

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

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site ID: R042XD007NM

Site Name: Gravelly

Precipitation or Climate Zone: 12-14 inches

Phase: _____

PHYSIOGRAPHIC FEATURES

Narrative:

This site occurs on gently to moderately sloping erosional fan remnants. Slopes range from 2 to 5 percent. Elevations range from 4700 to 6000 feet above sea level.

Land Form:

1. Erosional remnant on fan piedmont

2.

3.

Aspect:

1. No influence on this site.

2.

3.

	Minimum	Maximum
Elevation (feet)	4700	6000
Slope (percent)	2	5
Water Table Depth (inches)		
Flooding:	Minimum	Maximum
Frequency	None	None
Duration	None	None
Ponding:	Minimum	Maximum
Depth (inches)	None	None
Frequency	None	None
Duration	None	None

Runoff Class:

Very High

CLIMATIC FEATURES

Narrative:

Average precipitation for this site is approximately 12 to 14 inches. Variations of 5 inches are not uncommon. Approximately 75 percent of this occurs from May through October with most of the rainfall occurring from July to September. Most of the summer precipitation comes in the form of high intensity short duration thunderstorms. Although little precipitation does occur during the winter month, rain and snow of low intensity usually characterize the precipitation that does occur. Temperatures are mild. Freezing temperatures are common at night from December through April, however, temperatures during the day are frequently above 50 degrees F. Occasionally in December to February brief periods of 0 degree F. Temperatures may be expected. During June to August some days may exceed 100 degrees F.

The mean annual precipitation figures are derived from rain gauge data collected by the BLM (1971 to 1990), and NOAA weather maps utilizing prism model estimation techniques. There are no permanent weather stations within the boundaries of the Land Resource Unit.

	Minimum	Maximum
Frost-free period (days):	140	180
Freeze-free period (days):	145	185
Mean annual precipitation (inches):	12	14

Monthly moisture (inches) and temperature (⁰F) distribution:

	Precip. Min.	Precip. Max.	Temp. Min.	Temp. Max.
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

Climate Stations:

Station ID _____	Location _____	From: _____	To: _____	Period
Station ID _____	Location _____	From: _____	To: _____	Period
Station ID _____	Location _____	From: _____	To: _____	Period
Station ID _____	Location _____	From: _____	To: _____	Period

INFLUENCING WATER FEATURES

Narrative:

This site is not influenced by water from wetland or stream.

Wetland description:

System	Subsystem	Class
N/A		

If Riverine Wetland System enter Rosgen Stream Type:

N/A

REPRESENTATIVE SOIL FEATURES

Narrative:

The soils on this site are shallow to moderately deep over a petrocalcic horizon. The surface and underlying layers are calcareous gravelly or very gravelly loams. The soils are well drained and have moderately slow permeability above the very slowly permeable petrocalcic layer. The petrocalcic horizon restricts water movement and plant root penetration. Available water holding capacity is very low.

Parent Material Kind: Alluvium influenced by eolian material

Parent Material Origin: _____

Surface Texture:

1. Loam
2.
3.

Surface Texture Modifier:

1. Gravelly
2.
3.

Subsurface Texture Group: Loamy

Surface Fragments <=3" (% Cover): 20-45

Surface Fragments >3" (% Cover): 0

Subsurface Fragments <=3" (%Volume): 20-50

Subsurface Fragments >=3" (%Volume): 0-10

	Minimum Well Drained	Maximum Well Drained
Drainage Class:	Moderately slow	Moderately slow
Permeability Class:	14	31
Depth (inches):	0	2
Electrical Conductivity (mmhos/cm):	7.9	8.4
Sodium Absorption Ratio:	1	2
Soil Reaction (1:1 Water):	0	40
Soil Reaction (0.1M CaCl ₂):		
Available Water Capacity (inches):		
Calcium Carbonate Equivalent (percent):		

PLANT COMMUNITIES

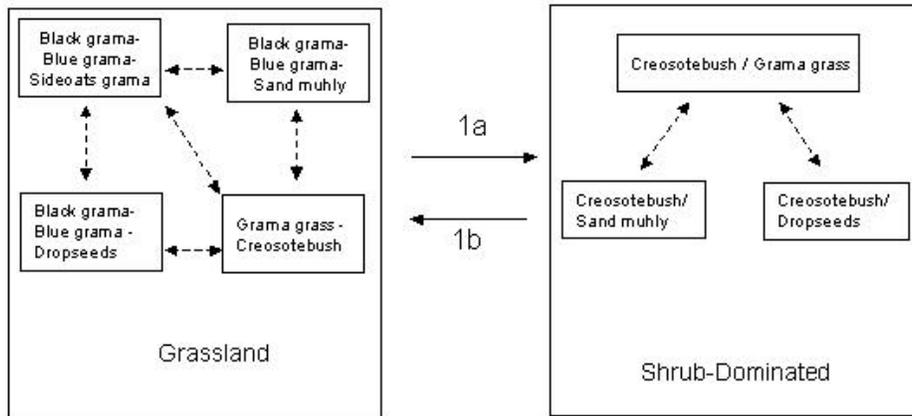
Ecological Dynamics of the Site:

Overview

The Gravelly site is associated with the topographically higher Limestone Hills site from which it can receive extra run-on water. The Gravelly site is also associated with the Shallow Sandy site, where they occur together as a complex on fan piedmonts. The Gravelly site is also found adjacent to the Limy, and Loamy sites. The Limy and Loamy sites are usually in a slightly lower, concave position (Inset fan) while the Gravelly site occupies a more convex landscape position. The soils are gravelly loams shallow to a petrocalcic horizon. This very slowly permeable layer helps to store and keep water perched and available to plants.² Black grama is the dominant grass species. Blue grama, sideoats grama and sand muhly also occur in significant numbers. Forb production is variable but is an important component of this site. Common forbs include prickleaf dogweed, globemallow, and croton. Shrubs are a noticeable component of this site and include yucca, prickly pear, creosotebush, tarbush, winterfat, and others. Retrogression within this state is characterized by a decrease in black grama, blue grama, and sideoats, and an increase in dropseeds, sand muhly, and creosotebush. These changes can be influenced by drought or overgrazing. Sideoats grama may increase in representation following periods of increased precipitation, or on locations adjacent to limestone hills, which receive run-on water. If the theory that fire historically occurred fairly frequent in Chihuahuan Desert grasslands is correct, then the relative density of shrubs for this site may have been kept in check by fire.¹ Fire suppression therefore may facilitate shrub expansion and the transition to a shrub dominated state. Years with above normal winter precipitation may also favor the establishment of shrubs.³ Drought and overgrazing may assist in shrub establishment and expansion. As grass cover is reduced, organic matter is decreased and the amount of bare ground increases. The bare soil is susceptible to physical crusting, reduced infiltration, litter movement and redistribution, and erosion.

Plant Communities and Transitional Pathways (diagram)

State-Transition model, MLRA 42, SD-4, Gravelly

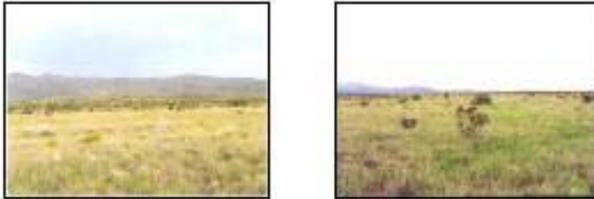


1a. Shrubs come to dominate due to climate, overgrazing, lack of fire.

1b. Brush control, prescribed grazing, restore grass cover, redistribution of resources.

MLRA 42; SD-4; Gravelly

Grassland



At left black, blue, & sideoats grama with good representation of winterfat, grass cover high,

• At right grass cover high, few widely scattered creosotebush

• Philder-Jerag complex, Fort Bliss Soil Survey, Otero Co.

Grassland

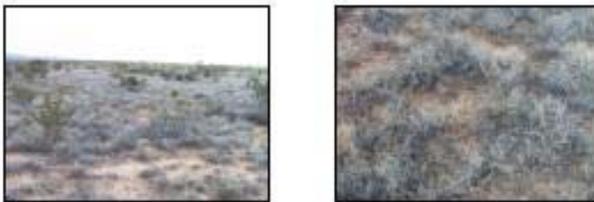


• Grazed black grama-bluegrama-NM feathergrass with scattered creosotebush and snakeweed

• Grass cover high to moderate, gaps small evenly distributed

• Philder-Jerag complex, Fort Bliss Soil Survey, Otero Co.

Grassland



• Black grama - blue grama with scattered creosotebush during drought

• Grass cover (during drought) moderate, many dead plants, gaps enlarging

• Philder-Jerag complex, Fort Bliss Soil Survey, Otero Co.

Shrub-Dominated State



• Creosotebush/Black grama

• Grass cover low, large bare patches

• Philder-Jerag complex, Fort Bliss Soil Survey, Otero Co.

State Containing Historic Climax Plant Community

Grassland:

Grasses dominate the historic plant community with shrubs evenly distributed throughout. Black grama and blue grama are the dominant grass species. Sideoats grama, sand muhly, New Mexico feathergrass and dropseeds also occur in significant numbers. New Mexico feathergrass increases in representation on gravelly sites on southern Otero Mesa. It may be that this increase in feathergrass is due to a slight increase in cool season precipitation toward the south along the Otero Mesa Escarpment. Common forbs include prickleaf dogweed, globemallow, and croton. The dominant shrubs include yucca, prickly pear, creosotebush, tarbush, broom snakeweed, and winterfat. Retrogression caused by grazing or drought is characterized by a decrease in black grama, blue grama, sideoats, and winterfat. In response to this decrease, dropseeds, sand muhly and broom snakeweed increase. The calcareous gravelly soils are underlain by a petrocalcic horizon and provide ideal conditions for creosotebush establishment. Natural fire may have historically inhibited the expansion of creosotebush by killing seedlings.⁵ Reduced fire frequency due to fire suppression or reduction in fuel load by drought or grazing may contribute to creosotebush seedling establishment. Disturbance by drought or grazing can cause a decrease in grass cover and organic matter. As herbaceous cover declines, bare ground and erosion increase and eventually nutrients are redistributed by wind and water around remaining plants. Those nutrient-rich areas surrounding shrubs increase the probability of shrub seedling establishment, while the bare inter-shrub spaces preclude seedling establishment by grasses.

Diagnosis: Black grama is the dominant species and blue grama is secondary. Grass cover is uniformly distributed with few large bare areas. The surface gravel helps to protect the site from erosion and the gentle to moderate slopes usually display limited evidence of active rills and gully formation if plant cover remains intact. Litter movement associated with overland flow is limited to smaller size class litter and short distances. Shrub cover is variable, but grasses remain dominant.

Ground Cover and Structure: presently being revised. _____

Plant Community Annual Production (by plant type): _____

Plant Type	Annual Production (lbs/ac)		
	Low	RV	High
Grass/Grasslike	560	850	1044
Forb	70	70	72
Tree/Shrub/Vine	70	80	84
Lichen			
Moss			
Microbiotic Crusts			

Plant Community Composition and Group Annual Production:

Plant Type - Grass/Grasslike

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
1	BOER4	Black grama	350-400	350-400
2	BOGR2	Blue grama	150-200	150-200
2	BOCU	Sideoats grama	50-75	
2	BOHI2	Hairy grama	50-75	
2	PAHA	Hall's panicum	50-75	
3	MUAR2	Sand muhly	100-150	100-150
3	SPCR	Sand dropseed	50-75	
3	SPCO4	Spike dropseed	50-75	
4	SEVU2	Plains bristlegrass	50-75	50-75
4	LEDU	Green sprangletop	50-75	
4	HENE5	NM feathergrass	50-75	
4	SPAI	Alkali sacaton	50-75	
5	ARIST	Threeawn	20-30	20-30
5	MUAR	Ear muhly	20-30	
5	ERPU8	Fluffgrass	20-30	

Plant Type - Forb

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
6	2FA	Annual forbs	15-20	15-20
7	2FP	Perennial forbs	25-35	25-35
7	CROTO	Croton	25-35	
7	SPHAE	Globemallow	25-35	
7	LESQU	Bladderpod	25-35	
8	THAC	Prickleleaf dogweed	8-10	8-10
8	SOEL	Silverleaf nightshade	8-10	

Plant Type – Tree/Shrub/Vine

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
9	YUSP	Yucca spp.	20-30	20-30
9	OPUNT	Prickly pear	20-30	
10	LATR2	Creosotebush	30-40	30-40
10	FLCE	Tarbush	30-40	
10	EPHED	Ephedra	5-10	
10	GUSA2	Broom snakeweed	5-10	
11	KRLA2	Winterfat	8-10	8-10
11	PAIN2	Mariola	8-10	
11	KRER	Range ratany	8-10	

Plant Type - Lichen

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

Plant Type - Moss

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

Plant Type - Microbiotic Crusts

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production

Plant Growth Curves

Growth Curve ID 5807

Growth Curve Name: HCPC Grassland State

Growth Curve Description: SD-4 Warm Season Grassland - Average rainfall year

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0	0	3	3	8	7	18	28	25	6	2	0

-

Additional States:

Shrub Dominated State This state is characterized by the dominance of creosotebush. Other shrubs/sub-shrubs that typically increase due to overgrazing, drought and lack of fire include tarbush, prickly pear, and broom snakeweed. Black grama, blue grama, and sideoats, decline while sand muhly dropseeds and threeawns continue to increase.

Diagnosis: Creosotebush is the dominant species. Grass cover is no longer uniformly distributed, instead tending to be patchy with large areas of bare ground present. Black grama, sand muhly or dropseeds may be the dominant grass species. Threeawns, and fluffgrass occur at increased densities in comparison to the grassland state. Physical crusts are present in bare areas and erosion is increased by evidence of rills and gully formation.

Transition to Shrub Dominated (1a): Climate, overgrazing, erosion and lack of fire are believed to be the key factors causing this transition. Periods of consistent above average winter precipitation favor shrub increase, while warm season grasses are favored when the winters are dry and summers are wet.³ Extended periods of drought can severely reduce perennial grass cover, even in the absence of grazing.⁴ Loss of grass cover reduces competition between grasses and shrub seedlings, creating conditions that favor shrub expansion. Erosion is accelerated by the reduction in cover. Fire is believed to be a natural component of desert grasslands and historically may have limited the expansion of creosotebush and other non-sprouting species. A loss of grass cover as a fuel source will also reduce the ability to utilize fire as a management tool.

Key indicators of approach to transition:

- Reduction in grass cover and increase in size and frequency of bare patches.
- Increase in amount of creosotebush seedlings.
- Formation of physical crusts—indicating loss of organic matter and decrease in soil aggregate stability and reduced infiltration.
- Evidence of litter movement—indicating loss or redistribution of organic matter.
- Evidence of accelerated erosion such as: formation of pedestals, increase in number and size of rills, formation of or active head cutting of gullies.

Transition back to Grassland (1b) Brush management is necessary to remove resource competition from shrubs and increase grass cover. Reestablishing cover will also provide organic matter and fine fuels necessary to carry fire. Prescribed grazing will help ensure proper forage utilization and plant vigor, especially during times of drought. The amount of erosion and loss of soil resources may dictate the degree to which the system is capable of recovery.

ECOLOGICAL SITE INTERPRETATIONS

Animal Community:

This site provides habitat, which supports a resident animal community, characterized by pronghorn antelope, coyote, black-tailed jackrabbit, red-tailed hawk, meadow lark, horned lark and prairie rattlesnake. This site also provides nesting, hiding and thermal cover for a variety of small rodents, birds and reptiles and their associated predators.

Hydrology Functions:

This site normally receives approximately 12-14 inches annual precipitation. Most summer rainfall occurs as brief sometimes-heavy thunderstorms. Soils are shallow to moderately deep and rated as being in hydrologic group D. Slopes range from 2-5 percent. Permeability is moderately slow above the very slowly permeable petrocalcic horizon. The petrocalcic horizon will restrict water movement keeping it perched in the upper profile for short periods of time. Runoff is very high, and the hazard of water erosion is severe. Available water capacity to the root restricting layer is Very Low.

Recreational Uses:

This site offers good potential for antelope and predator hunting, wildlife observation and photography. Scenic beauty of this site will especially appeal to those who value wide open prairie grasslands.

Wood Products:

This site has no significant value for wood products

Other Products:

Grazing: This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. As the site deteriorates there will be an increase in bare ground leaving the exposed soil susceptible to wind and water erosion. This site responds best to a system of management that rotates the season of use.

Initial starting stocking rates will be determined with the landowner or decision-maker. They will be based on past use histories and type and condition of the vegetation. Calculations used to determine initial starting stocking rate will also be based on forage preference ratings.

Other Information:**Plant Preference by Animal Kind:**Animal Kind: Cattle

Animal Type: _____

Common Name	Scientific Name	Plant Part	Forage Preferences											
			J	F	M	A	M	J	J	A	S	O	N	D
Black grama	Bouteloua eripoda	EP	D	D	P	P	P	P	P	P	P	P	P	D
Blue grama	Bouteloua gracilis	EP	D	D	P	P	P	P	P	P	P	P	P	D
Sideoats grama	Bouteloua curtipendula	EP	D	D	P	P	P	P	P	P	D	D	D	D
Hairy grama	Bouteloua hirsuta	EP	D	D	P	P	P	P	P	P	P	P	P	D
Hall's panicum	Panicum hallii	EP	D	D	P	P	P	P	P	P	P	P	P	D
Sand muhly	Muhlenbergia arenicola	EP	D	D	P	P	P	P	P	P	P	P	P	D
Sand dropseed	Sporobolus cryptandrus	EP	D	D	P	P	P	D	D	D	D	D	D	D
Spike dropseed	Sporobolus contractus	EP	D	D	P	P	P	D	D	D	D	D	D	D
Plains bristlegrass	Setaria vulpiseta	EP	U	U	D	D	D	P	P	P	U	U	U	U
Green sprangletop	Leptochloa dubia	EP	D	D	P	P	P	P	P	P	P	P	P	D
NM feathergrass	Hesperostipa neomexicana	EP	P	P	P	P	P	D	D	D	P	P	P	P
Alkali sacaton	Sporobolus airoides	EP	U	U	D	D	D	D	D	D	U	U	U	U
Threeawn	Aristida	EP	U	U	D	D	D	U	U	U	U	U	U	U
Ear muhly	Muhlenbergia arenacea	EP	U	U	D	D	D	D	D	D	U	U	U	U
Fluffgrass	Dasyochloa pulchella	EP	U	U	U	U	U	U	U	U	U	U	U	U
Annual forbs		EP	D	D	P	P	P	P	P	P	D	D	D	D
Perennial forbs		EP	D	D	D	D	D	P	P	P	P	P	P	D
Croton	Croton	EP	D	D	D	D	D	D	D	D	D	D	D	D
Globemallow	Sphaeralcea	EP	D	D	D	D	D	D	D	D	D	D	D	D
Bladderpod	Lesquerella	EP	D	D	D	D	D	D	D	D	D	D	D	D
Prickleleaf dogweed	Thymophylla acerosa	EP	U	U	U	U	U	U	U	U	U	U	U	U
Silverleaf nightshade	Solanum elaeagnifolium	EP	U	U	U	U	U	U	U	U	U	U	U	U
Yucca	Yucca spp.	F&F/S	U	U	D	D	D	D	D	D	U	U	U	U
Prickly pear	Opuntia spp.	F, F/S	U	U	U	E	E	E	E	U	U	U	U	U
Creosotebush	Larrea tridentata	L, S	U	U	U	U	U	U	U	U	U	U	U	U
Tarbush	Flourensia cernua	S&L	U	U	U	U	U	U	U	U	U	U	U	U
Broom snakeweed	Gutierrezia sarothrae	EP	U	U	U	U	U	U	U	U	U	U	U	U
Ephedra	Ephedra spp.	S&L	U	U	U	U	U	U	U	U	U	U	U	U
Winterfat	Krascheninnikovia lanata	S&L	P	P	D	D	D	D	D	D	D	D	D	P
Mariola	Parthenium incanum	S&L	U	U	U	U	U	U	U	U	U	U	U	U
Range ratany	Krameria erecta	S&L	D	D	D	D	D	D	D	D	D	D	D	P

SUPPORTING INFORMATION

Associated sites:

Site Name	Site ID	Site Narrative
Limestone Hills Shallow Sandy Limy Loamy	042XE001NM 042XD006NM 042XD004NM 042XD001NM	The Gravelly site is associated with the topographically higher Limestone Hills site from which it can receive extra run-on water. The Gravelly site is also associated with the Shallow Sandy site, where they occur together as a complex on fan piedmonts. It can also be found adjacent to Limy and Loamy sites

Similar sites:

Site Name	Site ID	Site Narrative

Inventory Data References (narrative):

Supporting information includes limited clipping data, soil survey investigations, aerial photographs, and personal observations.

Inventory Data References:

Data Source	# of Records	Sample Period	State	County
NM-Range-26	5	1998	NM	Otero

State Correlation:

This site has been correlated with the following sites: _____

Type Locality:

State: New Mexico

County: Otero

Latitude: 32degrees, 28minutes, 58seconds N.

Longitude: 105degrees, 34minutes, 10seconds W.

Township: 21S.

Range: 13E.

Section: 13

Is the type locality sensitive? Yes No

General Legal Description: Otero County, New Mexico; approximately 30.4 miles east and 8.1 miles north of Oro Grande; NW1/4, NE 1/4, section 13, T.21 S., R.13 E. USGS Sixteen Canyon topographic quadrangle.

Relationship to Other Established Classifications:

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. Fort Bliss and Otero County.

Characteristic taxonomic units are:

Fort Bliss SSA:

<@34>61—Philder-Jerag complex, 2 to 5 percent slopes (Philder part)

Other soils included are:

Other References:

1. Brooks, M.L., and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pages 1–14 *in* K.E.M. Galley and T.P. Wilson (eds.). Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species.
2. Hennessy, J.T., R.P. Gibbens, J.M. Tromble, and M. Cardenas. 1983. Water properties of caliche. *J. Range Manage.* 36: 723-726.
3. Moir, W. H. and J. A. Ludwig. 1991. Plant succession and changing land features in desert grasslands. P. 15-18. In P.F. Ffolliott and W.T. Swank (eds.) *People and the temperate region: a summary of research from the United States Man and the Biosphere Program 1991*. U.S. Dept. State, Publ No. 9839, Nat. Tech. Info. Serv., U.S. Dept. Commerce, Springfield, Illinois. 63 p.
4. Paulsen, H.A. and F.N. Ares. 1962. Grazing values and management of black grama and tobosa grasslands and associated shrub ranges of the southwest. USDA, Forest Service, Tech. Bull. 1270.
5. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, September). Fire Effects Information System, [Online]. Available: <http://www.fs.fed.us/database/feis/> [accessed 9/20/02].

Site Description Approval:

<u>{PRIVATE}Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
David Trujillo & Dr. Brandon Bestelmeyer	9/10/00	George Chavez	2/20/03

Site Description Revision:

<u>{PRIVATE}Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
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