USDA Natural Resources Conservation Service

Ecological site R042AD008NM
Loamy Sand, Dry Mixed Prairie

Accessed: 05/18/2024

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.

Classification relationships

Associated sites

R042AD001NM	**Loamy, Dry Mixed Prairie** The Loamy Sand site is elevated above and lies adjacent to or between Loamy sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on gently sloping fan terraces, alluvial fans or fan remnant. They formed in eolian sands over alluvium. Occasionally low stabilized dunes may occur. Slope ranges from 2 to 5 percent. Elevation ranges from 4700 to 6000 feet.

Table 2. Representative physiographic features

Landforms	(1) Fan remnant (2) Alluvial fan (3) Alluvial flat
Flooding frequency	None
Ponding frequency	None
Elevation	1,433–1,829 m
Slope	2–5%
Aspect	Aspect is not a significant factor

Climatic features

Average precipitation for this site is approximately 12 to 14 inches. Variations of 5 inches are not uncommon. Approximately 75 percent 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. Rain

and snow of low intensity characterize the limited winter precipitation.

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 degrees 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.

Table 3. Representative climatic features

Frost-free period (average)	180 days
Freeze-free period (average)	185 days
Precipitation total (average)	356 mm

Influencing water features

This site is not influenced by wetland or stream.

Soil features

Soils are deep or very deep, and have moderately rapid permeability. Surface texture are loamy fine sand. Subsoil is a loamy fine sand, loam and sandy loam. Underlying layers are sandy loam, fine sandy loam, and loam.

At least 20 inches or more of sandy material overlies an argillic horizon. There is a calcic horizon at a depth of about 3 feet. Precipitation is readily absorbed and can be stored in the lower part of the root zone. These soils are subject to wind erosion and the formation of low dunes if adequate plant cover is not maintained.

Minimum and maximum values listed below represent the Characteristic soils for this site.

Characteristic soils:
Stealth

Table 4. Representative soil features

Surface texture	(1) Loamy fine sand
Family particle size	(1) Loamy
Drainage class	Well drained to moderately well drained
Permeability class	Moderate to moderately rapid
Soil depth	152–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	5–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1

Soil reaction (1:1 water) (0-101.6cm)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The Loamy Sand site occurs as a distinct unit, often adjacent to loamy sites. Loamy sites however are located on lower (inset fan) landscape positions. The soils are very deep, well drained, with moderately- slow permeability, which formed in eolian sands over alluvium. The site is a grass/shrub mix. In the historic plant community, grasses account for the majority of production but shrubs are a conspicuous component of this site. Black grama is the dominant grass. Hairy grama, dropseeds and New Mexico feathergrass also occur in significant numbers. Globemallow species and croton are two of the most common forbs. Sand sagebrush is the dominant shrub. Southwest rabbitbrush and soaptree yucca are also prominent. etrogression within the Grass/Shrub Mix state caused by drought, overgrazing or a combination of the two can shift grass dominance from black grama to dropseeds or threeawns. Increased winter precipitation and forage preference for black grama may result in a community dominated by New Mexico feathergrass. If retrogression continues due to overgrazing or drought, resource competition from shrubs with subsequent erosion, may contribute to shrub dominance.

State and transition model

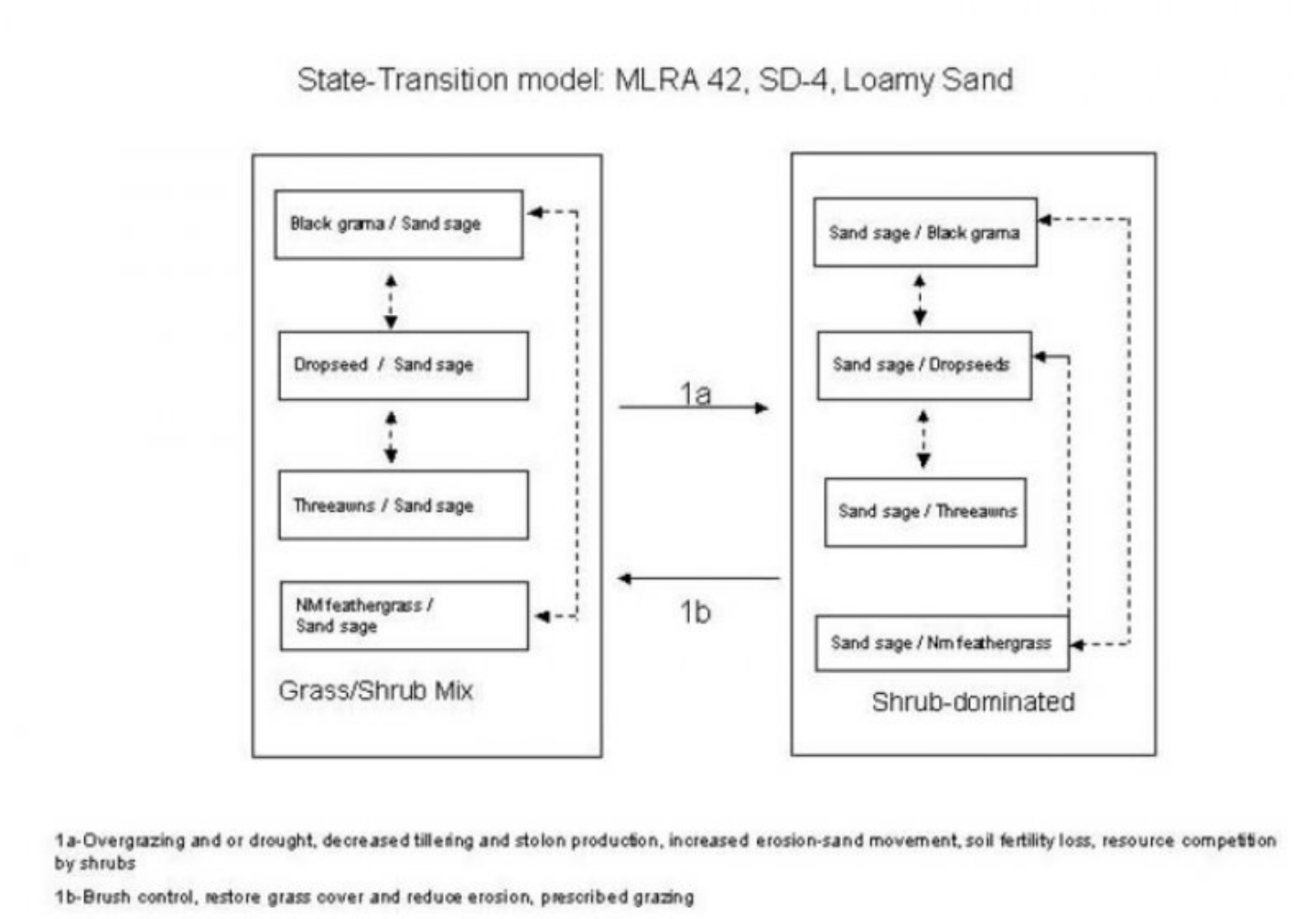

Figure 4. MLRA-42, SD-4, Loamy Sand

State 1
HCPC

Community 1.1
Grass/Shrub Mix

Figure 5. Grass/Shrub Mix

The historic plant community is dominated by black grama. Hairy grama, dropseeds, and New Mexico feathergrass also occur in significant numbers. Globemallow and croton are common forbs on this site. Sand sagebrush, southwest rabbitbrush, and soaptree yucca are the principal shrubs. Black grama communities are dynamic and readily influenced by amount of grazing pressure and variation in climate . The year-round high palatability and nutrition of black grama make this species especially susceptible to grazing pressure, and its ability to respond to disturbance is in part based on climate. Black grama seed production is dependent on amount and timing of precipitation. Inadequate or uneven distribution of precipitation may prevent seed from maturing. Stolons are an important method of vegetative reproduction, however, two favorable growing seasons are required for stolons to form and become established. Stolons are sensitive to trampling and grazing. On overgrazed ranges the production of stolons is severely decreased. Tillering is thought to be the principal method of regeneration on rangeland that is continuously grazed. The amount of tillering that occurs is dependent on plant vigor during the previous year. Drought also has the direct effect of causing plant mortality. Basal area of black grama during extended periods of drought is reduced by about the same amount regardless of grazing intensity; recovery however is quicker on conservatively grazed sites2. Dropseeds or threeawns typically increase and may become dominant in response to a reduction of black grama. New Mexico feathergrass may also become the dominant grass, usually in localized patches. It is not known if this increase in feathergrass is due to climate favoring cool season grasses1, combined with year-round palatability of black grama, or if the increased density is in part due to some unknown difference in soil characteristics. Loss of grass cover and subsequent erosion may facilitate the increase in sand sagebrush. Sand sagebrush is well adapted to the sandy soils of this site. Prolific seed production and its ability to remain viable over time enable this species to take advantage of favorable climatic conditions and quickly occupy or re-occupy a site.1 The light seed is easily dispersed by wind, it does not require scarification, and germinates rapidly. Domestic livestock rarely utilize sand sagebrush especially where other more palatable forage species are present.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	538	953	1143
Forb	67	67	112
Shrub/Vine	67	101	90
Tree	–	–	–
Total	**672**	**1121**	**1345**

Figure 7. Plant community growth curve (percent production by month). NM5807, R042XD008NM-Loamy Sand-HCPC. R042XD008NM-Loamy Sand-HCPC.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	3	8	7	18	28	25	6	2	0

State 2
Shrub Dominated

This state is characterized by the dominance of sand sagebrush, decreased grass cover and increased erosion. The reduction in grass cover results in increased wind erosion. Resources are redistributed around remaining shrubs and grasses. The more extensive root system of sand sagebrush allows it to exploit concentrated resources below the shrub canopy as well as remaining resources beneath bare areas. Grazing or drought induced retrogression can cause a shift in grass dominance from black grama to dropseeds or threeawns. New Mexico feathergrass may attain dominance among grasses during periods of wet winters and dry summers where climate favors C3 grass production.3 Forage preference for black grama may facilitate this change in grass composition.

Community 2.1
Shrub Dominated

Figure 8. Shrub Dominated

Sand sagebrush cover is high. Grass cover is sparse and patchy with increased amounts of bare ground. Black grama, threeawns, dropseeds, or New Mexico feathergrass may be the dominant grass. Croton increases in representation. Erosion is evident by pedestalling, deposition, and blowouts. Small low stabilized dunes may form around shrubs.

Transition 1a
State 1 to 2

This site is highly susceptible to wind erosion if adequate plant cover is not maintained. Over grazing and or drought can cause a reduction in plant cover, reducing soil aggregate stability and increasing erosion potential. Black grama cover can be reduced by its inability to persist when covered by sand.2 Characteristics of sand sagebrush such as, prolific seed production and the ability of the seed to remain viable over time enable it to take advantage of favorable climate and establish seedlings. Key indicators of approach to transition: Reduction in grass cover and increase in size and frequency of bare patches. Increase in amount of sand sagebrush seedlings. Evidence of litter movement—indicating loss or redistribution of organic matter. Evidence of accelerated wind erosion such as; formation of pedestals, soil deposition, and blowout areas.

Transition 1b
State 2 to 1

Brush management is necessary to remove resource competition from shrubs and increase grass cover. Reestablishing cover will also provide organic matter, increase aggregate stability, and reduce erosion potential.4 Prescribed grazing will help ensure proper forage utilization and plant vigor, especially during times of drought. The degree of erosion and loss of soil resources may dictate whether or not the system is capable of recovery.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				336–392	
	black grama	BOER4	*Bouteloua eriopoda*	336–392	–
2				112–168	
	hairy grama	BOHI2	*Bouteloua hirsuta*	101–112	–
	vine mesquite	PAOB	*Panicum obtusum*	34–56	–
	blue grama	BOGR2	*Bouteloua gracilis*	34–56	–
3				168–191	
	spike dropseed	SPCO4	*Sporobolus contractus*	90–112	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	90–112	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	90–112	–
4				140–168	
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	90–112	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	22–45	–
	cane bluestem	BOBA3	*Bothriochloa barbinodis*	17–34	–
5				17–34	
	threeawn	ARIST	*Aristida*	17–34	–
Forb					
6				17–22	
	leatherweed	CRPO5	*Croton pottsii*	17–22	–
7				9–11	
	globemallow	SPHAE	*Sphaeralcea*	9–11	–
	Hopi tea greenthread	THME	*Thelesperma megapotamicum*	2–4	–
8				11–17	
	Forb, perennial	2FP	*Forb, perennial*	11–17	–
9				11–17	
	Forb, annual	2FA	*Forb, annual*	11–17	–
Shrub/Vine					
10				45–67	
	sand sagebrush	ARFI2	*Artemisia filifolia*	45–67	–
	southwestern rabbitbrush	CHPU4	*Chrysothamnus pulchellus*	34–45	–
11				11–17	
	soaptree yucca	YUEL	*Yucca elata*	11–17	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	6–9	–
	jointfir	EPHED	*Ephedra*	3–6	–
12				3–6	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	3–6	–
	pricklypear	OPUNT	*Opuntia*	3–6	–
13				9–11	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	9–11	–

Animal community

Wildlife species associated with this site include: antelope, coyote, badger, black-tailed jackrabbit, silky pocket mouse, Ord's kangaroo rat, horned lark, eastern and western meadowlark, black-throated sparrow, northern mockingbird, ash-throated flycatcher, common nighthawk, western kingbird, loggerhead shrike, striped whiptail lizard, southern prairie lizard, northern earless lizard, Mojave rattlesnake, prairie rattlesnake, and western diamondback. This site is usually slightly elevated above surrounding terrain, providing predators such as coyotes with natural observation points. The sandy soils are easily excavated by small mammals and reptiles for the construction of dens and burrows. The shrubs provide hiding, nesting, and thermal cover for small mammals, birds, and reptiles. Use of this site by antelope is diminished as shrub size increases due to increased vulnerability to predators. Black grama associated with this site provides excellent forage throughout the year for all classes of livestock and wildlife.

Hydrological functions

This site normally receives approximately 12-14 inches annual precipitation. Most summer rainfall occurs as brief sometimes-heavy thunderstorms. Soils are very deep, well drained and rated as being in hydrologic group B. Slopes range from 2-5 percent. Permeability is moderate to moderately rapid. Runoff is low to very low and the hazard of water erosion is slight to very slight. Available water capacity to a depth of 40 inches is Low.

Recreational uses

This site offers good potential for antelope and predator hunting, wildlife observation and photography.

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 accelerated wind 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.

Inventory data references

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

Type locality

Location 1: Otero County, NM	
Township/Range/Section	T22 S R10 E S9
Latitude	32° 24′ 45″
Longitude	105° 43′ 44″
General legal description	Approximately 2.5 miles north and 20.5 miles east of Oro Grande; 900 feet east and 400 feet south of the northwest corner of Section 9, Township 22S. Range 10E. USGS El Paso Draw topographic quadrangle.

Other references

1. Ludwig, J. A., E. Muldavin, and K.R. Blanche. 2000. Vegetation Change and Surface Erosion in Desert

Grasslands of Otero Mesa, Southern New Mexico: 1982 to 1995. AM. Midl.Nat 144: 273-285.

2. 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.

3. 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 9/23/02].

4. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet. Rangeland Soil Quality—Aggregate Stability, Organic Matter. Rangeland Sheets 3,6, [Online]. Available: http://www.statlab.iastate.edu/survey/SQI/range.html

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:**

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

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

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

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

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

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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:

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

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

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

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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:

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17. **Perennial plant reproductive capability:**
