

Ecological site R042CY124NM

Gypsum Hills

Last updated: 10/21/2024
Accessed: 09/11/2026

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.

MLRA notes

Major Land Resource Area (MLRA): 042C—Central New Mexico Highlands

Major Land Resource Area (MLRA): 070C—Central New Mexico Highlands Major Land Resource Area (MLRA) 70C - will become 42C - is a high elevation portion of central New Mexico that is the convergence of four major physiographic provinces: Basin and Range, Southern Rocky Mountains, Great Plains, and Colorado Plateau. As such, it contains parts or characteristics of each, though tectonically, as a region, it is the easternmost extent of the Basin and Range Province and, more specifically, a structural expression of the Rio Grande Rift. It consists mostly of rangeland with some forested areas associated with numerous disconnected mountain ranges such as the Guadalupe, Sacramento, and Manzano Mountains. Other major physiographic features include the Galisteo Basin or the enclosed Estancia Basin, the structural Chupadera and Glorieta Mesas, and the piedmonts of the Buchanan and Guadalupe Mesas.

Ecological site concept

This site occurs on hillsides and on footslopes of higher mountains. Slopes range from 15 to 60 percent but average 20 to 30 percent. The soils on this site are well-drained soils that formed on gypsum bedrock. Surface textures range from a sandy loam to a channery loam overlaying dense layers of soft or cemented gypsum material. Thus, depth to root-restrictive layers is quite variable.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Tiquilia hispidissima</i> (2) <i>Mahonia repens</i>
Herbaceous	(1) <i>Sporobolus nealleyi</i> (2) <i>Sporobolus airoides</i>

Physiographic features

This site occurs on hillsides and on footslopes of higher mountains. Slopes range from 15 to 60 percent but average 20 to 30 percent. Aspect of slope varies but is not significant. Elevation ranges from 5,000 to 7,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Hill
Elevation	1,520 – 2,130 m

Slope	20 – 60 %
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 13 to 16 inches. Variations of 5 inches, more or less, are not uncommon. Seventy-five percent of the precipitation falls from April to October. Much of the summer precipitation comes in the form of high-intensity, short-duration thunderstorms.

The average frost-free season ranges from 130 to 160 days in the CP-3 subland resource area and from 160 to 190 days in the WP-3 subland resource area.

Growing conditions favor warm-season perennial vegetation, however, late winter and late summer precipitation is also available for cool-season plant growth. Strong winds blow across these areas in the spring and can dry the soil profile rapidly 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)	170 days
Freeze-free period (average)	190 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

The soils on this site are well-drained soils that formed on gypsum bedrock. Surface textures range from a sandy loam to a channery loam overlaying dense layers of soft or cemented gypsum material. Thus, depth to root-restrictive layers is quite variable. These gypsum materials commonly outcrop to the surface as inclusions of raw gypsum-land, which are void of vegetation and not part of the ecological site. The soils have moderate permeability and water-holding capacity is very low. Water erosion hazard is high and wind erosion hazard is moderate.

Table 4. Representative soil features

Surface texture	(1) Channery sandy loam (2) Very fine sandy loam (3) Fine sandy loam
Family particle size	(1) Loamy

Drainage class	Well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	0 – 180 cm
Surface fragment cover >3"	20 – 40 %
Available water capacity (0-101.6cm)	0 – 7.62 cm
Electrical conductivity (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	20 – 40 %
Subsurface fragment volume >3" (Depth not specified)	20 – 40 %

Ecological dynamics

Due to the shallow highly erosive soils grazing must be carefully managed to prevent irreparable loss of productivity. Mismanagement of grazing leads to a decrease in the desirable forage plants such as alkali sacaton, black grama, bush muhly, the needlegrasses and sideoats grama, and an increase in undesirable forage plants such as gyp dropseed, threeawn spp., ring muhly, and hairy coldenia.

State and transition model

Figure 3. Generalized STM for gypsiferous sites in 70C

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1				39-78	
	gyp dropseed	SPNE	<i>Sporobolus nealleyi</i>	39-78	–
2				39-62	
	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	39-59	–

3				22-39	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	20-39	–
4				22-39	
	needlegrass	ACHNA	<i>Achnatherum</i>	20-39	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	20-39	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	20-39	–
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	20-39	–
5				6-22	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	4-20	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	4-20	–
6				22-28	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	20-28	–
Forb					
7				6-11	
	globemallow	SPHAE	<i>Sphaeralcea</i>	4-12	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	4-12	–
8				6-11	
	dyssodia	DYSSO	<i>Dyssodia</i>	4-12	–
	dyssodia	DYSSO	<i>Dyssodia</i>	4-12	–
9				6-11	
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus</i> var. <i>flaccidus</i>	4-12	–
10				6-11	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	4-12	–
Shrub/Vine					
11				22-39	
	hairy crinklemat	TIHI	<i>Tiquilia hispidissima</i>	20-39	–
12				11-22	
	algerita	MATR3	<i>Mahonia trifoliolata</i>	12-20	–
13				6-11	
	banana yucca	YUBA	<i>Yucca baccata</i>	4-12	–
14				6-22	
	Bigelow sage	ARBI3	<i>Artemisia bigelovii</i>	4-20	–
15				11-22	
	mormon tea	EPVI	<i>Ephedra viridis</i>	12-20	–
16				6-22	
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	4-20	–
17				22-28	
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	20-28	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	20-28	–
18				6-11	
	Shrub, deciduous	2SD	<i>Shrub, deciduous</i>	4-12	–

Type locality

Location 1: Valencia County, NM

Location 2: Sierra County, NM
Location 3: Socorro County, NM
Location 4: Torrance County, NM
Location 5: Catron County, NM
Location 6: Lincoln County, NM

Other references

Data collection for this site was done in conjunction with the progressive soil surveys within the Pecos-Canadian Plains and Valleys and the NM and Az. Plateaus and Mesas Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys: Lincoln, Torrance, Socorro, Sierra, Socorro, Grant, Chaves, De Baca, Guadalupe, Lincoln, Sna Miguel, Santa Fe, Torrance.

Characteristic Soils Are:
 Tanbark

Other Soils included are:
 Clovis, La Fonda, Palma

Contributors

Christine Bishop
 Don Sylvester
 Elizabeth Wright
 John Tunberg

Approval

Kendra Moseley, 10/21/2024

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	09/11/2026
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:
