CANYONS OF THE ANCIENTS NATIONAL MONUMENT
BUREAU OF LAND MANAGEMENT
ENVIRONMENTAL ASSESSMENT

EA Number:	CO-SJPLC-03-099
Casefile/Project Number:	1675
Preparation Date:	January 2005
Project Name:	Livestock Grazing Permit Renewal for Yellow Jacket, Cahone Mesa, Goodman Gulch, Sand Canyon East, Sand Canyon West, Flodine Park and Hamilton Mesa Allotments
Project Type:	Livestock Grazing Permit Renewal
Planning Unit:	Bureau of Land Management Canyons of the Ancients National Monument
Legal Description:	T. 35 - 38 North; R. 17 - 20 West, New Mexico Prime Meridian; Montezuma County, Colorado.
Applicants:	Applicant One, W. Wesley Wallace; Applicant Two, Steve, Tim and Jay Wallace; and Applicant Three, Laymon Family Living Trust

Table of Contents

I. INTRODUCTION/PURPOSE AND NEED 1
Introduction 1
Purpose and Need 1
BLM Standards for Public Land Health in Colorado 1
Potentially Affected Resources and Critical Elements of the Human Environment 2
Issues and Critical Elements Considered But Not Addressed Further 3
Conformance with BLM Land Use Plan, Presidential Proclamation and Interim Guidance 5
Relationship to Statutes, Regulations, or Plans of Other Governmental Agencies 6
II. PROPOSED ACTION AND ALTERNATIVES 7
Alternative A, Proposed Action 7
Alternative B, Deferred Grazing During Critical Period 8
Alternative C, Grazing During Dormant Season 10
Alternative D, No Grazing 10
Alternative E, No Action 11
Consideration of Permitted Use, Actual Use and Expected Use AUMs 11
Compliance with Existing Terms and Conditions 11
Alternatives Considered but Eliminated From Further Analysis 12
III. AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES 12
General Setting 12
Vegetation 13
Affected Environment 13
Environmental Consequences 18
Alternative A, Proposed Action and Alternative E, No Action 18
Direct and Indirect Impacts 18
Alternative B, Deferred Grazing During Critical Period 19
Direct and Indirect Impacts 19
Alternative C, Grazing During Dormant Season 20
Direct and Indirect Impacts 20
Alternative D, No Grazing 21
Direct and Indirect Impacts 21
Special Status Plants 21
Affected Environment 21
Environmental Consequences 22
Alternative A, Proposed Action and Alternative E, No Action 22
Direct and Indirect Impacts 22
Monitoring 23
Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season 22
Direct and Indirect Impacts 23
Monitoring 24
Alternative D, No Grazing 24
Direct and Indirect Impacts 24
Floodplains, Wetlands and Riparian Zones 24
Affected Environment 24
Environmental Consequences 27
Alternative A, Proposed Action 27
Direct and Indirect Impact 27

Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season 28
Direct and Indirect Impacts 28
Alternative D, No Grazing 29
Direct and Indirect Impacts 29
Alternative E, No Action 30
Direct and Indirect Impacts 30
Water Quality 31
Affected Environment 31
Environmental Consequences 33
Alternative A, Proposed Action 33
Direct and Indirect Impacts 33
Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season 34
Direct and Indirect Impacts 34
Alternative D, No Grazing 35
Direct and Indirect Impacts 35
Alternative E, No Action 36
Direct and Indirect Impacts 36
Threatened, Endangered and Sensitive Wildlife Species 36
Affected Environment 40
Environmental Consequences 40
Alternative A, Proposed Action and Alternative E, No Action 40
Direct and Indirect Impacts 40
Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season 41
Direct and Indirect Impacts 41
Alternative D, No Grazing 41
Direct and Indirect Impacts 41
General Wildlife Species 41
Affected Environment 42
Environmental Consequences 42
Alternative A, Proposed Action and Alternative E, No Action 42
Direct and Indirect Impacts 42
Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season 43
Direct and Indirect Impacts 43
Alternative D, No Grazing 43
Direct and Indirect Impacts 43
Cultural Resources 43
Affected Environment 48
Environmental Consequences 48
Consequences Common to all Alternatives, Except Alternative D, No Grazing 48
Direct and Indirect Impacts 48
Mitigation 49
Alternative D, No Grazing 49
Direct and Indirect Impacts 49
Recreation 49
Affected Environment ....

Environmental Consequences 50
Consequences Common to all Alternatives, Except Alternative D, No Grazing 50
Direct and Indirect Impacts 50
Alternative D, No Grazing 50
Direct and Indirect Impacts 50
Visual Resources 51
Affected Environment 51
Environmental Consequences 51
Consequences Common to all Alternative A, Proposed Action and Alternative E, No Action 51
Direct and Indirect Impacts 51
Consequences Common to Alternative B, Deferred Grazing During Critical Period, Alternative C, Grazing During Dormant Season and Alternative D, No Grazing 51
Direct and Indirect Impacts 51
SocioEconomics 51
Affected Environment 51
Environmental Consequences 56
Alternative A, Proposed Action 56
Direct and Indirect Impacts 56
Alternative B, Deferred Grazing During Critical Period 58
Direct and Indirect Impacts 58
Alternative C, Grazing During Dormant Season 59
Direct and Indirect Impacts 59
Alternative D, No Grazing 59
Direct and Indirect Impacts 59
Alternative E, No Action 60
Direct and Indirect Impacts 60
Cumulative Impacts 61
IV. CONSULTATION AND COORDINATION 65
Persons, Groups and Agencies Consulted 65
Public Notification 66
Public Comments 66
V. LIST OF PREPARERS 66

MAPS

Map 1 Grazing Allotments Evaluated

FIGURE

Figure 1 Population in Montezuma County from 1970 to 2000.
Figure 2 Net Farm Income in Montezuma County from 1970 to 2001.
Figure 3 Gross Farm Income vs. Production Expenses in Montezuma County from 1970 to 2000.

APPENDICES

Appendix A BLM Standards for Public Land Health and Guidelines for Livestock Grazing in Colorado
Appendix B Potential Determinations and their Causal Factors for all Standards
Appendix C Terms and Conditions
Appendix D Summary of Weather Records
Appendix E Rangeland Health Attributes and Indicators
Appendix F Species Composition

Appendix G Vegetation Production
Appendix H Proper Functioning Condition Definitions
Appendix I Literature Cited
Appendix J Public Comments and Responses

I. INTRODUCTION/PURPOSE AND NEED

INTRODUCTION

The livestock grazing permittee, W. Wesley Wallace (i.e., applicant one) made application to renew his existing term grazing permit for Yellow Jacket, Cahone Mesa, Goodman Gulch, Sand Canyon East, Sand Canyon West, Flodine Park, and Hamilton Mesa Allotments (Map 1). These allotments are located in the Bureau of Land Management (BLM) Canyons of the Ancients National Monument (Monument). Winter and spring grazing on these allotments is part of the permittee's year-round livestock operation, which also includes U.S. Forest Service and private lands. In addition, applicant one has applied for grazing privileges on a unalloted area of the Monument referred to as the Under-the-Cannon-Ball-Rim.

It should be noted that during the preparation of this environmental assessment (EA), applicant one's base property leases for Cahone Mesa and Hamilton Mesa Allotments expired and were not renewed. As a result, applicant one is no longer eligible to hold a permit for these allotments (43 CFR 4110.2-2(d)). Currently there are three separate applicants, or livestock operators holding existing term grazing permits for the seven allotments. More specifically, W. Wesley Wallace holds the permit for Yellow Jacket, Goodman Gulch, Sand Canyon East, Sand Canyon West and Flodine Park Allotments; Steve, Tim and Jay Wallace (i.e., applicant two) hold the permit for Hamilton Mesa Allotment; and the Laymon Family Living Trust (i.e., applicant three) holds the permit for Cahone Mesa Allotment.

The Monument is currently in the process of developing its first Resource Management Plan (RMP). Through this planning effort, the BLM will work collaboratively with interested parties to identify the management decisions that are best suited to local, regional, and national needs and concerns. These decisions could affect allotments evaluated in this EA.

PURPOSE AND NEED

An interdisciplinary team has developed this EA for the purpose of analyzing potential site-specific impacts on resources that would result from issuing new term permits for livestock grazing in the allotments identified above. These permits are needed to authorize the applicant permittees to continue livestock grazing on public lands (43 CFR 4130.2(a)), address public lands that are failing to achieve BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado due to livestock grazing (43 CFR 4180.2(c)) (standards and guidelines), assure protection of objects of historic and scientific interest specified in the Monument proclamation, and to comply with the 1985 San Juan/San Miguel RMP. Under the RMP, livestock grazing must be managed to maintain or improve the vegetation component of the ecosystem and to enhance the resource values of the area to permit a balanced mix of uses to ensure sustained yield.

BLM STANDARDS FOR PUBLIC LAND HEALTH IN COLORADO

In February 2003, a BLM interdisciplinary team was assembled to determine if the allotments were meeting the BLM Standards for Public Land Health in Colorado (standards) (43 CFR 4180.2(c)). Information including the 2001 Rangeland Health Assessment (rangeland health assessment), proper functioning condition assessments for both lotic (i.e., moving water) and lentic (i.e., standing water) riparian areas, rangeland trends, vegetation production and water quality data were considered in

determining if the five standards are being achieved or not achieved. These five standards include 1) upland soils; 2) riparian systems; 3) healthy, productive plant and animal communities; 4) special status, threatened and endangered species; and 5) water quality. An explanation of these standards is provided in Appendix A and is discussed in more detail in the appropriate Affected Environment/Environmental Consequences sections of this EA.

Table 1 summarizes the interdisciplinary team's determinations whether the allotments are achieving the standards, along with causal factor(s). In addition, a determination if the standards would be achieved under Alternatives A, B, C, D and E along with causal factor(s) are provided in Appendix B. Supporting documentation of the interdisciplinary team's determinations is provided in this EA and is available by request from the Dolores Public Lands Office.

POTENTIALLY AFFECTED RESOURCES AND CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT

The identification of issues for this EA was accomplished by considering resources and critical elements of the human environment that could be affected by implementation of one of the alternatives, through input from the BLM interdisciplinary team.

Critical elements that could be affected by the Proposed Action or the alternatives include Invasive, Non-native Plant Species, Floodplains, Wetlands/Riparian Zones, Water Quality (drinking/ground), Threatened, Endangered or Candidate Species and Cultural Resources. They are described below along with the following resources: Vegetation, General Wildlife Species, Recreation, Visual Resources and Socioeconomics. These resources and critical elements could be affected by the Proposed Action or alternatives for the reasons stated below.

- ***Vegetation:*** Changes in livestock grazing management could improve the composition and structure of some plant communities; however, other severely degraded areas would not see improvements. The healthy, productive plant and animal communities and upland soils standards would not be achieved on the allotments, though progress would be made in achieving these standards in some areas.

- ***Special Status Plants:*** Two sensitive plant species are known to occur and five have potential habitat in the area of analysis. All of the alternatives, excluding Alternative D, No Grazing, could impact individual plants (i.e. trampling from livestock), except for *Amsonia jonesii* and degrade suitable habitat. In addition, impacts (i.e., trampling from livestock) to *Astragalus naturitensis* could prevent the special status, threatened and endangered standard from being achieved in the Sand Canyon East and West Allotments.

- ***Floodplains, Wetlands and Riparian Zones:*** Changes in livestock management could improve the health and functionality of floodplains, wetlands and riparian zones, though would not result in the riparian systems standard being achieved in Cahone Mesa, Yellow Jacket, Hamilton Mesa and Flodine Park Allotments.

- ***Water Quality (drinking/ground):*** Changes in livestock management could affect water quality in

McElmo Creek, Yellow Jacket Canyon and their tributaries, though would not result in the water quality standard being achieved in Yellow Jacket Allotment.

- ***Threatened, Endangered and Sensitive Wildlife Species:*** Under the alternatives, except for Alternative D, No Grazing, suitable habitat for the Southwestern Willow Fly Catcher could be degraded. As a result, the Yellow Jacket, Hamilton Mesa and Flodine Park Allotments may not achieve the standard for special status, threatened and endangered species. In addition, the long-nosed leopard lizard, twin-spotted spiny lizard and Mesa Verde nightsnake could be impacted by livestock trampling.

- ***General Wildlife Species:*** Reduction in livestock grazing could provide improved habitat for upland species, and affect plant cover, the prey base for raptors and reptiles.

- ***Cultural Resources:*** Range permit renewals are undertakings under Section 106 of the National Historic Preservation Act (NHPA). Livestock grazing and other rangeland management activities identified in the Proposed Action and alternatives have the potential to affect cultural resources. These effects could include trampling, chiseling, churning, and compaction of site soils and cultural features, artifact displacement and breakage, and impacts (e.g., knocking down, abrasion) to standing walls, rock images, and other above ground cultural features.

- ***Recreation:*** Changes in livestock grazing could affect the competition for space between livestock and recreational users, particularly in the Sand Canyon West Allotment and portions of the Cahone Mesa Allotment. As livestock grazing is established in these areas, the quality of recreational experiences could decrease.

- ***Visual Resources:*** Proposed fence construction under Alternatives B, C, and D could affect visual resources.

- ***Socioeconomics:*** Both local communities and ranchers (present and potential future) operating on the allotments would be financially impacted by continuation or changes in livestock grazing management.

ISSUES AND CRITIAL ELEMENTS CONSIDERED BUT NOT ADDRESSED FURTHER
BLM resource specialists have determined that the following critical elements of the human environment are not present in the area addressed in the Proposed Action or alternatives:

Farmlands (prime or unique)
Wastes (hazardous or solid)
Wilderness
Wild and Scenic Rivers

Table 1. Summary of existing determinations and their causal factor(s) for standards on all allotments.

Standards and Causal Factor(s)	ALLOTMENTS					
	Cahone Mesa	Yellow Jacket	[1]Sand Canyon East and West	Hamilton Mesa	Flodine Park	Goodman Gulch
Upland Soils	not achieving	not achieving	not achieving	not achieving	not achieving	not achieving
Causal Factor(s)	livestock grazing, decrease in fire cycle	livestock grazing	current and historic livestock grazing	livestock grazing, decrease in fire cycle,	livestock grazing	livestock grazing
Riparian Systems	not achieving	not achieving	[2]n/a	not achieving	[2]not achieving	[2]n/a
Causal Factor(s)	historic homestead site, livestock grazing, [4]upstream land uses	livestock grazing, [4]upstream land uses		livestock grazing, [4]upstream land uses	[4]upstream land uses, livestock grazing	n/a
Healthy, Productive Plant and Animal Communities	not achieving	not achieving	not achieving	not achieving	not achieving	not achieving
Causal Factor(s)	decrease in fire cycle, livestock grazing	livestock grazing	current and historic livestock grazing	decrease in fire cycle, livestock grazing	livestock grazing	livestock grazing
Special Status, Threatened and Endangered Species	achieving	not achieving	not achieving	not achieving	not achieving	achieving
Causal Factor(s)	[3]n/a	[4]upstream land uses, livestock grazing	recreation use, livestock grazing	[4]upstream land uses, livestock grazing	[4]upstream land uses, livestock grazing	[3]n/a
Water Quality	achieving	not achieving	[3]n/a	achieving	achieving	[2]n/a
Causal Factor(s)	[3]n/a	[4]upstream land uses, livestock grazing	[3]n/a	[3]n/a	[3]n/a	n/a

[1]Determinations for these allotments were made together, due to their similar range conditions and no separation by fencing or topographic features.
[2]Standard was not present in the allotment.
[3]Determination not required, as a result of standard being achieved.
[4]Upstream land uses include, but are not limited to agriculture on private property.

The following resources and critical elements are present in the project area, but would not be affected by the Proposed Action or alternatives for the reasons stated below.

Air Quality
Air Quality in the area of analysis is good, as is typical of undeveloped areas of the western United States. The area is considered a Federal Class II air quality area as described in the Clean Air Act and the Prevention of Significant Deterioration (PSD) program. The Proposed Action and alternatives would not increase emission levels above current levels, which are within Colorado State Air Quality Standards.

Environmental Justice
No minority or economically challenged populations would be disproportionately affected because none of these populations have any investment or interest in the allotments.

Native American Religious Concerns
Native Americans are being consulted through a request for comment on this EA. If Native American religious or other concerns are identified, they will be brought forward for analysis. A list of the Native American tribes and pueblos being consulted is provided in the Consultation, Coordination, and Public Participation section of the EA.

CONFORMANCE WITH BLM LAND USE PLAN, PRESIDENTIAL PROCLAMATION AND INTERIM GUIDANCE

The Proposed Action and alternatives described below are subject to the San Juan/San Miguel RMP, approved September 1985 and its amendment (i.e., Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado), approved February 1997. BLM finds the Proposed Action and No Action Alternatives not in conformance and Alternatives B, C, and D in conformance with the resource objective that livestock grazing must be managed to maintain or improve the vegetation component of the ecosystem, and to enhance the resource values of the area to permit a balanced mix of uses to ensure sustained yield (U.S. Department of the Interior 1985). Furthermore, the Proposed Action and alternatives are in conformance with the San Juan/San Miguel RMP decisions that livestock use adjustments (i.e., kind or class of livestock grazing the allotment, season of use, stocking rate, or grazing pattern) may be made on all allotments (U.S. Department of the Interior 1985), and that "spring use by domestic livestock in all allotments will not be permitted on natives ranges during the critical period of early growth (i.e., March 1st through May 15th) unless a grazing system is implemented that provides critical period rest once every three years" (U.S. Department of the Interior 1997).

Additionally, the Proposed Action and alternatives have been reviewed for conformance with the Presidential Proclamation, signed June 9, 2000, designating the Monument. The Monument was designated to protect its objects of scientific and historic interest (i.e., archaeological, geological and biological). Potential impacts to these objects are analyzed in this document or, if not impacted, were omitted. Furthermore, the proclamation addresses livestock grazing by stating that "laws, regulations, and policies followed by the BLM in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the Monument" (Clinton 2000).

Interim management guidance for the Monument is provided by both the BLM Washington Office and the Colorado BLM State Director. This guidance was developed to supplement the San Juan/San Miguel RMP, until completion of the Monument's first RMP. Similar in scope, this guidance directs BLM to continue permitting livestock grazing, pursuant to the terms of existing permits and leases; that appropriate grazing management practices should be followed to protect rangeland resources and ensure compliance with BLM Colorado's Standards and Guidelines, and administrative actions be implemented under existing regulations to assure compliance with existing permit and lease requirements (BLM Colorado 2002; BLM 2001). The Proposed Action and alternatives are in conformance with these interim guidelines.

RELATIONSHIP TO STATUTES, REGULATIONS, OR PLANS OF OTHER GOVERNMENTAL AGENCIES

This EA is prepared under the authority of the National Environmental Policy Act (NEPA) of 1969 (PL 91-852) and its regulations (40 CFR 1500-1508), Chapter V. The Proposed Action and alternatives described below are consistent with other federal, state, and local laws, regulations, and plans to the maximum extent possible.

The Montezuma County Comprehensive Plan, adopted January 6, 1997, states that "declines in federal grazing will result in declines in ranching and agriculture, which will result in declines in privately maintained open space and wildlife" (Montezuma County 1997). Furthermore, the County plan states that "such declines are counter to County policies in support of multiple-use, economic diversity, cultural heritage, healthy and productive landscapes, and collaborative problem solving" (Montezuma County 1997). Following these policy determinations, BLM finds the Proposed Action and No Action Alternatives consistent with the Montezuma County Comprehensive Plan, and Alternatives B, C and D as partially consistent. A partially consistent finding indicates that Alternatives B, C and D are consistent with only part of the County plan provision cited. In these cases, BLM has determined that it cannot be consistent with a portion of the provision due to conflicts with federal law and regulation.

BLM finds the Proposed Action and No Action Alternatives inconsistent and Alternatives B, C and D consistent with the Federal Land Policy and Management Act (FLPMA), Public Range Improvement Act (PRIA), Taylor Grazing Act (TGA) and BLM grazing regulations under 43 CFR 4100. FLPMA sets the basic standard that public lands shall be managed for "multiple use" and "sustained yield."(FLPMA § 102(a)(7), 43 U.S.C. § 1701(a)(7)). FLPMA defines "multiple use" as "harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output" (43 U.S.C. § 1702(c)).

The TGA enacted the following objectives: "To stop injury to the public grazing lands by preventing overgrazing and soil deterioration, to provide for their orderly use, improvement and development, to stabilize the livestock industry dependent upon the public range, and for other purposes" (48 Stat. 1269). PRIA establishes as the goal of managing public rangelands to improve the range conditions so they become as productive as feasible except where the land use planning process required pursuant to section 202 of [FLPMA] determines otherwise or the

Secretary determines, and sets forth his reasons for determination, that grazing uses should be discontinued (either temporarily or permanently) on certain lands (43 U.S.C. 1903(b)).

The Proposed Action and alternatives are also consistent with 43 CFR 4130.2(a) which states, in part, "grazing permits or leases shall be issued to qualified applicants to authorize use on the public lands and other lands under the administration of the BLM that are designated as available for livestock grazing through land use plans." Last, analysis within in this EA is made in accordance with regulations 43 CFR 4180, Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration.

II. PROPOSED ACTION AND ALTERNATIVES

ALTERNATIVE A, PROPOSED ACTION

Under this alternative (proposed by applicant one), term grazing permits would be reissued to the applicants for a time period of ten years, or for the length of the base property lease for the Cahone Mesa, Yellow Jacket, Sand Canyon West, Sand Canyon East, Hamilton Mesa, Flodine Park, and Goodman Gulch Allotments. Livestock grazing would occur during the seasons of use, and with the number of AUMs, identified in Table 2 below. Permit terms and conditions identified in Appendix C would apply.

Table 2. Grazing use authorized under Alternative A, Proposed Action.

Allotment Name	Allotment Number	Acres	Livestock			[1]%PL	[2]AUMs
			Number	Kind	Season of Use		
Cahone Mesa	08012	22,925	284	Cattle	11/26 - 05/30	99%	1,719
Yellow Jacket	08018	5,727	250	Cattle	12/07 - 05/27	50%	[3]707
Sand Canyon West	08022	377	4	Cattle	12/01 - 05/31	100%	24
Sand Canyon East	08023	2,264	13	Cattle	12/01 - 01/31	100%	26
Sand Canyon East	08023	2,264	13	Cattle	04/01 - 05/31	100%	26
Hamilton Mesa	08035	7,577	107	Cattle	12/14 - 05/31	100%	[3]595
Flodine Park	08066	4,723	143	Cattle	12/14 - 02/28	75%	272
Flodine Park	08066	4,723	143	Cattle	03/01 - 05/31	75%	324
Goodman Gulch	08055	319	15	Cattle	12/01 - 01/31	100%	31
Goodman Gulch	08055	319	15	Cattle	04/01 - 05/31	100%	30

[1] Percent of livestock forage in allotment contributed by public land.
[2] Animal Unit Month (AUM) is the amount of forage required to sustain one cow and calf or its equivalent for one month.
[3] Additional public land AUMs are carried in the grazing permit for the allotment, however, they are suspended and not currently available for use.

ALTERNATIVE B, DEFERRED GRAZING DURING CRITICAL PERIOD

Under this alternative, BLM would reissue term grazing permits to the applicants for a time period of ten years, or for the length of the base property lease for the Cahone Mesa, Yellow Jacket, Sand Canyon West, Sand Canyon East, Hamilton Mesa, Flodine Park, and Goodman Gulch Allotments. Livestock grazing would occur during the seasons of use, and with the number of AUMs, identified in Table 3 below. The permitted AUMs listed in Table 3 for Cahone Mesa, Yellow Jacket, Hamilton Mesa, Flodine Park, Sand Canyon East, Sand Canyon West and Goodman Gulch Allotments were derived from vegetation production information, collected in 2001, for perennial species and palatable shrubs. Furthermore, these permitted AUMs were calculated using 50 percent of the available forage production in an allotment and assuming that 34 pounds of forage are required per cow/calf per day and that there are 30.4 days per month. Permit terms and conditions identified in Appendix C would apply.

Table 3. Grazing use authorized under Alternative B, Deferred Grazing During Critical Period.

Allotment Name	Allotment Number	Livestock			[1]%PL	[2]AUMs
		Number	Kind	Season of Use		
Cahone Mesa	08012	137	Cattle	11/16 - 5/20	99%	829
Yellow Jacket	08018	86	Cattle	12/7 - 5/27	50%	243
Hamilton Mesa	08035	108	Cattle	12/14 - 5/31	100%	600
Flodine Park	08066	51	Cattle	12/14 - 5/31	75%	211
Sand Canyon West	08022	2	Cattle	12/1 - 5/31	100%	12
Sand Canyon East	08023	9	Cattle	12/1 - 1/31 4/1 - 5/31	100%	36
Goodman Gulch	08055	5	Cattle	12/1 - 1/31 4/1 - 5/31	100%	21

[1] Percent of livestock forage in allotment contributed by public land.
[2] Animal Unit Month (AUM) is the amount of forage required to sustain one cow and calf or its equivalent for one month.

- Institute a rotational grazing system in the Cahone Mesa Allotment, by using its eight pastures to provide critical period rest (i.e., March 1st through May 31st). For more information on grazing deferment during the critical period see number seventeen of the terms and conditions in Appendix C.

- Institute a rotational grazing system in the Flodine Park Allotment, by using its four pastures to provide critical period rest (i.e., March 1st through May 31st).

- Institute a rotational grazing system in the Hamilton Mesa Allotment, by using its seven pastures to provide critical period rest (i.e., March 1st through May 31st).

- Livestock grazing would not be permitted on the entire Yellow Jacket, Sand Canyon East, Sand Canyon West and Goodman Gulch Allotments one year out of every three during the critical period, (i.e., March 1st through May 31st) to provide critical period rest. A rotational grazing system would not be used on these allotments.

- Cancel all historically suspended AUMs for both Yellow Jacket (i.e., 365 AUMs) and Hamilton Mesa Allotments (i.e., 650 AUMs).

Actions Common to Alternatives B, C and D

- In cooperation with the permittee, BLM would construct approximately ¼ mile of new 4-strand barbed wire fence along the public/private property line boundary directly adjacent to McElmo Creek, located in T.35N., R.20W., Section 2: N½NW¼. The permittee would maintain the fence through a cooperative range improvement agreement with BLM. Currently, there is approximately ¼ mile of McElmo Creek located on public land that is fenced in with private land. The new fence would remove this portion of public land from private control, and tie in to an existing fence to create a riparian exclosure within Hamilton Mesa Allotment. This exclosure would provide numerous opportunities for research concerning ecosystem responses to the removal of livestock from riparian areas.

  a. The final location of the fence would be dependent on and subject to, cultural resource inventories and section 106 consultation under the National Historic Preservation Act.

Actions Common to Alternatives B and C

- In cooperation with the permittee, BLM would construct approximately ¼ mile of 4-strand barbed wire fence on public land, adjacent to the south side of McElmo Creek. This new fence would be located on public land in T.35N., R.20W., Section 1: NW¼NW¼. This fencing would tie into an existing fence located on the public/private boundary line to create a riparian exclosure. A water gap, approximately twenty feet in width, would be located at a point nearest the existing private land, and bridge on the west end of the exclosure to provide livestock access from Hamilton Mesa Allotment. The permittee would maintain the fence through a cooperative range improvement agreement with BLM.

- In cooperation with the permittee, BLM would construct approximately ¼ to ½ mile of two 4-strand barbed wire gap fences, within Hamilton Mesa Allotment, to exclude the Bluewater Spring development from livestock grazing. The new sections of gap fencing would be located above both the spring within Bowdish Canyon and a small side drainage to Bowdish Canyon. The new gap fencing, in conjunction with existing gap fencing located below the spring, would create a large exclosure around the spring. The permittee would maintain the fence through a cooperative range improvement agreement with BLM.

  a. The existing livestock watering troughs at Bluewater Spring would be relocated outside of the proposed exclosure, to a location approximately ¼ mile down Bowdish Canyon. The existing fence, associated with the spring development head box, would be removed.

b. The final locations of both the fences and watering troughs would be dependent on and subject to, cultural resource inventories and section 106 consultation under the National Historic Preservation Act.

- In cooperation with the permittee, BLM would construct approximately 200 feet of new 4-strand barbed wire fence on public land in T.37N., R.19W., Section 8: NE¼NE¼SW¼, to exclude livestock grazing from Nice Spring. The permittee would maintain the fence through a cooperative range improvement agreement with BLM.

- These exclosures would provide numerous opportunities for research concerning ecosystem responses to the removal of livestock from riparian areas and springs.

ALTERNATIVE C, GRAZING DURING DORMANT SEASON

Under this alternative, BLM would reissue term grazing permits to the applicants for a time period of ten years, or for the length of the base property lease for the Cahone Mesa, Yellow Jacket, Sand Canyon West, Sand Canyon East, Hamilton Mesa, Flodine Park, and Goodman Gulch Allotments. Livestock grazing would occur with the same number of AUMs identified in Alternative B; however, the annual season of use would be October 1st through February 28th for each allotment. Livestock grazing would occur during the season of use, and with the number of AUMs, identified in Table 4 below. Under this season of use, livestock grazing would occur only during the fall and winter when plants are not actively growing. Permit terms and conditions identified in Appendix C would apply.

Table 4. Grazing use authorized under Alternative C, Grazing During Dormant Season.

Allotment Name	Allotment Number	Livestock			[1]%PL	[2]AUMs
		Number	Kind	Season of Use		
Cahone Mesa	08012	169	Cattle	10/1 - 2/28	99%	829
Yellow Jacket	08018	98	Cattle	10/1 - 2/28	50%	243
Hamilton Mesa	08035	121	Cattle	10/1 - 2/28	100%	600
Flodine Park	08066	57	Cattle	10/1 - 2/28	75%	211
Sand Canyon West	08022	2	Cattle	10/1 - 2/28	100%	12
Sand Canyon East	08023	7	Cattle	10/1 - 2/28	100%	36
Goodman Gulch	08055	4	Cattle	10/1 - 2/28	100%	21

[1] Percent of livestock forage in allotment contributed by public land.
[2] Animal Unit Month (AUM) is the amount of forage required to sustain one cow and calf or its equivalent for one month.

- Cancel all historically suspended AUMs for both Yellow Jacket (i.e., 365 AUMs) and Hamilton Mesa Allotments (i.e., 650 AUMs).

ALTERNATIVE D, NO GRAZING

Under this alternative, the applicants would not be reissued term grazing permits for the Cahone Mesa, Yellow Jacket, Sand Canyon West, Sand Canyon East, Hamilton Mesa, Flodine Park, and Goodman Gulch Allotments. As a result, no livestock grazing would occur on these allotments. The Monument is currently in the process of developing an RMP. Through this planning effort, a land use plan level decision will be made to determine if these allotments should remain available, or become unavailable to livestock grazing. Until this decision is made the applicants would retain grazing preference for these allotments, but would not be authorized to graze them.

ALTERNATIVE E, NO ACTION

Under this alternative, the applicants' existing grazing permits would be renewed for a time period of ten years or for the length of the base property lease for the Cahone Mesa, Yellow Jacket, Sand Canyon West, Sand Canyon East, Hamilton Mesa, Flodine Park, and Goodman Gulch Allotments with the same terms and conditions. These existing terms and conditions are presented in Appendix C. Livestock grazing would occur during the seasons of use and with the number of AUMs, identified in Table 2, except for in Cahone Mesa Allotment. Table 5 below presents changes to the livestock number, season of use and AUMs in Cahone Mesa Allotment, from those presented in Table 2.

Table 5. Grazing use authorized under Alternative E, No Action for Cahone Mesa Allotment.

Allotment Name	Allotment Number	Acres	Livestock			[1]%PL	[2]AUMs
			Number	Kind	Season of Use		
Cahone Mesa	08012	22,925	185	Cattle	11/16 - 05/20	99%	1,117

[1] Percent of livestock forage in allotment contributed by public land.
[2] Animal Unit Month (AUM) is the amount of forage required to sustain one cow and calf or its equivalent for one month.

CONSIDERATION OF PERMITTED USE, ACTUAL USE AND EXPECTED USE AUMS

Upon review of historical actual use and billing records for livestock grazing on the allotments, it was determined that differences exist between the number of permitted use AUMs (i.e., active preference) and average actual or expected use AUMs. These differences are presented in Table 6 below. This information was used to better analyze the impacts of livestock grazing under the alternatives.

COMPLIANCE WITH EXISTING TERMS AND CONDITIONS

As discussed under the Conformance with BLM Land Use Plan, Presidential Proclamation and Interim Guidance section, the San Juan/San Miguel RMP was amended in February 1997 (i.e., Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado). As part of this plan amendment, a decision in the San Juan/San Miguel RMP was modified to read that "spring use by domestic livestock in all allotments will not be permitted on native ranges during the critical period of early growth (i.e., March 1st through May 15th) unless a grazing system is implemented that provides critical period rest once every three years." From this decision modification a term and condition was added to the applicants' existing permits.

Compliance with this term and condition, by applicant one, has been inconsistent during his past management of all seven allotments. This fact was used to better analyze the impacts of livestock grazing under Alternative E, No Action.

Table 6. Comparison of permitted use AUMs with average actual or expected use AUMs for all allotments.

Allotment Name	Permitted Use (AUMs)	[1]Average Actual Use (AUMs)	[2]Average Expected Use (AUMs)	Years Average Calculated From	High Use During Years Averaged	Low Use During Years Averaged
Cahone Mesa	1,117	777		1977-2000	1,524	150
Yellow Jacket	707	300		1981-2000	624	65
Hamilton Mesa	595	350		1984-2000	864	99
Flodine Park	596	349		1981-2001	579	104
Sand Canyon West	24		21	1990-2002	24	12
Sand Canyon East	52		44	1990-2002	52	26
Goodman Gulch	61		53	1990-2002	61	30

[1] When available, annual actual use records were used to calculate an average.
[2] If annual actual use records were not available, annual grazing bill records were used to calculate an average. Annual grazing bill records reflect the permittee's expected use at the beginning of a grazing year, not their actual use at the end.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Authorize Livestock Grazing in the Under-the-Cannon-Ball-Rim area

Under this alternative (proposed by applicant one), a term grazing permit would be issued to applicant one for a time period of ten years in the Under-the-Cannon-Ball-Rim area. This alternative was not considered further because it would not be in conformance with the San Juan/San Miguel RMP. The Under-the-Cannon-Ball-Rim area is identified in the San Juan/San Miguel RMP as unavailable to livestock grazing. As a result, this approximately 440 acre area cannot be allotted for such use. As noted, the Monument is currently in the process of developing an RMP. Through this planning effort, a land use plan level decision will be made determining if the Under-the-Cannon-Ball-Rim area should become available, or remain unavailable to livestock grazing.

III. AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES

Affected resources and critical elements that might be impacted are assessed in the paragraphs that follow.

GENERAL SETTING

All seven of the allotments are located west of U.S. Highway 491, east of the Utah state line and north of the Ute Mountain Ute Reservation. In this area of analysis, biotic and abiotic

characteristics (e.g., climate, physiography, soils, vegetation and wildlife), land uses and environmental setting are similar. This landscape's primary historic uses include livestock grazing, cultivated agriculture, and oil and gas resource development. All of the allotments are located in Montezuma County, Colorado. Annual precipitation within this area averages about 8 to 12 inches. Precipitation is highly variable with many years far below, or far above, average. Also, precipitation increases in a gradient from west to east with increasing elevation.

VEGETATION

AFFECTED ENVIRONMENT

Currently, ecological site descriptions developed by the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) provide the best available information concerning the plant community that would occur on a given ecological site. This plant community is referred to as the "potential plant community" (PNC), defined as "the biotic community that would become established if all successional sequences were completed without interference by human beings under the present environmental conditions. Natural disturbances are inherent in development. PNCs can include naturalized non-native species" (U.S. Department of Interior 1999).

Three dominant vegetation types are present in the allotments being considered. They include saltdesert shrub, big sagebrush and pinyon-juniper. Dependent on soil, elevation and moisture regime, seven dominant ecological types occur within these major vegetation types. The ecological sites are defined by the NRCS in the Cortez Soil Survey as follows:

Salt desert Breaks and Clayey Saltdesert

These ecological sites occur at lower elevations with clay loam soils derived from Morrison shale. The PNC is a salt desert shrub community. In general, indicators of degradation in these ecological sites are 1) reductions in more palatable shrubs such as fourwing saltbush, ephedra, budsage, winterfat and kochia; 2) resistant shrubs such as shadscale and mound saltbush staying on site longer, though eventually declining; 3) decline or complete loss of perennial grass species, particularly cool season bunchgrasses; 4) decline in production levels for all species; and 5) annual species, alien species, big sagebrush, greasewood, pinyon and juniper increasing as competition is reduced. The most common existing vegetation sampled on these ecological sites was cheatgrass, galleta grass, big sagebrush and Utah juniper. Together, these two ecological sites make up about 30% of the allotments and are most common on the Cahone Mesa, Flodine Park, Hamilton Mesa and Yellow Jacket Allotments.

Alkali Flat and Shallow Desert

These ecological sites occur at lower elevations. Alkali Flat sites have deep soils with fine sandy loam soils formed in alluvial or eolian materials derived from sandstone. Shallow Desert sites have shallow soils with sandy loams soils formed in residuum, or colluvial materials derived from sandstone. PNC is shadscale, greasewood and galleta grass on the Alkali Flat sites and shadscale, sagebrush and New Mexico feathergrass on the Shallow Desert sites. With heavy grazing or other disturbance, these sites become dominated by cheatgrass, annual forbs, greasewood and big sagebrush. The most common, existing vegetation sampled on these

ecological sites was cheatgrass, filaree and big sagebrush. Together, these two ecological sites make up about 10% of the allotments and are most common on the Cahone Mesa, Flodine Park, Hamilton Mesa and Yellow Jacket Allotments.

Semidesert Loam

This ecological site occurs in the low to mid elevations with deep fine sandy loam soils formed in eolian and alluvial materials derived from sandstone. PNC is a mixed grass-shrub community with dominant species being big sagebrush and galleta grass. With heavy grazing or other disturbance, sagebrush increases in density and the understory becomes dominated by cheatgrass or bare soil. Currently, the existing vegetation is dominated by dense big sagebrush, juniper and cheatgrass. It occurs on about 10% of the allotments and is most common on the Cahone Mesa and Hamilton Mesa Allotments.

Pinyon Juniper and Loamy Foothills

These ecological sites are the most common types in the mid to upper elevations. Soils are loams, sandy loams or sandy clay loams derived from sandstone and shale. PNC is pinyon pine and Utah juniper with a wide range in overstory canopy cover classes, depending on past fire history or other disturbance such as chaining or beetle outbreaks. Open canopy types have a more dominant understory of shrubs and grasses and denser cover types have fewer understory species and less production. With heavy grazing, open sites return to pinyon-juniper dominance more quickly due to the removal of competing vegetation. Furthermore, understory perennial grasses and the more palatable shrubs decline and big sagebrush, rabbitbrush and annual grasses and forbs increase. The most common existing vegetation sampled on these ecological sites is pinyon pine, Utah juniper, big sagebrush and cheatgrass. These are common ecological sites on all of the allotments, together making up over 50% of the area.

Upland Soils and Biological Soil Crusts

Geologic formations in the area of analysis are Dakota sandstone bedrock underlain by a series of sandstone and shale beds of the Morrison and Burro Canyon formations. An extensive layer of wind deposited silts and fine sands from the quaternary age mantles the uplands and mesas.

In general, soils can be grouped by major topographic and elevational features, climatic regimes and parent material. For the area being considered in this EA major groupings are:

- Alluvial fans, drainageways and floodplains - very deep alluvium derived from sandstone and shale.
- Hills and basins - very shallow to shallow residuum from shale.
- Rock outcrop and soils in canyons - shallow to very deep residuum, colluvium and slope alluvium derived from sandstone and shale.
- Mesas - very deep to very shallow soils depending on distance from the mesa edge. Eolian material and residuum derived from sandstone.

Biological soil-crust communities comprised of varied proportions of cyanobacteria, mosses, and lichens are present throughout most upland environments. Where undisturbed, these cyanobacterial crusts may extend up to 1-cm in depth and can greatly enhance soil stability.

The contributions of biological soil crusts to enhanced soil stability and diminished vulnerability to erosion are well-supported by experimental research (Williams et al. 1995a,b; Belnap and Gillette 1998; Eldridge 1998; Issa et al. 2001) and numerous technical reviews (Harper and Marble 1988, Metting 1991, Johansen 1993, Eldridge and Greene 1994, Warren 1995, Warren 2001). In addition to enhancing soil stability, biological soil crusts are recognized for their importance in several aspects of nutrient cycling, including the ability of some soil-crust organisms to acquire and convert atmospheric nitrogen into forms available to higher plants (Evans and Johansen 1999). Through effects on soil nutrient dynamics, cyanobacteria and some lichens also may enhance the nutritional quality of forage plants used by wildlife (Harper and Pendleton 1993).

BLM Standards for Public Land Health in Colorado

Of the five standards evaluated, two are discussed under this section. They include: 1) healthy, productive plant and animal communities; and 2) upland soils. Definitions for these standards are provided in Appendix A.

As presented in Table 1, these two standards are not being achieved on all the allotments. Furthermore, a causal factor for these determinations is identified as livestock grazing. Information used by the BLM interdisciplinary team to come to this determination includes rangeland health assessments, rangeland trends and vegetation production. Results of the rangeland health assessments are discussed below, along with information on rangeland trends and vegetative composition and production.

Rangeland Health Assessments

During 2001, upland rangeland health assessments were conducted in the allotments following the protocol outlined in BLM technical reference TR1734-6, *Interpreting Indicators of Rangeland Health* (Pellant et al. 2000). Consistent with recommendations made by the National Academy of Science (National Research Council 1994), this assessment protocol focuses on ecological processes such as the water cycle, energy flow, and the nutrient cycle. Because these processes are difficult and expensive to quantify directly, the protocol relies upon a suite of 18 indicators to gauge three attributes of rangeland health—1) biotic integrity, 2) site-soil stability, 3) hydrologic function. A list of indicators for each of the three attributes of rangeland health, are provided in Appendix E. For each attribute, site indicators were given a qualitative rating based upon departure from NRCS ecological site descriptions and/or ecological reference areas. These qualitative ratings include: 1) none to slight; 2) slight to moderate; 3) moderate; 4) moderate to extreme; or 5) extreme.

Biotic Integrity

For the rangeland health attribute biotic integrity, the degree of departure from NRCS ecological site descriptions and/or ecological reference areas for each allotment is displayed in Table 7 below.

Table 7. Biotic Integrity – Degree of departure from reference conditions, percent of acres by allotment.

Allotment	Moderate to extreme or Extreme	Moderate 'at risk'	None to slight or Slight to moderate
Cahone Mesa	22%	68%	10%
Flodine Park	60%	36%	4%
Goodman Gulch	7%	93%	0%
Hamilton Mesa	52%	46%	2%
Sand Canyon East and West	11%	86%	3%
Yellow Jacket	29%	64%	6%
Total for all Allotments	*30%*	*62%*	*8%*

A moderate rating is analogous to a 'at risk' rating (National Research Council 1994) and indicates rangelands that have a reversible loss in productive capability, but have an increased vulnerability to irreversible degradation. For all allotments combined, 62% of the acres have a 'at risk' rating. Another 30% of the acres have passed the 'at risk' level, possibly indicating irreversible degradation of the resource. The Flodine Park and Hamilton Mesa Allotments, have a greater proportion of acres in the 'moderate to extreme' or 'extreme' ratings. None of the allotments had more than 10% of their acres above the 'at risk' rating in either the 'none to slight' or 'slight to moderate' category.

Ecological sites that had a high proportion (55% or more) of acres in the 'moderate to extreme' or 'extreme' categories were Alkali Bottom, Alkali Flat, Clayey Saltdesert and Loamy Foothills. These ecological sites are typically grass-shrub types, which would be more prone to heavy use by livestock. These ecological sites make up 15% of the total area within the allotments.

Data compiling species composition information was collected during 2001 following protocols outlined in BLM technical reference BLM/RS/ST-96 *Sampling Vegetation Attributes* (Interagency Technical Team, 1996). Species composition for ecological sites were rated based on the degree of departure of the existing community from a reference point, either the ecological site description or, when available, an existing reference site on the Monument. A summary of this information is provided in Appendix F. Production data was collected for lifeform groupings such as perennial grass, annual grass or shrub, and is displayed in Appendix G for each allotment.

Soil and Site Stability

For the rangeland health attribute soil and site stability, the degree of departure from NRCS ecological site descriptions and/or ecological reference areas for each allotment is displayed in Table 8 below. Data was collected during 2001 to verify the qualitative health attribute rating for soil and site stability. The amount of the soil surface covered with biological crust, litter or rock, or bare surface were measured. Soil stability was measured using protocols described in BLM technical reference TR1734-6, *Interpreting Indicators of Rangeland Health* (Pellant et al. 2000). A summary of this information is provided in Appendix F.

Table 8. Soil and Site Stability – Degree of departure from reference conditions, percent of acres by allotment.

Allotment	Moderate to extreme or Extreme	Moderate 'at risk'	None to slight or Slight to moderate
Cahone Mesa	6%	61%	33%
Flodine Park	13%	51%	36%
Goodman Gulch	7%	8%	85%
Hamilton Mesa	25%	44%	31%
Sand Canyon East and West	3%	97%	0%
Yellow Jacket	8%	62%	30%
Total for all Allotments	*9%*	*61%*	*30%*

A moderate rating is analogous to an 'at risk' rating (NRC, 1994) and indicates rangelands that have a reversible loss in productive capability and increased vulnerability to irreversible degradation based upon an evaluation of current conditions of the soils and ecological processes. For all allotments combined, 61% of the acres have an 'at risk' rating. Another 9% of the acres are above the 'at risk' level, possibly indicating irreversible degradation of the resource. The majority of the Goodman Gulch Allotment is below the 'at risk' category otherwise the rest of the allotments have a majority of acres in or above the 'at risk' category.

Hydrologic Function

For the rangeland health attribute hydrologic function, the degree of departure from NRCS ecological site descriptions and/or ecological reference areas for each allotment is displayed in Table 9 below. Summaries of data collected for plant canopy, ground cover, soil stability and biological crusts, all indicators of hydrologic function are provided in Appendix E.

Table 9. Hydrologic Function – Degree of departure from reference conditions, percent of acres by allotment.

Allotment	Moderate to extreme or Extreme	Moderate 'at risk'	None to slight or Slight to moderate
Cahone Mesa	29%	43%	28%
Flodine Park	7%	57%	36%
Goodman Gulch	0%	100%	0%
Hamilton Mesa	27%	43%	30%
Sand Canyon East and West	10%	90%	0%
Yellow Jacket	20%	74%	6%
Total for all Allotments	*24%*	*52%*	*24%*

For all allotments combined, 52% of the acres have an 'at-risk' rating. Another 24% of the acres are above the 'at risk' level, possibly indicating irreversible degradation of the resource. All allotments have the majority of their acres in or above the 'at risk' category.

Ecological sites that had a high proportion (i.e., 55% or more) of acres in the 'Moderate to Extreme' or 'Extreme' ratings were Alkali Bottom and Loamy Bottom. These ecological sites make up 2% of the total area within the allotments.

Rangeland Trend Information

Long-term monitoring studies on the Monument document the trend, or direction of change in

conditions of vegetation and ground cover over time. Four allotments have trend transects that measure frequency of species and ground cover. In general, trend appears to be downward with increases in big sagebrush, decreases in cool season grasses, stable or decreasing warm season grasses and increases in bare ground.

Following are general summaries for the allotments with transects, more detailed information is available at the Dolores Public Lands Office.

Cahone Mesa – eleven transects
Big sagebrush is increasing on seven transects, stable on one, decreasing on one. Cool season grasses including crested wheatgrass are decreasing on nine transects, crested wheatgrass is stable on one. Warm season grasses are increasing on one transect, stable on three and down on two. Bare ground is increasing on seven transects. Overall trend for the allotment is downward.

Flodine Park – four transects
Cool and warm season grasses and saltbrush shrubs are decreasing on three transects, warm season grasses are stable on one. Ground cover is highly variable probably due to fluctuations in annual grass litter production. Overall trend for the allotment is downward.

Hamilton Mesa – two transects
On one transect big sagebrush is increasing and warm and cool season grasses are stable. On the other transect sagebrush is stable, warm season grasses are increasing and cool season grasses are decreasing. Overall trend for the allotment is stable to downward.

Yellow Jacket – one transect
There are no cool season grasses in the transect although the ecological site describes cool season species as having potential on the site. Warm season grasses are decreasing and bare ground is increasing. Overall trend for the allotment is stable to downward.

ENVIRONMENTAL CONSEQUENCES

Alternative A, Proposed Action and Alternative E, No Action

Direct and Indirect Impacts
Alternatives A and E are essentially the same except for the higher stocking rate on the Cahone Mesa Allotment proposed in Alternative A. They are evaluated here together.

Under these alternatives, all of the allotments would "not achieve" the BLM Standards for Public Land Health in Colorado for healthy, productive plant and animal communities and upland soils.

These alternatives allow grazing at stocking levels much higher than the capacity would allow, as calculated from perennial grass and forb and palatable shrub production. Continuing current grazing practices would, at minimum, maintain the current unacceptable vegetation, soil, and hydrologic conditions on the Cahone Mesa, Flodine Park, Hamilton Mesa and Yellow Jacket Allotments. Monitoring studies show a stable to downward trend in conditions. These studies

upland soils. Under this alternative, recovery would be slower for these standards than under Alternatives C and D. The rationale for these conclusions is presented below.

Stocking at capacity, and allowing for occasional rest during the critical growing period in spring would allow for re-growth and inputs to carbohydrate reserves, resulting in improved vegetation conditions. Furthermore, the lower stocking levels would allow for lighter utilization levels, resulting in reduced carbohydrate expenditures and improved health.

Litter cover and biological crust cover should increase due to the lighter stocking levels. There would be more vegetative material remaining under lighter utilization levels to provide litter. However, improvement would be limited since the season of use remains the same as under Alternative E, No Action. Grazing occurs during wet, dry and frozen soil surface conditions so there would be no advantage to crusts on either sandy or clay soils. Higher litter cover and increased development of biological crusts would provide greater ground cover. Wind and water erosion would be reduced as a result of the ground cover and increased infiltration rates.

Alternative C, Grazing During Dormant Season

Direct and Indirect Impacts

Except for Alternative D, this alternative has the highest potential for recovery of the plant community and development of ground cover. Under this alternative, all the allotments would "move toward achieving" the BLM Standards for Public Land Health in Colorado for healthy, productive plant and animal communities and upland soils. The rationale for these conclusions is presented below.

Grazing during the dormant period would have the lowest impact on plants and greatest potential to improve conditions than any other grazing period, especially when stocking rates are close to stocking capacity and rotational grazing systems are implemented. There is a high potential for improvement in the plant community where those resources that are not so degraded recovery is still possible.

Litter cover would increase since plants would have the entire growing season to produce vegetative matter without being grazed. There would also be greater amounts of material remaining after grazing due to the lighter stocking levels. Higher litter cover would provide soil cover and increase organic matter in the soil surface. Erosion would decrease and water infiltration would increase.

Biological crusts on sandy soils are less sensitive to impacts when damp or frozen (Belnap et al. 2001). There is a higher potential for soils to be damp or frozen during the scheduled dormant grazing season, (i.e., October 1st to through February 28th) than in April and May when temperatures are warmer, wind is common and precipitation levels lower. Sandy soils are dominant on the Cahone Mesa, Sand Canyon and Goodman Gulch Allotments and common on the Flodine Park, Yellow Jacket and Hamilton Mesa Allotments. Grazing during the dormant season only, would improve cover and complexity of biological crusts on these allotments. Clay soils are less sensitive to disturbance when dry or frozen (Belnap et al. 2001). About half of the

indicate that under current management and stocking levels there would likely be a decline in existing conditions.

The Cahone Mesa, Flodine Park, Hamilton Mesa and Yellow Jacket Allotments have a high proportion (i.e., 40% to 100%) of acres in the 'at risk' category for the rangeland health attributes: biotic integrity, soil and site stability and hydrologic function. It is likely that acres in the 'at risk' category would trend towards an even more extreme degree of departure from reference condition. As these sites are further degraded to conditions in the extreme categories, it is likely that changes would be irreversible. These allotments also have a large proportion (i.e., 20% to 60%) of acres above the 'at risk' category, into the extreme categories, for biotic integrity, particularly the Flodine Park and Hamilton Mesa Allotments. These areas are already in a highly degraded state, likely irreversible. There would be no improvement on these acres.

Biological crust cover is low on these allotments, especially the Flodine Park, Yellow Jacket, Hamilton Mesa and Cahone Mesa Allotments. Biological crusts on sandy soils are less sensitive to impacts when damp or frozen and on clay soils when dry or frozen (Belnap et al. 2001). Neither of these alternatives change the current season of use or decrease stocking from current levels. Grazing occurs during wet, dry and frozen soil surface conditions so there will be no advantage to crusts on either sandy or clay soils. The benefits of increases in biological crust cover such as reductions in wind and water erosion, increased soil nitrogen levels, and improved chances of native seedling establishment, would not occur under these alternatives.

The Goodman Gulch and Sand Canyon East and West Allotments have not recently been used as permitted and currently receive little to no use. There is little water, and forage production is very low on these allotments. Biological crusts make up a higher proportion of the ground cover and are in a more developed condition than other allotments. Under current management a few areas close to private land, water and supplemental feed are severely impacted while much of the area goes unused. If these allotments were actually used as permitted (e.g., higher numbers, longer periods of use, more regular periods of use), groundcover conditions and vegetative conditions would rapidly decline as cattle would have to seek out the sparse forage over a much wider area, trampling biological crusts and over-utilizing the sparse forage.

None of the allotments considered in this EA are meeting or moving toward meeting the BLM Standards for Public Land Health for healthy and productive plant and animal communities, or upland soils. Without a change in current management, the conditions and trends as described in the Affected Environment section would continue under these alternatives. In addition, conditions would further decline in the Cahone Mesa Allotment, under Alternative A, because of the increased stocking levels. None of the allotments would improve, moving towards meeting the standards, because of downward trends.

Alternative B, Deferred Grazing During Critical Period

Direct and Indirect Impacts

Under this alternative, all the allotments would "move toward achieving" the BLM Standards for Public Land Health in Colorado for healthy, productive plant and animal communities and

ecological sites on the Flodine Park, Yellow Jacket and Hamilton Mesa Allotments have soils that are clay loams. Improvement in biological crust cover on these allotments would be slower, primarily due to lighter stocking levels. Increases in the amount of biological crust cover, level of development and complexity of species, would impact the allotments through reductions in wind and water erosion, increased soil nitrogen levels, and improved chances of native seedling establishment.

Alternative D, No Grazing

Direct and Indirect Impacts
Under this alternative, all the allotments would "move toward achieving" the BLM Standards for Public Land Health in Colorado for healthy, productive plant and animal communities and upland soils. The rationale for these conclusions is presented below.

This alternative has the highest potential for improvement, in the plant community where resources that are not so degraded recovery is still possible. The recovery response may be negligible in certain situations where there is a very limited seed source for native perennial species, or where there is dominance of big sagebrush, cheatgrass or pinyon-juniper with little to no understory vegetation. An input of energy in the form of herbicides, seeding, fire or mechanical treatment would be necessary to see improvement in any reasonable time period. The Flodine Park and Hamilton Mesa Allotments have the lowest potential for recovery in the absence of livestock grazing.

Ground cover in the form of vegetative litter would increase since plants would only be utilized by wildlife. Due to reduced disturbance from hoof impacts, biological crust cover would increase and over time would develop characteristics of older crusts such as increased depth, and lifeform and species complexity. These two factors combined would reduce erosion, increase infiltration and site productivity and promote seedling establishment (Belnap et al. 2001). In some places, such as the Sand Canyon Allotments and potentially the Goodman Gulch Allotment, increases in recreational use would impact biological crusts contributing to a decline in cover.

SPECIAL STATUS PLANTS

AFFECTED ENVIRONMENT
Within the area of analysis, two sensitive plant species are known to occur and five have potential habitat. Sensitive plant species are derived from a list approved by the BLM Colorado State Director (BLM Colorado State Office Information Bulletin No. CO-2000-014). Bureau policy is that no action should be taken that would contribute to these species becoming listed as candidate species through actions funded, authorized, or implemented by BLM. Sensitive plant species known or suspected to occur in the area of analysis include the following:

Amsonia jonesii (Jones blue star) is known from a single location on the Hamilton Mesa Allotment. It is in a remote area with light grazing use and appears to be a healthy population. It is very likely that other locations exist on this and the Flodine Park Allotment. Potential habitat

for the species occurs on all of the allotments being considered in this EA.

Astragalus naturitensis (Naturita milkvetch) occurs in several locations on the Sand Canyon East and West Allotments. There is habitat on all of the allotments being considered in this EA.

Epipactis gigantea (Giant helleborine), *Mimulus eastwoodiae* (Eastwood monkey flower)and *Erigeron kachinensis* (Kachina daisy) occur either singly or very often together, in seeps and alcoves of sandstone canyon walls. Although none of these species have been found on the Monument, there is potential for this habitat on all of the allotments being considered in this EA.

Astragalus cronquistii (Cronquist milkvetch) and *Eriogonum clavellatum* (Comb Wash buckwheat) occur on shale soils in shadscale communities at elevations less than 5,800 feet. Although neither of these species has been found on the Monument, there is potential for this habitat on the Flodine Park, Hamilton Mesa, Cahone Mesa and Yellow Jacket Allotments.

BLM Standards for Public Land Health in Colorado
Of the five standards evaluated, special status, threatened and endangered species is discussed under this section. This standard applies to both plants and animals and therefore is also discussed under the Threatened, Endangered and Sensitive Wildlife Species section. A complete definition for this standard is provided in Appendix A.

As presented in Table 1, this standard is not being achieved on the Yellow Jacket, Sand Canyon East and West, Hamilton Mesa and Flodine Park Allotments. However, only the Sand Canyon East and West Allotments are not achieving this standard as a result of a sensitive plant species (i.e., *Astragalus naturitensis*). The other allotments are not achieving the standard as a result of the endangered southwestern willow fly catcher. A causal factor of the determinations for the Sand Canyon East and West Allotments is livestock grazing. Information used by the BLM interdisciplinary team to come to this determination includes Colorado Heritage Program data and past field surveys.

ENVIRONMENTAL CONSEQUENCES

Alternative A, Proposed Action and Alternative E, No Action

Direct and Indirect Impacts
Under this alternative, the Sand Canyon East and West Allotments would "not achieve" the standard for special status, threatened and endangered species. The rationale for this conclusion, along with other potential impacts, is presented below.

Under the current stocking levels, the known population of *Amsonia jonesii* appears to be stable. However, since the population was recently found and has not been adequately documented or monitored, any trend in numbers of individuals is unknown. It does not occur in an area that is heavily grazed. It is not likely to be a very palatable species as it has a milky latex sap, similar to milkweed.

Astragalus naturitensis occurs in fairly high numbers on the Sand Canyon East and West Allotments. This species was surveyed in the early 1980's. In 2002, a quick survey of one portion of the known population area yielded fewer numbers than documented in the 1980's. However, 2002 was a severe drought year and it is likely that, as with many species that year, it just was not able to grow. It is a very small plant, unlikely to be grazed, but susceptible to foot, bicycle, or hoof impacts, since it grows in shallow soil deposits on slickrock. If these allotments are ever used to the extent proposed under these alternatives, it is likely there would be impacts.

The three species that occur in sandstone canyon seeps have not been identified on the Monument, but have a high potential to be present. Water is sought after by livestock, even in remote and rough locations on these allotments. *Epipactis gigantea, Mimulus eastwoodiae* and *Erigeron kachinensis* are likely to be impacted depending on the accessibility of the seep.

Astragalus cronquistii and *Eriogonum clavellatum* have also not been identified on the Monument. However, potential habitat is common on the Flodine Park, Hamilton Mesa, Yellow Jacket and Cahone Mesa Allotments. The shadscale community on shale soils, the associated community for these species, has been severely impacted on these allotments. For the Saltdesert Breaks and Clayey saltdesert ecological sites, 85% of the acres are less than 50% similar to the potential plant community. These alternatives, with current or higher stocking levels, well beyond capacity, would not improve habitat for the species and could impact individuals if present.

Monitoring

Population size of *Amsonia jonesii* on the Hamilton Mesa Allotment would be monitored to determine stability of the population and whether grazing has any impacts.

Population size of *Astragalus naturitensis* on the Sand Canyon East and West Allotments would be monitored to determine stability of the population and whether recreation and/or grazing are impacting individual plants.

Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season

Direct and Indirect Impacts

Under this alternative, the Sand Canyon East and West Allotments would "not achieve" the standard for special status, threatened and endangered species. All other allotments would "move toward achieving" this standard. The rationale for this conclusion, along with other potential impacts, is presented below.

With improved grazing management and stocking at capacity, in general, the impacts described under Alternatives A and E would be lessened. Habitat conditions should improve. More specifically, individuals of *Astragalus naturitensis* may continue to be impacted (e.g., trampled) in the Sand Canyon area due to recreational users. Effects to the habitat for the three seep species (i.e., *Epipactis gigantea, Mimulus eastwoodiae, Erigeron kachinensis)* would be similar to Alternatives A and E, since livestock would seek out seeps regardless of stocking levels.

Monitoring

Same as identified under Alternatives A and E.

Alternative D, No Grazing

Direct and Indirect Impacts
Under this alternative, the Sand Canyon East and West Allotments would "not achieve" the standard for special status, threatened and endangered species. The rationale for this conclusion, along with other potential impacts, is presented below.

Habitat for all sensitive plant species would improve. Individual plants of *Astragalus naturitensis* may be impacted in the Sand Canyon area due to recreational users.

FLOODPLAINS, WETLANDS AND RIPARIAN ZONES

AFFECTED ENVIRONMENT
The allotments within the analysis area encompass portions of 15 unnamed USGS 6th level watersheds. Nine of those 6th level watersheds have major drainages within the analysis area. Those drainages are Bowdish Canyon, Goodman Canyon, East McElmo Creek, Hovenweep Canyon, McElmo Creek, Negro Canyon, Rincon Canyon, Sand Canyon, and Yellow Jacket Canyon. All drainages are tributary to the San Juan River.

The majority of the drainages within the analysis area are ephemeral or interrupted systems. They flow in response to runoff events and may or may not support discontinuous patches of riparian vegetation. The riparian vegetation generally consists of cottonwoods, willow, tamarisk and little to no herbaceous riparian species. Some drainages are dominated by sagebrush, greasewood and rabbitbrush due to limited amounts of available water in the system. McElmo Creek and Yellow Jacket Canyon are the only perennial streams within the analysis area. Riparian vegetation is similar to the ephemeral and interrupted systems (e.g., cottonwoods, willow and tamarisk) although present in more abundance with an herbaceous riparian vegetation component.

BLM Standards for Public Land Health in Colorado
Of the five standards evaluated riparian systems is discussed under this section. A definition for this standard is provided in Appendix A.

As presented in Table 1, this standard is not being achieved on the Cahone Mesa, Yellow Jacket, Hamilton Mesa and Flodine Park Allotments. Furthermore, a causal factor for this determination is identified as livestock grazing. Information used by the BLM interdisciplinary team to come to this determination is the proper functioning condition assessments for both lotic (i.e., moving water) and lentic (i.e. standing water) riparian areas.

Proper Functioning Condition Assessments

McElmo Creek and Yellow Jacket Canyon were assessed using Proper Functioning Condition protocol. This is a qualitative survey used to assess stream hydrology, vegetation and erosional/depositional processes. Streams are rated Proper Functioning Condition (PFC), Functional-At Risk (FAR) or Nonfunctional (NF). Functional-At Risk ratings include an assessment of trend (BLM TR 1737-9 1993). Definitions for these ratings are provided in Appendix H.

The Hamilton Mesa Allotment has 39 acres with potential for riparian vegetation, while the Flodine Park Allotment has 32 acres. These areas have no cottonwood and very little willow; tamarisk is the dominant vegetative cover with scattered Russian olive.

McElmo Creek traverses Flodine Park allotment for 0.2 miles. Width/depth ratio is high, while sinuosity is low. Recruitment of cottonwood is low and multiple species of cottonwood and willow are lacking compared to site potential. Unvegetated vertical banks exist indicating lateral stream movement is occurring at an accelerated rate.

Table 10. Lotic PFC ratings.

Stream	Allotment	Date Evaluated	Type of Evaluation	Rating	Causal Factors
McElmo Creek	Flodine Park	2002	Ground survey	FAR-trend not apparent/possibly stable	Upstream land use activities (irrigation, agriculture, road encroachment), livestock grazing, augmented stream flows
	Hamilton Mesa	2003	Ground survey	NF	Livestock grazing, upstream land use activities, augmented stream flows
Yellow Jacket Canyon	Yellow Jacket	2002	Aerial reconnaissance of entire stream, ground survey along upper public reach	FAR-trend not apparent/possibly downward	Livestock grazing, irrigation, agriculture, augmented stream flow
		2003	Ground survey	NF	Livestock grazing, upstream land use activities (irrigation, agriculture), augmented stream flow

In Hamilton Mesa allotment, there are two public reaches of McElmo Creek that total 0.2 miles of stream. They enter and exit the allotment at different areas. The westernmost reach has been fenced out of the allotment and fenced in with private land and has been subject to more continuous livestock grazing. For all reaches, width/depth ratio is high and sinuosity is low. Much of the channel is incised and no longer has access to its floodplain. Willow species lack diversity, have low vigor and are not present in adequate amounts. No cottonwoods were observed. Tamarisk dominates most of the two reaches. Herbaceous riparian vegetation is heavily utilized along these reaches. Streambanks are mostly vertical. Where point bars are trying to establish, they are not revegetating. Fine sediments dominate the stream channel bottom.

There are 41 acres of Cottonwood riparian type on the Yellow Jacket Allotment. Although the area still supports an overstory canopy of old Fremont cottonwood, the invasive alien species tamarisk dominates the understory. Tamarisk is an aggressive and tenacious invader which displaces native riparian species, de-watering riparian systems and adds salt to soils. Russian olive, another non-native invasive species that displaces native riparian vegetation, is scattered throughout the area as well. There are very few willow, carex and other wetland species present. There is a younger age class of cottonwood present in some areas, which would allow for replacement of the older upper canopy. Terraces above the riparian areas are dominated by sagebrush, greasewood or rabbitbrush with little to no understory. These terraces are frequently bisected by active gullies and there is evidence of severe sheet erosion contributing to sedimentation of the riparian systems.

Yellow Jacket Canyon was aerially surveyed in 2002. Overall rating for Yellow Jacket Canyon was FAR with trend not apparent or possibly stable. Sinuosity was low, width/depth ratio was high and the gradient was steep along much of the channel length. Recruitment of cottonwood was low. Tamarisk and Russian olive were encroaching upon cottonwood and willow species. The riparian herbaceous component was patchy. Unvegetated vertical banks existed along much of the channel indicating that lateral stream movement was accelerated. Point bars were not revegetating as expected.

Yellow Jacket Canyon traverses Yellow Jacket Allotment for 0.3 miles. Yellow Jacket Canyon along this reach is incised several feet and no longer has access to its original flood plain. Riparian vegetation on the abandoned flood plain does not have adequate soil moisture to support a diverse age-class distribution or diverse composition of riparian species. Cottonwood and willow within the abandoned floodplain are heavily browsed and have low vigor. In places, point bars are developing in the channel and are colonizing with herbaceous vegetation, but overall Yellow Jacket Canyon is in a nonfunctional state. For much of the public reaches, channel banks are vertical and unvegetated. Presence of fine sediments dominates the stream channel bottom.

In addition to riparian areas associated with McElmo Creek and Yellow Jacket Canyon, there are several seeps and springs scattered throughout Cahone Mesa and Hamilton Mesa Allotments. Most of the seeps and springs appear to be contact springs where permeable rock units overlie rocks of much lower permeability. The remaining springs are most likely depression springs where the water table has reached the ground surface at a topographic low spot. Through review of the water source inventory, it appeared that most contact seeps and springs in the assessment area had little riparian vegetation associated with them although tamarisk was usually present. Where there appeared to be a substantial amount of riparian vegetation and an herbaceous riparian component was present, seeps and springs were assessed on the ground using PFC protocol for lentic riparian systems (TR 1737-11 1994).

Table 11. Lentic PFC ratings.

Allotment	Spring/Seep Name	Date Evaluated	Rating	Causal Factors
Hamilton Mesa	Bluewater Spring	1/30/03	FAR-downward trend	Livestock grazing, spring development
Cahone Mesa	Nice Spring	1/30/03	FAR-stable	Livestock grazing, historical homestead site
	Old 160 Spring	1/30/03	NF	Livestock grazing, upstream watershed condition on private land

Bluewater Spring is tributary to the Bowdish Canyon drainage. It is unique in that it is a depression spring that has the potential to support diverse riparian vegetation. It was developed in 1978. A collection box was installed in the spring and a pipeline and trough were installed within 100 feet of the source area. Compaction of the area around the trough is limiting the expansion of the riparian-wetland area. A livestock trail above the spring source is contributing to sedimentation of the spring. Overland flows have been channelized along the northeastern side of the spring and gullies have started to form.

Nice Spring is a contact spring that is tributary to McLean Basin. Comparison of conditions between 1981 and present, using water source inventory photos, indicate that the riparian-wetland area associated with Nice Spring is shrinking. Riparian species are being lost and invasive weedy species comprise most of the vegetative cover. The location of a stockwater reservoir immediately above the spring and sparse upland vegetation in the area is resulting in sedimentation of the spring. The historical use of a homestead site near the spring probably introduced some of the weedy species present today.

Old 160 Spring is a contact spring within Negro Canyon drainage. Comparisons of 1981 inventory photos to present day conditions indicate that most of the spring source and associated riparian area have been lost to sedimentation of the spring. The spring is no longer saturated or inundated in relatively frequent events. The herbaceous riparian vegetation present in 1981 is gone. Cottonwoods and willows present today have low vigor and the cottonwoods have been heavily browsed. Upland watershed conditions are poor. The headwaters of Negro Canyon are steep v-shaped gullies with little riparian vegetation to capture and filter sediment. Upland conditions along the headwaters are in poor condition and are likely contributing sediment to Negro Canyon from overland flows.

ENVIRONMENTAL CONSEQUENCES

Alternative A, Proposed Action

Direct and Indirect Impacts

Under this alternative, the Cahone Mesa, Yellow Jacket, Hamilton Mesa and Flodine Park Allotments would "not achieve" the standard for riparian systems The rationale for this conclusion, along with potential PFC ratings, is presented below.

The portion of McElmo Creek rated as FAR would remain FAR due to upstream management activities. The portions of McElmo Creek and Yellow Jacket Canyon rated NF would remain NF

under this alternative. Bluewater Spring would remain FAR. Old 160 Spring would remain NF and Nice Spring would trend towards NF.

The following discussion applies to all allotments except Cahone Mesa. Implementing critical period rest in one year out of every three would temporarily improve upland conditions, but improvements would be minimal without a reduction in livestock numbers. Infiltration would increase and runoff would decrease during critical period rest, but would return to previous conditions during the remainder of the rotational period. Sediment delivery to stream channels would be slightly reduced throughout the rotational period. During critical period rest vigor of all riparian species should improve and the herbaceous understory may increase, but would be expected to return to their previous condition during periods of use. An increase in species diversity would not be expected without a reduction in livestock numbers. Width/depth ratio and sinuosity would not be expected to improve without a long-term improvement to the uplands and riparian vegetation, which is not expected under this alternative. Stream bank erosion may be reduced during the critical period rest with the establishment and improvement of riparian vegetation, but is expected to return to previous levels when livestock grazing occurs. Lateral movement of the stream channel would continue at its present rate. Fine sediments are likely to persist on the stream channel bottom. In Cahone Mesa Allotment, where an increase in livestock numbers is proposed, existing conditions of the interrupted and ephemeral stream channels would decline. Upland infiltration would decrease, runoff would increase and sediment delivery to stream channels would increase. The existing isolated patches of riparian vegetation in the stream channels would decrease in abundance, vigor and diversity.

In all of the allotments except for Cahone Mesa, riparian areas of seeps and springs would not be expected to enlarge or achieve their potential extent. Any increase in the riparian area during critical period rest would be set back during the remainder of the rotational period. Where spring developments occur, compaction would likely continue and rills and gullies would continue to develop or enlarge. Sedimentation of Bluewater Spring would continue to occur, but would be slightly reduced throughout the rotational period. In Cahone Mesa Allotment riparian areas of seeps and springs would be reduced. Compaction, particularly of developed springs, would increase. Rills and gullies would establish or continue to develop. Sedimentation of Old 160 Spring would increase. Invasive species at Nice Spring would be expected to increase.

Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season

Impacts of Alternatives B and C are similar except for the amount of time expected for recovery of riparian conditions. Deferred grazing would require a longer recovery time than grazing during the dormant season.

Direct and Indirect Impacts

Under this alternative, the Cahone Mesa, Yellow Jacket, Hamilton Mesa and Flodine Park Allotments would "not achieve" the standard for riparian systems The rationale for this conclusion, along with potential PFC ratings, is presented below.

Unfenced portions of McElmo Creek within the analysis area would show slow improvement

over time. They may reach a FAR status with a static or upward trend, but it is unlikely that they would achieve a PFC rating due to upstream management activities. Fenced portions of McElmo Creek would improve at a faster rate, but may still only reach a FAR status, also due to upstream conditions. Yellow Jacket Canyon may reach a FAR status with a static or upward trend. Upstream management activities would prevent Yellow Jacket Canyon from achieving PFC. Seeps and springs that are not developed may reach PFC. Developed springs that are highly compacted would probably persist at a FAR status. Depending on rill and gully development their trend may be static or downward. Bluewater Spring should trend towards PFC. Nice Spring would remain FAR if invasive species were not treated. Old 160 Spring may achieve FAR status.

Both deferred and dormant season grazing, with an adjustment in stocking levels in Flodine Park, Hamilton Mesa and Yellow Jacket Allotments, would allow upland conditions along McElmo Creek and Yellow Jacket Canyon to improve. An improvement in upland conditions would increase infiltration and decrease runoff. Sediment delivery to stream channels would be reduced. Fencing portions of McElmo Creek in Hamilton Mesa Allotment would allow riparian vegetation along those reaches to recover more quickly than upland conditions could recover. Riparian species such as cottonwood would be able establish, willow species would increase in diversity and the amount of herbaceous understory would increase. Vigor of all riparian species would improve. An improvement to the riparian vegetation would reduce the width/depth ratio and increase sinuosity. Stream bank erosion along those reaches would decrease. Lateral stream movement and excessive erosion are due mostly to upstream channel conditions and may improve only slightly. The unfenced portions of McElmo Creek in Flodine Park Allotment and Yellow Jacket Canyon are expected to recover in a similar fashion to the fenced portions of McElmo Creek, but over a longer time period and more in conjunction with recovery of the uplands. Fine sediments in the stream channel would be reduced.

By improving upland conditions, seeps and springs within Hamilton Mesa and Cahone Mesa Allotments, that are not developed, may be able to achieve their potential extent. Diversity and age-class distribution would increase slowly. Where spring developments occur, compaction would likely continue. If compaction around the springs continues, rills and gullies are likely to develop or enlarge. Sedimentation of Old 160 Spring would eventually decrease as upland conditions improve although private lands with poor upland condition would continue to deliver sediment to Negro Canyon and possibly to the spring itself. Under Alternatives B and C several acres around Bluewater Spring would be excluded from livestock grazing and Nice Spring would be fenced at the source. By excluding livestock from Bluewater Spring sedimentation would decrease, riparian vegetation should expand to its potential extent, and rills and gullies should stabilize. Fencing Nice Spring may slow the rate of increase of invasive species, however, they would likely persist unless treated directly. Sedimentation of Nice Spring would decrease with improved upland conditions.

Alternative D, No Grazing

Direct and Indirect Impacts

Under this alternative, the Cahone Mesa Allotment would "achieve" the standard for riparian

systems, while Yellow Jacket, Hamilton Mesa and Flodine Park Allotments would continue to "not achieve." Causal factors for the "not achieve" determination are land use activities upstream in the watershed (e.g., agriculture, irrigation). The rationale for this conclusion, along with potential PFC ratings, is presented below.

McElmo Creek and Yellow Jacket Canyon may reach a FAR status with a static or upward trend, but it is unlikely that they would achieve a PFC rating due to upstream management activities. All seeps and springs may reach PFC, although previously developed springs would require a longer recovery time.

No grazing throughout the analysis area in addition to creating an exclosure along that portion of McElmo Creek presently fenced in with private land would allow for the quickest recovery of McElmo Creek and Yellow Jacket Canyon. Improved upland conditions would increase infiltration and decrease runoff. Sediment delivery to the stream channel would be reduced. Riparian vegetation would improve. Cottonwood would be able to establish, willow species diversity would increase and the amount of herbaceous understory would increase. Vigor of all riparian species would improve. A marked improvement to the riparian vegetation would decrease width/depth ratio, increase sinuosity and reduce stream bank erosion. Lateral stream movement and excessive erosion should improve, however, due to upstream conditions may not drop below an accelerated rate. Fine sediments in the stream channel would be reduced.

Seeps and springs within Hamilton Mesa and Cahone Allotments would progress toward their potential extent, including springs that were developed. Developed springs would no longer undergo compaction and rills and gullies would likely stabilize over time. Diversity and age-class distribution at all springs would increase. Sedimentation of Bluewater and Old 160 Springs would decrease as upland conditions improve. Poor upland condition of private lands may continue to contribute sediment to Old 160 Spring. Invasive species at Nice Spring would probably persist unless treated directly.

Alternative E, No Action

Direct and Indirect Impacts

Under this alternative, the Cahone Mesa, Yellow Jacket, Hamilton Mesa and Flodine Park Allotments would "not achieve" the standard for riparian systems The rationale for this conclusion, along with potential PFC ratings, is presented below.

Under this alternative, the portion of McElmo Creek rated FAR would trend towards NF. The portions of McElmo Creek rated as NF would continue to be NF. Yellow Jacket Canyon would continue to be NF. Seeps and Springs would trend towards NF.

Although critical season use can result in better livestock distribution, it does not allow for regrowth of vegetation prior to seasonal rains in late July and August. Without regrowth of upland vegetation, infiltration on upland soils would decrease and runoff would increase resulting in increased sediment delivery to the stream channel. Without regrowth of riparian vegetation physical functions of the riparian system, such as capturing and filtering sediment and

stream shading, are less likely to occur. McElmo Creek and Yellow Jacket Canyon would maintain a high width/depth ratio and low sinuosity. Stream bank erosion, lateral stream movement and excessive erosion would continue to occur at present rates. Recruitment of cottonwoods is unlikely to occur and willow species would not achieve potential diversity. A functional flood plain supporting diverse riparian species would not be able to establish. Fine sediments would persist on the stream channel bottom.

Bluewater Spring within Hamilton Mesa Allotment would not enlarge or achieve its potential extent. Diversity and age-class distribution would continue to decline. Compaction would persist, overland flows would continue to occur at elevated rates and rills and gullies would develop or enlarge. Sedimentation of the spring would continue. Riparian areas around Old 160 and Nice Spring would not enlarge or achieve their potential extent. Diversity and age-class distribution would continue to decline. Where spring developments occur, compaction would persist, overland flows would continue to occur at elevated rates and rills and gullies would develop or enlarge if already established. Sedimentation of Old 160 Spring would continue to occur. Invasive species would further establish at Nice Spring.

WATER QUALITY

AFFECTED ENVIRONMENT

Perennial waters within the analysis area include McElmo Creek and Yellow Jacket Canyon. Yellow Jacket Canyon is tributary to McElmo Creek outside of the analysis area. Hamilton Mesa and Flodine Park Allotments contain reaches of McElmo Creek. Yellow Jacket Allotment contains reaches of Yellow Jacket Canyon. The rest of the analysis area allotments drain into McElmo Creek or Yellow Jacket Canyon through ephemeral or interrupted streams. All drainages are tributary to the San Juan River. McElmo Creek and Yellow Jacket Canyon are augmented by irrigation return flows diverted from the Dolores River basin. There are several seeps and springs in the analysis area that are considered tributary to McElmo Creek for purposes of assigning State water quality standards.

BLM Standards for Public Land Health in Colorado

Of the five standards evaluated, water quality is discussed under this section. A definition for this standard is provided in Appendix A. As presented in Table 1, this standard is not being achieved on the Yellow Jacket Allotment. Causal factors for this determination are primarily the land use activities upstream in the watershed (e.g. agriculture, irrigation). State of Colorado, Water Quality Standards information and BLM grab sample data were used by the BLM interdisciplinary team to come to these determinations and is discussed below.

State of Colorado Water Quality Standards

The State of Colorado establishes classifications and numeric standards for surface waters in compliance with the Colorado Water Quality Control Act. The classifications identify beneficial uses of the water. Beneficial uses may include public water supply, domestic, agricultural, industrial and recreational uses, and the protection and propagation of terrestrial and aquatic life. Beneficial use classifications are to be maintained and protected in accordance with antidegradation regulations as set forth by the State, unless given a use-protected designation. A

use-protected designation allows for some water quality degradation as long as use classifications, such as public water supply, continue to meet State standards.

Numeric standards exist for physical, biological, inorganic and metal parameters. Only those inorganic parameters listed in Table 12 would be affected by changes in livestock management. Metal parameters would not be affected by changes in livestock management and were therefore not listed. The temperature standard for the stream segments within the analysis area is maximum 30° C, with a minimum 3° C increase over a four to twelve hour period. To meet State water quality standards temperatures should maintain a normal pattern of diurnal and seasonal fluctuations with no abrupt changes. In addition to the numeric standards and the temperature standard, the Colorado Water Quality Control Commission has included a narrative statement for all surface waters that states that all water (except in wetlands and/or except where authorized by approved permits, certificates, or plans of operation) shall be free from substances attributable to human caused point or nonpoint source discharges in amounts, concentrations, or combinations that:

- can settle to form bottom deposits detrimental to the beneficial uses,
- are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life, and
- produce a predominance of aquatic life.

Bottom deposits can include fine sediments.

Table 12. Classifications and numeric standards for McElmo and Yellow Jacket Creeks and their tributaries.

Segment Description	Designation	Beneficial Use Classification	Numeric Standards	
			Physical and Biological Parameters	Inorganic Parameters[5]
7a. Mainstem of McElmo Creek from the source to the Colorado/Utah border, except for specific listings in segment 7b[1]. Mainstem of Yellow Jacket Creek, including all tributaries, wetlands, lakes and reservoirs, from the source to the confluence with McElmo Creek.	[None]	Aquatic Life Warm 1 Recreation 1a Agriculture	D. O. = 5.0 mg/L pH = 6.5-9.0 F. Coli. = 200/100mL E. Coli. = 126/100mL	NH_3(ac) = TVS[4] NH_3(ch) = 0.06 mg/L NO_2 = 0.05 mg/L
8a. All tributaries to McElmo Creek, including all wetlands, lakes and reservoirs, from the source to the Colorado/Utah border, except for specific segments listed in 7a, 8b[2] and 11[3].	Use Protected	Aquatic Life Warm 2 Recreation 1a Agriculture	D. O. = 5.0 mg/L pH = 6.5-9.0 F. Coli. = 200/100mL E. Coli. = 126/100mL	NH_3(ac) = TVS[4] NH_3(ch) = 0.06 mg/L NO_2 = 0.05 mg/L

1, 2 Ute Mountain Indian Reservation segments
3 Narraguinnep, Puett and Totten Reservoirs
4 TVS = table value standard, a numerical criteria set forth in the Basic Standards and Methodologies for Surface Water Regulation
5 Parameters listed include only those affected by livestock management

The State of Colorado has identified McElmo Creek and its tributaries as fully supporting all of its designated beneficial uses in its Status of Water Quality in Colorado-2004 report. Therefore, Yellow Jacket Canyon, being a tributary to McElmo Creek, is also identified as fully supporting its designated beneficial uses. However, grab sample data collected by the BLM between 1983 and 2001 indicate otherwise. The grab sample data show that the beneficial uses of Recreation 1a and Agriculture are being fully supported on Yellow Jacket Canyon, but that the beneficial use of Aquatic Life Warm 1 is not being fully supported due to high concentrations of ammonia. Acute and chronic standards for ammonia were exceeded for all samples between 1983 and 2001. Failure to meet acute and chronic standards for ammonia is most likely due to irrigation return flows containing fertilizers and to a lesser extent livestock use in or near the stream. Water quality at seeps and springs has also been sampled by the BLM since 1981. Water quality parameters sampled include temperature, pH and dissolved oxygen. The data indicates that existing beneficial uses are being fully supported throughout the analysis area.

The primary parameters that are affected by livestock management include the numeric physical and biological standards of dissolved oxygen, pH, and bacteria, the inorganic standards of ammonia and nitrite, the temperature standard and the narrative standard applicable to the accumulation of fine sediments. In relation to livestock management, dissolved oxygen, pH, nitrite and the presence of fine sediments are influenced by the amount of erosion occurring on the watershed. Bacteria and ammonia are influenced by the presence of livestock in the stream channel or riparian zone and to a much lesser degree their presence and concentration on the uplands. Temperature is influenced by the amount of stream shading and by physical characteristics of the stream, such as width/depth ratio.

ENVIRONMENTAL CONSEQUENCES

Livestock grazing generates nonpoint source pollution. The level of nonpoint source pollution varies considerably with site specific conditions and is highly dependent on the frequency, magnitude and timing of runoff events, watershed condition, number of livestock, proximity of livestock to surface water systems, duration of grazing and season of use.

Alternative A, Proposed Action

Direct and Indirect Impacts

Under this alternative, Yellow Jacket and Cahone Mesa Allotments would "not achieve" the standard for water quality. Water Quality for seeps and springs in Cahone Mesa would decline. State water quality standards should continue to be met for those parameters affected by livestock grazing with the exception of ammonia in Yellow Jacket Canyon. Hamilton Mesa and Flodine Park Allotments would continue to "achieve" the standard for water quality.

Implementing critical period rest in one year out of every three would temporarily improve conditions on the watershed during the period of rest. However, without a reduction in the number of livestock the soil surface would continue to be vulnerable to erosion and the quality of water draining from the uplands would not be expected to improve above current conditions. In the case of Cahone Mesa Allotment, where an increase in livestock numbers is proposed, erosion of the uplands would be expected to increase and the quality of water draining from the uplands

would decline from existing conditions. There are no perennial streams in the Cahone Mesa Allotment; therefore, the remainder of this discussion applies only to McElmo Creek and Yellow Jacket Canyon. Sediment delivery to McElmo Creek and Yellow Jacket Canyon may decrease slightly, but not enough to improve existing water quality. Dissolved oxygen, pH and nitrite concentrations would likely remain the same. Access to streamside vegetation would be reduced with one in three year critical season rest and vegetation during that year of rest should show an increase in vigor, but would be expected to return to its previous condition during periods of use. Therefore, stream temperatures and diurnal fluctuations would only show temporary improvement. The width/depth ratios of the streams would not be expected to improve with one in three year rest without a reduction in livestock numbers. Existing width/depth ratios are moderately high allowing for elevated stream temperatures and abrupt changes in temperature. Livestock would continue to have direct access to stream channels with the exception of the year of rest. Direct access by livestock to the streams would result in elevated amounts of bacteria and ammonia during times when livestock concentrate in the stream channel.

Other than in Cahone Mesa Allotment, seeps and springs would receive less sediment as a result of one in three year critical period rest possibly affecting dissolved oxygen, pH and nitrite concentrations. Riparian vegetation around seeps and springs would improve in vigor during critical season rest reducing local temperatures and preventing abrupt temperatures changes during that time period but without a reduction in livestock numbers, improved riparian plant vigor would not be maintained throughout the three-year rotational period. In Cahone Mesa Allotment, sedimentation of seeps and springs would be expected to increase with an increase in livestock numbers regardless of the one in three years critical season rest. Riparian vegetation would not be expected to improve in vigor, abundance or diversity and water quality would be expected to decline. Concentration of livestock around seeps and springs in all allotments would result in high levels of bacteria and ammonia, particularly around developed springs.

Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season

Impacts of Alternatives B and C are similar except for the amount of time necessary for water quality improvements to occur. Improvements would occur more quickly with dormant season grazing than deferred grazing.

Direct and Indirect Impacts

Under these alternatives, Yellow Jacket Allotment would "not achieve" the standard for water quality. However, if upstream conditions remained the same, water quality would improve slightly for some parameters in McElmo Creek and Yellow Jacket Canyon. Water quality for seeps and springs would improve. State water quality standards would continue to be met for those parameters affected by livestock grazing with the exception of ammonia in Yellow Jacket Canyon. Hamilton Mesa, Flodine Park and Cahone Mesa Allotments would "achieve" the standard for water quality.

Implementing a rotational or deferred grazing system with a reduction in livestock numbers would improve soil and water resources throughout the analysis area. Improvements would include increased vegetative cover and reduced soil compaction resulting in less soil erosion and

surface runoff. Sediment delivery to McElmo Creek and Yellow Jacket Canyon would decrease. As a result, dissolved oxygen may increase and nitrite concentrations may decrease. Livestock would no longer have direct access to portions of McElmo Creek under both of these alternatives. Eliminating access to the riparian area would allow for riparian vegetation to increase in abundance and vigor along the stream channel. This increase would be expected to occur within a couple of years and would reduce stream channel temperatures and lessen diurnal fluctuations (U.S. Department of the Interior 1997). Direct access to the streams by livestock would continue for the portion of McElmo Creek in Flodine Park Allotment. Riparian vegetation would still be expected to increase in abundance and vigor along that reach, resulting in lower stream temperatures, though over a much longer time period than the excluded reaches. Also affecting temperature in McElmo Creek would be an expected reduction in width/depth ratio. A narrower, deeper channel allows for cooler temperatures and lessens the possibility of abrupt temperature changes. In Yellow Jacket Canyon riparian vegetation would increase in abundance and vigor and result in lower stream temperatures and reduced width/depth ratios similar to the unfenced portions of McElmo Creek. Direct access by livestock to stream channels even on a rotational or dormant season grazing schedule would result in elevated amounts of bacteria and ammonia during times when livestock concentrate on the stream channel. On McElmo Creek where livestock is excluded from the stream the amount of bacteria and ammonia would decrease but may still be delivered from upstream during periods of high flow.

Seeps and springs would receive less sediment as a result of a rotational or deferred grazing system affecting dissolved oxygen, pH and nitrite concentrations. Riparian vegetation around seeps and springs would increase in abundance and vigor reducing local temperatures and preventing abrupt temperature changes. Concentration of livestock around seeps and springs would still result in high levels of bacteria and ammonia, particularly around developed springs. Fencing the area around Bluewater Spring would reduce sediment delivery to the spring and would increase the abundance and vigor of riparian vegetation resulting in improvements to water quality. Bacteria and ammonia levels would decline in the absence of livestock.

Alternative D, No Grazing

Direct and Indirect Impacts

Under this alternative, Yellow Jacket Allotment would "not achieve" the standard for water quality. However, a condition of "not achieved" would be due to land use activities upstream in the watershed (e.g., agriculture, irrigation) and not due to livestock grazing on public land. If upstream conditions remained the same, water quality in both McElmo Creek and Yellow Jacket Canyon would improve above existing conditions. Water quality for seeps and springs would improve. State water quality standards would continue to be met for those parameters affected by livestock grazing with the exception of ammonia in Yellow Jacket Canyon, due to upstream land use activities. Hamilton Mesa, Flodine Park and Cahone Mesa Allotments would "achieve" the standard for water quality.

No grazing throughout the analysis area would allow for the quickest recovery of upland vegetation and soils. Vegetative cover would increase and soil compaction would be reduced and possibly eliminated from much of the analysis area, resulting in less soil erosion and surface

runoff. Sediment delivery to McElmo Creek and Yellow Jacket Canyon would decrease. As a result, dissolved oxygen may increase and nitrite concentrations may decrease. Riparian vegetation would increase in abundance and vigor along stream channels within the analysis area and width/depth ratios would decrease. This would reduce stream channel temperatures and lessen diurnal fluctuations. Bacteria and ammonia would decrease, but may still be delivered from private lands upstream during periods of high flow.

Seeps and springs would receive less sediment under this alternative, affecting dissolved oxygen, pH and nitrite concentrations. Riparian vegetation around seeps and springs would increase in abundance and vigor reducing local temperatures and preventing abrupt temperature changes. Bacteria and ammonia concentrations would decrease.

Alternative E, No Action

Direct and Indirect Impacts
Under this alternative, Yellow Jacket, Hamilton Mesa, Cahone Mesa and Flodine Park Allotments would "not achieve" the standard for water quality. Water quality in McElmo Creek and Yellow Jacket Canyon would decline. Water quality for seeps and springs would decline.

Under this alternative, the soil surface would continue to be vulnerable to erosion and the quality of water draining from the uplands would continue to decline. Sediment concentrations in McElmo Creek and Yellow Jacket Canyon would increase. The increase in sediment would lead to changes in dissolved oxygen, pH and nitrite concentrations. Dissolved oxygen may decrease and nitrite concentrations may increase. Direct access to the streams by livestock would result in consumption of riparian vegetation that would lessen the amount of stream shading thereby increasing stream temperature or allowing for abrupt changes in stream temperature. High width/depth ratios would persist in McElmo and Yellow Jacket Canyon and would also affect stream temperatures, (i.e., where the stream is shallow, temperatures would be expected to be higher and undergo large diurnal changes). Direct access by livestock to stream channels would also elevate the amount of bacteria and ammonia in the stream channel.

Seeps and springs would receive increased sediment thereby affecting dissolved oxygen, pH and nitrite concentrations. The amount of riparian vegetation around seeps and springs would likely decrease affecting local temperatures. Concentration of livestock would result in high levels of bacteria and ammonia. Developed springs would be most at risk for increased levels of bacteria and ammonia.

THREATENED, ENDANGERED AND SENSITIVE WILDLIFE SPECIES

AFFECTED ENVIRONMENT
These allotments fall within the range of several listed threatened, endangered and sensitive wildlife species. The area of analysis does not provide suitable habitat for the black-footed ferret or Canada lynx. The black-footed ferret's historic distribution did include southwest Colorado, however, there are no known ferrets currently occupying this area (Fitzgerald et al. 1994). Since they have been extirpated from this area and there are no large prairie dog colonies, they have

been removed from the list of threatened and endangered species to be considered for project impacts (San Juan Public Lands Unit Species List, 3 March 2003).

Bald eagles are occasionally seen foraging along McElmo Creek during the winter, but are not known to nest within the area of analysis. They are also likely to forage in Yellow Jacket Canyon where there is perennial water and forage opportunities. The bald eagle was downlisted from federally endangered to threatened in the lower 48 states in 1995 (50 CFR 17.41(a)), and was proposed for delisting in July, 1999. There have been no changes to the eagle's status since this proposal.

Surveys were conducted in 1992 in Sand Canyon to determine the possible presence of Mexican spotted owls. None were located. Since then habitat definitions have been refined for Colorado and include the importance of sandstone cliffs for nesting. Spotted owls have been located on cliff faces in Mesa Verde National Park. The steep faces found within most of these allotments may provide habitat for this bird. No surveys have been conducted since 1992. However, habitat assessments will be conducted in some areas during the 2003 field season.

Habitat has been identified in McElmo Creek and Yellow Jacket Canyon as suitable and potential for the southwestern willow flycatcher. On March 29, 1995, the U.S. Fish and Wildlife Service (USFWS) listed the willow flycatcher as endangered. Surveys have been conducted in areas of both creeks (R. Ball, pers. comm). No willow flycatchers have been located to date. The habitat along McElmo Creek, located within the Flodine and Hamilton Mesa Allotments, is marginally suitable based on recent field reconnaissance (K. Philbrook, pers. comm.). Potential habitat for the flycatcher has been identified in the segment of Yellow Jacket Canyon, within the Yellow Jacket Allotment. However, field assessments conducted in 2002 and 2003 indicate that this habitat is unsuitable due to the presence of tamarisk and lack of saturated soil.

Observations by surveyors since 1997, have noted that impacts result from livestock grazing on suitable and potential willow flycatcher habitat. These impacts include direct loss of willows and reduction in height of willows. Also, it was concluded by the surveyors that changes to grazing practices (e.g., season of use, number of cattle) would likely improve these habitats. This is supported by and described in the Biological Evaluation for southwestern willow flycatcher (1998).

There is evidence in other portions of the willow flycatcher's range that indicate tamarisk may provide suitable habitat (T. Ireland, pers. comm.). This cannot be confirmed within these allotments since no birds have been located. Until the role of tamarisk is clarified, habitat assessments should include questions of habitat quality when tamarisk is located. The recovery plan for the southwestern willow flycatcher was completed in spring 2003 and includes updated habitat definitions, as well as refined boundaries for recovery areas based on the results of several genetic studies.

Creeks and canyons within these allotments are tributary to the San Juan River. Water depletions are not associated with range management so there would be no effect to listed San Juan River fishes. As a result, they will not be addressed further in this section.

Three candidate species may occur in this area: yellow-billed cuckoo, Gunnison's sage grouse, and the boreal toad. The yellow-billed cuckoo and boreal toad are rare and not likely to be found in this ecosystem. There is no suitable habitat for either species within these allotments. The project area falls within the historic range of the Gunnison's sage grouse. No grouse are known to occur and no suitable habitat is within the project area. Gunnison sage grouse are located more than 10 miles away on private lands north of the Cahone Allotment and near the town of Dove Creek.

Several BLM sensitive species may be found within these allotments. They include the ferruginous hawk, spotted bat, Allen's big-eared bat, fringed myotis, Yuma myotis, big free-tailed bat, peregrine falcon, bluehead sucker, and flannelmouth sucker. There is a diversity of habitats suitable for these species from steep, rocky canyons to pinyon-juniper woodlands.

The ferruginous hawk is uncommon to fairly common during the winter in southwest Colorado (Andrews and Righter 1992). It may be sighted foraging within these allotment areas. Ferruginous hawks predominantly forage on jackrabbits and cottontails west of the Continental Divide (Preston 1998). In the Monument, black-tailed jackrabbits and both desert and mountain cottontails are likely to be found (Fitzgerald et. al. 1994). Desert cottontails tend to forage largely on forbs and grasses, but the jackrabbit and mountain cottontail utilize shrubs such as juniper, sagebrush, greasewood, and rabbitbrush over the course of a year. Past grazing practices, as well as effects from past chaining projects in the pinyon-juniper, have likely affected the distribution and abundance of rabbits.

Allen's big-eared bats and fringed myotis roost in mines and caves and are known to forage in pinyon-juniper woodlands. There are few, if any, mine and cave structures such as these within the Monument overall. However, there may be roosts on adjacent lands and as a result pinyon-juniper woodlands, particularly within the Cahone Allotment, would provide suitable habitat.

The big free-tailed and spotted bats are likely to be found within this area. They roost in rocky cliffs with crevices and fissures. These features are typically found in canyons such as Yellow Jacket, Risley, Rincon, Hovenweep, and Sand.

The Yuma myotis is found in pinyon-juniper woodlands and semi-desert environments. They are tied to surface water and riparian areas. They are likely to be found in Yellow Jacket Canyon where there is perennial water.

Peregrine falcons are suspected in Sand Canyon. A typical cliff face in Sand Canyon with possible sign was noted in 2002. Follow-up surveys were conducted in April 2003 and no peregrines were located. Peregrines forage almost exclusively on birds. Fluctuations in bird populations could affect the falcon's breeding success from year to year. Peregrines are opportunistic hunters and forage over a large area.

The bluehead and flannelmouth suckers have been located in Yellow Jacket Canyon. Other texts also support their location within Montezuma County, specifically McElmo Creek (Woodling 1985). The bluehead is found in headwater streams and large rivers, requiring water of moderate

to fast velocity (Woodling 1985). The flannelmouth is found in larger streams and rivers and all habitat types including riffles, runs, eddies, and backwaters (Woodling 1985). Both fish are bottom feeders, eating a variety of invertebrates.

The longnose leopard lizard is also on the BLM sensitive species list, but was incorrectly omitted from occurring in the San Juan Resource Area. Until the list is corrected, it is being considered sensitive for this resource area. It was identified for protection in the Monument proclamation. This lizard is known to occur in southwest Colorado and has been observed on Hamilton Mesa (L. Stewart, pers. comm). Habitat for the leopard lizard is flat or gently sloping shrublands with a large percentage of open ground. Hammerson (1999) describes other habitat associations in southwest Colorado including areas along the Dolores River where leopard lizards inhabit areas with sandy-rocky soils and scattered sagebrush, junipers, and skunk brush in canyon bottoms. Other habitats within Montezuma County include mesa tops above canyons. Like the desert spiny lizard, the longnose leopard lizard has a small home range from 1.6 to 6 acres in size (Hammerson 1999). It is slightly more limited in its activity period (i.e., from May to early August) and they have an unwary behavior, which makes them vulnerable to human exploitation (Hammerson 1999). Habitat for this lizard can be found in the Cahone, Hamilton Mesa, and Sand Canyon East Allotments. Scattered habitat can also be found in Yellow Jacket Allotment. In portions of these allotments the sagebrush has become dense and dominate the site, losing some of the openness required by this lizard.

The desert spiny lizard is also on the BLM sensitive species list, and is identified for protection in the Monument proclamation. It is likely to occur within the project area. The primary period of activity is from May to September with some activity in April and October, during warm weather (Hammerson 1999). Habitat includes shrub-covered dirt banks and sparsely vegetated rocky areas near flowing streams or arroyos (Hammerson 1999). Courtship takes place in May and hatchlings first appear in early August. Adults stay within a small home range (1.6 to 6 acres) from year to year (Hammerson 1999). Suitable habitat for this lizard is found in Yellow Jacket, Flodine, and Hamilton Mesa Allotments. Livestock grazing is the primary land use in this lizard's range. Habitat alterations that do occur do not seem to affect use, as lizards are still commonly located in these areas (Hammerson 1999).

The Mesa Verde night snake is not on the BLM sensitive species list, but was identified for protection in the Monument proclamation. It may be found in the area of analysis. This snake inhabits landscapes (i.e., rocky slopes and canyons) that are generally not suitable for extensive development (Hammerson 1999). Hammerson (1999) stated that the habitat for this snake is largely intact and not threatened, and the distribution of this snake in western Colorado is probably more extensive than is now known.

BLM Standards for Public Land Health in Colorado

Of the five standards evaluated, special status, threatened and endangered species is discussed under this section. This standard applies to both plants and animals and therefore is discussed under the Special Status Plants section. A complete definition for this standard is provided in Appendix A.

As presented in Table 1, this standard is not being achieved on the Yellow Jacket, Sand Canyon East and West, Hamilton Mesa and Flodine Park Allotments. However, only the Yellow Jacket, Hamilton Mesa and Flodine Park Allotments are not achieving this standard as a result of an endangered animal species (i.e., southwestern willow fly catcher). The Sand Canyon East and West Allotments are not achieving the standard as a result a sensitive plant species (i.e., *Astragalus naturitensis*). A causal factor of these determinations for Yellow Jacket, Hamilton Mesa and Flodine Park Allotments is livestock grazing. Information used by the BLM interdisciplinary team to come to this determination includes Colorado Heritage Program data and past field surveys.

ENVIRONMENTAL CONSEQUENCES

Alternative A, Proposed Action and Alternative E, No Action

Direct and Indirect Impacts

Under this alternative, the Yellow Jacket, Hamilton Mesa and Flodine Park Allotments would "not achieve" the standard for special status, threatened and endangered species. The rationale for this conclusion, along with other potential impacts, is presented below.

Under these alternatives, there would be little change in the current downward trend of habitats within the allotments. Riparian areas would continue to be degraded. Habitat for the southwestern willow flycatcher would seldom reach its potential or become suitable habitat. Forage availability for prey species for the ferruginous hawk would decline over time with extreme population fluctuations. These rodent and rabbit species would become less likely to withstand the pressures of drought, as experienced in 2002.

There would be little impact on bald eagles, due to their mobility. As a result, bald eagles would go where foraging is most successful. Bat populations would remain relatively unchanged, more likely to fluctuate with insect populations. These alternatives would not affect bat roosting habitats.

Peregrine falcon annual breeding success is strongly tied to prey availability. Potential impacts to peregrines could occur as a result of changes to their prey base, but this is difficult to tie back to grazing practices. Peregrines eat a diversity of bird species including neotropical migrants and year-round residents.

The bluehead and flannelmouth sucker may be impacted when cattle drink. Trampling at riparian edges and the resulting sedimentation may reduce prey availability. The sensitive lizards and the nightsnake may be impacted by trampling. Cattle may crush burrows and nests, particularly if cattle use is concentrated in one area.

Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season

Direct and Indirect Impacts
Under these alternatives, the Yellow Jacket, Hamilton Mesa and Flodine Park Allotments would "move toward achieving" the standard for special status, threatened and endangered species. The rationale for this conclusion, along with other potential impacts, is presented below.

Under these alternatives, there would be improvements in vegetative conditions overall, both in quality and quantity. Riparian areas would improve in all allotments except for Yellow Jacket Canyon. Southwestern willow flycatcher habitat that is currently suitable and potential, though degraded from livestock grazing, is likely to improve. There would be more nesting opportunities. In addition, proposed fencing, adjacent to degraded riparian areas along McElmo Creek, would improve flycatcher habitat.

There would be more grasses, forbs, and shrubs available as a food source for animals such as jackrabbits, mice, insects, and birds. As discussed above, many of these animals are prey items for sensitive species like the ferruginous hawk. Changes to grazing practices, under these alternatives, would improve the food chain overall.

Under Alternative B, there may be impacts to the lizards and fish, as a result of trampling. Trampling would not be a concern under Alternative C, since livestock use would occur during winter months while reptiles are hibernating beneath the frozen ground.

Alternative D, No Grazing

Direct and Indirect Impacts
Under this alternative, the Yellow Jacket, Hamilton Mesa and Flodine Park Allotments would "achieve" the standard for special status, threatened and endangered species. The rationale for this conclusion, along with other potential impacts, is presented below.

There would be no trampling by livestock. Grasses and forbs would provide the maximum nutritional value as forage for a variety of species. Riparian vegetation would recover in all areas, including the Yellow Jacket Allotment. However, as described in the Vegetation section, land management practices would likely have to be implemented to manage the invasive plant problem (e.g., cheatgrass and tamarisk) and in areas where degradation is beyond natural recovery. No grazing in combination with other practices would restore the resiliency of the area.

GENERAL WILDLIFE SPECIES

AFFECTED ENVIRONMENT
Within the area of analysis there were no emphasis areas identified (e.g. critical or severe big game winter ranges) in the San Juan/San Miguel RMP. Resident deer can be found within and adjacent to the project area throughout the year. Wintering deer also utilize the area. Deer likely compete with cattle for the limited forage available in these allotments.

Elk are not common in the area, due to poor winter habitat and little forage available in the summer. However, they may be found in canyons and on mesa-tops within the Cahone Mesa Allotment where pinyon-juniper stands and protected canyons border agricultural fields. Elk are known to forage extensively in these fields, particularly during the winter. Evidence of elk during the late summer and early fall has been noted in areas adjacent to this allotment.

Several species of reptiles and amphibians are likely to be found within the project area including the bull snake, striped whipsnake, red-spotted toads, and collared lizards. Most are either highly mobile, have a large home range, or are likely to be found in riparian areas.

Birds within the project area are typical of those associated with shrubsteppe habitats. According to Brock et al. (1993), the most important shrubsteppe neotropical migrant birds are horned lark, sage thrasher, Brewer's sparrow, vesper sparrow, and western meadowlark. All of these neotropicals are ground nesting birds. The sage thrasher and Brewer's sparrow are more linked to sagebrush communities and have not been located during causal bird counts (L. Stewart and C. Stewart, pers. comm). Other neotropical birds that have been noted in the vicinity include the uncommon black-throated sparrow, gray flycatcher and gray vireo; and the more common Bewick's wren, black-throated gray warbler, blue bird, Say's phoebe, and ash-throated flycatcher. Birds in this environment are primarily influenced by extreme and irregular fluctuations in precipitation and ecosystem productivity. As a result, they are highly opportunistic and ecologically adaptable (Brock et al. 1993).

Mammals that may be within the project area include: red and gray fox, raccoon, desert shrew, possibly the Merriam's shrew, black-tailed jackrabbit, desert and mountain cottontail, chipmunks, ground squirrels, prairie dogs, woodrats, several species of mice, and the ringtail (Fitzgerald et al. 1994). The condition of the grasses and forbs throughout the project area would affect the rodent, rabbit, and prairie dog populations, since these vegetation types are the forage base for these animals. Available forage is limited and in poor condition as evidenced by the results of the rangeland health assessments. Animals that utilize these vegetation types can illustrate extremes in numbers, fluctuating with available food resources and weather conditions. Rodents and rabbits, in turn, are prey for the carnivores likely to be found within the Monument. Numerous studies have illustrated the cause and effect relationship between healthy carnivore populations and availability of prey.

ENVIRONMENTAL CONSEQUENCES

Alternative A, Proposed Action and Alternative E, No Action

Direct and Indirect Impacts

Under these alternatives, there would be little change in the current downward trend of habitats within the allotments. Riparian areas would continue to be degraded. Populations would decline over time with extreme fluctuations. Many would become less likely to withstand the pressures of drought, as experienced in 2002. Big game would continue to compete with livestock for limited resources and be more susceptible to disease and predation.

Several neotropical migrants, including the horned lark and green-tailed towhee are known to occur in the area are impacted by heavy grazing (Saab et. al. 1995). Conversely, other birds such as the mountain bluebird and sage thrasher are impacted by heavy grazing (Saab et. al. 1995). Continued downward trend of habitats within these allotments could have the same effects on neotropical migrants as described above.

Alternative B, Deferred Grazing During Critical Period and Alternative C, Grazing During Dormant Season

Direct and Indirect Impacts
Under these alternatives, there would be improvements in vegetative conditions overall, both in quality and quantity. Riparian areas would improve in all allotments except for Yellow Jacket Canyon. In addition, proposed fencing along McElmo Creek and around Nice and Bluewater Springs would improve riparian vegetation as presented in the Floodplains, Wetlands and Riparian Zones section.

There would be more grasses, forbs, and shrubs available as a food source for animals such as jackrabbits, mice, insects, and birds. As discussed above, many of these animals are prey items for other animals commonly found within these allotments. Changes to grazing practices, under these alternatives, would improve the food chain overall.

Alternative D, No Grazing

Direct and Indirect Impacts
Under this alternative, there would be no trampling by livestock. Grasses and forbs would provide the maximum nutritional value as forage for a variety of species. Riparian vegetation would recover in all areas, including the Yellow Jacket Allotment. There would be no competition for resources between livestock and big game. Deer populations would be healthier, as a result of increased forage and a decreased susceptibility to disease.

As described in the Vegetation section, other land management practices would likely have to be implemented to manage the invasive plant problem (e.g., cheatgrass and tamarisk) and the areas where degradation is beyond natural recovery. No grazing in combination with other practices would restore the resiliency of the area. Wildlife populations in these circumstances are healthier and are capable of responding to extremes in annual weather.

CULTURAL RESOURCES

AFFECTED ENVIRONMENT
Pursuant to the 1980 National Programmatic Agreement Regarding the Livestock Grazing and Range Improvement Program, and IM-CO-2002-029, cultural resource assessments (i.e., literature reviews) were completed for each of the allotments analyzed in this EA. These reviews were initially conducted in 1999, and were updated in March of 2003. The reviews were conducted using the cultural resource inventory and site overlays at the Anasazi Heritage Center. The reviews were facilitated by the use of allotment maps with the livestock concentration areas,

as defined in IM-CO-2002-029, plotted on them. Site forms for the archaeological and historic sites recorded in these livestock concentration areas were reviewed to see if any livestock impacts were noted and/or if range improvements were shown on the site maps. The results of these assessments are summarized by allotment below.

Hamilton Mesa Allotment

Twenty-two cultural resource inventories have been conducted in the allotment, resulting in coverage of approximately 15% of the area. There are currently 167 archaeological and historic sites and paleontological localities recorded within the boundaries of this allotment. These include sites affiliated with Ancestral Puebloan occupation such as surface pueblos, masonry towers, rock images, slab lined pitstructures, artifact scatter, ceramic firing features, and campsites. Also within the boundaries of the allotment are dunal sites from earlier Archaic and Paleoindian occupations such as temporary camps, resource processing areas, and quarries. There are also representative sites from historic Native American and European American occupations such as historic inscriptions and rock images, corrals, cow/sheep camps, and sweat lodges.

Eighteen archaeological and historic sites have been recorded within or in close proximity to livestock concentration areas within this allotment. Livestock impacts such as trailing and trampling, and/or the presence of range improvements within site boundaries were noted on the maps and/or site forms for six of these sites. However, the exact nature and intensity of the impacts to these sites is not well documented on these forms. One of these sites has standing masonry walls and was identified in the Anasazi Culture Multiple Use Area of Critical Environmental Concern Plan as a site requiring fencing to protect it from livestock impacts. To date, the site has not been fenced.

Based on the results of previous inventories that have been conducted within and in the general vicinity of the allotment, it is predicted that the allotment has a moderate to high sensitivity for cultural resources.

The Hamilton Mesa Cultural Resource Emphasis Area (CREA) is located within this allotment. This CREA was designated in the San Juan/San Miguel RMP as an area with resources of probable national importance. The San Juan/San Miguel RMP directs that more intensive management should be conducted in this CREA area in order to preserve the cultural resources that are known or expected to occur there.

Yellow Jacket Allotment

Eleven cultural resource inventories have been conducted within the allotment, resulting in coverage of approximately 5% of the area. There are currently 96 archaeological and historic sites recorded within the boundaries of this allotment. Sites that have been recorded include those affiliated with Ancestral Puebloan occupation such as quarries, rock images, artifact scatters, upland resource processing areas, kilns, rock shelters, and a few surface pueblos and campsites. Also within the boundaries of the allotment are sites from earlier Archaic and Paleoindian occupations such as campsites, quarries, rock shelters, lithic scatters, and resource

procurement and processing areas. There are also historic sites, including inscriptions, cow and sheep camps, and abandoned homesteads.

Five archaeological sites are located in livestock concentration areas within this allotment. These sites have never been formally recorded or evaluated for National Register eligibility, but their locations are shown on United States Geological Survey (USGS) topographic maps in the Monument cultural resource files. These sites are described on the maps as three rubble mounds, one tower, and one rubble mound with a tower. Based on the descriptions, these sites are inferred to be prehistoric Ancestral Puebloan components. BLM range staff who have looked at these sites while conducting rangeland health assessments have noted that they are being heavily grazed by livestock, especially those located close to drainages.

Based on the results of previous inventories that have been conducted within and in the general vicinity of the allotment, it is predicted that the allotment has a moderate to high sensitivity for cultural resources.

Goodman Gulch Allotment

Two cultural resource inventories have been conducted within the allotment, resulting in coverage of approximately 2% of the area. No archaeological or historic sites have been recorded there. The types of prehistoric archaeological sites that might occur in the allotment include, but are not limited to surface pueblos, rock images, slab lined pithouses, artifact scatters, kilns, rock shelters, and campsites. Historic Native American and Euro American sites may also be present. These sites may include rock images, campsites, and abandoned homesteads.

Based on the results of previous inventories that have been conducted within and in the general vicinity of the allotment, it is predicted that the allotment has a low to moderate sensitivity for cultural resources.

Sand Canyon East Allotment

Ten cultural resource inventories have been conducted within the allotment, resulting in coverage of approximately 55% of the area. Subsurface site testing and excavations have been conducted within this allotment, and several of the cliff dwelling sites have been mapped and monitored annually.

There are currently 90 archaeological and historic sites recorded within the boundaries of this allotment. They include sites affiliated with Ancestral Puebloan occupation such as collapsed or partially standing masonry habitations and cliff dwellings, masonry towers, slab-lined pithouses, artifact scatters, ceramic firing features and campsites. An unusually high number of cliff dwellings and standing masonry structures exist in alcoves adjacent to the terraces of McElmo Canyons and Sand Canyon in this allotment. Also within the boundaries of the allotment are sites from earlier Archaic occupations and later prehistoric Navajo and historic occupations, including lithic scatters, rock images, processing areas, and upland camps.

Six recorded sites and one undocumented site are located in livestock concentration areas within this allotment. Livestock impacts and/or the presence of range improvements were noted on the

map and/or site form for one of these sites. The form indicates that this site was impacted during construction of a stock pond. However, the exact nature and intensity of this impact is not well documented on the form.

This allotment lies within the boundaries of the Sand/East Rock Canyons Cultural Resource Emphasis Area, and is covered by the Sand/East Rock Canyons Cultural Resources Management Plan that directs management actions in this area to assure the integrity of the scientific, interpretive, and recreational values of the cultural resources, including their setting. This allotment is also located within a larger area pending National Register of Historic Places listing as the Sand Canyon Archaeological District.

Based on the results of previous inventories that have been conducted within and in the general vicinity of the allotment, it is predicted that the remaining unsurveyed portions of the allotment have a high sensitivity for cultural resources.

Sand Canyon West Allotment

Five cultural resource inventories have been conducted within the allotment, resulting in coverage of approximately 98% of the area. There are currently 57 archaeological sites recorded within the boundaries of this allotment. They include sites affiliated with Ancestral Puebloan occupation such as collapsed or partially standing masonry habitations and cliff dwellings, masonry towers, slab-lined pithouses, artifact scatters, ceramic firing features and campsites. An unusually high number of cliff dwellings and standing masonry structures exist in alcoves adjacent to the terraces of McElmo Canyon and Sand Canyon, in this allotment. Also within the boundaries of the allotment, are sites from earlier Archaic occupations such as lithic scatters, rock images, processing areas, and upland camps.

One recorded site is located in a livestock concentration area within this allotment. No livestock impacts were noted on the site form for this site.

This allotment lies within the boundaries of the Sand/East Rock Canyons Cultural Resource Emphasis Area, and is covered by the Sand/East Rock Canyons Cultural Resources Management Plan that directs management actions in this area to assure the integrity of the scientific, interpretive, and recreational values of the cultural resources, including their setting. This allotment is also located within a larger area pending National Register of Historic Places listing as the Sand Canyon Archaeological District.

Flodine Park Allotment

Eighteen cultural resource inventories have been conducted within the allotment, resulting in coverage of approximately 15% of the area. There are currently 126 archaeological and historic sites recorded within the allotment. These include sites affiliated with Ancestral Puebloan occupation such as surface pueblos, a possible great kiva, masonry towers, rock images, slab lined pitstructures, artifact scatters, ceramic firing features, and campsites. Also within the boundaries of the allotment, are dunal sites from earlier Archaic and Paleoindian occupations such as temporary camps, resource processing areas, and quarries. There are also representative

sites from historic Native American and European American occupations such as historic inscriptions and rock images, corrals, cow/sheep camps, and sweat lodges.

Fifteen archaeological and historic sites have been recorded within or in close proximity to livestock concentration areas within this allotment. In addition, there are two sites that have never been formally recorded, but their locations are shown on USGS topographic maps in the Monument cultural resource files. Livestock impacts such as trailing and trampling, and/or the presence of range improvements within site boundaries were noted on the maps and/or site forms for six of these sites. Extensive disturbance was noted on the forms for three sites. Two of these sites had extensive livestock trampling noted, while the other had been "greatly compromised" by construction of a stock pond.

Based on the results of previous inventories that have been conducted within and in the general vicinity of the allotment, it is predicted that the allotment has a moderate to high sensitivity for cultural resources.

A portion of the Hamilton Mesa CREA is also located within this allotment.

Cahone Mesa Allotment

Thirty-seven cultural resource inventories have been conducted within the allotment, resulting in coverage of approximately 25% of the area. There are currently 1,837 archaeological and historic sites recorded within the allotment. These sites include a very high density of sites affiliated with Ancestral Puebloan occupation such as surface pueblos, masonry towers, water control features, rock images, slab lined pithouses, artifact scatters, ceramic firing features, and campsites. At least thirteen sites with standing masonry walls are located in the allotment. Also within the boundaries of the allotment are sites from earlier Archaic and Paleoindian occupations such as temporary camps, processing areas, and quarries. There are also representative sites from later historic occupations such as historic inscriptions, rock images, corrals, cow/sheep camps and sweat lodges.

Sixty-two archaeological and historic sites have been recorded within or in close proximity to livestock concentration areas within this allotment. Livestock impacts and/or the presence of range improvements were noted on the maps and/or site forms for fifteen of these sites. Existing range improvements occur within the boundaries of eight sites, livestock grazing and trampling was noted for two sites and was described as a threat for two others sites, and monitoring was recommended for one site that is located in close proximity to a stock pond. The intensity of the grazing impacts to sites was not well documented on these forms however.

Based on the results of previous inventories that have been conducted within and in the general vicinity of the allotment, it is predicted that the allotment has a high sensitivity for cultural resources.

The Mockingbird Mesa Cultural Resource Emphasis area lies within this allotment. Site densities within this area exceed 120 sites per square mile. A Cultural Resource Management Plan was prepared for the Mockingbird Mesa CREA in 1987. This plan directs the management actions

for the area. It places constraints on vehicle access, vegetative manipulations, and grazing developments that might impair the values of the archaeological sites within the area.

ENVIRONMENTAL CONSEQUENCES

Consequences Common to all Alternatives, Except Alternative D, No Grazing

Direct and Indirect Impacts

Livestock impacts to cultural resources have been well documented (Osborn et al 1987, Roney 1977). Impacts that have been shown to occur to cultural resources include trampling, chiseling, churning, and compaction of site soils, cultural deposits and features; and damage to and displacement of artifacts caused by livestock grazing. Impacts occur to rock images and standing masonry and wooden walls from livestock standing, leaning, and rubbing against them. The potential for fire damage within rock shelters increases as a result the build up of animal dung.

Cultural resources could also be impacted by construction and maintenance of range improvements such as stock ponds and fence lines. Livestock impacts also occur in association with temporary improvements such as holding pens and water tanks, as well as around salt blocks and other supplemental feed.

Indirect impacts include soil erosion, gullying, and increased potential for unlawful collection and vandalism as sites become exposed due to loss of vegetation.

Impacts that are already known to be occurring to cultural resources within the allotments include livestock trailing, trampling, and disturbance related to construction of range improvements within the boundaries of these resources. Livestock trailing, trampling, and livestock use of existing range improvements such as stock ponds would continue under these alternatives.

Alcoves located throughout the allotments, in particular the Sand Canyon East and West, Cahone Mesa, and Flodine Park Allotments are particularly attractive to livestock seeking shelter. Many of the alcoves are known or expected to contain fragile standing masonry walls, archaeological midden deposits, and rock images that could be easily damaged by livestock use. The Cahone Mesa, Hamilton Mesa, and Sand Canyon East Allotments are known to have open sites with standing masonry walls. Livestock could also easily damage these architectural features.

Mitigation

Class III (intensive) cultural resource inventories would be conducted in the livestock concentration areas identified for each allotment. Newly recorded sites occurring within these livestock concentration areas would have determinations of eligibility made for them, and they would be assessed for livestock impacts. All previously recorded sites located within the livestock concentration areas would also be revisited and assessed for livestock impacts. These inventories and site assessments would be conducted during the 10-year term of the grazing permit.

Known alcoves and/or open sites with significant standing architecture, and known rock art panels within the allotments should also be re-visited and assessed for livestock impacts.

If BLM determines, in consultation with the State Historic Preservation Office, that livestock grazing or other range management activities are adversely affecting historic properties, treatment plans would be prepared. Following approval of the treatment plans; the BLM would treat the affected properties during 10-year term of the permit

Any new range improvements associated with the allotments (e.g. spring developments, stock tanks, fences) are subject to compliance with Section 106 of NHPA, and would undergo standard cultural resources inventory and evaluation procedures.

The placement of salt blocks, supplemental feed, temporary water tanks or holding pens would require prior authorization from the BLM.

A fence would be constructed to prevent livestock from grazing within the boundaries of the site located in the Hamilton Mesa Allotment that was identified for fencing in the Anasazi Culture Multiple Use Area of Critical Environmental Concern Plan.

Alternative D, No Grazing

Direct and Indirect Impacts
Direct and indirect impacts to cultural resources would be eliminated under this alternative, as no livestock grazing would be allowed within the allotments.

RECREATION

AFFECTED ENVIRONMENT
A variety of recreation activities occur on public lands within the Cahone Allotment including horseback riding, hiking, dispersed camping, viewing cultural sites and hunting. There are seven recreation permittees that utilize portions of this allotment for outfitting/guiding specifically for big game hunting (i.e., deer, elk, and mountain lion). In addition, there are four recreation permittees that provide horseback riding opportunities and archeological tours within portions of the allotment. Portions of the Painted Hand Pueblo including the parking lot, interpretive signs, and segments of the trail are also located within the allotment. This site provides visitors with a back-country experience via a .75 mile primitive hiking trail. Approximately 1,500 people utilize the trail annually. This estimate is derived from a trail counter that has been in place since November 2001.

The primary recreation activities that occur on public lands within Yellow Jacket Allotment include horseback riding, hiking, dispersed camping, viewing cultural sites, mountain biking, off-highway vehicles (ohv), and hunting. There are seven recreation permittees that utilize portions of this allotment for outfitting/guiding specifically for big game hunting (i.e., deer, elk, and mountain lion). In addition, there are five recreation permittees that operate within the allotment and provide horseback riding opportunities, guided mountain bike services, operating on existing roads, and guided archeological tours.

Within the Flodine and Hamilton Allotments there are no designated trails and/or recreation sites. However, there is occasional ohv use along roads within the allotments.

The popular Sand Canyon Trail lies within the Sand Canyon West Allotment. Recreation on this trail includes hiking, biking and horseback riding. Recreation is also predominant in the western portions of the Sand Canyon East Allotment. Due to the close proximity to the town of Cortez, Sand Canyon Trail has become a destination for non-motorized recreationists that desire a semi-primitive experience. Surrounding canyons and canyon rims also provide visitors with back-country opportunities. Due to the low elevation of Sand Canyon, the majority of recreation use occurs during the winter, spring, and fall seasons. The popularity of this area increases each year. At present, an estimated 10,000 visitors recreate in Sand Canyon. This estimate is derived from a trail counter along Sand Canyon Trail.

Within the Goodman Gulch and Sand Canyon East Allotments there are no designated trails and/or recreation sites. Since the area is not easily accessible, public lands within these allotments provide for non-motorized backcountry opportunities. There is one recreation permittee that operates on existing roads, providing horseback riding and archaeological tours.

ENVIRONMENTAL CONSEQUENCES

Consequences Common to all Alternatives, Except Alternative D, No Grazing

Direct and Indirect Impacts

The Proposed Action would have no effect on recreation resources in the Yellow Jacket, Flodine, Hamilton, Goodman Gulch, or Sand Canyon East Allotments. Since there is no formal trail system and/or recreation site within these allotments, recreation use tends to be more dispersed and visitation is minimal. This would apply equally to Alternatives B, C, and E.

Because the Sand Canyon West Allotment is extremely popular with recreational visitors, implementation of the Proposed Action could affect the competition for space between livestock and recreational users. Since this allotment has not been grazed much in recent years, the quality of recreational experiences could be impacted as livestock grazing is established. This would apply equally to Alternatives B, C, and E.

Implementation of the Proposed Action within the portion of Cahone Allotment that overlaps with Painted Hand Pueblo could potentially affect the recreation resource. Livestock grazing, specifically in and around the area of the parking lot and the trail, could impact the quality of the recreational experience for users.

Alternative D, No Grazing

Direct and Indirect Impacts

As a result of the No Grazing Alternative, there would be a direct impact to the recreation resource in the Sand Canyon West Allotment and the portion of Cahone Allotment that overlaps

with the Painted Hand site. Since there would be no authorized livestock grazing in these two allotments, there would be competition for space between livestock and recreational users.

VISUAL RESOURCES

AFFECTED ENVIRONMENT

None of the project area where fence building is proposed, is within any of the Outstanding Scenic Areas as described in the San Juan/San Miguel RMP, pg. 2-50. Furthermore, there is currently no interim guidance direction for visual resources for the Monument. It should therefore be managed as a Class III Visual Resource Management Area. The objective of this class is to partially retain the existing character of the landscape; the level of change to the landscape should be moderate. Management activities may attract attention, but should not dominate the view of the causal observer (VRM Manual 8410).

ENVIRONMENTAL CONSEQUENCES

Consequences Common to Alternative A, Proposed Action and Alternative E, No Action

Direct and Indirect Impacts

Under these alternatives, there are no proposed rangeland improvements or surface disturbing activities, and therefore no impact to visual resources including form, line, color, or texture of the existing landscape.

Consequences Common to Alternative B, Deferred Grazing During Critical Period, Alternative C, Grazing During Dormant Season and Alternative D, No Grazing

Direct and Indirect Impacts

The proposed fence construction projects under these alternatives would meet visual resource management objectives. The overall change to the visual resources may attract attention, but would not dominate the view of the causal observer.

SOCIOECONOMICS

AFFECTED ENVIRONMENT

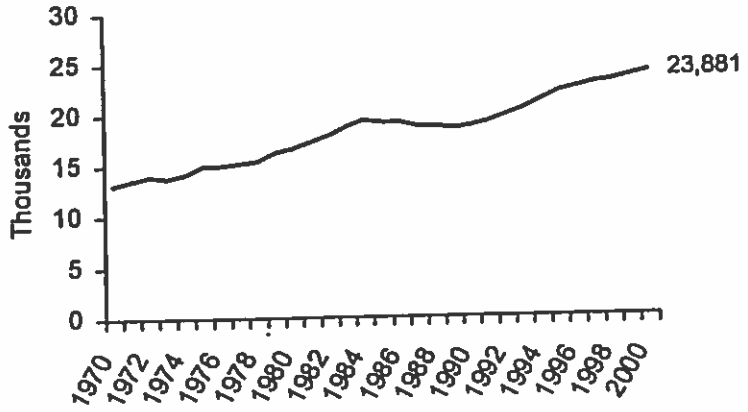
Livestock grazing is recognized as an important aspect of the local custom, culture, and economy in Montezuma County and is supported in its 1997 Comprehensive Land Use Plan. Livestock grazing is also recognized as an appropriate use of public lands in the Presidential Proclamation that established the Monument.

Montezuma County is located in southwestern Colorado and is predominantly rural. As of 1994, the county included 1,303,012 acres of which 29 percent or 372,591 acres were in private ownership (Preston 2001). Furthermore, of the 372,591 acres in private ownership, 230,842 acres or 62 percent were assessed as grazing land (Preston 2001).

From 1970 to 2000 Montezuma County grew by 10,834 people, an 83 percent increase in

population as illustrated in Figure 1 below (BEA REIS 2000 CD, Table CA30).

Figure 1. Population in Montezuma County from 1970 to 2000.



Between 1990 and 2001 the population of Montezuma County increased 29 percent, or 5,327 people for a total of 24,000. This time period also marks the beginning of an upward trend in rural residential development in the county, with 80 percent of the growth in the 1990s occurring in the unincorporated areas of the county (Preston 2004). This trend in residential development has resulted in an increase in the subdivision of agricultural land. Table 13, provides summary data on this trend in Montezuma County from 1970 to 2000.

Table 13. Montezuma County Agriculture Land Subdivision Trends by Decade: 1970 to 2000.

	1950/60s	1970s	1980s	1990s	Total
Agricultural Parcels Subdivided	6	25	29	68	128
Acres Subdivided	402	3,672	2,171	12,781	19,026
Average Agricultural Parcel Size	67	147	75	188	149
Subdivision Lots Created	237	531	623	704	2,095
Average Subdivision Parcel Size	1.69	6.92	3.48	18.15	9.08

Source: Montezuma County Planning Office

One result of the increased subdivision of agricultural land in Montezuma County was the establishment of the Landowner Initiated Zoning (LIZ) system. Through LIZ the county has "encouraged cluster development and facilitated the establishment of zoning to protect neighborhoods that wished to remain agricultural. Much of the productive agricultural land in the Montezuma Valley has been moved into agricultural zoning. Recent subdivision has been primarily in the pinyon-juniper landscape. The open parcels in and around the City of Cortez, have not seen the establishment of a zoning pattern leaving a lot of unresolved questions about the future expansion of Cortez and the desire to retain openness and agricultural character of the landscape along highway corridors and surrounding future urban growth" (Preston 2004).

The Montezuma County Comprehensive Land Use Plan emphasized the public's desire to sustain the rural character and wildlife populations in the county. The plan specifically stated that "Declines in federal grazing, will result in the declines in ranching and agriculture, which will result in declines in privately maintained open space and wildlife."

The three livestock operators holding permits for the seven allotments analyzed in this EA, are required to hold base property. Base property is private land, defined in 43 CFR 4100.0-5 (1) as "Land that has the capability to produce crops or forage that can be used to support authorized livestock for a specified period of the year." The acres of base property, which keeps the three livestock operators' permits in good standing are summarized in Table 14 below.

Table 14. Applicants' base property acreage for the seven allotments analyzed in the EA.

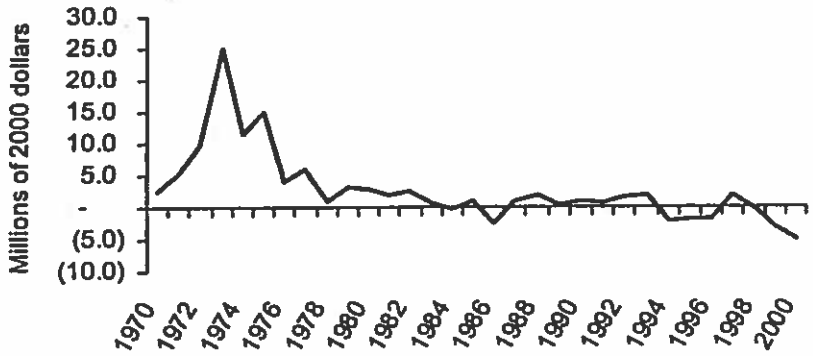
Livestock Operator	Base Property Acreage
W. Wesley Wallace (applicant one)	5,325
Steve, Jay and Tim Wallace (applicant two)	594
Laymon Family Living Trust (applicant three)	1,038
TOTAL	6,957

Source: Dolores Public Lands Office

Based on the data presented in Table 14, the total amount of base property held by the three applicants is 6,957 acres. All of this base property is located in Montezuma County. This base property is 1.9 percent of the 372,591 acres in private ownership, and 3.0 percent of the 230,842 acres of private land assessed as grazing land in Montezuma County. It should be noted that upon review of applicant one's base properties it was determined that 5,108 acres or 96 percent of these properties are unfenced land, surrounded by existing federal grazing allotments. As a result, these base properties cannot be used separately from the surrounding public land to provide forage for authorized livestock, during that period of time when livestock grazing is not allowed on public land. Therefore, applicant one's base property may not meet the requirements to be classified as "base property". An administrative review, outside this EA, will be preformed to determine if these 5,108 acres qualify as base property.

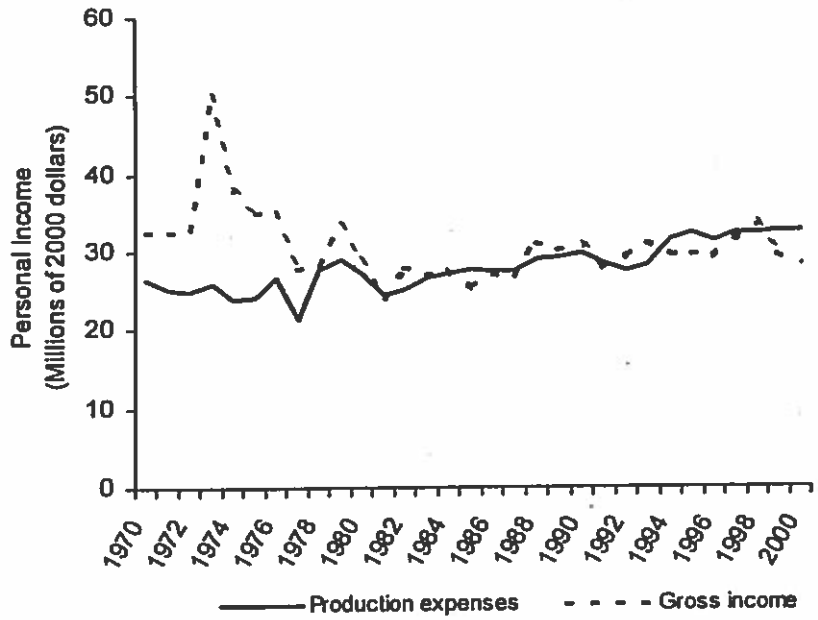
Net income from farming and ranching in the county has dropped from $2 million in 1970 to negative $5 million in 2000 as illustrated in Figure 2 below (BEA REIS 2000 CD, Table CA45).

Figure 2. Net farm income in Montezuma County from 1970 to 2000.



In 1970 gross farm income exceeded production expenses by $6 million. By 2000, gross farm income minus production expenses (i.e., realized net income) equaled negative $4.4 million (BEA REIS 2000 CD, Table CA45).

Figure 3. Gross farm income vs. production expenses in Montezuma County from 1970 to 2000.



Farm employment in the year 2000 in Montezuma County was 873 or 6.4 percent of total employment. In contrast, farm employment was 701 or 13.6 percent of total employment in the county in 1970. The percent change in county farm employment from 1970 to 2000 in Montezuma County was negative 7.2 percent (BEA REIS 2000 CD, Table CA25).

Within the Monument there are currently 9,794 AUMs authorized for livestock grazing under 21 individual livestock operations under section three Taylor Grazing Act (TGA) permits. Furthermore, 95 percent of the land area within the Monument is permitted for livestock grazing. The three applicants hold a total of 3,152 active permitted AUMs in the seven allotments considered in this EA. These 3,152 active permitted AUMs represent 32 percent of the total current AUM allocations for livestock grazing in the Monument. A January 2002 inventory of all cattle and calves in Montezuma County totaled 19,000 (Colorado Department of Agricultural 2002). The applicants' existing permits provide authorization to seasonally (i.e., winter and spring annually) graze about 888 cattle, or 4.7 percent of the total number of cattle in the county. If the average actual use or expected use figure of 1,894 AUMs from Table 6 is applied to this calculation, then the applicant's existing permits provide authorization to seasonally graze about 399 cattle, or 2.1 percent of the total number of cattle in the county.

Livestock grazing provides direct and indirect benefits to local economies. Assuming all 3,152 AUMs under the existing permit are used for livestock grazing, then permit fees associated with these AUMs directly generate $4,255.20 per year, of which 12.5 percent, or $531.90 is returned to the State of Colorado. The state then distributes this $531.90 among its four Boards of Grazing Advisors, using an established formula. The portion of this $531.90 that is distributed to the Montrose Board of Grazing Advisors is then disbursed to local ranchers, using a 50/50 matching-funds formula, for use in range improvement and maintenance projects on public lands. If the average actual use or expected use figure of 1,894 AUMs from Table 6 is applied to this

calculation, then permit fees associated with the AUMs directly generate $2,556 per year, of which 12.5 percent, or $319.61 is returned to the State of Colorado.

To accurately assess the economic viability of the three applicants' livestock operations, personal economic data would be required. Some of these data include the applicants' production expenses (e.g., labor, capital, rent, taxes) and other income sources (e.g., wages, salary, dividends, interest, rent, transfer payments). These data are not available, nor does the BLM want to make public, personal financial information for the three livestock applicants. However, one means of estimating the net revenues generated by the three applicants, from their livestock operations on the seven allotments, is to review estimates of production costs and returns for many typical Colorado operations. The 2000 to 2001 Colorado Livestock Enterprise Budget (budget) developed by the Colorado State University Cooperative Extension provides such an estimate. Based on a typical cow-calf operation of 250 cows this budget estimated a net value per cow of negative $34.32. This negative net value per cow is consistent with the overall trend of negative net income from farming and ranching in Montezuma County illustrated in Figure 2.

The budget does not represent all types of livestock production systems and should not be interpreted to reflect the actual budgets of the three applicants' operations. However, it does provide a reasonable estimate of the net value per cow, based on actual farm operations, data from actual records, and/or budget studies for the state of Colorado. Factors that could change this budget estimate include an operator's own level of debt, labor expenses, etc. In addition to personal economic data, another variable which would affect the current budget's projections is the market price for cattle, which fluctuates over time.

Market cycles in the livestock industry have been relatively consistent for many decades. Prices hit lows near the middle of each decade, and the number of breeding animals is sold down. By the transition between decades, breeding herds have been reduced to a point where demand causes prices to rise, which triggers a gradual expansion of breeding herds resulting in declining prices toward the middle of the next decade. When prices are adjusted for inflation, there is also a steady long term decline in relative purchasing power from livestock sales as illustrated in Table 15.

Table 15. Colorado average annual steer and heifer prices per hundred weight in current dollars and adjusted to 1980 dollars.

	1980	1985	1990	1995	2000
Steers and Heifers cwt.	$66.80	$59.90	$80.00	$66.60	*$89.50
Inflation Adjustment 1980	1.000	0.729	0.645	0.528	*0.482
Adjusted 1980 dollars	$66.80	$43.67	$51.60	$35.16	*$43.14

Source: 1980-1995 Colorado Ag Statistics adjusted for inflation to 1980 dollars using Denver-Boulder Consumer Price Index. * 2000 based on weighted average, Greeley Producers, March 7, 2000 adjusted to 1980 Denver-Boulder CPI as of 1998.

Regardless of the negative net income from farming and ranching in Montezuma County, livestock grazing contributes to the local economy. Livestock grazing indirectly generates additional monies throughout local communities by supporting local services and acquisition of goods related to the livestock industry. In Montezuma County, gross cash receipts for livestock

and livestock products in 2001 totaled $8,961,000, while net cash receipts for all agricultural sales in the same year equaled $4,845,000 (Colorado Department of Agricultural 2002). The exact amount that cash receipts from livestock and livestock products contributed to the net cash receipts for all agricultural sales in 2001 is unknown. Furthermore, the proportion of these totals that are directly attributable to livestock grazing on the seven allotments analyzed in this EA is also unknown. However, as noted, the existing 3,152 AUMs or 888 cattle permitted to graze seasonally account for 4.7 percent of the total number of cattle and calves in Montezuma County in January 2002. In contrast, the average actual or expected use over the last few decades, on the seven allotments, has been 1,894 AUMs or about 2.1% of the total number of cattle and calves in Montezuma County in January 2002.

Last, aside from the economics of livestock grazing there is a question of its role in the heritage, culture and aesthetics of Montezuma County. As part of a previous grazing permit renewal process, Montezuma County convened three focus groups. These focus groups included four ranching families. Focus group participants were asked why they stay in ranching. A summary of their responses to this question is provided below.

"In some cases, people have never known any other way of making a living. Some have done other things and came back to full time ranching because they like the 'way of life' that goes with it. Others continue to have additional sources of income and spend virtually all their 'free time' operating a family ranch for the same 'way of life' reasons" (Preston 2001).

ENVIRONMENTAL CONSEQUENCES

Categories of socioeconomic impacts analyzed in this section include: 1) permit fees; 2) applicants' and local goods-and-services-providers' livestock generated revenues; 3) applicants' and local goods-and-services-providers' economic viability; 4) privately maintained open space and wildlife; and 5) local culture and custom. To more accurately determine the socioeconomic impacts of each alternative the average actual or expected use AUM data in Table 6 were used. These data (i.e., average actual or expected use) were compared to the permitted use AUMs for each applicants' allotments, and for the seven allotments overall under each alternative. The results of this analysis are presented in Table 16 on the following page.

Alternative A, Proposed Action

Direct and Indirect Impacts

Under this alternative, the permitted AUMs (i.e., 3,754) are greater than the average use (i.e., average actual or expected) AUMs (i.e., 1,894) for the seven allotments combined. The difference between the permitted and average use AUMs for all seven allotments is positive 1,860. Furthermore, the permitted AUMs for each applicants' allotment(s) are also greater than the average use AUMs. Assuming future AUM use on the seven allotments remains consistent with historic, average AUM use the effects of the alternative on: 1) permit fees; 2) applicants' and local goods-and-services-providers' livestock generated revenues; 3) applicants' and local goods-and-services-providers' economic viability; 4) privately maintained open space and wildlife; and 5) local culture and custom would be minimal. Again, this "minimal impact" determination is made assuming that the applicants' future AUM use would be consistent with

Table 16. Difference between average actual or expected use AUMs to permitted AUMs.

Allotment	Avg. Actual Use	Avg. Expected Use	Total of Avgs.	Permitted Use	Alt A	Difference from Avg.	Alt B	Difference from Avg.	Alt C	Difference from Avg.	Alt D	Difference from Avg.	Alt E	Difference from Avg.
APPLICANT ONE														
Yellow Jacket	300		300	707	707	407	243	-57	243	-57	0	-300	707	407
Goodman Gulch		53	53	61	61	8	21	-32	21	-32	0	-53	61	8
Sand Canyon East		44	44	52	52	8	36	-8	36	-8	0	-44	52	8
Sand Canyon West		21	21	24	24	3	12	-9	12	-9	0	-21	24	3
Flodine Park	349		349	596	596	247	211	-138	211	-138	0	-349	596	247
SUBTOTAL	649	118	767	1,440	1,440	673	523	-244	523	-244	0	-767	1,440	673
APPLICANT TWO														
Hamilton Mesa	350		350	595	595	245	600	250	600	250	0	-350	595	245
SUBTOTAL	350		350	595	595	245	600	250	600	250	0	-350	595	245
APPLICANT THREE														
Cahone Mesa	777		777	1,117	1,719	942	829	52	829	52	0	-777	1,117	340
SUBTOTAL	777		777	1,117	1,719	942	829	52	829	52	0	-777	1,117	340
TOTAL	1,776	118	1,894	3,152	3,754	1,860	1,952	58	1,952	58	0	-1,894	3,152	1,258

* All units are in animal units per month (AUMs), or the amount of forage required to sustain one cow and calf or its equivalent for one month.

their average, historic use that is documented in Table 6.

Alternative B, Deferred Grazing During Critical Period

Direct and Indirect Impacts
Under this alternative, the permitted AUMs (i.e., 1,952) are greater than the average (i.e., actual or expected) use AUMs (i.e., 1,894) for the seven allotments combined. The difference between the permitted and average use AUMs for all seven allotments is positive 58. The permitted AUMs for applicant two's and three's allotment(s) are also greater than the average use AUMs, by a factor of positive 308. However, applicant one's permitted AUMs (i.e., 523) are less than the average use AUMs (i.e., 767) for the five allotments under his permit, by a factor of negative 244.

Assuming future AUM use on the seven allotments remains consistent with historic, average AUM use the effects of the alternative on: 1) permit fees associated with allotments held under permit by applicants two and three; 2) applicant two's and three's and local goods-and-services-providers' livestock generated revenues; 3) applicant two's and three's and local goods-and-services-providers' economic viability; and 4) local culture and custom would be minimal.

Reducing applicant one's, four allotments by 244 AUMs would result in impacts, due to the level of permitted AUMs being less than the average use AUMs on his allotments. This reduction would affect permit fees generated. Total average use (i.e., 1,894 AUMs) on the seven allotments results in $319.61 being returned to the Colorado Boards of Grazing Advisors each year. Under this alternative, the impact to the Colorado Boards of Grazing Advisors would be a decrease of $41.17 to the $319.61 generated, on average, from permit fees under the existing permit for these allotments.

The effect of reducing applicant one's, four allotments by 244 AUMs on privately maintained open space and wildlife in Montezuma County is uncertain. As stated, applicant one has 5,325 acres of base property in Montezuma County as part of his permit for these four allotments. This represents 1.4 percent of the 372,591 acres in private ownership, and 2.3 percent of the 230,842 acres of private land assessed as grazing land in Montezuma County. Applicant one's decision to continue using this private property for agricultural purposes, versus selling the property to a willing buyer for residential development or possibly developing the property himself depends on several factors. First and foremost, this property is privately held and therefore, applicant one has the right to change the existing use or sell the property at his discretion. Factors that could persuade applicant one to either keep or remove his base property from its current agricultural use are numerous. Some of these include increasing land values, demand in the real estate market for rural, agricultural land, his personal financial status and goals, his interest to continue working in the agricultural sector, his ability to replace lost AUMs with other sources of forage, his willingness to participate in the county LIZ system and future county planning efforts to protect agricultural lands.

Aside from these factors affecting applicant one's desire and/or ability to leave his base property in an agricultural use, the economic viability of his livestock operations could play a role. If AUMs were reduced to a level where applicant one could not stay in business, they may choose to sell their base properties. However, as noted, under this alternative applicant one's permit would be reduced by 244 AUMs, as compared to the average, historic use on these allotments. Based on data from the 2000 to

2001 Colorado Livestock Enterprise Budget and trend of negative net income from farming and ranching in Montezuma County illustrated in Figure 2, it is possible that this reduction could result in an increase to applicant one's personal income.

The analysis in this EA also demonstrates that Alternative B, would result in improvements in rangeland health conditions. These improvements in rangeland health conditions would make progress towards achieving some of the BLM Standards for Public Land Health in Colorado, not currently being achieved. With improvements in land health resulting from this alternative, the sustainability of livestock grazing on these allotments would be improved. Subsequently, the economic viability of applicant one's livestock operations could be improved as a result of a more productive, sustainable rangeland being available for his or other operators' future use. Also, improving the economic viability of applicant one's livestock operations would support preserving the ranching culture in Montezuma County.

Alternative C, Grazing During Dormant Season

Direct and Indirect Impacts
Under this alternative, the same number of AUMs as authorized under Alternative B would be permitted (i.e., 1,952 AUMs). As a result, the potential impacts disclosed under Alternative C would be similar.

Alternative D, No Grazing

Direct and Indirect Impact
Under this alternative, there would be no permitted AUMs on the seven allotments. This would result in a total of 1,894 average use AUMs not being available for livestock grazing on the seven allotments overall. Broken down across the three applicants the reduction in average use AUMs would be 767 for applicant one, 350 for applicant two and 777 for applicant three.

Under this alternative, the cost to the Colorado Boards of Grazing Advisors would be the loss of $319.61 per year from permit fees, assuming future AUM use on the seven allotments remains consistent with historic, average AUM use.

The effect of reducing the three applicants', seven allotments by 1,894 AUMs on privately maintained open space and wildlife in Montezuma County is uncertain. As stated, the three applicants have a total of 6,957 acres of base property in Montezuma County as part of their permits for the seven allotments. Again, this represents 1.9 percent of the 372,591 acres in private ownership, and 3.0 percent of the 230,842 acres of private land assessed as grazing land in Montezuma County. The three applicants' decisions to continue using this private property for agricultural purposes, versus selling the property to a willing buyer for residential development or possibly developing the property themselves depends on several factors. First and foremost, this property is privately held and therefore, the applicants have the right to change the existing use or sell the property at their discretion. Factors that could persuade the three applicants to either keep or remove their base property from its current agricultural use are numerous. Some of these include increasing land values, demand in the real estate market for rural, agricultural land, their personal financial status and goals, their interest to continue working in the

agricultural sector, their ability to replace lost AUMs with other sources of forage, their willingness to participate in the county LIZ system and future county planning efforts to protect agricultural lands.

Aside from these factors affecting the applicants' desires and/or abilities to leave their base property in an agricultural use, the economic viability of their livestock operations could play a role. If AUMs were reduced to a level where the applicants could not stay in business, they may choose to sell their base properties. However, as noted, broken down across the three applicants the reduction in average use AUMs, under this alternative, would be 767 for applicant one, 350 for applicant two and 777 for applicant three. Also, the actual operator under applicant three's permit for the Cahone Mesa Allotment is unknown. Applicant three has held the permit for Cahone Mesa Allotment for the past ten years. During this time period applicant three, who resides in another state, has never grazed his own livestock on the allotment. Instead, applicant three has always transferred the permit to another livestock operator. At the time of this analysis, applicant three has not transferred the permit to another livestock operator or pursued grazing their own cattle on the allotment. However, based on data from the 2000 to 2001 Colorado Livestock Enterprise Budget and trend of negative net income from farming and ranching in Montezuma County illustrated in Figure 2, it is possible that this reduction could result in an increase to applicant one's and two's personal income, as well as to the personal income of the future operator under applicant three's permit.

Not permitting livestock grazing on these allotments could also result in a decrease to livestock-generated revenues to local goods-and services providers, assuming an alternate location could not be found to seasonally graze the same number of cattle by the applicants. As noted, in Montezuma County gross cash receipts for livestock and livestock products in 2001 totaled $8,961,000, while net cash receipts for all agricultural sales in the same year equaled $4,845,000 (Colorado Agricultural Statistics 2002). The proportion that the 1,894 average use AUMs or 399 cattle, not permitted to graze seasonally under this alternative, could contribute to this total is unknown. However, assuming that future AUM use on the seven allotments remains consistent with historic, average AUM use these 399 cattle represent 2.1 percent of the total number of cattle and calves in Montezuma County in January 2002.

As noted, under this alternative there would be a reduction of 1,894 average use AUMs. Furthermore, this AUM reduction equals 399 cattle or 2.1 percent of the total number of cattle and calves in Montezuma County in January 2002. As a result, the impact of this alternative on the heritage, culture and aesthetics of Montezuma County would be minimal.

Alternative E, No Action

Direct and Indirect Impacts

Under this alternative, the permitted AUMs (i.e., 3,152) are greater than the average use AUMs (i.e., 1,894) for the seven allotments combined. The difference between the permitted and average use AUMs for all seven allotments is positive 1,258. Furthermore, the permitted AUMs for each applicants' allotment(s) are also greater than the average use AUMs. Assuming future AUM use on the seven allotments remains consistent with historic, average AUM use the effects of the alternative on: 1) permit fees; 2) applicants' and local goods-and-services-providers' livestock generated revenues; 3) applicants' and local goods-and-services-providers' economic viability; 4) privately maintained

open space and wildlife; and 5) local culture and custom would be minimal. Again, this "minimal impact" determination is made assuming that the applicants' future AUM use would be consistent with their average, historic use that is documented in Table 6.

Cumulative Impacts

This section analyzes the incremental impacts of Alternative E, No Action and Alternative D, No Grazing described in this EA, with similar past and reasonably foreseeable future actions on the socioeconomics Montezuma County. All other resource values have been evaluated for cumulative impacts, and found to be negligible.

Table 17 lists all of the past, present and reasonably foreseeable future actions considered in this cumulative impact analysis. All total, these actions cover twelve allotments. For the purpose of this analysis the six permit holders for these twelve allotments are referred to as operators one through six. Ten of these allotments are located on the Monument, while the other two (i.e., North Hay Camp, Rio Lado) are managed by the U.S. Forest Service on the San Juan National Forest. Of the ten allotments located on the Monument seven are addressed in this EA, one was addressed in the Rock Creek EA and associated decision record in 1999, and two others will be addressed in the near future through the Aztec Canyon and Sandstone EAs. It should be noted that the ten allotments located in the Monument have, are or will be analyzed through the NEPA process. However, changes (i.e., season of use) to the grazing permits for North Hay Camp and Rio Lado Allotments were made through administrative actions by the U.S. Forest Service. These changes were made as a direct result of the livestock operator not complying with the terms and conditions of his permit. The livestock operator on both the North Hay Camp and Rio Lado Allotments is applicant one.

Table 17. Past, present and reasonably foreseeable future actions considered in the cumulative impact analysis.

Allotment	Status	Managing Agency	Acres	% of Total Monument Acres
Yellow Jacket	Decision Pending	BLM	300	0.2
Goodman Gulch	Decision Pending	BLM	319	0.2
Sand Canyon East	Decision Pending	BLM	2,264	1.4
Sand Canyon West	Decision Pending	BLM	377	0.2
Flodine Park	Decision Pending	BLM	349	0.2
Hamilton Mesa	Decision Pending	BLM	7,577	4.6
Cahone Mesa	Decision Pending	BLM	22,925	14.0
Aztec Canyon	Decision Pending	BLM	1,829	1.1
Sandstone	Decision Pending	BLM	22,676	13.8
Rock Creek	Decision Record Signed in 1999	BLM	1,832	1.1
North Hay Camp	Administrative Action Taken in 2002	U.S. Forest Service	[1]22,671	[2]n/a
Rio Lado	Administrative Action Taken in 2004	U.S. Forest Service	[1]21,123	[2]n/a
		TOTAL	104,242	36.8

[1] These are total acres for the North Hay Camp Allotment; acres identified as suitable for grazing on these allotments are 21,452.
[2] These acres are located in the San Juan National Forest, not the Monument.

The Monument strategy for addressing livestock grazing issues includes making decisions through both individual grazing permit renewal EAs and the Monument RMP, which is currently under development. In order to address Monument grazing issues in a timely manner three separate EAs, covering nine allotments, will be completed prior to the Monument RMP being finished. These three EAs include this EA and the Aztec Canyon and Sandstone EAs, which are currently being developed.

Once these three EAs are completed, no additional grazing permit renewal EAs will be completed until following the completion of the Monument RMP. Once the Monument RMP is completed and a record of decision is signed, additional NEPA documents will be completed to renew grazing permits for the remaining allotments on the Monument. With the Monument RMP completed, efficiencies should be realized through referencing or tiering these NEPA documents to the analysis completed in the environmental impact statement (EIS) portion of the Monument RMP.

Therefore, cumulative impact analyses will be completed for socioeconomic issues through the three grazing permit renewal EAs and in the Monument RMP. The cumulative impact analysis, completed as part of this EA, is considering all past, present and reasonably foreseeable future actions. As additional foreseeable future actions are reasonably determined, they will be added to cumulative impact analyses in future NEPA documents (i.e., EAs, EISs). This will include future actions developed as part of the ongoing San Juan National Forest/San Juan/San Miguel RMP Revision process.

Cumulative impacts in this EA are analyzed using two scenarios. Through these two scenarios all of the past, present and reasonably foreseeable future socioeconomic actions are analyzed. Categories of cumulative impacts analyzed in this section include: 1) permit fees; 2) operators' and local goods-and-services-providers' livestock generated revenues; 3) operators' and local goods-and-services-providers' economic viability; 4) privately maintained open space and wildlife; and 5) local culture and custom. To more accurately determine the socioeconomic impacts under each scenario the average actual or expected use AUM data were used. These data (i.e., average actual or expected use) were compared to the permitted use AUMs for each operators' allotments, and for the twelve allotments overall under each scenario. The results of this analysis are presented in Table 18.

Table 18. Difference between average actual or expected use AUMs to permitted AUMs under scenario one and two.

Allotment	Avg. Actual Use	Avg. Expected Use	Total of Avgs.	Scenario One	Difference from Avg.	Scenario Two	Difference from Avg.
Yellow Jacket	300		300	707	407	0	-300
Goodman Gulch		53	53	61	8	0	-53
Sand Canyon East		44	44	52	8	0	-44
Sand Canyon West		21	21	24	3	0	-21
Flodine Park	349		349	596	247	0	-349
Hamilton Mesa	350		350	595	245	0	-350
Cahone Mesa	777		777	1,117	942	0	-777
Aztec Canyon	80		80	102	22	0	-80
Sandstone	1,291		1,291	2,201	910	0	-1291
Rock Creek	15		15	[1]43	[1]28	[1]0	[1]-15
North Hay Camp	1,945		1,945	2,225	280	[2]n/a	[2]n/a
Rio Lado	1,042		1,042	685	-357	[2]n/a	[2]n/a
TOTAL	6,149	118	6,267	8,408	2,743	0	-3,280

* All units are in animal units per month (AUMs), or the amount of forage required to sustain one cow and calf or its equivalent for one month.

[1] The decision record signed for Rock Creek stated that the permit for this allotment is non-transferable and will be terminated when the current permittee retires from the business of grazing her own cattle. Based on this decision, scenario one includes the existing AUM level and scenario two includes zero AUMs for this allotment.

[2] Zero AUMs were not added to scenario two for North Hay Camp and Rio Lado because these are not reasonably foreseeable future

actions for these allotments.

Under scenario one the existing permitted AUMs are listed for each allotment. This essentially reflects the No Action Alternative for each allotment. The decision record signed for the Rock Creek Allotment in 1999, left the AUM level at 43. Changes (i.e., season of use) to the grazing permits for the North Hay Camp and Rio Lado Allotments were made through administrative actions by the U.S. Forest Service in 2002 and 2004, respectively. Again, these administrative actions were taken as a result of the livestock operator not complying with the terms and conditions of his permit. Prior to these administrative actions, the permitted AUM levels for North Hay Camp and Rio Lado Allotments were 3,203 and 910, respectively.

Under scenario two all of the allotments, except North Hay Camp and Rio Lado, have zero AUMs. This scenario reflects the No Grazing Alternative. As presented in Table 18, zero AUMs were not listed for North Hay Camp and Rio Lado Allotments because these are not reasonably foreseeable future actions for these allotments. Though administrative actions were taken to address operator, noncompliance issues there is no foreseeable action considering a reduction or elimination of grazing on these allotments. Zero AUMs were listed under this scenario for the Rock Creek Allotment. As presented in Table 18, the 1999 decision record for Rock Creek stated that the permit for this allotment is non-transferable and will be terminated when the current permittee retires from the business of grazing her own cattle. Therefore, analyzing a zero AUM scenario for this allotment is reasonable.

Six livestock operators hold permits for the twelve allotments considered in this cumulative impact analysis. The acres of base property, which keeps the six livestock operators' permits in good standing are summarized in Table 19 below.

Table 19. Base property acreage in Montezuma County for the twelve allotments.

Allotment	Base Property Acreage
Yellow Jacket, Goodman Gulch, Sand Canyon East, Sand Canyon West, Flodine Park, Hay Camp North, Rio Lado	5,325
Hamilton Mesa	594
Cahone Mesa	1,038
Aztec Canyon	640
Sandstone	2,935
Rock Creek	104
TOTAL	10,636

Source: Dolores Public Lands Office

Based on the data presented in Table 19, the total amount of base property held by the six livestock operators in Montezuma County is 10,636 acres. There is also an additional 320 acres of private land in Dolores County that serves as base property for the Sandstone Allotment. The base property in Table 19 is 2.9 percent of the 372,591 acres in private ownership, and 4.6 percent of the 230,842 acres of private land assessed as grazing land in Montezuma County.

Scenario One

Under this scenario, the permitted AUMs (i.e., 8,408) are greater than the average use (i.e., average actual or expected) AUMs (i.e., 6,267) for the twelve allotments combined. The difference between

the permitted and average use AUMs for all twelve allotments is positive 2,141. Furthermore, the permitted AUMs for each operators' allotment(s) are also greater than the average use AUMs. Assuming future AUM use on the twelve allotments remains consistent with historic, average AUM use the effects of scenario one on: 1) permit fees; 2) operators' and local goods-and-services-providers' livestock generated revenues; 3) operators' and local goods-and-services-providers' economic viability; 4) privately maintained open space and wildlife; and 5) local culture and custom would be minimal. Again, this "minimal impact" determination is made assuming that the operators' future AUM use would be consistent with their average, historic use.

Scenario Two

Under this scenario, there would be no permitted AUMs on ten of the twelve allotments. As noted, zero AUMs were not a reasonable foreseeable action for both North Hay Camp and Rio Lado Allotments. Therefore, these allotments were not considered under scenario two. This would result in a total of 3,280 average use AUMs not being available for livestock grazing on the ten allotments overall. Broken down across the six operators the reduction in average use AUMs would be 767 for operator one, 350 for operator two, 777 for operator three, 80 for operator four, 1,291 for operator five and 15 for operator six.

Under this alternative, the cost to the Colorado Boards of Grazing Advisors would be the loss of $553.50 per year from permit fees, assuming future AUM use on the ten allotments remains consistent with historic, average AUM use.

The effect of reducing the six operators', ten allotments by 3,280 AUMs on privately maintained open space and wildlife in Montezuma County is uncertain. As stated, the six operators have a total of 10,636 acres of base property in Montezuma County as part of their permits for the ten allotments. Again, this represents 2.9 percent of the 372,591 acres in private ownership, and 4.6 percent of the 230,842 acres of private land assessed as grazing land in Montezuma County. The six operators' decisions to continue using this private property for agricultural purposes, versus selling the property to a willing buyer for residential development or possibly developing the property themselves depends on several factors. First and foremost, this property is privately held and therefore, the operators have the right to change the existing use or sell the property at their discretion. Factors that could persuade the six operators to either keep or remove their base property from its current agricultural use are numerous. Some of these include increasing land values, demand in the real estate market for rural, agricultural land, their personal financial status and goals, their interest to continue working in the agricultural sector, their ability to replace lost AUMs with other sources of forage, their willingness to participate in the county LIZ system and future county planning efforts to protect agricultural lands.

Aside from these factors affecting the operators' desires and/or abilities to leave their base property in an agricultural use, the economic viability of their livestock operations could play a role. If AUMs were reduced to a level where the operators could not stay in business, they may choose to sell their base properties. However, as noted, broken down across the six operators the reduction in average use AUMs, under this alternative, would be 767 for operator one, 350 for operator two, 777 for operator three, 80 for operator four, 1,291 for operator five and 15 for operator six. Also, the actual operator under operator three's permit for the Cahone Mesa Allotment is unknown. Operator three has held the permit for Cahone Mesa Allotment for the past ten years. During this time period operator three, who

resides in another state, has never grazed their own livestock on the allotment. Instead, operator three has always transferred the permit to another livestock operator. At the time of this analysis, operator three has not transferred the permit to another livestock operator or pursued grazing their own cattle on the allotment. Based on data from the 2000 to 2001 Colorado Livestock Enterprise Budget and trend of negative net income from farming and ranching in Montezuma County illustrated in Figure 2, it is possible that this reduction could result in an increase to the operators' personal incomes, as well as to the personal income of the future operator under operator three's permit.

Not permitting livestock grazing on these allotments could also result in a decrease to livestock-generated revenues to local goods-and services providers, assuming an alternate location could not be found to seasonally graze the same number of cattle by the operators. As noted, in Montezuma County gross cash receipts for livestock and livestock products in 2001 totaled $8,961,000, while net cash receipts for all agricultural sales in the same year equaled $4,845,000 (Colorado Agricultural Statistics 2002). The proportion that the 3,280 average use AUMs or 1,271 cattle, not permitted to graze seasonally under this scenario, could contribute to this total is unknown. However, assuming that future AUM use on the ten allotments remains consistent with historic, average AUM use these 1,217 cattle represent 6.7 percent of the total number of cattle and calves in Montezuma County in January 2002.

As noted, under this scenario there would be a reduction of 3,280 average use AUMs. Furthermore, this AUM reduction equals 1,271 cattle or 6.7 percent of the total number of cattle and calves in Montezuma County in January 2002. As a result, the impact of this alternative on the heritage, culture and aesthetics of Montezuma County would be minimal.

IV. CONSULTATION AND COORDINATION

PERSONS, GROUPS AND AGENCIES CONSULTED

A copy of the EA was mailed directly to the contacts below on February 3, 2004, for a 30-day public comment period. At the request of several members of the public a 38 day extension to the public comment period for the EA was provided, resulting in a total of 68 days for public comments to be submitted on the EA.

EA Applicant One W. Wesley Wallace,
Colorado Cattlemen's Association,
Colorado Division of Wildlife,
U.S. Fish and Wildlife Service,
Montezuma County Commissioners,
Individuals and organizations who submitted written comments on EA CO-038-99-066,
Monument Advisory Committee,
The Northern Ute Tribe,
The Ute Mountain Ute Tribe,
The Southern Ute Tribe,
The Navajo Nation,
The Hopi Tribe,
The Jicarilla Apache Tribe, and

The Pueblos of Acoma, Cochiti, Isleta, Jemez, Laguna, Nambe, Picuris, Pojoaque, Santa Ana, Santo Domingo, Sandia, San Juan, San Ildefonso, Santa Clara, San Felipe, Tesuque, Taos, Zia, and Zuni.

PUBLIC NOTIFICATION

Notification of the availability of the EA for a 68-day public comment period, was made through the local media, Monument website (http://www.co.blm.gov/canm/index.html), and the December through March, 2004 edition of the Schedule of Proposed Actions publication for the Monument. In addition, the actual EA was made available for a 68-day public comment period through the Monument website, by request, by direct mailings as identified above, and at the Monument headquarters office at the AHC.

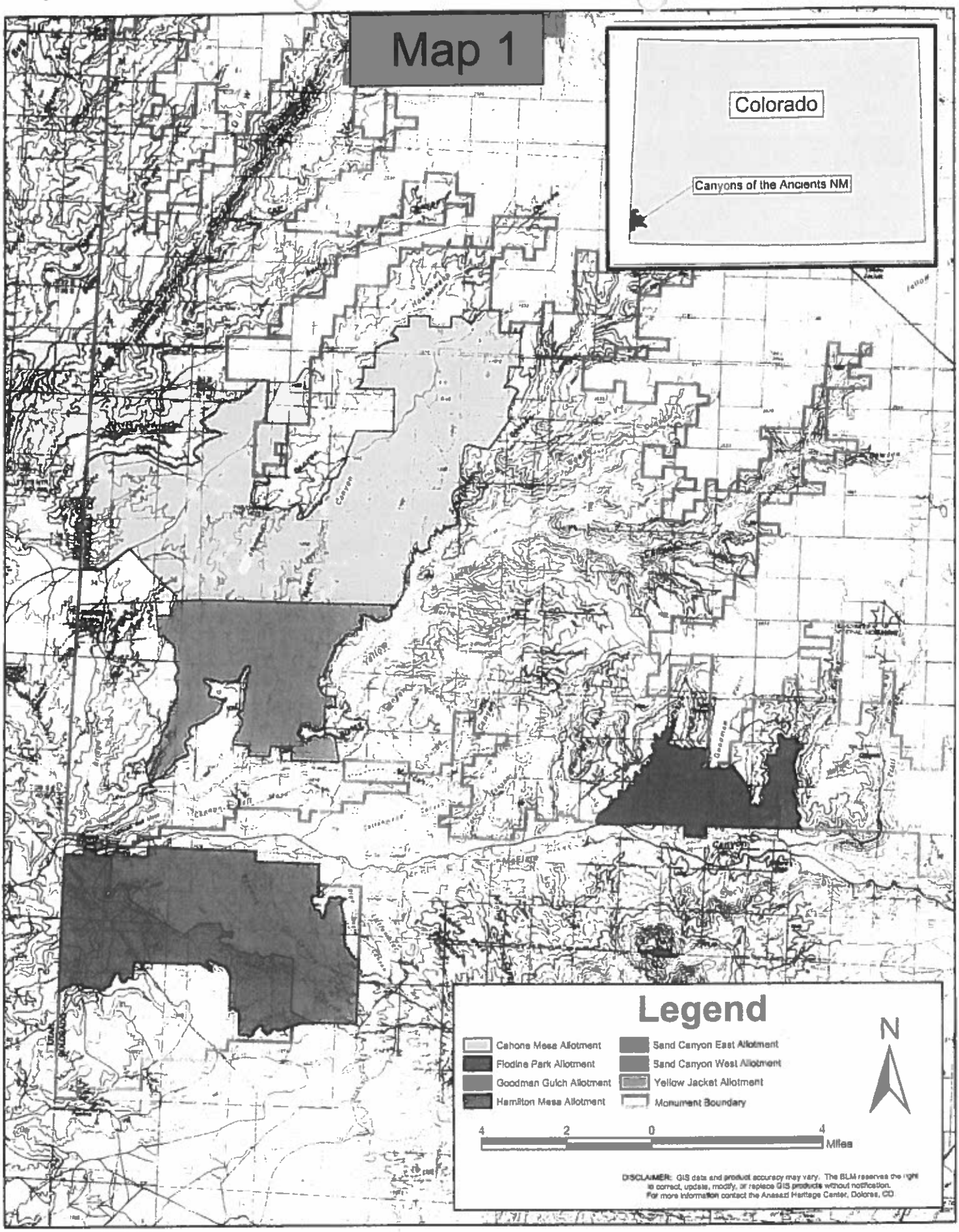
PUBLIC COMMENTS

All written comments received during the 68-day public comment period were reviewed and considered. Comments that presented new data or addressed the adequacy of the document, the alternatives, or the analysis are responded to in Appendix J. There were also many comments, which although not required to be addressed, are clarified in Appendix J. Comments expressing personal opinion or that had no specific relevance or accuracy of the EA were considered, but not responded to directly.

V. LIST OF PREPARERS

Bureau of Land Management's:

LouAnn Jacobson, Monument Manager
Steve Kandell, Planner and Environmental Coordinator
Kathy Nickell, Wildlife Biologist
Penny Wu, Outdoor Recreation Planner
Shauna Jensen, Hydrologist
Leslie Stewart, Ecologist
Mike Jensen, Range Management Specialist
Laura Kochanski, Archaeologist


Map 1
Colorado
Canyons of the Ancients NM
Legend
Cahone Mesa Allotment
Flodine Park Allotment
Goodman Gulch Allotment
Hamilton Mesa Allotment
Sand Canyon East Allotment
Sand Canyon West Allotment
Yellow Jacket Allotment
Monument Boundary
N
4 2 0 4
Miles
DISCLAIMER: GIS data and product accuracy may vary. The BLM reserves the right to correct, update, modify, or replace GIS products without notification.
For more information contact the Anasazi Heritage Center, Dolores, CO

STANDARDS
FOR PUBLIC HEALTH

AND

GUIDELINES
FOR LIVESTOCK GRAZING MANAGEMENT

IN COLORADO
November 1996

Standards for Public Land Health

STANDARD 1: *Upland soils* exhibit infiltration and permeability rates that are appropriate to soil, type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.

Indicators:

- Expression of rills and soil pedestals is minimal.
- Evidence of actively-eroding gullies (incised channels) is minimal.
- Canopy and ground cover are appropriate.
- There is litter accumulating in place and is not sorted by normal overland water flow.
- There is appropriate organic matter in soil.
- There is a diversity of plant species with a variety of root depths.
- Upland swales have vegetation cover or density greater than that of adjacent uplands.
- There are vigorous, desirable plants.

STANDARD 2: *Riparian systems* associated with both running and standing water, function properly and have the ability to recover from major disturbances such as fire, severe grazing, or 100-year floods. Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.

Indicators:

- Vegetation is dominated by an appropriate mix of native or desirable introduced species.
- Vigorous, desirable plants are present.
- There is vegetation with diverse age class structure, appropriate vertical structure, and adequate composition, cover, and density.
- Streambank vegetation is present and is comprised of species and communities that have root systems capable of withstanding high streamflow events.
- Plant species present indicate maintenance of riparian moisture characteristics.

- Stream is in balance with the water and sediment being supplied by the watershed (e.g., no headcutting, no excessive erosion or deposition).
- Vegetation and free water indicate high water tables.
- Vegetation colonizes point bars with a range of age classes and successional stages.
- Ac active floodplain is present.
- Residual floodplain vegetation is available to capture and retain sediment and dissipate flood energies.
- Stream channels have appropriate size and meander patterns for the streams' position in the landscape, and parent materials.
- Woody debris contributes to the character of the stream channel morphology.

STANDARD 3: Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential. Plant and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.

Indicators:

- Noxious weeds and undesirable species are minimal in the overall plant community.
- Native plant and animal communities are spatially distributed across the landscape with a density, composition, and frequency of species suitable to ensure reproductive capability and sustainability.
- Plants and animals are present in mixed age classes sufficient to sustain recruitment and mortality fluctuations.
- Landscapes exhibit connectivity of habitat or presence of corridors to prevent habitat fragmentation.
- Photosynthetic activity is evident throughout the growing season.
- Diversity and density of plant and animal species are in balance with habitat/landscape potential and exhibit resilience to human activities.
- Appropriate plant litter accumulates and is evenly distributed across the landscape.
- Landscapes are composed of several plant communities that may be in a variety of successional stages and patterns.

STANDARD 4: Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Indicators:

- All the indicators associated with the plant and animal communities standard apply.
- There are stable and increasing populations of endemic and protected species in suitable habitat.
- Suitable habitat is available for recovery of endemic and protected species.

STANDARD 5: The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the State of Colorado, Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and antidegradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303© of the Clean Water Act.

Indicators:

- Appropriate populations of macroinvertabrates, vertebrates, and algae are present.
- Surface and ground waters only contain substances (e.g., sediment, scum, floating debris, odor, heavy metal precipitates on channel substrate) attributable to humans within the amounts, concentrations, or combinations as directed by the Water Quality Standards established by the State of Colorado (5 CCR 1002-8).

Colorado Livestock Grazing Management Guidelines

1. Grazing management practices promote plant health by providing for one or more of the following:
   - periodic rest or deferment from grazing during critical growth periods;
   - adequate recovery and regrowth periods; and
   - opportunity for seed dissemination and seedling establishment.

2. Grazing management practices address the kind, numbers, and class of livestock, season, duration, distribution, frequency and intensity of grazing use and livestock health.

3. Grazing management practices maintain sufficient residual vegetation on both upland and riparian sites to protect the soil from wind and water erosion, to assist in maintaining appropriate soil infiltration and permeability, and to buffer temperature extremes. In riparian areas, vegetation dissipates energy, captures sediment, recharges ground water, and contributes to stream stability.

4. Native plant species and natural revegetation are emphasized in the support of sustaining ecological functions and site integrity. Where reseeding is required, on land treatment efforts, emphasis will be placed on using native plant species. Seeding of non-native species will be considered based on local goals, native seed availability and cost, persistence of non-native plants and annuals and noxious weeds on the site, and composition of non-natives in the seed mix.

5. Range improvement projects are designed consistent with overall ecological functions and processes with minimum adverse impacts to other resources or uses of riparian/wetland and upland sites.

6. Grazing management will occur in a manner that does not encourage the establishment or spread of noxious weeds. In addition to mechanical, chemical, and biological methods of weed control, livestock may be used where feasible as a tool to inhibit or stop the spread of noxious weeds.

7. Natural occurrences such as fire, drought, flooding, and prescribed land treatments should be combined with livestock management practices to move toward the sustainability of biological diversity across the landscape, including the maintenance, restoration, or enhancement of habitat to

promote and assist the recovery and conservation of threatened, endangered, or other special status species, by helping to provide natural vegetation patterns, a mosaic of successional stages, and vegetation corridors, and thus minimizing habitat fragmentation.

8. Colorado Best Management Practices and other scientifically developed practices that enhance land and water quality should be used in the development of activity plans prepared for land use.

POTENTIAL DETERMINATIONS AND THEIR CAUSAL FACTOR(S) FOR ALL STANDARDS

Table B-1. Summary of potential determinations and their causal factor(s) for the upland soils and healthy, productive plant and animal communities standards, on all allotments.

Alternative	ALLOTMENTS					
	Cahone Mesa	Yellow Jacket	[1]Sand Canyon East and West	Hamilton Mesa	Flodine Park	Goodman Gul
Alternative A	not achieving	not achieving	not achieving	not achieving	not achieving	not achieving
Causal Factor(s)	decrease in fire cycle, livestock grazing	livestock grazing	current and historic livestock grazing	decrease in fire cycle, livestock grazing	livestock grazing	livestock grazin
Alternative B	move toward achieving	move toward achieving	move toward achieving	move toward achieving	move toward achieving	move tow achieving
Causal Factor(s)	decrease in fire cycle, livestock grazing	livestock grazing	current and historic livestock grazing	decrease in fire cycle, livestock grazing	livestock grazing	livestock grazin
Alternative C	move toward achieving	move toward achieving	move toward achieving	move toward achieving	move toward achieving	move toward achieving
Causal Factor(s)	decrease in fire cycle, livestock grazing	livestock grazing	current and historic livestock grazing	decrease in fire cycle, livestock grazing	livestock grazing	livestock grazin
Alternative D	move toward achieving	move toward achieving	move toward achieving	move toward achieving	move toward achieving	move toward achieving
Causal Factor(s)	decrease in fire cycle, limited seed source	limited seed source	historic livestock grazing, limited seed source	decrease in fire cycle, limited seed source	limited seed source	limited seed source
Alternative E	not achieving	not achieving	not achieving	not achieving	not achieving	not achieving
Causal Factor(s)	decrease in fire cycle, livestock grazing	livestock grazing	current and historic livestock grazing	decrease in fire cycle, livestock grazing	livestock grazing	livestock grazin

[1] Determinations for these allotments were made together, due to their similar conditions and no separation by fencing or topographic features.

Table B-2. Summary of potential determinations and their causal factor(s) for the riparian systems standard, on all allotments.

Alternative	ALLOTMENTS					
	Cahone Mesa	Yellow Jacket	[1]Sand Canyon East and West	Hamilton Mesa	Flodine Park	Goodman Gulch
Alternative A	not achieving	not achieving	[2]n/a	not achieving	not achieving	[2]n/a
Causal Factor(s)	historic homestead site, livestock grazing, upstream land uses	[4]upstream land uses, livestock grazing		[4]upstream land uses, livestock grazing	[4]upstream land uses, livestock grazing	
Alternative B	not achieving	not achieving	[2]n/a	not achieving	not achieving	[2]n/a
Causal Factor(s)	[4]upstream land uses, livestock grazing, historic homestead site	[4]upstream land uses		[4]upstream land uses	[4]upstream land uses	
Alternative C	not achieving	not achieving	[2]n/a	not achieving	not achieving	[2]n/a
Causal Factor(s)	[4]upstream land uses, livestock grazing	[4]upstream land uses		[4]upstream land uses	[4]upstream land uses	
Alternative D	achieve	not achieving	[2]n/a	not achieving	not achieving	[2]n/a
Causal Factor(s)	[3]n/a	[4]upstream land uses		[4]upstream land uses	[4]upstream land uses	
Alternative E	not achieving	not achieving	[2]n/a	not achieving	not achieving	[2]n/a
Causal Factor(s)	historic homestead site, livestock grazing	[4]upstream land uses, livestock grazing		[4]upstream land uses, livestock grazing	[4]upstream land uses, livestock grazing	

[1] Determinations for these allotments were made together, due to similar range conditions and no separation by fencing or topographic features.
[2] Determination not required, as a result of standard being achieved.
[3] Determination not required, as a result of standard being achieved.
[4] Upstream land uses include, but are not limited to agriculture on private property.

Table B-3. Summary of potential determinations and their causal factor(s) for the special status, threatened and endangered species standard, on all allotments.

Alternative	ALLOTMENTS					
	Cahone Mesa	Yellow Jacket	[1]Sand Canyon East and West	Hamilton Mesa	Flodine Park	Goodman Gul
Alternative A	achieving	not achieving	not achieving	not achieving	not achieving	achieving
Causal Factor(s)	[2]n/a	livestock grazing	recreation use, livestock grazing	livestock grazing	livestock grazing	[2]n/a
Alternative B	achieving	move toward achieving	not achieving	move toward achieving	move toward achieving	achieving
Causal Factor(s)	[2]n/a	livestock grazing	recreation use, livestock grazing	livestock grazing	livestock grazing	[2]n/a
Alternative C	achieving	move toward achieving	not achieving	move toward achieving	move toward achieving	achieving
Causal Factor(s)	[2]n/a	livestock grazing	recreation use, livestock grazing	livestock grazing	livestock grazing	[2]n/a
Alternative D	achieving	achieving	not achieving	achieving	achieving	achieving
Causal Factor(s)	[2]n/a	[2]n/a	recreation use	[2]n/a	[2]n/a	[2]n/a
Alternative E	achieving	not achieving	not achieving	not achieving	not achieving	achieving
Causal Factor(s)	[2]n/a	livestock grazing	recreation use, livestock grazing	livestock grazing	livestock grazing	[2]n/a

[1] Determinations for these allotments were made together, due to similar conditions and no separation between them by fencing or topographic features.

[2] Determination not required, as a result of standard being achieved.

Table B-4. Summary of potential determinations and their causal factor(s) for the water quality standard, on all allotments.

Alternative	ALLOTMENTS					
	Cahone Mesa	Yellow Jacket	[1]Sand Canyon East and West	Hamilton Mesa	Flodine Park	Goodman Gulch
Alternative A	not achieving	not achieving	[2]n/a	achieving	achieving	[2]n/a
Causal Factor(s)	livestock grazing	[4]upstream land uses, livestock grazing		[3]n/a	[3]n/a	
Alternative B	achieving	not achieving	[2]n/a	achieving	achieving	[2]n/a
Causal Factor(s)	[3]n/a	[4]upstream land uses		[3]n/a	[3]n/a	
Alternative C	achieving	not achieving	[2]n/a	achieving	achieving	[2]n/a
Causal Factor(s)	[3]n/a	[4]upstream land uses		[3]n/a	[3]n/a	
Alternative D	achieving	not achieving	[2]n/a	achieving	achieving	[2]n/a
Causal Factor(s)	[3]n/a	[4]upstream land uses		[3]n/a	[3]n/a	
Alternative E	not achieving	not achieving	[2]n/a	not achieving	not achieving	[2]n/a
Causal Factor(s)	livestock grazing	[4]upstream land uses, livestock grazing		livestock grazing	livestock grazing	

[1] Determinations for these allotments were made together, due to similar range conditions and no separation by fencing or topographic features.

[2] Standard was not present in the allotment.

[3] Determination not required, as a result of standard being achieved.

[4] Upstream land uses include, but are not limited to agriculture on private property.

TERMS AND CONDITIONS THAT APPLY TO ALTERNATIVES A, B AND C

Resource/Livestock Management

1. The terms and conditions of this grazing permit could be modified if additional information indicates that a revision is necessary to conform with Title 43 CFR 4180, or if livestock use is jeopardizing cultural resources on public lands.

2. All grazing use shall be in accordance with the grazing regulations found in 43 CFR 4100, and shall meet the requirements as described in Appendix A - BLM Standards for Public Land Health in Colorado. All livestock grazing use shall be managed according to BLM Guidelines for Livestock Grazing Management in Colorado (Appendix A).

4. An Annual Operating Plan (AOP) would be reviewed by the permittee and BLM, at least fourteen days prior to initiation of grazing use. The AOP would address the grazing rotation for every permitted allotment, as well as range improvements that would be worked on during that grazing season. Failure to participate in reviewing the AOP would result in delays in turnout authorization.

6. During the dormant season (i.e., October 1st through February 28th) livestock numbers may be increased to make use of the full amount of permitted AUMs during a shortened grazing season. These changes must be applied for and approved in advance of the grazing season.

7. During the critical growing season (i.e., March 1st through May 31st) livestock numbers may not be increased above the livestock numbers on the permit.

8. Utilization levels shall not exceed 50 percent on key forage species of current year's growth as measured at the key monitoring sites.

9. Pasture moves could be adjusted two days before or after the planned move/release date. Livestock in a pasture more than two days before or after the planned move/release date, without prior approval, would be subject to an unauthorized use action.

10. The placement of salt blocks, supplemental feed, water tanks, holding pens or other facilities on public lands requires prior authorization from BLM. Proposed locations should be flagged prior to seeking authorization. All archaeological and/or historic sites must be avoided.

11. Maintenance of all structural range improvements and other projects (e.g., reservoirs, springs, corrals, roads, etc.) would be the responsibility of the permittee to which it has been assigned. Maintenance would be in accordance with cooperative agreements and/or range improvement permits. This written authorization must be on-site when the work is being completed. Failure to maintain assigned projects in a satisfactory condition may result in withholding authorization to graze livestock until maintenance is completed.

12. The permittee is responsible for informing all persons associated with their livestock operation that they are subject to prosecution for knowingly disturbing Native American shrines, historic and prehistoric archaeological sites, or for collecting artifacts of any kind, including historic items, and/or arrowheads and pottery shards from Federal lands.

13. If archaeological or historic sites are discovered during livestock operations on the allotment, the BLM would be notified as soon as possible so that further deterioration and resource loss can be prevented.

14. As provided for in Title 43 CFR 4130.3-2 (h), the permittee shall provide reasonable administrative access across private and leased lands to the BLM for the orderly management and protection of the public lands.

Administrative

15. No member of, or delegate to, Congress or Resident Commissioner, after his election or appointment, or either before or after he has qualified, and during his continuance in office, and no officer, agent, or employee of the Department of the Interior, other than members of advisory committees appointed in accordance with the Federal Advisory Committee Act (5 U.S.C. App.1) and Sections 309 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) shall be admitted to any share or part in a permit or lease, or derive any benefit to arise therefrom; and the provision of section 3741 Revised Statutes (41 U.S.C. 22; 18 U.S.C. Sections 431-433, and 43 CFR Part 7), enter into and form a part of a grazing permit or lease, so far as the same may be applicable.

TERMS AND CONDITIONS THAT APPLY TO ALTERNATIVES A, B, C AND E

Resource/Livestock Management

16. Livestock grazing use that is different from that authorized by a permit or lease must be applied for prior to the grazing period and must be filed with and approved by the authorized officer before grazing use can be made.

17. Where a rotational grazing system is operating properly, there would be no livestock grazing on every pasture at a minimum of one year out of every three during the critical period (i.e., March 1st through May 31st). If this critical period rest is not provided, the entire allotment could be closed to livestock grazing the following spring (i.e., March 1st through May 31st). Where a rotational grazing system is not functioning properly, or appropriate, the entire allotment would be closed to livestock grazing at a minimum of one year out of every three during the critical period.

18. An accurate actual grazing use report showing use by pasture must be turned in within fifteen days after completing grazing use.

19. Grazing permits or leases are subject to the terms and conditions of allotment management

plans if such plans have been prepared. Allotment management plans must be incorporated in permits or leases when completed.

Administrative

20. Grazing fee payments are due on the date specified on the billing notice and must be paid in full within fifteen days of the due date, except as otherwise provided in the grazing permit or lease. If payment is not made within that time frame, a late fee (the greater of $25 or 10 percent of the amount owed but not more that $250) would be assessed.

21. Billing notices are issued which specify fees due. Billing notices, when paid, become a part of the grazing permit or lease. Grazing use cannot be authorized during any period of delinquency in the payment of amounts due. Including settlement for unauthorized use.

22. Grazing permit or lease terms and conditions and the fees charged for grazing use are established in accordance with all the provisions of the grazing regulations now or hereafter approved by the Secretary of the Interior.

23. This grazing permit/lease is subject to cancellation, in whole or in part, at any time because of:
    a. Noncompliance by the permittee/lessee with rules and regulations.
    b. Loss of control by the permittee/lessee of all or a part of the property upon which it is based.
    c. A transfer of grazing preference by the permittee/lessee to another party.
    d. A decrease in the lands administered by the BLM within the allotment(s) described.
    e. Repeated willful unauthorized grazing use.

24. Those holding permits or leases must own or control and be responsible for the management of livestock authorized to graze.

25. The permittee's/lessee's grazing case file is available for public inspection as required by the Freedom of Information Act.

26. Grazing permits or leases are subject to the nondiscrimination clauses set forth in Executive order 11246 of September 24, 1964, as amended. A copy of this order may be obtained from the authorized officer.

TERMS AND CONDITIONS THAT APPLY TO ALTERNATIVE E

Resource/Livestock Management

27. No more than 50 percent utilization of Akey@ forage species, and no more than 30 percent of the active preference for these allotments would be used during the critical period, (i.e., March 1st through May 31st).

Administrative

28. The authorized officer may require counting and/or additional or special marking or tagging of the livestock authorized to graze.

SUMMARY OF WEATHER RECORDS

Table D-1. Three weather stations: Hovenweep National Monument, elevation 5,240 feet; Yellow Jacket, elevation 6,860 feet; and Cortez, elevation 6,210 feet.

Station	Year	Feb – May precipitation	Average for station	Percent of average	Annual precipitation	Average for station	Percent of Average
Hovenweep	1999	3.43	3.48	99%	8.12	10.8	75%
	2000	3.51		100%	9.41		87%
	2001	1.79		51%	5.82		54%
Yellow Jacket	1999	5.07	4.6	110%	12.8	15.79	81%
	2000	3.21		70%	14.86		94%
	2001	4.09		89%	12.85		81%
Cortez	1999	4.13	4.02	103%	9.36	12.84	73%
	2000	3.58		89%	9.45		74%
	2001	2.42		60%	8.53		66%

RANGELAND HEALTH ATTRIBUTES AND INDICATORS

Biotic Integrity

For the biotic integrity attribute, ten site indicators were given a qualitative rating based on a description of degree of departure from a desired reference condition for a particular ecological site (see Map ? for locations of sample points). Indicators were rated on whether they matched what was expected for the site, or the degree of departure from expected conditions; slight to moderate, moderate, moderate to extreme or an extreme departure. The indicators that were used for biotic integrity were:

- Soil surface resistance to erosion – degree of development of organic matter or biological crusts between or beneath plant canopies.
- Soil surface loss or degradation – degree to which soil surface horizon is intact.
- Compaction layer – degree of development of a layer that restricts water movement and root penetration.
- Functional/Structural group – degree of departure from the expected number of functional or structural group and expected number of species in each group. These are suites of species that have similar roles in ecosystem processes such as nitrogen fixing ability, type of root structure or shoot height, life cycle or photosynthetic pathways such as annual or perennial lifecycle and cool or warm season species.
- Plant mortality and/or decadence - degree of departure from expected levels of mortality or decadence.
- Litter amount – degree of departure from expected litter cover.
- Annual production – degree of departure from that expected for the ecological site during a similar precipitation year.
- Invasive plants – degree of presence, from rarely present to dominant on the site.
- Reproductive capability of perennial plants – capability of plants to produce seed or vegetative tillers relative to recent climatic conditions, intact throughout the site with entire suite of functional groups or limited to protected areas for only some functional groups.
- Biological crusts – degree of continuity throughout the site and proportion of suite of functional groups present.

Site-Soil Stability and Hydrologic Function

For these attributes, 13 site indicators were given a qualitative rating based on a description of degree of departure from a desired reference condition for a particular ecological site. Indicators were rated on whether they matched what was expected for the site, or the degree of departure from expected conditions, slight to moderate, moderate, moderate to extreme or an extreme departure. The indicators that were used for soil and site stability (S) and hydrologic function (H) were:

- Degree of rill formation and recent activity (S&H).
- Degree of development of water flow patterns and recent activity (S&H).
- Presence of pedestals and terracettes and recent activity (S&H).
- Amount and size of bare ground patches and connectivity (S&H).
- Degree of gully formation and recent activity (S&H).
- Presence and extent of wind scoured blowouts and deposition areas (S).
- Movement of litter (H).
- Soil surface resistance to erosion – degree of development of organic matter or biological crusts between or beneath plant canopies (S&H).
- Soil surface loss or degradation – degree to which soil surface horizon is intact (S&H).
- Degree of affect of plant community composition and distribution on infiltration and runoff (H).
- Compaction layer – degree of development of a layer that restricts water movement and root penetration (S&H).
- Amount of litter (H).
- Biological crusts – degree of continuity throughout the site and proportion of suite of functional groups present (S&H).

SPECIES COMPOSITION

Table F-1. Species composition as a percent of a desired reference condition, percent of acres in each composition class for each allotment.

Allotment	0 – 25% similar	26 – 50% similar	51 – 64% similar	65 – 100% similar	Trend
Cahone Mesa	28%	50%	13%	9%	Downward
Flodine Park	63%	22%	8%	7%	Downward
Goodman Gulch	0%	7%	47%	46%	No Studies
Hamilton Mesa	36%	41%	22%	1%	Stable to Downward
Sand Canyon East and West	22%	21%	51%	6%	No Studies
Yellow Jacket	2%	50%	40%	6%	Stable to Downward
Total for all Allotments	*29%*	*44%*	*16%*	*7%*	

Typically, communities that are less than 65% similar to a reference are not satisfactory especially if trends are static or downward (Range Analysis and Management Training Guide, USDA R2). Only 7% of the acres for all allotments are 65% or more similar. The Goodman Gulch allotment has 46% of its acres above 65% similar. The Sand Canyon and Yellow Jacket allotments had about 50% of their acres more than 50% similar to a reference. The Cahone Mesa, Flodine Park and Hamilton Mesa allotments have from 77% to 85% of their acres less than 50% similar to the reference.

Production information by lifeform was collected during the rangeland health assessment. Precipitation for the two years preceding the rangeland health assessment was close to average for the spring period of growth but below average for the year. The year of the assessment, 2001, was below average both during the spring period and for the year (Appendix D-Summary of Weather Records).

Annual grasses and forbs made up a large proportion of the vegetative communities on many of the allotments (Table F-2).

Table F-2. Proportion of production by life form.

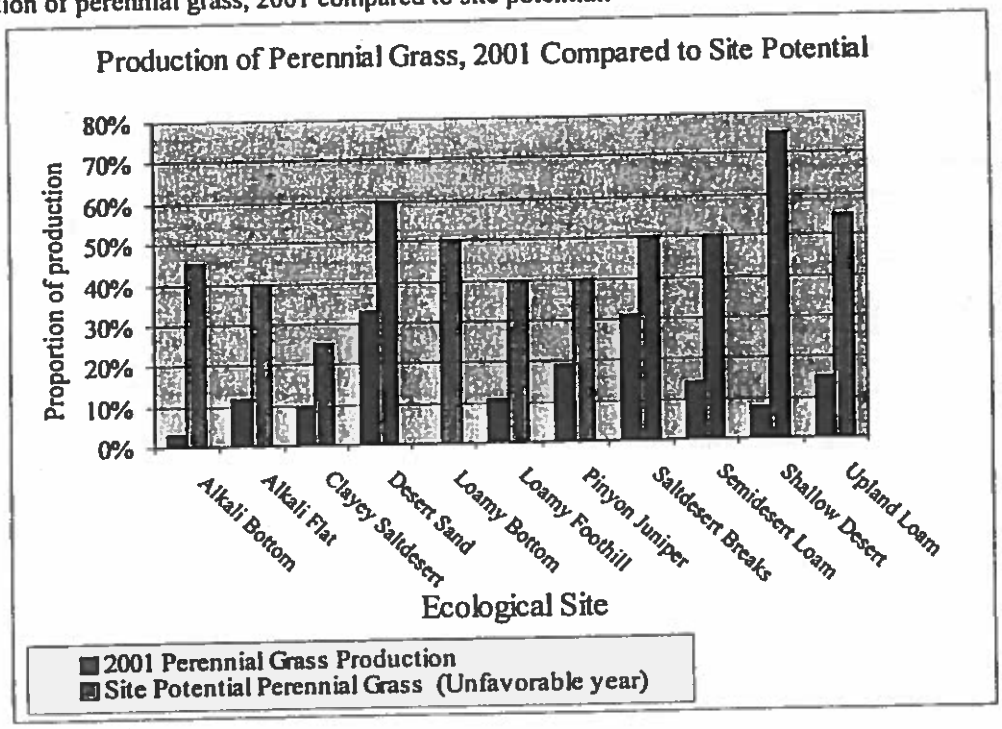
Allotment	Annual Grasses	Annual Forbs	Perennial Grasses	Perennial Forbs	Shrub
Cahone Mesa	22%	13%	17%	7%	40%*
Flodine Park	45%	15%	13%	3%	24%
Goodman Gulch	12%	10%	41%	11%	26%
Hamilton Mesa	33%	10%	9%	1%	47%*
Sand Canyon East and West	11%	8%	33%	6%	42%*
Yellow Jacket	24%	13%	27%	6%	30%*
Total for all Allotments	*28%*	*13%*	*16%*	*5%*	*39%*

*A high proportion of shrub production is big sagebrush

Five ecological sites have a high proportion, about 50% or more of total production made up of annual species. These ecological sites are Alkali bottom, Alkali Flat, Clayey Saltdesert, Desert Sand and Loamy Foothills. Desert Sand and Saltdesert Breaks ecological sites have about 30% of total production made up of perennial grasses.

The following graph displays a comparison of the existing proportion of perennial grass production compared to potential for the ecological site (NRCS Ecological Site descriptions, unfavorable year).

Figure F-1. Production of perennial grass, 2001 compared to site potential.

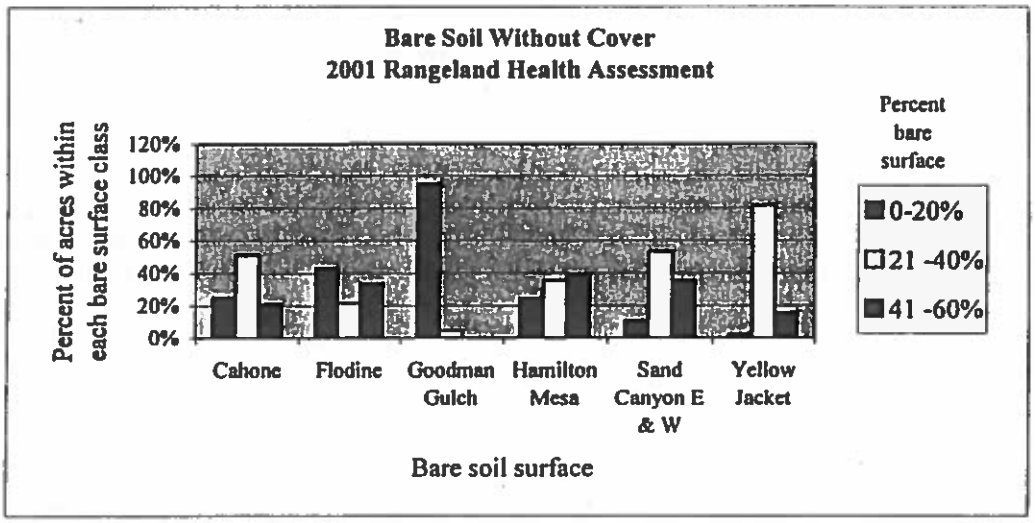


Ground Cover

The amount of bare soil has a direct effect on soil and site stability and hydrologic function (Pellant et al., 2000). Bare soil is a soil surface without living vegetative cover, vegetative litter, rock, or biological crust cover. Cheatgrass can add a significant amount of litter to a site, but the widely fluctuating cheatgrass populations and light 'trashy' nature of the litter makes it less dependable as a soil protective cover. Sites on the Monument thought to represent close to reference conditions had on average 20% bare soil. Except for Goodman Gulch, 57% to 97% of each allotment had more than 20% bare soil surface, 16 to 39% of each allotment had more than 40% bare soil surface.

If only the cover on the ground surface is considered, that is, bare soil without regard to overstory vegetative canopy, the percentages of bare soil increase for the Flodine Park and Cahone Mesa Allotments. This would mean that under an overstory canopy there is either less litter or fewer biological crusts. Erosional forces associated with raindrop impact are not an issue for this additional amount of bare soil, however, overland flow would be. For Flodine Park the proportion of the allotment with more than 20% bare soil increases from 58% to 88%, the amount with over 40% bare soil increases from 34% to 49%. For Cahone Mesa the proportion of the allotment with more than 20% bare soil increases from 75% to 83%, the amount with over 40% bare soil increases from 21% to 26%.

Figure F-2. Bare soil without cover, 2001 rangeland health assessment.



The amount of bare ground is a direct indication of site susceptibility to accelerated wind or water erosion (Pellant et al., 2000; Branson et al., 1981, page 112 - 117). When a soil does not have aerial cover, such as a vegetative canopy or surface cover such as biological crust, litter, rock or plant base, the site is more susceptible to raindrop splash erosion, decreasing infiltration, and increasing sediment suspension. Overland flow increases as a direct result, and if unimpeded by surface cover, will collect and cause erosion and sedimentation.

Soil Stability

Soil stability was measured during the rangeland health assessment with the Slake test (Pellant et al. 2000) to evaluate infiltration rates both under plant canopy and in the interspaces between plant canopies. For the allotments, soil stability was reduced in plant interspaces for a majority of the sites. There was a correlation between the amount of bare soil on a site and the soil stability rating in the plant interspaces. Sites with more bare soil were less stable, had lower infiltration rates, indicating less incorporated organic matter and a higher potential for erosion. Soils with decreased infiltration rates have an increase in overland flow resulting in more water available for sediment transport (Branson et al, pg 132, 1981).

Reference sites in the Monument averaged a soil stability rating of four on a scale of zero to six, six being the most stable. For all of the allotments being considered 66% of the area rated a three or less. Allotments with proportionally more acres with the lower values were, Cahone Mesa, Flodine Park and Hamilton Mesa.

Biological Crusts

Biological crusts are a living soil surface cover consisting of cyanobacteria, green algae, lichens, mosses and fungi. These crusts reduce wind and water erosion of soil surfaces. In cool deserts of the Colorado Plateau, biological crusts generally increase water infiltration (Belnap et al.2001, pg 35 - 40). The cyanobacteria and cyanolichens that are a common component of biological crusts in this area, are an important source of fixed nitrogen for plants (Belnap et al.2001, pg 31). Studies have shown that many native species have higher seedling establishment where crusts are more developed. Alien species such as cheatgrass have reproductive strategies that are not adapted to sites with crust cover and seedling establishment is reduced (Belnap et al.2001, pg 33).

Biological crusts are easily disturbed by hoof or foot impacts, vehicles and bicycles and by high intensity fire. The lichen and moss components are less tolerant of disturbance than the cyanobacterial component. Frequent disturbance will maintain the biological crust in a low successional stage of poorly developed cyanobacteria without the lichen or moss components. The positive effects of biological crusts such as nitrogen fixation, protection from wind and water erosion and increased infiltration, are higher where crusts are more developed. Biological crusts on soils high in clay suffer higher impacts when disturbed while wet, while crusts on soils high in sand are more sensitive when dry. Recovery rates vary greatly depending on the intensity of the disturbance, local climate, soil texture and shading availability. Cyanobacteria, the most common component of biological crusts, begins to recover from disturbance relatively quickly, 14 to 34 years on the Colorado Plateau. The cyanolichen component will take more than 50 years to recover. Later successional lichens and

mosses will take several hundred years to recover (Belnap et al. 2001, pg 46). Because of this pattern of recovery, the species components that are present and their abundance will give an indication of the intensity and time since the disturbance occurred. Sites with a higher lichen or moss component are well developed with the longest period since disturbance. Sites with only cyanobacteria would indicate more recent or frequent disturbance. Cyanolichens are a good indicator of disturbed sites allowed to recover within the last 50 years.

Within the Monument, the highest biological crust cover value sampled was 60% and the lowest 0%. The highest values for individual components were 45% cyanobacteria, 29% moss and 16% lichen. Biological crust cover varied greatly depending on the amount of associated rock cover and vegetative litter as well as the level of disturbance for each site.

The highest cover values found on the allotments were 39% cyanobacteria, 24% moss and 8% lichen. Average values for all sites sampled on the allotments were 12% total biological crust cover, 8% cyanobacteria, 3% moss and 1% lichen. The Flodine Park and Yellow Jacket Allotments had the lowest average biological crust cover values, while Sand Canyon and Goodman Gulch Allotments had the highest.

Table F-3. Percentage of biological crust cover on allotments.

Allotment	Average Biological Crust Cover	Cyanobacteria	Moss	Lichen
Cahone Mesa	14%	9%	4%	1%
Flodine Park	5%	4%	2%	0%
Goodman Gulch	18%	11%	4%	3%
Hamilton Mesa	10%	7%	3%	0%
Sand Canyon East and West	23%	17%	4%	2%
Yellow Jacket	9%	6%	1%	2%
Average for all Allotments	*12%*	*8%*	*3%*	*1%*

VEGETATION PRODUCTION

Production reflects the potential for the site based on elevation, average precipitation levels, soil depth and productivity and species composition. Production levels for reference sites on the Monument during 2001 show that some areas within the Monument were within the "normal year" category while other areas fell in an "unfavorable year" category as defined for each ecological site by the NRCS Cortez Soil Survey. Precipitation during the two years prior to the rangeland health assessment was normal to below normal. Precipitation was below normal during the year the rangeland health assessment was done. See Appendix E for local precipitation records. For consistency in this assessment all production potentials were considered under an "unfavorable year" category (Table G-1).

Four of the allotments, Cahone Mesa, Goodman Gulch, Sand Canyon and Yellow Jacket are producing well below site potential; productivity of these sites may be impaired. Much of the production on these allotments is provided by annual alien species, predominantly cheatgrass and filaree. Production of these annual species is highly variable from year to year depending on winter and spring moisture. A ten-fold difference in production has been measured in consecutive years for cheatgrass (Young and Allen, 1997). Site productivity is also hampered by species such as snakeweed, which severely restricts production of associated grasses through competition and by big sagebrush and juniper, which have allelopathic properties detrimental to other plants (Holechek et al, 1998).

A high proportion of acres on these allotments are producing less than 200 pounds per acre (Table G-1). Rangelands producing less than 200 pounds per acre of forage are generally not considered suitable for livestock production (USDA – RAMTG 1996, pgs 3-9).

Table G-1. Site productivity on allotments.

Allotment	% of allotment with production below potential*	Proportion of column 1 producing less than half of potential	% of acres producing less than 200 pounds per acre*	% of total production made up of perennial species and palatable shrubs
Cahone Mesa	88%	60%	60%	36%
Flodine Park	38%	18%	38%	38%
Goodman Gulch	100%	8%	93%	67%
Hamilton Mesa	17%	100%	17%	32%
Sand Canyon	96%	91%	96%	51%
Yellow Jacket	84%	34%	84%	45%

*Total production was considered: annuals, invasives, undesirable shrubs as well as perennial species and palatable shrubs. Potential for unfavorable years (NRCS Cortez soil survey) was used.

Pinyon-Juniper Chaining

The Cahone Mesa Allotment has 4,700 acres of pinyon-juniper type that were chained in the mid to late 1970's. The purpose of the chaining treatments was to remove pinyon-juniper overstory and increase production of understory forage species. All of these sites were seeded after treatment with introduced grass species such as crested wheatgrass and intermediate wheatgrass. Of these acres 63% have returned to a pinyon-juniper/shrub type, 36% are dominated by big sagebrush and 1% is primarily crested wheatgrass.

Production on the chained areas was measured during the rangeland health assessment and averaged 333 total pounds per acre for sites sampled. Alien annual grasses and forbs made up 33% of this production. Shrubs, primarily big sagebrush, made up 45% of the production. Perennial grasses and forbs were only 22% of the total. If only perennial grasses and palatable shrubs are considered, production on all 4,700 acres of chaining averaged out at 87 pounds per acre with a stocking level of 24 acres/AUM. This is a stocking level that is well below what is recommended for livestock production.

PROPER FUNCTIONING CONDITION DEFINITIONS

- Riparian areas are functioning properly (PFC) when there is adequate vegetation and landform structure present to dissipate stream energy from high flows, thereby reducing erosion and improving water quality, filtering sediment, aiding floodplain development, improving flood water retention and ground water recharge, developing root masses that stabilize stream banks against cutting action, developing pools and channel characteristics necessary for fish production (where applicable) and other uses, and supporting greater biodiversity.

- Riparian areas are functional-at-risk (FAR) when they are functioning properly but an existing soil, water, or vegetative attribute makes them susceptible to degradation.

- Non-functioning (NF) are streams where the lack of floodplain and riparian vegetation reduce the streams' ability to dissipate water energy; thus, every major flow event can have serious impacts such as down-cutting, and excessive siltation. Riparian areas are functioning properly (PFC) where there is adequate vegetation.

LITERATURE CITED

Alan Osborn, Susan Vetter, Ralph Hartley, Laurie Walsh and Jesslyn Brown. 1985. Impacts of Domestic Livestock Grazing on the Archaeological Resources of Capitol Reef National Park, Utah. Midwest Archaeological Center Occasional Studies in Anthropology No. 20. National Park Service, Midwest Archaeological Center, Lincoln, Nebraska.

Andrews, R. and R. Righter. 1992. Colorado birds. Denver Museum of Natural History. 442 pp.

Belnap, Jayne, R. Rosentreter, Steve Leonard, J. H. Kaltrenecker, J. Williams and D. Eldridge, 2001. Biological Soil Crusts: Ecology and Management, USDI, BLM – National Science and Technology Center, 2001. Technical Reference 1730-2.

Belnap, J., and D. A. Gillette. 1998. Vulnerability of desert biological crusts to wind erosion: the influences of crust development, soil texture, and disturbance. Journal of Arid Environments 39: 133-142.

Bureau of Economic Analysis, Regional Economic Information System CD. 2000. Tables CA30, CA 45 and CA25.

BLM Colorado State Office Information Bulletin No. CO-2000-014, 2000. State Director's Sensitive Species List.

BLM, 2001. State Director's Interim Management for Canyons of the Ancients National Monument.

BLM, 2002. Interim Management for all National Monuments

Branson, Ferrel A. G.F. Gifford, K.G. Renard, and R.F. Hadley, 1981. Rangeland Hydrology. Society for Range Management, Range Science Series, second edition.

Brock, C.E., V.A. Saab, T.D. Rich, and D.S. Dobkin. 1992. Effects of livestock grazing on neotropical migratory landbirds in western North America in Finch, D.M. and P.W. Stangel, eds. 1993. Status and management of neotropical migratory birds; 1992 September 21-25; Estes Park, CO. Gen. Tech. Rep. RM-229. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 422 pp.

Clinton, William B. 2000. A Proclamation, Establishing Canyons of the Ancients National Monument.

Colorado Department of Agriculture. 2002. Colorado Agricultural Statistics.

Colorado Department of Public Health and Environment, Water Quality Control Commission, 2002. Regulation No. 31 The Basic Standards and Methodologies for Surface Water.

Colorado Department of Public Health and Environment, Water Quality Control Commission, 2002. Regulation No. 34 Classification and Numeric Standards for San Juan River and Dolores River Basins.

Colorado Department of Public Health and Environment, Water Quality Control Commission, 2002. Status of Water Quality in Colorado 2000.

Eldridge, D. J. 1998. Trampling of microphytic crusts on calcareous soils, and its impact on erosion under rain-impacted flow. Catena 33: 221-239.

Eldridge, D. J., and S. B. Greene. 1994. Microbiotic soil crusts: a review of their roles in soil and ecological processes in rangelands of Australia. Australian Journal of Soil Research 32: 289-415.

Evans, R. D., and J. R. Johansen. 1999. Microbiotic crusts and ecosystem processes. *Critical Reviews in Plant Sciences* 18: 183-225.

Fitzgerald, J.P., C.A. Meaney, D.M. Armstrong. 1994. Mammals of Colorado. Denver Museum of Natural History

and University Press of Colorado. 467 pp.
Hammerson, G.A. 1999. Amphibians and reptiles in Colorado. University Press of Colorado. 484 pp.

Harper, K. T., and J. R. Marble. 1988. A role for nonvascular plants in management of arid and semiarid rangelands. Pages 135-169 in P. T. Tueller, ed. Vegetation science applications for rangeland analysis and management. Kluwer Academic Publishers, Dordrecht.

Harper, K. T., and R. L. Pendleton. 1993. Cyanobacteria and cyanolichens: can they enhance availability of essential minerals for higher plants? *Great Basin Naturalist* 53:59-72.

Holechek, Jerry L., Rex D. Pieper and Carlton H. Herbel, 1998. Range Management Principles and Practices, third edition.

Interagency Technical Team: Cooperative Extension Service, U.S. Department of Agriculture Forest Service, Natural Resource Conservation Service Grazing land Technology Institute, U.S. Department of the Interior Bureau of Land Management. 1996. Sampling Vegetation Attributes, Interagency Technical Reference BLM/RS/ST-96/002+1730.

Issa, O. M., Y. L. Bissonnais, C. Defarge, and J. Trichet. 2001. Role of cyanobacterial cover on structural stability of sandy soils in the Sahelian part of western Niger. *Geoderma* 101: 15-30.

Johansen, J. R. 1993. Cryptogamic crusts of semiarid and arid lands of North America. Journal of Phycology 29: 140-147.

L. Stewart, BLM Ecologist, personal communication

L. Stewart, BLM Ecologist and C. Stewart, Forest Service Range Specialist, personal communication

Metting, B. 1991. Biological surface features of semiarid lands and deserts. Pages 257-293 in J. Skujins, ed. Semiarid lands and deserts: soil resource and reclamation. Marcel Dekker, Inc., New York.

Montezuma County. 1997. Montezuma Country Comprehensive Plan

National Research Council. 1994. Rangeland Health: New Methods to Classify, Inventory, and Monitor Rangelands. National Academy Press, Washington DC.

Pellant Mike, P. Shaver, D. A. Pyke and J. E. Herrick, 2000. USDI, BLM – National Science and Technology Center, Technical Reference 1734-6, Interpreting Indicators of Rangeland Health, version 3.

Preston, C.R. 1998. in Kingery, H.E., editor. Colorado breeding bird atlas. Colorado Bird Atlas Partnership and Colorado Division of Wildlife. 636 pp.

Preston, Mike. 2001. Social and Economic Assessment, San Juan Forest Boggy Draw Allotment Management Planning: 4 – 7.

Preston, Mike. 2004. Productive Harmony Analysis Interpretive Framework for Social and Economic Assessment of Southwest Colorado Communities and San Juan Public Lands DRAFT: 30 – 31.

Resource Sciences Center. Technical Reference 1737-16, A user guide to assessing proper functioning condition and the supporting science for lentic areas.

R. Ball, BLM Range Specialist, personal communication

Roney, John. 1977. Livestock and Lithics: Effects of Trampling. Bureau of Land Management, Phoenix District Office, Phoenix, Arizona.

Saab, V.A., C.E. Bock, T.D. Rich, and D.S. Dobkin. 1995. Livestock grazing effects in western North America. In Martin, T.E. and D.M. Finch, editors. Ecology and management of neotropical migratory birds a synthesis and review of critical issues. Oxford University Press. 489 pp.

T. Ireland, personal communication

United States Department of Agriculture, Forest Service. 1996. Rangeland Analysis and Management Training Guide (RAMTG), Region 2.

United States Department of the Interior, Bureau of Land Management. Riparian Area Management, Grazing Management for Riparian-Wetland Areas TR 1737-14, 1997

United States Department of the Interior, Bureau of Land Management. 1985. Record of Decision for San Juan-San Miguel Resource Management Plan and Final Environmental Impact Statement, Montrose District, Colorado

United States Department of the Interior, Bureau of Land Management. 1991. Record of Decision for San Juan-San Miguel Resource Management Plan Amendment.

United States Department of the Interior, Bureau of Land Management Riparian Area Management, Process for Assessing Proper Functioning Condition TR 1737-9 1998

United States Department of the Interior, Bureau of Land Management. 1997. Environmental Assessment, Decision Record and Finding of No Significant Impact, Standard for Public Land Health and Guidelines for Livestock Grazing Management in Colorado.

United States Department of Interior, Bureau of Land Management. 1998 Riparian Area Management, Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas TR 1737-11 1994.

United States Department of Agriculture, NRCS – Cortez Soil Survey, unpublished.

Warren, S. D. 1995. Ecological role of microphytic soil crusts in arid ecosystems. Pages 199-209 in D. Allsopp, R. R. Colwell, and D. L. Hawksworth, eds. Microbial diversity and ecosystem function. CAB International, Oxford.

Warren, S. D. 2001. Synopsis: Influence of biological soil crusts on arid land hydrology and soil stability. Pages 349-362 in J. Belnap and O. Lange, eds. Biological soil crusts: Structure, function, and management. Springer-Verlag, Berlin.

Williams, J. D., J. P. Dobrowolski, D. A. Gillette, and N. E. West. 1995a. Microphytic crust influence on wind erosion. Transactions of the American Society of Agricultural Engineers 38: 131-137.

Williams, J. D., J. P. Dobrowolski, and N. E. West. 1995b. Microphytic crust influence on interrill erosion and infiltration capacity. Transactions of the American Society of Agricultural Engineers 38: 139-146.

Woodling, J. 1985. Colorado's little fish a guide to the minnows and lesser known fishes in the state of Colorado. Colorado Division of Wildlife. 77 pp.

Young, James A. and Fay L. Allen, 1997. Cheatgrass and Range Science: 1930 – 1950. Journal of Range Management 50(5), September 1997.

PUBLIC COMMENTS AND RESPONSES

This section contains the comments received from individuals, organizations, and government agencies during the comment period for the EA. The comments are organized by eleven categories as follows: 1) biological resources; 2) alternatives; 3) social/economic; 4) legal; 5) general; 6) public participation; 7) recreation; and 8) cultural resources.

BIOLOGICAL RESOURCES

COMMENT: The negative and unscientific content of this EA is a part of a pattern that reflects a desire to run ranching families off of public land cut by cut, ranch by ranch.
RESPONSE: A body of peer-reviewed scientific literature was consulted during the preparation of the EA. Literature citations are provided in Appendix I.

COMMENT: The EA paints a very negative assessment of conditions with what appears to be very limited sampling conducted in the midst of an extreme drought. Current grazing is assumed to be the only causal factor with no attention paid to site capability, or historic and natural events.
RESPONSE: The 2001 Rangeland Health Assessment was conducted on the seven allotments analyzed in the EA, following the protocol outlined in BLM technical reference *TR-1734-6, Interpreting Indicators of Rangeland Health*. As part of this assessment a total of 107 sampling points were established in these seven allotments. Also, site potential was evaluated at each of these 107 sampling points. Data collected through the 2001 Rangeland Health Assessment were only part of the entire data set used to determine if the BLM Standards for Public Land Health in Colorado were being achieved. Also used in making these determinations were the proper functioning condition assessments for both lotic (i.e., moving water) and lentic (i.e., standing water) riparian areas, long term rangeland trend studies, vegetation production and water quality data. These other data sets were collected at different times and over a longer time period than the 2001 Rangeland Health Assessment. For example, long term rangeland trend studies were established at 20 locations in the seven allotments, starting in 1981. Last, in determining factor(s) responsible for the land health determinations all possible causes were considered, not just livestock grazing.

COMMENT: This EA was conducted during the worst drought in history, which is also conducive towards building a negative public opinion toward grazing and livestock production in general.
RESPONSE: The primary data set used in analyzing the effects of the alternatives was the BLM Standards for Public Land Health in Colorado. Data collected through the 2001 Rangeland Health Assessment were only a part of the entire data set used to determine if the BLM Standards for Public Land Health in Colorado were being achieved. Also used in making these determinations were the proper functioning condition assessments for both lotic (i.e., moving water) and lentic (i.e., standing water) riparian areas, long term rangeland trend studies, vegetation production and water quality data. These other data sets were collected at different times and over a longer time period than the 2001 Rangeland Health Assessment. For example, long term rangeland trend studies were established at 20 locations in the seven allotments, starting in 1981.

COMMENT: We have strong concerns that modifications were not made for 15-20 years when drought wasn't an issue. It appears that changes in grazing, reseeding, weed control and over-all management have been neglected by all parties.
RESPONSE: It's likely that past management and in some cases a lack of management by all parties, is responsible for the current condition of the seven allotments analyzed in the EA. The analysis summarized in Table 1 of the EA (page four) demonstrates that several of the BLM Standards for Public Land Health in Colorado are not being achieved. Furthermore, livestock grazing is identified as a causal factor in several

of these determinations. Reversing the trend of poor land health in these allotments is a considerable task requiring time, new management approaches and collaboration between BLM, local ranchers and other interested parties. The decisions made through this environmental compliance process are one just step towards addressing the current land health of these allotments.

COMMENT: We question the implication that livestock grazing is a cause for Non Functioning Condition and Functioning At Risk Condition of riparian areas mentioned in the EA.
RESPONSE: Livestock grazing was identified as a causal factor for both lotic (i.e., moving water) and lentic (i.e., standing water) areas being rated as either Functional-At Risk or Nonfunctional. These data are presented in Tables 10 and 11, of pages 25 and 27 of the EA, respectively. Lotic areas were assessed using the protocol described in *Riparian Area Management, Process for Accessing Proper Functioning Condition TR 1737-9 1993*. Lentic areas were assessed using the protocol described in *Riparian Area Management, Process for Accessing Proper Functioning Condition for Lentic Riparian Wetland Areas TR 1737-11 1994*.

COMMENT: We request that the EA address the control and eradication of Tamarisk with attention to the full array of causal factors and solutions as well as the many benefits that would result from successful management of the Tamarisk problem in the area being assessed.
RESPONSE: The potential effects of the alternatives on riparian vegetation, including tamarisk, is addressed under the Floodplains, Wetlands and Riparian Zones section of the EA on page 27. However, fully addressing the control and eradication of Tamarisk is outside the scope of the EA. The Monument is in the process of developing its first Resource Management Plan, which will address the management of Tamarisk.

COMMENT: Your standards for range health and vegetation are not realistic.
RESPONSE: The BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado were amended to the San Juan/San Miguel RMP and all other Colorado BLM RMPs, in February 1997. These standards and guidelines were developed in partnership with the three Colorado Resource Advisory Councils, utilizing input received during numerous public workshops and meetings and consultations with academicians.

COMMENT: On page two you state "Two sensitive plant species are known to occur and five have potential habitat in the area of Sand Canyon East and Sand Canyon West. Potential Habitat is not a reason to eliminate livestock grazing."
RESPONSE: No decision is made until a Decision Record is signed. The EA analyzes effects of alternatives, but does not finalize a decision.

COMMENT: Bluewater Spring in Bowdish Canyon was developed by the ranchers and is not a riparian area.
RESPONSE: The Affected Environment section on page 27 of the EA describes Bluewater spring as a depression spring that has the potential to support diverse riparian vegetation; however, the expansion of riparian vegetation around the spring is being hindered due to compaction. The description also states that the spring was developed by ranchers in 1978. Therefore, the spring is a riparian area that was developed to support livestock grazing in the area in 1978.

COMMENT: On page 26 the portions of McElmo Creek rated Functional at Risk, would remain Functional at Risk due to upstream management activities. Do you also want to control upstream agriculture.
RESPONSE: Upstream land use activities (irrigation, agriculture, road encroachment) are identified as causal factors for the Functional-At Risk and Nonfunctional ratings for McElmo Creek. These ratings are

presented in Table 10, on page 25 of the EA. Management of Monument resources and uses, by the BLM, is limited to public land located within the boundary of the Monument.

COMMENT: On page 33, you say eliminating livestock access to the riparian area would allow for riparian vegetation to increase in abundance. That is ridiculous, cloud burst and floods is what affects riparian areas.
RESPONSE: The environmental consequence analysis on page 35 of the EA did find that under Alternatives B and C that "livestock would no longer have direct access to portions of McElmo Creek under both of these alternatives." Furthermore, the analysis found that "eliminating access to the riparian area would allow for riparian vegetation to increase in abundance and vigor along the stream channel."

COMMENT: The EA fails to adequately consider credible and relevant science or sound scientific methods in the analysis.
RESPONSE: A body of peer-reviewed scientific literature was consulted during the preparation of the EA. Literature citations are provided in Appendix I.

COMMENT: Designate upper Sand Canyon as a Research Natural Area (RNA) and permanently exclude livestock grazing from this area.
RESPONSE: Recommending areas for special designation (e.g., Research Natural Areas) and changes in public land as available or unavailable for livestock grazing are planning level decisions that must be specifically made in a land use plan or amendment. Land use planning decisions require specific NEPA and planning processes be followed as well as providing the opportunity for public comment. As a result, this EA cannot make these decisions. However, the Monument is currently in the process of developing its first Resource Management Plan, which will make decisions on what public land should be available or unavailable to livestock grazing and if special designations should be made.

COMMENT: The EA contains no credible, relevant science. Words like "may", "could", "potential", "possible", "probable" etc. seem to be the basis of the theory used to substantiate the EA.
RESPONSE: A body of peer-reviewed scientific literature was consulted during the preparation of the EA. Literature citations are provided in Appendix I. Also, it is common practice to write an EA using future tense (e.g., could, would) instead of present tense. This is done to indicate that a decision has not been made concerning the action.

COMMENT: It is incumbent on BLM to make the necessary management changes to meet the BLM Standards for Public Land Health, PFC guidelines, and Colorado Livestock Grazing Management Guidelines.
RESPONSE: Compliance with 43 CFR 4180.2(c) for Yellow Jacket, Cahone Mesa, Goodman Gulch, Sand Canyon East, Sand Canyon West, Flodine Park and Hamilton Mesa Allotments will be partially achieved through the Decision Record for this EA. Another management action already taken on several of the allotments, includes temporary reductions in grazing to mitigate the effects of drought. Additional management changes (e.g., terms and conditions) may be made for these allotments through the ongoing Monument planning process.

ALTERNATIVES

COMMENT: The only reasonable decision is to select alternatives A or E with the implementation of range improvements and a rotation program. This outcome would bring alternatives A & E in compliance with Colorado Standards and Guidelines for Livestock Grazing Management while remaining consistent with the Montezuma County Comprehensive Plan.
RESPONSE: The analysis presented in the EA found that implementation of Alternatives A or E would

result in several of the BLM Standards for Public Land Health in Colorado not being achieved, as a result of livestock grazing. The effects of each alternative on the BLM Standards for Public Land Health in Colorado are summarized in Appendix B of the EA.

COMMENT: I feel the information presented in the EA obliges BLM to select alternative D. If some mix of alternatives is chosen, use should be limited to dormant season and only occur in areas meeting management objectives.
RESPONSE: The purpose of the EA is to analyze and compare potential consequences of the alternative actions. The analysis is not required to justify any of the alternatives. However, a decision record will be prepared that identifies the decision and its supporting rationale. The Monument Manager will consider all alternatives and public comments when a decision record is prepared.

COMMENT: The Hopi Cultural Preservation Office supports Alternative D.
RESPONSE: A decision record will be prepared that identifies the decision and its supporting rationale. The Monument Manager will consider all alternatives and comments from the Hopi Tribe when a decision record is prepared.

COMMENT: The proposed Action as requested by the applicant is an unacceptable alternative. The Finding of No Significant Impact of this Alternative would be in violation of the BLM's policies, regulations, standards and guidelines for grazing on public land. The proposed action must not be considered. Therefore I oppose Alternative A. Likewise I oppose Alternative E that is basically the same as Alternative A.
RESPONSE: All alternatives, including A and E, and public comments will be considered by the Monument Manager when a decision record is prepared.

COMMENT: I am not in favor of either Alternatives B or D because neither offers the maximum potential for recovery of the degraded plant communities nor movement towards achieving healthy riparian areas.
RESPONSE: The effects of each alternative on the BLM Standards for Public Land Health in Colorado are summarized in Appendix B of the EA. Also, more detailed analysis of their impacts on Monument resources, including plant communities and riparian areas, is provided under the Affected Environment/Environmental Consequence section of the EA, starting on page 12. All alternatives and public comments will be considered by the Monument Manager when a decision record is prepared.

COMMENT: Alternative C offers the most protection of the land.
RESPONSE: The effects of Alternative C on the BLM Standards for Public Land Health in Colorado are summarized in Appendix B of the EA. All alternatives and public comments will be considered by the Monument Manager when a decision record is prepared.

COMMENT: The no grazing alternative should be selected for the Sand Canyon East, Sand Canyon West and Goodman Gulch Allotments.
RESPONSE: All alternatives, including Alternative D, No Grazing and public comments will be considered by the Monument Manager when decision record is prepared.

COMMENT: Instituting either the Proposed Action or the No Action Alternative would clearly be a violation of the Standards for Public Land Health and Guidelines for Livestock Grazing Management for Colorado, with which the proclamation demands conformance.
RESPONSE: The analysis within the EA found that Alternative A, Proposed Action and Alternative E, No Action would not achieve any of the BLM Standards for Public Land Health in Colorado (see Appendix B in the EA). The Presidential Proclamation does not require conformance with the standards, but does require that the objects of scientific and historic interest identified within the proclamation are

protected. The requirement to address public lands that are failing to achieve the standards comes from the 1985 San Juan/San Miguel Resource Management Plan and 43 CFR 4180.2(c).

COMMENT: Alternative A, the Proposed Action and Alternative E, No Action will lead to continuing downward trend.
RESPONSE: The Environmental Consequence analysis for Alternatives A and E, on page 19 of the EA did determine that "without a change in current management, the conditions and trends as described in the Affected Environment would continue under these alternatives." Furthermore, the analysis presented in the EA did find that implementation of Alternatives A or E would result in several of the BLM Standards for Public Land Health in Colorado not being achieved, as a result of livestock grazing. The effects of each alternative on the BLM Standards for Public Land Health in Colorado are summarized in Appendix B of the EA.

COMMENT: Please rewrite Alternatives B and C to make it more clear that the purported improvements in these allotments are by no means guaranteed and, since they include only slight reductions in stocking rate, are unlikely to lead to much change.
RESPONSE: The purpose of the EA is to disclose the potential impacts of the alternatives. Also, the effects of the alternatives on the BLM Standards for Public Land Health in Colorado are summarized in Appendix B of the EA.

COMMENT: Only Alternative D will lead to truly significant improvement.
RESPONSE: The potential effects of the alternatives are presented under the Affected Environment/Environmental Consequence section of the EA, starting on page 12. Also, the effects of the alternatives on the BLM Standards for Public Land Health in Colorado are summarized in Appendix B of the EA.

SOCIAL/ECONOMIC

COMMENT: In general, it is obvious that the intent is to eliminate grazing on BLM allotments completely, or reduce the time and numbers to a point where it is not economically feasible for the livestock producer to continue to graze cattle.
RESPONSE: The purpose of the EA is to analyze and compare potential consequences of the alternative actions. The analysis does not, nor is it required, to justify any of the alternatives. A decision record will be prepared that identifies the decision and its supporting rationale.

COMMENT: The EA needs to consider how proposed actions will impact the economic viability of the ranching operations directly affected by the proposed alternatives.
RESPONSE: The socioeconomic and cumulative impacts sections of the EA, starting on page 51, have been edited to address this comment.

COMMENT: The EA should analyze the cumulative effects of such reductions to the economic viability of ranching and the supporting business infrastructure as a whole in Southwest Colorado.
RESPONSE: A cumulative impacts section was added to the EA starting on page 61.

COMMENT: The EA needs to consider how proposed actions would potentially impact the subdivision and fragmentation of privately held agricultural lands. The cumulative effects on county land use patterns should be analyzed.
RESPONSE: The socioeconomic and cumulative impacts sections of the EA, starting on page 51, have been edited to address this comment.

COMMENT: The citizens of Montezuma County place a high value on the open space and wildlife habitat provided by large agricultural parcels. The EA needs to consider the impact of proposed actions on these open space and wildlife values as well as the cumulative effects if similar reductions were pursued in other allotment plans.
RESPONSE: The socioeconomic and cumulative impacts sections of the EA, starting on page 51, have been edited to address this comment.

COMMENT: While recognizing the growth in other uses and values connected to BLM land, Montezuma County strongly supports the continuation of traditional uses including livestock grazing as assured by the National Monument Proclamation.
RESPONSE: The Monument is managed under the principles of "multiple use" and "sustained yield" as set forth through the Federal Land Policy and Management Act (FLPMA). Furthermore, livestock grazing is recognized as an appropriate use under (FLPMA). However, the proclamation doesn't "assure" the continuation of livestock grazing, but instead states that that "Laws, regulations, and policies followed by the Bureau of Land Management in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the monument."

COMMENT: The analysis in the Affected Environment section illustrates the negative net income to agriculture in recent years. These economic hard times have certainly been compounded by persistent drought conditions. Montezuma County is interested in what measures are being taken or can be taken in the affected institutional environment to help the ranching community survive these difficulties, and re-establish their viability in order to provide the benefits of ranching as addressed in the Comprehensive Plan as summarized above. We request that the EA address existing and potential opportunities for public land agencies, the county and local ranchers to work together towards these ends.
RESPONSE: Developing an exhaustive list of opportunities (i.e., existing and potential) to collaborate on livestock grazing issues between the Monument, Montezuma County and local ranchers is beyond the scope of this EA. However, some of existing opportunities include providing comments on National Environmental Policy Act (NEPA) documents (e.g., EAs, EISs), one on one meetings between ranchers and BLM range specialists, Montezuma County Commissioner meetings with the Monument Manager and participating in the development of the Monument Resource Management Plan. With this said, the Monument welcomes the opportunity to meet with representatives of Montezuma County, local ranchers and all other interested parties to identify opportunities to collaborate on livestock grazing issues.

COMMENT: On page 5: Environmental Justice you state "No minority or economically challenged populations would be disproportionately affected because none of these populations have any investment in the allotments. You are already having a severe effect on the agricultural community.
RESPONSE: The finding on page five of the EA that "No minority or economically challenged populations would be disproportionately affected because none of these populations have any investment or interest in the allotments", is correct based on the definitions for "minority population" and "low-income population." Definitions for these terms are as follows:

- Minority Population: Identified as either: 1) the minority population of the affected area exceeds 50 percent, or 2) population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.
- Low-Income Population: Persons living below the poverty level based on a particular total income for a family house-hold of four persons, as based on the most current U.S. Bureau of Census. The average poverty threshold for a family of four in 1999, the most recent data available from the Census Bureau, was $17,029.

The effects of the alternatives on the socioeconomics of Montezuma County, is located in the socioeconomic and cumulative impact analysis sections of the EA on pages 51 and 61, respectively.

COMMENT: The BLM violated NEPA and FLPMA in failing to adequately consider the economic impacts effecting Montezuma County and its residents in an apparent effort to justify the elimination of domestic livestock grazing.
RESPONSE: The effects of the alternatives on the socioeconomics of Montezuma County, is located in the socioeconomic and cumulative impact analysis sections of the EA on pages 51 and 61, respectively.

LEGAL

COMMENT: Much of Secretary of Interior Norton's proposed Grazing Rule is well aligned with the Montezuma County Comprehensive Plan. The EA should recognize the opportunity to apply this Rule in cooperation with the County and the ranching community to address issues 1-4 above.
RESPONSE: The Proposed Action and alternatives in the EA were found to be consistent with other federal, state, and local laws, regulations, and plans to the maximum extent possible, under the Relationship to Statutes, Regulations, or Plans of Other Governmental Agencies section of the EA on page 6. Also, see the Consultation and Coordination section of the EA on page 65.

COMMENT: Has the applicant obtained base property that would allow him to be eligible for these leases or would this evaluation occur in any case in anticipation of other interest in leasing these lands by qualified applicants.
RESPONSE: An environmental assessment is prepared when any BLM grazing permit expires, regardless of who controls the base property.

COMMENT: In the proclamation it says nothing in this proclamation shall be deemed to affect existing permits or leases for or levels of livestock grazing.
RESPONSE: With regard to livestock grazing, the proclamation states that "Laws, regulations, and policies followed by the Bureau of Land Management in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the monument." The Proposed Action and alternatives in the EA were found to be consistent with other federal, state, and local laws, regulations, and plans to the maximum extent possible, under the Relationship to Statutes, Regulations, or Plans of Other Governmental Agencies section of the EA on page 6.

COMMENT: BLM cannot renew livestock grazing privileges for applicants who historically have failed to comply with terms and conditions of existing grazing permits.
RESPONSE: In accordance with 43 CFR 4110.1(b)(1)(i) it was determined, by the authorized officer, that the applicants are in substantial compliance with the terms and conditions of the existing Federal grazing permit or lease for which renewal is sought.

COMMENT: I believe this a major federal action that affects the quality of human environment and requires an Environmental Impact Statement.
RESPONSE: Based on the analysis of this EA, we have determined that the Proposed Action and alternatives would have no significant impact on the human environment, therefore an EIS is not required.

COMMENT: I do not believe the environmental assessment is in accordance with federal laws.
RESPONSE: The Proposed Action and alternatives in the EA were found to be consistent with other federal, state, and local laws, regulations, and plans to the maximum extent possible, under the Relationship to Statutes, Regulations, or Plans of Other Governmental Agencies section of the EA on page six.

COMMENT: The BLM violated NEPA in failing to adequately consider grazing as a separate, recognized issue.
RESPONSE: The various aspects of grazing that could be affected by the alternatives are discussed under the natural resource sections (e.g., vegetation, soils) and the socioeconomic and cumulative impact analysis sections of the EA.

GENERAL

COMMENT: On page 1 you state "it should be noted that during the preparation of this environmental analysis, the applicants base property leases for Cahone Mesa and Hamilton Mesa Allotments expired and were not renewed". This is not true, they are all in the family.
RESPONSE: At the time the term grazing permit expired applicant one (i.e., Wesley Wallace) controlled the base property for both the Cahone Mesa and Hamilton Mesa Allotments through base property leases. However, during preparation of the EA the base property lease between Wesley Wallace and the Laymon Family Living Trust for the Cahone Mesa Allotment expired on August 31, 2003, and was not renewed. In addition, on December 12, 2003, the BLM was notified by Steve Wallace that the base property lease between Steve, Tim and Jay Wallace and Wesley Wallace for the Hamilton Mesa Allotment was terminated.

PUBLIC PARTICIPATION

COMMENT: Secretary Gale Norton's Four C's, conservation through communication, cooperation, and consultation was not followed in preparation of this EA. Why was Montezuma County not involved in preparation of the EA.
RESPONSE: See discussion under the Consultation and Coordination section of the EA on page 65. Specifically, a copy of the EA was mailed directly to the Montezuma County Commissioners for a 30-day public comment period on February 3, 2004. On March 10, 2004, Glen E. Wilson Jr., Chairman of the Montezuma County Commissioners sent a letter to the Monument requesting a 30 day extension to the public comment period for the EA. This extension request was granted, resulting in a total of 68 days for public comment on the EA. The Montezuma County Commissioners submitted public comments on the EA, which have been addressed.

RECREATION

COMMENT: Due to conflicts with recreational users, including hikers, backcountry horseman, birdwatchers, and cultural resource enthusiasts, BLM should not approve any grazing use within Sand Canyon West, Sand Canyon East, and Goodman Gulch Allotments.
RESPONSE: A decision record will be prepared that identifies the decision and its supporting rationale. The Monument Manager will consider all alternatives and public comments when a decision record is prepared.

CULTURAL RESOURCES

COMMENT: Significant cultural resource sites are present in most of the analyzed allotments. These include rock art panels and rock shelters that are already damaged by livestock grazing. Given the unique resource comprised by these ancient pre-Puebloan sites, and the protection given to cultural resources under the Presidential Proclamation, livestock grazing may be an inappropriate use of many of the allotments.
RESPONSE: The potential impacts of the alternatives on cultural resources, along with mitigation

measures are discussed in the EA, starting on page 48. The compatibility of livestock grazing with protection of cultural resources on the seven allotments will be considered in drafting the decision record for this EA.