

Ecological site R035XB017NM

Cobbly Slopes

6-10"

Last updated: 5/20/2025
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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 upland site occurs on the riser part of high stream terraces. It suffers from excessive drainage and is subject to significant amounts of runoff. Slopes range from 15 to 60%. The soils are moderately deep and well drained. They are formed in alluvium derived from quartzite and residuum derived from siltstone. Surface textures include very cobbly fine sandy loam. The soils are saline (EC 4-8), slightly sodic (SAR 5-13), and moderately to strongly alkaline (pH 7.9-9.0).

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex cuneata</i> (2) <i>Atriplex confertifolia</i>
Herbaceous	(1) <i>Pleuraphis jamesii</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

This upland site occurs on the riser part of high stream terraces. It suffers from excessive drainage and is subject to significant amounts of runoff. Slopes range from 15 to 60%. Elevations range from 4,600 to 6,100 feet.

Table 2. Representative physiographic features

Landforms	(1) Rise
Elevation	1,400 – 1,860 m
Slope	20 – 60 %

Climatic features

Mean annual precipitation varies from 5 to 8 inches with about 60% of it coming as rain from April through October. May and June are the driest months. Most of the precipitation from November through March comes as snow. High-velocity winds are common in late winter and early spring.

Mean temperatures for the hottest month, July, are about 83 degrees F. The coldest month is January, when the mean temperature is about 27 degrees F. Extreme temperatures of 104 and -17 degrees F have been recorded. The frost-free period ranges from 140 to 160

days.

The cool-season plants start growth in March and end with plant maturity and seed dissemination about mid-June. Warm-season plants grow from June through September, taking advantage of the moisture and warmth from tropical air out of the Gulf of Mexico. About 40 percent of the total precipitation is received during these summer months. The other 60 percent, received from fall through spring, influences cool-season plants.

The tabular climate summary for this ESD was generated by the Climate Summarizer (http://www.nm.nrcs.usda.gov/technical/handbooks/nrph/Climate_Summarizer.xls) using data from the following climate station:
298294 Shiprock, NM (Period of record = 1926 to 2006).

Table 3 Representative climatic features

Frost-free period (average)	170 days
Freeze-free period (average)	190 days
Precipitation total (average)	230 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 are moderately deep and well drained. They are formed in alluvium derived from quartzite and residuum derived from siltstone. Surface textures include very cobbly fine sandy loam. The subsoil has textures of gravelly fine sandy loam, clay loam, very cobbly fine sandy loam, silt loam, and gravelly sandy clay loam. Siltstone occurs at depths from 31 to 34 inches. Permeability is moderately slow. Available water holding capacity is low. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate. The soils are saline (EC 4-8), slightly sodic (SAR 5-13), and moderately to strongly alkaline (pH 7.9-9.0).

Shiprock SSA:

102 – Blackston – Camac – Rock Outcrop Complex (Camac part)

265 – Camac – Kimbeto – Badland Association (Camac part)

Additional information may be found in Section II of the Field Office Technical Guide.

Table 4. Representative soil features

Surface texture	(1) Very cobbly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow
Soil depth	50 – 100 cm

Surface fragment cover <=3"	30 – 40 %
Surface fragment cover >3"	20 – 30 %
Calcium carbonate equivalent (0-101.6cm)	10 – 20 %
Electrical conductivity (0-101.6cm)	0 – 10 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	10
Soil reaction (1:1 water) (0-101.6cm)	7.9 – 10
Subsurface fragment volume <=3" (Depth not specified)	10 %
Subsurface fragment volume >3" (Depth not specified)	0 – 10 %

Ecological dynamics

This ecological site has a plant community made up primarily of grasses, shrubs, and minor amounts of forbs. In the reference plant community there is a mixture of cool-season and warm-season grasses.

Plant species most likely to invade or increase on this site when it deteriorates are cheatgrass, Russian thistle and other annual forbs, shadscale, and valley saltbush (Castle Valley clover). Continuous livestock grazing during winter and spring decreases the cool-season species and increases lower forage value plants.

The reference plant community has been determined by study of relict areas or areas protected from excessive grazing. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

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	galleta			56-123	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	56-127	–
2	alkali sacaton			6-22	

	alkali sacaton	SPAI	<i>Sporobolus airoides</i>	3-26	-
3	Indian ricegrass			56-123	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	3-26	-
4	sand dropseed			6-22	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	3-26	-
5	Fendler's (red) threeawn			0-6	
	Fendler's threeawn	ARPUF	<i>Aristida purpurea var. fendleriana</i>	0-6	-
6	squirreltail			0-11	
	squirreltail	ELEL5	<i>Elymus elymoides</i>	0-10	-
7	other perennial grasses			0-22	
Forb					
8	perennial forbs			0-11	
9	annual forbs			0-11	
Shrub/Vine					
10	valley saltbush			45-101	
	valley saltbush	ATCU	<i>Atriplex cuneata</i>	43-101	-
11	shadscale saltbush			22-78	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	28-76	-
12	bud sagebrush			0-22	
	bud sagebrush	PIDE4	<i>Picrothamnus desertorum</i>	0-26	-
13	broom snakeweed			0-6	
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0-6	-
14	plains pricklypear			0-6	
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0-6	-
15	other shrubs			0-11	

Animal community

Wildlife: The steep topography provides cover for big game species. Water is not found naturally. Livestock grazing: The steepness of this site severely restricts livestock use. Proper distribution is often impossible to attain, and heavy livestock use occurs in the limited accessible areas. Care should be taken not to overuse this site as recovery will be very slow and erosion will accelerate.

Hydrological functions

The soils are moderately deep and well drained. Permeability is moderately slow. Available water holding capacity is low. Runoff is rapid, and the hazard of water erosion is moderate.

Recreational uses

Hiking, rock hounding, and photography can be enjoyed on this site. The aesthetic appeal is excellent because of the visual effect in contrast to the surrounding topography.

Wood products

This site has no significant value for wood products.

Type locality

Location 1: San Juan County, NM

Township/Range/Section	T31N R19W S26
General legal description	Rattlesnake Quad - 2 miles WNW of Cudei, NM - Navajo Reservation.

Contributors

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Approval

Kendra Moseley, 5/20/2025

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	06/17/2026
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:
