USDA Natural Resources Conservation Service

Ecological site R042AD002NM
Loamy Bottom, Dry Mixed Prairie

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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 consists of very deep, soils that formed in calcareous alluvium derived from sedimentary materal. The sites are on alluvial bottoms, fan aprons and, inset fans, fan piedmonts, terraces and have slopes of 0 to 5 percent. The mean annual precipitation is about 12 inches and the mean annual air temperature is about 61 degrees F. Elevations range from 4700 to 6000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Inset fan (2) Fan piedmont (3) Flood plain
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional to frequent
Elevation	4,700–6,000 ft
Slope	0–1%
Ponding depth	8–16 in
Water table depth	60 in
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)	14 in

Influencing water features

This site is not influenced by water from wetland or stream.

Soil features

Soils are deep to very deep. Surface layers are loam, and silt loam. Substratum textures are loam, silt loam, clay loam and silty clay loam. Subsoil textures are loam, silt loam and silty clay loam. Some subsoils may have more than 15 percent calcium carbonate. The soils are well drained and have a moderately slow permeability. Available water capacity is very high. This site usually receives some extra water from higher surrounding terrain. If unprotected by vegetative cover the soils become susceptible to water erosion.

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

Characteristic soils:
Reyab
Salado

Table 4. Representative soil features

Surface texture	(1) Loam (2) Silt loam (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	60–80 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	6–6.8 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–1

Soil reaction (1:1 water) (0-40in)	7.9–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The aspect of this site's historic plant community is open grassland. This site is associated with the loamy ecological site. It occurs in the lowest position in relation to adjacent landscapes and receives extra run-on water making this a highly productive site. Alkali sacaton is the dominant grass species; other typical upland grass species may be limited by high soil moisture. Vine mesquite and tobosa are important associated species and are evenly distributed throughout the site. Forb production is variable and woody species do not normally occur in the climax community, nor do they invade. Continuous grazing, drought, or a combination can result in a decrease or loss of vine mesquite, and an increase in tobosa. Further retrogression is evidenced by an increase in burrograss and invasion of broom snakeweed.

The overflow water this site receives makes it resistant to state change, however, changes in hydrology can effect rapid transition. Roads or erosional features such as gullies can alter the hydrology and 'dry' the site causing the transition to the dry grassland state. In response to decreased available water, alkali sacaton decreases and is eventually replaced by more drought tolerant grasses. Tobosa and burrograss become the dominant grass species characterizing the dry grassland state.

State and transition model

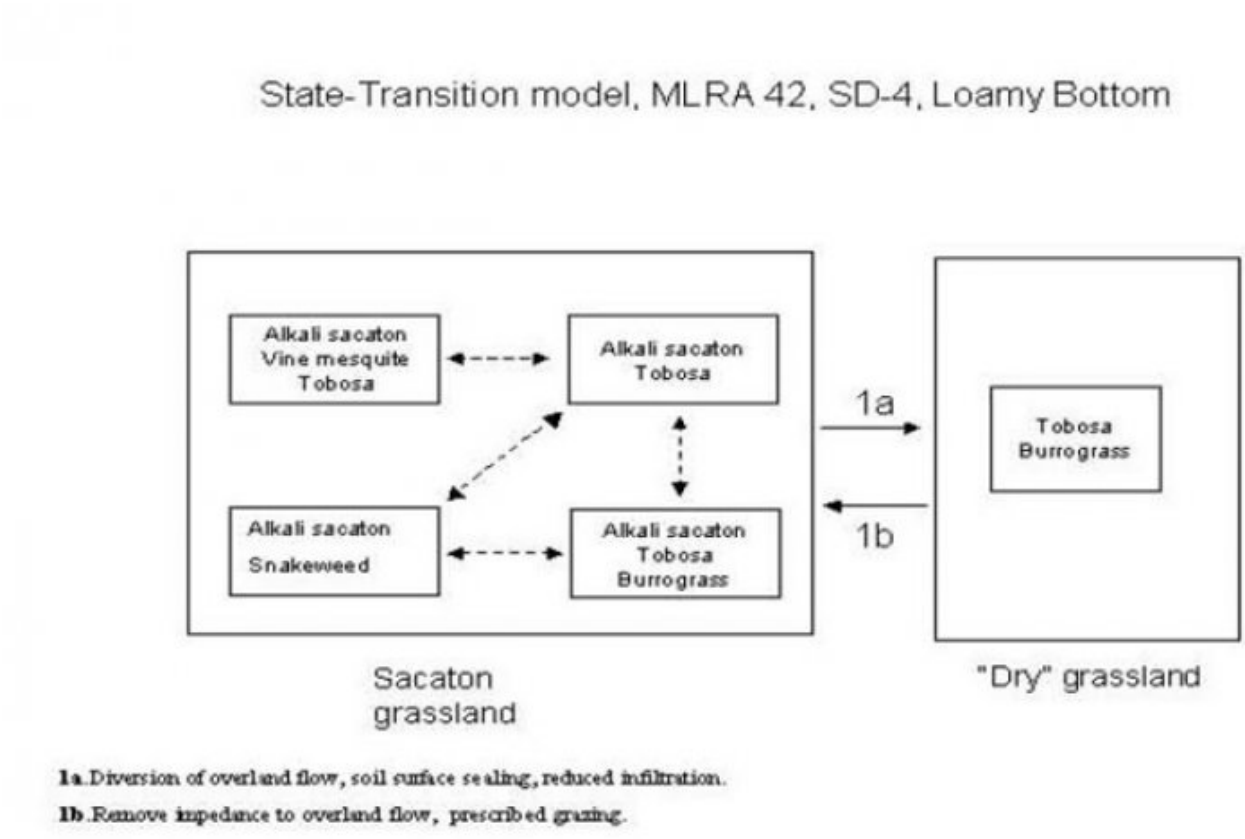

Figure 4. MLRA-42, SD-4, Loamy Bottom

State 1

Historic Climax Plant Community

Community 1.1
Sacaton Grassland

Figure 5. Grassland

Alkali sacaton is the dominant grass of this site both in aspect and composition. Other grass species include vine mesquite, tobosa, blue grama, burrograss, ear muhly and sand muhly. Forbs are only a minor part of the potential plant community and shrubs are absent. The extra water received as overland flow provide the conditions necessary for alkali sacaton to dominate, and its ability to produce from seeds and tillering, and abundant seed production and viability keep it competitive. Other species on this site such as vine mesquite are more palatable and selectively grazed first. As vine mesquite declines tobosa increases. As the site continues to degrade, burrograss increases and eventually broom snakeweed can invade. The invasion of snakeweed may be due in part to the amount of winter moisture received.1 Large bare patches, hummocks or clumps of alkali sacaton, and heavy concentrations of broom snakeweed are characteristic of the alkali sacaton / broom snakeweed community. As long as the hydrology of the site is not compromised and sufficient cover of alkali sacaton remains, recovery is possible.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1500	2850	3850
Forb	100	150	150
Total	**1600**	**3000**	**4000**

Figure 7. Plant community growth curve (percent production by month). NM5802, R042XD002NM Loamy Bottom HCPC. R042XD002NM Loamy Bottom HCPC Average rainfall year..

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
Dry Grassland

Tobosa and burrograss are the dominant grass species. This change in state is primarily due to a change in hydrology where effective run-on moisture is reduced. Without the addition of overland flow the site begins to dry and alkali sacaton decreases. The alkali sacaton will clump up forming tussocks and eventually die from the center outward. Drought and grazing pressure can accelerate this decrease in alkali sacaton. As the site begins to dry the number of bare patches increase and they begin to connect, forming large bare areas. The soils in these areas form physical crust when erosion causes particles to dislodge clogging the pores of the soil surface2. These clogged pores reduce infiltration of water and nutrients necessary for plant growth. Tobosa and burrograss are better adapted to reduced soil moisture and eventually become the dominant grasses.

Community 2.1
Dry Grassland

Figure 8. Dry Grassland

Tobosa is dominant or co-dominant with burrograss. Alkali sacaton is absent or very limited. Large interconnected bare patches are present. Production levels are reduced from the Sacaton Grassland State.

Transition 1a
State 1 to 2

The construction of roads or the formation of gullies can effectively reduce the amount of moisture a site receives by intercepting and rerouting surface and ground water. Heavy grazing may accelerate formation of gullies by reducing vegetative cover and creating stock trails. Key indicators of approach to transition: Reduction in alkali sacaton cover and increase in size and frequency of bare patches. Increase in tobosa and or burrograss cover. The formation of roads, gullies or other features (on or off site) that disrupts natural overland flow on site. Decrease in frequency and duration of water ponding.

Transition 1b
State 2 to 1

Restoration of hydrologic processes is necessary for transition back to sacaton grassland. Prescribed grazing will help to ensure recovery and prevent grazing induced retrogression.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				1500–2100	
	alkali sacaton	SPAI	*Sporobolus airoides*	1500–2100	–
2				240–300	
	vine mesquite	PAOB	*Panicum obtusum*	240–300	–
3				240–300	
	tobosagrass	PLMU3	*Pleuraphis mutica*	200–240	–
	sand muhly	MUAR2	*Muhlenbergia arenicola*	100–120	–
	blue grama	BOGR2	*Bouteloua gracilis*	75–100	–
4				100–150	
	ear muhly	MUAR	*Muhlenbergia arenacea*	50–75	–
	burrograss	SCBR2	*Scleropogon brevifolius*	50–75	–
Forb					
5				50–75	
	Forb, annual	2FA	*Forb, annual*	50–75	–
6				50–75	
	Forb, perennial	2FP	*Forb, perennial*	50–75	–
	globemallow	SPHAE	*Sphaeralcea*	50–75	–

Animal community

This ecological site provides habitat that supports a resident animal community characterized by coyote, black-tailed jackrabbit, silky pocket mouse, spotted ground squirrel, Merriam’s kangaroo rat, California myotis, American kestrel, red-tailed hawk, northern harrier, meadow lark, horned lark, northern mockingbird, box turtle, couch’s spadefoot toad, northern earless lizard, striped whiptail, and prairie rattlesnake.

Hydrological functions

This site normally receives approximately 12-14 inches annual precipitation. Most summer rainfall occurs as brief sometimes-heavy thunderstorms. Soils are deep to very deep and rated as being in hydrologic group B. Slopes range from 0- 1 percent. Permeability is moderately slow.

Runoff is low, and the hazard of water erosion is slight. This site occasionally floods and will occasionally to frequently pond water. Available water capacity to a depth of 40 inches is moderate. As basal cover and litter are reduced and the size of gaps between vegetation increases, the surface soils become exposed to accelerated erosion.

Soil Hydrologic Unit
Reyab ----------B
Saldado --------B

Recreational uses

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

Wood products

This site has no significant value for wood products.

Other products

Grazing: The plant community on this site is suitable to grazing at all seasons of the year, however the vast majority of the forage is most palatable to livestock is most effectively used during the summer months. 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 and initial starting stocking rate will also be based on forage preference ratings.

Type locality

Location 1: Otero County, NM	
Township/Range/Section	T22S R13E S18
General legal description	Otero County New Mexico, 250 feet east and 200 feet north of the southwest corner of section 18, T.22S., R.13E., El Paso Draw Quadrangle.

Other references

1. Moir, W.H. and J. A. Ludwig. 1991. Plant succession and changing land features in desert grasslands. P. 15-18. In P.F. Ffolliott and W.T. Swank (eds.) People and the temperate region: a summary of research from the United States Man and the Biosphere Program 1991. U.S. Dept. State, Publ No. 9839, Nat. Tech. Info. Serv., U.S. Dept. Commerce, Springfield, Illinois. 63 p.

2. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet. Rangeland Soil Quality—Physical and Biological Soil Crusts. Rangeland Sheet 7, [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:**

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

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

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

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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):**

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:**