

Ecological site R070BY070NM

Very Shallow

Last updated: 9/12/2023

Accessed: 05/16/2024

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.

Ecological site concept

This site occurs on soils that are shallow or very shallow to calcareous root-restrictive layers: limestone or petrocalcic horizons (caliche). Slopes range from 0 to 5 percent. Soils typically have high fragment content. The Very Shallow ecological site typically occurs on plains or mesa and plateau summits. It is often associated with the Shallow, Sandy Plains, and Sandy Loam sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is on nearly level to gently undulating soils of the upland plains, mesas, and ridges. Slopes range from 0 to 5 percent. Exposure varies, but is not ecologically significant. Elevation ranges from 4,200 to 5,300 feet.

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Plain (3) Ridge
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	None to rare
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	1,280–1,615 m
Slope	0–5%
Ponding depth	0–3 cm
Aspect	Aspect is not a significant factor

## Climatic features

The climate of this area can be classified as “semi-arid continental”.

Annual average precipitation ranges from 11 to 16 inches. Roughly 78 percent of the moisture falls during the 6-month period of May through October. Most of this summer precipitation falls in the form of brief and heavy afternoon and evening thunderstorms. Hail may accompany the more severe summer storms. In the winter, there is normally only one day a month when as much as one-tenth inch of moisture falls, usually in the form of snow. Snow seldom lies on the ground for more than a few days.

Temperatures are characterized by a distinct seasonal change and large annual and diurnal temperature ranges. Summers are moderately warm. Maximum temperature average above 90 degrees F from July to August, and an average summer includes about 80 days with high readings exceeding 90 degrees F and 10 days with readings above 100 degrees F. Temperatures usually fall rapidly after sundown and lows average 60 degrees F on most summer nights. Winters are mild, sunny, and dry. Daytime shade temperatures in midwinter usually rise to the 50's. However, freezing temperatures normally occur at night from mid-November to mid-March.

The freeze-free season ranges from 196 to 218 days. Dates of the last freeze range from April 11th to April 17th and the first freeze ranges from October 20th to October 25th.

Both temperature and rainfall distribution favor warm-season, perennial plant communities in the area. However, sufficient late winter and early spring moisture allows cool-season species to occupy a minor component within the plant community.

Climate data was obtained from <http://www.wrcc.dri.edu/summary/climsmnm.html> web site. Data were interpreted utilizing NM Climate Summarizer spreadsheet.

**Table 3. Representative climatic features**

Frost-free period (average)	192 days
Freeze-free period (average)	218 days
Precipitation total (average)	406 mm

## Influencing water features

There are no surface water features or wetlands associated with this site. During heavy rain events, this site may receive run-on moisture from landforms above and contribute runoff to landforms below.

## Soil features

Soils are shallow to very shallow over limestone bedrock or a cemented layer of caliche (a petrocalcic horizon).

Surface and sub-surface textures include very gravelly fine sandy loam, very gravelly loam, very gravelly loamy fine sand, very cobbly fine sandy loam, gravelly fine sandy loam, and extremely cobbly fine sandy loam. Surface runoff is high. Wind erosion hazard is moderate and water erosion hazard could be high on steeper slopes.

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

Characteristic soils:

Neso

Kolar

Lozier

Note: Lozier is an MLRA 81 soil.

**Table 4. Representative soil features**

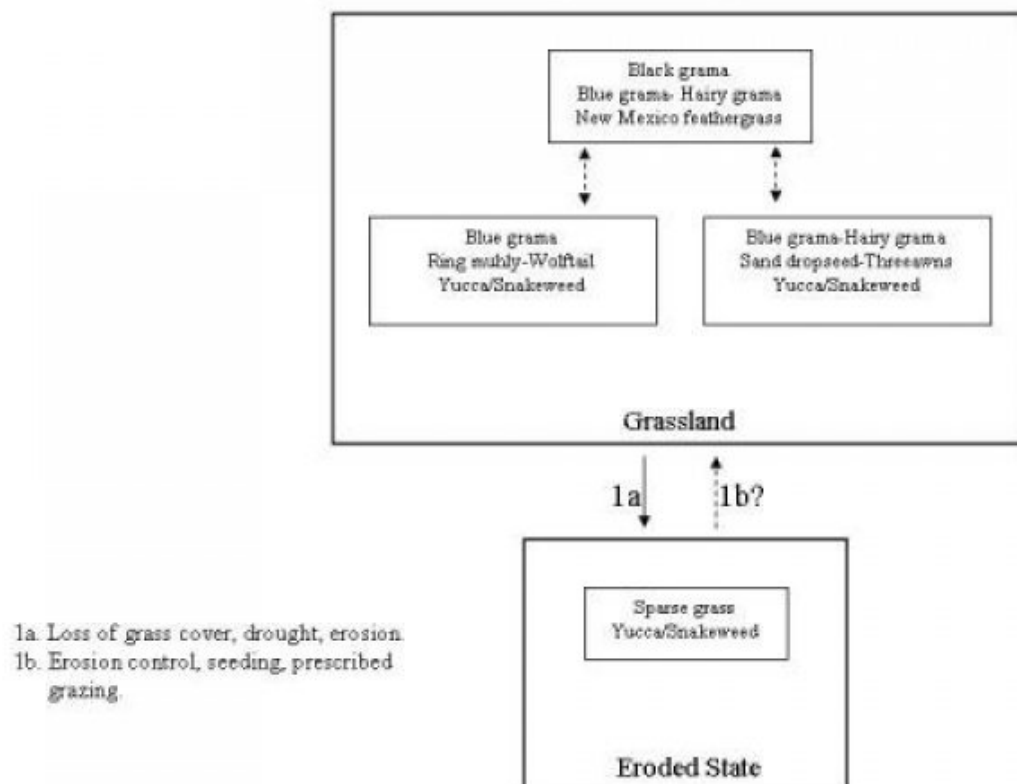
Surface texture	(1) Very gravelly fine sandy loam (2) Very gravelly loam (3) Very cobbly very fine sandy loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderate
Soil depth	15–36 cm
Surface fragment cover <=3"	10–25%
Surface fragment cover >3"	1–35%
Available water capacity (0-101.6cm)	2.54–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	20–40%
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)	7.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	10–25%
Subsurface fragment volume >3" (Depth not specified)	1–35%

## Ecological dynamics

The reference plant community of this site is a grassland dominated by warm-season short- and mid-grasses, and dotted with shrubs. Forbs are typically a minor component, with their distribution and abundance dependent on precipitation. Black grama is the dominant grass. Catclaw acacia, Ephedra, yucca, and broom snakeweed are characteristic shrubs. Continuous heavy grazing pressure will initially cause a shift in community composition followed by a decrease in herbaceous cover. If plant cover continues to decline and grasses become sparse, the site becomes susceptible to accelerated erosion (Eroded state).

## State and transition model

## MLRA 70, CP-2 Very Shallow



### State 1 Grassland

This state is dominated by grasses.

### Community 1.1 Grassland

In the reference plant community, black grama is the dominant grass with blue and/or hairy grama and New Mexico feathergrass occurring as sub-dominants. Other grasses that occur in significant amounts include sand dropseed, sideoats grama, and wolfstail. Shrubs including catclaw acacia, Ephedra, yucca, and broom snakeweed are usually sparsely scattered across the site. Continuous grazing pressure can cause a decrease in black grama, New Mexico feathergrass, sideoats grama, and little bluestem. This can result in a community dominated by blue and/or hairy grama, with increases in yucca and broom snakeweed. Other species that characteristically increase include ring muhly, wolfstail, sand dropseed, and threeawns. Diagnosis: Grass and litter cover are fairly uniform with few large (greater than 1 meter) bare areas present. Shrubs constitute a minor portion of the plant community with combined canopy cover averaging 5 percent or less. Evidence of erosion is minimal. Other plants that can appear on this site include: witch grass, Halls panicum, western wheatgrass, plains bristlegrass, Arizona cottontop, feather dalea, Bigelow sagebrush, woolly indianwheat, New Mexico thistle, annual mustards, fetid marigold, hairy tridens, and *Dyssodia*.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	247	404	706
Shrub/Vine	22	45	78
Forb	22	45	78
<b>Total</b>	<b>291</b>	<b>494</b>	<b>862</b>

**Table 6. Ground cover**

Tree foliar cover	0%
Shrub/vine/liana foliar cover	3-5%
Grass/grasslike foliar cover	20-30%
Forb foliar cover	2-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	10-12%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	10-15%
Bedrock	0%
Water	0%
Bare ground	25-35%

**Figure 5. Plant community growth curve (percent production by month).**  
**NM4317, R070BY070NM Very Shallow Reference State. R070BY070NM Very**  
**Shallow Reference State Mixed short/mid-grassland w/shrubs, half-shrubs,**  
**trees and scattered forbs. .**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

## State 2 Eroded

This state shows evidence of significant erosion such as truncated topsoil and/or pedestalling at the surface.

### Community 2.1 Eroded

This phase is characterized by accelerated erosion and loss of soil fertility. Grass cover is very sparse, and usually restricted to scattered patches of blue grama or widely-scattered individual bunchgrasses. Diagnosis: Bare ground is interconnected with little grass cover remaining. Litter is often restricted to protected areas behind rocks, shrub bases, or other obstructions to sheet flow. Water flow patterns and rills are common. Sheet erosion is extensive. Transition to Eroded state (1a) Transitions to the Eroded state occur mainly in response to the loss of grass cover due to continuous heavy grazing, especially in conjunction with drought. As grass cover and litter decline, organic matter and infiltration decrease and erosion accelerates. Key indicators of approach to transition: Significant decrease in cover of black grama Decrease in grass and litter cover Increase in size and number of bare patches Pedestalling of plants Transition back to Grassland (1b) Erosion control structures would be necessary to help accumulate soil, restore natural overland flow patterns, and prevent further nutrient and soil loss. Seeding would be necessary to reestablish ground cover. The addition of organic matter or other soil amendments may be needed to restore soil fertility and facilitate grass recovery. Prescribed grazing is necessary to ensure adequate rest following seeding and proper forage use following grass recovery. Potential for recovery is inhibited by shallow soils, low available water capacity, limited precipitation, and low nutrient availability.

Figure 6. Plant community growth curve (percent production by month).  
NM4317, R070BY070NM Very Shallow Reference State. R070BY070NM Very  
Shallow Reference State Mixed short/mid-grassland w/shrubs, half-shrubs,  
trees and scattered forbs. .

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	7	10	15	25	25	8	5	0	0

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Black Grama</b>			45–157	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	41–157	–
2	<b>black grama hairy grama</b>			22–112	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	28–118	–
	hairy grama	BOHIH	<i>Bouteloua hirsuta</i> var. <i>hirsuta</i>	28–118	–
3	<b>New Mexico feathergrass</b>			22–112	
	New Mexico feathergrass	HENE5	<i>Hesperostipa neomexicana</i>	28–118	–
4	<b>sand dropseed</b>			11–78	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	13–78	–
5	<b>sideoats grama</b>			0–78	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	2–78	–
6	<b>wolftail</b>			11–78	
	wolftail	LYCUR	<i>Lycurus</i>	13–78	–
7	<b>ring muhly</b>			11–34	
	ring muhly	MUTO2	<i>Muhlenbergia torreyi</i>	9–39	–
8	<b>threeawn spp.</b>			11–78	
	threeawn	ARIST	<i>Aristida</i>	13–78	–
9	<b>little blue cane blue silver blue</b>			11–34	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	9–39	–
	silver bluestem	BOSA	<i>Bothriochloa saccharoides</i>	9–39	–
	little bluestem	SCSCS	<i>Schizachyrium scoparium</i> var. <i>scoparium</i>	9–39	–
<b>Shrub/Vine</b>					
10	<b>catclaw mormon tea yucca other</b>			11–34	
	catclaw acacia	ACGR	<i>Acacia greggii</i>	9–39	–
	fourwing saltbush	ATCAC	<i>Atriplex canescens</i> var. <i>canescens</i>	9–39	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	9–39	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	9–39	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	9–39	–
<b>Forb</b>					
11	<b>buckwheat croton globemallow</b>			11–34	
	croton	CROTO	<i>Croton</i>	9–39	–
	buckwheat	ERIOG	<i>Eriogonum</i>	9–39	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	9–39	–
12	<b>verbena twinleaf milkweed</b>			11–34	
	sand verbena	ABRON	<i>Abronia</i>	9–39	–
	milkweed	ASCLE	<i>Asclepias</i>	9–39	–
	twinleaf	JEDI	<i>Jeffersonia diphylla</i>	9–39	–

## Animal community

Wildlife; This ecological site provides habitat which supports a resident animal community that is characterized by pronghorn antelope, black-tailed jackrabbit, spotted squirrel, plains pocket mouse, southern plains woodrat, horned lark, scaled quail, side blotched lizard, and round tailed horned lizard.

## Hydrological functions

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

Hydrologic Interpretations

Neso-----D

Lozier-----D

Kolar -----D

## Recreational uses

Recreational opportunities on this site are limited, in part, by lack of surface water and shade. Suitability for camping, picnicking, and hiking is fair. Hunting is good for antelope, quail, dove, and small game. Trapping for fur-bearing animals is good. Aesthetic appeal is enhanced by the "wide open spaces" of the area. The natural beauty of the site is enhanced by the wildflowers that bloom from early spring to late fall following significant precipitation events.

## Wood products

No wood product on this site.

## Other products

Grazing: This site can be grazed by all classes and kinds of livestock during any season of the year. Approximately 90 percent of the annual total yield is from species that furnish forage for grazing animals. These species are a large variety of grasses and forbs which provide good forage and nutrition for grazing animals for most of the year. Continuous year long grazing or continual grazing in the period from April thru October will cause the site to deteriorate and become less productive. Species such as blue grama, sideoats grama, New Mexico feathergrass and little bluestem will decrease in composition.

This will cause an increase in the composition of species like Threeawn, Sand dropseed, Blue grama, Yucca and Broom snakeweed. A system of grazing which rotates the season of use will maintain or improve the composition of the plant community. If this site continues to deteriorate, there will be a severe water erosion hazard that can drastically alter the site and require significant management inputs to correct.

## Other information

Guide to Suggested Initial Stocking rate in Acres per animal unit month

Similarity Index-----Acres/AUM

100 to 76-----2.7 to 3.7

51 to 75-----3.5 to 5.3

26 to 50-----5 to 10

25 or less-----10 plus.

## Type locality

Location 1: De Baca County, NM
Location 2: Guadalupe County, NM

## Other references



## References

1. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet. Rangeland Soil Quality—Aggregate Stability. Rangeland Sheet 3, [Online]. Available: <http://soils.usda.gov/sqi/publications/rsqis.html>
2. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheet. Rangeland Soil Quality—Organic Matter. Rangeland Sheet 6, [Online]. Available <http://soils.usda.gov/sqi/publications/rsqis.html>

## Contributors

Don Sylvester  
John Tunberg

## Approval

Kendra Moseley, 9/12/2023

## 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	05/16/2024
Approved by	Kendra Moseley
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:**

---