



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

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*Project Type:* Livestock Grazing Permit Renewal

*Planning Unit:* Bureau of Land Management Canyons of the Ancients National Monument

*Legal Description:* T.36N., R.16W. Sec. 29, 30, 31 and 32, New Mexico Prime Meridian; Montezuma County, Colorado.

*Applicant:*

James A. Black

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## **I. INTRODUCTION/PURPOSE AND NEED**

### **INTRODUCTION**

The livestock grazing permittee, James A. Black has applied to renew his existing term grazing permit for the Aztec Canyon Allotment (#08025) (Map 1). This allotment is located in the Bureau of Land Management (BLM) Canyons of the Ancients National Monument (Monument).

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 the allotment evaluated in this environmental assessment (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 a new term permit for livestock grazing in the Aztec Canyon Allotment. This permit is needed to authorize the applicant permittee to continue livestock grazing on public lands (43 CFR 4130.2(a)), address public lands that are failing to achieve the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (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 this RMP, livestock grazing must be managed to maintain or improve the vegetation component of the ecosystem and enhance resource values of the area, ensuring a balanced mix of uses and sustained yield.

### **BLM STANDARDS FOR PUBLIC LAND HEALTH IN COLORADO**

In the summer of 2003, a BLM interdisciplinary team was assembled to determine if the allotment was 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., streams) and lentic (i.e., springs) 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 allotment is achieving the standards, along with causal factor(s). In addition, a determination if the standards would be achieved under Alternatives A, B, C and D along with causal factor(s) is 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.

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

<b>Standards</b>	<b>Determinations</b>	<b>Causal Factor(s)</b>
Upland Soils	Achieving	n/a <sup>1</sup>
Riparian Systems	Significant Progress	n/a <sup>1</sup>
Healthy, Productive Plant and Animal Communities	Not Achieving	livestock grazing, PJ- Chaining and unsuccessful reseeding, noxious weed infestation from adjacent private lands
Special Status, Threatened and Endangered Species	Achieving	n/a <sup>1</sup>
Water Quality	Achieving	n/a <sup>1</sup>

<sup>1</sup>Determination not required, as a result of standard being achieved or significant progress.

## **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 Cultural Resources, Invasive, Non-Native Species, Threatened, Endangered, or Candidate Species, and Migratory Birds. They are described below along with the following resources: Vegetation, Range, and Socioeconomics.

### ***Cultural Resources:***

- Range permit renewals are undertakings under Section 106 of the National Historic Preservation Act (NHPA). Livestock grazing and other rangeland management activities that would be authorized in the permit to be renewed have the potential to affect cultural resources. Livestock grazing effects could include trampling, chiseling, churning, and compaction of site soils and cultural features, artifact displacement and breakage, and impacts to standing walls, rock images, and other above ground cultural features. The construction of range improvements such as fences and stock ponds can result in damage to, or loss of, surface and subsurface cultural deposits and features.

### ***Invasive, Non-Native Species:***

- Russian knapweed, musk thistle, Canada thistle, tamarisk and Russian olive is common along the riparian area associated with McElmo Creek.
- Russian knapweed and musk thistle are common along the two track road/historic stock driveway through the allotment.

### ***Vegetation:***

- The rangeland health attribute “biotic integrity” dominantly reflects a moderate (at risk) to moderate to extreme degree of departure, from the ecological site descriptions.
- Vegetation condition ratings are poor and fair for the majority of the allotment, reflected by 0-25% of the desired species composition for 65% of the allotment and 26-50% of desired species composition for 7% of the allotment.

- Site productivity for the majority of the allotment is far below potential. Over 70% of the capable acres produce less than 200 pounds of forage per acre.

***Threatened, Endangered, or Candidate Species:***

***Migratory Birds:***

- The Migratory Bird Treaty Act provides oversight for the taking of native birds. There would be concern regarding disturbance and destruction of nesting birds. The Birds of Conservation Concern (U.S. Fish and Wildlife Service 2002) which may be in this project's vicinity are: Lewis' woodpecker, gray vireo, pinyon jay, Virginia's warbler, black-throated gray warbler, golden eagle, and sage sparrow. This project is low impact and unlikely to result in the destruction or disturbance of nesting birds. There would be no impact to migratory birds.

***Range:***

- Continuous winter and spring grazing have not provided regular rest during the critical growing period.
- 2001 forage production studies indicate that current stocking levels are too high.

***Socioeconomics:***

- Both local communities and ranchers (present and potential future) operating on the allotment could be financially impacted by continuation or changes in livestock grazing management.

**ISSUES AND CRITICAL 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:

*Farm Lands (prime or unique)*

*Wastes (hazardous or solid)*

*Wild and Scenic Rivers*

*Wilderness*

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 listed as Class II under the Prevention of Significant Deterioration (PSD) program. The Proposed Action and alternatives would not increase emission levels above current levels, which are within the 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 allotment.

Native Americans will be 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.

### *Native American Religious Concerns*

Native Americans will be consulted through the request for comments on this EA. Comments and suggestions will be considered by the decision making official prior to preparation of the Finding of No Significant Impact and signing of the Decision Record. A list of the Native American tribes and pueblos being consulted is provided in the Consultation, Coordination, and Public Participation section of this document.

### *Areas of Critical Environmental Concern*

The ACEC boundary is coincidental to the more recent Monument designation. Furthermore, Monument designation provides a higher level of protection to objects of scientific and historic interest (i.e. archaeological, geological and biological), then compared to the ACEC designation. As stated in the section below (i.e. Conformance with BLM Land Use Plan, Presidential Proclamation and Interim Guidance), potential impacts to these objects are analyzed in this document or, if not impacted, were omitted. Therefore, potential impacts to the ACEC are addressed.

### *Recreation*

Recreational activities within the allotment are small due to very limited public access. Therefore, it is not anticipated that livestock grazing would decrease recreational experiences.

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

The Proposed Action and the No Action Alternatives are the same, therefore the Proposed Action will be carried forward in the analysis. 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 Alternative 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 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 Interior 1985), and 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 1<sup>st</sup> through

May 15<sup>th</sup>) unless a grazing system is implemented that provides critical period rest once every three years” (U.S. Department of 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 BLM Colorado 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 consistent with the Montezuma County Comprehensive Plan, and alternatives B, C and D as partially consistent. A partially consistent finding indicates that the 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 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 condition 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 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 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 the applicant’s existing term grazing permit for the Aztec Canyon Allotment (#08025) would be reissued for a time period of ten years with the same terms and conditions. Livestock grazing would occur during the season 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, No Action.

Allotment	Livestock Number	Kind	Begin Period	End Period	Percent Public Land <sup>1</sup>	Type Use	AUMs <sup>2</sup>
Aztec Canyon	100	Cattle	5/1	5/31	51	Active	52
	100	Cattle	11/16	12/15	51	Active	50

<sup>1</sup>Percent of livestock forage in allotment contributed by public land.

<sup>2</sup> Animal Unit Month (AUM) is the amount of forage required to sustain one cow or its equivalent for one month.

### ALTERNATIVE B: DEFERRED GRAZING DURING CRITICAL PERIOD

Under this alternative, BLM would reissue the term grazing permit for the Aztec Canyon Allotment (#08025) to the applicant for a time period of ten years. 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 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 the 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	Livestock	Kind	Begin	End	Percent	Type	AUMs <sup>2</sup>
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	Number		Period	Period	Public Land <sup>1</sup>	Use	
Aztec Canyon	37	Cattle	5/1	5/31	51	Active	19
	36	Cattle	11/16	12/15	51	Active	18

<sup>1</sup>Percent of livestock forage in allotment contributed by public land.

<sup>2</sup> Animal Unit Month (AUM) is the amount of forage required to sustain one cow or its equivalent for one month.

- Livestock grazing would not be permitted on the entire allotment one year out of every three during the critical growing period, (i.e., March 1<sup>st</sup> through May 31<sup>st</sup>) to provide critical period rest.

### **ALTERNATIVE C: GRAZING DURING DORMANT SEASON**

Under this alternative, BLM would reissue the term grazing permit for the Aztec Canyon Allotment (#08025) to the applicant for a time period of ten years. Livestock grazing would occur during the seasons of use, and with the number of AUMs, identified in Table 4 below. The permitted AUMs listed in Table 4 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 the 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 4. Grazing use authorized under Alternative C, Grazing During Dormant Season

Allotment	Livestock Number	Kind	Begin Period	End Period	Percent Public Land <sup>1</sup>	Type Use	AUMs <sup>2</sup>
Aztec Canyon	74	Cattle	11/16	12/15	51	Active	37

<sup>1</sup>Percent of livestock forage in allotment contributed by public land.

<sup>2</sup> Animal Unit Month (AUM) is the amount of forage required to sustain one cow or its equivalent for one month.

### **ALTERNATIVE D: NO GRAZING**

Under this alternative, the applicant would not be reissued a term grazing permit for the Aztec Canyon Allotment (#08025). As a result, no livestock grazing would occur on this allotment.

### **CONSIDERATION OF PERMITTED USE AND ACTUAL USE AUMS.**

Upon review of the actual use records submitted by the applicant permittee for livestock grazing on the allotment, it was determined that differences exist between the number of permitted AUMs (i.e., active preference) and average actual use AUMs. These differences are presented in Table 5 below. This information was used to better analyze the impacts of livestock grazing under the alternatives.

Table 5. Permitted AUMs and Actual Use AUMs.

ALLOTMENT NAME	PERMITTED USE (AUMS)	AVERAGE ACTUAL USE (AUMS)	YEARS AVERAGE CALCULATED FROM	HIGH USE DURING YEARS AVERAGED	LOW USE DURING YEARS AVERAGED
Aztec Canyon	102	78	1985,	102	13

			1987/1988, 1993/1994, 1995, 1996, 1997/1998, 2000		
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**III. AFFECTED ENVIRONMENT/ENVIRONMENTAL CONSEQUENCES**

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

**GENERAL SETTING**

The Aztec Canyon Allotment is 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, physiographic, soils, vegetation and wildlife), land uses and environmental setting are similar. The landscape’s primary historic uses include livestock grazing, cultivated agriculture, oil and gas resource development.

**VEGETATION**

**AFFECTED ENVIRONMENT**

The Aztec Canyon Allotment is 1,981 acres in size. The majority of the allotment is a sloping mesa bordered by Aztec Canyon to the west and McElmo Canyon to the south. The elevation at the upper end of the mesa is 6,400 feet and the lowest elevation at the bottom of McElmo Canyon is 5,800 feet. Aztec Canyon is a steep, narrow canyon up to 400 feet deep. It cuts through Dakota and Morrison geologic formations, exposing extensive outcrops of Dakota sandstone and rocky slopes of mixed sandstone and shale deposits. The upper slope of the mesa has deep, productive, sandy-loam soils derived from aeolian deposited sands. The lower portions of the mesa have soils of mixed, shallow to deep, colluvium and alluvium derived from the sandstone and shale deposits of the Morrison formation. The canyon bottoms are fairly wide in McElmo Canyon, and narrow in Trail Canyon. Soils in the floodplains and drainage ways of the canyon bottoms are for the most part deep alluvial deposits.

Average precipitation measured in Cortez, Colorado (approximately 3 miles to the east at an elevation of 6,210 feet) is 12.78 inches, based on 77 years of record. Over the last 10 years the average precipitation has been 11 inches.

The dominant vegetation type is pinyon and juniper woodland on gentle mesa slopes or moderate to steep canyon sides. About 60% of the pinyon juniper woodland was chained and seeded with crested wheatgrass in the late 1960’s. The purpose of the chaining treatment was to remove pinyon and juniper trees and enhance production of grasses for livestock forage. The remainder of the pinyon juniper woodland is untreated. The bottom of McElmo Canyon is a flat sagebrush terrace with the creek itself deeply incised in a wide channel. Tamarisk, coyote willow, occasional old cottonwood trees and some young cottonwoods dominate the channel sides. Knapweed, musk thistle and Canada thistle are very common and tend to dominant in the riparian understory.

More specifically, the allotment has the following ecological sites. Ecological sites are areas with uniform soils and topography that produce a distinct natural (reference) plant community. The ecological sites are described in detail in Table 6 with the reference community compared

to the existing vegetation. The acres placed in the steep canyonside category are pinyon juniper ecological sites, however because of the steep terrain and rocky barren slopes, the areas are not considered capable of supporting livestock grazing. Those acres are not included in most of the following discussion.

Table 6 - Ecological sites in the Aztec Canyon Allotment

Ecological Site	Acres	Proportion of Allotment
Pinyon juniper	120	7%
Pinyon Juniper (chained)	422	23%
Pinyon Juniper (steep canyonside)	561	31%
Loamy Foothill	385	21%
Loamy Foothill (chained)	245	13%
Loamy Bottom	61	3%
River Bottom (Riparian)	34	2%

A Rangeland Health Assessment was completed in 2001. This assessment evaluated ecological sites on the allotment comparing existing site conditions to those expected for the site at potential condition. Eighteen site indicators were evaluated with a qualitative, descriptive rating system, following BLM Technical Reference 1734-6, 2000, Interpreting Indicators of Rangeland Health. The indicators were used to evaluate three rangeland health attributes, Soil and Site Stability, Hydrologic Function and Biotic Integrity. These attributes are used, in part, to help make a determination as to whether the allotment is meeting the Rangeland Health Standards for public land health (H-4180-1 Rangeland Health Standards, 1/19/01). Overall the Aztec Canyon Allotment had the following ratings applied:

Table 7. Degree of Departure from Reference Site Condition.

Percent of acres in each rating	Degree of Departure from Reference Site Condition				
	Extreme	Mod to Extreme	Moderate	Slight to Moderate	None to Slight
Soil and Site Stability	0%	0%	39%	61%	0%
Hydrologic Function	0%	29%	19%	52%	0%
Biotic Integrity	0%	45%	35%	20%	0%

Since the majority of acres are in a slight to moderate category for soil and site stability and hydrologic function, the allotment was determined to be meeting the rangeland health standards for upland soils. Since the majority of acres for biotic integrity were in the moderate or moderate to extreme category (at risk or greater categories), the allotment was determined not to be meeting the rangeland health guidelines for healthy and productive plant and animal communities. At risk rangelands 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 (NRC 1994).

Additional data was collected during the rangeland health assessment to assist in making decisions regarding management of the allotment. Vegetation cover, ground cover and production were measured on all of the ecological sites in the allotment. Using this data, the vegetation for each sample point was rated based on the existing species composition as compared to a desired condition. The desired condition was determined from the appropriate

ecological site description, reference sites within the monument if available, and a consideration of the general conditions on the monument for each ecological site. Overall, none of the acres were in excellent condition, (76 to 100% of the desired plant community represented), 28% were in good condition or 51 to 75% of the desired community, 7% in fair condition, or 26 to 50% of the desired plant community, and 65% in poor condition, or 0 to 25% of the desired plant community.

Table 8. Vegetation Condition Ratings

Condition rating	Percent of desired plant community	Acres	Proportion of allotment
Excellent	76 – 100%	0	0%
Good	51 – 75%	344	28%
Fair	26 – 50%	86	7%
Poor	0 – 25%	803	65%

More detailed information is provided for each ecological site in the following discussion, and a complete data table with information for each sample point, by ecological site, listing all species is available.

Site productivity for most ecological sites (94% of the capable portions of the allotment) was below site potential, even considering “unfavorable year” production as described by the NRCS in the ecological site descriptions. On a large proportion of these sites production is very low, less than 200 pounds per acre, which is minimal for livestock production, especially considering that invasive annual grasses and forbs form a large proportion of the production.

Each ecological site is described in detail below:

**Pinyon Juniper Ecological Site:**

The soils that make up the Pinyon Juniper Ecological site are a Romberg-Crosscan complex (109,110) and a Gladel-Pulpit complex (42). The Romberg-Crosscan soils typically occur on the moderate to steep canyon slopes with the Romberg component being deep and the Crosscan shallow, alluvium and residuum derived from sandstone and shale. These sites typically have chained or mature pinyon juniper woodland vegetation. The Gladel soils are shallow, 12 to 20 inches, and typically occur on the mesa edges.

Potential vegetation composition (by weight), as described by the NRCS for “South West Mountain Pinyon and Juniper” is pinyon juniper woodland with canopy cover dominance dependent on fire or other disturbance history. Understory vegetation will differ in amount depending on the dominance of the tree canopy cover. When tree canopy cover is 15 to 40%, as with all sites measured on this allotment, understory production is a diverse mix of grasses, forbs and shrubs with production between 400 and 600 pounds per acre. Typical species to be expected are the grasses muttongrass, Indian ricegrass and galleta with smaller amounts of needle and thread, bottlebrush squirreltail, sun sedge and sandberg bluegrass. The dominant shrub is big sagebrush with smaller amounts of Greene’s rabbitbrush, bitterbrush, mountain mahogany and serviceberry.

Overgrazing of these sites results in a decrease in perennial cool season grasses and palatable shrubs such as serviceberry, bitterbrush and mahogany, an increase in Greene’s rabbitbrush

and big sagebrush and invasion of annual grasses and forbs. Pinyon and juniper seedlings establish more rapidly after disturbances such as fire or chaining if grazing is heavy.

Existing vegetation was sampled in 2001 on the Pinyon Juniper ecological sites. The analysis of these sites assessed chained and unchained stands separately.

There were 2 data points representing 422 acres in chained pinyon juniper woodlands. Pinyon juniper canopy cover was between 25 and 30% with very few species and very low production in the understory. Understory composition based on production was: 9% perennial grasses, primarily bottlebrush squirreltail and muttongrass; 12% cheatgrass; 12% perennial forb, all native species; 35% annual forbs, mostly weedy non-native species; and 32% shrub, mostly bitterbrush, cliffrose and ephedra. Reference sites on Canyons of the Ancients National Monument (CANM) for chained pinyon juniper had 49% of the composition in perennial grasses, mostly mutton grass with some bottlebrush squirreltail, galleta and sun sedge, 4% annual grass, 24% forbs and 24% shrub (Table 9).

There were 2 data points representing 120 acres in unchained pinyon juniper ecological sites. Average pinyon juniper canopy cover was 25 to 40%. These sites had the following average composition based on production: 3% perennial grasses, bottlebrush squirreltail; 1% cheatgrass; 16% native perennial forbs; 13% annual forbs, mostly alien annuals; and 67% shrub, mostly mahogany and ephedra. Reference sites on CANM had 44% of the composition in perennial grasses, mostly mutton grass with some bottlebrush squirreltail, galleta and sun sedge; 2% annual grass; 15% perennial forbs; 5% annual forbs and 33% shrub.

Pinyon Juniper sites on slopes greater than 30%, or with barren rocky slopes, were not sampled, and account for 31% of the acres on the allotment.

Table 9. Pinyon Juniper ecological site, lifeform composition by weight

Lifeform	Mature PJ reference	Mature PJ average	Chaining reference	Chaining average
Perennial Grasses	44%	3%	49%	9%
Annual Grasses	2%	1%	4%	12%
Perennial Forb	15%	16%	13%	12%
Annual Forb	5%	13%	11%	35%
Shrub	33%	67%	24%	32%

Species composition data, based on canopy cover, was collected at each sample point. Each site was rated based on NRCS site description, reference sites, and general vegetative conditions found on the monument. Information showing each data point rating and number of representative acres is available at the Dolores Field Office, BLM. Table 10 is a summary of the vegetation condition ratings.

Table 10. Pinyon Juniper Vegetation Condition Ratings

Condition rating	Percent of desired plant community	Acres	Proportion of Ecological Site
Excellent	76 – 100%	0	0%
Good	51 – 75%	99	18%
Fair	26 – 50%	0	0%
Poor	0 – 25%	443	82%

As described in the ecological site description, for sites at potential with canopy cover between 15% and 40%, annual production on an unfavorable year should be 400 pounds per acre, dry weight. The average annual production during 2001 on chained sites was 143 pounds and on unchained sites it was 49 pounds.

The rangeland health ratings for Pinyon Juniper Ecological sites are shown below:

Table 11. Degree of Departure from Reference Site Condition for Pinyon Juniper Ecological Sites.

Percent of acres in each rating	Degree of Departure from Reference Site Condition				
	Extreme	Mod to Extreme	Moderate	Sight to Moderate	None to Slight
Attribute (Chaining)					
Soil and Site Stability	0%	0%	0%	100%	0%
Hydrologic Function	0%	0%	20%	51%	0%
Biotic Integrity	0%	0%	100%	0%	0%
Attribute (Mature Pinyon Juniper)					
Soil and Site Stability	0%	0%	100%	0%	0%
Hydrologic Function	0%	0%	100%	0%	0%
Biotic Integrity	0%	88%	12%	0%	0%

### Loamy Foothill Ecological Site

The soils that make up the Loamy Foothill Ecological site are, Wetherill Loam (143, 144), Pulpit (42) and Sharps (21). Landscape position is gently rolling terrain on mesas with slopes between 1 and 12%. These soils are very deep (>60 inches) loams to fine sandy loams that developed on loess overlying sandstone or shale. The elevation range for these sites is from 6000 to 7000 feet.

Potential vegetation composition (by weight), as described by the NRCS (ecological site description 284) is a continuum from grassland, to shrubland, to pinyon juniper woodland, depending on the fire history on the site. The Aztec Canyon Allotment had sites with mature pinyon juniper woodland (several hundred years old), chained sites with young pinyon juniper cover and shrubland. When the site has mature pinyon juniper it should have an understory dominated by muttongrass, a perennial, cool season, bunchgrass. With fire disturbance the site should have grasses mixed with shrubs such as black or big sagebrush. Grasses common to more open stages are muttongrass, western wheatgrass, junegrass, needle and thread and Indian ricegrass. Grasses would make up about 60% of the composition and shrub up to 15% in this situation.

Existing vegetation as sampled in 2001 on the Loamy Foothills sites was assessed separately as mature pinyon juniper woodland stands, chained areas and a small area of big sagebrush.

There was one data point representing 360 acres of Loamy Foothill ecological sites in mature pinyon juniper. There were very few species and very little production in the understory. Composition was: 24% perennial grasses, all bottlebrush squirreltail; 2% perennial forbs; and 68% annual forbs. A reference site on CANM had 51% of the composition in perennial grasses, mostly mutton grass with some bottlebrush squirreltail and Indian ricegrass; 14% annual grasses; 33% forbs; and 2% shrub. Pinyon Juniper cover was between 35 and 60% on these sites (Table 12).

There was one data point representing 245 acres in Loamy Foothills ecological sites that have been chained with the following average composition in the understory: 21% perennial grasses, bottlebrush squirreltail and crested wheatgrass; 11% cheatgrass; 12% annual forbs, mostly invasive alien species; and 56% shrub, mostly bitterbrush, big sagebrush and lesser amounts of snakeweed and ephedra. Reference sites on CANM had 64% perennial grass, mutton grass, Indian ricegrass and bottlebrush squirreltail; 2% annual grass; 30% perennial forb, mostly perennial; and 4% shrub, bitterbrush and big sagebrush. Average pinyon juniper cover was 40%. The pinyon and juniper trees are what have returned to the site after the chaining treatments done in the late 1960's. Typically trees are from 2 to 10 feet tall.

There was one data point representing 25 acres in a shrubland stage with the following average composition: 14% perennial grasses, all bottlebrush squirreltail; 7% annual grasses mostly cheatgrass; 3% perennial forb; 45% annual forbs, mostly weedy alien species; and 30% big sagebrush.

Table 12. Loamy Foothills lifeform composition by weight

Lifeform	Mature PJ reference	Mature PJ average	Chaining reference	Chaining average	Shrub site average
Perennial Grasses	51%	24%	64%	21%	14%
Annual Grasses	14%	0%	2%	11%	7%
Perennial Forb	14%	2%	24%	0%	3%
Annual Forb	19%	68%	2%	12%	45%
Shrub	2%	0%	4%	56%	30%

As described in the ecological site description, for sites in the grass shrubland stage, such as after a chaining treatment, heavy livestock grazing can aid in the establishment of pinyon and juniper seedlings by reducing competition from other plants, exposure of mineral soil and reducing fuels so that fires no longer carry through the site. Other species likely to invade degraded sites are rubber rabbitbrush, snakeweed, cheatgrass and annual forbs.

Species composition data, based on canopy cover, was collected at each sample point. Each site was rated based on NRCS site description, reference sites, and general vegetative conditions found on the monument. The ratings and acres for each data point are available at the Dolores Field Office, BLM; Table 13 shows a summary of the condition ratings.

Table 13. Loamy Foothill Vegetation Condition Ratings

Condition rating	Percent of desired plant community	Acres	Proportion of Ecological Site
Excellent	76 – 100%	0	0%
Good	51 – 75%	245	39%
Fair	26 – 50%	25	4%
Poor	0 – 25%	360	57%

As described in the ecological site description, for sites at potential in a grass/shrub stage, annual production on an unfavorable year should be 800 pounds per acre dry weight. Production on mature pinyon juniper sites would be 400 pounds per acre. The average annual production during 2001 on the chained sites was 249 pounds and in mature pinyon juniper sites it was 25 pounds. The sagebrush site was producing 498 pounds per acre.

The rangeland health ratings for the three health attributes, Soil and Site Stability, Hydrologic Function and Biotic Integrity for Loamy Foothills sites are shown below:

Table 14. Rangeland Health Ratings for Loamy Foothills Sites.

Attributes by major vegetation stage	Degree of Departure from Reference Site Condition, percent of acres in each rating				
	Extreme	Mod to Extreme	Moderate	Sight to Moderate	None to Slight
<b>Mature Pinyon Juniper</b>					
Soil and Site Stability	0%	0%	100%	0%	0%
Hydrologic Function	0%	100%	0%	0%	0%
Biotic Integrity	0%	100%	0%	0%	0%
<b>Chainings</b>					
Soil and Site Stability	0%	0%	0%	100%	0%
Hydrologic Function	0%	0%	100%	0%	0%
Biotic Integrity	0%	0%	0%	100%	0%
<b>Burn</b>					
Soil and Site Stability	0%	0%	0%	100%	0%
Hydrologic Function	0%	0%	100%	0%	0%
Biotic Integrity	0%	100%	0%	0%	0%

## Loamy Bottom Ecological Site

The soil that makes up the Loamy Bottom Ecological site on this allotment is Ramper (98). Landscape position is alluvial fans, drainageways and flood plains on slopes less than 3%. The soils are very deep (>60 inches). Parent material is alluvium derived from sandstone and shale. The elevation range for these sites is from 5400 to 7400 feet.

Potential vegetation composition (by weight), as described by the NRCS (ecological site description 035XY011UT), when close to potential the site should be a mixed grass shrub community dominated by basin big sagebrush and great basin wild rye. The dominant grasses are wildrye, Indian ricegrass, sandburg bluegrass, muttongrass, and western wheatgrass (5 to 10% each). Subdominant grasses are needle and thread, bottlebrush squirreltail, sand dropseed, bluegrama, galleta and alkali sacaton (up to 10%). The dominant shrub is basin big sagebrush (25 to 30%) with other shrubs such as rubber rabbitbrush, fourwing saltbush, greasewood, and winterfat (0 to 5%).

Existing vegetation, as sampled with one data point in 2001, had the following composition: 3% perennial grasses, primarily junegrass; 2% cheatgrass; 60% weedy annual forbs; and 35% shrubs, mostly basin big sagebrush with some greasewood (Table 15).

As described in the ecological site description, when the ecological condition deteriorates due to over grazing, the plant species most likely to invade the site is cheatgrass. Perennial grasses, especially the large cool season bunchgrasses will decrease and there will be a corresponding increase in basin big sagebrush, rubber rabbitbrush, and juniper. The sites on the Aztec Canyon Allotment were dominated by weedy annual forbs, basin big sagebrush and greasewood. Perennial grasses were only a minor component of the understory.

Table 15. Comparison of reference site to existing community, lifeform composition

Lifeform	Potential composition	Existing composition
Perennial Grasses	50 – 60%	3%
Annual Grasses	(5 – 10% of above)	2%
Perennial Forb	3 – 5%	0%
Annual Forb		60%
Shrub	35 – 45%	35%

More than 50% of the composition by weight is outside the range of the desired plant community.

Species composition data, based on canopy cover, was collected and rated at 31% of the desired plant community, or fair condition. The desired plant community was based on NRCS site description, reference sites, and general vegetative conditions found on the monument.

As described in the ecological site description annual production on an unfavorable year should be 700 pounds per acre, dry weight. The average annual production during 2001 was 817 pounds, comprised mostly of sagebrush, greasewood and weedy annual forbs.

The rangeland health ratings for Loamy Bottom sites were:

Table 16. Rangeland Health Ratings for Loamy Bottom sites.

Percent of acres in each rating	Degree of Departure from Reference Site Condition				
	Extreme	Mod to Extreme	Moderate	Sight to Moderate	None to Slight
Soil and Site Stability	0%	0%	0%	100%	0%
Hydrologic Function	0%	0%	0%	100%	0%
Biotic Integrity	0%	100%	0%	0%	0%

### **Ground Cover and Soil Stability Ratings**

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. 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. On the Aztec Canyon Allotment cheatgrass adds a significant amount of litter to sites, however the widely fluctuating amounts of cheatgrass from year to year and the light ‘trashy’ nature of the litter makes it less dependable or effective as a soil protective cover. Sites on the Monument thought to represent close to reference conditions, had an average 20% bare soil. For the Aztec allotment, 96% of the acres had more than 20% bare soil surface and 59% of the rated acres had 50% or more bare soil.

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 Aztec allotment, soil stability was high under plant canopies and in the interspaces, averaging 5 on a scale of 1 to 6. It is possible the ratings are high because microbotic crusts have had a better chance to develop since the allotment has not been used for some years. The ratings were lower for the interspace measurements with some ratings in the 3 category. Sites with lower stability ratings have lower infiltration rates, less incorporated organic matter and a higher potential for erosion. Soils with decreased infiltration rates will have an increase in overland flow resulting in more water available for sediment transport (Branson et al, pg 132, 1981).

### **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. 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. Recovery rates after disturbance 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). The species components that are present and their abundance will give an indication of the intensity and time since the disturbance occurred.

Within the CANM, 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 Aztec allotment were 12% cyanobacteria, 14% moss and 1% lichen. Average values for all sites sampled on the Aztec allotment were 10% total biological crust cover, 6% cyanobacteria, 4% moss and <1% lichen.

## **ENVIRONMENTAL CONSEQUENCES**

### **Alternative A - Proposed Action**

#### ***Direct and Indirect Impacts***

It has been determined that while the rangeland health standard for upland soils is being met, the standard for healthy and productive plant and animal communities is not. The standard for riparian systems is not being met however progress is being made towards meeting the standard. Existing grazing management practices and levels of grazing use are significant factors in failing to achieve the standards not being met. Continuing the current management system at the present stocking levels will not allow the currently unacceptable conditions to improve so that progress can be made towards meeting these standards (Aztec Canyon Rangeland Health Determination Report, 7/31/2003).

There are a high proportion of acres in the 'at risk' category (35%) and above the 'at risk' category (45%) for the Rangeland Health Evaluation attribute Biotic Integrity. With a moderate degree of departure from site potential 'at risk' rangelands still 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 (NRC, 1994). With no change in management it is likely that acres in the 'at risk' category could trend towards a 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 will be irreversible. Acres above the 'at risk' category have a moderate to extreme degree of departure from potential. These areas are already in a highly degraded state, likely irreversible. There would be no improvement on these acres under this alternative.

Plant composition, measured in 2001, shows a disproportionate amount of the site productivity (over 40%) taken up in weedy annual forbs and grasses. Shrubs have a more dominant part of the composition than would be expected for the site potentials. It is apparent from examining the existing plant composition in relation to the NRCS ecological site descriptions and local reference sites that perennial grasses have declined or are absent on the Aztec Canyon Allotment. For the capable rangelands 65% of the acres rated in the poor range condition

category, having a species composition of less than 25% of the desired plant community and 7% rated in the fair condition category, having less than 50% of the desired plant community. Trend information is not available as there are no trend studies on the allotment. Under current stocking and management, it is unlikely that there will be an improvement in species composition.

Site productivity is below site potential for the majority of the capable acres that were rated on the allotment. In addition, the majority of these acres produce less than 200 pounds per acre, an amount that is minimal for livestock production. The loss of site productivity is likely due to the degraded conditions as evidenced by poor and fair range conditions, at risk or greater health evaluation categories and low site productivity. This condition is not likely to change without a change in management and/or stocking level.

An estimated capacity for the allotment was calculated during 2001 from production clipping and estimates. The capacity considers perennial grasses, forbs and palatable shrubs, uses 50% of available production, and assumes 34 pounds per day per cow/calf. The capacity for the Aztec Canyon Allotment was 37 Animal Unit Months (AUM). If the weedy annual grasses and forbs are included, the capacity is 78 AUM. The average stocking from 1985 through 2000 was 78 AUMs with a high of 102 and a low of 13. The average actual use is more than double (216%) the capacity. If annual grasses and forbs are considered as part of the capacity, actual use has been equal to the calculated capacity (however most of the annual forbs species present on the allotment are very small, unpalatable and unavailable for livestock use). Of the 28 allotments that were assessed during 2001 in CANM, the Aztec allotment is stocked at one of the highest rates, when actual use is compared to the calculated capacity.

Stocking levels on the Aztec allotment indicate livestock are over-utilizing the remaining species present on the site. Shrubs probably form a large part of the diet. At current actual stocking levels, the more palatable species are most likely being damaged and will continue to decline in the plant community.

With no change in management or stocking, biological crust cover will not increase. Grazing occurs during wet, dry and frozen soil surface conditions so there is no advantage to crusts at any time of the year. 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, will not occur under this alternative.

Riparian systems along McElmo creek rated in a 'Functional at Risk' condition. Riparian vegetation will likely not improve under current management. The noxious weeds, knapweed, Canada thistle, musk thistle Russian olive and tamarisk, all abundant in the riparian areas, will increase, competing with native and more palatable vegetation unless treated with an herbicide.

The Indian Camp fuels project was completed on public lands within this allotment in the fall/winter of 2004. The size of the project area was approximately 240 acres of which 180 acres were actually treated. This project utilized a hydromower to treat decadent sagebrush and recently killed pinyon pine and to reduce the amount of large woody debris remaining after an earlier chaining that occurred in 1963. As part of this project approximately 140 acres of the 180 acres hydromowed was seeded this past fall (2005) using a rangeland drill. The seed mix consisted of a variety of native bunchgrasses, shrubs and forbs. It is anticipated that this seeding will improve habitat conditions for wildlife, improve the diversity of native vegetation and reduce competition from weedy species in the long term. A voluntary non-use agreement

was cooperatively entered into between the applicant permittee and the BLM to temporarily suspend grazing for two consecutive years through 2007 during the spring growing season. The intent of this agreement was to facilitate for seedling establishment by protecting seedlings from grazing. Without adjusting stocking levels or management systems following the seeding it is likely that the seeding will not persist and will result in failure similar to the pinyon juniper chaining and seeding treatments done in the 1960's.

At current stocking levels, with current management, there will be no improvement in plant composition or site productivity. There will be no progress towards meeting rangeland health standards for healthy and productive plant and animal communities or for riparian systems.

## **Alternative B – Deferred grazing during the critical period**

### ***Direct and Indirect Impacts***

Allowing for occasional rest during the critical growing period in spring and stocking at the calculated capacity will allow for improvement in vegetation condition. A perennial plant's carbohydrate reserve storage is typically lowest during the initial growth period through the flowering period. Cool season grass species initiate growth early in the spring (April, May). Grazing during this period adds to the depletion of the reserve (Holechek et al. 1998, pgs 115 - 118). By deferring use during this critical period plants should respond. The occasional rest during the critical period will allow for re-growth and inputs to carbohydrate reserves. Lighter utilization levels on palatable species will reduce carbohydrate expenditures. Seedlings will have a longer period to become established before the next grazing period when trampling will have an effect.

Changing the stocking rate to the calculated capacity will reduce livestock pressure. Reduced stocking, especially during critical periods of growth, can improve conditions where soil degradation has not been too severe and palatable perennial forage plants still remain (Holechek et al. 1998, pg 157). Studies have shown that heavy stocking consistently causes a downward trend in ecological condition, light stocking causes an upward trend, and slight improvement occurs under moderate stocking (Holechek et al. 1999). By reducing stocking to a level more consistent with available forage, plants should respond with an upward trend, where there is still potential.

Rangelands that have been degraded, which lack understory vegetation or are dominated by unpalatable shrubs, noxious weeds or invasive annual species, may be in a degraded stable state requiring more than just improved livestock grazing management and reduced stocking for change to occur. An input of energy such as herbicides, mechanical treatment, burning and/or seeding may be required for these areas to improve within a reasonable time (Westoby et al. 1989). 1998, page 127). Therefore, the mechanical treatment and seeding along with reduced stocking levels and improved management systems will most likely improve conditions on the allotment.

Litter cover and biological crust cover should increase due to the lighter stocking levels. There will be more vegetative material remaining under lighter utilization levels to provide litter. Biological crust cover should improve slightly due to reduced impacts and longer periods of recovery. However, improvement will be limited since the season of use remains the same as the no action alternative, with grazing occurring during wet, dry and frozen soil surface conditions. Higher litter cover and the possibility of increased development of biological crusts

will provide greater ground cover. Wind and water erosion will be reduced as a result of the ground cover and increased infiltration rates.

Improvements in plant composition and health and increased ground cover and infiltration will improve site productivity. Increased forage production should increase to the potential for the ecological sites.

Riparian vegetation may have a chance to improve with the lighter stocking levels and periods of deferment. However, McElmo Creek will remain a concentrated livestock use area with use occurring every year during the fall, and spring use deferred one in three years. Improvement will also be limited due to the presence of tamarisk, Russian olive and knapweed. These noxious weeds will not decline in these areas without herbicide or other treatment and will continue to de-water the system and compete with native riparian species.

Recovery under this alternative will be slower than with alternative C or D. This alternative will make progress moving the allotment toward meeting the Rangeland Health Standards for healthy and productive plant and animal communities and riparian systems.

### **Alternative C – Grazing During Dormant Season**

#### ***Direct and Indirect Impacts***

Grazing during the dormant period will have the lowest impact on plants and provide the greatest potential for improved conditions than any other grazing period, especially when stocked at the calculated capacity. Deferring use during the growing period will allow for plant re-growth and inputs to carbohydrate reserves. Lighter utilization levels on palatable species will reduce carbohydrate expenditures. Seedlings will have an entire growing season to become established and dormant period grazing should have less of a trampling effect. There is a high potential for improvement in the plant community where those resources are not so degraded that recovery is still possible.

Rangelands that have been severely degraded and are dominated by unpalatable shrubs or invasive annual species may be in a degraded stable state requiring more than just improved management and reduced stocking for change to occur. An input of energy such as herbicides, mechanical treatment, burning and/or seeding may be required for these areas to improve within a reasonable time (Westoby et al. 1989). If improvement does not occur with the implementation of reduced stocking and dormant season use, these treatments may be required to meet the standards for rangeland health. Therefore, the mechanical treatment and seeding along with reduced stocking levels and improved management systems will most likely improve conditions on the allotment. New seedlings will have the entire growing season each year to become established.

Litter cover will increase since plants will have the entire growing season to produce vegetative matter without being grazed. There will also be greater amounts of material remaining after grazing due to the lighter stocking levels. Higher litter cover will provide soil cover and increase organic matter in the soil surface. Erosion will decrease and water infiltration will 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 period than in May when temperatures are warmer, wind is common and

precipitation levels lower. Grazing during the dormant period only, should improve cover and complexity of biological crusts on these allotments. Increases in the amount of biological crust cover will provide benefits such as a reduction in wind and water erosion, increased soil nitrogen levels, and improved chances of native seedling establishment.

Grazing in the winter is thought to be the best time of year for grazing in riparian areas while allowing for recovery (Chaney, Elmore and Platts, 1993). In the winter, livestock tend to concentrate less in riparian areas since snow provides for more dispersed water sources. There are fewer hot days when livestock seek out shade and water, although cattle may seek out shelter in riparian areas during very cold periods. Reduced stocking will also improve conditions by reducing impacts to the vegetation. Improvement will still be limited due to the presence of tamarisk, Russian olive and knapweed. These noxious weeds will not decline in these areas without herbicide or other treatment and will continue to de-water the system and compete with native riparian species.

Except for alternative D, this alternative has the highest potential for recovery of the plant community and development of ground cover. This alternative will allow the allotment to meet the Rangeland Health Standards for healthy and productive plant and animal communities and riparian systems.

### **Alternative D – No grazing**

#### ***Direct and Indirect Impacts***

This alternative has the highest potential for improvement in the plant community where those resources are not so degraded that recovery is still possible. Plants will be able to complete their entire growing cycle each year allowing for balanced carbohydrate reserves and regular production of seeds for reproduction. Seedlings will be able to establish without damage from trampling. 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, tamarisk or pinyon-juniper. An input of energy in the form of herbicides, seeding, fire or mechanical treatment will be necessary to see improvement in any reasonable time.

Ground cover in the form of vegetative litter will increase since plants will only be utilized by wildlife. Due to reduced disturbance from hoof impacts, biological crust cover will increase and over time will develop characteristics of older crusts such as increased depth, and lifeform and species complexity. These two factors combined will reduce erosion, increase infiltration and site productivity and promote seedling establishment (Belnap et al. 2001).

It is to be expected under this alternative that improvement in the riparian vegetation will occur. Dramatic riparian vegetation changes can occur when grazing stress is removed. If habitat deterioration is not severe, herbaceous and woody vegetation can rebound within 5 to 10 years. Severe habitat deterioration can require longer recovery times, perhaps decades or more (Clary and Medin, 1990). Cottonwood, willow and native streamside herbaceous species of carex and sedge will increase. Age class diversity of woody species will improve. The amount of tamarisk, Russian olive and knapweed will not decline without herbicide treatment. These species will continue to de-water the system and compete with native species.

This alternative has the highest potential for recovery of the plant community and development of ground cover in the shortest amount of time. This alternative will allow the allotment to

meet the Rangeland Health Standards for healthy and productive plant and animal communities and healthy riparian areas.

## **THREATENED, ENDANGERED AND SENSITIVE PLANT SPECIES**

### **AFFECTED ENVIRONMENT**

Two Endangered, one Threatened and one Candidate species have potential to occur on lands administered by the San Juan Public Lands Center (SJPLC). Endangered species are *Astragalus humillimus*, Mancos milk-vetch and *Pediocactus knowltonii*, Knowlton's cactus. The threatened species is *Sclerocactus mesae-verdae*, Mesa Verde cactus and the Candidate species is *Astragalus tortipes*, Sleeping Ute milkvetch (USFWS letter of 1/29/03). None of the Endangered, Threatened or Candidate species with potential to occur on lands administered by the SJPLC have potential habitat within the analysis area.

*Astragalus humillimus* has only been found on exfoliating Point Lookout sandstone formation of the Mesa Verde group (Spackman et al. 1997). *Pediocactus knowltonii* is known only from a very restricted area south and east of Bayfield, Colorado, on cobbly riverine alluvium (Spackman et al. 1997). *Sclerocactus mesae-verdae* is only known from clay hills underlain by the Mancos Shale or the Fruitland Formation east of Sleeping Ute Mountain. *Astragalus tortipes* occurs on the Southern flank of Sleeping Ute Mountain on Mancos shale badlands overlain by pediment gravel (Anderson and Porter, 1994). These habitats do not occur within the Aztec allotment

Eleven Sensitive plant species are known to occur on lands administered by the SJPLC (BLM Colorado State Office Information Bulletin No. CO-2000-014). Within the analysis area for this Environmental Assessment, no species are known and five species have potential habitat. A list of these species, the habitats they are known to occupy and their potential to occur in the analysis area are summarized and shown below in Table 17.

Table 17. Sensitive plant species known or suspected to occur on lands administered by the SJPLC.

Scientific Name Common Name	Federal Status	Habitat	Potential to occur in analysis area
<i>Amsonia jonesii</i> , Jones blue star	Sensitive	Runoff-fed draws on sandstone in pinyon-juniper, and desert shrub communities, 3,900 to 7,000 feet	Yes, habitat within analysis area
<i>Astragalus cronquistii</i> , Cronquist milkvetch	Sensitive	Mancos Shale and on substrates derived from the Morrison Formation, 4,800 to 5,800 feet	No, habitat not present
<i>Astragalus naturitensis</i> , Naturita milkvetch	Sensitive	Sandstone mesas, ledges, crevices and slopes, 5,000 to 7,000 feet	Yes, habitat within analysis area
<i>Epipactis gigantea</i> Giant helleborine	Sensitive	Decomposed sandstone; sandstone seeps; <8,000 feet	No, habitat not present
<i>Erigeron kachinensis</i> , Kachina daisy	Sensitive	Saline soils in alcoves and seeps in canyon walls, 4,800 to 5,600 feet	No, habitat not present
<i>Eriogonum clavellatum</i> Comb Wash buckwheat	Sensitive	Shale soils in shadscale communities, 4,300 to 5,500 ft.	No, habitat not present
<i>Ipomopsis polyantha</i> Pagosa skyrocket	Sensitive	Mancos shale; barren shrublands; around 7,000 feet	No potential habitat; Pagosa area only
<i>Lesquerella pruinosa</i> Frosty bladderpod	Sensitive	Mancos shale; ponderosa pine, Gambel oak; 6,800 to 8,000 feet	No potential habitat, Pagosa area only
<i>Lygodesmia doloresensis</i> Dolores skeleton plant	Sensitive	Juniper and sagebrush communities, 4,600 to 5,700 feet	No potential habitat; San Miguel County only
<i>Mimulus eastwoodiae</i> , Eastwood monkey-flower	Sensitive	Shallow caves and seeps on canyon walls, 4,700 to 5,800 feet	No, habitat not present
<i>Oreocarya rollinsii</i> , Rollins cryptanth	Sensitive	Shale slopes in pinyon-juniper or cold desert shrublands, 5,300 to 5,800 feet	No potential habitat; San Miguel County only

## FLOODPLAINS, WETLANDS AND RIPARIAN ZONES

### AFFECTED ENVIRONMENT

The Aztec Canyon allotment is completely contained within 3 USGS 6<sup>th</sup> level watersheds. McElmo Creek is a perennial stream within the allotment. Riparian vegetation along McElmo Creek consists of willows, tamarisk, Russian olive, occasional cottonwoods and herbaceous riparian species. Tributary to McElmo Creek, also within the allotment, is Alkali Canyon. Alkali Canyon is an intermittent stream with few remnant cottonwoods, small patches of willow and/or tamarisk and little herbaceous riparian species. All other streams within the allotment are ephemeral. They flow in response to runoff events and may or may not support discontinuous patches of riparian vegetation.

## **BLM Standards for Public Land Health in Colorado**

Of the five standards evaluated for public land health riparian systems is discussed under this section. Aztec Canyon allotment is making significant progress towards achieving the riparian standard based on an evaluation of McElmo Creek. Information used by the BLM interdisciplinary team to come to this determination is the proper functioning condition assessments for lotic (flowing water) riparian areas.

### **Proper Functioning Condition Assessments**

McElmo Creek was 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 D.

McElmo Creek traverses public land in Aztec Canyon allotment for approximately one mile. McElmo Creek rated Functional-At Risk with an upward trend during field season 2002. The width/depth ratio is slightly high and sinuosity is low but improving. The channel has downcut and narrowed in the recent past but is now widening to create a new floodplain. There is some lateral erosion of vertical banks as a result of this process. Vertical erosion has recently occurred but thin geologic controls are effectively slowing the process down at the present time. Sedges, rushes and willows are present along the stream.

## **ENVIRONMENTAL CONSEQUENCES**

Under all of the alternatives, Aztec Canyon allotment would continue to be “making progress towards achieving” the standard for riparian systems but would not “achieve” the standard over the long term.

The upward trend that McElmo Creek is presently experiencing would eventually level off to a static or stable state and would still be considered Functioning-At Risk. Attaining PFC is unlikely for McElmo Creek due to upstream management activities that generally result in accelerated lateral and sometimes vertical erosion of the stream.

### **Alternative A, Proposed Action**

#### ***Direct and Indirect Impacts***

Continuation of critical season use with no reduction in livestock numbers will not improve upland conditions within the allotment. Present upland conditions are poor to fair resulting in increased runoff and sediment delivery to the stream channel. Should increased water and sediment delivery continue at its present rate, then McElmo Creek would be unlikely to maintain its upward trend. As a result, width/depth ratio and sinuosity would not be expected to improve significantly. The size of the riparian area may increase while the stream is establishing a new floodplain but may not reach its potential extent in the long term. Recruitment of cottonwoods would be unlikely and willow species would not be expected to achieve its potential diversity. Exotic riparian species would continue 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 improvement of riparian conditions. Deferred grazing would require more time for improvement than grazing during the dormant season.

### ***Direct and Indirect Impacts***

Both deferred and dormant season grazing with an adjustment in stocking levels would allow upland conditions along McElmo Creek to improve. An improvement in upland conditions would increase infiltration and decrease runoff. Sediment delivery to stream channels would be reduced. Some improvement would be expected to occur within the riparian area itself. Willow species would increase in diversity (more so under dormant season grazing) and the riparian area may be able to achieve its potential extent. Species such as cottonwood may or may not be able to establish. An increase in diversity and abundance of riparian vegetation would improve channel conditions slightly by decreasing width/depth ratio and increasing sinuosity. Exotic species would continue to be present but would be less likely to increase in abundance.

## **Alternative D, No Grazing**

### ***Direct and Indirect Impacts***

No grazing throughout the allotment would allow for the quickest recovery of upland conditions and aid in riparian system recovery. Improved upland conditions as a result of no grazing would increase infiltration and decrease runoff. Sediment delivery to the stream channel would be reduced. Willow species would increase in diversity and cottonwood should be able to establish. The riparian area would be expected to achieve its potential extent. A marked improvement to the uplands and the riparian vegetation would continue to decrease the width/depth ratio and increase sinuosity. Exotic species would continue to be present but would not be expected to increase in abundance.

## **WATER QUALITY**

### **AFFECTED ENVIRONMENT**

McElmo Creek is the only perennial stream within Aztec Canyon allotment. An intermittent tributary to McElmo Creek within Aztec Canyon allotment is Alkali Canyon. The remaining streams are ephemeral. All streams are augmented by irrigation return flows diverted from the Dolores River basin. McElmo Creek receives the highest amount of return flow.

### **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 being achieved for Aztec Canyon allotment. State of Colorado, Water Quality Standards information was 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 anti-degradation 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. The classifications and numeric standards for McElmo Creek and its tributaries is shown below in Table 18.

Table 18. Classifications and numeric standards for McElmo Creek and its tributaries.

Segment Description	Designation	Beneficial Use Classification	Numeric Standards	
			Physical and Biological Parameters	Inorganic Parameters <sup>5</sup>
7a. Mainstem of McElmo Creek from the source to the Colorado/Utah border, except for specific listings in segment 7b <sup>1</sup> . 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 <sub>3</sub> (ac) = TVS <sup>4</sup> NH <sub>3</sub> (ch) = 0.06 mg/L NO <sub>2</sub> = 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 <sup>2</sup> and 11 <sup>3</sup> .	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 <sub>3</sub> (ac) = TVS <sup>4</sup> NH <sub>3</sub> (ch) = 0.06 mg/L NO <sub>2</sub> = 0.05 mg/L

<sup>1,2</sup> Ute Mountain Indian Reservation segments

<sup>3</sup>Narraguinnep, Puett and Totten Reservoirs

<sup>4</sup>TVS = table value standard, a numerical criteria set forth in the Basic Standards and Methodologies for Surface Water Regulation

<sup>5</sup>Parameters listed include only those affected by livestock management

Numeric standards exist for physical, biological, inorganic and metal parameters. Only those inorganic parameters listed in Table 18 would be affected by changes in livestock management. Metal parameters would not be affected by changes in livestock management and were therefore not listed. A temperature standard that is generally acceptable for the stream segments within the allotment is a maximum 3° C increase over a minimum four hour period lasting a maximum of thirteen hours. 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.

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-2002 report.

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.

Under each alternative, Aztec Canyon allotment would “achieve” the standard for water quality. State water quality standards that are presently met would continue to be met for those parameters that are affected by livestock grazing for each alternative.

### **Alternative A, Proposed Action**

#### ***Direct and Indirect Impacts***

Under this alternative, the soil surface would continue to be vulnerable to erosion and surface water draining from the uplands would continue to deliver large concentrations of sediment to McElmo Creek. Sediment delivery to McElmo Creek at the present rate is expected to result in changes in dissolved oxygen, pH and nitrite concentrations over the long term. Dissolved oxygen may decrease and nitrite concentrations may increase. The amount of stream shading, width/depth ratio and sinuosity are not expected to change significantly under this alternative and therefore, stream temperature should not change significantly or abruptly meaning it will continue to meet State water quality standards. Direct access by livestock to stream channels would elevate the amount of bacteria and ammonia in the stream channel.

### **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***

Implementing a rotational or deferred grazing system with a reduction in livestock numbers would improve soil and water resources throughout the allotment. Improvements would include increased vegetative cover and reduced soil compaction resulting in less soil erosion and surface runoff. Sediment delivery to McElmo Creek would decrease. As a result, dissolved oxygen may increase and nitrite concentrations may decrease. The size of the

riparian area may be able to increase to its potential extent and channel morphology characteristics would improve slightly, resulting in lower stream temperatures and further lessening the possibility of abrupt temperature changes. Direct access by livestock to stream channels would result in elevated amounts of bacteria and ammonia during times when livestock concentrate on the stream channel.

## **Alternative D, No Grazing**

### ***Direct and Indirect Impacts***

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 would decrease. As a result, dissolved oxygen may increase and nitrite concentrations may decrease. The size of the riparian area would be expected to increase to its potential extent and channel morphology would improve with a reduction in width/depth ratio and an increase in sinuosity. This would reduce stream channel temperatures and lessen potential diurnal fluctuations. Bacteria and ammonia would decrease, but may still be delivered from private lands upstream during periods of high flow.

## **THREATENED, ENDANGERED, OR CANDIDATE SPECIES**

### **AFFECTED ENVIRONMENT**

This allotment falls within the range of several listed threatened or endangered species. The Project Area does not provide suitable habitat for the Canada lynx and black-footed ferret. The black-footed ferret's historic distribution included southwest Colorado but 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, 1 June 2004). Lynx are found in high elevation aspen and spruce-fir forests. The project area may provide habitat for the Mexican spotted owl. There is no willow habitat in this allotment. There was a southwestern willow flycatcher documented within the Monument in 2004 at a stock reservoir in the Flodine Park Allotment.

Bald eagles are occasionally seen foraging along McElmo Creek during the winter but are not known to nest within the vicinity of the allotment.

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. They will not be addressed further in this assessment.

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 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 near the town of Dove Creek.

Several sensitive species may be found within this allotment including: ferruginous hawk, spotted bat, Allen's big-eared bat, fringed myotis, big free-tailed bat, 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 would play an important role.

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 within the Aztec allotment.

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. They are unlikely to be found in this allotment.

The longnose leopard lizard is on the State Director's Sensitive Species List but was incorrectly omitted for the SJPLC. Until the list is corrected, it is being considered sensitive for this area. It was identified in the Monument proclamation. This lizard is known to occur in southwest Colorado and has been observed within the Monument (Leslie 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 (from May to early August) and they have an unwarly behavior, which makes them vulnerable to human exploitation (Hammerson 1999). Habitat for this lizard can be found in this allotment.

The desert spiny lizard is also on the State Director's Sensitive Species List, and is listed 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 the allotment.

The Mesa Verde night snake is not on the State Director's Sensitive Species List but was recognized in the Monument proclamation. It may be found in the project area. This snake inhabits landscapes (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.

## **ENVIRONMENTAL CONSEQUENCES**

### **Alternative A – Proposed Action**

#### ***Direct and Indirect Impacts***

Under this alternative, there would be little change in the current downward trend of habitats within this allotment. Riparian areas would continue to be degraded. Habitat for the southwest 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 droughts, such as experienced in 2002.

There would be little impact of this alternative on bald eagles. They are very mobile and would go where the foraging can be most successful. Bat populations would remain relatively unchanged, more likely to fluctuate with insect populations. This alternative would not affect bat roosting habitats.

Several neotropical migrants known to occur in the area are negatively impacted by heavy grazing including the horned lark and green-tailed towhee. Conversely, other birds are positively impacted by heavy grazing such as the mountain bluebird and sage thrasher (Saab et. al. 1995).

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.

### **Alternatives B and C – Deferred grazing during the critical period and Dormant season use**

#### ***Direct and Indirect Impacts***

Under these alternative there would be improvements in vegetative conditions overall, both in quality and quantity. Riparian areas would improve.

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. Improvements in grazing practices benefit the food chain overall.

There is a higher likelihood of trampling of reptiles and amphibians, under Alternative B since there would be cattle on the allotment at the beginning of their activity period in May. Cattle may also increase the amount of sedimentation in creeks and riparian areas. However, there would be less cattle on the allotment so impacts to reptiles, amphibians, and fish should occur over a broader area.

Trampling would not be a concern in Alternative C, since livestock use would be concentrated in winter months. In addition, the lizards will be hibernating and the ground frozen, eliminating the concern regarding crushing of burrows and nests.

## **Alternative D – No Grazing**

### ***Direct and Indirect Impacts***

This alternative promotes the most positive response for threatened, endangered, and sensitive species. 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. However, as described in the vegetation section, land management practices would likely have to be implemented to manage the invasive plant problem (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.

## **GENERAL WILDLIFE SPECIES**

### **AFFECTED ENVIRONMENT**

Within the project area there were no emphasis areas identified (e.g. critical or severe big game winter ranges) in the 1984 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 rare in this area and would be limited by insufficient cover for winter and little summer forage. However, they may be found in canyons and on mesa-tops within the 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 use 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 which are ground nesting birds. The sage thrasher and Brewer's sparrow are more linked to sagebrush communities and have not been located during casual bird counts (Leslie Stewart and Cliff 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 Land Health Assessment. 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**

#### ***Direct and Indirect Impacts***

Under this alternative, 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 droughts, such as experienced in 2002. Big game would continue to compete with livestock for limited resources and be more susceptible to disease and predation.

### **Alternative B and C - Deferred grazing during the critical period and Dormant season use**

#### ***Direct and Indirect Impacts***

Under these alternative there would be improvements in vegetative conditions overall, both in quality and quantity. Riparian areas would improve. 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. Improvements in grazing practices benefit the food chain overall.

### **Alternative D – No Grazing**

#### ***Direct and Indirect Impacts***

This alternative promotes the most positive response for wildlife. 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. There would be no competition for resources between livestock and big game. Deer populations would be healthier with improvements in forage availability and less susceptible to disease.

As described in the vegetation section, other land management practices would likely have to be implemented to manage the invasive plant problem (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, a cultural resource assessment (literature review) was completed for the allotment. The review was conducted using the cultural resource inventory and site overlays at the Anasazi Heritage Center and the compass database maintained by the Colorado State Historic Preservation Office (SHPO). The review was facilitated by the use of allotment maps and 7.5 minute quadrangle 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 result of the assessment is summarized below.

Eight cultural resource inventories have been conducted in the allotment, resulting in coverage of approximately 60% of the area. There are currently 116 archaeological and historic sites recorded within the boundaries of the allotment. These include sites affiliated with prehistoric Archaic and Ancestral Puebloan occupations, as well as historic Native American and European American occupations. The prehistoric sites include artifact scatters, processing areas, temporary campsites, pottery firing kilns, quarries, a reservoir, fieldhouses, and seasonal and permanent habitations. The historic sites include a sweatlodge, refuse scatters, homesteads, and mining adits.

Thirty four sites have been recorded within or in close proximity to livestock concentration areas within the allotment. Twenty three sites have been determined to be eligible for inclusion on the National Register of Historic Places, six have not yet been evaluated for eligibility, and five have been determined to be ineligible. Livestock disturbance and/or the presence of range improvements were noted on the site forms and maps for sixteen of these sites. In addition, livestock disturbance was noted for two sites located outside of livestock concentration areas.

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 portion of the allotment will have a moderate to high sensitivity for cultural resources.

## **ENVIRONMENTAL CONSEQUENCES**

### **Alternative A – Proposed Action**

#### ***Direct and Indirect Impacts***

Direct impacts that occur to prehistoric and historic sites located in areas where livestock concentrate include trampling, chiseling, churning, and compaction of site soils, cultural deposits and features; damage to and displacement of artifacts; impacts to rock images and standing masonry and wooden walls resulting from livestock standing, leaning, and rubbing against them; and the potential for increased fire damage within rock shelters as a result of the build up of animal dung. Indirect impacts include soil erosion, gullyng, and increased potential for unlawful collection and vandalism as sites become exposed due to loss of vegetation.

Impacts that have been noted on sites previously recorded within the allotment include livestock trampling and trailing. The sites located within the allotment that have fence lines within their boundaries, or are in close proximity to fences and stock driveways, are likely to

have been impacted by construction and use of those features. These sites would continue to be impacted by use and/or maintenance of these 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 re-located and assessed for livestock impacts. These inventories and site assessments would be conducted during the 10-year term of the permit.

If the BLM determines, in consultation with the SHPO, that livestock grazing or other range management activities are adversely affecting historic properties, treatment plans will be prepared. Following approval of the treatment plans; the BLM would treat the affected properties during the 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.

**Cumulative Impacts-** damage to archaeological sites resulting from direct and indirect impacts (as discussed in the Environmental Consequences section above) would become cumulative if mitigation measures are not taken to address them.

### **Alternative B, Deferred Grazing During Critical Period**

**Direct and Indirect Impacts-** the direct and indirect impacts from this alternative are the same as those described in Alternative A. However, these impacts would be less than in Alternative A because the number of AUMs would be reduced.

**Cumulative Impacts-** the cumulative impacts for this alternative are the same as those described in Alternative A, but would be reduced because of the decrease in the number of AUMs.

**Mitigation-** Mitigation measures for this alternative are the same as those described in Alternative A.

### **Alternative C, Grazing During Dormant Season**

**Direct and Indirect Impacts-** the direct and indirect impacts from this alternative are the same as those described in Alternative B.

**Cumulative Impacts-** the cumulative impacts for this alternative are the same as those described in Alternative B.

**Mitigation-** Mitigation measures for this alternative are the same as those described in Alternative A.

## 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 allotment.

**Cumulative Impacts-** cumulative impacts to cultural resources would be eliminated under this alternative, as no livestock grazing would be allowed within the allotments.

**Mitigation-** No mitigation measures would be needed for this alternative, as there would be no livestock grazing.

## SOCIOECONOMICS

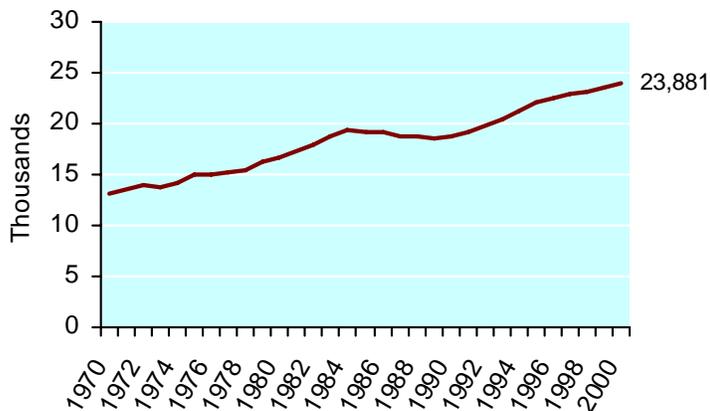
### AFFECTED ENVIRONMENT

Livestock grazing is recognized as an important aspect of the local custom, culture, and economy in Montezuma County and is supported in their 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 19 provides summary data on this trend in Montezuma County from 1970 to 2000.

Table 19. Montezuma County Agricultural 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 applicant permittee holding the grazing permit for the allotment analyzed in this EA, is 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 livestock operators’ permit in good standing is summarized in Table 20 below.

Table 20. Applicants’ base property acreage for the Aztec Canyon Allotment.

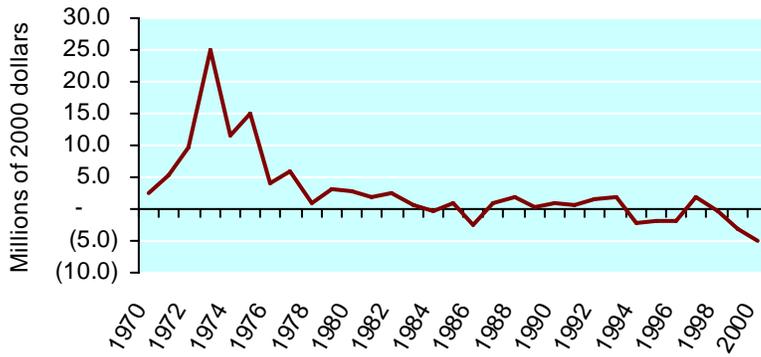
Livestock Operator	Base Property Acreage
James A. Black	640

Source: Dolores Public Lands Office

Based on the data presented in the table above, the total amount of base property held by the applicant is 640 acres. All of this base property is located in Montezuma County. This base property is 0.17 percent of the 372,591 acres in private ownership, and 0.27 percent of the 230,842 acres of private land assessed as grazing land in Montezuma County.

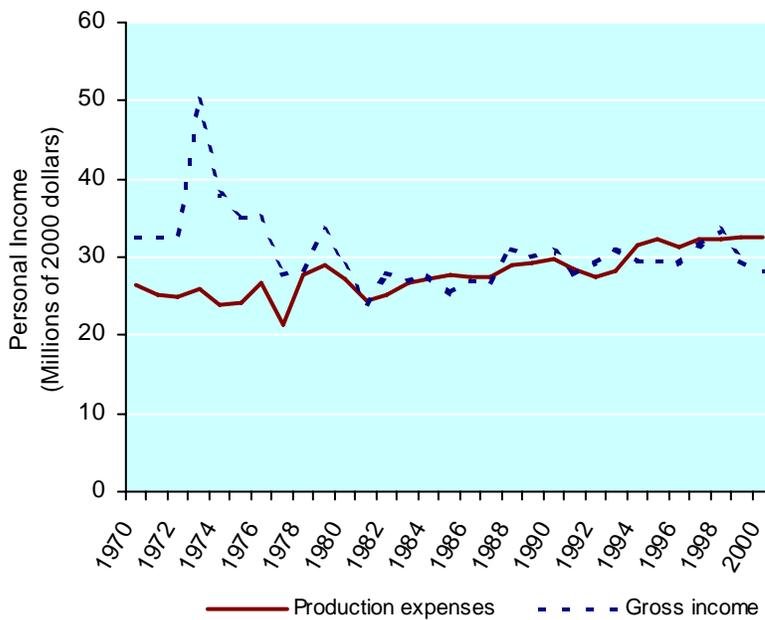
Net income from farming and ranching in the county has dropped from \$2 million in 1970 to negative \$5 million in 2000 as illustrated in Figure 2 below (BEA REIS 2000 CD, Table CA45).

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 9,234 AUMs authorized for livestock grazing under 22 individual livestock operations under section three Taylor Grazing Act (TGA) permits. Furthermore, 95 percent of the public land area within the Monument is permitted for livestock grazing. The applicant holds a total of 102 active permitted AUMs in the allotment considered in this EA. These 102 active permitted AUMs represent 1 percent of the total current active AUM allocations for livestock grazing in the Monument. A January 2002 inventory of all cattle including calves in Montezuma County totaled 19,000 (Colorado Department of Agriculture 2002). The applicants existing permit provides authorization to seasonally (i.e. May 1<sup>st</sup> through May 31<sup>st</sup> and Nov. 16<sup>th</sup> through Dec. 15<sup>th</sup>) graze 100 cattle, or 0.5 percent of the total number of cattle in the county. If the average actual use of 78 AUMs for this

allotment is applied to this calculation, then the applicant’s existing permit provides authorization to seasonally graze about 76 cattle, or 0.4 percent of the total number of cattle in the county.

Livestock grazing provides direct and indirect benefits to local economies. Assuming all 102 AUMs under the existing permit are used for livestock grazing, then permit fees calculated using the 2006 grazing fee of \$1.53/AUM associated with these AUMs directly generate \$159.12 per year, of which 12.5 percent, or \$19.89 is returned to the State of Colorado. The state then distributes this \$19.89 among its four Boards of Grazing Advisors, using an established formula. The portion of this \$19.89 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 of 78 AUMs is applied to this calculation, then permit fees associated with the AUMs directly generate \$119.34 per year, of which 12.5 percent, or \$14.91 is returned to the State of Colorado.

To accurately assess the economic viability of the 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 applicant. However, one means of estimating the net revenues generated by the applicant, from their livestock operation 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 budget of the applicant’s operation. 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 21.

Table 21. 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
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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 Aztec Canyon Allotment analyzed in this EA is also unknown. However, as noted, the existing 102 AUMs or 100 cattle permitted to graze seasonally account for 0.5 percent 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**

### **Alternative A, Proposed Action**

#### ***Direct and Indirect Impacts***

The proposed action would not change the applicants existing permitted AUMs. Under this alternative the permittee would continue to be authorized to graze 100 cattle from November 16<sup>th</sup> through December 15<sup>th</sup> and May 1<sup>st</sup> through May 31<sup>st</sup> for a total of 102 AUMs. The impact to the Colorado Boards of Grazing Advisors would remain unchanged in which they receive \$19.89 generated from these permit fees.

### **Alternative B, Deferred Grazing During Critical Period**

#### ***Direct and Indirect Impacts***

Under this alternative, 37 AUMs or 37 cattle would be authorized to graze from November 16<sup>th</sup> through December 15<sup>th</sup> and May 1<sup>st</sup> through May 31<sup>st</sup> every year. The cost to the Colorado Boards of Grazing Advisors from this reduction in AUMs would be \$12.68 in lost permit fees, assuming all 37 AUMs are used for livestock grazing.

This 36% decrease in permitted AUMs could result in a decrease in livestock-generated revenues to the applicant, assuming an alternative location could not be found to seasonally graze the same number of cattle. Furthermore, this decrease in permitted AUMs could also result in a decrease to livestock-generated revenues to local goods-and services providers. 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 Department of Agricultural 2002). The proportion that the 65 AUMs or 63 cattle, not permitted to graze under this alternative, could contribute to this total is unknown. However, assuming all 65 AUMs are used for livestock grazing, these 63 cattle represent 0.3 percent of the total number of cattle including calves in Montezuma County in January 2002.

### **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., 37 AUMs). As a result, the potential impacts disclosed under Alternative C would be similar.

### **Alternative D, No Grazing**

#### ***Direct and Indirect Impacts***

Under this alternative, the cost to the Colorado Boards of Grazing Advisors would be the loss of \$19.89 from permit fees, assuming all 102 AUMs not permitted under this alternative would be used for livestock grazing.

This 100% decrease in permitted AUMs could result in a decrease in livestock-generated revenues to the applicant, assuming an alternative location could not be found to seasonally graze the same number of cattle. Furthermore, not permitting livestock grazing on this allotment could also result in a decrease to livestock-generated revenues to local goods-and services providers. 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 102 AUMs or 100 cattle, not permitted to graze seasonally under this alternative, could contribute to this total is unknown. However, assuming all 102 AUMs are used for livestock grazing, these 100 cattle represent 0.5 percent of the total number of cattle including calves in Montezuma County in January 2002.

### **Cumulative Impacts**

All other resource values have been evaluated for cumulative impacts, and were found to be negligible.

Ranching operations often operate close to the margin and their profitability can be significantly affected by market conditions. In addition, drought conditions since 2000 have reduced the amount of grazing capacity on both public and private lands have reduced the amount of grazing capacity which has adversely affected ranchers. Federal land grazing plays an important and vital role in the economic viability of those ranchers in Montezuma County who hold grazing permits, and significant changes to the permitted livestock numbers affect those operations.

Alternative D (No Grazing) would be the most detrimental alternative for the applicant permittee because it would remove livestock grazing from public land. The uncertainty of being able to find alternative pasture lands, combined with fluctuating market conditions and ongoing drought conditions would adversely affect the viability of the applicant permittees livestock operation. Therefore, this alternative would contribute to an adverse cumulative affect. Alternative A (Proposed Action) would have no immediate effect to the current livestock operation. However, current stocking levels would eventually decrease the current resource conditions of the allotment and eventually adversely affect the ranching operation. Therefore, the Proposed Action would contribute to an adverse cumulative effect on the long-term sustainability of livestock grazing. Both Alternative B (Deferred Grazing During Critical Period) and Alternative C (Grazing During Dormant Season) would immediately affect the current livestock operation by adjusting permitted livestock numbers and season of use. Although this may immediately affect the current permittee, the resource conditions of the allotment would improve and provide for the long-term sustainability of livestock grazing within the allotment. Therefore, Alternatives B and C would not contribute to adverse cumulative economic effects because they would ensure that livestock grazing would continue on this allotment.

## **IV. CONSULTATION AND COORDINATION**

### **PERSONS, GROUPS AND AGENCIES CONSULTED**

A copy of the EA was mailed directly to the following for a 30-day public comment period:  
Montezuma Board of County Commissioners  
Montezuma County Stewardship Committee  
James Black

The Northern Ute Tribe  
The Ute Mountain Ute Tribe  
The Southern Ute Tribe  
The Navajo Nation  
The Hopi Tribe  
The Jicarilla Apache Tribe  
The Pueblos of Acoma, Cochiti, Isleta, Jemez, Laguna, Nambe, Picuris, Pojoaque, Santa Ana, Santo Domingo, Sandia, San Juan, San Ildefonso, Santa Clara, Taos, Zia, and Zuni

#### **PUBLIC NOTIFICATION**

Notification of the availability of the EA for a 30-day public comment period, was made through the local media, Monument website (<http://www.co.blm.gov/canm/index.html>). In addition, the actual EA was made available for a 30-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.

#### **V. LIST OF PREPARERS**

LouAnn Jacobson, Monument Manager  
Michael Jensen, Rangeland Management Specialist  
Kathy Nickell, Wildlife Biologist  
Penny Wu, Outdoor Recreation Planner  
Shauna Jensen, Hydrologist  
Leslie Stewart, Ecologist  
Linda Farnsworth, Archeologist  
Roger Baker, Noxious Weed Program Coordinator

**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 biodiversity. 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.
- 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 macroinvertebrates, 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 uses.

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

Table B. Summary of potential determinations and their causal factor(s) for the Aztec Canyon Allotment.

<b>Alternative(s)</b>	<b>Standards</b>	<b>Potential Determinations</b>	<b>Causal Factor(s)</b>
Alternative A: Proposed Action	Upland Soils	Achieving	n/a <sup>1</sup>
	Riparian Systems	Move towards achieving	n/a <sup>1</sup>
	Healthy, Productive Plant and Animal Communities	Not Achieving	livestock grazing, PJ chaining unsuccessful re-seeding, noxious weeds
	Special Status, Threatened and Endangered Species	Achieving	n/a <sup>1</sup>
	Water Quality	Achieving	n/a <sup>1</sup>
Alternative B: Deferred Grazing During Critical Period	Upland Soils	Achieving	n/a <sup>1</sup>
	Riparian Systems	Move towards achieving	n/a <sup>1</sup>
	Healthy, Productive Plant and Animal Communities	Move towards achieving	Livestock grazing, PJ chaining, unsuccessful re-seeding, noxious weeds
	Special Status, Threatened and Endangered Species	Achieving	n/a <sup>1</sup>
	Water Quality	Achieving	n/a <sup>1</sup>
Alternative C: Grazing During Dormant Season	Upland Soils	Achieving	n/a <sup>1</sup>
	Riparian Systems	Move towards achieving	n/a <sup>1</sup>
	Healthy, Productive Plant and Animal Communities	Move towards achieving	Livestock grazing, PJ chaining unsuccessful re-seeding, noxious weeds
	Special Status, Threatened and Endangered Species	Achieving	n/a <sup>1</sup>
	Water Quality	Achieving	n/a <sup>1</sup>
Alternative D: No Grazing	Upland Soils	Achieving	n/a <sup>1</sup>
	Riparian Systems	Move towards achieving	n/a <sup>1</sup>
	Healthy, Productive Plant and Animal Communities	Move towards achieving	livestock grazing, PJ chaining unsuccessful re-seeding, noxious weeds
	Special Status, Threatened and Endangered Species	Achieving	n/a <sup>1</sup>
	Water Quality	Achieving	n/a <sup>1</sup>

<sup>1</sup>Determination not required, as a result of standard being achieved.

**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).
3. During the dormant season (i.e., October 1<sup>st</sup> through February 28<sup>th</sup>) 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.
4. During the critical growing season (i.e., March 1<sup>st</sup> through May 31<sup>st</sup>) livestock numbers may not be increased above the livestock numbers on the permit.
5. Utilization levels shall not exceed 50 percent on key forage species of current year's growth as measured at the key monitoring sites.
6. 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.
7. Maintenance of all authorized 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 range improvement agreements and/or range improvement permits. Cultural resource inventories may be required prior to authorizing any maintenance activities. 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.
8. 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.
9. 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.

10. 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.
11. 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.
12. An accurate actual grazing use report showing use by pasture must be turned in within fifteen days after completing grazing use.

### **Administrative**

13. 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.
14. 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 than \$250) would be assessed.
15. 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.
16. 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.
17. 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.
18. Those holding permits or leases must own or control and be responsible for the management of livestock authorized to graze.

19. The permittees/lessees grazing case file is available for public inspection as required by the Freedom of Information Act.
20. 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.
21. 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 1<sup>st</sup> through May 31<sup>st</sup>).
22. The authorized officer may require counting and/or additional or special marking or tagging of the livestock authorized to graze.

## **TERMS AND CONDITIONS THAT APPLY TO ALTERNATIVES A and B**

### **Resource/Livestock**

1. During the critical growing season (i.e. March 1<sup>st</sup> through May 31<sup>st</sup>) livestock numbers may not be increased above the livestock numbers identified on the permit.

No more than 50 percent utilization of key forage species, and no more than 30 percent of the active preference would be used during the critical period (i.e. March 1<sup>st</sup> through May 31<sup>st</sup>)

**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 (NFC) 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 properly (PFC) where there is adequate vegetation.

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