Ecological site R035XG116NM
Shallow

Last updated: 5/19/2025
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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.

Ecological site concept

This site occurs on benches, hills, ridges, and dipslopes of cuestas. Slopes vary from 1 to 15 percent. The soils are shallow over a petrocalcic horizon (caliche), limestone, or shale. Surface textures are typically medium and the soils are usually gravelly, cobbly, or stony throughout the profile.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Bouteloua gracilis* (2) *Hesperostipa neomexicana*

Physiographic features

This site occurs on benches, hills, ridges, and dipslopes of cuestas. This site occurs on gently sloping to undulating terrain. Slopes vary from 1 to 15 percent. Elevations range from 6,000 to 7,300 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Cuesta (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	1,830 − 2,230 m
Slope	0 − 20 %

Aspect	Aspect is not a significant factor

Climatic features

Average annual precipitation varies from about 10 inches to just over 16 inches. Fluctuations ranging from about 5 inches to 25 inches are not uncommon. The overall climate is characterized by cold dry winters in which winter moisture is less than summer. As much as half or more of the annual precipitation can be expected to come during the period of July through September. Thus, fall conditions are often more favorable for good growth of cool-season perennial grasses, shrubs, and forbs than are those of spring.

The average frost-free season is about 120 days and extends from approximately mid May too early or mid September. Average annual air temperatures are 50 degrees F or lower and summer maximums rarely exceed 100 degrees F. Winter minimums typically approach or go below zero. Monthly mean temperatures exceed 70 degrees F for the period of July and August.

Rainfall patterns generally favor warm-season perennial vegetation, while the temperature regime tends to favor cool-season vegetation. This creates a somewhat complex community of plants on a given ecological site, which is quite susceptible to disturbance and is at or near its productive potential only when both the natural warm/cool-season dominants are present.

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)	150 days
Freeze-free period (average)	170 days
Precipitation total (average)	410 mm

Influencing water features

This is an upland site, and is not associated with water features or wetlands. During heavy rain events, this site may receive run-on moisture from landforms above and contribute runoff to landforms below.

Soil features

Surface textures are typically medium and the soils are usually gravelly, cobbly, or stony
throughout the profile. They are shallow to very shallow over an indurate layer such as caliche or unweathered limestone bedrock. Permeability is moderate to rapid, but the available waterholding capacity is usually low.

Table 4. Representative soil features

Surface texture	(1) Gravelly loam (2) Cobbly fine sandy loam (3) Stony clay loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained

Permeability class	Very slow to moderately rapid
Soil depth	10 – 50 cm
Surface fragment cover <=3"	10 – 60 %
Surface fragment cover >3"	10 – 20 %
Available water capacity (0-101.6cm)	7.62 – 15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 30 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	0 – 10
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 10
Subsurface fragment volume <=3" (Depth not specified)	10 – 60 %
Subsurface fragment volume >3" (Depth not specified)	10 – 20 %

Ecological dynamics

Overview
This site occurs on benches, hills, ridges, and dipslopes of cuestas. The soils are shallow over a petrocalcic horizon (caliche), limestone, or shale. Loamy and Savannah sites often occur as areas of deeper soils interspersed or adjacent to the Shallow site. This is a grassland site characterized by a mixture of warm and cool-season grasses, scattered shrubs, and a few trees. Blue grama, New Mexico feathergrass, and sideoats grama are the dominant grasses. Winterfat and Bigelow sagebrush are characteristic shrubs. Juniper and piñon are the tree species that occur on this site. This site appears to be highly resistant to state change, as no alternate states were identified during our inventory. This may be due in part to the petrocalcic horizon1 or bedrock that helps to keep water perched and available, favoring shallow rooted grasses.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				101-123	
	blue grama	BOGR2	*Bouteloua gracilis*	96-129	–
2				67-123	
	needle and thread	HECO26	*Hesperostipa comata*	65-129	–
	New Mexico feathergrass	HENE5	*Hesperostipa neomexicana*	65-129	–
3				67-123	
	sideoats grama	BOCU	*Bouteloua curtipendula*	65-129	–
4				11-22	
	hairy grama	BOHI2	*Bouteloua hirsuta*	7-19	–
5				34-65	
	little bluestem	SCSC	*Schizachyrium scoparium*	33-65	–
6				34-65	
	common wolfstail	LYPH	*Lycurus phleoides*	33-65	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	33-65	–
	common wolfstail	LYPH	*Lycurus phleoides*	33-65	–
	spike muhly	MUWR	*Muhlenbergia wrightii*	33-65	–
7				34-65	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	33-65	–
	squirreltail	ELEL5	*Elymus elymoides*	33-65	–
	western wheatgrass	PASM	*Pascopyrum smithii*	33-65	–
8				11-34	
	James' galleta	PLJA	*Pleuraphis jamesii*	7-33	–
9				11-34	
	sand dropseed	SPCR	*Sporobolus cryptandrus*	7-33	–
10				11-22	
	black grama	BOER4	*Bouteloua eriopoda*	7-19	–
11				11-34	
	threeawn	ARIST	*Aristida*	7-33	–
	ring muhly	MUTO2	*Muhlenbergia torreyi*	7-33	–
Forb					
12				11-34	
	Forb, perennial	2FP	*Forb, perennial*	7-33	–
13				11-22	
	Forb, annual	2FA	*Forb, annual*	7-19	–
Tree					
14				11-34	
	juniper	JUNIP	*Juniperus*	7-33	–
	twoneedle pinyon	PIED	*Pinus edulis*	7-33	–
Shrub/Vine					
15				11-22	

	pale desert-thorn	LYPA	*Lycium pallidum*	7-19	–
	oak	QUERC	*Quercus*	7-19	–
	skunkbush sumac	RHTR	*Rhus trilobata*	7-19	–
16				11-34	
	Bigelow sage	ARBI3	*Artemisia bigelovii*	7-33	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	7-33	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	7-33	–

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Animal community

Habitat for Wildlife: This ecological site provides habitats which support a resident animal community that is characterized by pronghorn antelope, coyote, black-tailed jackrabbit, Merriam's kangaroo rat, white-throated woodrat, silky pocket mouse, sparrow hawk, Cassin's kingbird, chipping sparrow, plateau whiptail, short-horned lizard and prairie rattlesnake. Where pinyon pine and juniper increase under conditions of site retrogression, mule deer, gray fox, pinyon mouse, and scrub jay utilize the site. Mourning dove and black-chinned sparrow use it to nest. The chestnut-collared longspur winters here and the common raven and prairie falcon hunt over this site.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydrologic cover conditions and hydrologic soil groups. Hydrologic Interpretations Soil Series----------Hydrologic Group Churipa----------C Lavodnas----------C Menefee----------D Persayo----------D Sandoval----------D Shadilto----------D Winona----------D

Recreational uses

This site offers fair to good potential for hiking, horseback riding, nature observation, photography, camping, and picnicking. It offers good potential for pronghorn antelope hunting, and poor to fair opportunities for hunting mule deer. A generally open landscape, dotted by shrubs and half-shrubs, provides natural beauty on this site.

Wood products

This site at its potential has little or no significant value for wood products.

Other products

Grazing: This site is suitable for grazing by most kinds and classes of livestock in all seasons of the year, but is poorly suited for continuous yearlong use if the natural potential vegetation is to be maintained. Occasional spring or fall deferment is especially critical for continued production of such grasses as New Mexico feathergrass and needleandthread. Summer rest is important if the production of sideoats grama and blue grama is to be sustained. Heavy prolonged use on a continuous basis will most likely result in a rapid decrease in cool-season grasses and a more gradual but eventually just as certain decrease in sideoats grama, winterfat, little bluestem, spike muhly, and blue grama. Advanced site deterioration may be typified by an increase of such plants as broom snakeweed, ring muhly, and threeawn spp. The site is also subject to invasion by woody plants such as rabbitbrush.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month Similarity----------Index Ac/AUM 100 - 76----------3.6 – 4.7 75 – 51----------4.5 – 6.7 50 – 26----------6.5 – 11.5 25 – 0----------11.5+

Type locality

Location 1: Catron County, NM

Location 2: Socorro County, NM

Other references

Data collection for this site was done in conjunction with the progressive soil surveys within the New Mexico and Arizona Plateaus and Mesas 36 Major Land Resource Area of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: McKinley, Socorro, Cibola, Sandoval Catron.

1. Hennessy, J.T., R.P. Gibbens, J.M. Tromble, and M. Cardenas. 1983. Water properties of caliche. J. Range Manage. 36: 723-726.

2. McDaniel, K. C., L. A. Torell, and J.W. Bain. 1993. Overstory-understory relationships for broom snakeweed-blue grama grasslands. Journal of Range Management. 46: 506-511.

3. Stubbendieck, J., S. L.Hatch, and C. H. Butterfield, 1992. North American range plants. 4th ed. Lincoln, NE: University of Nebraska Press. 493 p.

Contributors

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Approval

Kendra Moseley, 5/19/2025

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	05/11/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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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):**

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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:**
