USDA Natural Resources Conservation Service

Ecological site R070AY008NM
Sandstone Breaks

Last updated: 9/12/2023
Accessed: 05/21/2025

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.

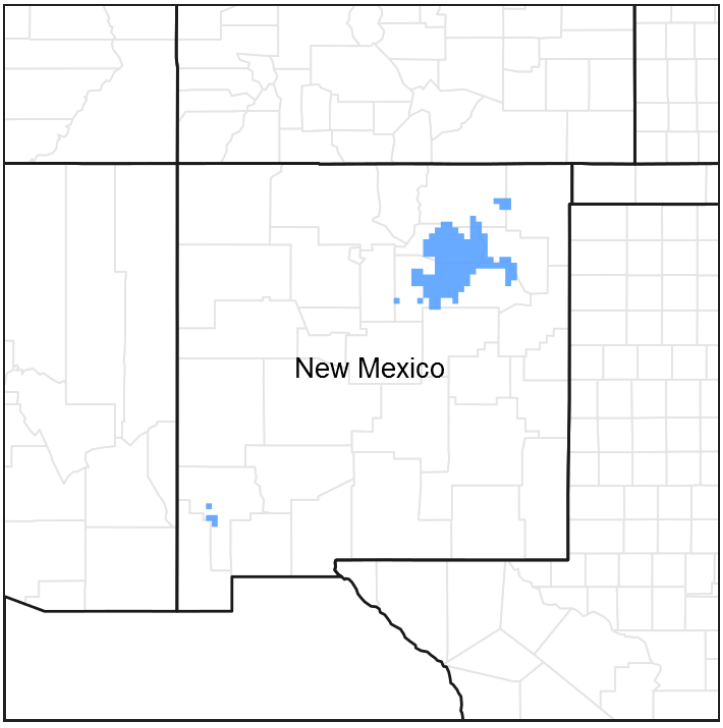

Figure 1. Mapped extent

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

From an old ESD key for MLRA 70A:
15. Slopes usually 35 to 60 percent, but range from 20 to 75 percent. Soils are shallow to deep, with various textures, usually stony. Parent material is sandstone. Vegetation includes little bluestem, sideoats grama, blue grama, hairy grama, common wolftail, spike

muhly, deergrass, piñon ricegrass, switchgrass, needle and thread, wavyleaf buckwheat, wild buckwheat, piñon, juniper, oak, mountain mahogany, fringed sagewort, skunkbush sumac, and cliffrose.

This site correlates to the Mesozoic Canyons and Breaks LRU of MLRA 70A, and to the Shallow Ecological Site Group (GX070A01XESG02).

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Schizachyrium scoparium* (2) *Bouteloua curtipendula*

Physiographic features

Site occurs on steep and very steep slopes and escarpments. The landscape consists of interbedded sandstone, limestone and shale on steep fans, escarpments, scarps mesa cliffs and hill slopes. Slopes are usually 35 to 60 percent but range from 20 to 75 percent. Slopes are on all aspects and vegetation varies with aspect. North and east-facing slopes have lower temperatures and rainfall is more effective than on the south and west-facing slopes. Elevation differences on individual areas range from 150 to 800 feet. This site is a barrier to the movement of livestock. Elevation ranges from 4,000 to 7,000 feet above sea level.

Table 2. Representative physiographic features

Landforms	(1) Escarpment (2) Scarp (3) Erosion remnant
Flooding frequency	None
Ponding frequency	None
Elevation	4,000–7,000 ft
Slope	20–75%
Aspect	Aspect is not a significant factor

Climatic features

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

Precipitation averages 14 to 16 inches. Seventy seven percent of the year’s moisture normally falls during the period of May through October. Practically all of it is brought by brief afternoon and evening thunderstorms. In July and August, normally the wettest

months of the year, one can expect about one day in five when rainfall exceeds one-tenth inch. Early spring precipitation in May benefits the cool-season plants. Winter precipitation, supplying 24 percent of the year's moisture, normally has no more than two days a month with as much as one-tenth inch of moisture. Much of the winter precipitation falls as snow.

Air temperatures vary from a monthly mean of 20 degrees F in January to 69 degrees F in July. Daily high temperatures average in the 80's and low 90's during the summer. Winter low temperatures fall below the freezing mark much of the time from November through March with minimum temperatures approaching 25 degrees F below zero. Dates of the last killing frost may vary from May 9th through May 17th, and the first killing frost from September 27th to October 8th. The frost-free season ranges from 141 days to 153 days from early May to early October.

Wind velocities for the area average 10 to 12 miles per hour and prevail from the south and southwest. Generally, March is the windiest month. Strong winds during the spring cause rapid drying of the soil surface.

Nearby mountains to the west intercept much of the precipitation from the Pacific storms coming through this area during the winter. About 70 percent of the 14 to 16 inches of annual precipitation falls in the form of rainfall during the frost-free season. About 40 percent of the annual precipitation benefits cool-season plants, 50 percent benefits warm-season plants and 10 percent falls during the season of plant dormancy. Relative humidity is moderately low. The sun shines approximately 75 percent of the time.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50 percent 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)	149 days
Freeze-free period (average)	171 days
Precipitation total (average)	16 in

Influencing water features

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

Soil features

Soils are very shallow to shallow. Surface texture are stony sandy loam, gravelly sandy loam, cobbly sandy loam, extremely sandy loam, cobbly fine sandy loam, gravelly silt loam, or channery loam. Subsoil textures are stony sandy loam, gravelly sandy loam,

cobbly sandy loam, extremely sandy loam, cobbly fine sandy loam, gravelly silt loam, or channery loam. Sandstone bedrock is at depths of less than 20 inches. Permeability is moderate. The available water-holding capacity is low. Effective rooting depth is 6 to 20 inches. Air-water relationship is favorable for plant growth. Rock fragments make up 5 to 25 percent of the soil profile and occupy 5 to 25 percent of the surface.

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

Characteristic soils:
Travessilla
Rizozo

Table 4. Representative soil features

Surface texture	(1) Stony sandy loam (2) Gravelly sandy loam (3) Extremely gravelly sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Moderate to rapid
Soil depth	10–60 in
Surface fragment cover <=3"	10–25%
Surface fragment cover >3"	5–15%
Available water capacity (0-40in)	1–4 in
Calcium carbonate equivalent (0-40in)	0–30%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–4
Soil reaction (1:1 water) (0-40in)	7–8.4
Subsurface fragment volume <=3" (Depth not specified)	10–25%
Subsurface fragment volume >3" (Depth not specified)	5–15%

Ecological dynamics

This site has the potential to support piñon-juniper stands, and typically does. Fire does kill

tree species, and has the potential to temporarily convert the plant community to a grassland dominated sideoats grama and little bluestem.

Text from the Grazing Section that is relevant to plant ecology:

Approximately 70 percent of the total annual yield are from species that furnish forage for livestock when accessible. The potential plant community has a large variety of grasses, forbs and shrub species that provide a well-balanced feed and good nutrition for livestock and wildlife. Continuous grazing will cause the plant community to deteriorate and little bluestem, sideoats grama, blue grama, piñon ricegrass, New Mexico feathergrass, and hairy mountain mahogany to decrease. Meanwhile, piñon pine, oneseed juniper, broom snakeweed, threeawns, and ring muhly increase. Sleepygrass will invade the site as the plant community deteriorates.

State and transition model

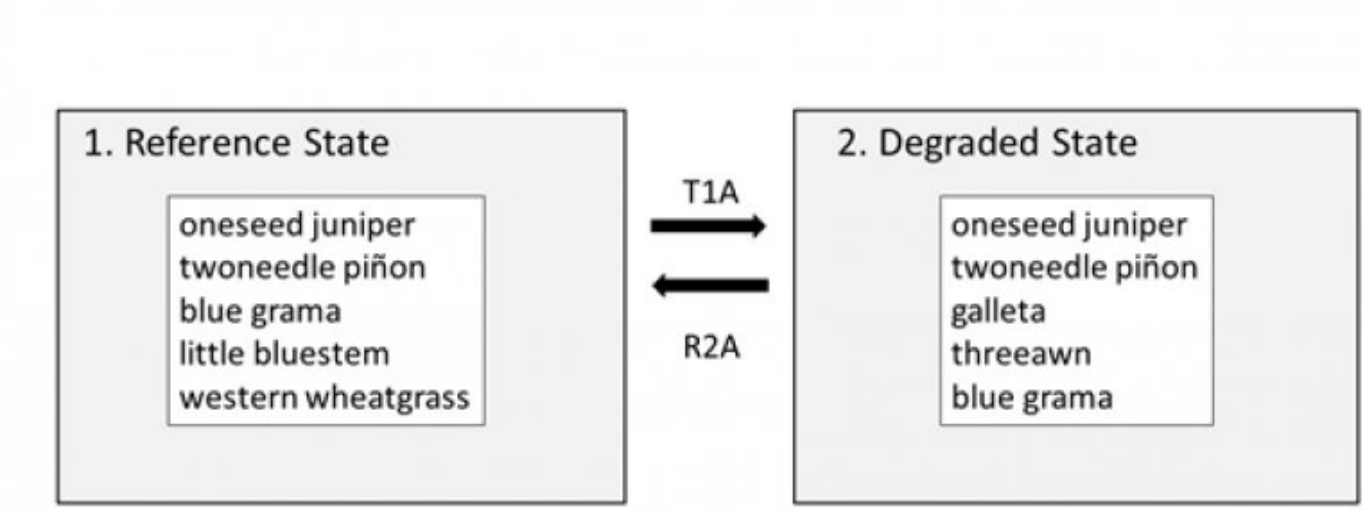

Figure 4. Generalized STM for shallow sites in 70A. Refer to the interactive STM for more site-specific information.

State 1
Reference State

Community 1.1
Reference Plant Community

The vegetation of this site is dominated by grasses but may have the appearance of being dominated by woody species. Warm-season mid-grasses dominate the annual grass

production. Piñon pine, oneseed juniper, oak, and hairy mountain mahogany are the main woody species.

Forest understory. Other grasses that could appear include: threeawn spp., galleta, ring muhly, and bottlebrush squirreltail.

Other shrubs that could appear include: broom snakeweek, choilla cactus, and plains pricklypear cactus.

Other forbs that could appear include: fetid marigold and aster.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	380	570	760
Shrub/Vine	140	210	280
Forb	50	70	100
Total	**570**	**850**	**1140**

Table 6. Ground cover

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

Figure 6. Plant community growth curve (percent production by month). NM3708, R070AY008NM Sandstone Breaks HCPC. R070AY008NM Sandstone Breaks HCPC Grassland with a major component of shrubs and a minor component of forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

State 2
Degraded

Common plants in this state are: piñon pine, oneseed juniper, broom snakeweed, threeawns, and sleepygrass.

Transition T1A
State 1 to 2

Season-long grazing providing little rest and recovery for preferred grazed plants during critical growing periods, coupled with high utilization.

Restoration pathway R2A
State 2 to 1

Restoration pathway resulting from the implementation of prescribed grazing.

Conservation practices

Grazing Management Plan - Applied

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1				180–220	
	little bluestem	SCSC	*Schizachyrium scoparium*	180–225	–
2				180–220	
	sideoats grama	BOCU	*Bouteloua curtipendula*	180–225	–
3				130–180	
	blue grama	BOGR2	*Bouteloua gracilis*	135–180	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	135–180	–
4				30–40	
	common wolfstail	LYPH	*Lycurus phleoides*	27–45	–
5	muhly			30–40	

5	**muwr**			30–40	
	spike muhly	MUWR	*Muhlenbergia wrightii*	27–45	–
6				30–40	
	deergrass	MURI2	*Muhlenbergia rigens*	27–45	–
7				30–40	
	pinyon ricegrass	PIFI	*Piptochaetium fimbriatum*	27–45	–
8				30–40	
	switchgrass	PAVI2	*Panicum virgatum*	27–45	–
9				30–40	
	needle and thread	HECO26	*Hesperostipa comata*	27–45	–
10				30–40	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	27–45	–
Forb					
11				30–40	
	buckwheat	ERIOG	*Eriogonum*	27–45	–
12				30–40	
	Forb, annual	2FA	*Forb, annual*	27–45	–
13				30–40	
	Forb, perennial	2FP	*Forb, perennial*	27–45	–
Tree					
14				90–130	
	juniper	JUNIP	*Juniperus*	90–135	–
	twoneedle pinyon	PIED	*Pinus edulis*	90–135	–
15				45–90	
	oak	QUERC	*Quercus*	45–90	–
Shrub/Vine					
16				30–40	
	hairy mountain mahogany	CEMOP	*Cercocarpus montanus var. paucidentatus*	27–45	–
17				10–40	
	prairie sagewort	ARFR4	*Artemisia frigida*	9–45	–
	Mexican cliffrose	PUME	*Purshia mexicana*	9–45	–
	skunkbush sumac	RHTR	*Rhus trilobata*	9–45	–
18				10–40	

	Shrub, deciduous	2SD	*Shrub, deciduous*	9–45	–

Animal community

Habitat for Wildlife: This site provides habitats which support a resident animal community that is characterized by mule deer, bobcat, gray fox, spotted skunk, eastern cottontail, rock squirrel, pinyon mouse, southern plains woodrat, great horned owl, ferruginous hawk, plain titmouse, brown towhee, scrubjay, western diamondback rattlesnake, and red-spotted toad. The mountain lion hunts through these habitats. There is seasonal use by band-tailed pigeons in years of heavy mast production.

Hydrological functions

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

Hydrologic Interpretations
Soil Series----- Hydrologic Group
Travessilla----- D

Recreational uses

This site has good aesthetic appeal and natural beauty. It has a large variety of plants. It is fair to good for hiking and poor to fair for camping and picnicking. Hunting for deer is good.

Wood products

Some piñon and juniper can be harvested for fence posts and as firewood.

Other products

Grazing:

Distribution of domestic livestock is a problem on this site. All ages and classes of livestock will graze the flatter slopes, leaving the steeper slopes ungrazed. Younger livestock tend to graze the steeper slopes better than the older cows. This site can be grazed during the spring, summer and fall. Approximately 70 percent of the total annual yield are from species that furnish forage for livestock when accessible. The potential plant community has a large variety of grasses, forbs and shrub species that provide a well-balanced feed and good nutrition for livestock and wildlife. Continuous grazing will cause the plant community to deteriorate and little bluestem, sideoats grama, blue grama, piñon ricegrass, New Mexico feathergrass, and hairy mountain mahogany to decrease. Pinyon pine, oneseed juniper, broom snakeweed, threeawns, and ring muhly to increase. Sleepygrass will invade the site as the plant community deteriorates.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index---- Ac/AUM
100 - 76---------- 3.3 – 4.4
75 – 51---------- 4.3 – 6.5
50 – 26---------- 6.4 – 12.6
25 – 0---------- 12.6+

Contributors

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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	05/21/2025
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:

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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:**
