

UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION

**ECOLOGICAL SITE CHARACTERISTICS**

Site Type: Rangeland

Site ID: R042XC022NM

Site Name: Sandhills

Precipitation or Climate Zone: 10 to 13 inches

Phase: \_\_\_\_\_

## PHYSIOGRAPHIC FEATURES

### Narrative:

This site occurs on plains. Slopes range from gently sloping to hilly and sometimes steep. Slopes are complex as the steeper slopes are shorter in length while the more gentle slopes are longer in length. Slopes average 8 to 10 percent. Direction of slopes vary and is usually not significant. Elevations range from 2,842 to 4,500 feet.

### Land Form:

1. Plain

2. Hillside

3.

### Aspect:

1. Varies but not significant

2.

3.

	Minimum	Maximum
Elevation (feet)	2,842	4,500
Slope (percent)	8	10
Water Table Depth (inches)	N/A	N/A
	Minimum	Maximum
Flooding:		
Frequency	N/A	N/A
Duration		
	Minimum	Maximum
Ponding:		
Depth (inches)	N/A	N/A
Frequency		
Duration		

### Runoff Class:

## 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 in 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. Because of the texture of this soil, most rainfall is effective. Strong winds blow from the west and southwest from January through June which accelerates soil drying at a 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 by 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 of this site are deep and well drained. The textures are fine sand or loamy fine sand from the surface to a depth of 60 inches or greater. The soils have a rapid permeability. Available water-holding capacity is moderate. These soils are subject to severe wind erosion if vegetative cover is not adequate.

Parent Material Kind: Eolian sands

Parent Material Origin: Sandstone-Unspecified

### Surface Texture:

1. Fine sand
2. loamy fine sand
3.

### Surface Texture Modifier:

1. N/A
2.
3.

Subsurface Texture Group: Fine sand

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

Surface Fragments  $> 3''$  (% Volume): N/A

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

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

### Drainage Class:

Permeability Class:

Depth (inches):

Electrical Conductivity (mmhos/cm):

Sodium Absorption Ratio:

Soil Reaction (1:1 Water):

Soil Reaction (0.1M CaCl<sub>2</sub>):

Available Water Capacity (inches):

Calcium Carbonate Equivalent (percent):

	Minimum	Maximum
	<u>Rapid</u>	<u>Very Rapid</u>
	<u>60</u>	<u>60</u>
	<u>N/A</u>	<u>N/A</u>
	<u>3+</u>	<u>3+</u>
	<u>N/A</u>	<u>N/A</u>

## **PLANT COMMUNITIES**

### Ecological Dynamics of the Site

#### Overview

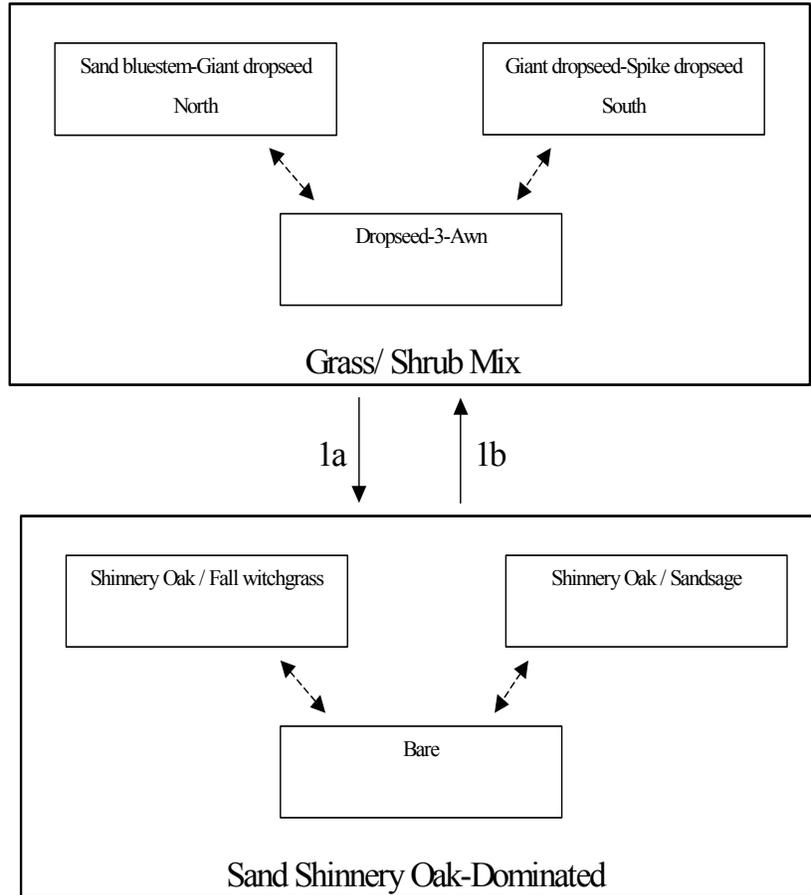
The Sandhills site occurs adjacent to or intergrades with the Deep Sand site. The Sandhills site is differentiated from deep sand sites by a steeper average slope, and an increased depth to a soil texture change. Sandhills slopes are usually greater than eight percent, and the soil profile is a fine sand or loamy fine sand to a depth greater than 60 inches. Deep Sand sites have slopes less than eight percent and a textural change can occur at less than 60 inches. The historic plant community of the Sandhills site is a mixture of grasses, shrubs and forbs, with tall grasses dominating in aspect. During years of abundant spring moisture, tall growing forbs occasionally reach aspect dominance. Sand bluestem and giant dropseed are the dominant grasses, with Havard panicum and dropseeds as sub-dominants. Sand shinnery oak and soapweed yucca are the dominant shrubs. Above average summer rainfall, changes in historical fire regimes, competition by shrubs, and overgrazing may contribute to this site becoming dominated by sand shinnery oak.

# Plant Communities and Transitional Pathways (diagram)

## MLRA-42, SD-3, Sandhills

1a. Above average summer rainfall, fire suppression, competition, over grazing, drought

1b. Brush control, Prescribed grazing



## Plant Communities Photo Display & Descriptive Diagnosis

### MLRA 42; SD-3; Sandhills

#### Sand Shinnery Oak-Dominated



- Sand shinnery oak, sandsage, giant dropseed
- Grass cover patchy, mosaic pattern of shrubs, and bare ground
- Large bare areas and blowouts common

#### Sand Shinnery Oak-Dominated



- Sand shinnery oak, feather dalea, mesquite, sandsage, dropseeds
- Grass cover litter abundant
- Large bare areas present

#### Sand Shinnery Oak-Dominated



- Sand shinnery oak, sandsage, dropseeds
- Grass cover patchy
- Large bare areas present

Plant Community Name: Historic Climax Plant Community

Plant Community Sequence Number: 1 Narrative Label: HCPC

Plant Community Narrative:  
 State Containing Historic Plant Community

**Grass-Mix:** The historic plant community in the northern part of the resource area (SD-3) is dominated by sand bluestem and giant dropseed, with Havard panicum as a sub-dominant. Primary grass dominance may gradually shift moving south across the resource area to a community dominated by giant dropseed and spike dropseed, with mesa dropseed as the sub-dominant grass species. Throughout the resource area sand shinnery oak and soapweed yucca are the dominant shrubs with sand sagebrush as the sub-dominant. As retrogression within this state occurs, plants such as sand bluestem, giant dropseed, Havard panicum, plains bristlegrass, sand paspalum, and fourwing saltbush decrease. This results in an increase in spike dropseed, sand dropseed, mesa dropseed, threeawns sand shinnery oak, and sand sagebrush. Continued loss of grass cover may result in a transition to a sand shinnery oak dominated state.

**Diagnosis:** Sand bluestem or giant dropseed are dominant or present in substantial amounts. Spike dropseed, sand dropseed or mesa dropseed may be dominant in some instances. Grass cover is variable, shifting sands and large irregular dunes produce considerable variation in the spatial distribution and composition of the plant community. Grass cover is not continuous, but is fairly uniform across the more stable areas. Large natural bare areas or blowouts are a common feature on the less stable portions of the Sandhills site.

**Ground Cover (Average Percent of Surface Area).**

Grasses & Forbs	10 - 15
Bare ground	45 - 60
Surface gravel	
Surface cobble and stone	0 - 3
Litter (percent)	20 - 25
Litter (average depth in cm.)	3

**Plant Community Annual Production (by plant type):**

Plant Type	Annual Production (lbs/ac)		
	Low	RV	High
Grass/Grasslike	360	585	810
Forb	120	195	270
Tree/Shrub/Vine	120	195	270
Lichen			
Moss			
Microbiotic Crusts			
Totals	600	975	1350

## 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	PAHA2	Harvard panicum	195	293
	ANHA	sand bulustem		
	SPGI	giand dropseed		
2	SPFL2	mesa dropseed	146	195
	SPCO4	spike dropseed		
	SPCR	sand dropseed		
3	SEVU2	plains bristlegrass	49	98
	PASE5	sand paspalum		
4	ARIST	threeawns spp.	29	49
	CYPER	flatsedge		
	CELO3	field sandbur		
5	2GP	other grasses	29	49

### Plant Type - Tree/Shrub/Vine

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
6	QUHA3	shinnery oak	49	98
7	YUGL	small soapweed	49	98
8	ARFI2	sand sagebrush	29	49
9	ARFI2	fourwing saltbush	20	49
10	CHRYS9	rabbitbrush	20	49
11	2SHRUB	other shrubs	20	49

### Plant Type – Forb

12	DALA3	wooly dalea	20	49
13		phlox heliotrophe	29	49
		half-shrub sundrop		
		penstemon		
14		lemon beebalm	20	49
		spectaclepod mustard		
16		hymenopappus	29	49
		stickleaf		
		threadleaf groundsel		
17		annual sunflower	20	49
18		annual wild buckwheat	20	49
19		other forbs	20	49

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   NM2822  

Growth Curve Name:   HCPC  

Growth Curve Description:   SD-3 Sandhill warm season plant community  

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
0	1	3	4	10	10	25	30	12	5	0	0

**Additional States:**

**Sand Shinnery Oak -Dominated:** Sand shinnery oak is the dominant species and in dense stands may reduce forage production by as much as 90 percent.<sup>1</sup> It often forms a mosaic of dense thickets interspersed with occasional motts of taller oaks, large areas of bare ground, and concentrations of sand sagebrush. Sand shinnery oak is well suited to deep sandy soils. The height and cover of oak decreases as sand depth decreases or clay content increases. The aggressive nature of fall witchgrass and continued loss of more palatable grasses and threawn species may result in a sand shinnery oak-fall witchgrass community. Burning may result in a community with very little grass or sand shinnery oak (bare). Sand shinnery oak usually recovers due to its ability to sprout aggressively following fire.

**Diagnosis:** Sand shinnery oak is the dominant species. Grass cover is sparse and patchy. Shrub cover is high. Blowouts and bare areas are common, however, high shrub cover mediates erosion.

**Transition to Sand Shinnery Oak Dominated (1a):** Climate may play a role in facilitating the spread sand shinnery oak. It is best adapted to those areas that receive an average of 16 inches of annual rainfall; it may therefore gain a competitive advantage during cycles of above average precipitation. Sand shinnery oak spreads mainly by elongation of rhizomes, but in some instances will reproduce by seed. The establishment and survival of seedlings is limited to those years with abundant rainfall during the months of July and August. If fire historically played a part in suppressing the density and distribution of shrubs in desert grasslands, then fire suppression may facilitate a shift to shrub dominance.<sup>2</sup> Competition for resources between grasses and shrubs may be a factor in increased densities of sand shinnery oak.<sup>1</sup> Sand shinnery oak has an extensive system of underground roots and stems that can uptake and store water for growth during drier periods, allowing it to increase, at times when grasses decrease. Evidence of competitive suppression of grasses is indicated by increases in herbaceous vegetation following chemical control of sand shinnery oak.<sup>1</sup> However, this increase may in part be due to a flush of nutrients made available from the decomposing biomass of woody roots and stems. Loss of grass cover due to overgrazing or drought may give a competitive advantage to sand shinnery oak.

Key indicators of approach to transition:

- A decrease in the tall grass species and the associated increase in threeawns may be indicative of the initial stage of transition to a shrub-dominated state.
- Increased cover of sand shinnery oak.

**Transition back to Grass/Shrub Mix (1b)** Chemical brush control is an effective means of controlling sand shinnery oak and sand sagebrush. Where large areas of chemical control are planned, increased erosion and the effect on loss of wildlife habitat should be considered. Prescribed grazing will help ensure an adequate deferment period to allow grass recovery and subsequent proper forage utilization. There have been studies that suggest long term browsing by goats can reduce sand shinnery oak, altering production in favor of grasses.<sup>3</sup>

## ECOLOGICAL SITE INTERPRETATIONS

### Animal Community:

This site provides habitat which support a resident animal community that is characterized by pronghorn antelope, black-tailed jackrabbit, Ord's kangaroo rat, Northern grasshopper mouse, Southern Plains woodrat, swift fox, roadrunner, meadowlark, lark bunting, ferruginous hawk, lesser prairie chicken, mourning dove, scaled quail, marbled whiptail, ornate box turtle, bullsnake and Western diamondback rattlesnake.

Grasshopper and vesper sparrows utilize the site during migration. The ferruginous hawk sometimes nests on dunes associated with the site. White-tailed deer are also sometimes on dunes associated with this site (Mescalero Sands). Where mesquite invades, resident species of birds such as white-necked raven, roadrunner, pyrrhuloxia, mourning dove, and Harris hawk nest. Where sand hummocks form around shrubs, rodent populations and their predators increase.

Fourwing saltbush, shinnery oak, and sand sagebrush and mesquite 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 mammals, including mourning dove, scaled quail, lesser prairie chicken and antelope.

### Hydrology Functions:

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

Hydrologic Interpretations	
Soil Series	Hydrologic Group
Kermit	A
Kermo	A
Pintura	A
Bluepoint	A
Penwell	A
Likes	A
Roswell	A

**Recreational Uses:**

This site offers recreation potential for hiking, horseback riding, nature observation and photography. This site also offers opportunities for hunting of such species as quail, dove and antelope.

Mechanical, off-road vehicle use by dune buggies, four wheelers, or motor bikes is site-destructive, resulting in severe soil movement by wind erosion. Off-road vehicle use should be confined to those areas which are already deteriorated and where intensive management for soil protection can be practiced.

During years of abundant spring moisture, this site displays a colorful array of wildflowers during May and June. A few showy summer and fall flowers also occur.

**Wood Products:**

The plant community associated with this site affords little or no wood products. Where the site has been invaded by mesquite, the roots and stems of these plants provide attractive material for a variety of curiosities and small furniture.

**Other Products:**

This site is suitable for grazing during all seasons of the year by all kinds and classes of livestock. Where shinnery oak has increased considerably above the amount in the potential plant community cattle loss can occur if grazed during the late bud and early leaf stage. This site responds well to an integrated brush management and grazing management.

Mismanagement of this site will cause a decrease in Harvard panicum, sand bluestem, giant dropseed, plains bristlegrass, sand paspalum and fourwing saltbush. There will be a corresponding increase in dropseeds, sand sagebrush and shinnery oak. When shinnery oak is not a problem, this site responds best to a system of management that rotates the season of use.

**Other Information:**

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index	Ac/AUM
100 - 76	2.0 - 4.0
75 - 51	3.0 - 6.5
50 - 26	5.0 - 12.0
25 - 0	12.0 - +

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
havard panicum	Panicum havardii	EP	N/S	N/S	N/S	N/S	D	D	D	D	N/S	N/S	N/S	N/S
giant dropseed	Sporobolus giganteus	EP	D	P	P	P	D	D	D	D	D	D	D	D
sand bluestem	Andropogon hallii	EP	D	D	D	D	P	P	P	P	D	D	D	D
little bluestem	Schizachyrium scoparium	EP	D	D	D	D	D	P	P	P	D	D	D	D
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
fourwing saltbush	Atriplex canescens	EP	P	P	P	P	P	D	D	D	D	D	P	P
sand paspalum	Paspalum setaceum	EP	N/S	N/S	N/S	N/S	D	D	D	D	N/S	N/S	N/S	N/S
halfshrub sundrop	Oenothera albicaulis	EP	N/S	N/S	N/S	N/S	D	D	D	D	N/S	N/S	N/S	N/S
penstemon	Penstemon	EP	N/S	N/S	N/S	N/S	P	P	P	P	P	N/S	N/S	N/S
blue grama	Bouteloua gracilis	EP	D	D	D	D	D	P	P	P	P	P	D	D
black grama	Bouteloua eriopoda	EP	P	P	P	D	D	D	D	D	D	D	P	P

## Supporting Information

### Associated Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
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### Similar 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

### Inventory Data References:

<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 (SD-3) Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: South Chaves, Eddy, Lea and Otero Counties.

### Characteristic Soils Are:

Kermit fine sand greater than 8 percent slopes	Kermo fine sand greater than 8 percent slopes
Pintura fine sand greater than 8 percent slopes	Bluepoing fine sand greater than 8 percent slopes
Penwell fine sand greater than 8 percent slopes	Likes fine sand greater than 8 percent slopes
Roswell fine sand greater than 8 percent slopes	
Other Soils included are:	

1. Sears, W.E., C.M. Britton, D.B. Wester, and R.D. Pettit. 1986. Herbicide conversion of a sand shinnery oak (*Quercus havardii*) community: effects on biomass. *J. Range. Manage.* 39: 399-403.
  2. 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 1/07/02].
  3. Villena, F. and J.A. Pfister. 1990. Sand shinnery oak as forage for Angora and Spanish goats. *J. Range. Manage.* 43: 116-122.
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Site Description Approval:

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Don Sylvester	06/05/80	Don Sylvester	06/05/80

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