

DEC 22 1999

Mining and Minerals Div

CULLUM MINE REVEGETATION PLAN

Submitted on behalf of:

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Prepared by:

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Revegetation Objectives

This attachment provides for the design, implementation, and monitoring for revegetation of lands within the permit area. We will discuss and evaluate the existing conditions of the permits area, and will propose methods for revegetation. We will include methods that will minimize disturbance to naturally regenerating plant communities, and those that will enhance resource values for wildlife use, protect water quality, and enhance the existing site aesthetically.

Post-Mining Use

The post mining use will be wildlife habitat.

Revegetation Timetable

All revegetation will be implemented in the growing season, between June 15th and August 15th. Revegetation will occur after earthwork is complete and access to the site has been controlled.

Reclamation Cost Estimate and Bonding

The estimated costs for revegetation are included in Appendix A.

Revegetation Species and Planting Rates

Species included in the seed mixture are native to the site (with the exception of Yellow sweetclover (*Melilotus officinalis*) and have been selected with the following criteria: (1) the species is present on the site as inventoried by MFG staff in the fall of 1999 (See Appendix B), or; (2) the species is listed by the Natural Resources Conservation Service (NRCS) as a desirable plant community component for the site (Appendix C).

Existing Conditions

The Cullum Mine permit area has not been mined for approximately 20-30 years (Curt Weitkunat, 1999). There has been considerable natural regeneration of native herbaceous and woody species on both the overburden piles and on the flat, low-lying areas between the overburden piles. An effort to determine if revegetation would be required for the entire permit area included discussion with New Mexico Energy, Minerals and Natural Resources Department Division of Mining and Minerals (MMD) staff and a site characterization by MFG.

Standards for Measuring Natural Regeneration of Vegetation

The Mining and Minerals Division (MMD) has defined the necessary level of natural revegetation at a site to be 75% of the plant community for that site as defined by the Natural Resources Conservation Service (letter to Matt Carnahan, Western Mobile, from Carrie Neet, MMD, April, 1999. Appendix D). In this letter, Ms. Neet suggested conducting a vegetative survey in order to determine if vegetative cover and diversity requirements are satisfied.

Site Characterization

MFG staff contracted with the NRCS Espanola District Conservationist, Paul Montoya, to obtain soils descriptions and plant community descriptions for the permit area. Soils information was interpolated by Mr. Montoya from Sheet 74 (Soil Survey of Rio Arriba Area, New Mexico, Parts

of Rio Arriba and Sandoval Counties, United States Department of Agriculture, Soil Conservation Service, developed from 1980 aerial photography, unpublished – Appendix E). Interpolation was required because the permit area occurs within the Santa Fe National Forest boundary, and soils information ends at this boundary. Mr. Montoya determined the soils to be a combination of Puye gravelly sandy loam, 3 to 15 percent slopes (302) and Chiminet-Rock outcrop association, 5 to 40 percent slopes (401). The majority of the permit area, however, is characterized by the Puye soil, with limited inclusions of the Chiminet association.

For rangeland and some woodland areas, plant community descriptions are presented in “Range Site Descriptions”. The range site descriptions provide the only NRCS - generated breakdown of plant community composition and cover by percentage. Since the permit area is classified as woodland, the NRCS does not have a range site description that is tied to the Puye soil. However, Mr. Montoya recommended using the range site description “Gravelly Hills Complex” WP2 (USDA-NRCS, Section IE, Technical Guide - Appendix C) for percentages of cover and species composition by structure class, and using the “Woodland Grazing Guide” (Appendix C) to determine representation of plant species.

In November 1999, MGF staff sampled the vegetative communities at Cullum Mine. Four distinct sample areas were identified: (1) the overburden piles; (2) the side slopes of the overburden piles; (3) the flat areas between overburden piles, and (4) the adjacent unmined area. Of these, the second (side slopes of overburden) was eliminated from the sampling design as the vegetative cover was very sparse and could be assessed visually. This preliminary evaluation will discuss the measurements made for the overburden and the flat areas within the permit area.

Methods

The overburden piles and flat areas were sampled using a “point-step” method as described in the Draft Closeout Plan Guidelines [New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division (MMD) 1996]. In each of these two areas, three sub-areas were randomly located along a transect. Within these areas, five transects of 50 feet each was taped out, and “hits” recorded at every foot along the tape. Total cover and cover by species was recorded and combined to give a value for cover by each species, and a value for total cover.

Results

The overburden areas had a total vegetative cover of 45%. Of that, the dominant species was rubber rabbitbrush (*Chrysothamnus nauseosus*) at approximately 14.5%, with a co-dominant sweetclover (*Melilotus officinalis*) of 13.5%. A sub-dominant species on the overburden areas was sagewort (*Artemisia campestris*) at 5.7%. The remainder of the plant community was composed of grass and forb species that each represented less than 5% cover. These included blue grama (*Bouteloua gracilis*), sand dropseed (*Sporobolus cryptandrus*), cheatgrass (*Bromus tectorum*), and several species of aster (*Aster* spp.). In addition, a component of cryptogam crust was present.

Bare ground measured at 12%, litter at 6.2%, and gravel at just under 2%. These surface characteristics were only recorded when they were exposed, with no canopy or ground cover. Therefore, the gravel component is not well represented by this figure, as approximately 90-95% of the ground surface is coarse gravel.

The range site description “Gravelly Hills Complex” describes a plant community of 15% grasses, 5-10% shrubs and sub-shrubs, and 40-60% surface gravel.

Table 1. Comparison of Existing Vegetation on Overburden Piles with USDA-NRCS Range Site Description

Existing		NRCS	
Species	Percent Cover	Species	Percent Cover
Total Cover (live vegetation)	45	Total Cover (live vegetation)	25
Sagewort	13.5	Sagewort	1-3
Rubber rabbitbrush	14.5	Shrubs	1-3
Sweetclover	13.5	Perennial forbs	1-5
Blue grama	Present <5	Blue grama	1-5
Sand dropseed	Present <5	Sand dropseed	1-5
Three awn	Present <5	Three awn	1-3
Broom snakeweed	Present <5	Broom snakeweed	1-5

The flat areas between overburden were much more sparsely vegetated, although they do support a number of small stands of ponderosa pine (*Pinus ponderosa*), and also appear to have more cryptogamic crusts.

This plant community had almost equal representation of four primary species: (1) rubber rabbitbrush at 1.8%; (2) sweetclover at 2.4%; (3) sagewort at 2.53%, and (4) mullein (*Verbascum thapsus*) at 3.8%. Surface gravel measured 27.4%, litter 7%, and bare ground at 1.53%. Cryptogam crusts measured at 1.7%, cheatgrass at 1.06 %, blue grama at 1.265, and bottlebrush squirreltail (*Elymus elymoides*) at 1.6%.

Existing		NRCS	
Species	Percent Cover	Species	Percent Cover
Total Cover (live vegetation)	24	Total Cover (live vegetation)	25
Sagewort	2.53	Sagewort	1-3
Rubber rabbitbrush	1.8	Shrubs	1-3
Sweetclover	2.4	Perennial forbs	1-5
Blue grama	1.26	Blue grama	1-5
Sand dropseed	Present <5	Sand dropseed	1-5
Three awn	Present <5	Three awn	1-3
Broom snakeweed	Present <5	Broom snakeweed	1-5
Little bluestem	Present <5	Grasses	1-5
Bottlebrush squirreltail	Present <5	Bottlebrush squirreltail	1-5

Proposed Actions

The permit area has been divided into two treatment areas: (1) the overburden piles and flat areas between overburden piles, and (2) the newly disturbed soil areas that will be created by reduction of highwalls. A proposed seed mixture has been provided in Appendix F.

Area 1 – Overburden and Flat Areas

This area has been stabilized by natural regeneration of native and non-native species. Although total cover in certain areas is quite dense, species diversity is not acceptable. The presence of vegetation and cryptogam crusts indicates that additional disturbance should be minimized. Therefore, in order to increase species diversity and minimize soil disturbance, this area will be inter-seeded by hand broadcasting. Wherever possible, seed will be “scratched” into the soil surface with a hand-held implement such as a light rake.

Area 2 – Newly disturbed slopes

On sloped areas that area created from reduction of highwalls, the following full treatment will be implemented.

A hydro-seed mixture of seed, mulch, organic amendment, and tackifier will be applied during the growing season (June 15 through August 15). Experienced personnel will carry out hydro-seeding with equipment meeting the following specifications. All mixing of materials will be done within a tank. The tank will have a built-in continuous agitation and recalculation system of sufficient operating capacity to produce a homogeneous slurry of mulch, seed, amendment, tackifier, and water.

Fencing and Livestock Management

The entire permit area will be fenced in order to control use by livestock from the adjacent Forest Service allotment. Carefully managed livestock may enhance the development of a more diverse plant community, and La Farge may elect to work with this permittee to utilize the livestock to the benefit of the re-seeded plant communities.

Monitoring for Revegetation Success

Revegetation success monitoring for both Areas 1 and 2 will include three periods of post-seeding evaluation. The first will be a seedling-emergence evaluation that will be performed for Area 2 during the fall following seed application. If seedling emergence is not satisfactory, re-seeding will be planned for the following growing season.

The second evaluation period will occur after six years. If vegetation does not meet standards (described below), re-seeding will be planned for the following growing season.

The third and final monitoring period will encompass the last two years of the bonding period.

Revegetation success criteria will include criteria for total plant cover and for species diversity. For final bond release, a reclaimed area, or sampling unit, will meet the revegetation success criteria as described below.

Total Cover

The NRCS Range site Description “Gravelly Hills” WP-2 (Appendix C) will be used as a standard for total cover. Sampling will be carried out by point-step method as described in the “Methods” section of the Site Characterization (above). Revegetation will be considered successful when 75% of the total cover listed in this range site description is not significantly

different from the on-site measurement of total plant cover at a 90% level of statistical confidence, and when this cover is composed of primarily non-invasive species.

Species Diversity

Vegetation cover data will be used for determining revegetation success with respect to species diversity. A technical standard, derived from the "Woodland Grazing Guide", will be applied, to include the following criteria:

1. The reclaimed area will have at least 50% of the species listed in the "Woodland Grazing Guide".

Sample Adequacy

Reclaimed areas will be sampled in two separate units: Area 1 and Area 2. A minimum of 10 cover transects and 10 species diversity transects will be completed for each sampling unit. In sampling for final bond release, sample adequacy will be achieved as required under the regulations.

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APPENDIX A
Estimated Revegetation Costs

**CULLUM MINE Permit No. RA003ME****Removal of Feeder Bin and Miscellaneous Scrap**

	<u>Cost</u>
Mobilization/Demobilization:	\$3,500.00
Labor:	\$5,000.00
Travel:	\$1,000.00
Disposal:	\$500.00
Total	\$10,000.00

Revegetation Cost Estimate

Per Maria Sonett, Vegetation Consultant, McCulley, Frick, and Gilman, Albuquerque, NM

	<u>\$ per unit</u>	<u># of units</u>	<u>Cost</u>
Labor (4 persons):	15.00	80	\$1,200
Interseeding of overburden (25 acres):	228.00	25	\$5,700
Revegetation of new 3:1 slopes (5 acres)	2,500.00	5	\$12,500
Research/Consultant:	83.00	40	\$3,320
Total			\$22,720.00

Cultural Resource Inspection Estimate

Per Laura Michalik and Joe Martin, Archaeological Consultant, Archaeological Services, Las Cruces, NM

	<u>Cost</u>
Site Investigation	\$1,200.00
Research	\$600.00
Report	\$200.00
Total	\$2,000.00

Total Amounts for Reclamation

	<u>Costs</u>
Earth work	\$ 126,730.00
Scrap Removal	\$10,000.00
Revegetation	\$22,720.00
Cultural	\$2,000.00

TOTAL RECLAMATION ESTIMATE \$ 161,450.00

APPENDIX B
Disturbed Species

Cullum Mine Preliminary Species List for Disturbed Areas
M. Sonett November 1999

Scientific Name	Common Name
<i>Aristida divaricata</i>	Poverty threeawn
<i>Aristida longiseta</i>	Purple threeawn
<i>Artemesia frigida</i>	Fringe sage
<i>Artemesia sp.</i>	Sagewort
<i>Aster chilensis</i>	Purple aster
<i>Aster sp. (tall)</i>	
<i>Bouteloua gracilis</i>	Blue grama
<i>Chrysothamnus nauseosus</i>	Rubber rabbitbrush
<i>Cryptogam crust</i>	
<i>Dasyochloa pulchella</i>	Fluffgrass
<i>Elymus elymoides</i>	Bottlebrush squirreltail
<i>Eriogonum sp.</i>	Buckwheat
<i>Euphorbia prostrata</i>	Spurge
<i>Fallugia paradoxa</i>	Apache plume
<i>Gutierrezia sarothrae</i>	Broom snakeweed
<i>Haplopappas spinulosus</i>	Perennial goldenweed
<i>Hymenoxys ricardsonii</i>	Colorado rubberweed
<i>Juniperus monosperma</i>	One-seed juniper
<i>Lycurus setosus</i>	Wolftail
<i>Melilotis officinalis</i>	Yellow sweetclover
<i>Mentzelia sp.</i>	Stickleaf
<i>Moss</i>	
<i>Muhlenbergia torreyii</i>	Ring muhly
<i>Opuntia polyacantha</i>	Prickly pear cactus
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Pinus edulis</i>	Pinon pine
<i>Pinus ponderosa</i>	Ponderosa pine
<i>Polygala alba</i>	Milkwort
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Sisymbrium altissimum</i>	Tumble mustard
<i>Stipa comata</i>	Needle and thread
<i>Tragopogon dubius</i>	Yellow salsify
<i>Verbascum thapsus</i>	Mullien
<i>Yucca glauca</i>	Soapweed yucca

APPENDIX C

Range Site Description

Soil Conservation Service Woodland Grazing Guide

Range Site Description

Section IIE, Technical Guide

A. Site No.

Gravelly Hills Complex (WP-2)

B. PHYSIOGRAPHIC FEATURES

This site occurs as hills dissected by natural arroyos. Slopes range from 15 to 50 percent and average 25 percent. Elevation ranges from 5,500 to 7,200 feet.

C. CLIMATIC FEATURES

1. Average annual precipitation varies from about 10 inches to just over 14 inches. Fluctuations ranging from about 5 inches to 25 inches are not uncommon. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. As much as half or more of the annual precipitation can be expected to come during the period of July through September. Thus, fall conditions are often more favorable for good growth of cool-season perennial grasses, shrubs, and forbs than are those of spring.

2. The average frost-free season is about 150 days and extends from approximately May to September. Average annual air temperatures are 50° F. or lower, and summer maximums rarely exceed 100° F. Winter minimums typically approach or go below zero. Monthly mean temperatures exceed 70° F. for the period of July and August.

3. Rainfall patterns generally favor warm-season perennial vegetation, while the temperature regime tends to favor cool-season vegetation. This creates a somewhat complex community of plants on a given range site which is quite susceptible to disturbance and is at or near its productive potential only when both the natural warm and cool season dominants are present.

D. SOILS

1. The soils are shallow to deep. The surface and underlying layers are either gravelly or very gravelly loams, sandy loams, and fine sandy loams. The soils are well-drained and moderately to rapidly permeable. The available water capacity is moderate to low. Erosion is normally none to slight unless natural plant cover is seriously reduced.

2. Characteristic soils are:

Parida coarse loamy

Placio fine loamy

3. Other soils included are:

E. POTENTIAL NATURAL PLANT COMMUNITY

1. This site supports a mixture of warm and cool season grasses and a sparse stand of scrub juniper and pinon significant only as a visual aspect. This site is a complex made up of the two slopes. The north slopes typically have more sideoats grama and juniper-pinon than the south slopes. The south slopes typically have more black grama and shrubs.

2. Composition of Potential Plant Community

Grasses and Grasslike 90-95%

Shrubs-Woody 1-5%

Forbs 1-5%

Sideoats grama	15-40	Pinon-juniper	1-3	Perennial forbs	1-5
Black grama	15-40	Broom snakeweed	1-5	Annuals	1-5
Galleta	5-15	Biglow sagewort	1-3		
Hairy grama	5-10	Longleaf ephedra	1-3		
New Mexico feather grass	} 5-10	Small soapweed	1-3		
Needleandthread		Feathered dalea	1-3		
Blue grama	1-5	Cholla	1-3		
Sand dropseed	1-5	Mountain mahogany	} 1-3		
Threeawn spp.	1-3	Oak sp.			
Bottlebrush squirltail	1-5	Others	1-3		
Sedge	1-5				
Other grasses	1-5				

3. Canopy Cover

Shrubs and half-shrubs 5-10%

4. Ground Cover (Average Percent of Surface Area)

Grasses and forbs	15
Bare ground	12
Surface gravel	40-60
Surface cobble & stones	10
Litter - % of area with avg. depth in 2 cm.	3

F. TOTAL ANNUAL HERBAGE PRODUCTION (Air-dry; lbs/Ac)

	<u>North Slopes</u>	<u>South Slopes</u>
Favorable years Avg.	400	500
Unfavorable years Avg.	100	150

1. Grazing

This site is suited for grazing by all kinds and classes of livestock. Livestock on this site generally prefer grazing north and south facing slopes during different times of the year. Grazing generally occurs on the north slopes during the summer and on the south slopes during the winter. The bulk of the forage produced and utilized on the north slopes is sideoats grama and the bulk of the forage produced and utilized on the south-facing slopes is black gramma. These species together with the cool-season grasses respond well to planned deferment periods. A planned grazing system which rotates the season of use will allow these species to increase in vigor and production. When this site is lowered in condition, severe water erosion, both sheet and rill, will take place. If this erosion continues, it can destroy this site.

2. Wood Products

This site has little significant value for wood products.

3. Habitat for Wildlife

This range site provides habitats which support a resident animal community that is characterized by mule deer, bobcat, black-tailed jack-rabbit, white-throated woodrat, Merriam's kangaroo rat, Botta's pocket gopher, brush mouse, sparrow hawk, Cassin's kingbird, meadowlark, common raven, chipping sparrow, leopard lizard, plateau whiptail, short-horned lizard, and black-tailed rattlesnake.

Where cliffs and ledges are found associated with the site, golden eagle, great horned owl, prairie falcon, Say's phoebe, white-throated swift, and cliff swallow nest or hunt over the site. Mourning dove and black-chinned sparrow nest on the site. Large rocks or boulders, where found

associated with the site, provide habitat for rock squirrels. Where it occurs adjacent to ponderosa pine forests, elk may range to feed.

4. Hydrologic Interpretations

Soils Series

Hydrologic Groups

Runoff curve numbers are determined by field investigations.

5. Recreation and Natural Beauty

This site offers fair to good potential for hiking, horseback riding, nature observation, photography, camping, and picnicking.

Scattered forbs and flowering shrubs, in addition to the rolling hills and open grassland character of this site, provide a degree of natural beauty.

6. Endangered Plants and Animals

To be added as reliable information becomes available.

G. Other Pertinent Information

1. Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month.

Range Con	North Slopes	South Slopes
<u>Range Condition</u>	<u>Ac/Aum</u>	<u>Ac/Aum</u>
Excellent (100-76)	10-15	10-12
Good (75-71)	15-18	12-15
Fair (50-26)	18+	15+
Poor (25-0)		

2. Relative Quality of Plants for Animal Use^{1/}

(a) Cattle

<u>Primary</u>	<u>Secondary</u>	<u>Low Value</u>
Sideoats grama	Blue grama	Broom snakeweed
New Mexico feathergrass	Hairy grama	Pinon
Needleandthread	Sand dropseed	Juniper
Bottlebrush squirreltail	Galleta	Feathered dalea
Winterfat	Threeawns spp.	Small soapweed
Indian ricegrass	Bigelow sagebrush	Cholla
Black grama	Longleaf ephedra	
Mountain mahogany	Oak spp.	
Sedge spp.		

(b) Sheep

<u>Primary</u>	<u>Secondary</u>	<u>Low Value</u>
Bottlebrush squirreltail	New Mexico feathergrass	Galleta (antelope)
Sideoats grama	Needleandthread	Pinon
Black grama	Blue grama	Juniper
Indian ricegrass	Threeawns spp.	Broom snakeweed
Winterfat	Dropseeds	Cholla
Bigelow sagebrush	Galleta (sheep)	Small soapweed
Mountain mahogany	Oak spp.	Feathered dalea
Sedge spp.	Longleaf ephedra	
	Hairy grama	

(c) Deer

<u>Primary</u>	<u>Secondary</u>	<u>Low Value</u>
Winterfat	Bigelow sagebrush	Pinon
Mountain mahogany	Bottlebrush squirreltail	Cholla
Oak spp.	Oneseed juniper	Broom snakeweed
Forbs	Sideoats grama	Galleta
	Longleaf ephedra	Threeawn spp.
	New Mexico feathergrass	
	Needleandthread	
	Black grama	

IDENTIFICATION AND AUTHORIZATION

1. USDA, SCS
Albuquerque, New Mexico
MLRA 36
2. Field Offices:
Española
3. Field office sample location:

Legend and Definitions for Range Site Descriptions.

- 1/ This rating system provides general guidance as to animal preference for plant species. It also indicates possible competition between kinds of animals for the various plants. Grazing preference changes from time to time and place to place, depending upon the animals, upon plant palatability and nutritive value, stage of growth and season of use, relative abundance, and associated plants. Grazing preference does not necessarily reflect a plant's ecological place in the climax plant community.

The following definitions apply to cattle, sheep, goats, deer, and antelope grazing:

Primary: These species generally decrease when the climax plant community is subjected to continuous heavy grazing pressure by the animals listed. These species are normally grazed first and preferred by the designated grazing animals when given free choice.

Secondary: These plants usually increase initially, then decrease when the site is subjected to continuous heavy grazing use by the animals listed. These plants are normally grazed after primary plants become scarce under free choice, or along with them under intensive grazing systems.

Low Value: These plants continue to increase with heavy, continuous grazing use of the site. These plants are not normally grazed until primary and secondary species are gone and animals are forced to eat them.

GRAZING GUIDE FOR WOODLAND
SOIL CONSERVATION SERVICE

New Mexico

MLRA D-36
NM-AZ Plateaus and Mesas
Sub-Resource Area WP-2

Woodland Community Type--Pinyon-juniper-grass
Woodland Suitability Group--(Not yet developed)
Soil Great Group--Haplustalfs, Ustochrepts
Soil Series --

Typical soils are dark-colored and range from shallow to moderately deep over varying parent materials. They are of mesic temperature regimes and ustic moisture regimes. Annual precipitation averages range from 14 inches to 18 inches. The average frost-free season is around 110 days but may be as high as 145 days in some areas. Slopes range from 3 to 35 percent, with extremes of 45 percent on hillsides. Elevation vary from about 6,000 to 7,500.

A. Nature of the woodland community:

Pinyon-pine and species of juniper characterize this type. Crown canopy varies usually from about 15 percent to 60 percent. Oneseed juniper, alligator juniper, and Rocky Mountain juniper are common.

Understory shrubs include, but are not limited to, mountainmahogany, skunkbush sumac, and various oaks. Perennial grasses are both cool-season and warm-season and make up a highly variable proportion of the understory production. Forb composition also varies greatly. Exposure is a major factor in the make up of the plant community, including canopy cover.

B. Relative grazing value of the understory for:

1. Cattle and elk

Grasses and grasslike

<u>Preferred</u>	<u>Desirable</u>	<u>Undesirable</u>
prairie junegrass	blue grama ✓	threeawn
western wheatgrass	wolftail	
pine dropseed	bullgrass	
pinyon ricegrass ✓	hairy grama	
muttongrass		
bottlebrush squirreltail ✓		
sideoats grama		
New Mexico muhly		
Indian ricegrass		
little bluestem		
sedge spp.		
needleandthread		
alkali sacaton		

Forbs

Preferred
Wright silktassel

Desirable
fringed sagewort
Indian paintbrush
wildbuckwheat ✓
carroth sagewort

Low Value
green sagewort
broom snakeweed ✓
rabbitbrush

Woody

Preferred
Bigelow sagebrush —
mountainmahogany —
apacheplume —
fourwing saltbush —

Desirable
oak spp. —
juniper seedlings ✓

Low Value
pinyon seedlings ✓
skunkbush sumac ✓
spineless horsebrush —
rabbitbrush ✓

2. Sheep and deerGrasses and grasslike

Preferred
bottlebrush squirreltail

Desirable
sideoats grama
blue grama
hairy grama
New Mexico muhly
prairie junegrass
muttongrass
pinyon ricegrass

Low value
western wheatgrass
little bluestem
wolftail
sideoats grama (deer)
blue grama (deer)
hairy grama (deer)
New Mexico muhly (deer)

Forbs

Preferred
globemallow spp.
Wright silktassel
wildbuckwheat spp.
fringed sagewort
Carruth sagewort
forbs spp.

Desirable
Indian paintbrush
forbs (in general)

Low value
broom snakeweed
green sagewort

Woody

Preferred
mountainmahogany
oak spp.

Desirable
juniper seedlings
pinyon seedlings

Low Value
spineless horsebrush
rabbitbrush spp.

C. Determination of forage value rating:

<u>Forage value rating</u>	<u>Minimum percentage of preferred and desirable species, by weight</u>
Very high	50 preferred + desirable = 90
High	30-49 preferred + desirable = 60
Moderate	10-29 preferred + desirable = 30
Low	Less than 10 preferred

D. Suggested initial stocking guide:

Forage value rating	Canopy Class		
	Sparse <u>1/</u> (0-10%)	Medium (10-40%)	Dense (40-70%)
		Acre/AUM	
Very high <u>2/</u>	3.0-4.0	3.5-6.5	6.0-12.0
High	3.6-5.3	5.0-9.5	10.5-15.0
Medium	5.0-10.0	9.0-19.0	13.5-25.0
Low	10.+	19+	20+
Seeded <u>3/</u>			

- 1/ Sparse includes cutover land and poorly stocked stands.
- 2/ Conservationists must use considerable judgment because in places, an area in the very high forage value class could be producing less than normal volumes, and adjustments would need to be made in the initial stocking rate.
- 3/ See field office Technical Guide for seeding recommendations.

E. Wildlife values:

Food and cover for wildlife are provided in some abundance by this woodland type, especially deer. Elk and black bear will also use this type. Meriam's turkey feed on grass seed in years of poor mast crop. Mountain lion, bobcat, and gray fox are the primary predators. Harlequin (Fool's) quail is associated with oak brush and pinyon-juniper, but adequate cover of tall grass for nesting is not normally available for this species. Pinyon jay is common in some areas, scrub jay in others. Band-tailed pigeon may be found in years of high pinyon nut or acorn mast production. A variety of other birds and small mammals are also found. Reptiles include prairie rattlesnake.

F. Effect on total environment:

This resource, in addition to providing wood products and pinyon nuts, provides recreation, watershed cover, wildlife habitat and sufficient understory vegetation suitable for forage that can be grazed without significantly impairing wood production and other forest values. Careful control and management of domestic grazing animals is required to maintain or enhance the potential of the area for wood production, watershed, forage, recreation, and aesthetic values. The understory is an integral part of the woodland ecosystem and its management must be coordinated with the management of the tree overstory. Therefore, total resource management includes both grazing management and woodland management. The soil resource is unstable and the erosion hazard and subsequent sediment yield potential is high if the vegetative cover is destroyed. Proper resource use, treatment, and management will hold soil loss and stream pollution by sediment to an acceptable minimum.

G. Watershed values (hydrologic interpretations):

Hydrologic curve numbers vary significantly from soil to soil on this woodland type. Field investigations are needed to determine hydrologic curve numbers.

H. Threatened or endangered species:

Bald eagle hunts over this woodland type. Other species will be added as reliable information is received.


State Range Conservationist

APPENDIX D

Cullum Claims Mine Permit Correspondence