

Ecological site R070BD005NM

Deep Sand

Accessed: 05/02/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on terraces, Piedmonts, dunes fields, or upland plains. Parent material consists of eolian deposits and alluvium derived from sandstone. Slopes range from 0 to 15 percent, usually less than 5 percent. Low, stabilized hummocks or dunes frequently occur. Elevations range from 2,842 to 4,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Dune (2) Parna dune (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	866–1,372 m
Slope	0–15%
Aspect	Aspect is not a significant factor

Climatic features

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.

Climate data was obtained from <http://www.wrcc.sage.dri.edu/summary/climsmnm.html> web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	240 days
Precipitation total (average)	330 mm

Influencing water features

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

Soil features

Soils are deep or very deep. Surface textures are sand loam, fine sand or loamy fine sand, Underlying material textures are loamy fine sand, fine sand, sand or fine sandy loam. 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.

Characteristic soils are:

Anthony
Aguena
Kermit
Likes
Pintura
Bluepoint

Table 4. Representative soil features

Surface texture	(1) Sand (2) Fine sand (3) Loamy fine sand
Family particle size	(1) Sandy
Drainage class	Well drained to excessively drained
Permeability class	Moderate to very rapid
Soil depth	152–183 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	5–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.6–7.8

Subsurface fragment volume <=3" (Depth not specified)	5–10%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

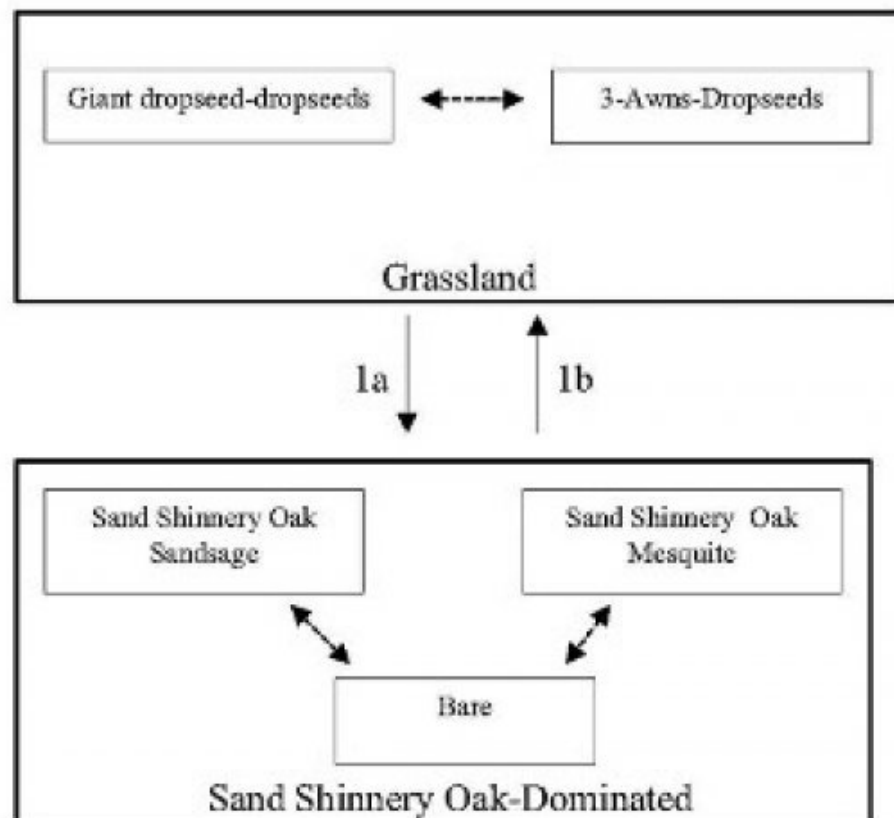
Overview

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.

State and transition model

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

State 1
Historic Climax Plant Community

Community 1.1 Historic Climax Plant Community

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. 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 heliotrope, scorpionweed, deerstongue, fleabane, nama, hoffmanseggia, lemon beebalm and stickleaf.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	444	962	1480
Shrub/Vine	121	262	404
Forb	108	233	359
Total	673	1457	2243

Table 6. Ground cover

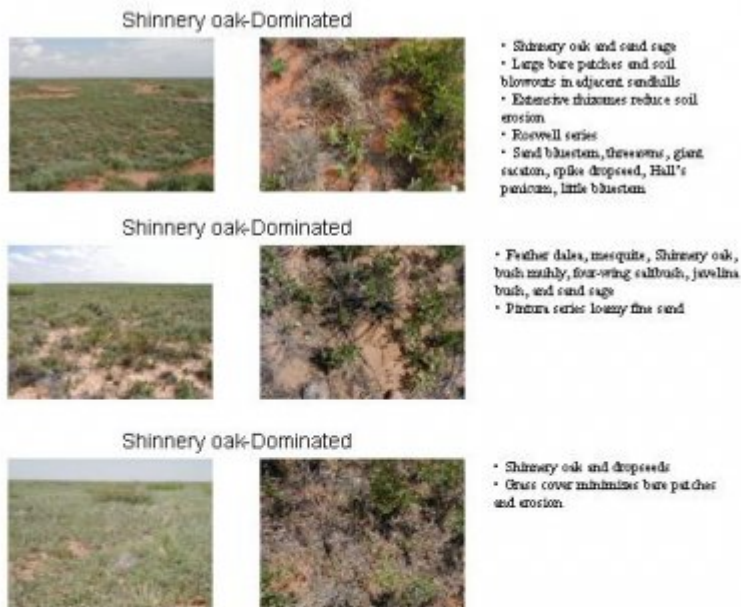
Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	15-20%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	35-40%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	35-40%

Figure 5. Plant community growth curve (percent production by month).
NM2805, HCPC. SD-3 Deep Sand - Warm season plant community .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

State 2 Shinnery Oak Dominated

Community 2.1 Shinnery Oak Dominated



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.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
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Grass/Grasslike					
1	Warm Season			504-656	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	504-656	-
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	504-656	-
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	504-656	-
	giant dropseed	SPGI	<i>Sporobolus giganteus</i>	504-656	-
2	Warm Season			73-117	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	73-117	-
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	73-117	-
3	Warm Season			44-102	
	threeawn	ARIST	<i>Aristida</i>	44-102	-
4	Warm Season			15-44	
	thin paspalum	PASE5	<i>Paspalum setaceum</i>	15-44	-
5	Warm Season			15-44	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	15-44	-
6	Warm Season			15-44	
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	15-44	-
7	Warm Season			15-44	
	Havard's panicgrass	PAHA2	<i>Panicum havardii</i>	15-44	-
8	Warm Season			15-73	
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	15-73	-
9	Other Annual Grasses			15-73	
	Grass, annual	2GA	<i>Grass, annual</i>	15-73	-
Shrub/Vine					
10	Shrub			73-146	
	Havard oak	QUHA3	<i>Quercus havardii</i>	73-146	-
11	Shrub			15-44	
	sand sagebrush	ARFI2	<i>Artemisia filifolia</i>	15-44	-
12	Shrub			73-146	
	yucca	YUCCA	<i>Yucca</i>	73-146	-
13	Shrub			15-44	
	rabbitbrush	CHRY9	<i>Chrysothamnus</i>	15-44	-
14	Other Shrubs			15-44	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	15-44	-
Forb					
15	Forb			44-102	
	croton	CROTO	<i>Croton</i>	44-102	-
	Indian blanket	GAPU	<i>Gaillardia pulchella</i>	44-102	-
16	Forb			44-102	
	aster	ASTER	<i>Aster</i>	44-102	-
	whitest evening primrose	OEAL	<i>Oenothera albicaulis</i>	44-102	-
	beardtongue	PENST	<i>Penstemon</i>	44-102	-
17	Forb			44-102	
	touristnplant	DIWI2	<i>Dimorphocarna wislizeni</i>	44-102	-

	buckwheat	ERIOG	<i>Eriogonum</i>	44-102	-
	sunflower	HELIA3	<i>Helianthus</i>	44-102	-
	spiny false fiddleleaf	HYSP	<i>Hydrolea spinosa</i>	44-102	-
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus var. flaccidus</i>	44-102	-
18	Other Forbs			15-73	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	15-73	-

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.

Hydrological functions

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

Hydrologic Interpretations

Soil Series Hydrologic Group

Anthony B

Bluepoint A

Kermit A

Aguena A

Likes A

Pintura 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 no 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. Shinnery oak is toxic in the late bud or early leaf stage. Shinnery oak will increase, as will sand sagebrush following drought. Changes in the fire return interval have also favored an increase in shrub cover. 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. Nesting habitat for lesser prairie chicken can be improved by providing residual cover that is at least 14 inches high.

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 +

Inventory data references

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.

Other references

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.

Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or**

decadence):

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**
