

**UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE**

ECOLOGICAL SITE DESCRIPTION

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site ID: R042XC001NM

Site Name: Gravelly

Precipitation or Climate Zone: 10 to 13 inches

Phase: _____

PHYSIOGRAPHIC FEATURES

Narrative:

This site occurs on upland plains, fans, and mesas, or between toeslopes of desert hills and drainageways. Slopes range from zero to fifteen percent. Direction of slope varies and is not usually significant. Elevations range fro 2,841 to 4,500 feet.

Land Form:

1. Plains
2. Mesa
3. Alluvial fan, Piedmont fan

Aspect:

1. Not significant
- 2.
- 3.

	Minimum	Maximum
Elevation (feet)	2,841	4,500
Slope (percent)	0	15
Water Table Depth (inches)	N/A	N/A
	Minimum	Maximum
Flooding:		
Frequency	N/A	N/A
Duration	N/A	N/A
	Minimum	Maximum
Ponding:		
Depth (inches)	N/A	N/A
Frequency	N/A	N/A
Duration	N/A	N/A

Runoff Class:

Negligible to Medium

CLIMATIC FEATURES

Narrative:

The climate of the area is “semi-arid continental”. The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity – short duration thunderstorms.

Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer.

The average frost free season is 207 to 220 days. The last killing frost is late March or early April, and the first killing frost is in late October or early November.

Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of this site. The vegetation on this site can take advantage of moisture at any time of year or amount of precipitation. Because of the soil texture and profile, water cannot be stored for long periods of time. Strong winds from the southwest blow from January through June which accelerates soil drying at a critical time for cool season plant growth.

	Minimum	Maximum
Frost-free period (days):	180	221
Freeze-free period (days):	199	240
Mean annual precipitation (inches):	10.0	13.0

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

	Precip. Min.	Precip. Max.	Temp. Min.	Temp. Max.
January	0.40	0.42	20.6	59.7
February	0.40	0.41	25.2	65.6
March	0.41	0.43	31.4	72.7
April	0.58	0.63	40.4	81.5
May	1.28	1.35	49.6	88.7
June	1.40	1.46	59.1	95.4
July	1.62	1.64	63.3	96.4
August	1.79	1.84	61.6	94.8
September	1.81	2.20	54.1	88.5
October	1.16	1.41	40.7	80.4
November	0.43	0.47	28.4	68.7
December	0.48	0.51	20.9	61.1

Climate Stations:

- (1) NM0600, Artesia, NM - Period of record 1961 - 1990
- (2) NM0992, Bitter Lakes WL Refuge, NM - Period of record 1961 - 1990
- (3) NM1469, Carlsbad, NM - Period of record 1961 - 1990
- (4) NM293792, Hagerman, NM - Period of record 1961 - 1990
- (5) NM299563, Waste Isolation Plant, NM - Period of record 1961 - 1990
- (2) NM4346, Jal, NM - Period of record 1961 - 1990

INFLUENCING WATER FEATURES

Narrative:
This site is not influenced from water from wetlands or streams.

Wetland description:

System	Subsystem	Class
N/A		

If Riverine Wetland System enter Rosgen Stream Type:
N/A

REPRESENTATIVE SOIL FEATURES

Narrative:

The soils are gravelly loam and gravelly fine sandy loam. They are moderately deep to deep and well drained. Permeability is moderate to moderately rapid and water holding capacity is low to medium. Because of the skeletal nature of this soil, this site has a high water erosion potential and a droughty appearance.

Parent Material Kind: Alluvium

Parent Material Origin: Mixed-igneous, sedimentary, metamorphic

Surface Texture:

1. gravelly loam
2. very gravelly loam
3. gravelly fine sandy loam

Surface Texture Modifier:

1.
2.
3.

Subsurface Texture Group:

Gravelly Loam

Surface Fragments $\leq 3''$ (% Volume):

15 to 30 %

Surface Fragments $> 3''$ (% Cover):

0

Subsurface Fragments $\leq 3''$ (%Volume):

8 to 47 %

Subsurface Fragments $\geq 3''$ (%Volume):

0

Drainage Class:

Minimum
Well drained

Maximum
Well drained

Permeability Class:

Slow

Moderate

Depth (inches):

20

80

Electrical Conductivity (mmhos/cm):

0

2

Sodium Absorption Ratio:

Soil Reaction (1:1 Water):

7.9

8.4

Soil Reaction (0.1M CaCl₂):

Available Water Capacity (inches):

0

2

Calcium Carbonate Equivalent (percent):

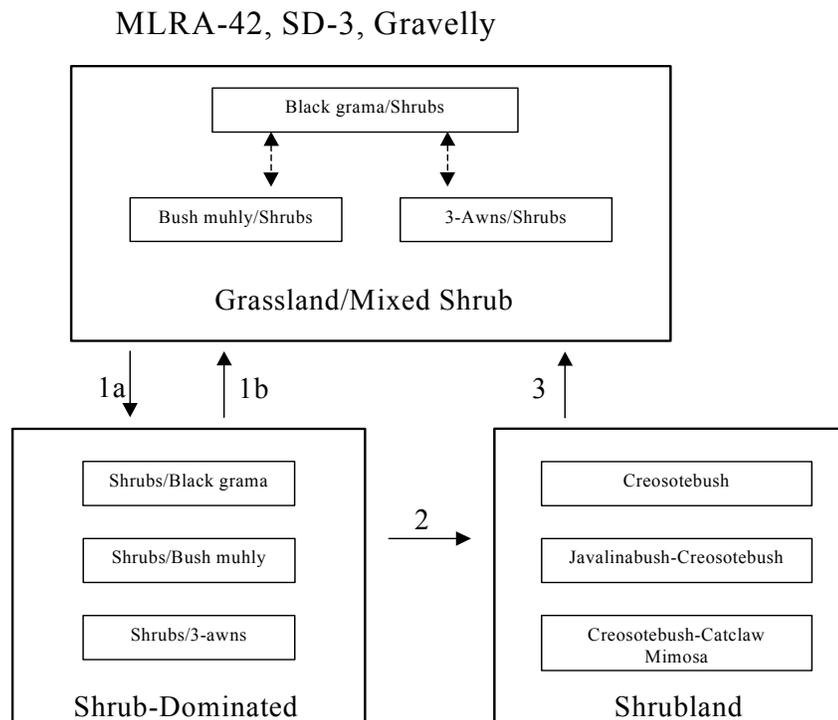
PLANT COMMUNITIES

Ecological Dynamics of the Site:

Overview

The Gravelly site is associated with Limestone Hills, Draw, Loamy, and Sandy sites. On piedmont slopes, the Gravelly site is often associated with Limestone Hills and Draw sites. Limestone Hills are topographically higher and can provide run-on water to Gravelly sites. Draw sites often dissect Gravelly sites. Loamy and Sandy sites can exist as components of a complex, or occur as distinct units adjacent to Gravelly sites. On alluvial terraces, Loamy and Sandy sites typically occupy the sideslopes and depressions while the Gravelly site occurs on the ridges of the terrace. The historic plant community of the Gravelly site has the aspect of a grassland/shrub mix, dominated by grasses, with shrubs scattered and evenly distributed. Black grama is the dominant grass species. Winterfat, fourwing saltbush, and creosotebush are common shrubs. Overgrazing and or extended drought can reduce grass cover, effect a change in grass species dominance, and may result in a shrub-dominated state. Suppression of natural fire regimes may also play a part in the transition to shrub dominance.¹ Resource competition by shrubs, continued loss of grass cover, and resulting erosion may initiate the transition to a shrubland state.

Plant Communities and Transitional Pathways (diagram)



1a. Overgrazing and or extended drought, fire suppression.

1b. Brush control, prescribed grazing

2. Persistent loss of grass cover, competition by shrubs, erosion.

3. Brush control, erosion control, prescribed grazing, seeding?

Plant Community Name: Historic Climax Plant Community

Plant Community Sequence Number: 1 Narrative Label: HCPC

Plant Community Narrative:

State Containing Historic Climax Plant Community

Grassland/Shrub Mix: *The historic plant community is dominated by black grama, with bush muhly, sideoats grama, and sand dropseed present as sub-dominants. Fourwing saltbush, winterfat, creosotebush, cactus species, and sacahuista are the dominant shrubs of the historic plant community. Retrogression within this state due to overgrazing is characterized by a decrease in black grama, sideoats grama, blue grama, Arizona cottontop, cane bluestem, plains bristlegrass, winterfat, and fourwing saltbush. Black grama may eventually become co-dominant or sub-dominant to secondary species such as bush muhly or threeawns. Retrogression due to drought can causes an overall decline in grass cover and production based on the species drought tolerance. The separation of impacts due to climate and grazing are difficult to determine. As grass cover declines due to drought, overgrazing, or a combination of the two, shrubs and the amount of bare ground increase and a shrub-dominated state may result*

Diagnosis: Grass cover is more or less uniformly distributed, however, surface gravel and bare ground make up a large percent of the total ground cover, and grass production during unfavorable years may only average 200 pounds per acre. Shrubs are common with canopy cover averaging five to seven percent. Rills and small gullies may be present, but are typically restricted to slopes greater than eight percent.

Ground Cover (Average Percent of Surface Area).

Grasses & Forbs	10 – 15
Bare ground	40 – 60
Surface Gravel and Cobble	15 – 30
Litter (percent)	5 – 10
Litter (average depth in cm.)	2 – 3

Percent canopy cover (trees, shrubs, and half-shrubs)	
Trees	0
Shrubs and half -shrubs	5 - 7

Plant Community Annual Production (by plant type):

Plant Type	Annual Production (lbs/ac)		
	Low	RV	High
Grass/Grasslike	222	481	740
Forb	24	52	80
Tree/Shrub/Vine	54	117	180
Lichen			
Moss			
Microbiotic Crusts			
Totals	300	650	1000

Plant Community Composition and Group Annual Production: Plant species are grouped by annual production **not** by functional groups.

Plant Type - Grass/Grasslike

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
1	BOER4	Black grama	163-228	163-228
2	MUPO2	Bush muhly	33-65	33-65
3	BOCU	Sideoats grama	33-65	33-65
4	DICA8	Arizona cottontop	33-65	33-65
	BOBA3	Cane bluestem		
5	BOGR2	Blue grama	13-33	13-33
6	SEVU2	Plain bristlegrass	13-33	13-33
7	ARIST	Threeawn	13-33	13-33
8	PLMU2	Tobosa	13-33	13-33
9	SPCR	Sand dropseed	33-65	33-65
10	MUAR	Ear muhly	13-33	13-33
11	TRIDE	Tridens spp.	13-33	13-33
12	2GP	Other grasses	33-65	33-65

Plant Type – Tree/Shrub/Vine

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
13	RHMI3	Littleleaf sumac	7-20	7-20
14	MIACB	Catclaw mimosa	7-20	7-20
14	LATR2	Creosotebush	13-33	13-33
15	EPHED	Ephedra spp.	7-20	7-20
16	FLCE	American tarbush	7-13	7-13
17	KRLA2	Winterfat	20-33	20-33
18	ATCA2	Fourwing saltbush	20-33	20-33
19	YUCCA	Yucca spp.	7-20	7-20
20	OPUNT	Cactus	13-33	13-33
21	NOMI	Sacahuista	13-33	13-33
22	2SHRUB	Other shrubs	13-33	13-33

Plant Type - Forb

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
23	CRPOP	Leatherweed croton	7-20	7-20
24	PACAL5	Woolly groundsel	7-20	7-20
25	ERWR	Wrights buckwheat	13-33	13-33
26	SPHAE	Globemallow	7-20	7-20
27	2FORB	Other forbs	13-33	13-33

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

Other grasses that could appear on this site would include: hairy grama, spike dropseed, burrograss, fluffgrass, vine-mesquite, New Mexico feathergrass, silver bluestem and ring muhly.

Other woody plants include: common javalinabush, spiny althorn, condalia, range ratany broom shakeweed, mariola, tesajo cactus, desert willow, Apacheplume and wolfberry.

Other forbs include: bladderpod, senna, desert zinnia, wooly paperflower, prickleaf dogweed, stemless actinea, verbena and deerstongue.

Plant Growth Curves

Growth Curve ID NM2801

Growth Curve Name: HCPC

Growth Curve Description: SD-3 Gravelly HCPC Warm Season Plant Community

Jan.	Feb	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0	0	3	5	10	10	25	30	12	5	0	0

Additional States:

Shrub-Dominated: This state is characterized by an increase in shrubs and a decrease in grass cover. Across the range of soil types included in the Gravelly site, creosotebush is typically the dominant shrub, but it does occur as a co-dominant, or sub-dominant species with either catclaw mimosa or javalinabush. Black grama, bush muhly, or threeawns are often the dominant grass species. Tridens, hairy grama, fluff grass, and burrograss increase in response to a decrease in black grama and bush muhly.

Diagnosis: Shrubs are found at increased densities relative to the grassland/shrub mix, especially creosotebush, catclaw mimosa, or javalinabush. Grass cover is patchy with large connected bare areas present. Black grama may or may not be the dominant grass. Rills and gullies may be common and actively eroding.

Transition to Shrub-Dominated (1a) Overgrazing and or extended periods of drought, and suppression of natural fire regimes are thought to cause this transition. Decreases in grass cover give a competitive advantage to shrubs and shrub seedling establishment. Shrubs are better equipped to withstand prolonged periods of drought due to the ability of their root systems to extract water from a larger area than grasses.

Key indicators of approach to transition:

- Decrease or change in composition or distribution of grass cover.
- Increase in size and frequency of bare patches.
- Increase in amount of shrub seedlings.

Transition back to Grassland/Shrub Mix (1b) Brush control is necessary to re-establish grass dominance. Prescribed grazing will help to ensure proper forage utilization and sustain grass cover. Periodic use of prescribed fire may help in maintaining a grass-shrub mix.

Shrubland State: This state is characterized by very little grass cover, extensive dominance of shrubs, and accelerated erosion. Creosotebush is typically the dominant shrub, but it does occur as a co-dominant, or sub-dominant species with either catclaw mimosa or javalinabush. Hairy tridens, hairy grama, fluffgrass, or threeawns may become the dominant grasses.

Diagnosis: Grass cover is sparse and often restricted to the nutrient stable soils of shrub bases, with very little remaining in shrub interspaces. Shrub cover is high (>25%). Rills and gullies may be common and actively eroding. Wind and water erosion is evident by the presence of pedestals and terracettes.

Transition to Shrubland State (2) Persistent loss of grass cover and competition between shrubs and remaining grasses for resources may drive this transition. Reductions in grass cover reduce infiltration, decreasing available soil moisture necessary for grass seedling establishment. Accelerated erosion due to loss of grass cover can relocate organic matter and nutrients from shrub interspaces and concentrate them around shrub bases.² This relocation of resources further increases shrubs competitive advantage.

Key indicators of approach to transition:

- Increase in size and frequency of bare patches.
- Loss of grass cover in shrub interspaces.
- Increased signs of erosion.

Transition back to Grassland/Shrub Mix (3) Erosion control methods such as shaping and filling gullies, net wire diversions, rock and brush dams, etc. may be needed to curtail erosion and restore site hydrology. Brush control will be necessary to overcome competition between shrubs and grass seedlings. Seeding may expedite recovery or may be necessary if an adequate seed source is no longer remaining. Prescribed grazing will help ensure adequate deferment and proper forage utilization following grass establishment. The degree to which this site is capable of recovery depends on the restoration of hydrology, extent of degradation to soil resources, and adequate rainfall necessary to establish grasses.

ECOLOGICAL SITE INTERPRETATIONS

Animal Community:

This Ecological Site provides habitats which support a resident animal community that is characterized by desert cottontail, spotted ground squirrel, Merriam's kangaroo rat, cactus mouse, white-throated woodrat, gray fox, spotted skunk, roadrunner, Swainson's hawk, white-necked raven, cactus wren, pyrrhuloxia, lark sparrow, mourning dove, scaled quail, leopard lizard, round-tailed horned lizard, prairie rattlesnake, Couch's spadefoot toad, marbled whiptail, and greater earless lizard.

Where associated with Limestone Hills, mule deer utilize this site. Where large woody shrubs occur, most resident birds and scissor-tailed flycatcher, morning dove, lark sparrow and Swainson's hawk nest.

Hydrology Functions:

Runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups

Soils	Hydrologic Group
Agustin	B
Chispa	B
Nickel	B
Sanderson	B
Vado	B

Recreational Uses:

This site offers recreation potential for hiking, horseback riding, rock hunting, nature photography and bird watching and hunting. During years of abundant spring moisture, a colorful array of wild flowers is displayed during May and June. A few summer and fall flowers also occur.

Wood Products:

There are no significant wood products that occur on this site.

Other Products:

Grazing

This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. Mismanagement of this site will cause a decrease in plants such as black, blue and sideoats grama, Arizona cottontop, cane bluestem, plains bristlegrass, winterfat and fourwing saltbush. This will be followed by an increase in bare ground and an increase in plants such as threeawns, muhly spp., fluffgrass, burrograss, catclaw mimosa, creosotebush, cactus, mesquite, American tarbush and yucca. Due to the soils on this site, the plant community takes advantage of the rainfall quickly. The livestock operation needs to be flexible enough to take advantage of this response, either by grazing or deferment. This site responds best to a system of grazing that rotates the season of use.

Other Information:	
Guide to Suggested Initial Stocking Rate - Acres per Animal Unit Month - Ac/AUM	
Similarity Index	Ac/AUM
100 – 76	3.5 – 4.5
75 – 51	4.1 – 5.5
50 – 26	5.3 – 9.5
0 – 25	9.0 - +

Plant Preference by Animal Kind:

Plant Part	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
Black grama	<i>Bouteloua eriopoda</i>	EP	P	P	P	D	D	D	D	D	D	D	P	P
Bush muhly	<i>Muhlenbergia porterti</i>	EP	P	P	P	P	P	P	P	P	P	P	P	P
Sideoats grama	<i>Bouteloua curtipendula</i>	EP	P	P	P	P	P	P	P	P	P	P	P	P
Arizona cottontop	<i>Digitaria californica</i>	EP	U	U	U	U	U	U	P	P	D	U	U	U
Cane bluestem	<i>Bothriochloa barbinodis</i>	EP	U	U	U	U	U	U	P	P	D	U	U	U
Blue grama	<i>Bouteloua gracilis</i>	EP	D	D	D	D	P	P	P	P	P	D	D	D
Leatherweed croton	<i>Pottsii pottsii</i>	EP	D	D	D	D	D	D	D	D	D	D	D	D
Wrights buckwheat	<i>Eriogonum wrightii</i>	EP	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C
Winterfat	<i>Krascheninnikovia lanata</i>	EP	P	P	P	D	D	D	D	D	D	P	P	P
Fourwing saltbush	<i>Atriplex canescens</i>	EP	P	P	P	P	D	D	D	D	D	P	P	P
Cactus	<i>Opuntia</i>	EP	E	E	E	E	E	E	E	E	E	E	E	E

Supporting Information

Associated Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
Shallow	R042XC025NM	
Limestone Hills	R042XC020NM	
Shallow		

Similiar Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
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State Correlation:

This site has been correlated with the following states: Texas

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
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Type Locality:

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. Eddy County, Lea County, and Chaves County.

Characteristic soils are:

Agustin gravelly loam	Nickel gravelly loam	Vado very gravelly loam
Chispa loam	Sanderson gravelly loam	

- Humphrey, R.R. 1974. Fire in the deserts and desert grassland of North America. In: Kozlowski, T. T.; Ahlgren, C. E., eds. Fire and ecosystems. New York: Academic Press: 365-400.
- U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality—Erosion. Rangeland Sheet 9 & 10 [Online]. Available: <http://www.statlab.iastate.edu/survey/SQI/range.html>

Site Description Approval:

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Don Sylvester	07/12/1979	Don Sylvester	07/12/1979

Site Description Revision:

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
David Trujillo	03/26/03	George Chavez	03/26/03