

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

ECOLOGICAL SITE DESCRIPTION

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site ID: R042X005NM

Site Name: Deep Sand

Precipitation or Climate Zone: 10 to 13 inches

Phase: _____

PHYSIOGRAPHIC FEATURES

Narrative:

This site occurs on upland plains or old basins between desert drainageways. Slopes are nearly level to gently sloping, usually less than 5 percent. Low, stabilized hummocks or dunes frequently occur. Direction of slope varies and is usually not significant. Elevations range from 2,842 to 4,500 feet.

Land Form:

1. Plains

2. Basin floor

3. _____

Aspect:

1. Not Significant

2. _____

3. _____

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

Runoff Class:
Negligible to Very low

CLIMATIC FEATURES

Narrative:

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.

Both temperature and moisture favor warm season perennial plant growth. During years of abundant winter and early spring moisture, cool season growth and annual forbs, make up an important component of this site. Strong winds blow from the west from January through June, which accelerates soil drying during a critical period 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

If Riverine Wetland System enter Rosgen Stream Type:

REPRESENTATIVE SOIL FEATURES

Narrative:

The soils of this site are deep and well drained. The surface textures are sand and loamy fine sand greater than 40 inches deep. The underlying layers may be loamy fine sand or fine sandy loam. The soils have rapid permeability and moderate water holding capacity. Because of the coarse textures and rapid drying of the surface, the soil, if unprotected by plant cover and organic residue, becomes windblown and low hummocks or dunes are formed around shrubs.

Parent Material Kind: Alluvium

Parent Material Origin: Sandstone – Unspecified

Surface Texture:

1. sand
2. fine sand
3. loamy fine sand

Surface Texture Modifier:

1. N/A
2.
3.

Subsurface Texture Group:

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

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

Subsurface Fragments $\leq 3''$ (%Volume): 5 to 10%

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

	Minimum	Maximum
Drainage Class:	Well Drained	Excessively Drained
Permeability Class:	Moderate	Very Rapid
Depth (inches):	> 72	> 72
Electrical Conductivity (mmhos/cm):	N/A	N/A
Sodium Absorption Ratio:	N/A	N/A
Soil Reaction (1:1 Water):	N/A	N/A
Soil Reaction (0.1M CaCl ₂):	N/A	N/A
Available Water Capacity (inches):	N/A	N/A
Calcium Carbonate Equivalent (percent):	N/A	N/A

PLANT COMMUNITIES

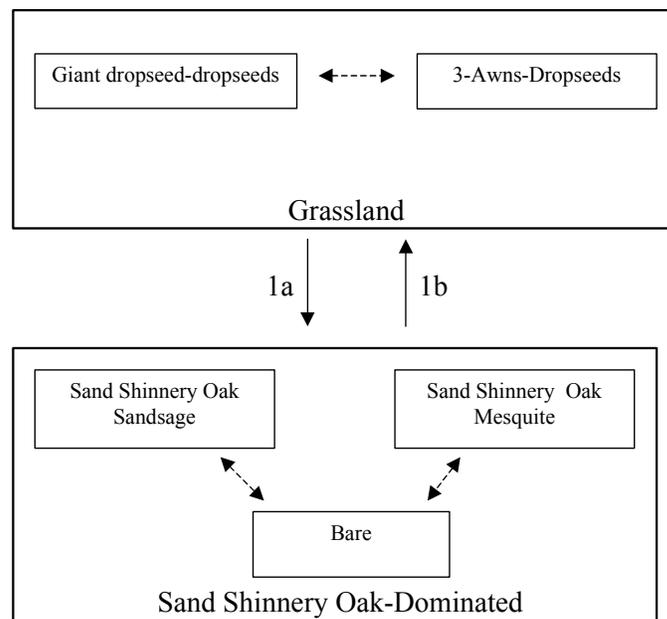
Ecological Dynamics of the Site:

Overview

The Deep Sand site occurs adjacent to and/or intergraded with the Sandhills and Sandy sites (SD-3). The Deep Sand site can be distinguished by slopes less than eight percent (approximately five percent) and textural changes at depths greater than 40 inches. The Deep Sand site has well drained soils with a surface texture of sand or loamy fine sand. The Sandhills site has slopes greater than eight percent and textural depths greater than 60 inches. Conversely, the Sandy site has slopes less than five percent and depths to textural change commonly around 20 inches. The historic plant community of the Deep Sand site is dominated primarily by giant dropseed (*Sporobolus giganteus*) and other dropseeds (*S. flexuosus*, *S. contractus*, *S. cryptandrus*), with scattered shinnery oak (*Quercus havardii*) and soapweed yucca (*Yucca glauca*). Other herbaceous species include threeawns (*Aristida* spp.), bluestems (*Schizachyrium scoparium* and *Andropogon hallii*), and annual and perennial forbs distributed relative to precipitation occurrences. Bare ground and litter compose a significant proportion of ground cover while grasses are the remainder. Shinnery oak will increase with an associated decrease in dropseed and bluestem abundance possibly due to climatic change, fire suppression, interspecific competition, and excessive grazing. Continued grass cover loss may result in a transition to a shinnery oak dominated state with increases in sand sage (*Artemisia filifolia*) and honey mesquite (*Prosopis glandulosa*). However, brush management may restore the grassland component and reverse the shinnery oak state back toward the historic plant community.

Plant Communities and Transitional Pathways (diagram)

MLRA-42, SD-3, Deep Sand



1.a Climate, fire suppression, competition,
over grazing

1.b Brush control, Prescribed grazing

Plant Communities Photo Display & Description Diagnosis

MLRA 42; SD-3; Deep Sand

Shinnery oak-Dominated



- Shinnery oak and sand sage
- Large bare patches and soil blowouts in adjacent sandhills
- Extensive rhizomes reduce soil erosion
- Roswell series
- Sand bluestem, threeawns, giant sacaton, spike dropseed, Hall's panicum, little bluestem

Shinnery oak-Dominated



- Feather dalea, mesquite, Shinnery oak, bush muhly, four-wing saltbush, javelina bush, and sand sage
- Pintura series loamy fine sand

Shinnery oak-Dominated



- Shinnery oak and dropseeds
- Grass cover minimizes bare patches and erosion

Plant Community Name: Historic Climax Plant Community

Plant Community Sequence Number: 1 Narrative Label: HCPC

Plant Community Narrative:

State Containing Historic Plant Community

Grassland: The historic plant community is dominated by giant dropseed, other dropseeds, threeawns, and bluestems. Dominant woody plants include shinnery oak and soapweed yucca. Forb abundance and distribution varies and is dependent on annual rainfall. The Deep Sand site typically exists in sandy plains and dunes (Sosebee 1983). Grass dominance stabilizes the potentially erosive sandy soils. Historical fire suppression, however, may have contributed to increased woody plant abundance, which has reduced grass species. Further, drought conditions compounded with excessive grazing likely has driven most grass species out of competition with shrubs which has resulted in a shinnery oak dominated state with sand sage and mesquite (Young et al. 1948).

Diagnosis: Grassland dominated by dropseeds, threeawns, and bluestems. Small shrubs, such as shinnery oak and soapweed yucca, and subshrubs are dispersed throughout the grassland.

Ground Cover (Average Percent of Surface Area).	
Grasses & Forbs	15 – 20
Bare ground	35 – 40
Surface cobble and stone	0 – 2
Litter (percent)	35 – 40
Litter (average depth in cm.)	3

Plant Community Annual Production (by plant type):

Plant Type	Annual Production (lbs/ac)		
	Low	RV	High
Grass/Grasslike	396	858	1320
Forb	96	208	320
Tree/Shrub/Vine	108	234	360
Lichen			
Moss			
Microbiotic Crusts			
Totals	600	1300	2000

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

Plant species are

Plant Type - Grass/Grasslike

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
1	SPGI	giant dropseed	450 - 585	450 - 585
1	SPFL2	mesa dropseed		
1	SPCO4	spike dropseed		
1	SPCR	sand dropseed		
2	SCSC	little bluestem	65 - 104	65 - 104
2	ANHA	sand bluestem		
3	ARIST	threeawn spp.	39 - 91	39 - 91
4	PASE5	sand paspalum	13 - 39	13 - 39
5	BOER4	black grama	13 - 39	13 - 39
6	CELO3	field sandbur	13 - 39	13 - 39
7	PAHA2	Havard panicum	13 - 39	13 - 39
8	SEVU2	plains bristlegrass	13 - 65	13 - 65
9	2GA	other annual grasses	13 - 65	13 - 65

Plant Type - Tree/Shrub/Vine

Group Number	Scientific Plant Symbol	Common Name	Species Annual Production	Group Annual Production
10	QUHA3	shinnery oak	65 - 130	65 - 130
11	ARFI2	sand sagebrush	13 - 39	13 - 39
12	YUCCA	yucca	65 - 130	65 - 130
13	CHRYS9	plains rabbitbrush	13 - 39	13 - 39
14	2SHRUB	other shrubs	13 - 39	13 - 39

Plant Type - Forb

15	CROTO	croton	39 - 91	39 - 91
15	GAPU	blanketflower		
16	OEAL	halfshrub sundrop	39 - 91	39 - 91
16	PENST	penstemon		
16	ASTER	aster		
17	DIWI2	spectaclepod mustard	39 - 91	39 - 91
17	HYSP	hymenopapus		
17	HELIA3	sunflower		
17	ERIOG	wild buckwheat		
17	SEFLF	threadleaf groundsel		
18	2FORB	other forbs	13 - 65	13 - 65

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: flatsedge, almejita signalgrass, big bluestem, Indiangrass, fall witchgrass, hairy grama and red lovegrass

Other shrubs include: fourwing saltbush, mesquite, ephedra and broom snakeweed.

Other forbs include: wooly and scarlet gaura, wooly dalea, phlox heliostrope, palefoxia, scorpionweed, deerstongue, fleabane, nama, hoffmanseggia, lemon beebalm and stickleaf.

Plant Growth Curves

Growth Curve ID NM2805

Growth Curve Name: HCPC

Growth Curve Description: SD-3 Deep Sand - 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 State:

Shinnery Oak Dominated: This state is dominated by shinnery oak with subdominants of sand sage or mesquite. Bare ground is a significant component in this state as well. Shinnery oak is characterized by dense stands in sandy soils; however, as clay percentage increases, shinnery oak decreases. Shinnery oak abundance and distribution increase with disturbances, such as excessive grazing and fire, due to an aggressive rhizome system. As shinnery oak abundance increases, an associated increase of mesquite, sand sage, and soapweed yucca also occurs. Shinnery oak's extensive root system allows the oak to competitively exclude grasses and forbs. Sand sage, however, stabilizes light sandy soils from wind erosion and can co-exist with herbaceous species by protecting them in heavily grazed conditions (Davis and Bonham 1979). Shinnery oak has been found primarily in very deep, excessively drained, and rapidly permeable soils. Shinnery oak is associated with landforms which are gently undulating to rolling uplands, very gently sloping to moderately steep slopes, and upland plains, alluvial fans and valley sideslopes. Shinnery oak and sand sage can be controlled with herbicide if applied in the spring with a subsequent rest from grazing (Herbel et al. 1979, Pettit 1986). In addition, repetitive seasons of goat browsing can also reduce shinnery oak abundance. Patches should be maintained during brush control, however, to prevent erosion and to provide wildlife cover and forage. Further, as shinnery oak and other shrubs increase, bare patches and erosion will increase due to a lack of herbaceous ground cover.

Diagnosis: Shinnery oak dominated with subdominant sand sage, honey mesquite, and soapweed yucca with increasing frequency and size of bare patches.

Transition to Shinnery oak dominated state (1a): The historic plant community begins to shift toward the shinnery oak dominated state as drivers such as climate change, fire suppression, interspecific competition, and excessive grazing contribute to alterations in soil properties and herbaceous cover. Cover loss and surface soil erosion are initial indicators of transition followed by an increase of shrub species abundance and bare patch expansion.

Key indicators of approach to transition:

- Loss of grass and forb cover
- Surface soil erosion
- Bare patch expansion
- Increased shrub species abundance and composition

Transition to Historic Plant Community (1b): The shinnery oak dominated state may transition back toward the historic plant community as new drivers are introduced such as prescribed grazing, brush control, and discontinued drought conditions.

ECOLOGICAL SITE INTERPRETATIONS

Animal Community:

This site provides habitat which supports a resident animal population characterized by pronghorn, antelope, black-tailed jackrabbit, spotted ground squirrel, Ord's kangaroo rat, northern grasshopper mouse, southern plains woodrat, badger, meadowlark, roadrunner, white-necked raven, cactus wren, lesser prairie chicken, morning dove, scaled quail, Harris hawk, side blotched lizard, marbled whiptail, Texas horned lizard, western diamondback rattlesnake and ornate box turtle. In the area called Mescalero Sands, there are white-tailed and mule deer.

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	
Berino	B	Bluepoint	A
Kermit	A	Penwell	A
Kermo	A	Likes	A
Pintura	A	Roswell	A

Recreational Uses:

This site offers limited recreation potential for hiking, horseback riding, nature observation and photography, game bird, predator, antelope, and deer hunting.

Wood Products:

This site has not potential for wood products.

Other Products:

This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. However, if the percent of shinnery oak increases considerably above the potential, it becomes toxic and can result in livestock losses if grazing in the late bud of early leaf stage. Shinnery oak will increase under retrogression, as will sand sagebrush. The dropseeds and bluestem will decrease. This site responds very well to brush management and deferment. This site is well suited to a grazing system 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 – 3.8
75 – 51	3.0 – 6.0
50 – 26	5.0 – 10.0
25 – 0	10.1 +

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
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	P	P	P	P	D	D	D	D
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
black grama	Bouteloua eriopoda	EP												
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
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

Supporting Information

Associated Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
Sandy	<u>R042XC004NM</u>	
Sandhills	<u>R042XC022NM</u>	

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:

Kermit fine sand less than 8 percent slopes	Berino sand
Kermo fine sand less than 8 percent slopes	Penwell fine sand
Pintura fine sand	Tonuco loamy fine sand hummocky
Bluepoint fine sand	Likes fine sand
Roswell fine sand	

Literature Cited

- Davis, Joseph H., III and Bonham, Charles D. 1979. Interference of sand sagebrush canopy with needleandthread. *Journal of Range Management* **32**(5):384-386.
- Herbel, C. H, Steger, R, Gould, W. L. 1974. Managing semidesert ranges of the Southwest. Circular 456. Las Cruces, NM: New Mexico State University, Cooperative Extension Service. 48 p.
- Pettit, Russell D. 1986. Sand shinnery oak: control and management. Management Note 8. Lubbock, TX: Texas Tech University, College of Agricultural Sciences, Department of Range and Wildlife Management. 5 p.
- Sosebee, Ronald E. 1983. Physiological, phenological, and environmental considerations in brush and weed control. In: McDaniel, Kirk C., ed. Proceedings--brush management symposium; 1983 February 16; Albuquerque, NM. Denver, CO: Society for Range Management: 27-43.
- Young, Vernon A., Anderwald, Frank R., McCully, Wayne G. 1948. Brush problems on Texas ranges. Miscellaneous Publication 21. College Station, TX: Texas Agricultural Experiment Station. 19 p.

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>
George Chavez	04/12/02	George Chavez	04/30/03
David Trujillo	04/29/03		