UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
ECOLOGICAL SITE DESCRIPTION

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site Name: Gyp Upland (SD-3, SD-2)

Site ID: R042XB006NM

Major Land Resource Area: 042 - Southern Desertic Basins, Plains, and Mountains

Physiographic Features

This site occurs on plains and terraces between desert drainageways. Slopes range from level to gently sloping, usually less than 9 percent. Direction of slope varies and is usually not significant. Elevations range from 2,500 to 3,800 feet.

Land Form:
(1) Valley side
(2) Plain
(3) Terrace

	Minimum	Maximum
Elevation (feet):	2500	3800
Slope (percent):	1	9
Water Table Depth (inches):	N//A	N/A
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	N/A	N/A
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	High
Aspect:		

Climatic Features

The frost-free season ranges from 190 to 225 days between early April and late October. The optimum growing season of the major native warm season plants coincides with the summer rains during June, July, August, and September. However, plants can make some growth at any time during the frost free period when moisture is available and minimum daily temperatures stay above 51 degrees F. Vegetation on this site will be limited to plants which can take advantage of moisture at the time it falls, since the soil profiles have large amounts of available water for short periods of time and then rapidly dry. The majority of precipitation comes in the form of high intensity, short duration thunderstorms. Little or no available moisture can be stored in the soil profiles of this site. Strong winds from the southwest blow during January through June, which accelerate soil drying within the plant root zone and further, discourage cool season plant growth or occupancy of the site.

	Minimum	Maximum
Frost-free period (days):	179	212
Freeze-free period (days):	200	233
Mean annual precipitation (inches):	8.0	10.5

Monthly precipitation (inches) and temperature (°F):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Min.	0.37	0.36	0.23	0.18	0.29	0.57	1.42	1.92	1.53	1.01	0.48	0.57
Precip. Max.	0.54	0.39	0.27	0.36	0.45	0.64	1.9	2.2	1.66	1.07	0.58	0.78
Temp. Min.	20.8	25.5	31.2	38.0	46.4	54.3	61.1	59.1	51.5	39.8	28.8	22.3
Temp. Max.	58.1	63.8	71.0	79.3	87.4	96.4	95.5	92.7	87.5	78.7	67.2	58.5

Climate Stations:
(1) NM3855, Hatch. Period of record 1961 - 1990
(2) NM8387, Socorro. Period of record 1961 - 1990

Influencing Water Features

This site is not influenced by water from wetlands or streams.

Wetland Description:	System	Subsystem	Class
(Cowardin System)			

Representative Soil Features

The soils of this site are very shallow and well drained. The surface layers are loam and fine sandy loam overlying dense layers of soft or cemented gypsum material and gypsiferous earth at depths less than 8 inches. The gypsum materials commonly outcrop to the surface as inclusions of raw gypsumland, which are void of vegetation and not part of the ecological site. In the lower part of the profile the semi indurated gypsum and caliche make up about 75 percent of the mass and are restrictive to root development. The soils have moderate permeability. Water holding capacity is very low. The plant, soil, air, water relationship is poor. The site has a droughty appearance because of the soils inability to support a dense stand of vegetation. If unprotected by plant cover or organic residue, the soil becomes easily wind blown and water eroded.

Predominant Parent Materials:
Kind: Marine deposits
Origin: Gypsum

Surface Texture:	(1)	Gypsiferous Fine sandy loam
	(2)	Loam
Subsurface Texture Group:		Loamy
Surface Fragments <=3" (% Cover):		1
Surface Fragments > 3" (% Cover):		1
Subsurface Fragments <=3" (% Volume):		8
Subsurface Fragments > 3" (% Cover):		0
Drainage Class:		Moderately well drained To Well drained
Permeability Class:		Moderately slow To Moderate

	Minimum	Maximum
Depth (inches):	25	72
Electrical Conductivity (mmhos/cm):	2	16
Sodium Absorption Ratio:	0	0
Calcium Carbonate Equivalent (percent):	0	0
Soil Reaction (1:1 Water):	7.4	8.4
Soil Reaction (0.01M CaCl2):	N/A	N/A
Available Water Capacity (inches):	4.0	8.0

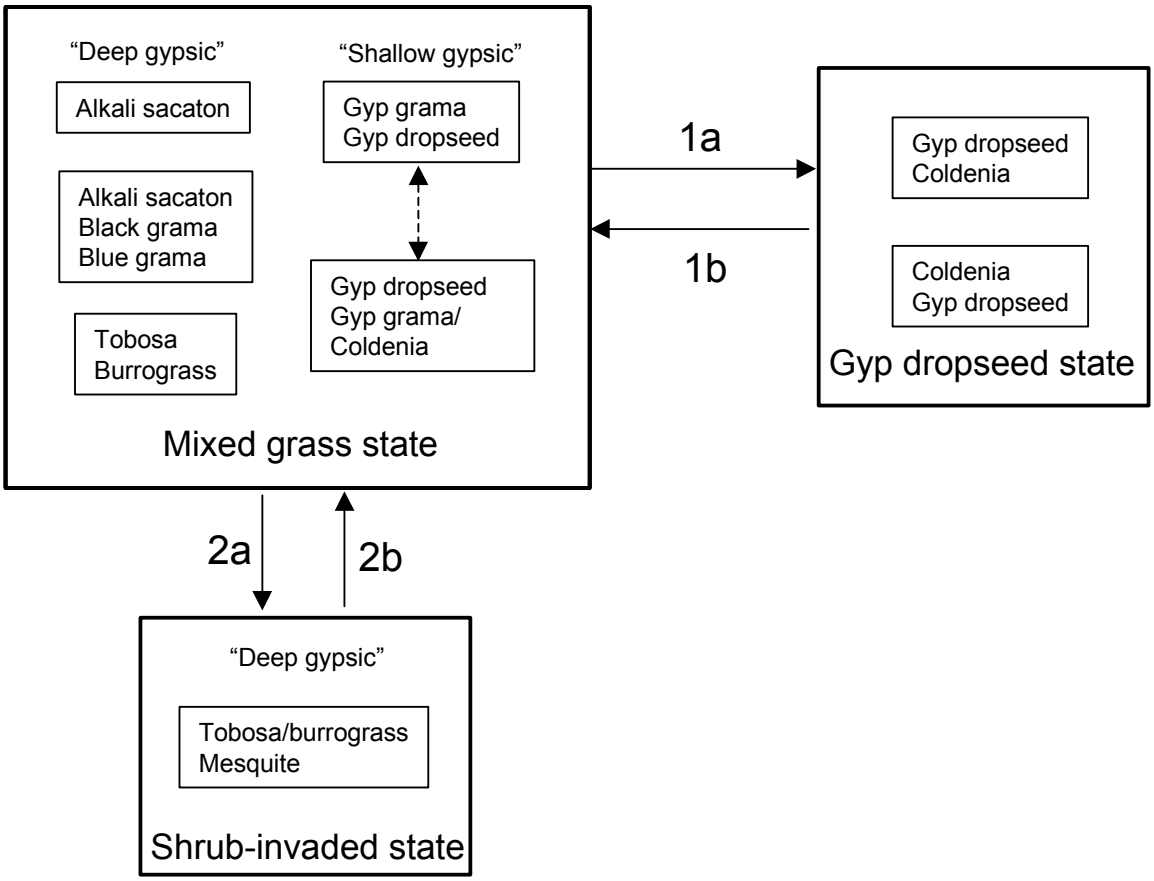
Plant Communities

Ecological Dynamics of the Site

Overview

The vegetation of this site often intergrades with that of Loamy sites, depending on the amounts of gypsum, soil texture, and depths of gypsic horizons. Low-lying areas where run-in water occurs behave like draws. Areas where gypsum outcrops are exposed harbor little vegetation. Gyp Uplands may intergrade with the Salt Flats site depending on salinity levels. Thus, the vegetation of this site is very patchy, variable, and difficult to characterize. The historic plant community types that are likely to be associated with the gyp uplands site include 1) an alkali sacaton (*Sporobolus airoides*) and black grama (*Bouteloua eriopoda*) or blue grama (*B. gracilis*)-dominated community associated with soils having relatively deep (> 10 “) gypsic horizons and 2) a gyp grama (*Bouteloua breviseta*) and gyp dropseed (*Sporobolus nealleyi*)-dominated community on soils with shallow (< 10”) gypsic horizons. Tobosa (*Pleuraphis mutica*), burrograss (*Scleropogon brevifolius*), and/or saltbush (*Atriplex canescens*) may also dominate depending on texture, land-use history, or other features. The subshrub Coldenia (*Coldenia* spp) increasingly dominates sites with very shallow gypsic horizons as grasses decline. Gyp upland sites are susceptible to erosion when vegetation cover is reduced due to drought and overgrazing. Mesquite (*Prosopis glandulosa*) may invade soils with deeper gypsic horizons within the site that are dominated by tobosa or burrograss. Erosion of A horizons bring gypsic horizons closer to the surface and can shift community composition to dominance by gyp dropseed, coldenia, and bare soil.

State-Transition model: MLRA 42, SD-2, Gyp Upland



1a. Erosion and loss of soil fertility
1b. Soil addition
2a. Reduced fire or heavy grazing with shrub seed addition
2b. Shrub removal

Mixed grass state

•Gyp grama, gyp dropseed
•Alkali sacaton and other grasses absent, may be degraded community
•Normally has patches of open ground, often covered with lichen crust
•Hollomex-Milner-Reeves association, Chaves Co. NM

Mixed grass state-run-in setting

•Alkali sacaton, silver bluestem
•Draw-like setting, abundant cover and litter
•Hollomex-Milner-Reeves association, Chaves Co. NM

Gyp dropseed state

•Gyp dropseed, coldenia, gyp grama, small patches of alkali sacaton and tobosa in depressions.
•Similar ground cover to communities With more palatable grasses
•Hollomex-Milner-Reeves association, Chaves Co. NM

Gypsum outcrop

• Coldenia, gyp dropseed
• Very low vegetative cover, note high cover of biological crust
• Inclusion within Malargo series
Otero Co. NM

Plant Community Name: Historic Climax Plant Community

Plant Community Sequence Number: 1 Narrative Label: HCPC

Plant Community Narrative:

State Containing Historic Climax Plant Community
Mixed grassland State: Alkali sacaton, black grama, and blue grama (only in SD-3) dominate soils that have relatively deep gypsic horizons that are deeper than 10" (e.g. Reeves series). Saltbush may be an abundant shrub. Alkali sacaton cover may be continuous in run-in settings surrounded by sparsely vegetated areas (alkali sacaton community). On fine-silty or fine loamy calcareous gypsid soils (e.g. Milner or Reeves series), tobosa or burrograss may be dominant. Dominance by burrograss or tobosa might represent grazing-induced retrogression from an alkali sacaton-grama community type on these soils, but this has not been confirmed. In some cases, saltbush may be extremely dominant, (e.g. Malargo series) but it is not clear why. Gyp grama, black grama, and gyp dropseed dominate soils with shallow gypsic horizons and gyp dropseed, mormon tea (*Ephedra* spp.), and coldenia tend to dominate where the gypsic horizon is shallowest (< 3"). These communities exhibit low production, perhaps due to the comparatively shallow infiltration in gypsic soil and other chemical properties (Campbell and Campbell 1938). Outcrops of gypsum, often revealing a whitish floury mass at the surface, may be devoid of vegetation. Heavy grazing may reduce grama grasses and increase the dominance of gyp dropseed and coldenia, but it is important to recognize that these plants may dominate some patches without heavy grazing. Soil degradation due to surface compaction and reduced infiltration may be important on this site and result in reduced grass cover. Slight variations in the depth to the gypsic horizon, whether human induced or not, exert a powerful control on plant community composition. Where gypsic horizons are deep, soil texture or soil chemistry may govern composition.

Diagnosis: Soils with deeper gypsic horizons should have continuous grass cover with a high representation of alkali sacaton and black grama. Shallower soils should have gyp grama and black grama but gyp outcrops will be dominated by gyp dropseeds or coldenia. Depending upon the depths to a gypsic horizon, large (< 1 m) bare patches may be common but they should not be common where the depth to gypsic horizon is greater than 5".
This site has a grassland aspect with patches of bare or lichen covered soil surface exposed between patches of vegetation. The potential plant community is dominated by alkali sacaton, short and mid grass perennials and forbs, with half shrubs and shrubs sparsely and evenly distributed.

Ground Cover (Average Percent of Surface Area).	
Grasses & Forbs	25
Bare ground	57
Surface gravel	1
Surface cobble and stone	1
Litter (percent)	16
Litter (average depth in cm.)	1

Plant Community Annual Production (by plant type):

	Annual Production (lbs/ac)		
Plant Type	Low	RV	High
Grass/Grasslike	300	470	640
Forb	45	71	96
Tree/Shrub/Vine	30	47	64
Lichen			
Moss			
Microbiotic Crusts			
Totals	375	588	800

Mixed Grassland Plant Species Composition: Plant species are grouped by annual production **not** by functional groups.

Group	**Grass/Grasslike** Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
1	alkali sacaton	*Sporobolus airoides*	266	323
2	black grama	*Bouteloua eriopoda*	29	88
3	gypsum grama	*Bouteloua breviseta*	6	59
4	bush muhly	*Muhlenbergia porteri*	18	88
	bristle panicum	Setaria ramisetum		
	plains bristlegrass	*Setaria vulpiseta*		
5	gyp dropseed	*Sporobolus nealleyi*	6	18
6	sand dropseed	*Sporobolus cryptandrus*		
7	blue grama	*Bouteloua gracilis*		
8	threeawn	*Aristida*	18	88
	fluffgrass	*Dasyochloa pulchella*		
	ear muhly	*Muhlenbergia arenacea*		
	burrograss	Scleropogon brevifolius		

Group	**Shrub/Vine** Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
9	fourwing saltbush	*Atriplex canescens*	18	41
	Morman-tea	*Ephedra*		
	littleleaf sumac	*Rhus microphylla*		
10	javelin bush	*Condalia ericoides*	6	18
	knifeleaf condalia (squawbush)	*Condalia spathulata*		
	crown of thorns	*Koeberlinia spinosa*		
11	pricklypear	*Opuntia*	6	18
	yucca	*Yucca*		

Group	**Forb** Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
12	Coldenia	*Condalia*	29	59
13	Forb, annual		6	88
	trailing four-oçlock	*Allionia incarnata*		
	daisy	*Chrysanthemum*		
	golden tickseed	*Coreopsis tinctoria*		
	leatherweed	*Croton pottsii var. pottsii*		
	gyp wild buckwheat	*Eriogonum gypsophilum*		
	woolly gaura	*Gaura villosa*		
	blazingstar	*Mentzelia*		
	fiddleleaf	*Nama*		
	whitest evening-primrose	*Oenothera albicaulis*		
	beardtongue	*Penstemon*		
	scoprionweed	*Phacelia integrifolia var. texana*		
	white milkwort	*Polygala alba*		
	devils claw	*Proboscidea althaeifolia*		
	whitestem paperflower	*Psilostrophe cooperi*		
	threadleaf ragwort	*Senecio flaccidus var. flaccidus*		
	Hopi tea greenthread	*Thelesperma megapotamicum*		

Plant Growth Curve:
Growth Curve Number: NM2501
Growth Curve Name: Historic Climax Plant Community
Growth Curve Description: SD-2 Warm Season Plant Community

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	10	25	30	15	5	0	0

Additional States:

Transition to gyp dropseed state (1a): Reduced grass cover caused by poor grazing management and/or drought may result in erosion of surface horizons. As the depth to the gypsic horizon decreases, plant communities will become increasingly dominated by gyp dropseed and/or coldenia. Mechanical disturbance of the soil surface and soil degradation may contribute to this effect.

Key indicators of approach to transition: Increased bare ground, pedestalling, water flow patterns, blowouts, and eventually the loss of the A horizon.

Transition to shrub-invaded state (2a): Reduced grass cover in deep gypsic soils may result in mesquite invasion.

Key indicators of approach to transition: Increasing bare ground, presence of mesquite seedlings.

Shrub-invaded: On deep gypsic soils and soils with less strong gypsic horizons (i.e. have a lower percentage of gypsum) within this site, mesquite may invade and cause some reduction in grass cover due to competition with grasses. These communities are dominated by tobosa or burrograss. Saltbush may also be an important component. It is not known if shrub presence and resulting erosion may result in the loss of dominant perennial grasses across broad areas on gypsic soils. As soil characteristics grade toward those of the loamy ecological site, widespread grass loss may be increasingly probable.

Diagnosis: Moderate densities of mesquite, bare ground patches associated with mesquite patches.

Transition to mixed grassland (2b): Shrub removal may result in the eventually recovery of perennial grasses.

Gyp dropseed: These communities are dominated by gyp dropseed or coldenia, and often exhibit high amounts of bare ground and exposed gypsum at the surface. Gyp grama, black grama, and alkali sacaton may persist in small patches, especially in low-lying spots receiving run-in water and/or in which soils are protected from erosion. The frequency with which these community types represent degradation from mixed grassland due to poor management versus “natural” is unknown. The conditions under which gyp dropseed and coldenia dominate are unknown.

Diagnosis: Dominance by gyp dropseed or coldenia, high amounts of bare ground, sometimes associated with a high cover of microbiotic crusts.

Transition to mixed grassland (1b): Restoration or recovery of a non-gypsic A horizon would be required.

Information sources and theoretical background: Communities, states, and transitions are based upon information in the ecological site description and observations by Brandon Bestelmeyer, Jornada Experimental Range and David Trujillo, NRCS. Information on the the role of gypsum in concert with soil chemical features in determining plant composition is sorely needed.

Ecological Site Interpretations

Animal Community:
This site provides habitats which support a resident animal community that is characterized by coyote, hooded skunk, desert cottontail, whitethroated woodrat, sparrow hawk, cactus wern, scaled quail, logggerhead shrike, mourning dove, Texas horned lizard, lesser earless lizard, and western diamondback rattlesnake.

Fourwing saltbush, littleleaf sumac, spiny allthorn, common javilinabush, and knifeleaf condalia provide protective cover for scaled quail. Seed, green herbage and fruit from a variety of grasses, forbs and shrubs provide food for a number of birds and mamals, including scaled and Gambel's quail, mourning dove and prairie dogs. The fruit of tesajo cactus is relished by quail.

Hydrology Functions:

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations

Soil Series	Hydrologic Group
Cottonwood	C
Holloman	C
McCarran	C
Yesum	B
Alamogordo	B

Recreational Uses:
This site offers recreation potential for hiking, horseback riding, rock, gem, and mineral collecting, nature observation and photography, relic hunting, and quail, dove, and predator hunting.
During years of abundant moisture, a colorful array of wildflowers can be observed from spring through fall.

Wood Products:
This site provides little or no wood products other than curiosities and small furniture which can be made from the roots and stems of mesquite where it has invaded the site. The woody pods of devils claw are also used in curiosities.

Other Products:

This site is suitable for grazing during all seasons of the year. Care must be taken to leave enough vegetation cover for soil protection during windy and rainy periods or severe soil erosion will result. About 300 pounds per acre of total vegetation and litter is minimal for soil protection. This site is best suited and most efficiently utilized by cattle. It can also be utilized by small numbers of goats and sheep in combination with cattle where control or protection from predators can be provided.

Other Information:

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index	Ac/AUM
100 - 76	5.5 – 8.0
75 – 51	7.5 – 11.0
50 – 26	11.0 – 15.0
25 – 0	25.0 +

Plant Preference by Animal Kind:

	Code	Species Preference	Code
Stems	S	None Selected	N/S
Leaves	L	Preferred	P
Flowers	F	Desirable	D
Fruit/Seeds	F/S	Undesirable	U
Entire Plant	EP	Not Consumed	NC
Underground Parts	UP	Emergency	E
		Toxic	T

Animal Kind: Livestock

Animal Type: Cattle

Common Name	***Scientific Name***	***Plant Part***	***Forage Preferences***											
			J	F	M	A	M	J	J	A	S	O	N	D
Alkali Sacaton	Sporobolus airoides	EP	U	U	U	D	D	D	P	P	D	D	U	U
fourwing saltbush	Atriplex canescens	EP	P	P	P	P	P	D	D	D	D	D	P	P
gyp grama	Bouteloua breviseta	EP	N/S	N/S	N/S	N/S	N/S	D	D	D	D	D	N/S	N/S
black grama	Bouteloua eriopoda	EP	P	P	P	D	D	D	D	D	D	D	P	P
blue grama	Bouteloua gracilis	EP	D	D	D	D	D	P	P	P	P	P	D	D
redstem stork's bill	Erodium cicutarium	EP	N/S	P	P	P	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
winterfat	Krascheninnikovia lanata	P	P	P	P	P	P	D	D	D	D	P	P	P
bush muhly	Muhlenbergia porteri	EP	P	P	P	P	P	P	P	P	P	P	P	P
plains bristlegrass	Setaria vulpiseta	EP	D	D	D	D	D	P	P	P	P	D	D	D
Mormon tea	*Ephedra spp.*	D	D	D	D	D	N/S	N/S	N/S	N/S	N/S	D	D	D
soaptree yucca	*Yucca elata*	F	N/S	N/S	N/S	N/S	P	P	N/S	N/S	N/S	N/S	N/S	N/S

Supporting Information

Associated Sites:

Site Name	Site ID	Site Narrative

Similiar Sites:

Site Name	Site ID	Site Narrative

State Correlation:
This site has been correlated with the following states: Texas

Data Source	Number of Records	Sample Period	State	County

Type Locality:
Eddy County, New Mexico – center of N.W. ¼, Sec. 27, T. 26 S., R. 24 E., NMPM. 2 ½ miles N. E. of the Texas – New Mexico State line, on the west side of Highway 180. A. M. Leeman Ranch. GC Mapping Unit, Cottonwood component. Map Sheet 148 insert, Eddy Area New Mexico Soil Survey Report.

Relationship to Other Established Classifications:

Other References:
Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Sierra County Dona Ana County Grant County Hidalgo County Luna County Otero County Eddy County.

Characteristic soils are:
Cottonwood loam, very shallow, less than 8 inches thick
Holloman loam, very shallow, less than 8 inches thick
McCarran loam, very shallow, less than 8 inches thick
Yesum fine sandy loam, less than 8 inches thick
Alamogordo fine sandy loam, less than 8 inches thick

Site Description Approval:

Author	Date	Approval	Date
Don Sylvester	07/12/1979	Don Sylvester	07/12/1979

Site Description Revision:

Author	Date	Approval	Date
Dr. Brandon Bestelmeyer	02/27/03	George Chavez	02/27/03
George Chavez	02/27/03		