There are no permanent transects on this allotment. Ocular macroplot data was collected in 2005. Smooth brome and/or Kentucky bluegrass were found on all but site 005, in addition to other native grass and forb species. It is possible these were seeded to help restore the sites following the stocking reductions in the 50's and 60's. The data shows a relatively broad variety of grasses, forbs, and shrubs on all 5 sites; the photos indicate that vegetation recovery is occurring on some sites.

Ocular Plant composition data

Site	Bare ground	Dominant species
Cutler creek Trailhead 001	3%	Smooth brome; crested wheatgrass
Near junction Baldy and Storm Gulch Trails 004	35%	Weedy forbs; letterman needlegrass
Baldy 005	30%	Buckbrush; snowberry; needle and thread
Baldy 003	20%	Gambel oak; Thurber fescue
Baldy 002	5%	gambel oak; snowberry

Big Blue C&H

This allotment encompasses nearly 12,000 acres, of which approximately half is considered suitable for livestock grazing. The allotment is characterized by spruce-fir; aspen; grass meadows; willow; and forb plant communities. The allotment has been vacant since 1996; however, the lower 2 units of the allotment have been grazed for the past several years with the Alpine Plateau C&H allotment. Noxious weed inventories are incomplete on this allotment, but there are small, localized populations of Canada thistle on the allotment. There are no developed water sources, and approximately 2 miles of interior fence that is in mostly poor condition.

Although the creek was at one time considered to be in poor condition, vegetation recovery since the 1940's is occurring, as evidenced by the 2 comparison photos below.



Photo by Arthur Cramer, 8-16-1948 - Denver Public Library, Western History Collection

Allotment was grazed season-long by 450 cow/calf pairs from July 1 to October 15. This area was grazed by approximately 100 pairs for the season. Cramer noted that stream bank was undercut by excessive run-off. Precipitation for the year was “average.”



Photo by David Bradford, 8-02-2001

U.S. Forest Service

The allotment was converted to a 4-pasture rest rotation system in 1966 and grazed by 175 cow/calf pairs from 7/16-10/15. This pasture was rested every 4th. Livestock last grazed the allotment in 1996. Precipitation for the year was 88% of average.

Data collected in 2007 in Big Blue Creek shows an abundance of native vegetation and litter, and little bare ground. The allotment has been grazed for about 2 weeks annually by cattle for several years.

Bare ground and Cover/Frequency Index for Permanent Study Plots

Benchmark	ACC for bare ground	ACC for litter	Σ CFI for Native Plants	Σ CFI for Non-Native Plants
Big Blue Creek 016	1.0 %	96.5%	11472.9	200

Big Park C&H

The Big Park C&H allotment encompasses approximately 7790 acres, of which 1193 is considered to be suitable for livestock grazing. Vegetation on the allotment is dominated by spruce-fir plant communities; aspen plant communities; and open parks. Forage productivity and capability is relatively low in the denser spruce-fir type and relatively high in the native meadow and aspen plant communities. Livestock typically graze the parks first, and then

move into the aspen. The resulting use pattern historically showed higher use levels in the parks, and with much lower use under the aspen canopy. Current stocking levels, however, are typically low enough to mitigate this use pattern, and Forest Plan utilization standards have not been exceeded. This allotment is considered to be in good condition.

There is no developed water on this allotment. There is about 1.2 miles of interior fence that is no longer used and needs to be removed, and an additional ½ mile of allotment boundary fence for this allotment. There are active motorized and non-motorized trail systems on this allotment. The fences are in very poor to fair condition.

Noxious weeds observed on this allotment are Canada thistle and musk thistle. Chemical treatment of the Canada thistle has been occurring for the past 2 years, and is focused primarily on the roadside and timber harvest areas. Musk thistle occurrences are generally solitary plants that have been hand pulled.

Long-term trend data was collected in 2006 and 2007. A comparison of photos for C1 indicates that ground cover is improving and that bare ground has decreased. Overall, the data reflects an abundance of litter and ground cover, a high diversity of native plant species, and little bare ground in many places.

Bare ground and Cover/Frequency Index for Permanent Study Plots

Site	ACC for bare ground	ACC for litter	Σ CFI for Native Plants	Σ CFI for Non-Native Plants
C2T1	0%	97.1%	17249.6	653.5
C1T1	6.7%	91.3%	16463.5	3764.4
Upper Fire Park 024	2.6%	94.5%	11313.2	35.6



September 6, 2006. Big Park C&H allotment. Photo taken during the grazing season shows very light utilization across this park. The Alpine motorized trail crosses the park approximately mid-photo. No cows observed in the park, and little to no sign in the park or on the trail. K. Liston



CIT1 Big Park C&H. Upper photo taken 9/29/1964; lower photo taken 8/8/2007.

Coal Creek C&H

The Coal Creek allotment encompasses approximately 4190 acres of NFS lands, of which approximately 535 is considered to be suitable for livestock grazing. Vegetation on the allotment is dominated by spruce-fir plant communities; aspen plant communities; and open parks. Forage productivity and capability is relatively low in the denser spruce-fir type and relatively high in the native meadow and aspen plant communities. Livestock typically graze the parks first, and then move into the aspen. The resulting use pattern historically showed higher use levels in the parks, and with much lower use under the aspen canopy. This has been mitigated to some degree by the low stocking rate on this allotment.

Noxious weeds observed in or near the allotment include Canada thistle and musk thistle. Some nearby private lands are infested with leafy spurge; however, none has been observed on the allotment to date.

Range improvements on the allotment include 1.3 miles of fence and no water developments. The allotment is currently grazed under a continuous or season-long rotation with 17 head of cattle from July 1 to September 20.

Ocular macroplot data was collected in 2006 and indicates abundant litter and no bare ground on one aspen site. Overall ground cover and condition are very good to excellent, although some conifer encroachment is occurring. Plant species diversity is perhaps average, and not as good as on some other sites within the analysis area. Production data collected on this site averaged 1000 pounds per acre of forage production from American vetch; blue wildrye; and Kentucky bluegrass.

Green line transect data collected in the Coal Creek drainage is shown in the table below. Field observations indicated that the stream is considered to be 90% vegetated and stable, and 10% vegetated and unstable.

Riparian Community Composition

Site	Community	Composition (percent)
Coal Creek	Sedge/mimulus/buttercup/senecio	54
	Nebraska sedge	6.3
	aspen/spruce	17.3
	Kentucky bluegrass/dandelion	16.7
	Reedgrass/tufted hairgrass	4.2
	alder	0.5
	Blue wildrye/nettle	0.5
	Gravel	0.5

Cocan Flats and Box Factory C&H

These 2 allotments are currently vacant. The proposal is to leave them vacant, unless there is an opportunity to incorporate them into the West Dallas allotment to create a multi pasture rotational grazing system. At this time, the West Dallas permit holder has indicated that he is not willing to combine the 3 allotments. The Cocan Flats allotment encompasses approximately 7515 acres of NFS lands, of which approximately 1097 acres is considered to be suitable for livestock grazing. The Box Factory allotment encompasses 2674 acres of NFS lands, of which approximately 500 acres is considered to be suitable for livestock grazing. The Box Factory allotment has been vacant since 2004.

Vegetation on the allotment is dominated by spruce-fir plant communities; aspen plant communities; and open parks. Forage productivity and capability is relatively low in the denser spruce-fir type and relatively high in the native meadow and aspen plant communities. Livestock typically graze the parks first, and then move into the aspen. The resulting use pattern historically showed higher use levels in the parks, and with much lower use under the aspen canopy. This was mitigated to a large degree by relatively low stocking rates in recent years on the Box Factory allotment.

Noxious weed species known to occur on the allotments include yellow toadflax; oxeye daisy; Canada thistle; and musk thistle. Chemical treatment has been focused primarily at the Blue Lakes trailhead for oxeye daisy and the two thistles because of the concentration of public use in this area and the potential for spread due to recreational activities.

Ocular macroplot data collected on the west side of the Cocan Flats allotment indicates a higher percentage of bare ground (from gopher activity); an abundance of litter, and a good mix of native and introduced grass and forb species. Production data from this site shows an average forage production of 1400 pounds per acre. The dominant forage species are nodding brome; Kentucky bluegrass; Letterman's needlegrass (*Stipa lettermanii*); dandelion, and American vetch. Ocular macroplot data collected on the east side of the Cocan Flats allotment also indicates about 14% canopy cover from bare ground; 85% litter canopy cover; and fewer grass and forb species than the Box Factory plots. Production data from this site shows an average forage production of 866 pounds per acre. The dominant forage species are timothy; dandelion; Kentucky bluegrass, and nodding brome. Additional production data taken from Cocan Flats, a wet meadow dominated by Nebraska sedge (*Carex nebraskensis*) shows that it is producing 4700 pounds per acre.

Long term trend data collected in 2006 in Box Factory Park is displayed below. Overall, the park is in good condition, with abundant litter, and a broad mix of plant species.

Ocular macroplot data from the Box Factory allotment indicates a relatively high # of plant species – plot003 shows a mix of mostly native and some introduced species (Kentucky bluegrass is notably absent), with an abundance of litter and a small percentage of bare ground. Average forage production on this site was 966 pounds per acre – the dominant forage species are blue wild-rye (*Elymus glaucus*); nodding brome (*Bromus anomalus*); timothy (*Phleum pratense*); dandelion (*Taraxacum officinale*); and American vetch (*Vicia americana*).

Long term trend data is shown below. Overall, the plot data indicates abundant litter cover, and relatively high plant diversity. As seen below, some plots have a fairly high CFI for non-

natives. For all of these plots this CFI is based on relatively few plant species, versus the native plant CFI, which generally consists of 15-25 plant species.

Bare ground and Cover/Frequency Index for Permanent Study Plots

Benchmark	ACC % for bare ground	ACC litter	for Σ CFI for Native Plants	Σ CFI for Non-Native Plants
Box Factory Park	6%	61.2%	2621	3232
C1T1	2.8%	93.7%	6460.2	12540
C2T1	6.1%	90.1%	1664.5	7578.1
Willow Flats 035	0	98.5%	14863.3	415.9
E. Fork Dallas Creek 026	5.5%	92.4%	7146.8	1807.3
Cocan Flats 025	0.3%	97.4%	15765.3	84.7
Cocan Flats	0%	96.2%	5891	1444

Corbett/Boiler C&H

The Corbett and Boiler allotments have been grazed as a single allotment since 2003. For this analysis, they are considered to be and are evaluated as a single allotment. Combined, the allotments encompass approximately 3940 acres of NFS land, of which approximately 1457 acres is considered to be suitable for livestock grazing. Previous to this, both allotments were managed as separate allotments with season-long grazing systems. Combining the allotments offered an opportunity to reduce the overall use by permitted livestock and incorporate rotational grazing into the management. The permittee has implemented a 2 pasture rotation system, and has begun reconstruction of division fence in the past 3 years.

Vegetation on the allotment is dominated by spruce-fir plant communities; aspen plant communities; and open parks. Forage productivity and capability is relatively low in the denser spruce-fir type and relatively high in the native meadow and aspen plant communities. Livestock typically graze the parks first, and then move into the aspen. The resulting use pattern historically showed higher use levels in the parks, and with much lower use under the aspen canopy. Current stocking levels, however, are typically low enough that even with this use pattern, Forest Plan utilization standards should not be exceeded.

Permitted livestock grazing on this allotment is supported by 1.1 miles of fence (excluding private land fence), and 2 water developments. The permittee also leases adjacent private land in support of their operation. The allotment is currently grazed under a 2 pasture deferred-rotation grazing system with up to 60 head of cattle from July 1 to September 20.

Noxious weeds known to occur on the allotment are Canada thistle, houndstongue, and yellow toadflax. The heaviest infestations inventoried to date occur primarily adjacent to the

Dallas Trail, and are less than 10 acres in size. Two sites inventoried in 2006 are within an old timber sale. One site is in Moonshine Park.

Production data was collected in 2006. The first site is a park in the sub-alpine zone where the dominant forage species are Kentucky bluegrass (*Poa pratensis*); spike trisetum (*Trisetum spicatum*); nodding brome (*Bromus anomalus*); dandelion (*Taraxacum officinale*); and American vetch (*Vicia americana*). The average production from 3 plots was 833 pounds per acre. The 2nd site is also a park, where the dominant forage species are smooth brome (*Bromus inermis*); Kentucky bluegrass; American vetch; and dandelion. On this site, the average production from 3 plots was 2467 pounds per acre. Both sites tend to be typical of the parks at this elevation that are intermixed with spruce-fir plant communities on the Corbett-Boiler; Coal Creek; West Dallas; Box Factory; and Cocan Flats allotments. The 3rd site is an aspen stand where the dominant forage species are of sedges (*Carex spp.*); blue wild-rye (*Elymus glaucus*); Kentucky bluegrass, and dandelion. On this site, the average production from 3 plots was 633 pounds per acre.

Long-term trend studies (cover frequency transects) were completed in 2006. As seen in the table below, the sum of the cover-frequency index on the open park sites is higher for non-native plants than for native plants and the average canopy cover for bare ground is relatively low. This would appear to be primarily the result of introduced species on these sites such as smooth brome, Kentucky bluegrass, and dandelion. Both smooth brome and Kentucky bluegrass were common components of seed mixes used following disturbance such as fire or timber harvest, or for restoration of depleted sites. On the aspen dominated site, ocular macroplot data was collected in 2006. The plot had 25 different plant species; including aspen, spruce, Kentucky bluegrass, elk sedge; dandelion; geranium; tall larkspur; American vetch; cow parsnip. Data sheets and plot photos are available in the 2210 files for this allotment stored at the Ouray Ranger District office.

Bare ground and Cover/Frequency Index for Permanent Study Plots

Benchmark Site	ACC for bare ground	ACC for litter	Σ CFI for Native Plants	Σ CFI for Non-Native Plants
Burn Park	21.3%	51% (moss/lichen)	2948	4565
Moonshine Park	7.3%	83.7%	15	10477
Hilkey Park	36.5%	43.3%	560	6539

In comparison, the 1966 and the 1977 data for the Hilkey Park area showed that two of the most prevalent species were Kentucky bluegrass and dandelion. A comparison of the data collected in 1966, 1977, and 2006 indicates that there is a much greater diversity of plant species now, and that Kentucky bluegrass and dandelion are still very prevalent on this site. Similarly, on Burn Park, the 1966 data shows that Kentucky bluegrass and dandelion were the most prevalent species. The 2006 data, while showing that these 2 species are still very prevalent, also indicates a much greater diversity of plant species on the site.

Green Mountain C&H

The Green Mountain C&H allotment encompasses approximately 21,700 acres, of which 4758 acres is considered to be suitable for livestock grazing. This includes the Devil's Canyon allotment that was combined into the Green Mountain allotment in 2004. Vegetation on the allotment is characterized by Ponderosa pine-Gambel oak; aspen; spruce-fir; and open parks and meadows. Forage productivity and capability is relatively low in the denser spruce-fir type and moderate to very high in the pine/oak, meadow and aspen plant communities.

Permitted livestock grazing on this allotment is supported by 5 miles of fence (excluding private land fence), and 11 water developments. The permittee owns adjacent private land in support of their operation. The allotment is currently grazed under a

Noxious weeds known to occur on this allotment include Canada thistle; musk thistle; houndstongue; oxeye daisy; and absinth wormwood. Chemical treatment has been ongoing for several years, and is focused on roadsides, trailheads, and the Stealey Mountain trail area.

Ocular macroplot data collected near the Nate Creek Trail area in an aspen dominated site indicates an abundance of litter, a minimal amount of bare ground, and good plant diversity (29 species in the plot). Average forage production from nodding brome, blue wildrye and Kentucky bluegrass was 1233 pounds per acre. Ocular macroplot data from an oakbrush site in the Nate Creek unit reflects abundant litter, very little bare ground, and good plant diversity (27 species in the plot). The site is heavily wooded, with a few open parks with a higher component of weedy forbs such as tarweed. Average forage production on this site from Letterman's needlegrass, Kentucky bluegrass, nodding brome, dandelion, and American vetch was 833 pounds per acre.

Long term trend data was collected in 2006. The Devil's Canyon site is an aspen dominated site, and is typical of what may be described as a "wet" aspen site. These sites tend to be more productive than the "dry" aspen sites which tend to have more juniper and a different variety of forbs and grasses. The site has 5 grass or grass-like species and a variety of mostly native forbs. Plant diversity is considered to be fairly high and the site is in good condition. The lower Nate Creek site is an open park, and is a relatively dry site. Site data reflects that average canopy cover (ACC) for litter is 44.5%; and for bare ground it is 13.8%. Average forage production is 1033 pounds per acre. The upper Nate Creek site is in an old timber harvest unit. The site overall is healthy; noxious weeds observed on the site are Canada thistle and oxeye daisy. Average forage production on this site was 2300 pounds per acre. The Owl Creek plot is a riparian plot in a well-developed cottonwood stand.

Additional forage production and line intercept data was collected in association with the Green Mountain oakbrush project. The project report is filed in the allotment files at the Ouray Ranger District Office.

Bare ground and Cover/Frequency Index for Permanent Study Plots

Benchmark Site	ACC for bare ground	ACC for litter	Σ CFI for Native Plants	Σ CFI for Non-Native Plants
Devil’s Canyon	3.1%	93.3%	8647	575
Lower Nate Creek	13.8%	44.5 %	1909	2888
Upper Nate Creek	15.7%	69.6%	6537	3125
Owl Creek 008	0%	95.9%	9842.1	10078.8

Little Cimarron C&H

This is a cattle allotment that has not been used since 1962 or earlier. Due to the narrow, steep sided canyons, and heavily timbered and rocky hillsides, forage availability is minimal. The main portion of the suitable and usable range is located in the bottom of the Little Cimarron Creek drainage, and is primarily bluegrass and willow bottoms. The allotment encompasses approximately 7300 acres of which 115 is considered usable and suitable for livestock grazing. (1962 range analysis)

The term grazing permit was cancelled in 1967 following a 5 year non-use for resource protection agreement with the permittee. This agreement was for restoring range and watershed values. The permitted livestock number at the time of cancellation was 12 cow/calf pairs from 7/16-9/15 (24 HM).

Actual use records show a gradual decline in permitted AUM’s from 1940 through 1962; some temporary use was authorized in various years.

1940 – 90 c/c 6/16 – 10/15 (360 AUM’s)

1966 – 8 c/c 8/1 – 10/15 (20 AUM’s)

The 1961 unapproved AMP recommends closing the allotment, since any usable capacity will no longer exist after the Little Cimarron road construction is completed.

Riparian transects were installed in 2007 and are on file at the Ouray Ranger District Office.

West Dallas C&H Allotment

The West Dallas allotment encompasses approximately 2389 acres, with approximately 1509 acres of NFS land. Approximately 605 acres is considered suitable for livestock grazing. Vegetation on the allotment is dominated by spruce-fir plant communities; aspen plant communities; and open parks. Forage productivity and capability is relatively low in the denser spruce-fir type and relatively high in the native meadow and aspen plant communities. Livestock typically graze the parks first, and then move into the aspen. The resulting use pattern historically showed higher use levels in the parks, and with much lower use under the aspen canopy. This has been mitigated to some degree with a relatively light stocking rate, and implementation of a rotation system that changes the season of use every year. Some of

the permittee's private lands adjacent to the National Forest are included as the "off" portion of the term on-off grazing permit.

There are no water developments, and about 1.5 miles of fence, on this allotment, excluding private boundary fence. The fences are in poor to fair condition and need heavy maintenance or reconstruction in the next 1-3 years.

Noxious weeds observed on the allotment include oxeye daisy, yellow toadflax, musk thistle, and Canada thistle. Many of the noxious weed infestations are associated with old timber harvest units; ditches; or the Dallas Trail. There has been limited noxious weed treatment on the allotment in the past 3-5 years.

Ocular macroplot data collected in 2006 shows somewhat less abundant litter than on other sites in this portion of the analysis area, and somewhat more bare ground. On this site, there were 5 grass species observed, and 7 forb species. Musk thistle was also found on the site, though not in the plot. Utilization was observed to be 50-60% on the upland vegetation, and 65% in the riparian area, though browsing of woody species did not exceed 10%.

The data from long-term trend studies clearly indicates that there is a significant amount of Kentucky bluegrass and dandelion on these sites. Some non-native grass species, such as smooth brome were also found on a few sites. Cluster 1 (C1T2 in chart below) is the only site for which multiple years of data are available; the other plots are riparian transects installed in 2007. A comparison of the photos associated with this transect from 1963, 1968, 1977 and 2007 seems to indicate that improvement is occurring on the site. The data also shows that overall ground cover has increased while bare ground has decreased. Plot 0018 is one of the heaviest grazed places on this allotment, and the site is dominated by many weedy forbs. The site is similar to the Box Factory site, although in poorer condition and has potential to improve with a change in management. Although the site appears healthy and vigorous, it has potential to improve with changed management. Green line data was also collected on this allotment.

Bare ground and Cover/Frequency Index for Permanent Plots

Site	ACC for Bare ground	ACC for litter	Σ CFI for Native Plants	Σ CFI for Non-Native Plants
C1T2	20.4%	69.9%	2489.1	15017.5
West Fork West Dallas creek 047	18.6%	71.6%	1375.8	15295.1
West Fork West Dallas creek 048	12.1%	82.6%	1923	14955.6
West Fork West Dallas Creek 049	20.3%	73%	4545.2	11162.3
West Dallas 0018	28.4%	38.7%	640	1085.5

Riparian Community Composition

Site	Community	Composition (percent)
Trib. to West Dallas Creek	CANE, MIMU, PHPR	14.2
	DECA, CAREX, HOBR	48.4
	PIPU, ALIN	16.3
	Juncus, POPR, EQAV	4.7
	SAMO, SAPL, CANE	13.8
	Calamagrostis, POPR, PHPR	2.6

Sheep Allotments

The five sheep allotments within analysis area are Bear Creek, Hero-Idarado, Big Blue-Fall Creek-Little Cimarron, Uncompahgre Peak-North Henson, and Crystal-Lower Elk. At one time, the latter three allotments were at least 10 individual allotments, with 1 band of sheep per allotment. No permanent study plots were located on any of the sheep allotments, prior to those installed by CSAS in 2004, and by the Forest Service in 2006-2007. The 5 allotments are similar in elevation, topography, plant composition and species frequency (personal communication, E. Mason, M. Jenson; K. Liston) Photo points, comparisons of historic photos to current photos, data collected from the CSAS study, and observations made on these allotments form the basis for evaluating current conditions.

Vegetation cover types include spruce-fir; forb, grass, or willow dominated communities; aspen; and doug-fir. Range improvements support livestock operations on all but the Hero-Idarado S&G. Range improvements include the Soldier Creek corral and fence; and 3 stock driveways (Ridge, Middle Fork, and East Fork).

General locations of sheep camps are on file at the Ouray Ranger District Office for the Crystal-Lower Elk, Big Blue-Fall Creek-Little Cimarron, and Uncompahgre Peak-North Henson allotments. The remaining Bear Creek and Hero-Idarado allotments do not have sheep camps located on them.

Historical information, reports, and photos for the above-mentioned sheep allotments and the stock driveways are filed at the Ouray Ranger District office.

Bear Creek S&G

This allotment encompasses nearly 3100 acres of NFS lands (there is about 80 acres of private land within the allotment boundary. Five hundred twenty seven acres is considered suitable for livestock grazing. The allotment is grazed in rotation with the American Flats S&G allotment administered by the Gunnison Field Office of the BLM. The allotment is grazed by 878 sheep for about 4 weeks annually. There are no sheep camps associated with this allotment on NFS lands.



2004. Bear Creek S&G. (M. Jenson)

The long-term studies in the table below are all riparian and wetland transects installed in 2006-2007. Willow cover is prevalent, accounting for the significantly higher CFI for native species seen here versus on upland sites.

Bare ground and Cover/Frequency Index for Permanent Study Plots

Benchmark Site	ACC for bare ground	ACC for litter	Σ CFI for Native Plants	Σ CFI for Non-Native Plants
Fall Creek 020	0	97.7%	18509.3	0
Fall Creek 019	0	97.9%	10872.5	0
High Mesa 012	0	97.5%	15092.3	0
High Mesa 013	0	98.0%	20785.2	0
Van Boxel Creek 014	0	93%	13425	0

Big Blue-Fall Creek-Little Cimarron S&G

This allotment encompasses approximately 18342 acres; about 3749 acres is considered suitable for livestock grazing. The allotment is grazed by 850 sheep from July 6 to September 15.



July 2005. Big Blue drainage – Big Blue-Fall Creek-Little Cimarron S&G (both photos). Site is well-vegetated; with perhaps 20-25% bare ground. Some of the species on site include alpine clover; nodding bluegrass, American bistort, avens. Site appears very productive. No herder camps on this site and the sheep have not yet grazed this area this year.



Bighorn S&G

The allotment has been vacant since the mid to late 80's. The permittee (Elizondo) voluntarily waived the grazing permit back to the Forest Service. 12/1/87 letter to Elizondo refers to our plans to use this allotment to improve bighorn sheep habitat. No records that any improvement work occurred.

The last approved AMP on this allotment is dated 6/21/1966 – based on range analysis work completed in 1963. Prior to 1966, the Bighorn allotment was 2 sheep allotments – West Cow and Middle Cow.

AMP refers to an “elk wildlife reservation” in the head of Cascade Creek.

The 1960-61 range analysis referred to in the AMP states 1064 usable acres in fair condition; 600 acres in poor condition. Apparent trend was stable or up since reduction in use in 1962-63.

Crystal-Lower Elk S&G

This allotment encompasses about 18858 acres within the analysis area; about 6300 acres is considered suitable for livestock grazing. The allotment is grazed by 600 head of sheep from July 6 to September 10.

Hero-Idarado S&G

This allotment is located near Red Mountain Pass, and is grazed for about 2 weeks per year by 1 band of sheep. The allotment includes Senator Beck Basin, the site of CSAS snow studies. Cover frequency data was collected in 2004 by CSAS and was made available to the Forest Service; it is included in the analysis file for the allotment stored at the Ouray Ranger District. An allotment inspection made in 2008 indicates that there is good plant diversity by native plant species; very little bare ground; and an adequate amount of litter. The only exotic species observed in 2008 was common dandelion; no noxious weed species were observed.



July 2008. Hero-Idarado S&G. This site, though within the allotment boundary is not used by the permitted livestock. Note that it appears to be a drier site, with rock outcrops and krummholz. Sites like this may be found throughout the analysis area. Use by domestic sheep is further south of this site and is primarily used for trailing through to other grazing allotments.



July 2008. Hero-Idarado S&G. This site is representative of the more well-vegetated sites in Senator Beck Basin, as well as other high-elevation basins in the analysis area.

Middle Fork-Wetterhorn S&G

The most recent rangeland inventory for the Middle Fork and Wetterhorn allotments was completed in 1964, following a rangeland improvement agreement between the Forest Service and the permittee in 1962. The agreement called for approximately a 20% reduction in stocking rate and reducing the grazing season by 14 days for 1962, 1963, and 1964. As a result of monitoring and the 1964 rangeland inventory, the stocking was reduced to 900 head, the 2 allotments were combined into a single management unit, and the grazing season shortened. The allotment became vacant in about 1992. Vegetation is characterized by spruce-fir forest; open parks above timberline with a variety of grass and grass-like species including *Deschampsia*; *Carex*, *Kobresia*; *Poa alpina*; as well as many forb species, including marsh marigold, paintbrush, American bistort, *Sibbaldia*, *Acomastylus*.

The allotment used to carry 2 bands of sheep. There was a recommended reduction to 800 head of sheep 7/16-9/15 in the early 60's due to small area suitable for grazing; soil trampling; soil loss; loss of watershed values; potential conflict with values of Uncompahgre scenic area (pre-wilderness); wildlife/sheep competition; thistle and sneezeweed invasion; water runoff; downward vegetation and soil trends in steep areas; see letter dated 10/10/1961 in 2210 file.

Although the allotment is vacant, there is an active stock driveway, the Middle Fork driveway, which passes through it. The driveway is typically used for bringing sheep out of the high country in the fall, since it is quite often still snow-covered in early and mid July when the sheep go up. The driveway privileges for the Middle Fork driveway (up and back) are associated with the Bear Creek/American Flats allotment; the Mineral Point allotment; and the Middle Fork/Wetterhorn allotment. When the sheep are trailed out this way, it usually occurs in early September. There are no other range improvements associated with this allotment, other than the fences, dividing the Big Cimarron allotment from the Middle Fork-Wetterhorn allotment.

The 1967 allotment management plan states that the allotment is generally late in terms of range readiness; massive snowbanks on the leeward side of the ridges prevents the movement of livestock and camps in some units until late July or early August.

An inspection to Porphyry Basin and lower elevations of the Middle Fork of the allotment in 2006 by Kelley Liston and Barry Johnston (see photos below) shows a significant amount of recovery from sheep grazing. A species list of plants found during that inspection can be found in the 2210 allotment files for this allotment. Although evidence of grazing and trailing still exists, the vegetation resource is recovering, and there were no areas of active soil erosion.

There are no known infestations of noxious weeds listed on the State of Colorado A, B, or C lists, or any local county weed lists of species of concern. A large thistle population identified in 1990 in the Wetterhorn Basin area was identified as *Cirsium tweedyi*, a native species.





Miner-Poughkeepsie S&G

The Miner's Creek S&G and Poughkeepsie Gulch S&G were combined into 1 allotment with 1 band of sheep in mid to late 1960's. The allotment went vacant in (probably) the 1980's – the last actual use record is from 1985.

The range analysis summary shows 358 suitable acres.

1965 range analysis summary indicates that the allotment is (was) about 50% NFS lands, 25% private land, mostly in mining claims, and 25% BLM.. Grazing in the 1970's was for a period of 4-5 weeks, starting around 8/5. The allotment has an abundance of wet meadows that were improving in condition, as the sheep do not graze them. Observations for several years prior to 1963 indicate that the forage was over-allocated; and there was concern about heavy grazing on the steeper slopes of the allotment.

A portion of this allotment is currently used in conjunction with the Bear Creek S&G allotment, because of topography.

Uncompahgre Peak-North Henson S&G

The allotment encompasses approximately 17440 acres, of which about 4330 acres is considered suitable for livestock grazing. The allotment is grazed by 900 sheep from July 11 to September 20. The five sheep allotments within analysis area are Bear Creek, Hero-Idarado, Big Blue-Fall Creek-Little Cimarron, Uncompahgre Peak-North Henson, and Crystal-Lower Elk. At one time, the latter three allotments were at least 10 individual allotments, with 1 band of sheep per allotment. No permanent study plots were located on any of the sheep allotments, prior to those installed by CSAS in 2004, and by the Forest Service in 2006-2007. The 5 allotments are similar in elevation, topography, plant composition and species frequency (personal communication, E. Mason, M. Jensen; K. Liston) Photo points, comparisons of historic photos to current photos, data collected from the CSAS study, and observations made on these allotments form the basis for evaluating current conditions.

Vegetation cover types include spruce-fir; forb, grass, or willow dominated communities; aspen; and doug-fir. Range improvements support livestock operations on all but the Hero-Idarado S&G. Range improvements include the Soldier Creek corral and fence; and 3 stock driveways (Ridge, Middle Fork, and East Fork).

General locations of sheep camps are on file at the Ouray Ranger District Office for the Crystal-Lower Elk, Big Blue-Fall Creek-Little Cimarron, and Uncompahgre Peak-North Henson allotments. The remaining Bear Creek and Hero-Idarado allotments do not have sheep camps located on them.

Historical information, reports, and photos for the above-mentioned sheep allotments and the stock driveways are filed at the Ouray Ranger District office.



July 2005. Uncompahgre Peak-North Henson S&G. Site has not yet been grazed by sheep. Estimate of bare ground is 30%; dominant species include American bistort, nodding bluegrass, paintbrush, avens, fleabane, mustards. Site appears more productive than those observed earlier near Bighorn Ridge and Wildhorse Peak.

Stock Driveways

The Ridge Stock Driveway has a long history of trailing use; anecdotal evidence indicates that there may have been as many as 80,000 to 90,000 head of sheep trailing on this driveway in the early 1900's. More than 50,000 head of sheep were counted onto the driveway in 1934. (1968 Ridge Stock Driveway Plan) Early evidence, as displayed in some of the photos below, shows deteriorated rangeland conditions including loss of vegetation and erosional processes at work. Some portions of the driveway are characterized by bare talus slopes and rocky ridges; these sites are exposed to severe climactic extremes and in all likelihood do not have the potential to support even a minimal amount of vegetation.

The Cimarron Driveways (Middle Fork and East Fork) were established in the 1930's or early 1940's as a means to reduce trailing use on the Ridge Stock Driveway.

Reductions in use have occurred on both NFS and BLM lands, resulting in a subsequent reduction of trailing use on the driveways to current levels. Photo points were established in the 70's to monitor resource conditions; the data is included in a 1978 report as well as in more recent photographs.

As can be seen in the more recent photographs below, vegetation recovery is occurring on parts of the driveway. This is due in large part to a reduction in the amount of sheep grazing and trailing, shorter grazing seasons in some cases, and a conscientious effort on the part of the land management agencies and the permittees to manage trailing use on the driveways.



6/23/51. Ridge Stock Driveway.



8/17/48. Early stages of erosion on sidehill near Ridge Driveway.



8/17/48. View across headwaters of Big Blue below Ridge Driveway.



9/21/07. Area adjacent to Ridge Stock Driveway, at the head of Nellie Creek drainage. (D. Funka)



August 2007. Area adjacent to Ridge driveway. (R. McKeever)



August 2007. Area adjacent to Ridge driveway. (R. McKeever)

